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The "Instant Lessons" of the Iraq War:

Main Report

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The reader should also be aware that this book makes extensive use of reporting on the war from a wide range of press sources, only some of which can be fully footnoted, interviews with serving and retired officers involved in various aspects of the planning and execution of the war, and the extensive work done by Australian, British, and US officers in preparing daily briefings and official background materials on the conflict.

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Index

I. Introduction 9

II. The Limits of Analysis: What We Don't Yet Know 11

III. The Forces Engaged 15

THE CHANGING AND UNCERTAIN NATURE OF FORCE RATIOS: 15
IRAQ'S MISUSE OF ITS FORCE STRENGTH DURING THE FIGHTING 17
FAILURES IN IRAQI LEADERSHIP 18
THE IMPACT OF SEAPOWER 19
THE IMPACT OF AIRPOWER 20
The Size and Nature of the Iraqi Air Force 20
The Size and Nature of the Coalition Air Component 21
The Coalition Application of Airpower 24
Effects Based-Bombing 24
Anything But a Cakewalk 25
LAND-BASED AIR DEFENSES 26
The Iraqi Air Defense Command 27
The Weakness of Iraqi Air Defenses 28
IRAQI AND COALITION LAND FORCES 29
Coalition Land Forces 30
The Size and Capability of Iraqi Forces 32
The Iraqi Land Force Command Structure 33
The Iraqi Manpower Base 33
The Iraqi Land Force Order of Battle 34
The Deployment of Iraqi Land Forces 35
Iraq's Irregular Forces 37
Iraqi Tank Strength 37
Other Iraqi Armored Equipment Strength 38
Iraqi Artillery Strength 38
Other Iraqi Major Land Force Weapons 39
Army Aviation 40
Army Air Defenses 40
Other Qualitative Problems 40
THE PROBLEM OF FUTURE FORCE RATIOS 41

IV. The Course Of The War and the Interaction of Joint Forces 42

THE BEGINNING OF THE CONFLICT: THE DECAPITATION STRIKE AND INITIAL LAND ADVANCE 43
18/19 March: Prelude 43
19/20 March: G-Day 44
INTENSIVE AIR OPERATIONS AND CONTINUING LAND ADVANCES 45
20/21 March 46
21/22 March 47
22/23 March 50
23/24 March 52
24/25 March 53
THE CONTINUING ADVANCE FROM THE SOUTH 54
25/26 March 56
26/27 March 57
27/28 March 58

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28/29 March ... *59*
29/30 March ... *61*
30/31 March: ... *61*
31 March/1 April ... *63*
1/2 April ... *65*
2/3 April ... *67*
3/4 April ... *70*
THE "BATTLE OF BAGHDAD" ... 71
4/5 April ... *73*
5/6 April ... *77*
6/7 April ... *78*
7/8 April ... *80*
8/9 April ... *82*
9/10 April ... *85*
THE END OF THE BATTLE OF BAGHDAD AND MOVEMENT TOWARDS TIKRIT ... 86
10/11 April ... *89*
11/12 April ... *92*
12/13 April ... *96*
THE END OF THE CONFLICT AND THE TRANSITION TO NATION BUILDING ... 96
13/14 April ... *97*
14/15 April ... *98*
15/16 April ... *101*
16/17 April ... *104*
17/18 April ... *107*
18/19 April ... *108*
19/20 April ... *110*
20/21 April ... *111*
NO CLEAN ENDING ... 113

V. The War Plan and Transformation Debate; the "Powell Doctrine" versus the "Rumsfeld Doctrine" Debate; and the "new way of war" debate ... 114

THE WAR PLAN DEBATE ... 114
THE POLITICAL FACTORS THAT MAKE THE "WAR PLAN" DEBATE LARGELY MOOT ... 116
THE PROBLEM OF NOT KNOWING THE DETAILED HISTORY AND NATURE OF THE "WAR PLAN" ... 116
THE "NEW WAY OF WAR" DEBATE ... 120
The Need to Remember the Past ... *121*
The New "New Way of War"? ... *121*
THE "POWELL DOCTRINE" VERSUS "RUMSFELD DOCTRINE" DEBATE ... 124
The Need to Redefine "Decisive Force" ... *125*
The Dangers of American "Triumphalism" ... *127*

VI. Lessons About the Interaction Between Military Fundamentals and New Tactics and Technology ... 129

COMPETENCE, ADAPTIVENESS, AND FLEXIBILITY IN WAR PLANNING: ... 129
SYNCHRONICITY, SIMULTANEITY, SPEED, JOINTNESS, AND COMBINED ARMS ... 130
SITUATIONAL AWARENESS; INTELLIGENCE SURVEILLANCE, AND RECONNAISSANCE (ISR); AND COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE (C4I) ... 131
THE IMPACT OF SPACE WARFARE ... 132
Overall Coalition Superiority ... *132*
Evolving Space into Jointness ... *133*
Space and Communications ... *133*
The Ongoing Evolution of Space ... *134*
Importance of GPS ... *135*

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GPS Jammers and Countermeasures *136*
THE VALUE OF TRAINING, READINESS, AND HUMAN FACTORS 136
The Role of the Reserves *137*
THE VALUE OF TECHNOLOGY: "OWNING THE NIGHT" AND "ALL-WEATHER WARFARE 138
THE IMPORTANCE OF SUSTAINABILITY 139
Airborne Refueling *139*
Logistics and Power Projection *139*
Airlift and Sealift *140*

VII. US and British Lessons More Specific to the Iraq War 142

LESSONS AFFECTING THE OVERALL CONDUCT OF THE WAR AND JOINT FORCES 142
Landpower Reinforced Airpower and Vice Versa *143*
Precision and Focus *143*
Netcentric Warfare, ISR Technology, Processing, Integration, and Near Real Time Information Flow and Targeting *143*
Target Characterization and Battle Damage Assessment *145*
Asymmetric Warfare *146*
Friendly Fire and Casualty Issues *147*
Postwar Review of Force Plans and Transformational Restocking *149*
LESSONS PRIMARILY AFFECTING AIR, MISSILE, AND LAND–BASED AIR DEFENSE FORCES 150
Air Dominance *150*
Effects-Based Bombing: Fundamentally Changing the Effectiveness of Airpower While Limiting Civilian Casualties and Collateral Damage *150*
True All-Weather Precision Air Strike Capability *163*
In-flight and Rapid Targeting and Retargeting: Time Sensitive Strikes *164*
Stealth *166*
Urban Close Air Support is a Reality – Under The Right Conditions *167*
The Value of Expeditionary Airpower and Problems in Allied Readiness, Interoperability, and Modernization *167*
Changes in Air Combat Packages *169*
Hard Target Kill Capabilities *170*
Cruise Missiles *170*
The US of Precision Air Weapons *172*
The Problem of Cluster Munitions *174*
The Bomber and the Advantage of Range-Payload *175*
The Role of the E-8 JSTARS *177*
Unmanned Aerial Vehicles (UAVs) *179*
The Strengths and Weaknesses of the A-10 ..... *182*
The Strengths and Weaknesses of the A-64 Apache *182*
The US Marine Corps Harrier *185*
The US Marine Corps Osprey *186*
Suppression of Enemy Air Defense (SEAD) *186*
The Role of the Patriot Remains Controversial and IFF Problems Emerge *188*
LESSONS PRIMARILY AFFECTING ARMY LAND FORCES 189
The Value of Main Battle Tanks and Heavy Firepower and Armor: *190*
"Precision Artillery" is a Natural Partner to "Precision Airpower" *192*
Special Forces are Becoming a Far More Important Element of Joint Warfare *192*
Urban Land Warfare Does Not Have to Be Fought on Traditional Terms *194*
Try Force the Defender to Maneuver and Move Outside of Cities *195*
Research and Re-research Local Weather and Operating Conditions *195*
The Problem of Allied Power Projection, Interoperability, and Allied Warfighting Capability *196*
LESSONS PRIMARILY AFFECTING MARINE CORPS LAND FORCES 196
The Marines are "Post-Amphibious," and "Post-Littoral Forces" *197*
Detailed Lessons from Marine Forces: The Marine Corps *197*
LESSONS PRIMARILY AFFECTING NAVAL FORCES 205

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Aircraft Carriers: *205*
Cruise Missile Ships *207*
Mine Warfare and Naval Raids *207*
LESSONS RELATING TO WEAPONS OF MASS DESTRUCTION, ASYMMETRIC WARFARE AND INTELLIGENCE 207
Study of the Enemy: *207*
The Need for Better Assessment, Characterization, and Location of Weapons \ of Mass Destruction and Key Delivery Systems *207*
Rapid and Reliable Characterization of Chemical and Biological Agents and Proper Protection Gear/Systems *209*
Organized Searches for Weapons of Mass Destruction in Proliferating Countries *209*
Iraqi Asymmetric Tactics and Links to Terrorism *212*
LESSONS RELATING TO POLITICAL, DIPLOMATIC, AND PSYCHOLOGICAL WARFARE 212
Limited Success in Psychological Warfare *212*
Longstanding Failures in Public Diplomacy *213*
Problems Stemming from the Bush Administration *214*
Broader Failures in the US and British Efforts *214*
The Broader Implications of Cutting Casualties and Collateral Damage: A New Dual Standard and Form of Asymmetric Warfare? *215*
OTHER LESSONS 219
The Role of Women in Combat *219*
Military Medical Facilities and Capabilities: *219*
Safety Becomes a More Critical Issue: *219*

VIII. Iraqi Problems and Shortcomings 221

Iraq Really Was a Tyranny: *221*
Iraq Had Rival, Politicized, Bureaucratic, and Compartmented Forces *222*
Wasting the Best Forces Wastes all the Forces *222*
The Problem of Sanctions and Equipment Modernization *223*
Iraqi Wartime Preparations Emphasized the Wrong Ideology and Psychological Operations *224*
The "Suicide Effect" *224*
Iraqi Command and Control was Never Effective, and Iraq Could Never Recover in the Face of Airpower and the Speed of the Coalition Advance *225*
A Blind Force as Well as One Without a Brain *225*
Iraqi Irregular Warfare Tactics Were Unexpected but More an Irritant than Effective *225*
Misuse of Urban Warfare: *225*
Iraq Failed to Use Its Weapons of Mass Destruction *225*
Iraq Failed to Use Its Missiles Effectively *226*
Failure to Use Water Barriers *226*
Force Protection *226*

IX. The Value of Allies and Build-Up Time 227

X. Grand Strategy: Nation Building and the Challenge of Winning the Peace 230

CONFLICT TERMINATION AND TRANSITIONS 231
LOOKING AT POSTWAR IRAQ: THE INTERNAL POLITICAL FRACTURE LINES 232
Key Political Fracture Lines *232*
Divisions within Divisions *232*
INSIDERS VERSUS OUTSIDERS 234
POLITICAL HERITAGE AND GOVERNANCE PROBLEMS: 234
A SHATTERED MILITARY: RESTRUCTURING THE SECURITY AND MILITARY FORCES WILL PRESENT BOTH REGIONAL AND INTERNAL PROBLEMS: 235
SADDAM'S EXPLOITATION OF TRADITIONAL TRIBAL CHIEFS AND LEADERS, ESPECIALLY OUTSIDE THE LARGE CITIES AND IN THE MORE ISOLATED SOUTH AND WEST. 235

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LOOKING AT POSTWAR IRAQ: HOW ITS POLITICAL FRACTURE LINES INTERACT WITH ITS NEIGHBORS . 236
LOOKING AT POSTWAR IRAQ: IRAQI DEMOGRAPHIC FRACTURE LINES 237
LOOKING AT POSTWAR IRAQ: IRAQI ECONOMIC FRACTURE LINES 237
Economic Strains and Weaknesses 237
Debt, Reparations, and Contingency Contracts..... 238
LOOKING AT POSTWAR IRAQ: IRAQI ENERGY AND OIL EXPORT FRACTURE LINES 240
Iraqi Oil Development Needs..... 240
Contingency Contracts Signed Under Saddam..... 241
The Ethnic Fracture Lines of Oil Development and Control..... 242
The Fracture Lines of Oil and Gas Exports..... 242
THE FRACTURE LINES OF DISARMAMENT AND REBUILDING IRAQI MILITARY FORCES..... 244
THE LESSONS OF PEACEMAKING AND NATION BUILDING 246

XI. Grand Strategy: The Outcome of the Iraq War and the New, Old, Middle East..... 249

AN EXAMPLE OF WHAT? 249
ISRAEL AND THE SECOND INTIFADA 250
IRAN 250
SYRIA 251
TURKEY..... 252
SAUDI ARABIA AND THE SOUTHERN GULF STATES 252
JORDAN 253
EGYPT 254
NORTH AFRICA..... 254
ISLAMIC EXTREMISM AND TERRORISM..... 254
THE US ROLE AND PRESENCE IN THE REGION..... 255
ENERGY IMPORTS AND ENERGY SECURITY 255
THE UNDERLYING FACTORS THAT SHAPE THE NEW OLD MIDDLE EAST..... 256

Annexes 258

Iraq Before the Gulf War and at the Start of the War –I..... 259
Iraq Before the Gulf War and At the Start of the War II..... 260
The Iraqi Order of Battle of Regular Army, Republican Guard, Special Republican Guard, Paramilitary and Popular Forces at the Start of the War 261
Iraq's Capability for Popular Mobilization..... 263
Security Services that Might Support the Armed Forces and Help to Ensure Their Loyalty..... 264
Delivery Systems..... 270
Chemical Weapons..... 277
Biological Weapons 281
Nuclear Weapons..... 287
The Iraqi Top 55: The Iraqi Leadership Figures Most Wanted by USCENTCOM..... 291
US Forces in the Gulf At the Start of the War: A Rough Working Estimate..... 292
Task Force Ironhorse (US Forces Originally Planned for Turkey, Deploying to Gulf from Early April On) 305
British Forces in the Iraq War as Reported by the British Ministry of Defense 306
Australian Forces in the Iraq War in Operation Falconer as Reported by the Australian Ministry of Defense..... 310
Polish Forces in the Iraq War..... 312
US Airpower in Recent Regional Conflicts..... 313
America's Involvement in Past Wars and Casualties 314
Total Direct Cost of Major Past Wars..... 315
The House of Representatives and..... 316
CBO Cost Estimate of the Cost of an Iraq War 316
The Oil Costs of the War (Pessimistic View) George L. Perry Estimate of Cost of War in Terms of Oil Supply Disruption 317

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Total Cost to the United States of a Potential War in Iraq (in billions of 2002 dollars) Under Best and Worst Case Assumptions *318*

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I. INTRODUCTION

It is important to begin this analysis with an admission of ignorance. It is almost as arrogant to rush to judgment on the lessons of a war before all the data on military operations become available as it was to rush out and judge the war plan before the success of Coalition operations became apparent. History is filled with efforts to make instant judgments about the lessons of war that ultimately proved to be based on false information and assumptions.

War is extraordinarily complex and uncertain. It is all too easy to oversimplify the lessons of training, tactics, technology, and strategy; and find dominant themes. Even when these themes are correct, however, the impact of complex mixes of less important factors can often be cumulatively critical to a realistic understanding of what has actually occurred and its lessons for the future.

"Instant history" is an oxymoron. As the following chapter notes, there is much that is still unknown about the Iraq War. The details of the diplomatic interactions between governments that shaped the prelude to the war are known in broad terms, but scarcely in detail. The debates that shaped US, British, Australian and Iraqi war plans are largely unknown -- except for some controversial press reports on US plans.

Little is known about the build-up of US and British forces except for nominal data on force deployments, and little is known about the details of the Iraqi preparations for war. One key issue that cannot yet be addressed is how much of the Iraqi defeat was the result of the war plan, technology, tactics, and readiness of coalition forces, and how much the result of the mistakes made by the Iraqi leadership and the weaknesses of Iraqi forces. Both sets of factors are clearly involved, but far too little information is as yet available on the Iraqi side of the war to make clear judgments.

Chapter III does describe the history of the war using data based largely on official statements issued by the Department of Defense, the US Central Command (USCENTCOM), the British Ministry of Defense, and Australian Ministry of Defense. However, these data are drawn from wartime reports and not from the kind of meticulous historical research that war after war has shown is necessary to get an accurate picture of combat history.

Many of the key details of combat which could allow clear judgments to be made about given tactics, the interaction of combined and joint arms, and the impact of given weapons and technology are not yet available. Military history has shown again and again that any detailed lessons of war need extensive validation and that even the observations of the commanders and warrior most deeply involved can be wrong.

More generally, there are broader lessons to be drawn from the Iraq War that this book does not attempt to address. The road that led to the war must eventually involve a systematic reassessment of the way in which the Gulf War was terminated in 1991, the process of containment and confrontation that followed, and the public and private diplomacy that helped shape both the political struggles between 1991 and the Iraq War.

The problems that led Turkey to refuse to base US and British forces and the success the US and Britain had in dealing with friendly Gulf states like Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia need detailed analysis. There is a need to better understand the

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attitudes of the Iraqi people towards Saddam Hussein's regime and Coalition forces at the start of the war and as the war progressed.

As the final chapters to this book suggest, it is far too soon to judge critical aspects of the grand strategic outcome of the war. It is clear that military victory is only meaningful to the extent that it is a prelude to successful nation building in Iraq but it will be years before it is clear just how successful the coalition effort will be and what kind of Iraq will emerge from the ashes of Saddam Hussein's dictatorship. It is also unclear what the regional and global impact of the Iraq War will be. It seems unlikely that the war will really reshape the Middle East for either good or ill but it will certainly have a grand strategic impact and this impact remains unclear.

Nevertheless, some "lessons are worth raising, if only to reiterate the importance of military fundamentals and the impact of long-standing developments in US and British forces. Others are worth raising, simply to broaden the debate to come and avoid a "sound bite" approach to analyzing the lessons of war.

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II. THE LIMITS OF ANALYSIS: WHAT WE DON'T YET KNOW

One of the more striking aspects of the Iraq War is that the US and British commands issued far fewer "facts" about the conduct of the war and performance of weapons during the actual conflict than in the previous conflict. Very few data were provided on one of the most critical aspects of the war – the air and missile campaign – although the US Air Force has since provided significant data on the size of the forces and military effort.

At the same time, the information issued by the Iraqi government were so decoupled from reality that the statements of the Iraqi Ministry of Information bordered between tragic-comedy and an international practical joke. At the same time, Coalition forces encounters mixes of Iraqi forces that involved new irregular elements like Saddam's Fedayeen and new asymmetric tactics, and the successes and failures of their new force mixes and tactics may take a year or more to fully characterize.

The basic course of the fighting is clear, and the history of the war that is provided in the Chapters IV is drawn largely from USCENTCOM briefings and materials developed by the British Ministry of Defense, There are no sweeping controversies over the outcome of individual battles, or over many of the strengths and weakness in Coalition and Iraqi forces.

Nevertheless, many patterns of events are not yet clear, and the devil often lies in the details. For example, the general merits of precision-guided weapons are clear. What is not clear is how reliable, accurate, and destructive given weapons have been, how good the targeting was, how well they were employed, and how they altered the nature of joint warfare and traditional balance between forces.

The same uncertainties surround such key interactions as the changes made in the organization and technology used in the rapidly evolving command and control, communications, computer, intelligence, and strategic reconnaissance systems used in the war. The broad merits of these changes are clear. The details are invisible.

At a broader level, it is all too easy to focus on the most dramatic changes in tactics and technology, but there is no clear way to weigh what is known about these changes to the impact of fundamentals like military professionalism, training, readiness, sustainability, and logistics. It seems likely that the Coalition had an advantage in military professionalism that would have allowed it to win, albeit more slowly and with far more casualties, if it had had to fight with the technologies it had in the Gulf War. It is far from clear that it could have won if the emphasis US and British forces play on military professionalism had been lacking and the coalition had placed its primary reliance on advances in tactics and technology.

Other key areas of ignorance include:

- There are no few damage assessment data on the impact of firing some 800 Tomahawk and 100 CALM cruise missiles, and some 17,000 precision guided munitions and 8,500 unguided weapons as of April 11th. (USCENTCOM reports some 65% precision strikes versus 7% for the first Gulf War. Reports of 90% versus 10% definitely do not fit the facts to date.)[1] Data on the use of new

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concepts of precision warfare, like the first uses of the new Sensor Fused Weapon -- the first guided area weapon -- are not available. [2]

- There are few data on the nature of reinforcements between the start of the war and April 9th, aside from the movement of the 173rd Airborne Brigade into the North and rushing elements of the 2nd Armored Cavalry Regiment into the south to protect the logistic lines there. Some 62,000 men and women were moved by air, however, between the start of the war and April 6th.
- The history of battles and clashes laid out in Chapter IV described the dynamics of the fighting but not the scale of individual battles or the nature of the forces on each side. In many cases, intelligence analysis did not support initial estimates of the size of the Iraqi forces involved or their unit identification and mix of combat elements. Little or no data are available on the effectiveness of given elements of US and British joint forces and their interactions.
- It is particularly difficult to trace the interaction between land and air forces, the extent to which land action force Iraqi into exposed maneuvers, and the extent to which air strikes attrited the Iraqi land forces before they could engage Coalition forces. Anecdotal accounts to date do indicate that maneuvering Iraqi forces often took so much damage from the air that they could not close cohesively on Coalition ground forces.
- It is clear from the history in Chapter IV that Special Forces and ranger forces played a major role in the fighting throughout Iraq. It is clear that the new interactions between Special Forces, precision airpower, and advanced ISR systems demonstrated during the Afghan conflict are redefining the role of Special Forces, but many key details are not available.
- Less is known about the fighting in the West and the North than the fighting in the South and Central Iraq, in part because much of this fighting involved elements of Special Forces, operations with elements of the Iraqi opposition, and operations by relatively small forces like the 173rd Airborne Brigade – all of which required a high degree of wartime operational secrecy.
- Much of the combat outside Baghdad, and during the clashes on the way to Baghdad, seems to have occurred in terms of air strikes against Iraqi ground targets and in the form of helicopter and artillery engagements. There are few data on the nature of this "beyond visual range" combat.
- The role of "precision artillery" and helicopters is as hard to characterize as targeting and BDA for fixed wing aircraft.
- Any effort to characterize the intentions, capabilities, and nature of the Iraqi leadership from night one onwards, and the rate of decline in Iraqi C4I capabilities during the war, must have a high degree of speculation.
- The outcome of the war and the fact that Iraqi ground forces were decisively defeated is clear. So is the fact that most of the Republican Guards lost their bulk of their major weapons during the fighting and could not continue to fight. The fate of individual elements of the Republican Guards during the fighting is not

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clear. The detailed nature of operations by Iraqi regular army forces, and impact of the strikes and battles against them, is even less clear.

- There are only rough data available on the role and mix of Iraqi Special Republican Guards, Republican Guards, regular army, Fedayeen, Popular Army, and other forces in given battles and clashes, and of exactly what Iraqi forces were involved in the attacks conducted by Iraq's irregular and asymmetric forces. The Fedayeen Saddam are often give credit for battles where other irregular Iraqi forces may have been involved.
- Few meaningful data are as yet available on Iraq's capability and plans to use weapons of mass destruction and only minimal data are available on its missile operations. It is possible that Iraq destroyed much of its weapons before the war in an effort to conceal them from UNMOVIC, and had adopted a strategy of focusing on development and creating dual use facilities that could later be used for production once UN sanctions were lifted. At this writing, such conclusions remain speculative.
- The full nature of Iraqi plans and tactics to use its ground-based air defenses are unclear, as are the scale of Iraq's use of surface-to-air missiles and AA guns and the deployment of these forces.
- There are no data to confirm exactly why the Iraqi air force was totally passive. The impact of the Gulf War, the inability to contest the "No Fly Zones" in the years that followed, and the massive superiority of Coalition airpower explain why the Iraq Air Force had few practical prospects, and may have felt it could engage or survive successfully in combat, but this still does not explain its total lack of activity.
- It is clear that the US dropped some 50 million leaflets between October 2002 and April 11th, but the full scale of psychological warfare operations remains unclear, as doe the nature of Us efforts to deny Iraqi capability to communicate.
- There are few data on Iraqi plans and capabilities to conduct acts of terrorism, try to bring Israel into the war, or use asymmetric warfare beyond its actions in the cities in the south and use of the Fedayeen, and other irregulars.
- It is still unclear why so many massive weapons caches of conventional weapons have been found in various cities, and whether Iraq planned for a much larger role for the Popular Army and mass volunteers than was ever possible and/or planned for "stay behinds" and conflict after the fall of the regime. It seems most likely that the regime of Saddam Hussein planned on the massive mobilization of the Popular or Al Quds Army and that most Iraqis pressed into service in this force never showed up. The facts, however, remain unclear.
- The Iraqi regime's overall defensive plan for Baghdad is unclear because it failed so quickly that it is not possible to fully characterize Iraqi intentions.

Many of these data normally become available over time, but it is important to note that the truth is often complex and validating military lessons can takes and requires a great deal of objectivity. Far too often, "lessons" consist of arguments for a given strategy,

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force plan, tactic, weapon, or technology. Evidence is selected to suit a given argument and alternative data are ignored. So is the fact that key data often simply never do become available. This study is in many ways a guide to issues that it will take years to resolve.

As a final, and perhaps most import caution, even a perfect understanding of the lessons of the Iraq War does not mean these lessons can easily be applied to the next. The US and Britain may have developed a form of coalition and joint warfare more advanced than the capabilities of any other powers. As the next two chapters show, however, they faced a unique enemy in Iraq and one with many weaknesses. Prudent risks in fighting Iraq could prove to be remarkably imprudent in dealing with an enemy like North Korea, and other power may prove to be far more effective in asymmetric warfare. Learning from history never means that it can be repeated.

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III. THE FORCES ENGAGED

The Iraq War was an asymmetric war in several senses of the term. Iraq made extensive use of irregular forces and unconventional warfare techniques ranging from the use of its cities as sanctuaries for raids by light armed paramilitary forces like Saddam's Fedayeen to the use of it suicide bombers. It used some forces in civilian dress and may have attempted to disguises others by making them look like they were wearing US uniforms. The fundamental asymmetry, however, lay in the radically differences in capability between Iraq forces and those of the Coalition in technology, training, and readiness, and in Iraq's lack of joint warfare capability against American and British forces that had a degree of "jointness" that had never been approached in any previous war.[3]

The Changing and Uncertain Nature of Force Ratios:

The Iraq War did not make force ratios meaningless, but it did demonstrate that traditional comparisons of force numbers can be virtually meaningless in shaping the outcome of modern joint warfare. Iraq was still a major military power by regional standards and had over 400,000 conventional paramilitary troops in its order of battle.

The total forces committed by the Coalition actually outnumbered the Iraqis. A USAF database shows that nearly 30% of all active duty US military personnel were committed in some way to Operational Iraqi Freedom, plus 40,397 reservists. The same database shows a total of 42,987 active Coalition personnel, including 40,906 from Britain, 2,050 from Australia, and 31 from Canada.[4] The detailed break out reported by the USAF is as follows:

Total Personnel Deployed	466,985
USAF (10 Apr 03)	54,955
Reserve	2,084
National Guard	7,207
USMC (20 Apr 03)	74,405
Reserve	9,501
USN (5 Apr 03)	61,296 (681 are USCG)
Reserve	2,056
USA (17 Apr 03)	233,342
Reserve	10,683
National Guard	8,866
Coalition	42,987
British	40,906
Australian	2,050
Canadian	31

No similar databases is available on the forces actually deployed forward into combat. However, press estimates indicate that Iraq's total of roughly 400,000 compared with a total of some 231,000 service men and women in US forces, but only 130,000 were in Kuwait. Another 8,500 were in Saudi Arabia, 8,300 in Qatar, 3,400 in Oman, 5,500 in Bahrain, 1,400 in the UAE, 750+ in Diego Garcia, and 50,000 afloat. The British had approximately 45,000, the Australians approximately 2,000, and the Poles approximately 180.

Iraq still had major holdings of armor and artillery, a significant air force, and extensive ground-based air defenses. If it had fought some combination of regional opponents, it

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would probably have been far more effective and might have well won any defensive battle.

From a joint warfare perspective, however, Iraq had only limited capability. It had no meaningful navy and lacked an Air Force than could survive in the face of Coalition airpower. It had poor combined armed capabilities, and much of its order of battle was designed more for regime security than war fighting. Many Iraqi combat elements were better at watching each other, and at suppressing the Iraqi people, than fighting a foreign opponent.

Iraq had some successes in using irregular forces and in asymmetric warfare, but it failed to make effective use of its strategic geography and organize its forces effectively in spite of more than a year of strategic warning. In retrospect, the surprise that limited numbers of loyalists like the Fedayeen Saddam achieved in controlling cities in the south and attacking US forces and lines of communication in surprise raids disguised serious problems in Iraq's effort to organize for asymmetric warfare.

Iraq sought to create a massive Popular Army with a paper strength of some seven million and the goal of arming one million men. Had this force become real, it might have given Saddam Hussein's regime the ability to create massive popular defenses of Iraqi cities, create a "fortress" of defenses in depth around Baghdad, and conduct far more successful asymmetric fighting.

Arms caches were found throughout Baghdad and in many parts of the country that indicate the regime though it could actually mobilize and arm such a force. There were also many revetments and defensive points around Baghdad, including oil-filled trenches that the regime lit early in the war.

In broad terms, however, the regime created a Popular army that never showed up. As a result, Iraq's paramilitary forces were never strong enough to truly challenge Coalition capabilities, although they achieved significant tactical surprises in some clashes in the south and did force the US to devote forces to urban fighting and securing its lines of advance.

Iraq left virtually all of its regular forces deployed in their normal peacetime positions. The bulk of its armed forces were in the north and east at the start of the fighting. Moreover, they were deployed largely in forward areas against Iran and near the Kurdish Security Zone. It may be that Iraqi decision-making was heavily influenced by a debate in the UN that convinced it that the US, Britain, and Australia could not go to war for political reasons.

It may be that it waited until the last moment to see if Turkey would permit the US to deploy a second front through Turkey that could attack Iraq through Mosul and create a major threat in the Kurdish Security Zone. In any case, all of the Iraqi forces in the north were left largely in their peacetime positions when the Coalition attacked. Only one Republican Guard Division executed major movements to strengthen the defense of Tikrit and Baghdad and it was left in the north.

Iraq dispersed its Air Force in order to preserve it without any apparent concept of using it in military operations. It seems to have calculated, as a result of the Gulf War and more than a decade of encounters in the Northern and Southern "No Fly" Zones, that the Iraqi

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Air Force simply could not survive in air combat. If it had any concept of air operations like last ditch or suicide raids, such strikes were never implemented. There is no way as yet to determine the exact cause, but it seems likely that this was the result of years of defeat and weakness, a command decision, and the impact of Coalition air strikes. The key unknown is whether the Iraqi air Force ever intended to, or was order to, fight and if so, what happened?

Iraq's Misuse of Its Force Strength During the Fighting

Once the war began, Iraq could only maneuver in the face of massive assaults by Coalition precision airpower that could locate all major armored movements using sensors like the E-8 JSTARS, strike during any time of day and in most forms of weather, and either paralyze movement or exact a high price in terms of disruption and attrition. In broad terms, the regular army never moved and the Republican Guards units in the north paid an extremely high price for moving south to try to defend the southern approaches to Baghdad.

Similar problems emerged in the south. When the war began, Iraq did have some regular army forces defending the approaches to Baghdad along the Euphrates and Tigris, but a large number were still in their peacetime positions and concentrated on the Iranian border. The Republican Guards units in the south had some elements forced but were still largely postured in their peacetime positions around Baghdad, rather than dispersed and prepared for defense in depth.

No cohesive prewar effort was made to create a defense in depth of Baghdad or to protect the lines of advance up the Euphrates. While one division was moved from the area around Mosul to the area around Tikrit, Iraq's Republican Guards only began to move to position themselves where they could oppose the US advance from the south once the war began and they were exposed to Coalition airpower. The Republican Guards then moved largely in response to the Coalition advance, and had to fighting largely in the form of scattered meeting engagements rather than as part of a coherent defense in depth. In many cases, they intermingled their brigade elements with scattered elements of Regular Army forces and paramilitary units in ways that made well-organized defensive action difficult or impossible and compounded the impact of Coalition strikes on Iraq's weak command and control capabilities.

There was no real effort to prepare the regular army in the south for defense in depth. The coalition seems to have successfully subverted the Iraqi 51st Mechanized Division in Basra to the point it disrupted the defense of Basra. It largely bypassed the Iraqi regular army corps defending the Iranian border, although elements of this corps did move to challenge the 1 MEF advance on Al Kut.

The remaining elements of the other regular army corps in the south attempted to maneuver to defend the lines of attack up the Euphrates, but never could keep up with the V-Corps advanced up the western side of the river, which was left largely undefended except for paramilitary elements in the cities along the route – most of which could be bypassed.

There was heavy fighting for the key road junctions around Nasiryah, and the 1 MEF forces had to fight f their way through Iraqi regular army units on the way from Nasiryah

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to Al Kut. In virtually every case, however, Iraqi forces had to maneuver and expose themselves to air attack to close on the advancing US forces, moved far too slowly to improvise a cohesive defense, fought at the small unit element level, and suffered mass attrition from Coalition air attacks.

As the next chapter describes, Iraq never succeeded in exploiting its water barriers with any meaningful success, left major gaps in its defenses of the Karbala Gap and southwestern approaches to Baghdad, could not improvise an effective defense of the road from Al Kut to Baghdad in the east. It also continue to committed its Republican Guards piecemeal to the defenses of the approaches to Baghdad against both V Corps and the 1 MEF in ways which largely destroyed them and deprived the regime of the ability to create a cohesive defense of the city.

Failures in Iraqi Leadership

It is impossible at this point to determine why the regime of Saddam Hussein failed to act decisively in so many ways, including why it never made effective use of any missiles and chemical and biological weapons it retained. The end result, however, was that the Coalition forces achieved a high degree of both strategic and tactical surprise. Much of what Iraq did, however, greatly enhanced the advantages the coalition had in joint warfare, and allowed the US to exploit Iraq's own strategic geography in ways that denied Iraq the ability to develop a cohesive defense in depth.

The almost universal failures in Saddam Hussein's strategic leadership cannot be explained as the result of ignorance or "shock and awe." The Iraqi regime had already lost one war to a US led- Coalition and joint arms. It had seen what the US and Britain could do in some twelve years of postwar clashes and in the fighting in Afghanistan. The broad details of the Coalition build-up were fully revealed in the media during the months of debate within the UN, and so were many of the details of the Coalition war plan.

If there are excuses for the failures of the Iraqi leadership, they could include:

- The belief that the UN debate would paralyze the ability of the Coalition to take military action.
- Belief that Turkey's decision not to base Coalition land and air forces would delay or prevent military action while still leaving enough uncertainty regarding Turkey's ultimate intentions so that Iraq left its forces in the north.
- Belief that a Popular Army could be mobilized that did not in reality exist.
- An inability to support and sustain most forces outside their peacetime casernes and bases that force Iraq to wait to deploy them until the war began.
- An inability to translate a theoretical knowledge of Coalition joint warfare capabilities into practical estimates of the lethality of Coalition airpower, Coalition rates of maneuver, and Coalition capability to disrupt Iraqi movement capability and command and control capability once the war began.
- An unrealistic faith in unconventional and asymmetric warfare, and the impact of delay, deception, and potential casualties on the willingness of the US and Britain to sustain the war.

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- A worldview that mixed the cult of the leader with an inability to realistically assess the strengths and weaknesses of Iraqi forces.
- A series of actions to conceal and destroy Iraq's weapons of mass destruction in the face of UNMOVIC that continued virtually until the war began, and meant Iraq could never make effective use of any weapons that remained,

All that said, it is difficult not to draw the conclusion that one of the major asymmetries in the military balance at the start of the war and during it is that the Coalition had highly effective leadership and Iraq was led by a military jackass.

The Impact of Seapower

The Coalition had a near monopoly of seapower. Iraq had a small 2, 000-man navy with nine small, obsolete or obsolescent combat ships and an unknown number of mines and Silkworm land-based anti-ship missiles.[5]

The US had five carrier task forces, two amphibious task forces, and a total of 47 major surface ships, 12 submarines, and extensive additional support ships. These included roughly one-third of the total in the US Navy. There were some 70,000 sailors and airmen deployed in the region. The US Navy was able to sustain sorties from roughly 65 combat aircraft per carrier, and launch some 700 sea-based cruise missiles. At the same time, naval forces provided warning and air defense assets, and radar support to the operation of the Patriot as a missile defense system.[6]

The British Royal Navy had a Naval Task Group with some 4,000 men, The task force was headed by aircraft carrier HMS Ark Royal, accompanied by helicopter carrier HMS Ocean, destroyers HMS Liverpool, HMS Edinburgh, HMS York, an unidentified nuclear-powered submarine and 11 other support ships. The amphibious force deploying with the ships and included the 40th Commando Royal Marines, 42nd Commando Royal Marines, Headquarter 3rd Commando Brigade and helicopter air groups aboard Ark Royal and Ocean.[7]

The Royal Australian Navy deployed the frigates HMAS Anzac and Darwin in the Persian Gulf and the sea transport ship HMAS Kanimbla, which carried about 350 sailors and soldiers, a Sea King helicopter, Army landing craft, an Army air defense detachment and a specialist explosives ordnance team. [8]

The end result was that US, Britain, and Australia not only had total domination of the sea, but could operate carriers and cruise missile launch ships from virtual sanctuary. Moreover, Iraq had been effectively "landlocked" ever since the summer of 1990, shortly after its invasion of Kuwait, by UN sanctions that denied it the ability to import arms, military supplies, and many dual use items. Iraq's chief source of export income was under UN control as were the items it imported. While it did smuggle out oil through Turkey, Iranian waters, and Syria – and smuggled in some arms and military spare parts through Syria – Iraq not only had lost access to the sea but to the land for most military purposes, and its overall military modernization and sustainability efforts had been crippled for more than a decade.

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The Impact of Airpower

The Coalition did not have the same dominance in airpower in terms of sheer numbers. Nevertheless it had a nearly infinite force ratio in terms of military effectiveness. The Iraqi Air Force never flew a combat mission.

The Size and Nature of the Iraqi Air Force

As has been discussed earlier, the total passivity of the Iraqi Air Force is still difficult to fully explain. It dispersed and took shelter and stayed passive for the entire war, but this was scarcely inevitgable. The Iraqi Air force had around 20,000 men when the war began. It still had some 316-325 combat aircraft, although only about 50-60% were servicable. Senior pilots still flew 60-120 hours a year, depending on the aircraft, although most pilots flew as few as 20.[9]

There are no reliable estimates of Iraq's exact air strength. The IISS estimates that the Iraqi Air Force force had 6 obsolete H-6D and Tu-22 bombers, and 130 attack aircraft. These included Mirage F-1EQs, Su-20s, 40 Su-22s, 2 Su-24s, and 2 Su-25s. Iraq still had extensive stocks of short-range air-to-ground missiles and cluster bombs. It also had 180 air defense fighters, including 12 MiG-25s, 50 Mirage F-1EQs, and 10 MiG-29s, plus 5 MiG-25 reconnaissance aircraft. Additionally, the air force had extensive stocks of MiG-21s, training aircraft, and drones, and had experimented with using them as unmanned aerial vehicles (UAVs) and unmanned combat aerial vehicles (UCAVs). It stlll had 2 IL-76 tankers and large numbers of transport aircraft.

Jane's provides a different estimate with the following key combat types; the number estimated to be in service are shown in parenthesis: 40(0) F-7, 30 (13) Mirage F-1EQ, 36 (15-25) Mig-21, 35 (15-20) Mig23, 6 (3-6) MiG-25, 17 (1) Mig-29, 33 (15-18) Su-20/22, 21 (6-11) Su-25, 2 T-22, and 3 Tu-16.[10]

The Iraqi Air Force's key holdings seem to have include a total inventory of 255 fighters and fighter bombers, and some 80 trainers -- some of which are combat capable.[11] Iraq's total holdings seem to include a total of 130 J-6, MiG-23BN, MiG-27, Mirage F-1EQ5, Su-7, Su-20, and Su-25 attack fighters; 180 J-7, MiG-21, MiG-25, Mirage F-1EQ, and MiG-29 air defense fighters; MiG-21 and MiG-25 reconnaissance fighters, 15 old Hawker Hunters, a surviving Il-76 Adnan AEW aircraft, 2 Il-76 tankers, and large numbers of transports and helicopters. Estimates of its total surviving inventory by aircraft type vary by source, but Iraq probably retained about 30 Mirage F-1s, 15 MiG-29s, 50-60 MiG-23s, 15 MiG-25s, 150 MiG-21s, 25-30 Su-25s, and 60 Su-17s, Su-20s, and Su-22s.

Although it is unclear how many air munitions Iraq retained after the Gulf War, some estimates put this figure far below 50% of the pre-war total. Iraq, however, retained significant numbers of modern air-to-air and air-to-ground munitions. These stocks included AA-6, AA-7, AA-8, AA-10, Matra 530, Matra 550, and Matra Super 530 air-to-air missiles, and AM-39 Exocet, HOT, AS-11, AS-12, AS-6, AS-14, AS-301, AS-37, C-601 Silkworm; air-to-surface missiles; laser-guided bombs, and Cluster bombs.

Iraq deployed Matra Magic 2 "dogfight" air-to-air missiles on its Mirage F-1s after the Gulf War. This was virtually its only major improvement in air force equipment since 1990. It is not clear whether these missiles were delivered before the war, were stolen

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from Kuwait, or have been smuggled in before the Coalition attack. They are an advanced type similar to the more advanced export versions of the US AIM-9, with high energy of maneuver and a maximum range of three nautical miles.[12]

Iraq retained large numbers of combat-capable trainers, transport aircraft and helicopters, and remotely piloted vehicles. The trainers included some Mirage F-1BQs, 25 PC-7s, 30 PC-9s, 50-60 Tucanos (EMB-312s), 40 L-29s and 40 L-39s. Transport assets included a mix of Soviet An-2, An-12, An-24, An-26, and Il-76 jets and propeller aircraft, and some Il-76s modified to act as tankers. The remotely piloted vehicles (RPVs) included some Iraqi-made designs, Italian designs, and Soviet designs. It is unclear how effective Iraq was in using any of these RPV systems, but it did make limited use of them during the Gulf War.[13]

An air force, however, is not measured by its strength on the ground, or how many aircraft it can park. Iraqi Air Force air-to-air and air-to-ground training was limited and unrealistic. Its command and control was over-centralized and its mission planning often set impossible goals. The two "No Fly Zones" further limited air training and comat experience. It had no modern airborne sensor, command and control, or intelligence capabilities, other than a small number of UAVs. Its air control and warning was still heavily dependent on outdated ground-based intercept capabilities.

The Iraqi Air Force had, however, practiced penetration raids by single low-flying aircraft, and had shown that it could conduct independent offensive operations at the small formation level. Iraq had repaired many of the bases and air facilities that were destroyed or damaged during the Gulf War. It had 16-20 major air bases, with H-3, H-2, and Al Asad in the West; Mosul, Qayarah, and Kirkuk in the north, Al Jarah, Talil, and Shaybah in the South, and 5-7 more bases within a 150-kilometer radius of Baghdad. Many of these bases have surface-to-air missile defenses. It could have at least disrupted and delay Coalition air operations for a while, although at a terrible cost in pilots and aircraft.

The Size and Nature of the Coalition Air Component

The US, in contrast, built-up to over 1,000 aircraft in theater before the war began, and utilized 1,663 fixed wing aircraft at the peak of the fighting, including virtually every type in US inventory.[14]

According to USCENTCOM, the US Air Force had 37,000 service members directly assigned to the Iraqi build-up, Operation Northern Watch, and Operation Southern Watch on March 17,with 300 fighter-bombers; 70 C2, surveillance and electronic warfare aircraft; 80 special operations and rescue aircraft; 160 tanker aircraft; and 120 airlift aircraft, for a total of 730. These did not include aircraft in Diego Garcia or the UK. The US Navy added another 425 planes, with 250 "shooters" and 175 other, and the US Marine Corps add 75 more aircraft.

According to the US Air Force, the USAF had a peak total of 863 aircraft, the US Navy had 408, the US Marine Corps had 372, and the USA Army (less helicopters) had 20. The RAF had 113 aircraft, the Royal Australian Air Force had 22, and the Canadian Air Force had three. These numbers are shown below by major category:[15]

Aircraft Type	USAF	USMC	USN	US Army	Canadian	Australian	British

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Total	863	3762	408	20	3	22	113
Fighters	293	130	232	-	-	14	66
Bombers	51	-	-	-	-	-	-
C2	22	-	20	-	-	-	4
ISR	60	-	29	18	-	2	9
Sp Ops/Rescue	58	-	-	-	-	-	14
Special Forces	73	-	-	-	-	-	-
Tankers	182	22	52	-	-	-	12
Airlift	111	-	5	-	3	-	4
Other	13	220	70	2	-	3	-

The primary US holdings of combat aircraft included 11 B-1B, 4 B-2, and 28 B-52 bombers. The main fighter and fighter attack aircraft included 60 A-10/OA-10s, 70 AV-8B Harriers, 56 F-14s, 42 F-15Cs, 48 F-15Es, 60 F-16s, 250 F/A-18s, and 12 F-117s. The special purpose combat aircraft included 8 AC-130 gunship, 71 Wild Weasel F-16Cjs equipped with HARM anti-radiation missiles. The US had 1 RQ-1 Global Hawk, and 4 RQ-4 Predators. The Iraq War was the first time the USAF ever flew four RQ-4s or 6 U-2s simultaneously.[16]

US holdings also included 20 E-2, 19 E-3, 7 E-8, 35 EA-6B, 8 EC-130, 3 EP-3 1 R-1, 18 RC-12, 15 U-2, 8 HC-130 and 9 RC-135 electronic warfare and intelligence aircraft. There were 28 P-3, 1 PC-6, 40 S-3, and 2 PR-9 patrol aircraft. The tanker forces included 4 KC-1s, 33 KC-10s, 22 KC-130s, and 149 KC-135s. Airlift aircraft included 10 C-2s, 5 C-9s, 7 C-17s, 3 C-20s, 7 c-21s, 1 C-32, 1 C-40, 1 CN-235, 1 DC-130, and 124 C-130s. The database on helicopters is more uncertain because the USAF did not include US army helicopters in its database. It shows a total of 58 AH-1s, 8 AH-6s, 67 CH-46s, 11 CH-47s, 54 CH-53s, 16 HH-60s, 7 MH-6s, 14 MH-47s, 31 MH-53s, 18 MH-60s, 30 UH-1s, 4 UH-3s, and 3 UH-60s.

The US air order of battle is shown by base and peacetime location in rough form in the Annexes, but US airpower shifted force numbers during the course of the war. In any case, aircraft numbers were far less important that the fact the US could use its Air Force, Navy, Marine Corps, and Army to generate immense numbers of sorties and virtually all of its combat aircraft not only could use precision guided weapons, but acquire targets effectively, illuminate and/or track them, and fire at standoff ranges from Iraq's low altitude air defenses.

Sortie generation numbers, and sortie quality or lethality numbers, are far more important than numbers of aircraft. To all intensive purposes, the Coalition generated 41,404 sorties to none, and the US alone-generated 38,358, or over 93%. The Coalition flew at least 20,753 fighter and bomber sorties, and the US alone flew 505 bomber sorties and 18,190 fighter sorties – for a total of 18,695 fighter/bomber sorties. The details of these sortie numbers are shown below: [17]

Aircraft Type	USAF	USMC	USN	US Army	British	Australian
Total	24,196	4,948	8,945	269	2,841	565
Fighters	8,828	3,794	5,568	-		302
Bombers	505	-	-	-	-	-
C2	432	75	442 (E2)	-	112 (E3D)	-
ISR	452	305	357	269	273	-

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Sp Ops/Rescue	191	-	-	-	-	-
Tankers	6,193	454	2,058	-	359	-
Airlift	7,413	-	-	-	-	263
Other	182	320	520	-	1	-

Even sortie numbers, however, do not give a clear picture of the massive impact of Coalition and US airpower. The Coalition dropped a ratio of 19,948 precision-guided weapons, plus nearly 9,251 unguided weapons, to none.[18]

The US forces alone 19,269 fired guided weapons. The main weapons included 802 sea-launched BGM-109 TLAM or "Tomahawk" cruise missiles and 153 air-launched AGM-86 C/D CALCMs. They included 6,542 JDAM GPS-guided bombs (GBU-31, GBU-32, GBU-53, and GBU-37), and 8,618 laser guided bombs (GBU-10, GBU-12, GBU-16, GBU-24, GBU-27, GBU-28). They also included 98 EGBU-27 weapons with both GPS and laser guidance. The US fired 408 AGM-88 HARM high-speed anti-radiation missiles.

The US delivered an extremely diverse mix of other guided weapons. These included 88 CBU-105 WMCD (wind-corrected munition dispenser) sensor fused cluster bombs. It fired 818 CBU-103 and 2 CBU-107 WCMD cluster bombs. They also included lighter missiles such as 562 AGM-114 Hellfire and 918 AGM-65 Maverick anti-armor weapons, which sometimes were used against urban targets as well. The US fired 4 longer-range AGM-130s, 3 AGM-84 SLAM ERs, and 253 AGM-154 JSOWs.

While some 68% of the weapons the US fired were guided, the remaining 32% still added up to a massive total. The unguided weapons the US delivered included 118 CBU-87 and 182 CBU-99 cluster bombs, 1,625 M-117s, and 7,202 Mark 82, 83, and 84 unguided bombs. It also made massive use of strafing. The US fired some 16,901 20-mm rounds and 311,597 30-mm rounds from the air.One of the most striking aspects of the Coalition effort is how these sorties were allocated in terms of target. The data that USCENTAF has developed on the actual execution of sorties now use a weighted measure called sortie equivalents to take account of the different capabilities of different strike aircraft and their respective capability to hit multiple targets. If one uses these measures, and only counts actual executed sorties equivalents, the Coalition launched 15,592 sorties against Iraqi ground forces in killbox, interdiction, and close air sport targets of 79% of the total. It flew another 1,441 sortie equivalents to maintain air and space superiority (7%), 1,799 to suppress the Iraqi regime's ability to command Iraqi forces and govern Iraq (9%), 832 to suppress Iraqi theater missile and weapons of mass destruction delivery systems (4%), and 234 sorties to prevent non-combatant Iraqi forces from joining the battle or compel the capitulation of forces actively involved in combat (1%).

These figures show the focus the Coalition placed on defeating the regime and the Republican Guards versus any form of attacks on infrastructure and strategic targets outside the regime. It is also worth noting that many requests for attack sorties were rejected in the effort to limit the destructiveness of the air campaign. A total of 30,542 requests were made, measured in sortie equivalents, but only 25,240 got as far as the targeting list, and only 19,898 were executed – about 65% of those requested by component command.

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Moreover, the US had radically upgraded the targeting, data links, and avionics on its strike aircraft since the Gulf War and had honed its delivery techniques in the Balkans and Afghanistan. It had a monopoly of space assets and of greatly improved intelligence, targeting, surveillance, electronic warfare and command and control aircraft. It had a near monopoly of unmanned aerial vehicles (UAVs) and far better systems.

The British Royal Air Force deployed an additional 7,000 personnel, and some 100 fixed-wing aircraft. These aircraft also included highly capable systems. It used the E-3D Sentry aircraft for airborne command and control; 4 Jaguar GR3 fighters and Tornado GR4 bombers in reconnaissance mode. It used 14 Tornado F3 air defense aircraft with the newly integrated ASRAAM missile; and 30 Tornado GR4 bombers and 18 Harrier GR7 fighters to provide offensive capability, including precision-guided weapons. It also used the 8 VC10 and Tristar air-to-air refueling aircraft; plus Hercules transport aircraft. The UK launched a total of 679-guided weapons and 124-guided weapons.

The RAF's Joint Helicopter Command provided helicopter support, consisting of 27 Puma and Chinook helicopters and about 1,100 personnel. RAF Regiment units provided ground defense for the force. The Army's 21 Signal Regiment provided communications support for the Joint Helicopter Force.

The Royal Australian Air Force (RAAF) deployed another 2,000 personnel, a squadron of 14 F/A-18 Hornet fighter aircraft, three C130 Hercules transport aircraft, an Air Forward Command Element, and a small RAAF reconnaissance team.

The Coalition Application of Airpower

The fact that the US and Britain had in many ways defeated the Iraqi Air Force in the air, and had heavily suppressed the Iraqi land-based air defense system, even before the war began, allowed the Coalition to suppress Iraq’s air defenses with remarkable speed, and to concentrate on strike-attack missions almost immediately.

A monopoly of stealth and cruise missiles allowed the Coalition to attack any static target in even the most heavily defended air space at any time in any weather. As the following chapter shows, the Coalition leapt from air supremacy to nearly total air dominance.

While no public battle damage data (BDA) are available to assess the level of damage the Coalition inflicted, and few data are as yet available on the effectiveness of individual aircraft and systems, enough data are available from previous wars to show that a force ration over 18,000 well-directed precision guided weapons to zero, plus thousand more unguided weapons, must have had a massive effect. It certainly makes conventional force ratio and order of battle comparisons largely meaningless.

Effects Based-Bombing

More was involved, however, than the ability to use airpower as a killing mechanism. The Coalition could use precision-guided weapons and advanced US command and control and targeting assets to limit collateral damage and civilian casualties. It could use new intelligence assets and targeting planning to severely limit the number of targets it had to strike, and then carefully match weapon accuracy and reliability, and the size and effect of the weapon, to the right aim point to necessary to destroy the function of a target without imposing unnecessary destruction or risk to the target and target area.

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This, in turn, allowed the US and Britain to seek to paralyze and destroy a regime, not bomb a country. It allowed them to avoid attacking most urban and populated areas unless there were time urgent regime targets or Iraqi forces that actively threatened Coalition forces.

This issue of "time urgency" for a regime the Coalition only expected to survive for weeks at most, and to lose most of the country in days, was also a critical one. The Coalition had no need to bomb liberated or passive areas and Iraqi forces. It had no reason to hit at economic targets unless there were actively hostile Iraqi forces in them or a time-urgent risk they could provide WMD or missiles. There was no need for extensive attacks on economic or infrastructure facilities, lines of communication, or most other civilian targets.

Anything But a Cakewalk

At the same time, “effects-based bombing” remained an art form and not a science. One key problem, even with the targeting and intelligence assets the coalition had available, was to know how many targets were empty and how many forces were able to disperse. While no data are available on this aspect of the Iraq War, some of those involved in BDA in Desert Fox in 1998, feel the US found that at least 20-30% of strikes hit largely empty buildings or facilities or ones where the US could never confirm exactly what effect the strikes had had on the Iraqis.

The Iraqis had learned from Serbia and Kosovo, and had months to quietly prepare alternative sites, decoys, deception operations, and force dispersal. The Iraqis moved and their force mix changed. US targeting had to become dynamic and had to alter to hit at newly discovered or dispersed targets by the second day of operations. It then had to stay fluid and be shaped by the changing tactical situation, the discovery of new patterns in Iraqi military activity and dispersal, and the concentration of the enemy near American and British forces. Events increasingly dictated targeting in ways that had to be based on less and less certain information as the battle became more dynamic.

The dynamics of combat also affected the level of restraint the Coalition could show. The allies still had to protect American, Australian, and British soldiers, their rear areas, and their flanks, and do so even in urban areas. Senior US military officers said before the war that the coalition would hit whatever was necessary to do this, and that still planned to use a total of 30% unguided weapons -- although this total was around 10% in populated or sensitive areas.

The Coalition flew extensive numbers of sorties where no central control could be exerted over the targets flown. Aircraft flew in kill boxes” and attacked targets of opportunity in the rear or provide close air support. There were many areas where the pilots of fixed wing and rotary wining aircraft do their own targeting on a target of opportunity basis, supported by their individual formation.

Targeting restraints had to be different in the case of known or suspected locations with CBW or key delivery systems. The US and Britain could be precise and try to use weapons that could take out most CBW systems and burn them or otherwise limit their effects. At the same time, the Coalition had failed to locate and successfully hit such targets in the last war and how dangerous they are. A successful Iraqi use of such

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weapons on American, British and Australian troops might well have led lead to sudden massive changes in targeting and the allocation of strike assets.

Targeting was complicated by the fact that Iraq had every reason to try to disperse, use decoys, shelter in civilian areas and facilities, use sensitive buildings and areas to limit American and British effectiveness. It had equal reason to exaggerate military and civilian casualties, religious and cultural destruction, and economic and infrastructure destruction for political purposes.

Urban and heavily populated areas still presented a problem. US Most urban areas are still opened enough to allow the use of precision weapons. Most Iraqi regime facilities were surrounded by compounds and wide areas that allow fight to avoid densely populated areas, and civilians fled most areas or successfully take cover. Nevertheless, close-in urban fighting still to happen -- particularly in the cities the Coalition advanced through in the south and from Baghdad's outer defenses to the last core center of the regime. One senior US military targeting expert called this kind of targeting "trying have a fist fight in a really dark room." The US, Britain, and Australia could not let soldiers die in such fighting because of targeting constraints.

All of these issues meant the US and Britain had to react with rapid retargeting and bombing with less information and time. Precision bombing and targeting was still anything but a "cakewalk."

There are no public BDA data to use in analyzing how effective Coalition air forces were in dealing with these problems Nevertheless, it is important to remember that the Coalition could and did make extensive use of intelligence satellites, UAVs like Predator and Global Hawk, reconnaissance aircraft like the U-2, targeting aircraft like the E-8 JSTARS, helicopters, and Special Forces to maintain their targeting capability.

The Coalition had unprecedented intelligence assets, communications, and computer speed in acquiring, reviewing and allocating targets. The fog of war must have remained, but it was certainly thinned. (Ironically, there is no evidence the Coalition made more than token use of some of the new weapons like the MOAB and "e-bomb" that it played up for Psyops purposes and it seems to have made only limited use of the Sensor Fused Weapon.

The end result, at least from the evidence surfaced by media coverage to date, is that civilian casualties and collateral damage were remarkably limited and that postwar looting may actually have done more damage. Moreover, even if the Coalition does publish public battle damage assessment data, it may have uncertain value. With all of the advances in technology, there still is no way to instantly measure or verify lethality, or civilian casualties and collateral damage. Much of American and British analysis is based on whether we destroy the desired part of the building or hit the right area. They can't be sure who is in the building or shelter, how much their strikes have hurt the functional capabilities of Iraqi forces.

Land-Based Air Defenses

The US, several Gulf states, and Israel deployed the Patriot anti-aircraft and anti-tactical ballistic missile system, and used them in the defense of Kuwait. Israel deployed the Arrow ballistic missile defense system, but did never had to use it. In practice, however,

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it was Iraq that had an effective monopoly of land-based air defenses in most of the fighting, and Iraq's land based air defenses were its only potential counter to the Coalition's monopoly of air power.

The Iraqi Air Defense Command

At the time the war started, the heavy surface-to-air missile forces of the Air Defense Command are still organized into one of the most dense defensive networks in the world in spite of the losses during the Gulf War and during the US and British enforcement of the Northerm and Southern No Fly Zones.

USCENTCOM reported after the war that active Iraqi surface-to-air missile strength was a nominal 210 launchers, and 150 early warning radars. No similar unclassified estimates are available of Iraq's missile holdings by type, but some sources indicate that , Iraq still had a total inventory of 130-180 SA-2 launchers, 100-125 SA-3 launchers, 100-125 SA-6s, 20-35 SA-8s, 30-45 SA-9s, some SA-13s, and around 30 Roland VI and 5 Crotale surface-to-air missile fire units. Some of these systems were operated by the army. In addition, Iraq had some 2,000 man-portable SA-7s and SA-14s, and some SA-16s.[19]

Iraq was able to maintain part of its battle control and management system, and many of its sheltered air defense and air force command and control centers remained operational. Iraq's French-supplied KARI air defense communications and data-link system had never been particularly effective, but Iraq had improved many of the sensor and command links, and made much heavier used of fiber optics.[20] It had an operational Headquarters Center, Air Defense Operations Center, and Air Defense Military Intelligence facilities in the Baghdad area, plus four Sector Operations Centers (SOCs) and an independent SOC to protect Saddam's palaces and key Republican Guards and security operations.

Iraq's heavy surface-to-air missile forces were backed by extensive low-altitude anti-aircraft (AA) guns, and SA-8b, SA-11, and SA-13 short and medium range missiles. The Sterla 2 and 10 (SA-7 and SA-10) were used for terminal defense of key buildings. Iraq has learned to rapidly move its fire units and sensors, use urban cover and decoys, use "pop-on radar" guidance techniques, and optical tracking.

Many radars and elements of Iraq's air defense C^4I system were still operating, including the Soviet Spoon Rest, Squat Eye, Flat Face, Tall King, Bar lock, Cross Slot, and Thin Skin radars. Iraq also had Soviet, Italian, and French jamming and electronic intelligence equipment. Some experts felt that many of Iraq's underground command and personnel shelters survived the Gulf War, and at least 50-66% had survived the attacks made in enforcing the No fly Zones..

Iraq's ground-based defenses were concentrated around Baghdad, Basra, Mosul, and Kirkuk. Iraqi territory is too large to attempt territorial defense, and Iraq has always concentrated on defending strategic targets, and deploying air defense zones to cover critical land force deployments. Iraq had redeployed some missiles during 1992 and 1993 to create surface-to-air missile "traps" near the "no-fly zones". These traps were designed to attack aircraft with overlapping missile coverage when they attacked launchers deployed near the no-fly zones. While the Iraqi efforts failed -- and led to the destruction of a number of the missile launchers involved -- it is not clear what portion survived or what other detailed redeployments Iraq had made before the war began.[21]

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Unclassified estimatesd indicate that Iraqi air defenses were organized as follows:

- **The 1st Sector Operations Center** at Taji Military Camp in Northern Baghdad covered central and eastern Iraq and the greater Baghdad area. It seems to have had two missile brigades near al Dorah and at al Habaniah with a total of 10 SA-2 batteries and 6-9 SA-3 batteries, plus a range of independent batteries with SA-2s, SA-3s, SA-6s, Rolands, and possibly captured IHawks. It had four early warning radar regiments and an ECM unit.
- **The 2nd Sector Operations Center** covered western Iraq and was located near H-3 (al Waleed) air base near the Jordan border. It covered the Syria border, the Mosul area, and northern Iranian border. It had a brigade with 4 SA-2, 6 SA-3, and some SA-6 batteries, a Roland battalion, ZSU-23-4 and other AA gun units, and an early warning radar unit.
- **The 3rd Sector Operations Center** covered southern Iraq and was located in Imam Ali Airbase near Nasseria. It covered the Saudi, Kuwaiti, and Jordanian borders and the southern Iranian border. It had at least one missile brigade and AA gun unites, plus an early warning radar and control unit.
- **The 4th Sector Operations Center** was headquartered at al-Hurriya Airbase near Kirkuk. It defended Mosul to the north, the Iranian border to the east and the al Jazirah area in the west. It had at least 4 SA-2 battalions.
- Iraq also had an independent SOC based in Baghdad to defend the palaces, Republican Guards, and key security facilities. It had SA-2, SA-3, SA-8, SA-9, SA-11, and Roland batteries, plus SA-7s and SA-14s. The SRG and Republican Guards have independent batteries.

The Weakness of Iraqi Air Defenses

Iraq's air defenses were anything but passive during the war. USCENTCOM estimates that there were 1,224 reports of Iraqi firings of AA guns, 1,660 reports of surface-to-air missile launches, and 436 times when Iraqi radar emitters attempted to lock on to Coalition aircraft. Once again, however, Iraqi numbers were not a substitute for effectivness. The exact number of Coalition aircraft lost to Iraqi enemy combat is still being clarified, but USCENTCOM puts the total at seven – 4 AH-64D Longbow Apache attack helicopters, 2 AH-1W Cobra attack helicopters, and 1 A-10A Warthog attack aircraft. This is a negligible loss rate for the number of aircraft and sorties involve, and nearly twice as many aircraft – 13 – were lost to accidents and other causes.[22]

Iraq's mix of SA-2s, SA-3s, and SA-6s were systems whose design went back to the 1950s and 1960s, and were badly outdated. The Coalition had shown it could supporess them during the Gulf War in 1991, and had had years of practive in dealing with Iraqi tactics and technology and had long developed effewctive countermeassures it could use in most areas to launch strikes that avoided Iraqi defenses or penetrated them and then launched stand-off strikes from outside the range of Iraq's shorter range air defenses, which were more difficult to suppress

Iraq had lost much of its capability to carefully focused US and British strikes on its air defense facilities during the time of the UN debate and particularly from March 1st to the start of the war. This "enforcement" of the No Fly Zones effectively allowed the Coalition to begin the suppression of enmy air defense (SEAD) phase of the war long before G-Day on March 19th. During the struggle in the No Fly Zones, the US claimed it has destroyed some 20-33% of the launchers and major radars Iraq still had.

Iraq had learned a great deal about land-based air defense operations from the Gulf War and more than ten years of operations against the US and British aircraft enforcing the "No Fly Zones". Iraq provided significant aid to Serbia in air defense tactics during the

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fighting in Kosovo, and helped Serbia make effective use of decoys, "pop-on" and remotely linked radar activity, various ambush tactics, and the use of deployments in civilian areas to limit NATO's ability to strike at such targets.

Iraq had developed some crude countermeasures to US AGM-88 HARM anti-radiation missiles since the Gulf War, and had begun to get significant equipment through Syria. This may have included more advanced radar guidance kits for the 2K12 (SA-6 missile). It acquired equipment to jam the GPS guidance systems in US aircraft and munitions, and mounted some of its SA-3s on rotating launchers on trucks to give them some moblity. Deliveries of Czech and Ukranian radar deliveries may also have occurred. In broad terms, however, the Iraqi forces were obsolete to obsolescent, never recovered from the Gulf War, and suffered from further attacks between 1992 and 2003.

Iraq had never shot down a US or British aircraft in tens of thousands of sorties over Iraq. Iraq also still could not make any sustained use of its longer-range air defense systems with radar tracking and guidance wihtout losing them. The Coalition could strike effectively at most of Iraq's sheltered facilities and the Coalition could use stealth and cruise missiles to penetrate deep into Baghdad and other derfended areas and carry out SEAD missions. It could normally avoid dug-in short-range Iraqi defenses, and then systematically locate and kill them along with other key weapons system when it engaged moving Iraqi land forces.

Whle Iraq developed contingency plans to move and disperse its land-based air defenses in the event of a major US-led attempt to overthrow the regime, and to try to concentrate such defenses to protect the regime and try to use them to partially compensate for the lack of an effective Iraqi Air Force, it reacted too slowly. Like other plans, it could never execute a coherent defense.

Iraqi land based air defenses were too old and too ineffective to be an effective counterbalance to Coalition air dominace or even degrade the quality of most Coalition attack missions. Nevertheless, the sheer density of Iraqi defenses made them dangerous until the last stages of the fighting around Baghdad. Low altitude penetration missions in close air support remained dangerous and sometimes fatal until the end of the war – particularly for helicopters.

Iraqi and Coalition Land Forces

This near total lack of Iraq capability for any aspect of joint warfare other than land combat both makes the Iraq War unique, and again makes any traditional comparisons of the strength of Iraqi and Coalition land forces largely meaningless. This is particularly true in light of the relatively static nature of much of the Iraqi regular army forces during the war, and the Iraqi leaderships failure to effectively exploit Iraq's strategic geography.

The ratio of total manpower was sharply disparate: Counting irregulars, Iraq had at least 390,000 men to the Coalition's 250,000. However, it is warfighters that count in such comparisons, and quality is as important as force numbers. Iraq was a highly politicized conscript army organizing into layers more designed to prevent a coup than fight, and equipped with weapons some 15 to 25 years old. The US and British forces were all-volunteer professional forces of men and women with extensive training and technical

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background. This reliance on professionalism gave the Coalition de facto superiority in its force ratio even though it had a striking inferiority in force numbers.

Coalition Land Forces

The comparative strength of Coalition and Iraqi land forces in war fighting terms becomes far clear from the history of combat in the next chapter than any static comparisons of force numbers can show. The full order of battle of the Coalition land, forces is also remarkably complex and involves a wide range of support and sustainment units, and follow-on forces, that cannot be discussed in detail, only described in the annex to this report.

In broad terms, however, the land forces in the Coalition side of the military balance in the Iraq War were asymmetric in several striking respects. First, The Coalition had a much smaller number of actual combat troops on the ground. As has been noted earlier this was a much smaller total than the Coalition had originally planned, and senior officers in the Pentagon made it clear before the war that the total was small enough to significantly increase the risk if the Coalition met unexpected opposition or elements of the battle planned failed.

The total manpower strength of the combat troops in the US Army 3rd Infantry Division, brigade of the 82nd Airborne Division, 101st airborne Division (when deployed), 1st Marine Division, and supporting combat elements of V-Corps and the 1st Marine Expeditionary Force (1 MEF) probably totaled no more than 50,000 to 60,000, although the total in the theater was much higher when support forces are included. USECENTCOM reported a total of more than 115,000 US troops in Kuwait at the start of the war with a total of some 57,500 US army troops and 70,000 US marines.

The US had the following major land force elements ready in Kuwait. Additional forces arrive steadily during the battle. Including the 173rd Airborne Brigade, which dropped into the Kurdish Security Zone in Northern Iraq:[23]

Kuwait: US Troops: 115,000+[24]

Coalition Forces Land Component Command (CFLCC) HQ

Commander of all ground forces in Central Command: Army Lt. Gen. David D. McKiernan

Total Army Troops: About 55,000

V Corps
- Command elements
- Troops: About 1,500
- Heidelberg, Germany
- Commander (of V Corps & all ground forces in Kuwait): Lt. Gen. William Wallace

3rd Infantry Division
- "Rock of the Marne"
- Abrams tanks, Bradley Fighting Vehicles, Apache Longbow helicopters, Black Hawk helicopters
- Troops: About 18,000-20,000
- Commander: Maj. Gen. Buford C. Blount III
- Fort Benning, GA

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2nd Brigade Combat Team of the 82d Airborne Division
- aka 325th Airborne Infantry Regiment
- "Falcon Brigade"
- Paratroopers
- Troops: About 4,000
- Commander: Col. Arnold Neil Gordon-Bray

101st Airborne Division
- "Screaming Eagles"
- Light Infantry, 275 Longbow Apache Helicopters
- Army's only air assault division
- Troops: About 20,000
- Commander: Maj. Gen. Dave Petraeus

1st Marine Expeditionary Force and 1st Marine Division
- Troops: About 60,000
- Abrams tanks, Sea Knight helicopters, Sea Cobra helicopters, Super Stallion helicopters, Harrier jump jets
- From the West Coast
  - 1st Marine Expeditionary Force
  - 15th Marine Expeditionary Unit
  - Commander: Lt. Gen. James Conway
  - http://www.cpp.usmc.mil/
  - Camp Pendleton, CA
  - 760-725-9385
- From the East Coast
  - 2nd Marine Expeditionary Brigade
  - Camp Lejeune, NC

Navy
  - Special Warfare Unit 2

The British Army provided another 26,000 men in the form of the British 1st (UK) Armored Division. This force included the 7th Armored Brigade, 16th Air Assault Brigade, 102nd Logistics Brigade and various support units. The 7th Armored Brigade, nicknamed "Desert Rats," was a heavy armored unit equipped with Challenger 2 tanks, and had been reinforced with additional combat elements. It included the Royal Scots Dragoon Guards (Challenger 2 tanks). 2nd Royal Tank Regiment (Challenger 2 tanks), 1st Battalion The Black Watch (Warrior infantry fighting vehicles), 1st Battalion Royal Regiment of Fusiliers (Warrior infantry fighting vehicles), 3rd Regiment Royal Horse Artillery (AS90 self-propelled guns), and 32 Armored Engineer Regiment.

The 16th Air Assault Brigade had a combination of helicopter and parachute units. Its main combat elements included the 1st Battalion The Royal Irish Regiment, 1st Battalion The Parachute Regiment, 3rd Battalion The Parachute Regiment, 7 (Para) Regiment Royal Horse Artillery (105mm Light Guns), 23 Engineer Regiment, Household Cavalry Regiment (1 x armored reconnaissance squadron), and 3rd Regiment Army Air Corps (Lynx & Gazelle helicopters)

The British division also had a number of independent support elements including 30 Signal Regiment (strategic communications), The Queen's Dragoon Guards (reconnaissance), 1st Battalion The Duke of Wellington's Regiment (additional infantry capability), and 28 Engineer Regiment. It also included 102 Logistics Brigade.

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Australia's contribution to the coalition, known as Operation Falconer, involved about 2000 Australian Defense Force personnel. The Australian Army deployed a Special Forces Task Group with some 600-700 men. It included a Special Air Service squadron. Other elements included a Special Air Service squadron, CH-47 transport helicopters and personnel from 5th Aviation Regiment, troops from the newly established Incident Response Regiment (IRR), and a quick reaction support force drawn from the 4th Battalion Royal Australian Regiment (Commando) unit.

The Size and Capability of Iraqi Forces

There is no precise way to determine the combat manning of Iraqi forces, or to make any clear one-on-one comparisons between armies with such different structures. In broad terms, Iraq remained the largest and the most effective military power in the Gulf at the start of the Iraq War, despite its defeat in the Gulf War, and the loss of some 40% of its army and air force order of battle.

Iraq still had armed forces with around 389,000 full time actives. Its army had some 350,000 actives, including some 100,000 called-up reservists, before it began a serious build-up in reaction to US and British deployments, and an inventory of some 2,200-2,600 main battle tanks, 3,700 other armored vehicles, and 2,400 major artillery weapons.

The total active US tank holdings probably did not exceed 850, and the number actively engaged may have been less. The entire US V-Corps had some 406 M2 Bradley Armored Fighting Vehicles. One USCENTCOM source reported on March 17, that the 3rd Infantry Division had a total of 200 M-1A1 tanks, 200 M-2 Bradleys, 50 M-109A1 Paladins, 18 AH-64 Longbow, and 450 support vehicles. (There were 72 additional AH-64s in the 101st Air Mobile Division and 60 in V Corps forces.) Press reports indicate that the US Marine Corps had roughly 150 M-1A1 tanks, 120 of which were actively deployed in the 1st Marine Divisions, and a similar number of lighter armored and tracked vehicles.[25] The Marines also had 58 AH-1 Cobra attack helicopters and 8 AH-6s.

The British forces added something like another 116 Challenger 2 tanks to this total.[26] British forces had something like another 150 other armored vehicles. Coalition artillery strength seems to have totaled around 210 self-propelled and towed weapons. Roughly similar disparities probably existed between Iraq's holdings of major land weapons and Coalition holdings in other areas.

By any traditional standard, this was a totally inferior force, particularly because the British force had to be kept in the southeast to secure Basra and the area around it, pin down the Iraqi regular forces near the Iranian border, and secure and the Coalition's rear area. The US Marines also did not have the same advanced armored infantry fighting vehicles as the US army forces in V-Corps and relied on less advanced towed artillery weapons.

The Coalition land forces would have been much stronger if the 4th Infantry Division and 3rd Armored Cavalry Regiment had been deployed in Turkey. The US Army 4th Infantry Division also had more advanced versions of the M-1 tank and M-2 Bradley, a significant attack helicopter force that included some 140 AH-64 Apache attack helicopters, and was the most "digital" division in the US army. In fact, senior US military officers giving

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background briefings at the Pentagon before the start of the Iraq War noted that the lack of these forces did increase the risk in executing the battle plan.

At the same time, the Iraqi land forces did have significant defects, and these went beyond the maldeployment and lack of effective strategic and tactical leadership discussed earlier.

The Iraqi Land Force Command Structure

The Iraqi command structure was highly politicized. Saddam Hussein was the Supreme armed forces Commander. The Special Republican Guard and Republican Guard reported directly to him and his younger son Qusay, as did the President's Special Security Committee. He chaired a Defense Council of key loyalists, including the Minister of Defense, Minister of the Interior, and. Armed Forces Commander.

Iraqi forces were under the command of loyalists to the regime. These included General Sultan Hashim al-Ubaydi, the Minister of Defense, and General Ibrahim Abd Al-Satter Muhammad al-Tikriti, the Chief of Staff. Saddam selected the Chief of the General Staff, who was the head of the armed forces headquarters and combined service staff. Each of the four service headquarters was located in Baghdad, where it could be kept under tight control, as was the headquarters of the military intelligence elements. Each reported upwards through the Combined service Staff. Armed Forces Commander and Minister of Defense.

Saddam Hussein had also set up a structure designed to maintain central control even if Baghdad could no longer be the source of such authority. He set up four regional commands at the time of Desert Fox in 1998, each of which was placed under one of his most dedicated supporters. These regional commands included:

- ***The Southern Region***, which included the governates of Basra, Dhikar, Misan, and Waset under Saddam's cousin General Ali Hassabn al Majid.
- ***The Northern Region***, which was under Qusay, and covered the three Kurdish governates of Sulaimaniya, Arbil, and Dohuk plus the northern governate of Mosul.
- ***The Central Euphrates Region***, which was largely Shi'ite and included Karbala, Babylon, Najaf, Quadisiya, and Muthanna. It was commanded by Muhammed Hamza al Zubeidi, an RCC member and Deputy Prime Minister.
- ***The Central Region*** including Baghdad, Saladin, Anbar, and Diyala, under Defense Minister Ahmed Sultan.

Saddam Hussein created similar regional commands before the Iraq War, and made arrangements to use the civil intelligence and security forces to attempt to hold on to each major urban area and region. Saddam must have known that even limited local resistance might help force the US to disperse its forces, while successful urban resistance in a number of areas could confront the US with much more serious problems in urban warfare. He also must have known that large elements of the Iraqi Army might not be loyal if he did not maintain control over the key regions and towns and cities as long as possible.

The Iraqi Manpower Base

Part of the problem the Iraqi regime faced was the manpower base for its land forces. Iraq had a reserve pool of some 650,000, and a large pool of annual conscripts. The CIA

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estmated that some 274,000 males entered military service each year. Iraq also had the ability to include over 100,000 men from the security services and police forces in some military or paramilitary roles, and has at least lightly armored combat elements in each of its three main civilian security and intelligence services. It also had a popular force called Saddam's Fedayeen, and a youth corp that receives some form of military training.

Serious questions existed, however, about the effectiveness of any such mobilization. Iraq had small arms enough to equip several hundred thousand men for light infrantry warfare, and to play a limited role in urban warfare. It did not, however, have enough heavy weapons to properly equip such forces, and it rapidly became clear during the war that most Iraqi reserve and popular forces lacked the motivation to show up and fight,

Saddam Hussein had also spent the last decade dealing with repeated problems in his armed forces, and had had to become more selective in the recruitment and promotion of the men in the regular army heavy divisions and Republican Guard. This was partly the result of the fact that Saddam and most of his close supporters were Sunnis from the area around Tikrit, and Iraq had deep ethnic divisions. The CIA estimated before the war that Iraq's current population was divided as follows:: Arab 75%-80%, Kurdish 15%-20%, Turkoman, Assyrian or other 5% . It also had major religious divisions: Muslim 97% (Shi'a 60%-65%, Sunni 32%-37%), Christian or other 3%.

The fact that a relatively small Sunni Arab elite ruled oppressively over a majority of Shi'ites and Kurds (58%-76% of the total population) led to ethnic clashes with hostile Kurdish and Sh'ite elements. Even the Sunni Arab part of the population was divided. Saddam's main loyalists had a rural tribal rather than urban character,in a largely urbanized country and even "loyal" tribal elements sometimes turned against Saddam.

Saddam also faced serious Kurdish and Shi'ite uprisings after the Gulf War. Some 12%-15% of Iraq's population was in the Kurdish security zone, and Saddam still had major problems in parts of the Shi'ite south. At the same time, no major Shi'ite or Kurdish conscript element of the regular army defected during the Iran-Iraq or Gulf Wars.

The Iraqi Land Force Order of Battle

The International Institute of Stategic Studies and Jane's estimate that the Iraqi army could still can deploy some 350,000 to 375,000 men, organized into seven corps, with two Republican Guards corps and five regular army corps in mid 2002. At the timew of the war, these forces were divided into three major groups, each of which in some ways watched the others:

- Six Republican Guards divisions (3 armored, 1 mechanized, and 2 infantry)
- Four Special Republican Guards brigades as part of a complex 14 battalion force structure designed to protect Saddam and the regime.
- A regular army with some 16 divisions, (while 11 are relatively low-grade infantry divisions, 3 are armored divisions and 3 are mechanized divisions.
- The regular army also has five commando and two Special Forces brigades.
- A five wing army aviaition component with 2 fixed-wing and 21 helicopter squadrons.[27]

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Iraqi combat units did not have standardized structures or levels of manning and equipment, and US experts estimate that Iraqi divisions differ significantly by unit. In broad terms:

- Iraq had a total force today, of approximately 20-23 division-equivalents, versus 35-40 division-equivalents in the summer of 1990, and 67-70 division-equivalents in January 1991 -- just before the Coalition offensives began in the Gulf War.[28]
- Regular army divisions an average authorized strength of about 10,000 men, and that about half of the 23 Iraqi divisions had manning levels of around 8,000 men (less support forces), and "a fair state of readiness." Tank strength varied, but heavier divisions had some 175-250 tanks.
- Republican Guards Divisions had an average authorized strength of around 8,000 to 10,000 men (less support forces), and averaged at least 80% of authorized strength. Brigades averaged around 2,500-3,2000 men.[29] Tank strength varied, but heavier divisions had some 175-300 tanks.
- The Special Republican Guards was organized into four brigades, but were more a force of specialized battalions than one of regular combat brigades.

Most units lacked modern training, and the regular army units were heavily dependent on conscripts. There were many reports of badly undermanned units.[30] Estimates that most divisions have 50-75% manning, and substantial equipment shortages seem to have been accurate and most Iraqi divisions were substantially smaller than at the begining of the Gulf War.

The Deployment of Iraqi Land Forces

A more detailed Iraqi order of battle is provided in the annex to this book, but even a summary shows both the deep divisions between the three major types of Iraqi and forces and that Iraq's regular forces were spread out from north-to-south in, with a mix of regular and Republican Guards divisions.

The Iraqi regular Army was organized into five major corps, with 17 main-force division equivalents and major bases at Baghdad, Basra, Kirkuk, and Mosul. There are major training areas west of Baghdad, near Mosul, and in the Marsh areas in the south. The training area southwest of Basra has had only limited use because of the "no fly zones."[31]

US experts indicate that Iraqi land forces had a total of fourteen divisions in the north, three divisions in central Iraq, and six divisions south of An Najaf. There are also four independent brigades: the 65th Special Forces Brigade, the 66th Special Forces Brigade, the 68th Special Forces Brigade, the 440th Marine Brigade.

The Republican Guards had a total of three armored divisions deployed in the vicinity of Baghdad—one near Taji, one near Baghdad, and one near As Suwayrah.[32] All Republican Guards divisions are located above the 32-degree line. Several additional Republican Guards divisions are located around Baghdad to play a major role in internal security. Several more Republican Guards divisions were located north of Baghdad closer to the Kurdish area.[33]

While sources differ significantly over some of the details, unit designations, and unit locations, Iraq began the war with the following deployments:

Regular Army Forces in Northern Iraq

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The 1st Corps was headquartered at Kirkuk and the 5th Corps at Mosul. They guarded the Turkish border area and deploy on the edge of the Kurdish enclave, and the oilfields in the north. They had a total of 8 divisions, but only two are heavy mechanized divisions.

- **The 1st Corps** included the 2nd Infantry Division, the 5th Mechanized division, the 8th Infantry Division headquartered, and the 38th Infantry Division.
- **The 5th Corps** had units defending the border area with Syria and Turkey as well as covering other parts of the north. It included the 1st Mechanized Division, the 4th Infantry Division, the 7th Infantry Division, and the 16th Infantry Division l.

Regular Army Forces in Eastern Iraq

The 2nd Corps was deployed east of Baghdad to defend against Iran or any attack by Iranian-backed Iraqi opposition forces. It included the 3rd Armored Division headquartered at Jalawia, the 15th Infantry Division headquartered at Amerli, and the 34th Infantry Division headquartered near Khanaqin

Regular Army Forces in Southern Iraq

The Army had two corps that played a major role in securing Shi'ite areas and suppressing Shi'ite dissidents. They had a total of six divisions and two were heavy armored divisions:

- **The 3rd Corps** was positioned near the Kuwaiti border. It included the 6th Armored Division, the 11th Infantry Division, and the 51st Mechanized Division
- **The 4th Corps** defended the border with Iran. It included the 10th Armored Division, the 14th Infantry Division, and the 18th Infantry Division.

The Republican Guards

The Republican Guard had some 60,000 to 70,000 men. under the supervision of Qusay Hussein and commanded by Staff General Ibrahim Abdel Satter Muhammed al Tikriti. It had two more corps, and seven divisions:

- ***The Northern or 1st Corps of the Republican Guards*** could act to defend against Iran and Turkey, operate against the Kurds, and defend the greater Baghdad area and Tikrit. It included the 1st Adnan Mechanized Division, the Al Nida (Al Nedaa) Armored Division, the 2nd Baghdad Infantry Division, and the Al Abed (Al Abid) Infantry Division at Kirkuk-Khalid Camp.
- ***The Southern or 2nd Corps of the Republican Guards*** helped defend against Iran in the south, as well as any US-led attack, and acts as a deterrent force to suppress any Shi'ite uprising. It included the al Medina al Munawara Armored Division, the Nebuchadnezzar (Nabu Khuth Nusser) Infantry Division, and the Hammurabi Mechanized Division in the al-Taji area.

The Special Republican Guards or Al-Haris al-Jamhuri al-Khas

The third major element of the land forces included the four Special Republican Guards, which were located largely within the Baghdad are organized to defend the regime. The Special Republican Guard has four infantry/motorized brigades with 14 battalions, an armored brigade, and an air defense command with elements to secure Baghdad's ground-based air defenses against any coup attempt.

They were is headed by Qusay Hussein, and its formal commander was Major General Kheir-Allah Wahees Omar al-Nassiri. They served as a praetorian guard, protecting Presidential sites and escorting Saddam Hussein on travels within Iraq. They had a total active strength of about 12,000 to 15,000, but some sources claim it can mobilize to 20,000 to 25,000. They were the only force stationed in central Baghdad and in the Republican Palace, although there were light paramilitary brigades in the Special Security Service (SSO), the Iraqi Intelligence Service (IIS), and secret police

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Iraq's Irregular Forces

As has been noted earlier, the regime failed to attract broad support for its Popular Army and many of the paramilitary forces in its order of battle never played a significant role in the fighting. The major exception seems to have been the *Fedayeen Saddam (Saddam's Men of Sacrifice):* This was a force of 15,000-25,000 men.

The Fedayeen was founded by Saddam's son Uday in 1995, and started out as a force of some 10,000-15,000. In September 1996 Uday was removed from command of the *Fedayeen*. Uday's removal may have stemmed from an incident in March 1996 when Uday transferred sophisticated weapons from Republican Guards to the *Saddam Fedayeen* without Saddam's knowledge. Control passed to Qusay, further consolidating his responsibility for the Iraqi security apparatus.

During the Iraq War, these forces were widely reported to be the key element of the irregular forces that fought against US and British forces in the south along with loyalists from the security services, intelligence services, and Ba'ath Party. They may sometimes have been backed by the *Lions of Saddam (Eshbal or Ashbal Saddam**:*** A Hitler Youth-like paramilitary training structure for ages 10-16**.**

Another element that seems to have fought for Saddam was the *Special Security Service (SSS), Special Security Organization (SSO) or Amn al Khass*: It too was controlled by Saddam's son, Qusay, and was intended to be an ultra loyal force that has grown from a cadre of around 500 to a force of about 2,000-5,000 men which was established in the mid-1980s. It was recruited largely from loyal tribes around Tikrit, Hawuija, and Samarra, such as Saddam's own tribe, the Abu Nasr. It was headquartered in Palestine Street in Baghdad. According to most reports, it was the key security force for the regime and played a major role in controlling the actions of the Republican Guard and Special Republican Guard. It is also reported to have been in charge of the surveillance of Iraqi General Intelligence, Military Intelligence, Military Security, and General Security.

Iraqi Tank Strength

These layers of competing forces, each watching the other, were scarcely the basis for an effective modern army. They also relied on large numbers of combat-worn and obsolescent weapons. While they had an inventory of 2,200 to 2,600 tanks, only 1,800-2,000 seem to have been to be combat capable and most were difficult to maintain. Like the rest of Iraq's equipment, they were worn, and cannot be sustained or repaired after an initial period of combat. About half these tanks were obsolete T-54s, T-55s, T-59s and T-69s. Iraq also had about 600-700 M-48s, M-60s, AMX-30s, Centurions, and Chieftains captured from Iran or which it obtained in small numbers from other countries.

Iraqi had no modern tanks by US and British standards, although it had 700 some moderately capable T-72 tanks, and 200-300 T-62s. Even the T-72 and T-62 had poor ergonomics. They were limited by a lack of thermal vision and modern night warfare systems, and their sights and fire control systems could not approach the engagement range of Coalition tanks. The 120mm gun on the M-1A1, for example, has a nominal maximum engagement range of about 3,000 meters. The T-72 can fire accurately out to about 2,500 meters but has far worse sights, fire control systems, and sensors. The older T-55 is limited to about 2,000 meters but has poor fire control systems and

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stabilization.[34] The Coalition tanks could normally engaged Iraqi tanks at 50% to 100% longer engagement ranges in open maneuver combat, and the Coaltion tanks had much better armor and mobility.

Iraqi efforts to upgrade the armor if its tanks had limited success and Iraqi armor had only limited functional capability to use overpressure and filiters to deal with CBW threats.Iraq did retained over 1,500 tank transporters and heavy vehicle trailers out of the several thousand it bought during the Iran-Iraq War, but never made effective use of them during the fighting.[35] Iraq does, however, have a poor history of field repairs for tanks, and of aggressively attempting to recover and repair tanks in battle.

Iraq's doctrine and tactics for using tanks was poor. Iraqi Corps and division commanders often set personal standards for training and employing tanks,

Other Iraqi Armored Equipment Strength

The Army's other major weapons has similar problems. They included some 400 aging Soviet-bloc and Franch armored reconnaissance vehicles (AML-60/90s, BDRM-2s, EE-3s and EE-9s.), It had some 1,200 BMP-1/2 armored infantry fighting vehicles, of which some 900 BMP-series seemed to have been active. It had some 1,800 aging, worn, armored personnel carriers with 10 major types. Iraq's lack of standardization in spare parts, and lack of common weapons and operating features, created major sustainability and cross-training/interoperability problems.

Iraq faced a logistic and maintenance nightmare in supporting and providing combat and field repairs for so many types of vehicles with such different firepower, mobility, and endurance. Many of these weapons were old or obsolete, and cannot keep up with tanks.

Many were dead-lined due to lack of spares or have only limited operational capability. Furthermore, Iraq was forced to equip its divisions with different mixes of armor, with different maneuver capabilities and often with different training requirements for both the weapons crew and maintenance and support teams. It also has difficulties in ensuring that its infantry can keep up with its tanks.

Iraq's tactical doctrine for using other armored vehicles varied with the major combat unit using a given mix of equipment. Some heavy Republican Guards and regular army units used other armored vehicles much more effectively in supporting tanks than most of the Iraqi army. Iraq s generally over-relied on tanks, however, and had not used its other armored vehicles aggressively in scouting or combat support operations. Its forces were best suited to defensive operations against relatively slow-moving mechanized infantry at short to moderate ranges.

Iraqi Artillery Strength

Iraq had some 200-250 active self-propelled artillery weapons – with Soviet 122mm 2S1s, 152mm 2S3s largely in Republican Guard and a few elite Regular army heavy divisions. The bulk of Iraqi artillery consisted of some 1,900 towed weapons. Mostly 122mm, 152mm, and 155mm. Iraq had some 200 multiple rocket launchers – largely 122mm and 127mm systems but with some longer-range 400mm Ababil-100 systems. Iraq also had large numbers of 81mm, 120mm, 160mm, and 240mm mortars.

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Iraqi artillery could fire chemical and possibly biological shells and rockets and had relatively long range. Iraq never demonstrated, however, that it could appraoch Us and British capability to rapidly target moving forces and switch fires. It relied heavily on mass fires and area suppression. Its ability to target beyond line of sight is limited, and sensor and command problems severely limit the ability to target maneuver forces at long ranges, although Iraq did have some RASIT artillery surveillance vehicles and French Cymbeline counter-mortar radars.

Iraq had over 350 self-propelled mortars mounted on armored vehicles before the Gulf War. These do not seem to have been heavily committed to the Kuwaiti Theater of Operations, and Iraq probably still held several hundred after the conflict. Iraq also retained large numbers of 81 mm and 120 mm Soviet mortars. It has a total of over 2,000 towed and crew-portable mortars.

Only a few Iraqi units had the radars, training, and organization to allow them to conduct effective counter-battery fire. Their targeting and observed fire is heavily dependent on forward observers, and is often slow and unresponsive. Their ability to use UAVs and other techniques to acquire targets beyond visual range was limited, and artillery support of mobile Iraqi armored units had previously been consistently poor -- even when the forward armored unit called in targets and requested support.

Iraq never demonstrated the ability to quickly shift fires and deal with rapidly moving armored forces. Its towed artillery was relatively slow moving and often road bound, unless sufficient time existed to support rear areas. Iraqi artillery units usually needed extensive time to deploy large amounts of ammunition into prepared rear areas in order to maintain high rates of fire, and had to pre-survey the battlefield to mass artillery fire effectively. Iraq also relied heavily on the “feed forward” of large amounts of ammunition, without prior request from the user unit, to make up for its slow-moving and unresponsive logistic and support system.

Iraqi self-propelled artillery units had previously often had problems extracting themselves from prepared positions, and moving rapidly under defensive conditions. Field repair and recovery of artillery systems has been poor.

Other Iraqi Major Land Force Weapons

Iraq land-forces had extensive stocks of (2000+) relatively modern AT-3 (AM14), AT-4 (M136), Milan, and High-subsonic Optically Teleguided (HOT) anti-tank guided weapons. Iraq also had significant numbers of obsolescent 85mm and 100mm anti-tank guns, and 73mm, 82mm, and 107 mm rocket launchers and recoilless rifles.

Iraq had rarely employed these weapons well in previous battles. During the Gulf War, it showed little understanding of the range at which modern Western armored could engage, the rate of advance and scale of maneuver of modern well-led armor, the impact of night and poor weather warfare in limiting crew served weapons without night vision aids, the need to rapidly maneuver crew served weapons rather than rely on static positions, and the need to conduct constant actual training firings of such equipment to develop and maintain proficiency. Iraq was also unprepared for the rapidly moving precision of Coalition artillery and the ability of helicopters and tanks to bypass prepared defenses using such weapons.

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Army Aviation

Iraqi Army Aviation had roughly 100 attack and 275 utility/transport helicopters, although many had little effectiveness or sustainibility, and a number were not operational at all. The armed helicopters included 12 Mi-25s, 20 SA-319s with AS-12 air to surface missiles, 10 SA-316s with guns, and 20 SA-342s with HOT anti-tank missiles. The transport and support helicopters include 20 SA-330Fs, 30 BO-105s, 10 Mi-6s, 30 Mi-8s, and 12 Mi-17s.

Iraq's combat helicopter performance was consistently poor to bad before the Iraq War. Training operational readiness, and sustainability were all believed to be poor, and Iraq never demonstrated the ability to use these assets effectively against coalition forces.

Further, Iraq had to operate a fleet with some 12 different types of helicopters of very different ages, and using different technologies and sources of spare parts. The sensor and weapons mix on Iraqi attack helicopters at least 15 years old. Even those helicopters equipped with HOT lacked the sensors and fire control systems to effectively use the missile without closing to ranges that made the helicopter vulnerable.

Army Air Defenses

The army and semi-mobile elements of Iraq's 17,000 man Air Defense Command can deploy large numbers of manportable surface-to-air missiles like the SA-14 Strela 3, plus SA-7, SA-8, SA-9, and Roland vehicle mounted surface-to-air missiles. Iraq is believed to have had an inventory of well over 1,000 such missiles, but the types are unclear. These systems had limited effective against high flying US-UK fighters with stand-off weapons but sometimes presented a significant threat at low altitudes.

Other Qualitative Problems

Each point in this analysis highlights reasons why the US and Britain took far less chances in attacking with the level of ground forces they had ready on March 19th that is apparent in terms of force numbers, although some risks clearly remained. There were, however, additional set of factors that weakned the effective warfighting strength of Iraqi land forces.

The Iraqi forces of March 2003 had lost most of the battle experienced personnel of the Iran-Iraq War and Gulf War. They generally had only had low-level combat experience against the Shi'ite opposition in southern Iraq, and most Iraqi forces had limited exercise training, and have never mastered combined arms and joint operations by Western standards.

Saddam Hussein's regime had always given internal security against coup's a much higher priority than military effectiveness pers se. There were exceptions during the most threatening periods in the Iran-Iraq war, but many of the best officers were the retired or shoved aside into positions of limited importance, and some suffered suspicious fatal accidents. Political control not only affected independence and initiative, but extended to the point of limiting or preventing the use of ammunition in live fire exercises, the scale of maneuver exercises, and forward stockage of ammunition and supplies that might be used in a coup.

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The Problem of Future Force Ratios

This analysis is not an argument that numbers are not important. It is an argument that force ratios must be fundamentally rethought in terms of joint warfare and force quality, and the interactions between asymmetric kinds of force. The type of military analysis common in the order of battle analysis in World War I and II, or the force ratio analysis and war games used in the Cold War, assume roughly symmetrical forces in terms of structure, quality, and leadership. It is questionable whether this assumption has ever had more than limited validity. It is clearly invalid today.

The comparative strengths and weaknesses of the Coalition forces and Iraq allowed the Coalition to attack with forces that seemed inadequate by any of the previous calculations of quantitative force strength. The Coalition attack still involved carefully reasoned risks, and risks – by definition -- make failure a possibility. As the next chapter shows, however, the Coalition made a correct assessment of military capability in terms of a new era of high technology joint warfare, and Iraq lacked the leadership to make effective use of older concepts of warfare and new approaches to asymmetric warfare.

The lessons for other developing or dated military forces is clear: They are to concede, proliferate, place vastly greater reliance on asymmetric warfare, or find some mix of all of these options. The lesson for the US and Britain is that they have generally pursued an approach to coalition and joint warfare them gives them astounding strength in terms of traditional measures of force numbers.

At the same time, future opponents may well not be as inept as the regime of Saddam Hussein and may make much better use of proliferation and asymmetric warfare. As the next chapter shows, in those cases where Iraq did make effective use of asymmetric warfare it had at least some success. The pace and lethality of the Coalition attack never stopped the more dedicated elements of Iraq's forces from fighting with skill and courage, in spite of the massive institutional and leadership problems imposed upon them from above. The importance of every aspect of force quality is a lesson of the Iraq War. Hubris is not a lesson of any war.

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IV. THE COURSE OF THE WAR AND THE INTERACTION OF JOINT FORCES

One of key lesson of every war is the sheer complexity of war, and that any effort to produce lessons without examining the history of the fighting in any detail can be dangerously misleading. This lesson is particularly applicable in the case of the Iraq War because the most important single lesson of the war is the success of the new form of complex, high technology, joint warfare that the US has evolved since its defeat in Vietnam.

The US and Britain used the capabilities discussed in the previous chapter to fight ft a different kind of joint warfare from any previous conflict. While they certainly profited from the lessons gained during the Gulf War of 1991, and the conflict in Afghanistan, a detailed day-by-day analysis reveals at least the outline of how air and missile power, rapid and focused armored maneuver, the creative use of Special Forces and air mobile forces, and sea power were combined to inflict a massive and sudden defeat on a large traditional army.

General Richard Myers, the Chairman of the Joint Chiefs, described the "transformational" nature of the Iraq War as follows:[36]

> "…you're seeing a transformation of a sort. The equipment is the equipment we have had for years, But the difference is how well integrated all the capabilities of the services are in this case. All you have to do is look back, you can even look back at Afghanistan and see it's different than it was. Certainly look back at the first Gulf War.
>
> There, we were basically in a deconfliction mode. Here, between the various capabilities the services bring to the table, we are in a mode of integrating them in a way, and applying effects on the battlefield, thinking about the effects we want to have and being able to mass at the time and place of our choosing with very good command and control, intelligence, and surveillance and reconnaissance.
>
> The fact we were tied together very well and had a pretty good picture of the battlespace allowed us to do some of the things we did very rapidly, very quick, and not put our forces in harm's way.
>
> …Some of that is transformational in thinking, a lot of it is. Some of it is having commanders think in a more integrated way about how they employ their force. That's been our goal: to get to a level of joint warfighting where there is trust and confidence between the Army and the Air Force, the Navy, and Marines, the Coast Guard.
>
> The organizational structures are not necessarily new. It's more the application and General Tommy franks' idea of how to use these forces in an integrated way. And having the eyes and ears and the command and control to be able to carry it off…Joint warfighting is the key to greater things on the battlefield."

As the next chapter discusses, the issue of whether the Iraq War truly reflects a revolution in warfare, an evolution in warfare, force transformation, or a "new way of war," is an awkward and somewhat pointless cross between a word game and a theological debate. One thing is certain, the Coalition attack in the Iraq War was certainly highly innovative in many dimensions. If the Coalition attack did not meet all of the tests of "force transformation," or of the concept of "shock and awe" developed by analysts like Harlan Ullman and Jim Wade, it brought together a wide range of different combat elements to deliver a remarkable degree of speed, precision, and focus.

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The Beginning of the Conflict: The Decapitation Strike and Initial Land Advance

In some ways, the Iraq War began in late 2002, when the US and Britain stepped up their attacks on Iraqi air defenses in ways that increasingly acted more as suppression of enemy air defense (SEAD) activity than punitive efforts to enforce the No-Fly Zones. From March 1st on, such attacks stepped up to the point where Iraq can have been no doubt that it was losing its capability to maintain cohesive air defense and could be under attack within a matter of days. At the same time, it can be argued that the very reality of this threat should have persuaded Iraqi to accept the US and British ultimatum.

The exact timing of the Coalition attack came as surprise even to those in the theater. The press had already been quietly told that the war would not come on the night of March 19th. Yet, it became "G-Day" when the US received indicators that its intelligence had located Saddam Hussein and his sons, and might be able to use to launch a decapitating strike on Iraq's top leadership. The US reacted within hours and launched a combined strike by cruise missiles and stealth aircraft.

This attack came at a time the US only had part of the forces include in its original war plan. It came before any of the forces from the US Army 4th Infantry Division and 3rd Armored Cavalry Division could begin large-scale movement away from the Turkish theater where they had originally planned to fight towards the Gulf. The attack also began before the 101st Airborne Division could deploy most of its equipment.

The Coalition also changed its war plan to delay plans to execute a massive preparatory air campaign of 2-3 days and some 3,000 precision strikes. Instead, US and British ground forces drove into Iraq with little preparatory air bombardment because it was hoped that the decapitation strike on the regime would deprive its armed forces of leadership and the will to fight and an air campaign of the scale that might interfere with nation building could be avoided. Roughly 24 targets were also removed from the prewar strike plan while waiting to see if the leadership is killed, including sites with a high risk of civilian casualties, and leadership sites and communications nodes that might be needed to disseminate the information that the regime has collapsed. [37]

At the same time, General Richard Myers, the Chairman of the Joint Chiefs, later responded as follows to a question asking him if the war would have gone better with more forces on the ground:[38]

> I think less well. If you look at the initial objectives – trying to have some modicum of tactical surprise at the time we had over 220,000 forces in the region – how do you achieve tactical surprise? Well, it's not by amassing 500,000 to 600,000 folks in Kuwait and Saudi Arabia. I think we were clearly inside the decision loop capability of the regime. We started the war first, before the air war."

In retrospect, it is hard to argue with the Coalition's level of military success. There are time to take well reasoned risks, and victory is its own validation.

18/19 March: Prelude

Some key steps in the war began long before G-day. The Coalition had had more than a decade to improve its intelligence and targeting of Iraq. It had developed a basing structure in several of the Southern Gulf states over several decades, had begun the sealift

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necessary to move heavy equipment and supplies nearly a year earlier, and have greatly improved its forward facilities in Qatar and Kuwait. It also transformed its patrols of the two "No Fly Zones" in Iraq into the suppression of Iraqi air defense capabilities.

For example, Operation Southern Watch Coalition aircraft used precision-guided weapons to target several Iraqi military targets in southern and western Iraq. The Coalition executed these strikes after Iraqi forces fired anti-aircraft artillery at Coalition aircraft patrolling the Southern No-Fly Zone south of the 33rd Parallel in Iraq. As a result, Iraqi air defense troops had fired either surface-to-air missiles or anti-aircraft artillery more than 170 times since the beginning of 2003.

The targets and locations included communication sites near Ash Shuaybah, Mudaysis and Ruwayshid; long-range artillery near Az Zubayr; a mobile early-warning radar and an air defense command center at an Iraqi air base in western Iraq; long-range artillery on the Al Faw peninsula; a surface-to-surface missile system near Al Basra; and an air traffic control radar near Al Basra.

The Coalition struck the communications sites and the early-warning radar because they enhanced Iraq's integrated air-defense system. The artillery was struck because they were a danger to Coalition ground troops in Kuwait. The air traffic control radar was used to direct Iraqi anti-aircraft artillery fire at Coalition aircraft

Coalition aircraft dropped capitulation leaflets over suspected Iraqi troop locations. The leaflets gave detailed instructions about how Iraqi troops could avoid being harmed by Coalition forces in the event of military action. Although the Coalition has dropped millions of leaflets over the last few months, today was the first time that capitulation instructions were provided to Iraqi troops. The leaflets were dropped in an attempt to minimize Iraqi casualties if a military conflict occurs

19/20 March: G-Day

The war began with limited Coalition attacks launched against selected military targets, including a leadership compound used by very senior members of the Iraqi regime, attacked by Tomahawk Land Attack Missiles from six US warships. Preliminary operations were also conducted against Iraqi air defense systems, surface-to-surface missiles, and artillery batteries to reduce the threat to Coalition forces in Kuwait.

The aircraft included F-117 Nighthawks and F-15E Strike Eagles. The following ships were involved in Tomahawk Land Attack Missile (TLAM) strikes: USS Milius (DDG 69), USS Donald Cook (DDG 75)

USS Bunker Hill (CG 52), USS Cowpens (CG 63), USS Montpelier (SSN 765), USS Cheyenne (SSN 773)

Two Iraqi surface-to-surface missiles fired at Coalition forces in Kuwait were reported to have been successfully intercepted by air defenses. Another missile was reported to have landed near Camp Commando in Kuwait; no casualties were suffered.

The Patriot batteries successfully intercepted and destroyed two tactical ballistic missiles during an attack on Kuwait at approximately 12:24 p.m. and 1:30 p.m. (4:24 a.m. and 5:30 a.m. EST). Their guidance and control system locked onto the ballistic missiles,

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successfully engaging the targets with Hit to Kill PAC III and Guidance Enhanced Missiles (GEM).

Intensive Air Operations and Continuing Land Advances

It will be interesting to see how military historians treat the next phase of the Iraq War once all of the data become available. When the US took high casualties on March 23rd, and the initial advance on Baghdad slowed down, some outside observers concluded that the pace of the US land advance threatened to bog down for days or weeks because Iraq made creative use of asymmetric warfare in attacking the US lines of advance from the cities along the path of the V-Corps advance along the western edge of the Euphrates. They also felt that the 1 MEF advance would have serious problems in advancing rapidly through and beyond Nasiryah.

The fact that the population of southern Iraq did not rise up and welcome Coalition forces as liberators was also seen as an ominous sign that the US would meet massive resistance throughout Iraq, particularly in the areas of Baghdad and Tikrit, and would be forced to concentrate in a series of water crossing and urban warfare actions that would make it vulnerable to Iraqi use of chemical weapons.

A great deal of the debate over the war plan discussed in the following chapter reflected the resulting fears that the Coalition did not have enough ground forces to do the job, and that the US simply did not have the land forces to successfully attack Baghdad and would have to wait weeks or months for reinforcements to arrive and to successfully destroy the Iraqi regime. Others argued that the US has made a major miscalculation by not conducting a major air campaign before the land advance. These arguments were compounded when the main elements of V-Corps paused for several days to regroup, and the Marines were seen to be involved in intensive fighting along the southern part of their line of advance on Al Kut.

The chronology that follows, however, gives a different picture. It shows that an intensive air campaign began. According to press reports, a total 2,500 missiles and bombs were dropped in the first 72 hours and the ATO listed 11 missions. The missions are laid out in the chronology that follows, and also included close air support for Special Operations Forces in the North, West, and South, suppression and destruction of Iraq's air defenses, and missions designed to key Iraq's air forces on the ground through aggressive combat air patrols and attacks on Iraqi air bases.

The effect of the air campaign may not yet be measurable in the form of quantified estimates of BDA, but it certainly did much to disrupt and weaken Iraqi forces and destroy Iraq's ability to conduct cohesive command and control of the Iraqi war effort early in the war.

Rather than pause for any extended period, V-Corps and 1 MEF also soon went on to fight a series of battles against Iraqi regular and then Republican Guard forces under conditions that shattered the cohesion of the Iraqi regular army in the south and force the Republican Guards to deploy south in ways that exposed them to both air and land attack.

This does not mean the war plan was perfect. Iraqi did have unexpected success in using combinations of regular and irregular forces like Saddam's Fedayeen to threaten US and British forces. The US was forces to commit much of the 101st Air Mobile Division and a

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brigade of the 82nd Airborne Division to securing its lines of advance, and the rear areas in the south.

Lt. General William Wallace, the Commander of V Corps, later made it clear that this aspect of Iraqi operations did come as a surprise: [39]

> "…we had to adjust to his paramilitary (forces), which were more fanatical and more aggressive than we expected (them) to be. The adjustment that we made was to actually fight and have a presence in some of these urban areas that we had not really planned to do. We planned to bypass them. But we found it necessary to establish a presence to stop these paramilitaries. from influencing our operations

The Coalition did misread the level of popular Iraqi support it had. The US, in particular, missed the cumulative impact of (a) its failure to support the uprising in 1991, (b) its failure to conduct a meaningful public diplomacy campaign to explain that it was not responsible for the suffering of the Iraqi people under UN sanctions, (c) Iraqi and Arab hostility to the US because of its support of Israel and the Arab portrayal of the Second Intifada, and (d) the Coalition's failure to convincing rebut conspiracy theories that its goals were "neoimperialist" and to seize Iraqi oil.

The chronology of leaflet droppings that follows reflects what often seems to have been considerable success in those aspects of psychological warfare that helped cause Iraqi military inaction and expedite surrenders. At the same time, one of the key lessons of the war is that the US and Britain failed to conduct a successful political, diplomatic, and psychological campaign at the tactical, strategic, and grand strategic level.

The fact remains, however, that there was far less of a military pause than a brief period of media panic – much of it coming from military analysts.

20/21 March

Iraq launches its first theater missile against Kuwait at 2009Z on March 20th.

Coalition land forces pushed into Iraq. 3 Commando Brigade conducted an amphibious assault on the Al Faw peninsula, encountering light resistance. Casualties were inflicted on the enemy and prisoners taken. Oil infrastructure was successfully secured to prevent Saddam Hussein from attempting to release oil as an environmental weapon. Elements of 1(UK) Armored Division also entered Iraq along with other Coalition forces, thrusting towards Basra.

US Marines seized the port of Umm Qasr and Royal Navy minehunters began work to clear the associated waterways of any mines.

The 3rd US Infantry Division advanced north towards Baghdad. US troops, supported by British specialist personnel, secured oilfields in the Basra area.

US warships and Royal Navy submarines launched Tomahawk Land Attack Missiles at high value targets including command and control centers in Baghdad. Three U.S. ships and two British submarines that are part of the Coalition Forces Maritime Component launched Tomahawk Land Attack Missiles (TLAMs) during last night's military operations to disarm Iraq. The ships included the Aegis guided-missile destroyer USS John S. McCain (DDG 56) in the Persian Gulf and two Los Angeles class submarines,

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USS Columbia (SSN 771) and USS Providence (SSN 719). The Royal Navy submarines that launched Tomahawks include the Trafalgar class HMS Turbulent and Swiftsure class HMS Splendid.

Other Royal Navy vessels provided naval gunfire to support the advance of 3 Commando Brigade.

In the air Coalition aircraft including RAF assets were involved in a wide variety of operations. Tornado GR4s attacked key facilities and Harrier GR7s provided close air support. Other aircraft, including tankers, provided invaluable support.

A US Marine Corps CH-46 Sea Knight with 12 US and UK personnel aboard crashed in Kuwait south of Umm Qasr, near Highway 801 in Kuwait; there were no survivors. Enemy action is not thought to have been the cause.

News sources reported that Iraq fired seven missiles at Kuwait, four of which were intercepted, while the remaining missiles landed in unpopulated areas and caused no casualties.

Unconfirmed media reports state Iraqi forces moved missile launchers from the Basra area to Qurnah. The report quotes military sources as stating the missile attacks are not random launches and are aimed at American positions in Kuwait. Iraq fired 6 Ababil-100 missiles at several targets in Kuwait including: the “Thunder Road” staging area for the 101st Airborne Division; Camp Doha, command center for coalition forces; Camp Udari, another staging area; the Ali Al Salem airbase, and Tactical Assembly Area Fox, a large Marine logistics base. Of these six missiles, four were shot down, while the two launched against Tactical Assembly Area Fox missed their target. Additionally, Iraqi forces launched a CSS-C-3 Seersucker cruise missile at the headquarters of the 1st MEF at Camp Commando

21/22 March

US Secretary of Defense Donald Rumsfeld outlined the military objectives of Operation Iraqi Freedom:

- First, end the regime of Saddam Hussein.
- Second, to identify, isolate and eliminate Iraq's weapons of mass destruction.
- Third, to search for, to capture and to drive out terrorists from that country.
- Fourth, to collect such intelligence as we can related to terrorist networks.
- Fifth, to collect such intelligence as we can related to the global network of illicit weapons of mass destruction
- Sixth, to end sanctions and to immediately deliver humanitarian support to the displaced and to many needy Iraqi citizens.
- Seventh, to secure Iraq's oil fields and resources, which belong to the Iraqi people.
- And last, to help the Iraqi people create conditions for a transition to a representative self-government.

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The air campaign stepped up as ground forces continued to make good progress, aimed at several hundred military targets throughout Iraq. Coalition aircraft flew some 3,000 sorties in the air attack.

Sources differ over the scale of the air assault. USCENTAF reports that the air campaign of Operation Iraqi Freedom launched into high gear shortly before 1:00 p.m. EST on March 21st, as hundreds of Coalition Force aircraft and cruise missiles targeted select regime leadership and military targets in Baghdad and other various cities. Military command and control installations, structures and buildings were the targeted sites. Other cities with military sites targeted were the northern towns of Kirkuk, Mosul and Tikrit. Over 1,700 air sorties and 504 TLAM and CALCM cruise missiles are used.[40]

The USAF in the US reports that the coalition flew 1,500 total sorties, 700 of which were flown by strike aircraft. The rest were jammers, planes protecting bombers, surveillance, etc. during the 24-hour period that started March 21st at 1 pm ET.

- They launched a total of 600 cruise missiles – 500 Navy sea-launched cruise missiles [Tomahawks] and 100 Air Force air-launched cruise missiles [CALCM]
- About 1,000 targets, aka aim-points. Military command and control installations, structures and buildings were the targeted sites. Other cities with military sites targeted were the northern towns of Kirkuk, Mosul and Tikrit.
- Planes involved: B-52 bombers, B-2 stealth bombers, F-117 stealth fighter bombers. F-15s used for counter air defense. Have encountered anti-aircraft fire but no opposition from Iraqi planes.
- The air campaign was adjusted in stride, as it was underway. Some planes hit they targets with which they were tasked upon departure, others had their targets shifted en route. Gen. Moseley, head of the air campaign, was described as "the quarterback of the operation, calling audibles in response to changing circumstances."
- The early success of the air campaign allowed the Coalition to further reduce the target list by hundreds of targets, including rail lines, bridges, power stations, and other facilities. It is clear that striking them was not necessary to support the land advance and they would have great value for nation building once the once is over. [41]

Tomahawk missiles were also launched from 30 U.S. Navy and coalition warships currently assigned to Naval Forces Central Command launched Tomahawk Land Attack Missiles (TLAMs) during last night's military operations to disarm Iraq. The U.S. ships which launched Tomahawks were USS Bunker Hill (CG 52), USS Mobile Bay (CG 53), USS San Jacinto (CG 56), USS Cowpens (CG 63), USS Shiloh (CG 67), USS Briscoe (DD 977), USS Deyo (DD 989), USS Fletcher (DD 992), USS Arleigh Burke (DDG 51), USS John S. McCain (DDG 56), USS Paul Hamilton (DDG 60), USS Milius (DDG 69), USS Higgins (DDG 71), USS Donald Cook (DDG 75), USS O'Kane (DDG 77), USS Porter (DDG 78), USS Oscar Austin (DDG 79), USS Augusta (SSN 710), USS Providence (SSN 719), USS Pittsburgh (SSN 720), USS Key West (SSN 722), USS Louisville (SSN 724), USS Newport News (SSN 750), USS San Juan (SSN 751), USS Montpelier (SSN 765), USS Toledo (SSN 769), USS Columbia (SSN 771), USS

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Cheyenne (SSN 773) and two Royal Navy submarines, HMS Splendid and HMS Turbulent.

The RAF's new Storm Shadow missile was successfully used for the first time on operations.

The US V Corps secured bridges over the Euphrates in their rapid advance on Baghdad.

At Basra, the Iraqi 51st Mechanized Division surrendered as US Marines and the UK's 7th Armored Brigade secured the area.

Coalition forces secured the port of Umm Qasr in Southern Iraq at 4 p.m. and began the groundwork for beginning the delivery of humanitarian assistance supplies to Iraqi people through this strategic port. Forces from the 15th Marine Expeditionary Unit and the 3rd Commando Brigade Royal Marines were involved in the seizure of the port, one of the first objectives in Operation Iraqi Freedom. Securing the port of Umm Qasr allows international aid agencies to begin the much-needed work of getting humanitarian assistance to the Iraqi people

At approximately 6 p.m. the 1st Marine Expeditionary Force secured the gas oil separation plants (GOSPs), crude oil export facilities and oil wells in the Rumaylah Oil Fields. Although the oil infrastructure was confirmed to have been extensively booby-trapped, the installations were secured intact and US and British troops began clearing the demolition charges.

U.S. Marines from the 1st Marine Division, and U.K. Royal Marines combined their efforts to secure the critical Iraqi infrastructure. “Over half of the Iraqi oil production, approximately 1.6 million barrels per day produced by 1,074 Rumaylah oil wells, has been secured for the Iraqi people,” said Lt. Gen James Conway, Commanding General of the 1st Marine Expeditionary Force.

Four GOSPs, a key pumping station at Az Zubayr, a manifold and metering station on the Al Faw peninsula, and the offshore crude oil export facilities have been secured and are critical nodes of the larger oil infrastructure in Southern Iraq. These key facilities give the Iraqi people the ability to preserve 85 percent of the function of those fields. The Mina al Bakr export facility was captured intact and in working order. The Khor al Amaya export facility was destroyed during the war between Iran and Iraq in the 1980s, and is currently non-operating. Both facilities are capable of handling 1.6 million barrels per day when operational.

Six major GOSPs, covering an area approximately 50 kilometers in length, included seven oil wells that have been sabotage and are on fire. Oil fire fighting crews will move into the areas at a designated time to snuff out the fires. Flame trenches filled with oil were also set aflame in a deliberate action by Iraqi troops. Some of the deserted plants were improperly shut down by Iraqis, causing oil pumping from the well to overfill the pumping station’s oil tanks. The oil is currently seeping around the area and could pose a potential threat of explosion if the oil reaches the burning wells.

Three main missions are then conducted. The first is safe shutdown procedures, which properly shut down the facilities and keep the oil from pumping. Later, after the stations have been improved, they will resume pumping. The other main missions include spill

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containment and oil fire fighting, overseen by members of the United Kingdom forces, the U.S. Army, Navy and Air Force, and contracted civilian contractors.

Royal Navy and US Navy minehunters continued clearance operations in the southern waterways to allow supplies to be shipped into Umm Qasr. In particular, RFA Sir Galahad was stood by to deliver humanitarian aid.

Two Royal Navy Sea King Mk 7 Airborne Early Warning helicopters collided over the northern Arabian Gulf. There were no survivors from the six British and one US crew members aboard. Two US Marines were killed in action in southern Iraq.

22/23 March

Air effort continues. In the 24 hour period starting at 06:00 [local Saudi Arabia] on March 22, US aircraft flew more than 1,500 sorties. Some 800 bombing sorties were flown against 500 preplanned targets. This includes the US Navy figures but does not include allies.

- Of those, 800 were "strike sorties," or bombing missions.
- There were about 500 aimpoints, or targets.
- The Navy reports launching more than 400 Tomahawk sea-launched cruise missiles to date.
- Pilots continued to report taking heavy anti-aircraft fire and sporadic launches of surface-to-air missiles.
- Targets included Iraqi Integrated Air Defense Systems (IADS), regime command and control, regime security, regime leadership and weapons of mass destruction (WMDs).
- The remaining sorties included intelligence, surveillance & reconnaissance (ISR), close air support, electronic jamming, air refueling, intra- and inter-theater airlift, combined search and rescue and interdiction.
- U.S. Air Force jets bombed and destroyed two Ababil-100 missile launchers near Basra, only 30 minutes after one of them launched a missile.
- On Friday, USAF F-117 stealth fighters "struck five strategic targets in Baghdad using a new precision-guided munition, the EGBU-27... the strike missions were able to precisely hit communication nodes and command bunkers."
- Sorties originated from as far away as Whiteman AFB, MISSOURI, the Indian Ocean, and the United Kingdom, as well as being flown from 30 locations throughout the CENTCOM Area of Responsibility (AOR) and five Navy aircraft carriers. The B-2s flew the longest missions, lasting approximately 34-hours round-trip.

There are now more than 170,000 US Army, US Marine and allied ground forces in Iraq.

The US advance north continued but encountered stiffer resistance in some locations, including at An Nasiriyah, where twelve US troops were reported missing. US soldiers apparently captured by Iraqi forces were subsequently paraded on State television.

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Operations to secure Umm Qasr continued.

Sporadic resistance continued at Umm Qasr. A prisoner of war camp was under construction in the area to accommodate properly the hundreds of Iraqi troops who had surrendered in the area. Work continued to make safe the booby-trapped oil installations in southern Iraq.

An RAF GR4 Tornado aircraft from RAF Marham, which was returning from an operational mission, was engaged near the Kuwaiti border by a Patriot missile battery. Both aircrew were killed. The next of kin have been informed.

A soldier in the 101st Airborne wounded 10 senior division personnel in a late-night attack at Camp Pennsylvania, two of whom died later from wounds.

USCENTCOM commander General Tommy Franks and General Vincent Brooks, summarized combat operations to date as follows:[42]

General Tommy Franks:

> "The initiation of combat operations – we refer to that as D-day. The introduction of special operation forces – we refer to that as S-Day. The introduction of ground forces, G-Day. And the introduction of shock air forces, A-Day.
>
> "Additionally, a number of emerging targets have been struck along the way and will continue to be struck as they emerge. So the sequence you have seen up to this point has been S-G-A. That sequence was based on our intelligence reads, how we see the enemy, and on our sense of the capabilities of our own forces."

Brigadier General Vincent Brooks:

> "…I want to take a few minutes to brief you now on some of the operations that have occurred by the coalition over the last several of days. The operation of course began on the 19th of March, and since that time, coalition forces have already achieved a number of several key mission objectives.
>
> Our first effort is aggressive and direct attacks to disrupt the regime's key command, control, communications, integrated air defense and ballistic missiles using various targeting and methods that will achieve the desired effects. This video shows an attack against an Ababil-100 in southern Iraq, and resulted in its destruction.
>
> Our second focus is on special operations. Coalition special operations forces entered Iraq at night, after destroying Iraqi military outposts, The special operation forces then began looking for Saddam Hussein's and the regime's weapons of mass destruction and their ballistic missiles that threaten their neighbors. Additionally, coalition special operations forces saved three key oil terminals that are used for export through the Gulf, and these terminals are key to the future of Iraq. By preventing certain destruction, the coalition has preserved the future of Iraq. This is the area where the three terminals were in southern Iraq, and in the Arabian Gulf. On these platforms we found a variety of things. We found weapons, ammunition, and explosives. These explosives are not meant for defenders.
>
> Our coalition maritime forces have destroyed Iraqi naval forces, as the following video shows. This is a patrol boat being attacked from the air, and in a moment you'll see the secondary explosion completing its destruction.
>
> They are also very active in ensuring that the waterways remain open and unmined so that Iraq is not cut off from the aid that is prepared to flow in…. Interdictions done by our coalition maritime forces and others over the last few days prevented, for sure, the release of 139 floating mines into the Khor Abdullah, which is an inlet that joins the Iraqi inland waterways with the Arabian Gulf.
>
> Ground maneuver forces attacked to seize the key Rumaila oil fields, simultaneously began an unprecedented combined arms penetration deep into Iraq. The attack continues as we speak, and

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has already moved the distance of the longest maneuver in the 1991 Gulf War in one quarter of the time.

The oil fields were spared destruction that was intended by the regime because of the effectiveness of these attacks…wells were set afire on the 19th in the afternoon, before the coalition attack began. By the next day, the land component had already entered Iraq and had prevented any further destruction. And this is video from the entering forces. And the good news is only nine of the roughly 500 oil wells that are in the Rumalah oil fields—only nine were sabotaged by the regime. The flame on the bottom shows where that location is. All the rest of them are okay.

I should add that the power of information has been key throughout this operation, and it is truly having the effect of saving lives—of the Iraqi people and military units who are choosing not to fight and die for a doomed regime. The leaders from several regular army divisions surrendered to coalition forces, and their units abandoned their equipment and returned to their homes, just as the coalition had instructed.

We know that there are other forces on the battlefield that we haven't even arrived at yet, and there are Iraqi units that are preparing to surrender even now as we speak. These are lines of roughly 700 Iraqi soldiers that we imaged in the desert away from their equipment, awaiting our arrival.

The coalition is committed to disarming Iraq. But the coalition is equally committed to bringing humanitarian assistance to the Iraqi people. Our humanitarian work in Iraq is only beginning. The U.S. military, coalition partners and other civilian organizations from around the world have positioned millions of meals, medicines and other supplies for the Iraqi people."

23/24 March

The "worst day of the war:" A total of 26 soldiers die in combat. The coalition advance slows and appears to halt.

USAF planes continue to encounter heavy antiaircraft fire and some are returning to base riddled with bullet holes. The air campaign on March 23rd focused mainly on:

- Providing close-air support for ground troops advancing in the southwest and in the north.
- Taking out Republican Guard targets in and around Baghdad.
- US aircraft flew about 2,000 sorties today. Of those, 800-900 were strike runs. [This included the close-air support mission]. There were 500 preplanned targets.
- Still no action from the Iraqi Air Force.
- Baghdad was hit by both cruise missiles and precision-guided bombs dropped from planes.
- Just about 80 percent of the bomb drops were precision-guided, as close-air support pilots dropped dumb gravity bombs on Iraqi ground forces.
- Officials confirm two Tomahawk cruise missiles did accidentally land in Turkey. No injuries.
- Cruise missile figures continue to be confusing and conflicting.. Navy says they have fired more than 500 Tomahawks since the start of the war. [Only 45 shot off yesterday; 70 a day earlier].

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- There have been "6 or 7" Tomahawk failures – duds that never left the tube and others than dropped in the water – out of all 500.

US forces advanced beyond An Nasiriyah, while aviation forces attacked Republican Guard formations near Baghdad; one US helicopter was lost.

In the north, US forces reinforced their presence and targeted elements of regime support units and the Republican Guard. In and around Baghdad, they continue air and special operations activities with good success. In the south, air units continued the campaign towards Baghdad and continue to operate in and around the area in support of our ground forces.

US combat operations met with resistance in a number of locations, the most notable of which was in the vicinity of An- Nasiriyah. United States Marines defeated an enemy attack there while sustaining a 10 killed and a number of wounded in the sharpest engagement of the war thus far.

Also in the vicinity of An-Nasiriyah, a United States Army supply convoy was ambushed by irregular Iraqi forces. A number of American service members were wounded in that action. As a result of that action, 12 U.S. service members are reported missing.

A U.S. Air Force MQ-1 Predator found and destroyed a radar-guided anti-aircraft artillery piece in southern Iraq Saturday at 5:25 EST making it the first Predator strike of Operation Iraqi Freedom, defense officials announced. The multi-role Predator used one AGM-114K "Hellfire II" missile to strike an Iraqi ZSU-23-4 Mobile anti-aircraft artillery gun outside the southern Iraqi town of Al Amarah.

A Patriot firing battery successfully intercepted and destroyed an incoming Iraqi tactical ballistic missile during an attack on U.S. and Coalition Forces in Kuwait at approximately 1:00 a.m. (5:00 p.m. EST). Two bright orange flashes were seen over Kuwait as the engaging PATRIOT missile destroyed the Iraqi TBM.

Mine clearance operations in the southern waterways made good progress, with half the route to Umm Qasr made safe. Logistic preparations continued to allow the shipping of humanitarian supplies once the route was cleared. Basra airport was secured.

Two British soldiers were reported missing after an attack on UK military vehicles in southern Iraq. In a separate incident, a British soldier was killed in action at Al Zubayr, near Basra. The next of kin of all three have been informed.

24/25 March

Coalition air attacks continued against Republican Guard formations and regime command and control and military formations virtually all over the country with precision munitions and precision application of those munitions. On March 24, US aircraft flew more than 1,500 sorties. Some 800 bombing sorties were flown against 500 preplanned targets

During combat air operations at approximately 3:40 p.m. local time Monday, a U.S. F-16 fighter engaged a U.S. Patriot battery approximately 30 miles south of An-Najaf, Iraq. The F-16 pilot executed the strike against the Patriot while en-route to a mission near Baghdad. No soldiers were injured or killed by the strike. The incident is under review to ensure the future safety of the Patriot crews and aircrews.

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US forces continued to advance north of An Nasiriyah British forces completed operations to secure Umm Qasr.

The Forward Command Element of the Military Coordination and Liaison Command, led by U.S. Marine Maj. Gen. Pete Osman, arrived in Northern Iraq and began work. Osman then meet with all primary and numerous other Iraqi Opposition leaders in the region, conveying U.S. intentions and explaining U.S. plans and operations in Northern Iraq. The MCLC's continued presence and activities in the region aids stability to Northern Iraq, as the organization fosters open communication and synchronized efforts among the various organizations operating there. The MCLC was established by U.S. European Command in order to conduct liaison and coordination with military and humanitarian assistance organizations. Now under the operational control of U.S. Central Command, the organization's function is to provide a stabilizing effect in the northern region, coordinate international activities in Northern Iraq and support humanitarian assistance efforts.

British artillery destroyed Iraqi mortars and guns that had opened fire on Iraqi civilian areas in Basra. 3 Commando Brigade, supported by helicopters and US and UK aircraft, defeated a tank attack, destroying nineteen T-55s.

A British soldier from the Black Watch was killed in action at Al Zubayr. In a separate incident, two more soldiers were killed when their Challenger 2 tank was accidentally hit by another Challenger 2 during an engagement with Iraqi forces.

News reports state that the Iraqis were using soldiers in civilian clothes as artillery spotters. Elsewhere, Iraqi forces continued to attack the coalition logistics train using mines and ambushes with RPGs and small arms.

The Continuing Advance from the South

As the war proceeded, the most striking aspects of the Iraq War was not that V-Corps and 1 MEF forces sometimes had to pause to resupply and consolidate their positions, or that they had to deal with continuing threats to their lines of advance and communications. It was rather than their average rate of advance became so high and continued in the face of major problems with weather and sandstorms.

This continuous pressure from the land, coupled with air operations that continued in spite of major weather problems, moved far more quickly than Iraqi forces could deal with. One of the striking advances in Coalition air power is that the fact the Coalition has virtual air dominance allows it to deploy otherwise vulnerable slow fliers like the E-8 JSTARS forward nearer the battle space, along with refueling tankers. The Doppler radar of the JSTARS could locate Iraqi major ground weapons and maneuvers over an area of several hundred square miles, and the "fusion of intelligence" from other sources give the Coalition the ability to locate and target Iraq forces under weather conditions they felt protected them from the air. Aircraft like the RC-135 Rivet Joint, for example, could characterize and locate the source of Iraqi military communications. The ability to refuel aircraft in forward areas greatly increase their "loiter" time and ability to find targets, and extend combat air patrol time.[43]

Fighter attack aircraft like the F-16 were able to locate targets in spite of what the Iraqi felt was effective cover from the weather, and even use laser guided bombs. Less sophisticated aircraft like the A-10 were still able to use onboard sensors and binoculars

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to find and attack targets like Republican Guards units, but given clearance to make use of cluster munitions like the GBU-87 to hit them with area weapons. The Medina. Al Nida, and Hammurabi Divisions of the Republican Guards are hit hard during this period. [44]

It is unclear just how much attrition took place, and how much Iraqi forces suffered from the intense pace of ongoing air attack. It is equally unclear what level of attrition was necessary to severely degrade Iraqi war fighting capabilities, paralyze any cohesive command and control attempt at reorganizing and regrouping Iraqi defenses, and limit the willingness of much of the regular army to fight. In many cases, the weaknesses in Iraqi military leadership must have gravely compounded the impact of both the rapid US land advance and precision airpower.

What is clear, however, is that from late March on the Iraqi Army ceased to fight as a cohesive force. Moreover, the fact that it was not prepared and in place to deal with the V-Corps and 1 MEF advance meant that many elements of the Iraq regular army could or would not move in any coherent pattern of maneuver, and Iraq was forced to try to block the main thrusts of the Coalition advance by committing its Republican Guards in a piecemeal form in maneuvers that made them vulnerable to air attack in spite of weather, and then forced them to close on advancing Coalition forces in what became a series of meeting engagements where Coalition airpower could attack them as they closed and they were then outgunned and out-targeted by V-Corps and 1 MEF artillery and armor.

Saddam Hussein's regime stripped Baghdad and Tikrit of the shield of Republican Guard forces and possibly deployed elements of the Special Republican Guards as well. It may have calculated that this would result in high enough US casualties and delays to give the regime political support and time, but the end result meant that the Republican Guards suffered steadily greater attrition and lost the force strength they would need to conduct a cohesive defense of Baghdad.

The Iraqi regime used up those elements of the regular army forces in the south that it could make maneuver with little clear purpose, and failed to achieve any major repositioning of the bulk of the regular army, which was deployed in the north. It failed to effectively blow bridges and make use of water barriers. The fact Iraq's regular forces could still fight in cities, and it could conduct raids along the US line of advance and tie down British forces around Basra, became more harassment than defense. It did not mean Iraq could fight effectively in the more open areas that the US used to the west of the Euphrates or paralyze I MEF forces in their advance through much more densely populated areas. The 1 MEF did have to fight its way north, but it still advanced on Al Kut without having to encounter massed Iraqi land forces that conducted a coordinated defense in depth.

In contrast, the US and Britain exploited many of the features of their war plan that had first become apparent months before the war began. The Coalition advanced focused on destroying the regime's center of power, rather than trying to defeat all Iraqi forces in detail. It did not attempt occupy or secure rear areas, as distinguished from defeating and containing those forces that actively threatened the Coalition's main line of advance.

The Coalition used precision air and missile power to achieve the "effect" of disrupting and paralyzing enemy operations rather than in a battle of tactical attrition throughout the

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theater of operations of the kind fought in the 38-day air campaign in the Gulf War of 1991. At the same time, the Coalition's focus on destroying narrowly defined active leadership targets, active C4I/battle management facilities and systems, and the Republican Guards allowed it to achieve decisive "effects" without major attacks on population centers, infrastructure, industry, or lines of communication.

At the same time, the Coalition made use of Special Forces, with the addition of the 173rd Airborne Brigade, to occupy air bases in the West, secure the Kurdish Security Zone, and conduct small operations in a wide range of areas in Western and Northern Iraq. While the details remain unclear, Iraq failed to put effective pressure on the Kurds, resist decisively in the West, and make effective use of what – on paper – was a decisive superiority in force numbers in units that were not under V Corps and 1 MEF attack.

25/26 March

Weather has an impact on the battlefield, with high winds, with some rain, with some sandstorms and thunderstorms throughout the country. However, precision all-weather weapon systems and an aggressive integrated operations plan by air and land components allow coalition forces to maintain and increase pressure on the regime on all fronts, even in the bad weather.

The air component flies over 1400 combat and combat support missions over Iraq paying particular attention to the Iraqi Republican Guards, while attacking surface-to-surface missiles in a time-sensitive fashion, these missile systems that affect and threaten Kuwait and other neighbors in the region. They also focus on key regime command-and-control facilities. Command and control targets in Baghdad were attacked.

The US Air Force reported flew more than 1,500 sorties on March 25th, 700 of which were strike missions. They had about 100 preplanned targets. The strikes focused on regime command and control, leadership and Republican Guard units in and around Baghdad.

They also flew extensive close air support in the south (Basra), north and west. Aircraft supporting ground troops (mostly A-10 Warthogs) continue to take heavy anti-aircraft fire... and are returning shot up. The Air Force says the maintenance crews that keep these planes flying, are the unsung heroes in the fighting.

The resulting combination of air operations, direct land-based attack and precision special operations creates a synergy that is key to the coalition strategy.

Coalition land forces continue to progress northward with engagements in the vicinity of An Nasiriyah and Basra, and some casualties, but inflict more on the enemy and destroy a number of their tanks, artillery pieces and troop formations. The coalition lost a total of one soldier, four marines and two British soldiers in a number of incidents throughout the country.

US forces fought significant engagements near An Najaf and An Nasiriyah. The Ba'ath Party headquarters in As Samawah was destroyed.

Iraqi tanks advancing out of Basra were engaged and destroyed.

The Northern front opens on March 26th with the airlift of the US army 173rd Airborne Brigade.

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British troops conducted effective raids against paramilitary forces in the Basra area. Engineering work to construct a fresh water pipeline from Kuwait into southern Iraq continued.

Reports in the news media also mention that American forces using between 30 and 40 Apache and Apache Longbow attack helicopters attacked Republican Guard vehicles south of Karbala and came under very heavy fire, resulting in the loss of one AH-64D and the capture of its two crewmen. Pilots were shot at with small arms and RPGs from streets, roofs and backyards. One pilot was quoted as saying "They definitely had their air defense arrayed in different zones. That's what we were fighting against, plus some small arms." The tactics utilized by the Iraqis resemble helicopter ambush tactics first employed by North Vietnam in the late 1960's.

26/27 March

Sandstorms continued in Iraq, hindering fixed-wing and helicopter operations. According to media reports, Iraqi Republican Guard and Special Republican Guard units used the cover of the sandstorms to move units south from Baghdad. The Iraqi forces were hit by heavy air strikes and sustained estimated losses of hundreds of vehicles.

A United States Air Force B-2 Spirit bomber targeted and struck a major link in Iraq's national communication network. The communication link occupied a large tower on the east bank of the Tigris River in downtown Baghdad. The strike with two precision-guided munitions was to degrade the ability of the Hussein regime to command and control the actions of Iraq's military forces. Battle damage assessment is ongoing

US airborne forces landed in northern Iraq. US forces defeated attacks near An Najaf and An Nasiriyah. One M-2 Bradley was reported destroyed in the fighting near An Najaf.

As for the land campaign, Michael Eisenstadt of the Washington Institute notes that,

"U.S. forces heading to Baghdad had made remarkable progress, in one of the most rapid sustained armored advances in the history of warfare (averaging about 75 miles per day for the first four days). By avoiding major Iraqi military formations and skirting major population centers, U.S. forces racing to Baghdad have surpassed the achievements of the Germans in Russia (1941) and North Africa (1942), the Soviets in the Ukraine (1944) and Manchuria (1945), Israel in the Sinai (1967), and the United States in Iraq during Operation Desert Storm (1991).

"…losses remain relatively light. A review of personnel attrition rates indicates that, after six days of battle, approximately 20 coalition soldiers have been confirmed killed in action (an average of about 3 per day), whereas more than 150 coalition soldiers were killed during the four-day air- land campaign at the end of Operation Desert Storm (for an average of nearly 40 per day).

Southeast of An Najaf, there were a series of engagements that occurred over the period of about three to four hours. Coalition forces of U.S. Fifth Corps sustained a few damaged vehicles, and in turn inflicted significant damage on the Iraqi force.

In particular, elements of the 3rd Squadron, 7th Calvary Regiment encountered Iraqi forces in a series of ambushes and were in repeated contact with Iraqi forces over 24 hours near As Samwah and Al Faysaliah. The 3/7 Calvary was attacked by heavy small arms and ATGM fire and lost two trucks, one Humvee, a M-2 Bradley IFV and two M-1A1 tanks to enemy fire. Another M-1A1 and fuel truck were lost in difficult terrain couldn't be recovered. The M-1A1s were hit in the engine compartments and are thought to have been lost to Russian AT-14 Kornet ATGMs.

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In fighting throughout the region, Iraqi forces made use of harassing attacks and ambushes with mortars, anti-tank missiles, machine guns and small arms. In many instances Iraqi forces were dug in along several hundred yard stretches along roads.

Near An Nasiriyah, the First Marine Expeditionary Force gained control of a hospital that was in use as a paramilitary headquarters, staging area and storage area. Notably within the hospital, there were 200 weapons, Iraqi military uniforms, one tank, 3000 chemical protective suits, and nerve agent antidote injectors.

Special Operations forces continued to set conditions for our conventional forces by calling in close air support on military targets, including last night the destruction of the Ba'ath Party headquarters in As Samawa.

UK forces conducted aggressive patrols in the Al Faw area and in Umm Qasr to increase the security in those areas, and also conducted a raid that destroyed a Baath Party headquarters in Basra. They continue to have success against the regulars in the area.

Maritime forces began to clear the Khor Abdullah all the way up to the Port of Umm Qasr.

Two mines were discovered at sea close to the swept channel leading to Umm Qasr: the arrival of the Royal Fleet Auxiliary Sir Galahad, carrying humanitarian supplies, was delayed to allow that part of the swept channel to be checked by RN and USN minehunters

A squadron of the Royal Scots Dragoon Guards eliminated an Iraqi tank unit and infantry positions near Basra without suffering losses.

27/28 March

Sandstorms continued, slowing movement and hindering air operations.

US forces defeated further paramilitary counter-attacks north of An Najaf. The 3rd Infantry Division advanced beyond Diwaniyah east of An Najaf, and an airborne brigade combat team from the 173rd airborne Brigade parachuted into an airfield in northern Iraq yesterday evening.

East of An Najaf, coalition forces of the U.S. Fifth Corps were attacked by vehicle-mounted irregulars, where there had been a report of some significant number of vehicles approaching. The reports were not accurate in terms of the size of the force, but Fifth Corps units defeated the attack, destroying most of the force.

In An Nasiriyah, the First Marine Expeditionary Force defeated an attack by irregulars, supported by armored personnel carriers, rocket launchers and anti-aircraft artillery systems. The fight lasted for about 90 minutes. The Marines in that battle did sustain some wounded but remained fully effective.

UK forces continued aggressive patrols and operations in the Al Faw and Basra areas, and they also have inflicted considerable damage on paramilitaries south of Basra and near Al Faw.

Maritime forces continued their efforts to expand the width of the cleared channel in Khor Abdullah. The channel was opened all the way up to Umm Qasr, and about 60 yards wide. As it was expanded to get to about a 200-yard-wide pathway, Coalition

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forces identified some bottom-influenced mines. These are sub-surface mines that are able to be programmed, if need be, to count the number of hulls that pass over top of them, and at a certain point, however programmed, they detonate.

Following further mine clearance operations, the Royal Fleet Auxiliary Sir Galahad safely arrived in Umm Qasr, delivering a major consignment of humanitarian aid.

A soldier from D Squadron, The Blues & Royals, was killed in an incident in southern Iraq.

28/29 March

The weather cleared today; consequently, coalition forces increased the number of strikes on Baghdad and Republican Guard units. Ba'ath Party headquarters in nine locations were attacked by Coalition air and ground forces.

Land forces consolidated territory gained over the last several days, and conducted active security operations to eliminate identified terrorist death squads. The First Marine Expeditionary Force continued its advance beyond Kulat Sukhayr. The Fifth Corps, defeated paramilitary attacks north of An Najaf, and continued to shape the battlefield for future operations.

US forces captured a major Iraqi ammunition depot in central Iraq near Tallil. Other Coalition forces secured additional bridges across the Euphrates and launched offensives to isolate Iraqi forces holding out in the An Nasiriyah and As Samawah areas. V Corps bombarded the Republican Guard Medina Division.

In the 3rd Infantry Division sector, soldiers from the 2nd Brigade Combat Team attacked and cleared the enemy from quarries to the south of Karbala. At one point, the brigade came under ineffective and uncoordinated enemy artillery fire, which was suppressed with radar-directed multiple launch rocket system (MLRS) counterfire from the Corps' artillery.

The remainder of the 3rd Infantry Division attacked north throughout its zone to defeat small pockets of enemy forces. These attacks resulted in the destruction of two 57mm air defense artillery systems, two armored personnel carriers, one artillery piece, nine technical vehicles, several enemy KIAs and approximately 30 enemy prisoners of war.

The 101st Air Assault Division conducted patrols northwest and south of An Najaf, which resulted in the capture or defeat of one 120mm mortar, four weapons caches, several enemy KIA, and approximately 20 enemy prisoners of war.

US helicopters attacked the Republican Guard Medina division near Karbala. Apache Attack Helicopters from the 101st Airborne Air Assault Division pounded the Republican Guards Medina Division during an early evening (March 28) Deep Strike in the vicinity of the city of Karbala. The Deep Attack was a deliberate, coordinated operation directed against an elite, well-entrenched Republican Guard division. In this attack, coalition forces used artillery and ATACMS rockets to attack suspected air-defense sites. Additionally, coalition helicopters called in fixed-wing aircraft to attack six more heavily defended targets. The tactics employed in this attack seem to have been more effective in limiting damage to coalition forces. The initial battle damage assessment from the "Screaming Eagles'" attack reports the destruction of tanks, Armored Personnel Carriers,

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an anti-aircraft artillery system, and a radar unit, in addition to numerous enemy personnel.

Outside of As Samawa, a white pick-up truck attempted to crash an 82nd Airborne Division check point. One enemy was KIA and three were wounded when Paratroopers engaged the truck. No U.S. soldiers were wounded in the attack. In other action, the 82nd Airborne Division conducted several patrols around As Samawaa. These patrols resulted in the capture or defeat of numerous enemy KIA and WIA, approximately 20 enemy prisoners of war, two mortars, and 2 technical vehicles. As of yesterday, soldiers from V Corps had captured approximately 700 enemy prisoners of war

U.K. forces succeeded in preventing any reinforcement of Basra while securing the southern oil fields, and the key point of – the key port of Umm Qasr.

In the north, coalition forces kept pressure on regime forces while maintaining stability in the Kurdish region of Iraq. Following bombardment by coalition aircraft, Iraqi forces pulled out of positions at Chamchal, near Kirkuk. Kurdish paramilitary forces later seized these positions. Elsewhere in northern Iraq, US Special Forces and Kurdish fighters attacked and cleared a number of positions held by Ansar al-Islam near Halabja. It is estimated that 30 to 40 enemy troops were killed and two were captured.

Coalition special operations forces continue their actions throughout all of Iraq. A operation occurred at night in An-Nasiriyah involving special operations aircraft destroying two paramilitary headquarters.

Maritime forces clear the mines found in the channel of Khor Abdullah, near buoy number 24. The waterway has been reopened for the arrival of much needed humanitarian supplies.

USCENTCOM describes missile defense activity as follows: “a total of about – a total of 12 missiles have been fired. We believe them to be in the Ababil-100 or Al-Samoud family, and those have been launched from within Iraq toward Kuwait. We're seeing a rate of about one per day at this point, and all of the threatening launches have been intercepted by Patriot missiles. Additionally, we have established combat air patrols near the areas where most of the launches are occurring. We have been successful in destroying a number of launchers before and after they're fired, and we're actively hunting for them.”

US airborne forces landed in northern Iraq

British forces moved to interdict northern routes into Basra. The major oil refinery at Basra was secured. One British soldier died as a result of a friendly fire incident.

Two US marines were lost in action in two separate incidents.

Iraqi forces conducted a successful airborne reconnaissance of 3rd Infantry Division staging areas by using an ultralight aircraft. The ultralight was successfully acquired visually by Linebacker air defense units, but they were unable to receive authorization to engage before the aircraft left the area.

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29/30 March

Coalition aircraft attacked air defense, command and control, and intelligence facilities in the Baghdad area.

3 Commando Brigade launched an offensive near Basra that secured Abu al Khasib. A Royal Marine was killed in action on the Al Faw peninsula, and a Royal Signals NCO died in a road traffic accident in Kuwait.

An Iraqi suicide car bomber killed four soldiers from the 3rd Infantry Division near Najaf. Throughout the country, Iraqi forces continued their attacks on supply lines. Generally, Iraqi forces lie in wait and ambush the rear of a supply column as it moves through built-up areas.

In the north, Iraqi forces withdrew from positions around Qush Tapa and Taqtaq. A battery of 105 mm towed artillery was delivered to the Bashur airfield in northern Iraq to reinforce the 173rd Airborne Brigade.

An Iraqi CSS-C-3 Seersucker cruise missile was launched from southern Iraq and landed near a shopping mall in Kuwait. No injuries were reported.

A fresh-water pipeline from Kuwait to Umm Qasr was completed, delivering 625,000 gallons of water per day.

30/31 March:

General Franks defined current operational objectives as:

- "First, the coalition has secured the oil fields in the south from regime destruction, which they attempted, and this vital resource has been preserved for Iraq's future.
- Second, we have air and ground freedom of action in western Iraq, working to protect Iraq's neighbors from potential regime use of weapons of mass destruction.
- Third, our air forces work 24 hours a day across every square foot of Iraq. And every day the regime loses more of its military capability.
- Fourth, we're now staging and conducting air operations from a number of Iraqi airfields that are now under coalition control.
- Fifth, coalition forces have attacked and destroyed a massive terrorist facility in the last 48 hours in northern Iraq, and ground forces, as we speak, are exploiting the results of that strike.
- Sixth, the entire coastline of Iraq has been secured and her ports stand today as a gateway for humanitarian assistance for the Iraqi people. As you know, the first humanitarian shipments have arrived in convoys, and additional shipments are on the way.
- Seventh, the coalition has in fact introduced a very capable ground force into northern Iraq. These forces, along with large numbers of special operations troops, have preventing the rekindling of historic feuding which we've seen in years past between the Turks and the Kurds, and these forces do in fact represent a serious northern threat to regime forces.
- Eighth, a large and capable ground force has attacked to within 60 miles of Baghdad on multiple fronts, and they currently maintain readiness levels of their combat systems above 90 percent mission capable. As we speak, elements of that ground force are continuing the attack. The regime is in trouble, and they know it.
- Ninth, in the past 24 hours, I have received reports that coalition forces are working with local Iraqis in the city of An Nasiriyah, and the death squads that operate – the squads of gangs, regime gangs that operate in that city, have come under fire. The Iraqis in and around An Nasiriyah are

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> helping us once again as we speak by providing records on Ba'ath Party officials and members of the regime attempting to operate in and around An Nasiriyah. Similarly, we see from day to day Iraqis coming to our forces, linking up with free Iraqi forces, discussing the past, and wanting to discuss their future

> "…this military campaign will be like no other before. We will attack the enemy, have and will continue to attack the enemy, at times and at places of coalition choosing. Sometimes simultaneously, sometimes sequentially.

> "Let me talk for just a minute about the road ahead. We'll continue to surprise the enemy by attacking at all times of day and night all over the battlefield. Coalition forces will continue to advance on Baghdad while the Iraqi regime will continue to lose control of the country. The regime will continue in the days ahead to locate military assets near civilians, near cultural sites, near hospitals, near schools. And the regime may well attempt to destroy the Iraqi infrastructure. We'll do our best to protect the citizens of Iraq, while the regime does its best to use them as human shields. Our targets will remain the Iraqi regime, not the Iraqi people, and we will continue to provide humanitarian assistance, and we will continue to open the gateways in the south, and in the west, and in the north."

By 10 pm ET on March 30th, the USAF had flown 1,800 missions over Iraq during the pervious 24 hours. Of those, 800 will have been strike missions with 200 "aimpoints" or targets. The rest: 400 refueling tanker missions, 225 cargo or personnel airlift missions, 100 command/control/intelligence/surveillance/reconnaissance missions.

They dropped 1,200 precision-guided bombs, including 14 Tomahawk cruise missiles. More than 80 percent of the strike missions were to support ground forces in the south, north and west. And 60 percent focused on degrading the capabilities of Republican Guard divisions around Baghdad. Other targets, included command/control and leadership sites in and around Baghdad.

Moving through sandstorms, and harsh terrain, soldiers from the Corps' 3rd Infantry Division, 101st Airborne Division (Air Assault), and 82nd Airborne Division attacked the regular Army, Republican Guard, and the terror squad forces of the Iraqi regime.

The 3rd Infantry Division attacked and successfully seized a bridge over the Euphrates River near Al Handiyah, once again preserving Iraqi infrastructure that had been rigged for destruction. Engineers with the 2nd Brigade Combat Team cleared the explosives and reported that the bridge was in good shape.

Along with the 2nd Brigade Combat Team, soldiers from the division's 3rd Squadron, 7th Cavalry Regiment worked to deny enemy access to resupply routes in the sector. During the course of the day's operations, the Division captured nearly 150 enemy prisoners of war and destroyed numerous enemy vehicles, air defense weapons, and small arms caches.

The 101st Airborne Division (Air Assault) attacked and seized the airfield at An Najaf in its continuing effort to isolate enemy forces in the area. The division destroyed two T-55 tanks, 15 technical vehicles, and a field artillery battery. Over 70 enemy soldiers were captured.

In operations in the vicinity of As Samawah, the 82nd Airborne Division used precision artillery counterfire to destroy an enemy D30 artillery system. The division continued operations to secure the Corps' lines of communication. In total, Corps units captured over 230 enemy soldiers.

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Coalition troops seized the Hadithah dam on the Euphrates, to guard against deliberate flooding operations by the Iraqi regime.

A British soldier was killed during an explosive ordnance disposal operation in southern Iraq. A US soldier was killed in action in fighting near Najaf.

31 March/1 April

Roughly 66% of the targets struck on March 31st were the Medina, Baghdad and Hammurabi Divisions of the Republican Guard. Another 20 % were in support of ground operations in the south, west and north.

On March 31st:

- 2,000 total missions flown total
- 800 attack missions
- 400 air refueling tanker missions
- 250 cargo airlift missions
- 125 command, control, intelligence, surveillance & reconnaissance missions

Since the start of the war:

- 18,000 sorties flown (40% in the last three days)
- 8,000 precision guided weapons dropped
- 70% of all bombs dropped precision guided
- 20.1 million gallons of fuel pumped into planes on refueling missions
- 24,000 short tons of cargo moved by aircraft
- 27,000 passengers moved since 10/02.
- 26 million leaflets dropped

The status of Iraqi land forces is uncertain, but seems to be as follows:

The status of the regular army was:

- The 4th Corps had 1 armored, and 2 Infantry Divisions. Its headquarters and key command, control, communications, and intelligence (C3I) facilities had been extensively hit from the air, as well as its armor and equipment in moving units. It was shifting towards Marine force with elements deployed by Al Kut and al Hillah and some near Kerbala/An Najaf.
- The 3rd Corps had 1 armored, 1 Mechanized, and 1 Infantry Division. Its headquarters in the Nassiryah area had been captured. The 51st Mechanized Division was largely destroyed in fighting at Basra. The 11th Infantry Division was badly hurt by fighting at An Nassiryah. The 6th Armored Division had clashed with Marine elements and been hit it hard from air.

The status of the Republican Guards was:

- The Southern or 2nd Corps of the Republican Guards is headquartered at Al Hafreia (Alsuwera Camp) and the Al Fateh al Mubin Command Center. Its facilities had been hit hard from the air.
- The Medina or al Medina al Munawara Armored was the major force challenging the advance of the 3rd Mechanized Division. It had three brigades: 2nd and 10th Armored and 14th

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Mechanized. Its headquarters and key command, control, communications, and intelligence (C3I) facilities had been hit hard from the air, as well as armor and equipment in unit. Estimated to have lost 35% to 65% of effectiveness.

- The Nebuchadnezzar (Nabu Khuth Nusser) Infantry Division, normally at Al Husseinia-al Kutt, have shifted west to defend against Marine advance. Its headquarters and key command, control, communications, and intelligence (C3I) facilities had been hit hard from the air, as well as armor and equipment in unit. Loss of 10-20% of effectiveness.
- The 2nd Baghdad Infantry Division normally at Maqloob Maontin-Mosul had moved into the Al Kut area and was fighting US Marine forces. Its headquarters and key command, control, communications, and intelligence (C3I) facilities had been hit hard from the air, as well as armor and equipment in unit. It seems to have lost some 20-40% of its effectiveness.
- The Hammurabi Mechanized Division (Brigade?) had moved out of the al-Taji area, and elements that guarded Tikrit were engaging the 3rd Infantry Division in the Karbala and an Najaf area as the Medina Division declined in combat capability. Its headquarters and key command, control, communications, and intelligence (C3I) facilities had been hit hard from the air, as well as armor and equipment in unit. Loss of 10-20% of effectiveness.

The US 173rd Airborne Brigade completed its deployment in northern Iraq. Air attacks continued on the Republican Guard divisions around Baghdad and Tikrit. V Corps mounted simultaneous attacks at Al Hillah, Karbala and As Samawah.

Since the beginning of Operation Iraqi Freedom's ground campaign 12 days earlier, V Corps forces have traveled a distance roughly equivalent to the distance between New York City and Richmond, Virginia.

5th Corps actions included simultaneous, limited objective attacks near Al Hillah, Karbala, and As Samawa. And these attacks were intended to create vulnerabilities in the Republican Guard defenses, and also to isolate the remaining pockets of resistance for destruction at a time of our choosing. The attacks were effective, and resulted in the capture of an Iraqi general, an airfield, and a training camp for regime death squads.

V Corps engaged the Medina and Nebuchadnezzar Divisions at Karbala, as well as continuing operations to clear paramilitary forces from An Najaf, where Iraqi forces were reported to be firing from the sacred Ali Mosque.

The 3rd Infantry Division attacked and successfully seized a bridge over the Euphrates River near Al Handiyah, once again preserving Iraqi infrastructure that had been rigged for destruction. Engineers with the 2nd Brigade Combat Team cleared the explosives and report that the bridge is in good shape.

Along with the 2nd Brigade Combat Team, soldiers from the division's 3rd Squadron, 7th Cavalry Regiment worked to deny enemy access to resupply routes in the sector. During the course of the day's operations, the Division captured nearly 150 enemy prisoners of war and destroyed numerous enemy vehicles, air defense weapons, and small arms caches.

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In operations in the vicinity of As Samawah, the 82nd Airborne Division used precision artillery counterfire to destroy an enemy D30 artillery system. The division continued operations to secure the Corps' lines of communication. In total, Corps units captured over 230 enemy soldiers yesterday

Attacks on Ba'ath Party headquarters continued, some assisted by the local population. The Black Watch battle group rescued two Kenyan civilians who had been taken prisoner by Iraqi forces at Al Zubayr. British forces also destroyed an armored force north of Basra.

A British soldier died in an accident involving a light armored vehicle.

The maritime component continued its work and is completing the clearance of the old port of Umm Qasr, the old portion of the port, and extending efforts to clear the newer part of the port to the north.

1/2 April

Coalition air forces attacked regime targets in Baghdad and areas throughout the country. Precision attacks against surface-to-surface missiles and Republican Guard forces also continued. Coalition air operations struck more than 50 strategic regime targets in Baghdad on March 31st. On April 1st, they focused on killing Republican Guard targets and hitting strategic targets in Baghdad.

On April 1st:

* 1,900 total missions flown total

  * 800 attack missions

  * 400 air refueling tanker missions

  * 250 cargo airlift missions

  * 150 command, control, intelligence, surveillance & reconnaissance missions

Since the start of the war (as of Sunday):

- 20,000 sorties flown
- 8,000 precision guided weapons dropped
- 70% of all bombs dropped precision guided
- 22.3 million gallons of fuel pumped into planes on refueling missions
- 26,000 short tons of cargo moved by aircraft
- 27,000 passengers moved since 10/02.
- 26 million leaflets dropped.

US troops rescued a female soldier held prisoner by the Iraqis. US Marines captured at Al Hillah two of the Al Samoud II missiles that contravened UN resolutions.

An attack by US Marines drove back the Baghdad Division of the Republican Guard at Al Kut. The First Marine Expeditionary Force attacked the Baghdad division near the

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town of Al Kut over here shown) and crossed the Tigris River. The Baghdad division was destroyed

V Corps opened the gates to Baghdad with the destruction of the Medina Division of the Republican Guards in major offensive operations throughout the sector. The 3rd Infantry Division attacked to seize key terrain and devastate the Medina Division's forces. All three Brigade Combat Teams combined overwhelming firepower and decisive maneuver to destroy multiple enemy combat systems, including six T-72 tanks, 13 enemy armored personnel carriers, and 15 air defense weapons. The division's engineer soldiers, working in conjunction with the 1st Brigade Combat Team, established control over numerous bridge and gap crossing sites.

Fifth Corps units also attacked to clear paramilitary forces in An Najaf. The attacking unit was welcomed by thousands of citizens. It was also met by fire from regime forces that had positioned themselves inside the Ali mosque, one of the most important religious shrines to all of Shi'a Islam throughout the world.

The 101st Airborne Division (Air Assault) continued offensive operations to liberate the city of An Najaf and isolate enemy forces in sector. Soldiers from the division destroyed 13 air defense and field artillery weapon systems along with six technical vehicles used by paramilitary forces.

The 82nd Airborne Division tightened their grip on enemy paramilitary forces in the As Samawah area today, conducting a surprise attack on a platoon of paramilitary forces attempting to organize north of the city. The division's 2nd Brigade captured an enemy missile cache and additional enemy chemical protective gear.

The Corps' long-range artillery units combined with Air Force close air support to destroy over 60 enemy vehicles, including five tanks and 15 artillery systems. In total, the Corps captured nearly 100 enemy prisoners, destroyed over 100 enemy tracked and wheeled weapon systems, and eliminated numerous command and control facilities.

Coalition special operations forces continue to target regime concentrations with the aid of local populations. In An Nasiriyah, special operations forces controlled aircraft destroyed numerous buildings, numerous vehicles, and five regime buildings, including the director of general security headquarters. In the western desert, two suspected Iraqi intelligence service agents were captured at a special operations checkpoint.

The land component conducted operations throughout the zone of action that runs from Basra in the south, to al Kut in the east, and Karbala in the west: Basra in the south, al Kut in the east, and Karbala in the west.

There were several successful delivered raids against regime death squad locations in Ba'ath Party headquarters. These also, like with the special operations forces, were assisted by local populations, who are increasingly willing to provide information against the regime. And examples include the 1st Marine Expeditionary Force conducting attacks near Ad Diwaniyah and As Shatra (sp), which is just north of An Nasiriyah. Approximately 100 tribal men joined with coalition forces in these attacks and resulted in the captures of enemy prisoners of war, weapons, the destruction of bunkers, and the removal of explosives from a bridge – and there were no friendly casualties.

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U.K. operations in the Basra area resulted in the destruction of a considerable amount of Iraqi tanks and armored personnel carriers along Highway 6, north of the city. Operations there also resulted in the recovery of two Kenyan men who had been held hostage near Al Zubair, west of Basra. British troops destroyed Iraqi artillery and missiles near Basra.

UK forces continued to secure the Al Faw peninsula and the Rumaylah oil fields while destroying any remaining resistance in the south. Among their recent successes are the capturing of five cruise missiles of the Styx variety near Ash Shuaybah Airport. These missiles are designed for the Osa (patrol boats sunk in the first days of the war. They can be fired into Kuwaiti territory or against ships that are out inside the North Arabian Gulf. At this point UK forces remain firmly in control of the northern approach to Basra.

UK forces captured a motorcycle courier. The motorcycle and crew had maps in their possession that showed artillery positions. The UK forces went to find the artillery positions, found them, destroyed all the artillery, and also found three Ababil-100 missiles and destroyed them as well.

The maritime component handed over the port operations of Umm Qasr to the land component today. And a UK military port management unit will take over the running of the port from the military side.

Representatives of the International Committee of the Red Cross visited Iraqi prisoners of war held by Coalition forces in southern Iraq to confirm that their treatment was in accordance with the Geneva Convention.

2/3 April

The coalition air campaign focused on killing Republican Guard targets – Medina, Baghdad and Hammurabi divisions – and hitting strategic targets in Baghdad.

The Combined Forces Air Component Commander reported daily and total sorties on April 2nd as follows:

On April 2nd, the daily US air effort totaled:

- 1,900 total missions
- 900 attack missions
- 500 air refueling tanker missions
- 250 cargo airlift missions
- 100 command, control, intel, surveillance & recon missions
- Focused on killing Republican Guard targets – Medina, Baghdad and Hammurabi divisions – and hitting strategic targets in Baghdad.

Since the start of the war (as of Sunday), the US forces had flown

- 21,000 sorties
- 8,000 precision guided weapons dropped
- 70% of all bombs dropped precision guided
- 24.7 million gallons of fuel pumped into planes on refueling missions

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- 28,000 short tons of cargo moved by aircraft
- 36,000 passengers moved since 10/02.
- 26 million leaflets dropped (apparently different than what USCENTCOM says... but these are the numbers being turned out by the Air Force)

Today, two new weapons systems were used for the first time in an air attack by B-52s. One system was the Air Force's Sensor Fused Weapon, a smart submunition designed to attack tanks. This submunition was delivered using the new Wind Corrected Munitions Dispenser (WCMD). The designation of the WCMD carrying the Sensor Fused Weapon is the CBU-105.

Actions took place by the 1st Marine Expeditionary Force, isolating the town of al-Kut, and continue their attacks west of An- Numaniyah. Al-Kut on the east side, the river as it goes along – this is the Tigris River – and Numaniyah. There is a road that runs along the northern side of the river, and seizing that location and the space between it, gave the 1st MEF commander the ability to attack towards Baghdad up the main road on the northeast side of the Tigris.

Fifth Corps penetrated the Karbala Gap, the narrow area between the town of Karbala and the Lake Razzaza. It was defended by the Baghdad Division and elements of the Nebuchadnezzar Division. Most of those were arrayed further up to the northwest.

The US V Corps drove back the Medina Division of the Republican Guard close to Baghdad and secured another crossing over the Euphrates. It opened the gates to Baghdad) with the destruction of the Medina Division of the Republican Guards in major offensive operations throughout the sector. The US forces began their attack on Saddam International Airport.

The 3rd Infantry Division attacked to seize key terrain and devastate the Medina Division's forces. All three Brigade Combat Teams combined overwhelming firepower and decisive maneuver to destroy multiple enemy combat systems, including six T-72 tanks, 13 enemy armored personnel carriers, and 15 air defense weapons. The division's engineer soldiers, working in conjunction with the 1st Brigade Combat Team, established control over numerous bridge and gap crossing sites.

In crossing through the area, the 5th Corps forces were able to seize a bridge intact over the Euphrates River. It was in fact rigged for demolition. They were able to remove the demolition, cross the bridge, and continue the attack. At this point, 5th Corps began conducting a deliberate attack toward Baghdad. They are also continuing raids against identified regime pockets in places where the regime no longer has control.

The 101st Airborne Division (Air Assault) continued offensive operations to liberate the city of An Najaf and isolate enemy forces in sector. Soldiers from the division destroyed 13 air defense and field artillery weapon systems along with six technical vehicles used by paramilitary forces.

The 82nd Airborne Division tightened their grip on enemy paramilitary forces in the As Samawah area, conducting a surprise attack on a platoon of paramilitary forces attempting to organize north of the city. The division's 2nd Brigade captured an enemy

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missile cache and additional enemy chemical protective gear. One US soldier was lost in action in Samawah.

The Corps' long-range artillery units combined with Air Force close air support to destroy over 60 enemy vehicles, including five tanks and 15 artillery systems. In total, the Corps today captured nearly 100 enemy prisoners, destroyed over 100 enemy tracked and wheeled weapon systems, and eliminated numerous command and control facilities

In northern Iraq, air strikes were called in against the Iraqi 15th Mechanized Division.

Coalition special operations forces in northern Iraq coordinated air attacks against the 15th Mechanized Division, a regular army unit. They had communication with divisions along the green line and also provided information to them about the potential damage that will occur in the future. Additionally, special operations forces have moved into a number of positions to deny regime movement along the road that joins Tikrit and Baghdad. There have been several skirmishes that have occurred in these areas, l.

Special operations forces remain in control of the Hadithah Dam to prevent its destruction and the release of certain water flow that would affect the down-river areas particularly near Karbala. The town of Hadithah is just to the south of it. The dam is a very robust structure that had 16 floors inside it and underground. The top of the dam, in daylight. There have been repeated attacks against the force holding the dam by artillery and mortars, by counter special operations units operating from the town of Hadithah. The coalition forces in place have been well-supported by close air support, and that has enabled them to hold the dam.

More special operations raids against key regime locations continued. Last night, a special operations element raided the Tharthar Palace, on the outskirts of Baghdad. This is approximately 90 kilometers outside of Baghdad, roughly 56 miles. It is a known residence that is used by Saddam Hussein and his sons. They did take fire on entry from anti-aircraft artillery. Near the entry point of the compound itself, the helicopter was put down on the ground. And aerial gunship provided some support, The raid did not yield any regime leaders in this case, but documents were taken that will be valuable for intelligence, and they were examined further. The raiding force did accomplish its mission, with no combat losses.

The maritime component continued its efforts to keep the waterways open, and as they did some patrolling yesterday along the Khor Abdullah, which remains a primary focus to ensure that humanitarian supplies can come in, they discovered a small boat that was beached along one of the banks. As the small boat was searched and inspected, they discovered first that there were booby traps on it, but also that there were weapons caches nearby in the surrounding area. Several weapons were found inside of this, and also a tunnel complex that joined these different caches one to another. Small arms, grenades, rocket-propelled grenades and launchers, gas masks and uniforms were found at these sites.

An F/A-18C was shot down, and a UH-60 helicopter crashed in central Iraq. Six soldiers were confirmed to have died when their UH-60 Blackhawk helicopter crashed in Central Iraq at approximately 11:45 p.m. Some evidence suggests that a Patriot missile battery may have shot down the F/A-18.

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3/4 April

The Combined Forces Air Component Commander reported daily and total sorties on April 3rd as follows:

On April 3rd, the daily US air effort totaled:

- 1,900 total missions
- 850 attack missions – 85 percent focused on "destroying Iraqi ground troops."
- 450 air refueling tanker missions
- 200 cargo airlift missions
- 100 command, control, intel, surveillance & recon missions

Since the start of the war (through Tuesday):

- 23,000 sorties flown
- 27.1 million gallons of fuel pumped into planes on refueling missions
- 31,000 short tons of cargo moved by aircraft
- 38,000 passengers moved since 10/02.
- 26 million leaflets dropped (apparently different than what USCENTCOM says... but these are the numbers being turned out by the Air Force)

Coalition forces struck Iraqi Air Force headquarters buildings in central Baghdad. The first fixed wing Coalition aircraft (A-10s) are based at Talil Airport in Iraq on April 4th.

The land component attacked further into the defenses of Baghdad, seizing key objectives in the process. Concurrently, operations continued to eliminate paramilitaries and regime elements remaining in urban areas within the zone of attack.

V Corps forces completed the destruction of the Medina Division Thursday and continued the march to Baghdad The 3rd Infantry Division continued their attack through the Karbala Gap, with soldiers from 3rd Squadron, 7th Cavalry Regiment teaming with soldiers from the 3rd Brigade Combat Team to isolate the city and deny enemy forces freedom of maneuver. Soldiers from 3rd BCT also rendered over 30 enemy armor weapon systems inoperable in a military compound in their sector.

The 101st Airborne Division (Air Assault) completed the isolation of An Najaf, denying enemy paramilitary forces access to the city. The division was able to enlist the help of a local cleric to begin distributing humanitarian assistance supplies to the populace.

The 82nd Airborne Division conducted direct action missions against paramilitary and Iraqi Intelligence Service facilities in their efforts to secure the As Samawah area. Soldiers from the division's 2nd Brigade established positions to ensure coalition supply routes remain secure

Coalition special operations forces in northern Iraq continued concentrated air attacks against regime military forces in northern Iraq – maintaining effective control of roads

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leading into or out of Iraq, and roads between Baghdad and Tikrit. Special operations forces in key locations throughout the country are positioned to locate regime facilities or strategic systems, and to direct precision fires to destroy them.

Operations were conducted to ensure reply lines remain open, especially in as-Samawa and an-Najaf

The 1st Marine Expeditionary Force continued its attack towards Baghdad, destroying remnants of the Baghdad Republican Guard division near al-Kut, and elements of the Al Nida Republican Guard division between al-Kut and Baghdad. During the fighting near Kut, three Marine tanks were hit by Iraqi fire. It is not known whether the tanks were disabled or destroyed. Additionally, CENTCOM relieved the commander of the 1st Marine Regiment of the 1st MEF, Colonel Dowdy. No further explanation of the dismissal was given.

Elements of the 1st MEF encountered foreign volunteers in fighting near Azizyah, southeast of Baghdad. Thought to be largely Syrian and Egyptian, these irregulars tended to be somewhat more steadfast than many of their Iraqi counterparts.

The US 1st Marine Expeditionary Force inflicted further destruction on the Baghdad and Al Nida divisions of the Republican Guard near Al Kut and Baghdad. V Corps secured southern approaches to Baghdad and captured the International Airport to the west of the city.

Two Marine pilots were killed in the crash of their AH-1W "Super Cobra" attack helicopter in central Iraq.

In the South, U.K. forces continued to expand the area influenced by the coalition and efforts to rid Basra of regime death squads. Aggressive patrols beyond Basra resulted in the seizure of a cache of 56 surface-to-surface short-range ballistic missiles, and four missile launchers in the vicinity of al-Zubair, just north of – north and west of Basra..

A suspected NBC training school in western Iraq was investigated by Coalition forces.

The “Battle of Baghdad”

One of the most striking aspects of the climactic battles of the Iraq War is that the much anticipate “Battle of Baghdad” involved a series of relatively small battles, rather than a climactic encounter. By the time the battle began, Coalition air power had already inflicted massive damage upon the Republican Guards and other units that had actively maneuvered or fought. It had destroyed much of Iraq’s command and control capability and had shocked many units to into ceasing to maneuver to fight or even disbanding.

The Coalition had also achieve a degree of unprecedented “air dominance” that allowed it to fly stacks of attack aircraft around the city with a wide range of difference attack sensors and munitions that allowed on-call destruction of targets with minimal collateral damage. It was able to fly A-10s in low altitude strafing missions and use attack helicopters for urban close air support. It could also operate normally vulnerable slow fliers like refueling tankers and sensor aircraft like the E-8 JSTARS in more forward positions where they could support the air battle.

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The fact that V-Corps had successfully pushed through the Karbala Gap, and the remaining Republican Guards defense was so weak, opened up the defenses of Baghdad before the Iraqi regime could reposition its forces to the limited extent it could do so in the face of Coalition airpower. It became apparent that the Republican Guard had been shattered outside of Baghdad, and the large numbers of regular army forces remaining either could or would not maneuver effectively against advancing Coalition forces.

This was less true in the 1st MEF area. The Marine Corps line of advance pushed through significant concentrations of regular forces, and was inherently more vulnerable to attack. Nevertheless, the Marines advanced with remarkable speed, given the size of the remaining Iraqi ground forces.

The sudden V-Corps drive into the Baghdad International Airport both exposed the overall weakness of the remaining Iraqi forces and divided them, while giving the Coalition the ability to launch deep armored penetrations and raids into Baghdad. These "thunder runs" showed that the Coalition could defeat Iraq's remaining forces, proved to the Iraqi defenders that the regime's claims about Coalition defeats were false. They demoralized some of the defenders, further weakened the Iraqi regime's control over the city and the nation, and again forced the remaining elements of Iraqi forces into something approaching meeting engagements than made them far move vulnerable than a positioned and dug in defense.[45]

The sheer speed of the V Corps and 1st MEF penetration into the regime's center of power in Baghdad, the permeating shock of continuing precision air strikes, and the operations of Special Forces and the 173rd Airborne Brigade also largely paralyzed and then defeated most Iraqi resistance in the West and North as effective fighting forces.

More broadly, the Iraqi regime scattered arms caches throughout Baghdad and the country that indicate it may have believed it could rely on the mass mobilization of the Iraqi people through the Popular Army. In practice, however, no such mobilization occurred. Cadres of regime loyalists did fight, and presented a serious problem in terms of urban warfare in many cities in the south, but only as cadres – not as forces backed by large-scale popular support. The regime had similar cadres in Baghdad, but remarkably little popular support. Only relatively small elements of the Republican Guard and regular army forces made dedicated efforts to infiltrate back into the city to support its defense.

As a result, the regime of Saddam Hussein had little or no ability to conduct any kind of mass urban warfare throughout the city. V Corps and the 1st MEF were able to choose their areas and lines of attack with considerable flexibility and without encountering asymmetric tactics like mass suicide attacks or being dragged into house-by-house fighting. There was loyalist resistance, but it tended to disperse and melt away after initial defeats. The end result was that the fighting inside the city became more of a pacification campaign than classic urban warfare.

One of the practical lessons of the conflict is that a tightly centralized dictatorship, with no convincing popular ideology and support, is inherently vulnerable to a strike at its center of power.

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4/5 April

Air campaign continues on April 4th. For the 7th straight day, the coalition bombed the Republican Guard "around-the-clock" For the 16th straight day, they focused on "killing regime leaders" and knocking out command and control in Baghdad. Bombing priorities were "kill box interdiction" – meaning Iraqi ground troops in a particular area – and close-air support for US ground troops.

Activity on April 4th included:

- 1,850 total missions flown
- 700 attack missions – 80 percent focused on "destroying Iraqi ground troops."
- 400 air refueling tanker missions
- 350 cargo airlift missions
- 100 command, control, intel, surveillance & recon missions

Since the start of the war (through Wednesday):

- 25,000 sorties flown
- 29.6 million gallons of fuel pumped into planes on refueling missions
- 33,000 short tons of cargo moved by aircraft
- 43,000 passengers moved since 10/02.
- 33 million leaflets dropped.

Fifth Corps attacked Iraqi forces on the approach to Baghdad, and seized several key intersections on the south side of the city. The attack continued through the night, and by dawn the coalition had seized the international airport west of Baghdad, formerly known as Saddam International Airport. The airport was given a new name, Baghdad International Airport

Operations were conducted to ensure reply lines remain open, especially in as-Samawa and an-Najaf. As coalition forces clear these areas of regime presence, caches of weapons and ammunition are often found in residential areas, as this next image shows. These weapons and ammunition were found inside of an agricultural building in a neighborhood of an-Najaf. One report indicates that the US Army intelligence estimated that the Medina Division had been reduced to 18% of its prewar strength and the Hammurabi Division to 44%. [46]

The 1st Marine Expeditionary Force continued its attack towards Baghdad, destroying remnants of the Baghdad Republican Guard division near Al-Kut, and elements of the Al Nida Republican Guard division between Al-Kut and Baghdad

British forces expanded the area of control northwards from the main southern oilfields near Basra.

A patrol of U.K. forces near As-Zubair, just outside of Basra, came upon two warehouses containing human remains in bags and boxes. While an accurate count is not yet known, estimates would indicate that the remains are of more than 100 persons. Some have

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tatters of uniforms in and amongst the human remains, and in one of the warehouses there were pictures of executed soldiers. These remains are not from this conflict. They are from some other conflict at some other time. and are undergoing forensic examination. They appear to significantly predate the current conflict.

Major General Victor Renaurt of USCENTCOM provided a summary of the operational history to date at the USCENTCOM briefing on April 5th:

> "As you know, we began building up forces some number of weeks ago, potentially months ago as we floated some forces in the early days of – or late days of last year with the 3rd Infantry Division. Those forces continued to build over time until we began combat operations on the 21st of March.
>
> On the 21st, we began with an insertion of special operating forces and a strike in Baghdad by a number of Tomahawk land attack cruise missiles. Those targets were key leadership targets. We think the results were very favorable, and we're not exactly sure of the result of the leaders that were involved in that, but we continue to see disruption in the command and control of the regime.
>
> Shortly after that, the 1st Marine Division crossed the line of departure, moved north out of Kuwait into the oil fields in the south, taking control of those oilfields and begin to secure them for the future of the Iraqi people. The key elements of those oil fields were the gas-oil separators, the individual wellheads themselves, and the objective was to be able to secure those before the Iraqi regime had the opportunity to destroy them. As many of you know, there were some wellheads that were destroyed. We have since been able to bring those well fires under control. We're down to two wellheads remaining to be secured and the fires put out. A joint Kuwaiti and coalition oil firefighting team is working on those. We hope to get the last two of those oil well fires put out within the next few days.
>
> In addition to the oil heads that were damaged, we had a number of breaks in pipelines. Some of those were ignited. We have had a number of pools of oil that were let out on to the ground. Some of those were ignited as well. And we have since brought the majority of those under control, both securing the infrastructure in the oil fields and repairing those to be able to bring that back into operation.
>
> I had some maps earlier that were going to go along with this, but as you know, sometimes computers trick you, and so I'm going to have to go without the maps that will kind of walk you through what the ground looked like as we moved through southern Iraq.
>
> But during those first few days, we moved with the 1st Marine Expeditionary Force from south to north from Kuwait, and then with the 3rd Infantry Division moving from Kuwait's western, northwestern border to the northwest towards An Nasiriyah, As-Samawa, An Najaf, and then continuing on. The 3rd Infantry Division attacked to seize initially the Tallil airfield, the town of An Nasiriyah, and then to follow – with a follow-on objective of the town of As-Samawa. We also seized key Highway 1 bridges in the vicinity of An Nasiriyah to allow for the 1st Marine Division to then move forward to the north as they made the turn coming up out of the oil fields and continuing on towards As-Shatra (sp) and al-Kut to engage a Republican Guard division in the vicinity of al-Kut.
>
> I think the progress could be characterized as nothing short of superb. A lot was made about we were out there for three or four days – as you know, bad weather had challenged us a bit. A lot was made of bringing the supply lines along. I think what we've shown is that the plan was very smoothly executed, that logistics support, humanitarian assistance has flowed in behind the combat troops in a way that allowed the momentum of the fight to be carried to the Iraqis in a steady fashion with great results.
>
> Over the five days from about the 27th of March until right at the end of the month, 5th Corps forces pressed north to the vicinity of Karbala, and the 1 MEF forces pressed from An Nasiriyah towards al-Kut, As-Diwaniyah, and the town of As-Shatra (sp), in each case, taking the time to reduce pockets of irregular forces in each of these locations, forces that were holding the local

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leaders of the towns an the populations of those towns hostage, if you will, and in some cases terrorizing them to the point of inactivity by any of the leaders in the town to resist.

The 1st U.K. Armor entered the battlefield also on the 27th of March, beginning to secure the area from south to north from Umm Qasr to As-Zubair into the town of Basra. In addition, they expanded to the northwest to provide additional security for the southern oil fields.

And then in the north, on the 27th, the 173rd Airborne Brigade jumped into an area near Bashur (sp) in northern Iraq to provide additional combat power to the special operating forces that had already inserted themselves into Kurdish-held territory.

At the same time, combat operations were ongoing. Humanitarian aid – I mention this repeatedly because that is really one of the two great pillars of this combat operation – at the same time you're exerting combat power against a very focused enemy, you want to be able to infuse into that fight humanitarian assistance that will begin to normalize the lives of the people in the towns that you're liberating. And things like bringing in wheat to Umm Qasr, bringing in humanitarian aid over land from Kuwait – great support from the Kuwaitis to infuse that aid into the fight was noted as early as the second or third day after combat operations began.

The water pipeline was constructed and is completed now from Kuwait into Umm Qasr, up to Zubair, and we now have a situation just a few days ago, a couple days ago, where water into Basra is almost completely restored. We have a few small areas that we're completing that infusion.

Those operations continued until the 4th of April, just yesterday, where we saw great operations conducted on a two-core front approach in towards Baghdad. The 3rd Infantry Division moved north from Karbala to the highway intersections of routes 1 and 8, just south of the city, about seven miles from the city center. In fact, you saw some of the forces that were at that intersection today driving through the inner city of Baghdad.

In addition, forces moved to the west, initially created a force to attack and then secure the Baghdad International Airport. Those forces have completed that operation and now hold the airport secure. And we are continuing to flow forces in there to reinforce and establish a main operating base.

At the same time, the 1st Marine forces, the 1st Marine Expeditionary Forces were attacking from the vicinity of As-Diwaniyah and south of al-Kut to destroy the remnants of the Baghdad Division and then turn northwest along Highway 6 to the southeast corner of Baghdad, attacking remnants of a regular army division and a Republican Guard infantry division, destroying those forces as they moved forth to establish an operating base on the southeast edge of Baghdad.

Finally, continuing the great work in Basra and then moving further to the north, the 1st U.K. Armored Division has moved north through the oil fields to begin to secure more and more of those vital resources for the future, and we now have a substantial percentage of what we call the southern oil fields, the Ramallah fields, the Khorna fields, and some other smaller fields, Zubair, under our – under our safe control, and we continue to expand that U.K. lodgment position further north along Highway 6 to complete the destruction of – the remnants, really, of four regular army divisions that began the fight in the vicinity between al-Amarah and Khorna (sp) in the eastern portion of the country.

Finally, we've alluded to special operating forces throughout the operation, and I just want to spend a minute or two describing the intent of these very highly capable forces, the use of those highly capable forces around the country.

As we were beginning combat operations, special operating forces were infiltrated into western Iraq, into northern Iraq, and some areas in the south. The intent of these forces was to establish a relationship with leaders in the local area, to be able to call fires on theater ballistic missile launch sites in the west in order to protect neighbors in the region, other neighbors that were threatened by the Iraqi theater ballistic missile capability, to begin to set conditions to bring follow-on forces in to take advantage of the airfields in the west and in the north. In addition, to begin working in an unconventional warfare manner, engaging with Iraqi forces in the north that might be interested

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in laying down their arms and not continuing to fight. Those operations have been highly successful.

In addition to the unconventional warfare operations in the north, as many of you know, we attacked a terrorist base camp in – near the little town of Khoum (sp). The intent here was to eliminate an al Qaeda and Ansar al-Islam based terrorist training camp and military facility, and potential chemical WMD processing or manufacturing plant. Those operations were very successful. It was a combination of U.S. Special Forces and Kurdish fighters, and those operations actually continue to eliminate small pockets of terrorist activity in extreme northeastern Iraq.

Finally, on a – on a note of success that was very visible to you all, the special operating forces, in coordination with conventional forces from the Marine Corps and the Air Force and the Army were able to successfully rescue Private First Class Jennifer (sic) Lynch out of a hospital and irregular military headquarters facility that was being used by these death squads in Nasiriyah and successfully return her to U.S. hands and on to medical care and a reunion with her family. I'll talk a little bit about that operation in just a little bit, so if you'll hold for that one just a second, I'll come back to it.

To continue to beat the drum of humanitarian assistance, we have worked to secure key bridges and infrastructure to maintain those for future use, and we begin – have begun to really accelerate the infusion of humanitarian assistance into the country.

Throughout all of these operations, we've encountered an enemy who has been determined. We have encountered an enemy who has chosen to use fear and terror and brutality as a means to push the people either to not support a change in their own communities, or even to the extremes to be used as shields to protect these fighters as they try to engage our forces. We've seen forces fighting in civilian clothes from vehicles we call technical vehicles, pick-up trucks with machine guns loaded on to them, SUVs. We've seen them stringing wire across roads that would be designed to decapitate people driving in trucks. We've seen them wearing uniforms that were U.S. or U.K. or Australia based equipment so that they might fit in. We've seen them using flags of truth – truce, I'm sorry – to gain a position of advantage on the battlefield, and on and on, from suicide bombings to other acts of terror on the field.

This has been an unconventional enemy, but not one we have not trained for. Through it all, we've seen prudent use of the military. We've seen professional performance by our soldiers, and they have been able to, in each case, defeat this enemy threat as we've moved on to each of our objectives.

Now, all of that happens because the people behind the scenes, the logisticians, ensure that we have the tools that we need to carry the battle forward on the field. Some of you have had a chance to listen to some of the logistics facts that we've used out there. And I won't go into lots and lots of them, but I do have a few tidbits of trivia that might be interesting for you.

The line of communication that we are maintaining open from Kuwait up to Baghdad is about 350 miles. On any given day out there on the battlefield, we've probably got 2,500 or more logistics support-related vehicles traveling on that road.

So if you can sort of imagine driving from LA to San Francisco, along the way there you'll see a whole – it's sort of like having a big old convoy of semi tractor-trailers running up and down that road, moving food and fuel and water and humanitarian assistance to our forces.

We've moved something on the order of 65 million gallons of fuel into the region in order to fill supply points around the area to allow our forces to continue operations unencumbered. If you throw that into a – well, I've got a little car, so I get about 20 miles to the gallon. If you throw that into my car, I could do an around-the-world trip about 52,000 times.

To fly the air tasking order that we have each day, the aircraft that are out there to support our operations, takes something on the order of about two and a half million gallons of fuel. And in that same car of mine, I could only make the trip around the world about 1,736 times.

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> So, to give you some perspective, the cost – the support required to keep these operations going continuously is substantial. And the work that is being carried out by our logistics experts in the field is nothing short of Herculean. There are some real superstars out there.
>
> In order to keep our forces properly hydrated, we use about a million and a half liters of water a day. About 2 million tons of spare parts and support equipment is moved around the battlefield each day.
>
> And then, finally, soldiers, as they say – you know, you feed the army; you have to maintain its ability to eat. And, you know, about a third of a million MREs are consumed each day. So for that one Marine out there that didn't get more than one that day, we've got some more out there coming to him and I think we've solved that problem".

5/6 April

Coalition aircraft struck the residence of Ali Hassan al-Majid, Iraqi President Saddam Hussein's cousin. Notorious for ordering Iraqi forces to use chemical weapons on Kurds in northern Iraq, he is infamously known as "Chemical Ali." Two Coalition aircraft using laser-guided munitions struck the home at approximately 9:30 p.m. EST Friday. The structure is located in Al Basra, approximately 250 miles southeast of Baghdad

US forces consolidated their positions around Baghdad and at the international airport, establishing control of both the south-western and south-eastern approaches to the city and enter Baghdad for the first time on the 5th Other operations continued at Karbala, An Najaf and As Samawah to eliminate regime pockets of resistance.

The two Corps attack by 5th Corps and 1st MEF continued to isolate Baghdad, denying reinforcements or any escape by regime military forces. Fifth Corps controlled the corridor from Karbala to Baghdad in the east. The 1st Marine Expeditionary Force controlled the corridor from Salman Pak to Baghdad.

The 3rd Infantry Division conducted aggressive offensive operations to secure the cities in route to central Baghdad. The 1st Brigade Combat Team seized a palace believed to be a Special Republican Guard Headquarters, while the 2nd Brigade Combat Team conducted a reconnaissance that led to enemy surrender. The three Brigades combined secured key terrain, which led to the destruction of 30 military vehicles, 30 technical vehicles, three T-72 tanks, and three armored personnel carriers. During this operation an Iraqi RPG hit the track of a M-1 tank. In the subsequent attempt to tow the vehicle away, it caught fire and was destroyed in place by US forces.

The 101st Airborne Division (Air Assault) continues to isolate the city of An Najaf from enemy forces, allowing friendly forces to conduct stability and support operations. The division's fire power destroyed five mortars, two trucks, two weapons caches, and a host of other enemy combat systems.

The 82nd Airborne Division concentrated their efforts on conducting humanitarian assistance. The soldiers distributed 1200 meals, and worked to restore water and electricity in the city of As Samawah, making it a safer and more secure environment. Combined, the 5th Corps destroyed multiple enemy combat systems today and took 30 enemy prisoners of war

A raid by the 1st Marine Expeditionary Force hit a training camp near Salman Pak This raid occurred in response to information that had been gained by coalition forces from

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foreign fighters encountered from other countries, not Iraq, and this camp had been used to train these foreign fighters in terror tactics. It is now destroyed.

Efforts to remove remnants of the regime from the areas of Basra, Samawa, Najaf, and Karbala were ongoing. There were some encounters with regime forces in these areas, but the number of encounters went down appreciably while the support from the population is increased. Work by U.K. forces in the vicinity of Basra clearly weakened the grip of the regime.

Coalition special operations forces in northern Iraq directed focused air support against regime forces in the north near Kirkuk. Some of these forces, some of these Iraqi forces from the first corps relocated approximately 10 kilometers further to the south, away from what has been described as the "green line." The special operations teams with these Kurdish security — with Kurdish security elements, maintained contact with the first corps elements and moved forward in a portion of that 10-kilometer zone to observe on the relocating Iraqi forces.

Special operations forces were positioned along several key roads, to prevent movement of ballistic missiles — and deny free movement by regime forces or leaders.

British forces advanced further into Basra. A soldier from the Royal Regiment of Fusiliers was killed in action.

6/7 April

The Coalition declares air supremacy over all of Iraq.[47]

Three U.S. service members killed and five wounded in a possible friendly fire incident involving an F-15E Strike Eagle and Coalition ground force

The main focus of the land operation continued in and around Baghdad. The two corps attack continued with 1st Marine Expeditionary Force isolating Baghdad from the east along the Biala River, and with the 5th Corps operating in the west, northwest, and into the town of Baghdad itself, the city of Baghdad. To the northwest, the attack prevented reinforcement by Iraqi forces north of the city, and resulted in the destruction of an Iraqi unit that was composed of tanks, armored personnel carriers, other armored vehicles, artillery systems, and infantry.

Efforts to secure Baghdad International Airport continued from within the complex, where tunnels were found beneath it – some of these tunnels were large enough to accommodate automobiles – and from without, where artillery systems able to range the airport were attacked, and the forward observer, in this case an Iraqi colonel, was taken into coalition control.

US troops held positions in central Baghdad overnight, while US Marines pushed into the city from the south-east, taking Rasheed airport. A USAF A-10 aircraft was downed by hostile fire near Baghdad International Airport; the pilot ejected safely.

Two soldiers and two civilian news media were killed and 15 soldiers injured in an enemy rocket attack south of Baghdad (April 7). The attack, against a 3rd Infantry Division unit, occurred at approximately 11:30 a.m. local time. The wounded were evacuated to a military medical treatment facility in Iraq

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At Baghdad, the 3rd Infantry Division took a suspected Special Republican Guard headquarters, whilst the 1st Marine Expeditionary Force consolidated its position to the east of the city. Iraqi military elements in the Baghdad area use mosques and hospitals as bases to conduct military operations. These locations include the 'Mother of All Battles Mosque' in Northwest Baghdad, and the Saddam Hospital, which remain on the Coalition's no-strike list.

The 3rd Infantry Division conducted aggressive offensive operations to secure the cities on the route to central Baghdad. The 1st Brigade Combat Team seized a palace believed to be a Special Republican Guard Headquarters, while the 2nd Brigade Combat Team conducted a reconnaissance that led to enemy surrender. The three Brigades combined secured key terrain, which led to the destruction of 30 military vehicles, 30 technical vehicles, three T-72 tanks, and three armored personnel carriers.

The First Marine Expeditionary Force attacked Iraqi forces resisting from inside populated cities. The force of nearly 85,000 U.S. servicemen and British troops have attacked enemy forces hiding in Southeast Baghdad and inside the city of Basra, resulting in the discovery of five weapons caches consisting of more than 10 tons of ordnance, thousands of rocket-propelled grenades, thousands of aircraft bombs, 15 surface-to-surface missiles, 13 surface-to-air missiles, 400 cases of mortar rounds, thousands of AK-47 assault rifles and numerous crew-served weapons and ammunition. The force has also destroyed, damaged or captured 24 tanks, three artillery pieces, 31 armored personnel carriers, six fuel trucks, and six "technical" vehicles. The Marines' aircraft wing flew more than 250 sorties in 24 hours while ground forces seized two of Saddam's palaces and a terrorist training camp. The force has captured more than 3,500 enemy prisoners of war since hostilities began An Iraqi armored force was destroyed north-west of Baghdad

The 101st Airborne Division (Air Assault) continued to isolate the city of An Najaf from enemy forces, allowing friendly forces to conduct stability and support operations. The division's firepower destroyed five mortars, two trucks, two weapons caches, and many of other enemy combat systems. A Ba'ath Party headquarters at Karbala was destroyed. According to reports, one American soldier was killed and seven wounded in the two days of engagement at Karbala.

The 82nd Airborne Division concentrated efforts in conducting humanitarian assistance. The soldiers distributed 1200 meals, and worked to restore water and electricity in the city of As Samawah, making it a safer and more secure environment. Around As Samawah, the US 82nd Airborne Division conducted humanitarian operations.

The towns of As-Samawa, Diwaniyah, and Najaf became more stable as time goes on with coalition efforts against the – against the regime. In Karbala, coalition forces destroyed a Ba'ath Party headquarters and fought against regime death squads to further reduce regime influence, US troops remained in combat east of Karbala, while also conducting further humanitarian operations around As Samawah.

Coalition's special operations forces continued with unconventional warfare in northern Iraq, southern Iraq and central Iraq. These efforts were a key to facilitating operations by the air component in the north and in the west, and by the land component in the center and in the south of Iraq. More significantly, they represent the mechanism that also makes it possible for Iraqis to join in the fight against the regime.

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Coalition special operations forces conducted direct action missions to secure the Hadithah Dam, to deny the regime the use of ballistic missiles, and to destroy regime headquarters locations whenever they are identified. They used a night raid to seize a training camp near Hadithah.

Two critically wounded U.S. Army special operations soldiers' lives were saved by a Combat Search and Rescue team that evacuated them from about five miles south of Baghdad to be later transferred to a hospital in Kuwait.

British forces established control over a large part of the city of Basra, with the 3rd Battalion, The Parachute Regiment, clearing on foot the old quarter, inaccessible to vehicles. Two British soldiers were killed in action.

RFA Sir Percivale made another large delivery of humanitarian aid supplies to Umm Qasr.

7/8 April

The main focus of air operations on April 7th was on "killbox interdiction" – continually bombing ground targets close air support, command, control, intelligence, surveillance & reconnaissance missions. Intelligence flights focused largely on Baghdad to enable near-real-time strikes on emerging targets. Nearly 1/5 of the strikes focused on "ensuring the Iraqi military was unable to launch military aircraft."

The Combined Forces Air Component Commander reported daily and total sorties on April 7th as follows:

On April 7th:

- 1,500 total missions flown total
- 500 attack missions
- 350 air refueling tanker missions
- 400 cargo airlift missions
- 175 command, control, intelligence, surveillance & reconnaissance missions

Since the start of the war (except where noted):

- 30,000 sorties flown
- About 12,000 strike missions since G Day.
- 14,500 precision guided weapons dropped
- More than 750 Tomahawk cruise missiles fired from Navy ships
- 70% of all bombs dropped precision guided
- About 6,200 tanker missions.
- About 5,700 airlift missions.
- More than 2,000 command, control, intelligence, surveillance & reconnaissance missions

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- 37 million gallons of fuel pumped into planes on refueling missions (thru 4/5)
- 40,000 short tons of cargo moved by aircraft (thru 4/5)
- 55,000 passengers moved (since 10/02 – thru 4/5)
- 36 million leaflets dropped (since October – thru 4/5)

A USAF B-1B attacked a leadership target in the Al Mansur district of Baghdad. It used precision-guided munitions y to strike a suspected meeting of senior Iraqi regime leaders using four 2,000-pound Joint Direct Attack Munitions (JDAMs). The strike took place at 2 p.m. Qatar time (7 a.m. EST).

The main focus of the operation continued to be in and around Baghdad. In the east, the 1st Marine Expeditionary Force attacked across the Biyala River into the southeast corner of Baghdad. They encountered forces, including T-72 tanks, armored personnel carriers, other armored vehicles, surface-to- surface missiles, artillery pieces, and numerous technical vehicles. These forces were encountered and destroyed, and they proceeded on their attack to seize the Rashid Airport.

In the west, 5th Corps remained in the center of Baghdad overnight, and also continued attacks this morning from the north and from the south, conducting operations inside of the heart of Baghdad. They also encountered a mixture of forces, including T-72 tanks, armored vehicles, technical vehicles, and artillery pieces. In one engagement at an interchange on Highway 8, resupply vehicles were caught in a fight with Iraqi forces, several of which were destroyed.

According to wire services, an Iraqi surface-to-surface missile struck the tactical operations center of the 2nd Brigade, 3rd Infantry Division killing two soldiers and two journalists and wounding 15 others. According to unconfirmed reports, 17 soft-skinned vehicles were destroyed in the attack.

Coalition forces near As-Samawa continued to work in that area and the towns around it, eliminating any regime elements and also transitioning into humanitarian actions. While water resupply networks are still being reestablished, there were military units operating in that area providing purified water that they're generating from water purification systems to Samawa and Arupa (sp), located about 25 kilometers to the north.

In An-Najaf and Karbala, operations continued increasing security in those areas and also eliminating any remaining regime elements that are present. Combat operations were ongoing east of Karbala.

In Basra. Coalition forces, under the leadership of the U.K. and supported by coalition special operations, succeeded in reducing the final remaining concentrations of Ba'ath Party officials and regime forces in Basra. The remaining pocket was in the old part of the city and it was cleared by forces during the night. The capture of two more Ba'ath Party officials near the town of As-Zubair, on the outskirts of Basra, reflected ongoing efforts to rid the entire southern region of regime presence and influence. Coalition special operations forces conducted special operations in the north, the west, the east, the south, and the center of Iraq. In the north, coalition special operations forces, in conjunction with Kurdish forces of northern Iraq, are maintaining pressure on the Iraqi military forces in that area, while preventing their movement to Tikrit or Baghdad.

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In one engagement yesterday near Irbil, in the north, special operations forces, in conjunction with close air support, destroyed a force consisting of several armored personnel carriers, tanks, and infantry. In another engagement, a similar engagement near Kirkuk, a special operations element defeated an armored counter-attack, destroying several tanks, trucks and armored personnel carriers.

In the west, coalition special operations forces continued to hold the important Hadithah Dam. There's a smaller body of water to the side that's a result of the dam, and the Hadithah nearby, denying freedom of movement to regime forces, and also denying use of areas that could be used for ballistic missile launches. Unconventional warfare continued in other parts of Iraq.

Coalition maritime forces continued to take steps to maintain the flow of humanitarian assistance supplies into Iraq and dredge the Khor Abdullah to make it a deeper draft for larger ships that carry increasing amounts of humanitarian support and assistance into Umm Qasr.

Coalition forces continued to discover more weapons and ammunition stores.

8/9 April

The USAF reports that the top priorities for coalition air forces on April 8th were April 8: 1) 24/7 close air support in and around Baghdad; 2) killbox interdiction and close air support for coalition forces operating in the north around Mosul, Tikrit and Kirkuk; and 3) close air support of SOF forces operating in the west.

About three-fourths of the strike sorties were focused on supporting coalition ground forces. The others were focused on the air component's strategic attack (regime leadership, command and control, and security targets) and counterair (enemy aircraft and helicopters, runways, and surface to air missiles) missions.

Close air support in a heavily defended urban environment continued to be dangerous, and an A-10 was lost in Baghdad, some unconfirmed reports suggest that the plane was shot down by a French-made Roland surface to air missile. However, the Coalition continued to fly over whenever and wherever coalition ground forces were in contact with the enemy to provide close air support.

The Combined Forces Air Component Commander reported daily and total sorties on April 8th as follows:

- Total sorties (April 8/since G-Day-March 19th): About 1,700/Almost 32,000
- Strike sorties (April 8/since G-Day-March 19th): About 550/About 12,500
- Tanker sorties (April 8/since G-Day-March 19th): About 325/About 6,500
- Airlift sorties (April 8/since G-Day-March 19th): About 425/More than 6,000
- C2ISR sorties (April 8/since G-Day-March 19th): About 100/About 2,150
- Munitions (total guided/total unguided/percent PGM): About 15,000/About 7,100/About 70%
- Aerial refueling offloads (through 6 Apr): 270 million pounds (40 million gals)
- Cargo moved (through 6 Apr): Almost 46,000 short tons

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- Passengers moved (through 6 Apr): Almost 62,000
- Leaflets dropped (since G-Day-March 19th/since Oct 02): About 17 million/More than 36 million

The first Coalition fixed wing aircraft lands at Baghdad airport on the 8th.[48]

There now is no meaningful order of battle available for Iraqi land forces. The Republican Guard has taken a massive hammering at every level, and is now scattered and deploying somewhat erratically at the brigade level. There are strong indications that Iraqi forces have split up to fight by brigade, and that the remaining elements of the Republican Guards are making major adjustments to defend Baghdad in small movements designed to minimize damage from the air. Some five Republican guards divisions are said to have elements fighting in the south. Two: The Al Medina and Baghdad Divisions are said to be crippled and to have lost well over 80% of their effectiveness.

On April 5, Lt. General Michael Moseley, Combined Force Air Component Commander, described the status of Iraqi forces as follows from his HQ in Saudi Arabia: "Republican Guard units outside of Baghdad are now dead...we're not softening them up, were killing them." Moseley said there are still Republican Guard soldiers around "they are not 100 percent killed," but they are not operating in division formations or units anymore. "There are still some of them out there...we haven't killed all of them but the ones that are still around are walking with a bit of a limp."

Moseley said the Iraqi military has been seriously degraded, "the Iraqi defense" in terms of formations "doesn't exist any more." To date the Iraqi air force has not flown. "The airfields are still there" but "they are not flyable...we have killed a lot of them and done a lot of surface damage." If the Iraqis were able to get something in the air Moseley said it would not have a "strategic impact" since the coalition has air superiority. Moseley said he felt that a lot of the Iraqi air force members have, "made a calculation in their mind that they will not survive."

USCENTCOM sources estimated on April 6 that the remaining four divisions of the Republican Guard had lost at least 50% of their effectiveness. The USCENTCOM briefing on the morning of April 7th announced that the Republican Guard units in the vicinity of Baghdad had been reduced to approximately 30% of their original strength, and General Myers stated at the Pentagon briefing on the same day that their original main battle tank strength had been reduced to the low dozens.

On April 8, Pentagon sources reported that elements of three divisions were fighting in small units scattered at the fringes of Baghdad. Of the 850 tanks the Republican Guards forces started with, they now had 19. Of the 550 artillery pieces, they now had 40.

In steps that are unusual for Iraq, Republican Guards units are reported to have been reinforced by elements of forces from the regular army, many from units that suffered major losses in the fighting in the south.

The regular army does seem to be dispersed but has been largely static in the north. As of April 4, it still acted as a buffer between the Kurds and Kirkuk – not a problem from the US perspective – but some elements were pulling away from the Kurdish areas and

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towards Mosul or the Mosul-Tikrit-Baghdad area. If elements are reinforcing Baghdad, it is not clear what elements are involved or how large they are.

The regular army has no cohesive structure in the south, although substantial elements of the pre-war Corps are still; fighting or present in the area between the Tigris and Euphrates. They include elements of the 6th and 10th armored divisions. These forces have taken very serious damage from the air, but no damage estimates exist.

US troops consolidated their control of much of Baghdad. The 1st US Marine Expeditionary Force encountered minimal resistance from regular Army units near Al Amarah. The Marines also continued to push into southeast Baghdad. A counterattack across the Tigris that included some 50 soft-skinned vehicles and armored personnel carriers was defeated by elements of the 2nd Brigade, 3rd Infantry Division.

The coalition's operational maneuver consolidated gains in the areas south of Baghdad while continuing pressure against the regime and its remaining forces. Beginning in Basra, coalition forces transitioned to security and stability efforts. Coalition forces also continued expanding their area of influence north of Basra, along the road that leads between Basra and Al Amarah, this area in the east. Their efforts focused against any remaining regime elements, and also transitioning to humanitarian assistance.

Fifth Corps continued operations in Baghdad, and increased security areas beyond Baghdad to the west of the rivers, and also transitioned to humanitarian assistance.

The 1st Marine Expeditionary Force continued its attack near Al Amarah, and also in Baghdad. Near Al Amarah, the Marines there met minimal resistance from two of the divisions that had originally been deployed on the eastern flank. Those were the 10th and the 14th divisions. The divisions had already abandoned their weapons and departed the battlefield, after a period of air attacks, leaflet drops, and also following the liberation of Basra. Coalition forces at this point now occupy the 10th Armored Division headquarters, and will transition into humanitarian assistance and civil military operations in the Al Amarah area.

As regime security forces are eliminated from populated areas, more information is provided by the liberated Iraqis. In one example, Marines received information about a truckload of missiles, and found a truckload of surface-to-air missile southeast of Baghdad. These SA-6 surface-to-air missiles altered to have an infrared seeker added to the nose of the missile.

In the metropolitan area of Baghdad, the two corps' attacked to remove the regime from power d. The 1st Marine Expeditionary Force continued its attacks across the Diyala River, into the southeast corner of Baghdad, and also proceeded along the west edge of the river into the northeast corner of Baghdad. After entering in the southeast corner, the Marines continued their attacks into the heart of Baghdad, near key government facilities.

Fifth Corps forces continued to converge from multiple directions towards the center of Baghdad. The areas of convergence, began in the north, towards the center of town, also already in position in the center of town, and from the south. Baghdad Airport remained underneath coalition control, and the Coalition was able to conduct operations with freedom of action in each one of those areas.

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The operations remain opportunistic and focused, and there have been some sporadic engagements in different areas, particularly in the vicinity of the bridges in downtown Baghdad, right down in the center.

The Baghdad International Airport had ongoing air operations.

Maritime operations allowed the arrival of ships carrying humanitarian supplies from the U.K., from Australia, and also Spain. Large volumes of humanitarian supplies began to flow to the Iraqi people. The Spanish ship Galicia delivered humanitarian aid and a field hospital to Umm Qasr.

A USAF F-15E aircraft was lost over Iraq. Two Coalition airmen are missing after their F-15E Strike Eagle went down in Iraq at approximately 7:30 p.m. EDT

9/10 April

The regime in Baghdad effectively ceases to function on April 9th.

The air campaign continued. The top priorities for coalition air forces on April 9th were 1) 24/7 close air support in and around Baghdad; 2) kill box interdiction and close air support for coalition forces operating in the north around Mosul and Tikrit; and 3) close air support of SOF forces operating in the west. About three-fourths of the strike sorties focused on supporting coalition ground forces in Baghdad, the North and the west. The other quarter focused on the air component's strategic attack (regime leadership, command and control, and security targets) and counterair (enemy aircraft and helicopters, runways, and surface to air missiles) missions.

The Combined Forces Air Component Commander reported daily and total sorties on April 9th as follows:

- Total sorties (today/since G-Day-March 19th): About 1,650/Almost 33,000
- Strike sorties (today/since G-Day-March 19th): About 550/About 13,000
- Tanker sorties (today/since G-Day-March 19th): About 350/About 6,850
- Airlift sorties (today/since G-Day-March 19th): About 375/More than 6,450
- C2ISR sorties (today/since G-Day-March 19th): About 125/About 2,225
- Munitions (total guided/total unguided/percent PGM): About 15,500/About 7,500/About 70%
- Aerial refueling offloads (through 7Apr): 42.5 million gals
- Cargo moved (through 7Apr): Almost 48,000 short tons
- Passengers moved (through 7 Apr): Almost 65,000
- Leaflets dropped (since Oct 02): More than 43.8 million

US forces secured all the major routes leading into Baghdad, whilst continuing operations to eliminate resistance within the city. Coalition aircraft targeted a building near Ar Ramadi inhabited by Saddam Hussein's half–brother, Barzan Ibrahim Hasan al-Tikriti. The brother is a regime presidential advisor. The building was targeted with six JDAMs, in a continuing effort to degrade the Hussein Regime.

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The outer cordon in the vicinity of Baghdad is completed. Elements of the 1st Marine Expeditionary Force and 3rd U.S. Division complete the cordon around, and cut the major routes in and out of the city, eliminating the opportunity for large forces to move in and reinforce, and certainly complicating the problem of anyone trying to leave the city.

In the south, the first U.K. Armored Division conducted a number of operations in the Basra area, and continued to move to the north to link up with elements of the 1st Marine Division in the vicinity of Al-Amara.

Coalition forces have now secured all of the southern oil fields, and are moving through those oil fields to ensure they are secure. About 800 of the thousand wellheads have physically been inspected, and repair requirements have been determined for many.

Coalition forces did not bomb the Imam al-Adham mosque in Baghdad, contrary to news reports. Elements of the 1st Marine Expeditionary Force killed and captured enemy forces, which were using the mosque as a fighting position. One U.S. Marine was killed in action and another 22 injured in the fight

Around Al Hillah, the US 101st Air Assault Division continued operations against pockets of regime forces, and liberated warehouses of food hoarded by the regime.

U.S. Marines from Task Force Tarawa secured the headquarters of the Iraqi 10th Armored Division, a nearby airfield and an ammunition supply point at Al Amrah.

Elements of 1(UK) Armored Division pushed north from Basra towards the US-held positions around Al Amarah. In the west of the country, the town of Ar Rutbah declared itself open to Coalition forces.

Mine clearance work along the southern waterways leading to Umm Qasr having been accomplished, the focus of Royal Navy and Royal Australian Navy clearance teams switched to the northern waterways leading to Basra.

The End of the Battle of Baghdad and Movement Towards Tikrit

By the 10th/11th of April, Coalition forces had effectively defeated organized resistance in Baghdad, and could begin to deploy elements of their land forces towards Tikrit. At that point, it was still not clear whether the US V-Corps and 1 MEF forces would meet serious Iraqi resistance as they moved North.

While US intelligence estimated that most of the Republican Guard had been destroyed, there were indications that up to one brigade of the Republican Guard, and Special Republican Guard forces, might be digging-in in the area of Tikrit. Many of the combat forces of the three Iraqi regular army corps in the North had been heavily bombed but had not yet come under meaningful land attack and at least some elements seemed to be a potential threat.

Even so most of the remaining 10 Regular Army Divisions surrendered or collapsed, and there only seemed to be elements of one brigade of the Adnan Division of the Republican Guards left near Tikrit. Even before 22 days of bombing and attack, the Adnan Division only had mediocre quality by Guards standards and a brigade would only have around 50-60 tanks even at full strength.

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No precise characterization of Iraq's remaining forces is possible but Tikrit seems to have had additional elements of the Special Republican Guards, although these had no more strength than the equivalent of a few battalions. The heavy fourth brigade does not seems to have deployed its armor to Tikrit from Baghdad but some reinforcement is possible. Other elements of the Special Republican Guards that might be in the Tikrit could have included:

- Survivors from the Second Brigade, which was normally headquartered at the Al Rashid military base, and had combat elements outside Baghdad and in the Mosul area. Three battalions – the 11th, 14th, and 15th seem reasonably well suited for urban fighting, and a few elements some may have moved towards Tikrit. It is unclear whether any engaged the US 3rd Infantry Division when it seized the airport on April 3rd/4th or the 1st Marine Division on the fighting of 4th/5th. It may have taken serious losses. All forces have been hit hard from the air. Probably has lost most major facilities and at least 70-80% of effectiveness.

  The Fourth Battalion was a significant combat unit that protected Saddam's palace in Makhool in the Bayji area that is north of Baghdad. The Sixth Battalion protected the palaces in the Mosul area. The Eleventh Battalion guarded the approaches to Baghdad from the direction of Taji. The Fourteenth Battalion guarded the approaches to Baghdad from the direction of Salam Pak and Kut. The Fifteenth Battalion was part of the western defenses of Baghdad.

- The Third Brigade was headquartered at Taji and had four combat battalions to defend Taji and the approaches to Baghdad. All forces have been hit hard from the air. Probably has lost most major facilities and at least 70-80% of effectiveness. The Third Battalion was a rapid reaction combat force. The Ninth Battalion protected the palaces and road approaches in the Tharthar area. The Tenth Battalion was a combat unit in Taji that protects Baghdad from the direction of the north and northwest.

As for the regular divisions in the north, one of the great mysteries of the war is why Saddam left so many forces in place rather than rushed them south the moment it was clear the 4th US Army Infantry Division was not coming through Turkey, These divisions are place near the Kurdish area and Iranian border and they too have been hit hard for 19 days.

The regular army forces were hit hard from the air during the initial weeks of the war, Kirkuk and Irbil are liberated, and Mosul has surrendered. This had a major impact on the regular army forces that remained:

- The 1st Corps had 1 Mechanized Division; 3 Infantry Divisions. It had its headquarters at Khaleed Camp (al Rashid Command Center) in Kirkuk City. It included the 2nd Infantry Division headquartered at Alrabee, the 5th Mechanized division headquartered at Shuwan, the 8th Infantry Division headquartered at Shuwan, and the 38th Infantry Division headquartered at Quader Karam. These forces were under significant air attack from D+3 on and then under pressure from the land as well because of US deployments in the north. Most units believed to have broken up and disbanded by April 9th. Full status unknown.

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- The 5th Corps had 1 Mechanized Division; 3 Infantry Divisions. It had its headquarters at Alsalamia Camp (Amouria Command Center) in Mosul. When the war began, it had units defending the border area with Syria and Turkey as well as covering other parts of the north. It included the 1st Mechanized Division headquartered at Makhmur, the 4th Infantry Division headquartered at Bashiqa Maonten, the 7th Infantry Division headquartered at Alton Kopri Castle, and the 16th Infantry Division headquartered near the Saddam Dam and Mosul. 5th Corps forces were under significant air attack from D+3 on and then under pressure because of US land force deployments in the north. The corps commander surrendered on April 11th. Most units believed to have broken up and disbanded. Full status unknown.
- The 2nd Corps was headquartered at the Mansouria Alabal Camp (Al Yarmouk Command Center) in Deyala, and was deployed east of Baghdad when the war began to defend against Iran or any attack by Iranian-backed Iraqi opposition forces. It included the 3rd Armored Division headquartered at Jalawia, the 15th Infantry Division headquartered at Amerli, and the 34th Infantry Division headquartered near Khanaqin. These units too had been under significant air attack and recently under limited pressure because of US deployments in the north. The Corps had some units retreat and others disband.

It is still unclear exactly why Iraqi forces collapsed so quickly. As the following chronology shows, however, the US forces did not have to fight the expected battle of Tikrit and did not meet major organized resistance from other Iraqi forces. It seems that the causes were a combination of the fall of Baghdad, silence from the regime, weeks of precision air bombing, the breakdown in Iraqi command and control capability, and the sheer demoralization of a force that had lost cohesion and organized capability to resist led to the rapid collapse of the remaining Iraqi force structure. In most cases, the regular forces were now so shattered by air power, and so defeated in political and psychological terms, that they ceased to fight.

Lt. General William Wallace, the Commander of V Corps, described the reasons for fall of Baghdad as follows: [49]

> "Three things stick in my mind as being important, right off the top of my head.
>
> "One is the speed at which we were able to get into position to posture ourselves to come into Baghdad. The rapidity at which 3ID (the 3rd Infantry Division) was able to cross the desert and get into position, I think was significant. Across the Euphrates and deep into Iraqi territory very rapidly
>
> "The second thing that I think is significant (was), when it was clear the early regime collapse was not going to happen, the CFLCC commander (Lt. Gen. David McKiernan) placed the 82nd Airborne (Division) under my operational control. And that was significant in that it allowed us to extend our operational reach (to Baghdad) while still controlling the areas that we had already liberated.
>
> "And the third thing that comes to mind was when we simultaneous attacked (on March 31) to the East, North and West.
>
> "All those ... simultaneous attacks were designed to establish our stance for the drive into Baghdad. We saw as a result of those attacks ... that the enemy started repositioning into its final defensives sets in good weather under the eyes of the Air Force. And the Air Force was able to take advantage of that and do some great killing. That set the conditions for the decisive maneuver

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> (on Baghdad) all of which occurred over the course of about two days, actually less than that, about 36 hours.

Lt. General Wallace did note, however, that the drive on Baghdad was not without risk:[50]

> I was concerned that we make sure that if (the enemy) changed his tactic that we could still continue to resupply; that if the enemy reacted to what he saw previously he might do something different than what we had seen.
>
> "As it turns out, (2nd Brigade Commander) Dave Perkins did great and wonderful work. Perkins recognized not only could he get in there but once he got in there, he was better off staying there from a security perspective than pulling out.
>
> "And so we had a very short conversation. (Maj.) Gen. Blount called me up and said, "I think we can stay" and I said, "Are you sure?" and he said "Roger. We've got all the intersections secured. We can run fuel tankers in. We can run ammunition resupply in. We've got good lines of communication. I recommend we stay." And I said, "Roger, out."

It also is again clear from the chronology that follows that Special Forces and the173rd Airborne Brigade played a major role in deterring and paralyzing Iraqi operations in the North and West, and that Coalition airpower must also have had an effect.

10/11 April

Coalition air forces continue strikes in support of land forces, The top priorities for coalition air forces on April 10th were: 1) 24/7 close air support in and around Baghdad, with focus on the final destruction of the RG; 2) 24/7 close air support of SOF in the north, around Mosul and Kirkuk, and in the west; and 3) continue attacks on regime leadership, air force and air defense targets. More than 80 percent of the strike sorties on April 10th focused on supporting coalition ground forces The rest focused on attacking regime leadership and security targets in and around Baghdad, Mosul and Kirkuk, and enemy aircraft, airfields, and surface-to-air missile assets.

Coalition aircraft target a building near Ar Ramadi in central Iraq inhabited by Saddam Hussein's half-brother, Barzan Ibrahim Hasan al-Tikriti. They drop six Joint Direct Attack Munitions on the structure. Officials identify Barzan as an adviser to Hussein.

The Combined Forces Air Component Commander reported daily and total sorties on April 10th as follows:

- Total sorties (today/since G-Day-March 19th-March 19th): About 1,750/About 35,000
- Strike sorties (today/since G-Day-March 19th): About 550/About 13,500
- Aerial refueling sorties (today/since G-Day-March 19th): About 350/About 7,200
- Airlift sorties (today/since G-Day-March 19th): About 425/About 7,000
- C2ISR sorties (today/since G-Day-March 19th): About 120/About 2,350
- Air and space supremacy sorties (today/since G-Day-March 19th): About 275/About 4,700
- Combat search and rescue sorties (today/since G-Day-March 19th): About 10/About 250

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- Munitions (total guided/total unguided/percent PGM): About 15,950/About 7,750/Almost 70%
- Aerial refueling offloads (through 8 Apr): 308 million pounds (45 million gals)
- Cargo moved (through 8 Apr): About 52,000 short tons
- Passengers moved (through 8 Apr): About 71,600
- Leaflets dropped (since G-Day-March 19th/since Oct 02): About 27 million/About 44 million.

Regime leadership and control structures have been broken through most of the country. Pockets of resistance remain, and there are increasing indications of regime-associated individuals attempting to escape the coalition by fleeing into other countries. Regime instruments are still available to the remaining elements, and the coalition continued efforts to find these instruments, as well as the regime elements and destroy them.

In general terms, coalition efforts focused on increasing the conditions of security and stability in liberated areas and conducting focused combat operations in areas not yet liberated. The only significant combat in Iraq on April 10th is in the area of Tikrit, Army Brig. Gen. Vincent Brooks said. "The land component sent a Marine task force to attack from Baghdad to Tikrit,", noting that the force met little resistance between the two locations. "The attack continued yesterday and its first efforts were to isolate Tikrit."

Coalition maneuver operations continued in Karbala and in Baghdad. A patrol from the 101st Airborne Division that moved into the Karbala area by helicopter assault and then proceeded to clear any remaining enemy resistance

In Baghdad, operations continue to clear any remaining elements. There was still resistance inside of Baghdad in local pockets, and with efforts intended to increase the conditions of stability and security in these areas. A vehicle explosion occurred in the northeast of Baghdad. That explosion, and the clearance of a minefield along Highway 8 that had over 350 mines harvested from the minefield, served as reminders that Baghdad remained unsecured by both the 1st Marine Expeditionary Force units, on the east side of the Tigris River, and Fifth Corps units on the west side.

The coalition began broadcasting world news television broadcasts in Arabic using existing military broadcast platforms. And these are in addition to the radio broadcasts that continue 24-hours a day,

In Baghdad, Coalition troops took the notorious Abu Gharib prison complex, which proved to be empty. Operations also continued to increase the security of Baghdad International Airport. At Karbala, the university was cleared of regime forces.

3rd Infantry Division soldiers conducted combat patrols in the Baghdad area, which reduced enemy obstacles, and expanded the use of the Baghdad International Airport's airfield. The patrols also lead to the capture of seven missiles, and eight trucks with weapons and ammunition.

The 101st Airborne Division (Air Assault) encountered light enemy contact while conducting security operations in the cities of Karbala and Al Hillah. The soldiers also began clearing operations, which lead to the destruction of two tanks.

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The 82nd Airborne Division assessed the cities of As Samawah, Ar Rumaythah, and Ad Diwaniyah. The division continued to evaluate these cities to provide humanitarian assistance to the local populace, and security to ensure freedom of movement.

Special Forces soldiers, members of the 173rd Airborne Brigade and Kurdish Peshmerga militia enter Kirkuk, and end any organized military resistance there. Other portions of the 173rd Airborne Brigade move on to secure the Kirkuk oil fields and the military airport there.

A cease-fire agreement was also brokered with the Iraqi regular army's 5th Corps near Mosul.

Unconventional warfare and direct action missions continued in all parts of the country. In Baghdad, special operations forces, supported by mechanized infantry, entered the Abu Gharib prison complex. This prison has the capacity to hold up to 15,000 prisoners, and was found empty. American and British special operations forces have been engaged for quite some time with an Iraqi garrison at Al Qaim, the site where Iraq enriched uranium for its nuclear weapons program in the eighties.

In the west, special operations forces took surrender of an Iraqi colonel who was responsible for the border control points at Highway 11, leading into Syria, and Highway 10. And he turned over the keys to the border control point at Highway 11. The coalition now controls that border crossing point. Along Highway 1, this is the road that runs north of Tikrit, between Tikrit and Bayji, which is a bit further to the north, coalition special operations forces had a small firefight, and after the firefight discovered an area that had five small airplanes covered with camouflage. These airplanes might be something that could be potentially used by regime leaders to try to escape, or could potentially be used for the delivery of weapons of mass destruction. All five aircraft were destroyed to prevent their use by the regime remnants.

Coalition special operations forces, supported by Kurdish Peshmerga and elements of the 173rd Airborne Brigade, entered Kirkuk and ended any organized military resistance there. The 173 Airborne Brigade continued operations to secure key portions of the Kirkuk oil field and also Kirkuk military airport. At this point, four of the very important gas-oil separation plants and several wells were been secured, and none had been damaged tot this point.

Also in the north, a coalition special operations commander accepted a signed cease-fire agreement from the Iraqi 5th Corps commander, regular army, near Mosul. There had been discussions ongoing for some period of time, and were brought to a degree of closure. This followed a period of bombing and close air support missions, and a efforts to make contact.

Iraqi 5th Corps forces began to leave the battlefield – some leaving their equipment, and either returning to their garrison or simply proceeding with life, as civilians out of uniform. Many Iraqi forces in the north removed their uniforms and left the battlefield to walk home without their equipment.

For the first time in combat history, a B-52 Stratofortress used a LITENING Advanced Airborne Targeting and Navigation Pod to target facilities at an airfield in northern Iraq at approximately 5:45 a.m. EST April 11. It successfully dropped one laser-guided GBU-12

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munition on a radar complex and one on a command complex at the Al Sahra airfield northwest of Tikrit using the LITENING system.

A shipment of humanitarian aid from the Red Crescent and United Arab Emirates arrived in Umm Qasr.

11/12 April

The priorities and themes for air missions on April 11th were:

- On-call close air support, SOF support, and persistent ISR coverage.
- About 80 percent of strike sorties focused on 24/7 on-call close air support of coalition ground forces in Baghdad and throughout Iraq, ready to attack enemy forces instantly as required by coalition ground forces.
- About one-third of all strike sorties focused on supporting SOF forces in the north.
- The air component maintained persistent surveillance and reconnaissance operations over Iraq to locate and target enemy forces that are still resisting the coalition.

Coalition air forces maintain a constant close-air support group over Baghdad and the north. The comparative daily and total air effort as of April 11th was:

- Total sorties (today/since G-day): About 1,525/About 36,275
- Strike sorties (today/since G-day): About 375/About 14,050
- Air and space supremacy sorties (today/since G-day): About 260/About 4,900
- C2ISR sorties (today/since G-day): About 115/About 2,450
- Combat search and rescue sorties (today/since G-day): Less than 5/About 270
- Aerial refueling sorties (today/since G-day): About 380/About 7,525
- Aerial refueling offloads (through 9 Apr): 310 million pounds (46 million gals)
- Airlift sorties (today/since G-day): About 400/About 7,100
- Cargo moved (through 9 Apr): About 55,000 short tons
- Passengers moved (through 9 Apr): About 76,000
- Aeromedical evacuation sorties (today/since G-day): About 5/About 110
- AE urgent patients moved (today/since G-day): Less than 5/About 50
- AE total patients moved (today/since G-day): About 150/About 1,300
- Munitions (total guided/total unguided/percent PGM): About 17,000/About 8,500/About 65%
- Leaflets dropped (since G-day/since Oct 02): About 31 million/About 50 million

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These sortie and munition numbers include CFACC strike and strike support missions; they do not include CFSOCC sorties or munitions or CFLCC and CFMCC helicopter and small fixed-wing sorties.

These numbers do not mark the end of the war but they do mark the point at which the US had conducted a campaign that had effectively defeated all organized Iraqi conventional forces. To put such figures in perspective, the USAF Gulf War Air Power Survey counted the following sortie data for the 1991 Gulf War:

- Total strike sorties: 42,240
- Uncategorizable: 7,200 – mostly against ground forces
- Against ground Forces: 23,430
- Counterair: 4,990 – 11.8%
- (2,990 on air fields, 630 on air defense radars and C3I and 1,370 on surface-to-air missiles
- Strategic – largely military: 3.790 –9.0%
- Military Industry: 970, Nuc/Chem/Bio 990, Against Scuds 1460, against naval targets 370.
- Strategic – largely civilian: 2,830 6.7%
- Leadership 260, Electric power 280, oil/refinery/fuel 540, telecoms 580, lines of communication, 1,170

Coalition land forces continued to secure and stabilize cities and thoroughfares around Iraq, and to focus combat operations in those areas where resistance continues. Coalition ground forces continued to clear and secure the remainder of Baghdad. Brig. Gen. Vincent Brooks says: "The coalition is expanding areas of influence throughout the country and concentrating efforts on security and stability." Brooks says reports of looting in liberated areas have declined, and Iraqis are starting to work with coalition forces to provide security, to get critical infrastructure facilities back up and running, and to provide basic health and medical services. Coalition forces are receiving help from the Iraqi people in identifying foreign fighters who came into the country to fight for Saddam.

Pockets of regime resistance remained, but USCENTCOM intelligence reported regime leadership and control systems had been broken: The deputy director of operations at the command noted: "There are increasing indications of regime-associated individuals attempting to escape the coalition by fleeing into other countries,". Forces also work on creating a climate of security and stability in liberated portions of the country.

As deliberate operations continue in Baghdad, more information is made available to the coalition regarding any remaining regime elements, and also regarding the location of ammunition and equipment. The coalition received information from some of the Iraqi citizens about the location of some rockets, 5th Corps forces found five mobile launchers, and one Al-Samoud missile. Additional forces were added to the Baghdad clearance with the arrival of the 101st, Airborne Division.

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As deliberate operations continue in Baghdad, more information became available to the coalition regarding remaining regime elements, and regarding the location of ammunition and equipment. The coalition received information from Iraqi citizens about the location of some rockets, and found on the ground five mobile launchers, and one Al-Samoud missile.

There was a suicide bombing in the Saddam City portion of Baghdad that wounds four Marines and a Navy corpsman. In another portion of the city, soldiers cleared a minefield of more than 350 mines. "That explosion and the clearance of the minefield … served as reminders to us that Baghdad is still a very dangerous place and that conditions are not set for life to continue."

In Baghdad, special operations personnel and mechanized infantry forces entered one of Saddam's prison complexes. The area could hold up to 15,000 prisoners, but coalition troops found it empty.

Coalition governments identified a list of key regime leaders who must be pursued and brought to justice. The key list has 55 individuals who may be pursued, killed or captured.

The Presidential Scientific Adviser, Amir Hamudi Hasan al-Sadi, surrendered to Coalition troops in Baghdad.

The land component continued its attack to defeat any remaining forces north of Baghdad. U.S. Marines encounter sporadic resistance on April 11th as they move into Tikrit. The Marines enter the city easily and are extend their control. They secure the presidential palace and began the search for regime supporters. Coalition forces surround Tikrit to prevent Saddam's henchmen from escaping.

Coalition special operations forces had a small firefight north of Tikrit. After the skirmish, they discovered five small airplanes covered with camouflage. The craft could have been used to help regime officials escape or to spread chemical or biological weapons. Coalition forces destroyed the craft.

In the north, ground forces and Special Forces worked to secure Kirkuk and Mosul and degrade regime forces in and near Tikrit. This work included the beginning of securing the northern oil fields.

The situation in northern Iraq changed quickly as coalition forces, supported by Kurdish forces, moved into areas vacated by the Iraqi military. Significant increases in the number of Special Forces detachments in the area of Mosul in the North made it possible for us to meet with local leaders and set additional conditions for stability. A neighborhood watch system went e into effect in Mosul, and the presence of coalition forces there contributed to stability. Wholesale capitulations occurred, and effective military forces were not encountered in that area.

Coalition special operations forces and the 173rd Airborne Brigade continued efforts to increase the number of oil field structures that are secured. They are receiving assistance from local oil experts as these facilities are assessed.

Near Mosul, Iraq's third largest city, a coalition special operations commander accepted a signed surrender from the commander of the Iraqi 5th Corps commander, Brooks said.

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"There had been discussion … and we were able to bring them to a degree of closure," Brooks said. The surrender followed a sustained bombing campaign against these regular Iraqi army forces. Brooks says the Iraqi 5th Corps has started leaving the battlefield leaving its equipment behind. Its members are either returning to their garrisons or going home.

Elements of the Army's 173rd Airborne Brigade and the 26th Marine Expeditionary Unit reinforced the special operations forces in the north. The 173rd is normally based in Vincenza, Italy, and the 26th at Camp Lejeune, N.C.

Coalition special operations forces expanded their contacts in the northern cities of Mosul, Irbil and Kirkuk. Coalition forces completely secure the northern oil fields. Specialists check the fields for regime sabotage and unexploded ordnance.

In the West, at Al Qa'im, coalition special operations forces continued their work in and around that area. They entered into a number of facilities, including searching a train station, and air defense headquarters, a phosphate plant, a cement factory, and a water treatment plant. They found two drones at the phosphate plant.

In the West, special operations forces take the surrender of an Iraqi colonel who controlled the border checkpoints into Syria and Jordan.

Coalition special operations forces also entered Al Asad Airfield. This is a place that has been subjected to coalition attacks before. And what they found on the ground was 15 fighter aircraft, fixed-wing aircraft, hidden underneath the camouflage and in what appeared to be undamaged condition.

At a checkpoint in the west, coalition special operations forces stopped a bus with 59 military-aged men traveling west. Among their possessions were letters offering financial rewards for killing American soldiers and 630,000 U.S. dollars in 100-dollar bills. The men and all of their possessions have been taken into coalition control.

Coalition maneuver operations focused on increasing stability south of Baghdad to enable humanitarian assistance and on conducting combat operations to clear zones within Baghdad. Fifth Corps and 1st MEF forces expanded into new areas and there was a significant increase in the southern area because of the addition of one more unit – in this case, the 101st Airborne Division. In some cases there were pockets of resistance encountered, and were defeated.

In other areas, the coalition continued its operational maneuver in the area of Al-Amarah in the east, where U.K. forces and coalition U.S. forces are moving toward one another to link up. In the area of Al Kut, just to the northwest of there, there were still some indications that there may be a regime presence, and we are turning our attention in that direction.

Coalition forces continue operations in Baghdad to improve security to allow humanitarian aid deliveries. The Presidential Scientific Adviser, Amir Hamudi Hasan al-Sadi, surrendered to Coalition troops in Baghdad.

U.S. Marines discovered 310 suicide-bomber vests at an unspecified location in Baghdad on Friday. One hundred sixty of the vests contain ball bearings and are engineered with

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explosives. The remaining 150 vests did not contain ball bearings. Sixty of the vests are made of black leather, and are designed to be worn over clothing.

Coalition ground and sea forces maintained security on the Al-Faw peninsula, the port at Umm Qasar, and Basra, and in the southern oil fields. 1(UK) Armored Division and US Marines continued work to link the secured areas around Basra and Al Amarah.

Australian forces commenced Operation Baghdad Assist to help deliver medical supplies to the city.

12/13 April

U.S. and coalition troops searched out and eliminated pockets of Saddam-regime diehards, while they provided humanitarian relief to the Iraqi people. Marine forces in the Al Kut area searched for remaining Iraqi forces. U.S. and coalition troops continued attacks to defeat remaining enemy forces north of Baghdad, and American troops combed the city for regime holdovers.

An Australian C-130 flew medical supplies into Baghdad International Airport.

In Basra, local police patrols resumed under the close supervision of British troops.

Members of the First Marine Expeditionary Force returned seven American service members to the coalition. They were found in the vicinity of Samarra, Iraq. In Basra, local police patrols were resumed under the close supervision of British troops.

More countries provided humanitarian aid such as a delivery of 50,000 tons of wheat to Umm Qasr from an Australian ship. The United Arab Emirates is provides 70 metric tons of food, water and medical supplies. Assessments are ongoing throughout the liberated portions of Iraq to re-establish the country's infrastructure in partnership with the Iraqi people.

For instance, efforts are under way in Umm Qasr to get the railway system back on track. A rejuvenated Iraqi railroad "is just one of the ways we'll move supplies north toward An Nasiriyah and beyond," he said. U.S. and coalition battle plans had deliberately avoided destruction of Iraq's railroad system to ensure it would be ready for use after hostilities.

Coalition ships now have over 60,000 men and women and 140 ships in the region. Aircraft flying from US carriers have flown over 7,000 sorties in support of Operation Iraqi Freedom as part of the air component command power projection mission. Maritime patrol aircraft, P-3s principally, have provided intelligence, surveillance and reconnaissance of the battlefield forward into Iraq and over Baghdad. Since Operation Iraqi Freedom began on March 19th, United States and United Kingdom ships have fired over 800 Tomahawk missiles.

The End of the Conflict and the Transition to Nation Building

By the 13th of April, the last remnants of organized resistance by main Iraq units were fading and Saddam Hussein's regime had lost control over every major town in Iraq. It is not clear why no meaningful defense of Tikrit took place, but few cities in Iraq are more of a free fire zone for attack:

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Tikrit has a number of bunkers, and a tunnel network. At the same time, it has been steadily bombed, and it has poor urban geography to defend.

- It is long and narrow, with little defensive depth.
- It has been given so much money that streets are often wide and open.
- The main palace complex is totally outside the city with no defensive shield in terms of civilian areas. The palaces inside the city are wide open.
- There are three airports on the outskirts that have to be defended.
- It has many major equipment and storage centers, and command and control facilities but these too have been hit from the air.
- There are many major routes into the city or just north and south of it, and a bridge crosses the Tigris from the east in its center while two roads go up and easily bridgeable Tigris on either side of the river.
- A major four-lane bypass goes by the city on the west, allowing easy movement without entering the city.
- The terrain is relatively trafficable off-road all around the city.

In ay case, there was no formal regime surrender, and no smooth transition from war to peace. If anything, war with Iraqi forces faded into peacemaking duties in dealing with Iraq's divided factions while simultaneously attempting to deal with humanitarian concerns and nation building.

As was the case in the Balkans and Afghanistan, that transition proved much harder to make than the US and its Coalition allies planned for. This in part was a result of the lack of manpower and force size that was forced upon the Coalition by Turkey's decision not to base US and British forces. It part it was a result of calculations that estimated far more of Iraq would see the Coalition as a liberator and more urban services and police forces would stay intact, and in part it was the result of a failure to plan for the need to simultaneously fight urban warfare and establish order and security.

13/14 April

Commanding General Tommy Franks says there are no towns under Iraqi regime control now. "Saddam Hussein's regime cannot exercise control over any portion of the country," but this does not mean the fighting has ended. Franks says he is not ready to declare victory, even though the Iraqi regime is destroyed. "We believe that there are a number of military objectives in this country," he said. "One of them for sure is to remove the regime. And we believe this regime is no longer in charge. In fact, it is an ex- regime."

"The United States still must find Iraqi weapons of mass destruction, root out terrorist cells and then move to an "end state" where the Iraqi people choose their government." He notes that coalition forces, in their rush to Baghdad, bypassed a number of villages and cities. Coalition forces must now go into those towns and cities, and there may be fighting by "dead-enders." "Resistance is spotty…We have had our people in a number of places where they have had a hell of a fight. We have had our people go to other places

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where we were ready for a huge fight and been greeted by people saying all the regular army people have left."

Franks says that Baghdad has been divided into 55 or 60 block zones, and that coalition forces can expect fighting in 10 to 15 of them. He said coalition forces had "a heck of a fight" around a mosque in eastern Baghdad. In some cases these fighters are members of the Iraqi Special Republican Guard and the Fedayeen Saddam. And there have been foreign fighters – Syrians being the largest nationality represented among them. Coalition forces have stopped people from coming into Iraq. "In some cases we have taken them as enemy prisoners of war, and in other cases we have sent them back on their way," he said.

Franks says there are between 2,000 and 3,000 possible sites in Iraq where the regime may have weapons of mass destruction.

US forces attacked Tikrit from the South, West and North in what was the only significant combat action. They met less resistance than anticipated. They secured the presidential palace, which was not defended at all. This is after weeks of bombing, leafletting, a special ops raid and direct talks with Iraqi officers.

Forces turned their attention to stability operations. Moving to secure power stations, water facilities and hospitals. Map at 07:13 shows a key power plant and water treatment plant in Baghdad. Coalition engineers are meeting at all levels with Iraqi utility workers to restore services throughout Iraq.

Coalition forces secured all of the northern oil fields and worked with indigenous oil workers and firefighters on repair work to be done there.. Northern fields are in better shape than the south. All fires in south are out. One well in the north is still burning.

Village and city officials in some places worked with coalition forces to help restore their areas. For example, the Iraqis are helping coalition forces identify the Saddam Hussein loyalists, and they are working to establish safety patrols. They are also working with civil affairs experts to fix electricity, water and sewage systems.

USCENTCOM described Syrian and foreign fighters as using terrorist tactics. These people "are at the very best mercenaries who have been paid to come into Iraq. [07:43] No good estimate of how many of these well-armed and violent young men have made their way into Iraq. They're not doing any good for the people of Iraq. Up to 80 suicide bomb vests from the discovered cache remain unaccounted for. Of these foreigners, Syrians have been seen "in the greatest density." Iraqi intelligence services are believed to have recruited in Syria.

Joint patrols and about 200 police volunteers started patrolling Basra. In other areas, tribal leaders were establishing coalitions of tribes. In Karbala, a local police had 200+ volunteers, uniforms and 10 marked police vehicles.

14/15 April

Major military operations end on April 14th. Pentagon spokeswoman Victoria Clarke says that "The regime is at its end and its leaders are either dead, surrendered or on the run," She gives a report on progress in the eight objectives set for the war:

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- "The first was to eliminate the regime of Saddam Hussein. Most of the country is now free of the regime's influence.
- The second objective was to capture, kill or drive out terrorists and terrorist organizations sheltering in Iraq. Clarke said with the fall of Saddam, terrorists lost their largest state sponsor.
- The third objective was to collect intelligence on terrorist networks. She said that as stability returns, Iraqis are coming to the coalition with information on these groups. Military intelligence personnel are also sorting through captured papers for information.
- Fourth and fifth are to collect intelligence on weapons of mass destruction and to oversee their destruction. "We've begun the long process of exploring sites, sifting through documents and encouraging Iraqis to come forward with information," Clarke said.
- Sixth is to secure Iraqi oil fields. Coalition forces secured the Southern oil fields soon after entering the country on March 19, and coalition special operations forces, supported by conventional forces, secured the northern oil fields around Tikrit last week.
- The seventh goal is to end the U.N. sanctions against Iraq and begin sending humanitarian aid to the country. Clarke said President Bush and British Prime Minister Tony Blair have asked the United Nations to rescind the sanctions imposed following the 1991 Gulf War. Clarke said aid from any number of countries is beginning to flow into Iraq.
- Finally, the eighth goal was to help the Iraqi people establish a representative government that does not threaten its neighbors. "We are working with clerics, tribal leaders and ordinary Iraqis," she said. "Many will meet tomorrow in An Nasiriyah to discuss the future of Iraq and the Iraqi interim authority."

Since the conflict began 118 American service members have died.

Coalition air sorties decreased over the last few days to about seven (hundred) to 800 sorties over Iraq per day. Air forces dropped less than 200 precision-guided munitions in the last 24 hours to support operations on the ground. April 14th is the last day that aircraft from all five carrier battle groups will fly missions into Iraq.

The Marine task force that moved from Baghdad to attack Tikrit met little resistance in the towns of Ba'qubah on the east side of the Tigris River, and Samarra, along the Tigris River further to the west. The attack continued, and first efforts were made to isolate Tikrit from the south, from the west, and also from the north, as well as a key bridge in the center of town that crosses the Tigris River. That morning the attack entered Tikrit, secured the presidential palace and the Marine Forces began the search for any remaining regime supporters. This was the only significant combat action that occurred within the last 24 hours.

Operations continued in northern Iraq to extend the area controlled by Coalition forces around Arbil, Mosul and Kirkuk. Emergency supplies of fresh water were delivered around Kirkuk, pending the recommissioning of water infrastructure. Special operations

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forces expanded contacts with local leaders throughout the country, particularly in the north and in the west. The presence in the northern areas of Mosul, Irbil and Kirkuk was reinforced by the increasing commitment of the 173rd Airborne Brigade, and also by the arrival of the 26th Marine Expeditionary Unit. Operations remained focused on locating regime leaders and searching key regime facilities.

Special operations forces and conventional forces expanded throughout the northern oil fields and secured all of the northern oil fields. Assessments continued with the active cooperation of Iraqi oil workers. The remaining fire that was in the southern oil field was extinguished, and all oil fields within Iraq now fell within areas secured by the coalition. There was one well fire that is still burning in the north.

Special operations forces near Hadithah Dam, the location of intense combat in recent weeks, met with oil workers and fire fighters to organize an effort to extinguish and oil stabilization plant fire that was triggered by the regime over a week. Close cooperation between the coalition and Iraqis resulted in the fire being extinguished.

Electric power and water remained the key needs, and coalition forces continued to provide military support wherever possible. Coalition land forces actively engaged in setting the conditions for a stable Iraq. Among the challenges were disposing of all the materiel of war purchased and stored by the regime for use in the defense of Baghdad. As coalition forces moved to secure more power stations, water facilities and hospitals in several zones of the city, they often uncovered or were guided to significant amounts of ammunition, weapons, aircraft, and vehicles used by the regime.

In one example, coalition forces found 12 surface-to-air missiles and six VIP helicopters near a Ba'ath Party headquarters building. Other examples included 51 Iraqi trucks that were loaded with ammunition, several buildings and bunkers loaded with ammunition, with many more truckloads worth that need to be moved and disposed of, including artillery ammunition, tank ammunition and missiles.

In Baghdad, Coalition experts examined the power plant that services all of western and southern Baghdad, and also the water treatment plant in the south of Baghdad that provides safe water to the communities, and those are highlighted to the west and just south of the bend in the Tigris River. Coalition military engineers met with senior Iraqi power industry officials and electrical engineers to find the best way to restore power to the city. Meetings like this happened at lower levels as well, with military civil affairs teams or operational commanders throughout the country in places where the lack of power undermined the supply of water and put the population at risk.

Joint patrols are initiated, and roughly 200 police volunteers joined with coalition forces start patrolling Basra. This was an effort to assist in quelling any looting or any other civil unrest. In other areas, tribal leaders established coalitions of multiple tribes, and this was the foundation for local governance in cities in the north and in the west. In Karbala, as an example, town leaders established a local police force with over 200 volunteers, and provided them with uniforms. They had 10 vehicles that are marked as police vehicles, and they made efforts to try to get some degree of control and stability established themselves, These efforts went on tin other parts of the country.

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The US announced that two carrier battle groups centered around the USS Constellation and Kitty Hawk would leave the area. This left three carrier battle groups in the region: the USS Nimitz, Harry S. Truman and Theodore Roosevelt. It was also announced that coalition commander Army Gen. Tommy Franks was looking at ground-based air assets, now that the need for strike aircraft had diminished, and that the mix of land forces would change. As more of the country became stable, more military civil affairs specialists, engineers and military police will be needed.

15/16 April

Coalition forces in Iraq now total 122,000 U.S. troops and 21,000 British forces. Total coalition force: 143,000 in Iraq itself. U.S. officials say the number of ground troops is going to go up, although they are cutting back on the number of armored forces, which are no longer are necessary.

Coalition air activities were scaled back on April 15th. Coalition aircraft flew 1,050 sorties, with 275 being strike sorties. The only category to remain constant was airlift sorties. Coalition forces flew 425 airlift sorties. Defense officials said these aircraft are not only carrying military supplies and personnel, but also humanitarian supplies. They also flew 10 aeromedical evacuation flights.

Elements of the 4th Infantry Division are heading north and will take over responsibilities north of Baghdad, relieving the Marines and Special Ops troops. In general, the U.S. Army will assume responsibility for Baghdad and all territory north. The Marines will handle everything south of Baghdad. While ground troops are increasing, Air Force and Navy numbers will be sharply reduced.

Coalition operations on April 15th focused on eliminating remaining pockets of resistance and looking for regime leaders and on increasing the military contributions to humanitarian assistance operations. The work of clearing sectors of Baghdad and Tikrit continued.

Coalition forces were still rooting out the remnants of the regime, most notably in Saddam Hussein's hometown of Tikrit. Maneuver operations focused on eliminating any potential remnants of the regime leadership or forces within Baghdad and the area north of Baghdad. Special operations forces in the Baghdad area supported the efforts of the land component as they continue their work. Numerous arms caches were recovered. A local police force was mustered in As Samawah, and police officers conducted joint patrols with US forces in Baghdad.

The 1st Marine Expeditionary Force maintained the isolation of Baghdad along the eastern side of the city. The Marines cleared additional zones in the center of the city and conducted joint patrols with Iraqis. The remaining areas in Baghdad that have not yet been cleared are all suspected to harbor armed regime loyalists. Other 1st Marine units continued to secure Tikrit.

Special operations forces were active in expanding security in the northern Iraq areas of Mosul, Irbil and Kirkuk. All of the oil fields remained secure in the north, and the oil well fire reported the previous day had been extinguished. There were no burning oil wells in Iraq.

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Special operations forces meet with tribal and local leaders in former regime stronghold to secure letters of compliance that work is ongoing.

Cooperation by local populations enhanced the activities of special operations forces, and in one case near Ar-Rupa in the west, coalition forces were led to a group of three former regime death squad members that had infiltrated into the area and this resulted in the capture of these three death squad members.

Direct action missions were ongoing throughout the country. These actions were intended to locate regime leaders and to search former regime facilities. In a reconnaissance mission, special operations forces found 80 SA-2 or SA-3 surface-to-air missile hidden in a revetment within a ravine.

Coalition maneuver operations remained focused on increasing security in urban areas throughout Iraq while assessing and addressing humanitarian needs. There was a steady decrease in looting and lawlessness as more communities organize themselves but with coalition support.

The deliberate work of clearing sectors in Baghdad and Tikrit continued. Coalition forces regularly found large weapons and ammunition stockpiles with the assistance of the Iraqi people. Fifth Corps forces found a weapons cache with 91 cases of TNT and plastic explosives, six homemade bombs, 23 cases of rocket propelled grenades, and then were led by Iraqi people in the area to 10 smaller caches of ammunition and weapons in a different sector.

Coalition forces continued conversations with former regime commanders to seek any "final surrenders" that they may make, but these were not large pockets of military resistance. The military capability throughout Iraq has been destroyed or has simply walked away."

Special operations forces expanded security in northern Iraq cities of Mosul, Irbil and Kirkuk.

In Al-Ramadi an element of the 3rd Infantry Division accepted the capitulation of the 12th Armor Brigade, regular army, which was stationed in that area and had been defending the main road that leads from Jordan into Baghdad. This capitulation reflected compliance with the coalition instructions of moving into some sort of formation that would indicate a clear signal that capitulation was the desire of the command. This had been facilitated already by special operations forces that had been in contact with the commander of the formation, and some of their actions included moving vehicles into administrative parking, reorienting their weapons away from coalition forces, and in this case they even took additional steps of rendering some of the combat systems ineffective by removing batteries. Most of the force had already been released from service, but the commander had 40 soldiers that remained there to actually guard the equipment in the garrison. While there still may Ba'ath Party loyalists in Al-Ramadi, it's clear that the organized resistance there had come to an end.

U.S. forces stopped the flow of oil in a pipeline from Baghdad to Damascus, Syria, that was in violation of U.N. sanctions

British forces secured oil facilities in the south and searched for the remnants of any irregular forces in the vicinity of Basra.

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USCENTCOM announced that its search for Iraqi weapons of mass destruction by first establishing a number of mechanisms to do the initial checks when a possible discovery occurs. These are unit level detectors and monitoring equipment, and may give the first indication there is an agent or weapon. The next level consists of military units that have the capability to do a more detailed examination and confirm an agent, specifically what it might be. If a confirmed agent is found, it is examined further for better confirmation..

USCENTCOM had organized some units to do sensitive site exploitation, and embedded the capability in other units. These included some Special Operations units and some forward operating units. They were given the he ability to go into a place, and to examine it in detail, with the right knowledge, with the right equipment related to weapons of mass destruction. An entire brigade has been devoted to that mission – an artillery brigade – which changed from its normal mission of delivering fire support, trained to do site exploitations in small teams. And so we can cover a number of areas.

Coalition forces worked closely with emerging leaders and religious leaders in several areas to assist the formation of local governmental structures. In Diwaniyah, for example, local administrators worked to create a city council, get it started, and get underway with local government. Two former generals in that same area have volunteered to organize a local police force, and were being considered. In the town of Karbala, a local leadership council was formed. In As Samawa, a local police force was formed, with over 150 volunteers. Those were selected out of 1,500 that showed up for consideration.

Maritime components continued efforts to expand access to the inland ports within Iraq, and this enable the flow of commercial vessels as well as humanitarian supplies. Work was underway to open the port of As-Zubair. There were 36 of these derelict vessels between the port of Umm Qasr and the port of As-Zubair, and efforts were ongoing to clear those out. Each one had to be examined, removed of any demolitions or unexploded ordnance, cleared for mines and physically moved to clear the channel into Az Zubayr.

A group of largely pro-US Iraqi leaders met in Nassiryah. The meeting included senior American diplomats Zal Khalilzad, the president's personal representative to Iraq, and Ryan Crocker, the former ambassador to Kuwait, as well as retired Army Lt. Gen. Jay Garner, who is the head of the Pentagon's Office of Reconstruction and Humanitarian Assistance. Iraqi opposition leaders from inside and outside Iraq were present.

The group issued a statement that included 13 points outlining how they would seek to establish a "federal system" under leaders chosen by the Iraqi people and not "imposed from outside." The gathering highlighted critical issues for continuing discussion, like "the role of religion in state and society." "Those who would like to separate religion from the state are simply dreaming," said Hussein Mussawi, a schoolteacher at the meeting. His view was echoed in the streets of southern Iraqi cities. Yet, one Shiite cleric from Nasiriyah, Sheik Ayad Jamal al-Din, disagreed. "Dictators may not speak in the name of religion," he said, demanding a "system of government that separates belief from politics."

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16/17 April

Coalition special operations forces continued to be a key ingredient of the coalition efforts to deny free movement to former regime members, to secure key facilities, and to enable other coalition operations.

In the first Iranian official reaction to the situation in Iraq and to the allegations against Syria, Iran's President Khatami said that: " We will not recognize any administration in Iraq except for an all Iraqi government, but we are not seeking confrontations with anybody" at the same time he said that" we will not intervene in Iraqi internal affairs…We will defend Syria but this does not necessarily mean that we will engage in a military confrontation"

Fifth Corps continued to attack to cut off regime escape routes and also secured key Iraqi facilities. Other Fifth Corps elements continued to secure population centers and key roads in central and southern Iraq, and supported ongoing humanitarian assistance operations throughout the zone.

Direct action missions against regime leadership or terrorist interests were ongoing. On April 16th, Coalition special operations forces, supported by U.S. Marines, captured Barzan Ibrahim Hassan al-Tikriti. Barzan is the half-brother of Saddam Hussein, and an advisor to the former regime leader, with extensive knowledge of the regime's inner workings. There were no friendly or enemy casualties.

The 1st Marine Expeditionary Force maintained the isolation of Baghdad north along the eastern side of the city, and also continued its operations within the center of the city, clearing additional zones and conducting joint patrols with Iraqis. The remaining areas in Baghdad that have not yet been cleared are all suspected to harbor armed regime loyalists. Other 1st Marine Expeditionary Force units continued to secure Tikrit. U.K. forces secured oil facilities in Al-Kurna (sp), and searched for the remnants of any irregular forces in the vicinity of Basra.

Coalition special operations forces were actively breaking the Iraqi links to terrorists. On the night of 14 April 2003, coalition special operations forces, supported by the 3rd Infantry Division of Fifth Corps, conducted an operation in southern Baghdad to capture the Palestinian terrorist Mohammed Abbas, also known as Abu Abbas. Abbas was often described as the secretary-general of the Palestine Liberation Front, the PLF, and was also a key planner of the Achille Lauro Hijacking in 1985.

US intelligence estimated that 800 to 1,000 hardcore regime supporters or non-Iraqi fighters were still operating in the Baghdad area in small 2-to-3-man teams. Direct action missions went on throughout the country to locate former regime leaders and to search former regime facilities. An Iraqi intelligence service training facility was searched by coalition special operations forces and resulted in the seizure of information and materials that will now be examined in detail.

The Marines found an abandoned terrorist training camp, run by Iraq and the Palestine Liberation Front, where recruits had been taught how to make bombs as well as chemicals, beakers, and pipes. Troops brought out boxes of documents and three men with their hands up.

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Special operations forces, reinforced with conventional forces, continued to expand security and set conditions for stability in northern Iraq. Power, water and food were functional and adequate in most areas of the north. Four key cities, Dahuk (sp), north of Mosul, Irbil, Kirkuk, and Sulimaniyah to the east of Kirkuk, were assessed as permissive security environments, and this let humanitarian action occur with much greater density and activity.

The US acknowledged that Marines shot civilians in Mosul, after an angry confrontation. Special Operations forces with civil affairs, and reinforced by some Marines also operating in that area of Mosul, went into a location that they had selected to be used as a regional coordinating center, a place where people could come and meet and do the business that's necessary for creating a stable environment. This building was a former government building, and it had a retaining wall around it. And that was one of the reasons why it was chosen.

After the first group entered, another group of Marines joined them, and encountered by a very large crowd outside of the complex. The crowd was violent upon their arrival, throwing rocks at the Marines, hitting them with elbows, hitting them with fists and spitting on them as they entered the complex. The Marines entered the complex through that and then took up their positions to secure the work that was ongoing inside of the complex.

At a later time, the crowd became more incensed and agitated. An ambulance arrived that had loudspeakers on it. The coalition also had a vehicle with loudspeakers. It was trying to calm the crowd. The ambulance arrived to incense the crowd. And it became agitated, turned over a civilian vehicle, set it on fire in the streets, and the crowd’s actions became increasingly violent.

The coalition Special Operations forces and Marines observed men with weapons in and amongst the crowd who were firing in the air. It wasn't aimed fire. Warning shots were fired by coalition into a field beyond where the crowd was forming. Thereafter, fire was directed at the Marines and Special Operations forces in the complex. It was aimed fire, and aimed fire was then returned against some of the demonstrators who were climbing over the wall of the compound. The attack occurred from two sides, and men with weapons were involved in firing on the building during that time.

The fire delivered by coalition forces was lethal fire. And some Iraqis were killed. The U.S. military said they could only confirm seven Iraqis dead. Locals say 10 were killed. The U.S. military version of the confrontation goes as follows: A large crowd threw rocks and small arms fire came from within the crowd. The Marines–after firing warning shots– returned lethal fire. This happened as they tried to secure Ba’ath Party headquarters. The situation at the end of April 16th is described as "relatively calm."

There are still a few towns that the U.S. has not yet dealt with, but are started to move on. Bakuba near Tikrit was the largest of these.

Iraq's 12th Armored Brigade "capitulated" near Ar Ramadi. It was the last organized unit in Iraq and officials say, once the capitulation was negotiated, they discovered there was not much left of the unit.

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The cooperation by local populations in other areas was evident in the discovery of over 2,000 mortar shells and several hundred rockets in the city of Al-Kut. There were pointed out by civilians in that area.

The commander of the 101st Airborne estimated his troops would spend 75% of their time for the next two months searching more weapons, ammunition and documents than for enemy troops and leaders.

The first elements of the high technology 4th Infantry Division – arrived north of Baghdad. The last elements were still arriving in Kuwait. The division is spread out over 300 miles. The division included about 21,000 soldiers and was part of a larger Iron Horse Task Force that totaled about 30,000.

Civilian experts recruited by the United States to hunt for unconventional weapons in Iraq said bureaucratic confusion and infighting have delayed their effort to a point that the search itself may be compromised. “They're going to blow it,” one would-be inspector said. “That's the concern of a number of us.”

At this point, all coalition land units were conducted humanitarian assistance assessments throughout their areas. Coalition forces reported that looting had been dramatically reduced throughout the area of operations.

Loudspeaker teams and radio broadcasts helped to discourage looting, as well as reduce the tolerance of looters. Emerging joined in the call for looting to cease.

Coalition land component units continued several meetings with the Iraqi leaders regarding critical needs and issues. In a number of areas, control of infrastructure and the organs of governance was put back in the hands of the Iraqi people. In Al-Amarah, for example, the local population was control of most of the institutions,, as they already had been in Irbil in northern Iraq.

Power remained the root issue for many humanitarian challenges within Iraq. It is necessary to produce or to move fresh water, and allows hospitals to function at full capacity, and it also enables certain types of infrastructure repair. The coalition continued to distribute water supplies and assistance in Iraq. The water system in Basra was functioning at about 60 percent of the needed capacity, as it was before the war, and work is ongoing there to raise the system to 100 percent capacity in the coming weeks. In some other areas, like As-Zubair, near Basra, 80 percent of the population had access to running water. Humanitarian organizations were providing an additional delivery of bottled water and bulk water daily in that area. the water system in Kirkuk was functioning normally,. Medical care and public health received coalition support. Some facilities had already been restored to readiness.

Coalition countries and countries from without the coalition committed health professionals, supplies and facilities to provide assistance and relief. Some examples: A medical facility in Umm Qasr is supplemented by Kuwait; the Spanish field hospital and ship-based hospital in the region as well; insulin, children's vitamins, and bandages are pushed to the main hospital in As-Samawa. Qatar sent three pallets of medical supplies and 17 health professionals, including four doctors just within the last few days. A medical aid convoy and a Jordanian field hospital crossed into Iraq to provide assistance

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near Baghdad. Within Baghdad, water, fuel, pumps and batteries were supplied to several medical facilities in cooperation with the ICRC.

The first humanitarian relief flight lands in Busher.

President Bush signed a supplemental budget bill that gives the Department of Defense $62.4 billion for the Iraq War. The bill separates funding into major titles

instead of giving the administration a free hand on how to spend the money:

- -$31.2 billion for operations and maintenance
- -$13.4 billion for military personnel
- -$1.4 billion to support coalition partners
- -$1.3 billion for procurement
- -$502 million for Defense Health Program
- -$81.5 million for research and development
- -$15.7 billion for the flexible "Iraq Freedom Fund." The report requires the Defense Department to notify Congress five days before transferring funds from the Iraq Freedom Fund. Advanced notification is also required before allocating funds for counter-terrorism training activities and funds for Pakistan, Jordan and other countries.

The Office of the Comptroller of the Office of the Secretary of Defense provided an estimate of the direct costs of the war to date to the Department of Defense:

- $19-21 billion total to date
- $2 billion a month
- $4 billion for personnel (including pay and benefits)
- $2 billion for personnel sustainment (food clothing, etc.)
- $10-12 billion on operations (the fighting)
- $3 billion on munitions replacement
- $1.4 billion to reimburse allies. (Pakistan and Jordan are at the top of the list. Pakistan gets about $70 million a month. They send receipts to CENTCOM... the US Treasury sends a check.)
- $2 billion for "special pays" that service members receive for serving in combat
- $2 billion to mobilize the reserves
- $1.2 billion a month for the entire Global War on Terrorism, without Iraq.

17/18 April

- US Dead (Killed non-combat and in action)—— at least 125
- US Dead (KIA)———————— ——————— 96

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- US Dead non-combat——————————————— 29
- US Missing——————————— ——————————— 3
- British Fatalities——————————————————— 31

Special operations forces captured another key member of the regime. Samir Abd al-Aziz al-Najim, one of the top-55 leaders of the regime, was handed over to coalition forces by Iraqi Kurds near Mosul in northern Iraq. He was a Ba'ath Party official, a regional command chairman for the Baghdad district, and is believed to have first-hand knowledge of the Ba'ath Party central structure.

Coalition special operations forces remained active throughout Iraq, gaining capitulations or surrenders in several areas, including ar-Rupa Kirkuk, Al-Amara, Al-Ramadi, Mosul, and Al-Qa'im. These efforts continued where remaining pockets of military presence are found.

Coalition maneuver forces continued clearing potentially hostile pockets while conducting assessments and aiding the delivery of humanitarian assistance. The arrival of the 4th Infantry Division into the land component operations area included a brief fire-fight in the vicinity of Taji Airfield north of Baghdad. In the engagement, the 4th Infantry Division forces killed and wounded a portion of the enemy force, destroyed some T-72 tanks, and captured over 100 enemy fighters. The enemy force also had unmanned artillery pieces, armored personnel carriers, loaded multiple rocket launcher systems, a surface-to-air missile warehouse, and a number of computers. The site and the materials were secured for further exploitation and examination. The coalition force reported the airfield clear of enemy forces and continued its attack to the north, encountering sporadic small-arms fire and snipers.

In the U.K. sector of southern Iraq, patrols were attacked by rocket-propelled grenades near a bridge in Basra. The patrols were still finding evidence of armed regime death squad members in the city, but in Basra improved in stability and security.

An Iraqi-assisted discovery of five shallow gravesites near al-Zubair was under investigation.

In other areas throughout Iraq, the Coalition focused on improving the conditions necessary for a stable and free Iraq, particularly on the restoration of power systems, the continuous availability of water and other services.

18/19 April

Prince Saud al-Faisal's, Saudi Arabia's foreign minister called on U.S. and British "occupation" forces to set an interim government in Iraq – the dominant message from the first gathering of Arab leaders since the outbreak of the war. "So that they withdraw their forces as quickly as possible, we invite the occupation authority to set up an interim government and exert maximum efforts to reach this goal by establishing an Iraqi constitutional government based on the largest representation that would fulfill the ambitions and wishes of the Iraqi people in all their categories"

His call came during the opening of a conference in the Saudi capital Riyadh that collected the foreign ministers of Iraq's neighboring countries Kuwait, Syria, Saudi

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Arabia, Jordan, Iran and Turkey as well as Egypt and Bahrain. Egypt's foreign minister Ahmed Maher had earlier stated Egypt's support of Iraq's sovereignty and the independence, "Egypt will not recognize any Iraqi administration unless it emanated from the free will of the Iraqi people. ... We look forward to allowing Iraqis to exercise their sovereign right and not to have anything imposed on them."

Coalition forces interdicted free movement by regime members or paramilitary elements by patrolling to maintain presence and security in selected locations along borders, along key routes and in the vicinity of Baghdad..

Hikmat Mizban Ibrahim al-Azzawi, former deputy prime minister of economics & finance, was taken into coalition custody. He was captured by Iraqi Police in Baghdad and turned over to the First Marine Division. He is number 45 on the U.S. Central Command Iraqi Top 55 list.

The building that was once Dr. Riyadh Taha's (Dr. Germ) office was now under U.S. marine guard. Known officially as the National Monitoring Directorate, the building was considered by the U.S. to be the center of Iraq's biological weapons program..

The 10-story Ministry of Information building was in flames and apparently ignited by looters. A recording played over Army loudspeakers, warned people in Arabic to leave the area "immediately or there will be consequences."

Coalition maneuver forces adjusted their unit locations outside Baghdad and continued presence patrols in the other cities as well to increase security.

The 4th Infantry Division encountered paramilitary resistance as it continued its move north between Taji and Samara, along that route. In the engagement, the coalition destroyed eight technical vehicles and captured over 30 enemy prisoners. An armored unit of the 4th infantry division attacked an airfield north of Baghdad after images from an unmanned surveillance plane indicated that 20 to 30 paramilitary fighters were loading ammunition into pickup trucks. The fighters were presumed to be members of Fedayeen militia. No information on casualties was immediately available.

Special operations forces continued their efforts to stabilize northern Iraq and western Iraq, while also conducting direct-action missions when appropriate, Australian commandos took possession of an airfield in western Iraq, and discovered 51 undamaged combat aircraft and a quantity of weapons. The aircraft were well camouflaged and concealed. The base had not been bombed.

In Baghdad, six diesel-operated plants were online and generating power, and the south Baghdad power plant had resumed operations In Hadithah, near the Hadithah dam, power had been restored to the surrounding community. In the northern towns of Irbil, Dohuk, Sulimaniyah, there was sufficient fuel on hand to run electric power plants for over 40 days.

The coalition assisted medical care in Baghdad as well as in other areas. In some cases, this focus involved redistributing captured medical supplies. In other cases, it involved facilitating the delivery of supplies donated from other countries or from humanitarian organizations.

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Coalition teams were active in discussions with emerging leaders throughout Baghdad and other areas. Discussions occurred recently at a coalition civil-military operations center in Baghdad. The meeting covered a number of topics, including getting some of the former police back to work and even discussions of what uniforms these former policemen might wear to distinguish them as a new police force. Meetings like these were ongoing daily and they identify interim public-service employees for Baghdad and other cities.

U.S. officials predicted Iraq's southern oil fields could be producing 1.1 million barrels a day within seven weeks. Damage to the southern oil fields from combat - or sabotage - proved comparatively light. The 1.1 million barrels would be about 40 percent of prewar levels. The Prospects are less clear for Iraq's northern oil fields. Industry employees there say the widespread looting that followed the fall of Saddam's regime affected production facilities, offices and worker housing to the point it is unlikely oil will be flowing soon.

19/20 April

The Bush administration formulated plans to ask U.N. to lift sanctions in phases: Administration officials told The New York Times that instead of a single Security Council resolution to lift sanctions on Iraq, the U. S. would seek three or four resolutions over several months. The step-by-step approach was described as a tactic to counter assertions by France, Russia and other Security Council members that they would oppose lifting sanctions without a broader role for the United Nations than the one envisioned by Washington.

The Arab League issued a call to the “occupying power” that sanctions should be lifted once an Iraqi government was reestablished: “Now Iraq is under an occupying power and any request for lifting sanctions must come when there is a legitimate government which represents the people,” said the Saudi foreign minister, Prince Saud al-Faisal, the host of the meeting.

The Arab League denounced U.S. pressure on Syria: Prince Saud said, “We reject utterly any accusations and threats against Syria; this will lead to a vicious cycle of wars and turmoil.” Reading from the countries’ nine-point declaration, he “expressed their countries' disagreements with allegations directed toward Syria” and “welcomed the news regarding the intention of the American Secretary of State to visit Damascus to discuss Syrian-American relations.”

Syria banned Iraqis without visas from entering the country.

The US Army began to take over from marines in policing Baghdad: U.S. Army soldiers practiced crowd-control tactics on Saturday on hundreds of Iraqis swarming the Palestine Hotel in hopes of obtaining jobs with the transitional government. Shi’ites and Sunni Muslims protested against U.S. military: About 500 people marched toward the Palestine hotel, carrying such signs as “No to occupation.”

Soldiers of the 3rd Infantry Division found a total of $656 million in $100 bills. The money was found in an exclusive Tigris River neighborhood where senior Ba’ath Party officials lived.

Marines in Baghdad guarded bank vaults blasted open by robbers using rocket-propelled grenades. One group of Marines was equipped with machine guns and tanks.

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Khala Khadr Al-Salahat, a member of Abul Nidal terrorist organization, surrendered to the First Marine Division.

Abd al-Khalq Abd al-Gafar, Saddam Hussein's Minister of Higher Education and Scientific Research, and 43rd on the US list of 55 top Iraqi officials, is taken prisoner.

Special Forces secured a dam north of Baghdad: Six helicopters with about 58 Navy Seals and Polish Special Forces traveled 3 hours north from Kuwait to secure the Mukaraya Dam, one of the main hydroelectric dams in Iraq. Coalition forces were worried that Iraqi forces would damage the dam and flood Baghdad with up to two feet of water. There was no encounter with other forces, or resistance, although there may have been some detainees.

Roland Huguenin-Benjamin of the ICRC says in Baghdad that: “Nothing Works”: “This country has collapsed. Nothing works-no phones, no electricity, no schools, no proper medical care, no transportation, nothing…It's more than bringing in food or tablets of aspirin. The basic services need to be restored and a new civil administration must be set up to answer people's needs.”

British forces resumed train service from Umm Qasr to use it as an aid supply lifeline into the heart of Iraq. The train was planned to be a key link between Iraq's only major port, where thousands of tons of food aid was waiting -and Basra. British forces hoped the track beyond Basra would soon be secure up to Baghdad.

The U.S. sought to recruit an Iraqi as head of a board to kickstart Iraqi oil operations.

Social Services in Nasiriya were slowly returning: The city’s four water pumping and treatment stations are now functioning using generator power. Two hundred Iraqis were serving as police officers to guard critical facilities and provide traffic control, and the city’s fire department was working and had responded to several fire calls. Marines assessed that two of three city hospitals are fully operational and another hospital were partially operational, needing structural repairs. Marines and locals devised a plan to restore administrative functions of courts to include the issuance of marriage certificates and wills.

20/21 April

- US Dead (Killed non-combat and in action)—— at least 128
- US Dead (KIA)———————— ———————— 94
- US Dead non-combat———————————— 34
- US Missing———————— ———————— 2
- British Fatalities———————————— 31

The air campaign winds down. Data are available for the campaign as of April 22nd. The top priorities for coalition air forces today are to: 1) provide topcover for coalition ground forces, 2) support ongoing humanitarian operations, and 3) continue redeployment and reconstitution of forces.

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Air operations in OIF are conducted on a much smaller scale with strike missions limited to on-call close air support. Combat support missions continue but at lower sortie rates, while humanitarian assistance is ramping up.

Today's strike sorties will focused on close air support of coalition ground forces through on-call CAS in stacks south of Baghdad and south of Tikrit.

The air component engaged in humanitarian operations in Iraq. Through today, coalition air forces have flown six missions delivering approximately 125 tons of medical supplies to Baghdad and Tallil, two missions supporting the deployment of a Saudi hospital to Baghdad, and seven missions supporting the deployment of ORHA.

The air component was redeploying forces no longer required for OIF or OEF as rapidly as possible. The commander's goal was to reconstitute the force so the planes and people will be ready for whatever comes next.

- Total sorties (April 22nd/since 19 Mar): About 705/About 47,600[51]
- Strike sorties (April 22nd/since 19 Mar): About 125/About 17,200
- Air and space supremacy sorties (April 22nd/since 19 Mar): About 30/About 5,550
- C2ISR sorties (April 22nd/since 19 Mar): About 60/About 3,400
- Combat search and rescue sorties (April 22nd/since 19 Mar): About 10/About 280
- Aerial refueling sorties (April 22nd/since 19 Mar): About 70/About 9,700
- Aerial refueling offloads (through 21 Apr): 410 million pounds (60 million gals)
- Airlift sorties (April 22nd /since 19 Mar): About 400/About 11,450
- Cargo moved (through 21 Apr): About 81,570 short tons
- Passengers moved (through 21 Apr): About 117,125
- Aeromedical evacuation sorties (April 22nd /since 19 Mar): About 5/About 190
- AE urgent patients moved (April 22nd /since 19 Mar): 2/About 80
- AE total patients moved (April 22nd /since 19 Mar): About 35/About 1,980
- Munitions (total guided/total unguided/percent PGM): About 19,050/About 9,750/About 66%
- Leaflets dropped (since 19 Mar/since Oct 02): About 41 million/About 60 million

Two U.S. congressmen, Nick Rahall and Darrell Issa, met with Syria's president, Bashir Assad. Assad told them his government would not give asylum to Iraqis wanted for war crimes and will expel any Iraqis who cross into Syria. Issa said, "Assad went out of his way in being positive."

Marine Division elements in Baghdad were relieved by the Army's 3rd Infantry Division. The Marines moved to new areas of operations in areas south of Baghdad. As part of the

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transition, the Marines turned over the Civil-Military Operations Center (CMOC) at the Palestine Hotel in Baghdad. The CMOC directed civil-military operations in four major functional areas, including electricity, law enforcement, water and sanitation, and medical care.

The Iraqi National Congress reported they have Jamal Nustafa Abdullah Sultan al Tikriti and were turning him over to Coalition forces in Baghdad. He ranked 40th on the U.S. Central Command 'Iraqi Top 55' list. CENTCOM officials had no confirmation

In Al Harithiyah, the 2nd Brigade of the Army's 3rd ID discovered a primary school filled with weapons, ammunition, uniforms, new equipment, Iranian passports, flags, tents and food, and ID cards. Soldiers were told by local residents about the weapons cache.

Sayyed Abbas Abu Ragif, a Shi'ite cleric, declared himself mayor of Al Kut, and took control of city hall in Al Kut. One American official in Al Kut said that it does not mean anything that he took control of the building because the real representatives of the city were convening there.

INC head Ahmed Chalabi called for U.S. troops to stay in Iraq until elections "The military presence of the United States in Iraq is a necessity until at least the first democratic election is held, and I think this process should take two years." [Reuters]

Senate Foreign Relations Committee Chairman Richard Lugar, an Indiana Republican, said on NBC's "Meet the Press" that the political transition to a democracy in Iraq could take between four to five years.

Turkey, Italy, Bulgaria and Denmark offer to help in reconstruction Turkish Foreign Minister Abdullah Gul said Ankara had agreed in principle to a U.S. request to send Turkish soldiers into neighboring Iraq for postwar peacekeeping duties. Other countries including Italy, Bulgaria and Denmark offered to provide troops to help stabilize and reconstruct the country in the aftermath of the U.S.-led war.

No Clean Ending

Like the Afghan War, the Iraq War had no clean ending. While President Bush declared victory in a speech on May 1st, no senior official in the Iraqi regime surrendered.[52] Most forces gave up, but not all. The problems of peace keeping and nation building began while the fighting still raged, and factional fighting threatened to replace the fight between the Coalition and Saddam Hussein's regime. Military victory did not mean political victory or grand strategic victory, because military victory was always the prelude to a much more important struggle: Winning the peace.

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V. THE WAR PLAN AND TRANSFORMATION DEBATE; THE "POWELL DOCTRINE" VERSUS THE "RUMSFELD DOCTRINE" DEBATE; AND THE "NEW WAY OF WAR" DEBATE

The previous comparisons of US and British forces with those of Iraq, and history of the Iraq War, clearly reflect the transformational character of Coalition forces. The outcome of the Iraq War both demonstrated the value of such transformations and resolved a debate over one key set of lessons of the war that began even before the main battle commenced.

As has been noted earlier, when the US ground advance slowed in late March, a debate surfaced over charges that Secretary Rumsfeld had forced the US military and USCENTCOM commander General Tommy Franks to accept much lower force levels than they originally wanted. Some critics charged that this interference in the "war plan" had weakened coalition forces to the point where they were not large enough to win a decisive victory.

The speed and scale of the Coalition victory speaks for itself. The Coalition plan and force posture were not without risk, but the Coalition did not need to meet traditional measures of force strength to win. At the same time, the outcome of the war does raise new issues over the military doctrine the US should use in future force planning, and whether the US can now plan on a "new way of war" that need to be put in perspective.

The War Plan Debate

The full history of the evolution of the war plan used in the Iraq War remains a "black box." Few really know the details of how the Coalition war plan was evolved, and the options involved, beyond those directly involved in formulating and executing it. It is also a fact of life that virtually all war planning involves serious debates among the principles, and that it is the duty of the military to advance the best possible military solution and the duty of the Secretary of Defense to ensure that the plan reflects political and resource constraints and the priorities of the President. A war planning process that did not involve such a debate would reflect a dangerous passivity on the part of the officers and officials most responsible for the nation's security.

It is clear from personal conversations with some of the individuals involved in planning the Iraq War, however, that some of the criticism of civilian interference in the war plan that emerged during late March 2003 had an element of truth. Secretary Rumsfeld and his staff did challenge General Franks and the military planners early in the war planning process and demanded that they examine military options that relied more on airpower and relatively light ground forces.

The timing and nature of these debates remain unclear. Some press reports indicate that civilian officials were still pressing for force levels of 50,000-80,000 as late as August 2002, and that only eight major logistic ships were activated through the end of 2002, with the total raised to 42 in January 2003. Other reports claim that the ceiling was 150,000, and was raised earlier in 2002.[53] Still other reports have surfaced since the war

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that say the original plans called for a 20 day air war before the land war that was gradually cut to 10 days, five days, and then three – only to have the land campaign begin before the massive air offensive.[54]

What is clear is that rather than a single war plan, General Franks developed a number of options and that the debate over these options did include significant debates over the relative balance of air and land power, the ability to rely on Special Forces and Iraqi opposition forces versus US and allied heavy land forces, and the amount of logistic and sustainment resources that would be needed.

Senior officers present during these discussions note that these discussions sometimes were confrontational, but that much of the tension surrounding them had other causes. Some officers felt the Secretary Rumsfeld and his staff tended to be dismissive of military expertise. There was a heritage of tension that grew out of the Secretary's plans for a major transformation of US forces and various program and force planning discussions. This heritage was particularly strong in the case of the Army, where at least some officers perceived Secretary Rumsfeld as having effectively sidelined the army Chief of Staff and as favoring the Air Force and space and precision warfare over heavy ground forces.

Some officers were concerned over the force ratios and the amount of support forces available at the time the war began. Measured by the planning standards of 1990, and the "Two Major Regional Contingency" studies that followed, the US would have needed five to seven heavy divisions to deal with a force the size of the Iraqi Army, not one US army mechanized division, a Marine Corps Expeditionary Force with moderate armored strength, a British division that had armor roughly half the size of the armor in a US heavy division, a relatively light 101st Air Mobile Division, and additional elements of light land forces from the US, Britain, Australia, and Poland.

Traditional planning would have called for much stronger forces to secure the rear areas and flanks of the main land force thrusts, and more support forces of all kinds. This kind of force is still called for in the Time-Phased Forces Deployment List (TPFDL) that the Joint Staff uses for war planning. Secretary Rumsfeld repeatedly questioned the size and nature of the force called for by such planning methods, and did repeatedly press for cuts and changes in the early phases of the war plan.[55]

It is important to note, however, that this was scarcely a civil-military debate in which there was a clear split between military and civilian views. A number of officers also questioned the need for traditional force levels and felt that some of the options in the initial planning effort were outdated. They felt some options called for too many forces and too slow an execution of the battle plan, and did not reflect advances in intelligence surveillance, and reconnaissance (ISR), precision air power, and the speed of ground force maneuver.

It may be unfair to talk about a "generation gap" within the military over such issues, since age seems to have little to do with support for change or tradition. What does seem fair is to say that but at least some of the officers involved in the planning effort felt that the key elements in some options in the war plans the US military advanced to Secretary Rumsfeld were outdated and tended to represent a lowest common denominator approach to military planning in which every service requested a larger force than it really needed.

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At least some civilians also felt that calls from some "neocons" – most outside the government -- for an emphasis on airpower, and very limited ground forces, were far too risky and based on ignorance of military realities.

It is also important to note that the war plan evolved in a climate where few had any illusions Iraq's warfighting capabilities of the enemy, although no planner could dismiss the risk Iraq would use weapons of mass destruction until the war was over. US intelligence had clearly identified most of the comparative weaknesses in the Iraqi force structure outlined in Chapter III. While US intelligence analysts saw Iraq as a potentially serious threat because of its large force numbers, they also saw grave weaknesses in virtually every aspect of Iraqi conventional forces, and their assessment did not provide a rationale for requiring the kind of Coalition force ratios to defeat them that would be needed for a more effective enemy.

Moreover, officers like the Army Vice Chief of Staff, General Keane, had stated long before the war plan debate became public that precision airpower and advances in armored maneuver capability and joint warfare created a situation where far smaller forces could be used to secure the flanks and rear, and where speed and precisions of maneuver would be far more effective than a more traditional method of war fighting, General Richard Myers, the Chairman of the Joint Chiefs had made similar points.

The Political Factors that Make the "War Plan" Debate Largely Moot

Some of the serving officers who criticize Secretary Rumsfeld and his staff for an arrogant and confrontational approach to the military also note that it was General Franks that largely won the war plan debate. The fact Turkey rejected US and British basing of over 200 more combat aircraft, roughly 70-100 more helicopters, and the US 4th Infantry Division and 3rd Armored Cavalry Division had nothing to do with the debate over the war plan. The fact that the Coalition went to war missing an entire and well-planned second front from the north had nothing to do with the war plan decisions made by Secretary Rumsfeld

The same was true of most of the force planning impact of the long UN debate over a Security Council resolution to authorize the use of force. This debate meant that the Secretary of Defense had to make political decisions to delay the movement of some troops and various sealift and airlift activities to avoid appearing to make the war a certainty before the UN had time to act. This same delay gave Iraq more time to prepare.

Finally, the decision to exploit a perceived opportunity to decapitate the Iraqi regime by striking at Saddam Hussein and the Iraqi leadership at the beginning of the war was a political decision that had nothing to do with tensions between Secretary Rumsfeld and the military. Neither did the decision to wait several days to begin the massive air campaign to see if Saddam was dead and the Iraqi regime would collapse.

The Problem of Not Knowing the Detailed History and Nature of the "War Plan"

Donald Rumsfeld thrives on confrontation and is not a man who solicits or stimulates much by way of sympathy and compassion. Nevertheless, his response to the war plan

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debate at the Department of Defense press conference on March 25th raises some basic issues about the fairness of the debate that are well worth noting:

> "First of all, I don't know how anyone outside of the government thinks they know what my views are, or what General Franks' views are, or what General Myers' views are. We've all been deeply involved, and the plan has been a plan that's been approved by all the commanders and by, needless to say, General Myers and General Pace and Don Rumsfeld and the president of the United States. And it is a good plan, and it is a plan that in four and a half or five days has moved ground forces to within a short distance of Baghdad. And forces increase in the country every minute and every hour of every day. And that will continue to be the case. There is a force flow that's been put in place weeks and weeks and weeks ago, where people were mobilized, people were trained, people were -- equipment was loaded on ships, ships were leased, ships were sent over, ships moved into position, ships were unloaded, personnel were airlifted over to meet with their equipment. And every hour the number of U.S. and coalition forces in that country are increasing.
>
> "So I guess how I would respond to what you say are some folks who are concerned about that is that the people who are involved in this, the -- General Franks and General McKiernan and General DeLong and General Abizaid and Admiral Keating, General Moseley, are very comfortable, as are the Joint Chiefs of Staff, who have met with the president twice in the last two days and discussed it.
>
> "…If you go back to the Afghanistan situation, it was only a few days into it that it was described by one of the newspapers here as a "quagmire." And it was a matter of days later that things looked quite good and, as I recall, Mazar-e-Sharif fell, and then the other cities began to fall.
>
> "I can't manage what people -- civilians or retired military -- want to say. And if they go on and say it enough, people will begin to believe it. It may not be true, and it may reflect more of a misunderstanding of the situation than an analysis or an assessment of it, but there's no way anyone can affect what people say. We have a free country. In Iraq, they can affect what people say because you get shot if you say something they don't like. We don't do that."

It is equally important to consider the response of Chairman of the Joint Chefs Richard Myers, to speculation on the war plan. General Myers gave the following response to questions on the issue in the same Department of Defense press conference on March 25th,

> "… It's a plan that's on track. It's a plan everybody had input to. It's a plan everybody agrees to. I've been on public record that I think the plan as finally formulated and, as put together by General Franks with some help and some advice by General Franks and his commanders, is a brilliant plan. And we've been at it now for less than a week. We're just about to Baghdad. Some of the biggest losses we've taken are due to Iraqis committing serious violations of the law of armed conflict in the Geneva Convention by dressing as civilians, by luring us into surrender situations then opening fire on our troops. So this is a plan that is very well thought out, and that will play out, I think, as we expect.
>
> …Well, I would say, given the fact that we're 200-plus miles inside Iraq at this time, on the doorstep of Baghdad, that we really haven't engaged on the ground the Republican Guard divisions. So -- we've put helicopters against them, attack helicopters, we've put air against them, we've put some artillery against them, but we haven't engaged them in a classic battle. So their mettle has yet to be tested. We're going to have to find out.

Lt. General David D. McKiernan, the commander of the Coalition Forces Land Component Command, made similar points at a briefing on April 23rd, once the fighting was over:[56]

> This ground campaign to date has reflected itself in high-tempo continuous operations, decisive maneuver, extended logistical support, where I accepted some risk in the length of our lines of

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> communication and our logistical reach, which -- we have overcome that risk, and a execution of a plan that had several options in it but always remained focused on the enemy.
>
> …And I would refute any notion that there was any kind of operational pause in this campaign. There was never a day, there was never a moment where there was not continuous pressure put on the regime of Saddam by one of those components -- air, ground, maritime, Special Forces and so on.
>
> …there was no operational pause, when you have a tactical formation that is perhaps in the middle of very, very bad weather, which we had on about day three or four of this campaign, and they are stopped for a period of time to pull their logistics up to them, to get their formation back together after several fights, that might seem like a pause if you're sitting there with that unit that day on the ground. But at the same time, there is no let up in aerial targeting, in attack helicopter operations, in other ground maneuver in other places on the battlefield, and in all the operations that our special operating forces did throughout Iraq.
>
> …Scott Wallace, a close friend of mine, what he would tell you if he was standing next to me here today, he would say that the fact that we ended up fighting a lot of paramilitary or death-squad formations that were coming out of urban areas in the southern part of Iraq was probably not the most likely enemy course of action that we war-gamed against, but it was certainly a course of action that we war-gamed against and it was one that we adjusted our plan that we had options built into our plan to adjust from, and his divisions were magnificent in making that adjustment.

It is interesting to note in this context, that Lt. General David D. McKiernan refers to V Corps Commander Lt. General William (Scott) Wallace because he made a remark during the temporary lull in the fighting that the Iraqi use of irregulars was either "unexpected" or a "bit unexpected," and that the Iraqi use of irregular forces was "different from the one we war gamed against. "

Wallace was simply stating an obvious reality. The Iraqis did make several creative uses of irregular forces and they did force the US and Britain to adapt their tactics and force deployments in the south and along the main route of advance. As Wallace said in a postwar interview on May 7, 2003,

> "I make no apologies for these comments…The enemy we fought …was much more aggressive than what we expected him to be, or at least, what I expected him to be. He was willing to attack out of those towns towards our formations, when my expectation was that they would be defending those towns and not be as aggressive. There was also a presence of foreign fighters that we subsequently discovered to be seeded within and cooperating with Saddam's Fedayeen, which were at least fanatical, if not suicidal. So all of those things led to that comment."[57]

The problem was not that Wallace was wrong in making his initial comments. In fact, the discovery of massive numbers of arms caches throughout Iraq indicates that the problems he addressed would have been much worse if Saddam's regime had been able to mobilize more than a small fraction of the Popular Army that it had created, attempted to train, and planned to equip. The problem is rather that Wallace's statement was taken out of context at the time it was made by some commentators, and during the worst period of the war, as an excuse to argue that the war plan had not properly prepared for the war. More generally, it is that these same commentators did so in a way that implied that US military should foresee all possible enemy tactics and actions in their original war plans, rather than be ready to adapt to the fact that war always involves the unexpected and enemies inevitably are creative and achieve at least limited surprise.

Lt. General Wallace made far more important points, about the war plan, force strength and surprise after the war. The following comments have been rearranged in

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chronological order from an interview by James Kitfield in the National Journal, and not only put the whole war plan controversy in perspective, but serve as a short summary of many of the operational lessons of the war:[58]

> " Well, it's hard to argue with success. All of us would like more predictability in our lives and jobs. But we made this work—that's how I would phrase it. We had some very talented people who made it work. There are also advantages to a "rolling start," because it allows you to get into the fight quicker. You gain some strategic as well as tactical advantages from that fact. The impression we have from talking to some Iraqi officers, for instance, is that some were expecting a Desert Storm-type campaign preceded by a long period of aerial bombardment. As you recall, instead we actually started the ground war before we started the air war. That decision was made for a number of different reasons, but I have to believe it surprised some Iraqi military officers who found themselves confronting U.S. tanks very early in the war.
>
> …I would suggest to you that "tempo" can be fast or slow, either of which is OK as long as you are in control of the tempo, and the enemy is not. When we slowed our forward progress and tempo, it was for a very deliberate, twofold reason. First, we wanted to build our logistics stance prior to moving into the battle for Baghdad. Second, even though we weren't moving forward, we were attacking the enemy every day. We had three fights going on nearly simultaneously around Najaf in that time frame, and a very serious fight down in Samawa. The fact that we weren't advancing through the Karbala Gap didn't mean that we weren't fighting. We continued to fight, we continued to secure our [logistics] lines, and we continued to kill a lot of bad guys.
>
> …At the time, we simply couldn't discount the fanaticism with which those paramilitaries fought. I was not willing to ignore the threat it posed, or to expose my critical logistics train to it. In terms of forces to meet that threat, I had a very strong point of the spear with the 3rd Infantry Division. What I didn't have was a heavily mobile secondary force. The ability of the 101st Airborne Division to move itself around at that time was limited, quite frankly, because some of the trucks they rely on for mobility hadn't arrived in theater yet. So I was constrained in my ability to get one of the divisions around the battlefield. That led to some really tough calls on where to employ the 101st Division.
>
> …Personally, the period during the dust storm was the low point of the entire campaign for me. That was definitely the hardest part and the low point of the war. You have to remember that the 3rd Infantry Division crossed the line of departure to open the war with about five days of supplies in terms of water, food, and ammunition. Then the dust storm hit on the fifth day of the fight, and lasted for most of three days. During that storm, our convoys took three to four days to reach our forward forces, and they were carrying two days of resupply. So the math didn't add up at that point, which concerned me. Not that we couldn't hold on to the ground we had gained, but we couldn't advance a lot further in our plans until we had solved the logistics issue. The period of the dust storm was also tough because we were fighting our tails off. There was all of this discussion on the lack of progress, but in actual fact, we were still maintaining a high operations tempo. We just weren't gaining ground. What we were doing was setting conditions for a decisive fight to follow.
>
> We were surprised by the texture of the desert terrain. The dust problem in those areas was orders of magnitude worse than any of our terrain analysts had predicted. That caused us a number of problems. It caused us a problem in terms of convoy movement, and in terms of aviation assets. Anytime anything moved out there, it kicked up a dust cloud. It was like driving through talcum powder."
>
> …That (the fighting around Najaf and Karbala) may very well represent the single most significant adjustment we made in this entire war. We never had any intention of fighting in those southern cities, because we felt that would put us at a disadvantage; so we intended to bypass them.
>
> As it turned out, the enemy was so aggressive in coming out of the cities and attacking us that we had to counterattack, first to secure our lines of communication, and second because the enemy

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was going to keep coming at us until we went into the cities and whacked him. So we had to make an adjustment to our battle plan and tactics to compensate for that aggressive tactic by the enemy.

I think Saddam's forces were trying to draw us into the cities, where they thought they had an advantage. Instead, we turned the cities into a disadvantage, with our armored raids taking out their heavy equipment, technical vehicles, and bunker complexes. Once we did that with our heavy armored forces, we switched to light infantry, backed by heavy reinforcements, to do the more detailed clearing operations. In the process of those fights, we not only secured our lines of communication and diminished the enemy's capabilities, but we also began to take control of population centers that we had anticipated addressing later, in Phase 4 stability operations. We just ended up confronting that issue earlier in the campaign than we anticipated.

…When we seized the bridge over the Euphrates River at what we called Objective Peach. At that point, I was pretty confident that we had Saddam by the balls. If we hadn't seized that bridge, we were prepared to put our own bridges in the water, but that probably would have added 24 hours to our operations. If he had the capability at the time—and it's not clear to me now that he did—he could have used that 24 hours to reposition forces and mass artillery, making life a lot harder for us. So when we got the main bridge across the Euphrates, I knew we were essentially home free.

…I'm about 95 percent convinced that when we crossed the Euphrates in a series of feints just after the dust storm hit, it forced the Medina to start repositioning its forces to counter an advance between the rivers that was never our main intent. We had beautiful weather with clear skies at that point, and we started getting reports of enemy armor moving on trucks, of Iraqi artillery forces repositioning, and of attempts by Medina brigades to occupy what they believed would be optimum defensive positions. All that happened in the full view of the U.S. Air Force, and they started whacking the hell out of the Medina. So that was a pretty good feeling, knowing that the enemy felt he had to move his forces under conditions that were of great advantage to us as the attacker.

… For nearly a year, we had recognized collectively that once we were through the Karbala Gap, the fight would not be over until we seized the international airport in Baghdad. The entire fight from Karbala to the airport was considered as one continuous assault, because once we crossed through the gap, we were inside the range of all the artillery that was in support of Baghdad and all the Republican Guard divisions around Baghdad.

…We were also obviously worried about if and when Saddam would use chemical weapons. If you got 10 people in a room, you'd get 10 opinions on the subject, but clearly Karbala Gap was one of those choke points where Saddam could have used those weapons to some effect in terms of slowing us down. So the judgment I stated to my commanders was that once we crossed through the gap, we would be within Saddam's red zone in terms of defenses, and we had damn sure better be ready to continue the fight all the way to the encirclement of Baghdad.

The "New Way of War" Debate

The more relevant debate is the extent to which the Iraqi War was the product of transformational warfare and reflected a new way of war. The answer in some ways is obvious. Much of the asymmetry between US and British forces and Iraqi forces was the result of the fact that the US was using a new mix of strategy, tactics, and technology and Iraqi was not. As Chapter III has shown, these changes affected virtually every aspect of force quality and as Chapter IV has shown, they helped to accomplish a remarkably quick and decisive victory.

At the same time, any discussion of force transformation and a "new way of war" needs to be kept in historical perspective. There is a great work of military history still to be written on how the US has transformed its forces since the beginning of World War II, the cycles of success and failure in this transformation, and the role that different military officers and civilians have played in the process. It is a process that has always involved

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civil versus military tensions as well as deep debates within the military. While the US has benefited from many formal planning efforts, decision-making has always been dialectical and never Aristotelian.[59]

The Need to Remember the Past

While much of today's transformation has its historical roots in World War II and the early period of the Cold War, the pace and nature of this transformation has been particularly striking since the American defeat in Vietnam and has gathered a unique momentum since the end of the Cold War.

This is not a casual point to make in analyzing the lessons of the Iraq War. It took nearly a quarter of a century under a wide variety of military civilian leaders to shape the US forces that went to war in March 2003. They were the product of both victory and defeat, and virtually every element committed to battle was still in the process of ongoing transformation when it went into battle.

In broad terms, these forces began to practice a "new way of war" in the first Gulf War, and had honed many of their techniques in the Afghan conflict, but many of the key weapons systems they used were shaped in Vietnam or previous conflicts. Certainly some of the most important lessons regarding readiness and leadership go back to the initial US defeats in the Kasserine Pass and the shattering of Task Force Smith in the Korean War.

The discussion of comparative force strengths and weaknesses in Chapter III, the history of the war in Chapter IV, and the discussion of the importance of military fundamentals in Chapter VI, all illustrate the fact that any "new way of war" is built solidly on the past and the proper mix of new and old capabilities.

The New "New Way of War"?

The US did implement many elements of a new "new way of war" as laid out in the force transformation documents and testimony issued by Secretary Rumsfeld and his staff. In one form or another, the course of the fighting described in Chapter IV can be have said to have shown that the US forces fighting in the Iraq War achieved each of the six goals laid out in the Quadrennial Defense Review:[60]

- First, to defend the U.S. homeland and other bases of operations, and defeat nuclear, biological and chemical weapons and their means of delivery;
- Second, to deny enemies sanctuary—depriving them of the ability to run or hide—anytime, anywhere.
- Third, to project and sustain forces in distant theaters in the face of access denial threats;
- Fourth, to conduct effective operations in space;
- Fifth, to conduct effective information operations; and,
- Sixth, to leverage information technology to give US joint forces a common operational picture.

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The conduct of the war also followed many of the military principles laid out in what some have started to call the "Rumsfeld Doctrine," although press accounts differed on what the Rumsfeld doctrine was felt to be.

One report described it as an emphasis on "Rapid Decisive Operations," that stressed:[61]

- Fast-moving, lighter forces, that can be moved quickly into battle,
- Flexible decision-making, allowing field forces to react quickly to changes in the battle,
- Joint operations involving army, navy, air force and marines working together,
- Use of strategic airpower to attack simultaneously hundreds of targets, and
- Use of high technology in smart bombs and battlefield intelligence gathering.

Another press count described the Rumsfeld doctrine as being based on:[62]

- Civilian control of the war plan and its execution,
- Speed and maneuver,
- Flexibility in execution,
- Heavy use of Special Operations forces, precision though massive air strikes, and unprecedented integration of the different service branches or "jointness," and,
- Taking advantage of newer technologies, such as pilotless drones providing real time pictures of the battlefield.

Interestingly enough, in an interview following the war, the Secretary of Defense Rumsfeld's Director of the Office for Force Transformation, Arthur K. Cebrowski, made no reference to any Rumsfeld Doctrine." Instead, he summarized the initial lessons of the war in the following evolutionary terms:[63]

- The growing implementation of network centric warfare, and its role in shifting the balance of power through new forms of air-land battle and dynamics. He termed this a long process driven by better sensors, good networked intelligence, high-speed decision making, and the ability to exploit the non-contiguous battlefield, the battle field without a front.
- The need for increased connectively in netcentric warfare.
- The increased use, interdependency, and effectiveness of all forms of indirect fire: artillery support, close air support, and aerial battlefield interdiction.
- A possible reduced dependence on helicopters on the battlefield for vertical lift.
- Increase value of Special Forces and for increased knowledge of regional factors, the ability to work with friendly local forces, and provide more SOF-like forces to support ISR.
- The need for still further improvements in joint planning, particularly in codifying a clear doctrine for joint endeavors and the creation of a joint road map for force transformation.

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- Increased need for strategic mobility, possibly merging inter and intrathear lift, providing high speed sealift, and possibly airships.
- The need to accelerate the speed of command and control.

In fact, a little historical perspective shows that such reports of a "Rumsfeld Doctrine" describe concepts and principles that derive in large part from military thinking that took place long before Secretary Rumsfeld became Secretary of Defense. One example is the series of Joint Vision strategy papers developed by the Joint Staff, and is perhaps best articulated in the Joint Staff study Joint Vision 2020, which was issued before the Bush Administration came to office.[64] Before one talks about civilian innovation and military conservatism, it is important to note that Joint Vision 2020 emphasized four concepts of operations that seem remarkably familiar in terms of both the war plan used in the Iraq War and the force transformation goals of Secretary Rumsfeld: [65]

- Dominant maneuver,
- Precision engagement,
- Focused logistics, and
- Full dimensional protection.

Other key concepts like Network centric warfare emerged well over a decade before Secretary Rumsfeld came to office, as did the common use of the term "revolution in military affairs." The idea of using a wide range of synchronized forms of attack or "parallel warfare" was a key part of the war plan for the first Gulf War. Many of the ideas in "effects-based warfare" were used in Kosovo, and the emphasis place on a "joint response force" in the force transformation study was laid out by officers like Admiral William Owens no later than the early 1990s. President Clinton's last Secretary of Defense, William Cohen, was a strong advocate of expanding the role of special Forces, both as a senator and as Secretary of Defense.

The basic conceptual thinking in phrases like "rapid decisive operations" is as old as the art of maneuver warfare, and the new military emphasis on "decision dominance" is simply a reminder of basic concepts of 18th Century European warfare and that era's emphasis on using combinations of military power, economic power, and political power to achieve war fighting objectives – often without the use of war.

Even seen from the perspective of the Gulf and Afghan Wars, the Iraq War was more an evolution than a revolution. The dramatic speed of the Coalition victory must also be measured against Iraqi weaknesses as well as Coalition strengths, and one must always be careful about how "new" any new way of war ever is. The rubric of "Rapid Decisive Operations may be new, but the concept is as old as the writings on war. Concepts like "fighting fast and fighting light" would, after all, be familiar to Nathan Bedford Forest and Stonewall Jackson as well as Xenophon and Sun Tsu.

In short, new tactics and technology used in the Iraqi War, and projected for future force transformation, have taken decades to evolve. If US progress over the last 10 years seems remarkably fast, at least part of the reason is that so many foreign armies have stood still or regressed, and so many Americans forget or never knew the past history of current developments. In practice, America's "new way of war" has been relatively conservative.

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It never forced it to sacrifice proven force elements before the new ones were ready, has mixed new and old methods of warfighting, and has been measured and pragmatic.[66]

The "Powell Doctrine" versus "Rumsfeld Doctrine" Debate

The speculation over the "Powell Doctrine" versus the "Rumsfeld Doctrine," that has become part of the war plan and force transformation debate seems to be more of a red herring. It had little do to with the actual details of military operations in Iraq, and was largely a debate over whether Powell favored decisive force using more conventional military means while Rumsfeld favored minimum force using high technology weapons.

The debate again reflected the backlash from the more real debate between the US military, and Secretary Rumsfeld and many of his civilian advisors, over how quickly force transformation should occur and the path it should take. It reflected tensions between the Rumsfeld civilians and the military of many other issues, including what the military often saw as an arrogant or abusive style and indifference to military opinion and what the Rumsfeld civilians often saw as an over-bureaucratized military that was reluctant to face the need for change.

It also reflected a much broader political debate between those who supported Secretary Rumsfeld in a variety of issues that had little or nothing to do with the Iraq War, and those who supported Secretary Powell. Washington infighting is Washington infighting, and grasping for headlines is grasping for headlines.

In practice, calling the war plan used in the Iraq War the result of a "Rumsfeld Doctrine" made little sense for several reasons.

- First, as has just been noted, the force levels involved were not the ones Rumsfeld had originally called for.
- Second, Secretary Powell had never expressed any public views on the war plan or any detailed views dissenting from the force transformation planning going on under Rumsfeld. Only Secretary Powell could have known whether he felt the war plan used in Iraq had insufficient force. It is hard to have a debate when most would be spokesmen for the Powell doctrine quote themselves instead of he secretary and these is no "Powell Doctrine" as stated by Secretary Powell.

  Furthermore, Secretary Powell had helped institute many of the basic changes in US military technology and tactics that made victory in the Gulf War possible when he was as Chairman of the Joint Chiefs. He supported a war plan in 1991 that was also strikingly innovative. He had helped shape the major force cuts that followed the end of the Cold War, and demonstrated quite clearly that he supported innovation and not a rigid adherence to doctrine.
- Third, there was no way that the Iraq War could have been fought with the kind of force transformation that Secretary Rumsfeld sought. This transformation was had not yet set forth in detailed future year defense plans, was just beginning to be funded in the FY2004 defense budget. The transformational forces the Rumsfeld has sought will not be ready for at least 5-7 more years.
- Fourth, while the US Air Force, Marine corps, and Navy all have transformational concepts, not yet have detailed doctrines and force plans for long-term

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transformation that can be described as either following or opposing the undefined Rumsfeld plan.

- Fifth, while some of those discussing the "Powell Doctrine" associate it with the views of the US Army's leadership, the Army's plans are the most tenuous of all. The US Army Stryker brigades – the first element in the Army's effort to make its forces lighter and easier to project – were not fully ready for deployment in the Iraq War. Moreover, they were designed for combat against lighter forces than the tank heavy Iraqi Republican Guard, and had nothing to do with any "Powell doctrine" or the use or non-use of "decisive force."

  The US Army has so far failed to fully articulate a meaningful force plan for its Future Combat System that goes from a series of seemingly endless Power Point presentations to specific forces, equipment, and costs. Even according to the Army's own presentations, its broad concepts of force transformation also could not be implemented until some undefined time frame between 2010 and 2020.

The issues surrounding the debates over a "new way of war" are serious, as are any major force planning decisions. Personalizing a possible non-debate with no specifics around personal doctrines that neither Secretary Rumsfeld nor Secretary Powell have openly articulated in a contradictory form serves little purpose.

The Need to Redefine "Decisive Force"

As the previous chapter has shown, there also is a need to find new methodologies for calculating military effectiveness and force ratios. If one looks at the asymmetries in the Coalition-Iraqi military balance outlined in Chapter III, it is clear after the fact that the US and Britain did deploy "decisive" force relative to the weaknesses in Iraqi forces, Air dominance; superior intelligence, reconnaissance and targeting; far more effective and survivable command and control; precision strike capability; far more rapid and adaptive cycles of decision making; and far more rapid cycles of land maneuver were pitted against an incompetent enemy leadership whose forces had many deep structural weaknesses. At least in retrospect, to the extent that there were Rumsfeld and Powell doctrines, they can be said to coincide in terms of the actual course of the fighting and the outcome of the war and the balance of forces.[67]

At the same time, to return to some of the points made in Chapter II, far too little is a yet known about the details of each battle to make sweeping judgments about what forces did or did not contribute to the outcome and about the detailed trade-offs within joint forces in terms of their impact on the enemy, to suddenly go from the broad course of the fighting to making sweeping statements about future requirements and lessons for force transformation. Moreover, even if all of the necessary data were available, several key questions would still arise:

- First, what would have happened if Iraq had been able to fully execute its plans to call up massive irregular forces and make use of asymmetric warfare, and if it had used its conventional forces more effectively?

- Second, to what extent do the strengths and weaknesses of Coalition and Iraqi forces in this war apply to other key contingencies like a war in Korea, across the Taiwan Straits, a conflict with Iran, or – more importantly – an emerging power a

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decade from now that has acted intelligently on the lessons of this conflict and has developed effective and well hidden means to use weapons of mass destruction both in direct warfighting and covert or proxy attacks?

- Third, do the US and its allies really have a reliable mix of modeling techniques, operational analysis methods, and test and evaluation capabilities to properly use a single conflict like Iraq – or the broader patterns in recent conflicts -- to analyze the real-world impact of sudden sweeping changes in forces, technology, strategy, and tactics, in ways that allow them to make sweeping and rapid trade-offs? What risks can analysis really minimize in answering how much, what, and when is enough?

- Fourth, are there special risks in relying on "intangible" or "new" measures of military effectiveness like speed of military maneuver and action, improvements in ISR and C4I/battlement management systems, jointness, targeting, and effects-based operations before the very real advantages of transformation in these areas are clearly established? Is it possible to go from choosing the proper vector for change to choosing a specific direction, and leapfrogging from current to transformational forces on the basis of what is known about the Iraq War and other recent conflicts?

- Fifth, how much slack is there in the existing force posture of the US and its allies? Being able to say that the Coalition had decisive force in retrospect is not the same as saying it could have planned on being as decisive before the war. If one looks at actual major combat elements of force strength like combat battalions, combat-ready aircraft, and combat ready ships, the US has already cut its total deployable force strength by well over 40% since the end of the Cold War, while accepting growing de facto political constraints on its ability to inflict casualties and collateral damage.

  Even if one looks only a crude total force numbers, the Army has cut is active force stricture from 18 to 12 divisions and total active manpower from around 800,000 to 480,000. While it only committed some 12 combat brigades to the Iraq War versus 23 in Desert Storm, this was a total of 12 out of 32 combat bridges in the army's remaining force structure. The total cuts in combat ships and combat fighter and fighter attack aircraft have been even greater, and the Marines had roughly half of its170, 000 personnel committed outside the US at the peak of the fighting.

  It seems clear that the US did not have the worldwide assets during the Iraq War to effectively fight two major regional contingencies, Many US military experts feel that US forces are overdeployed and military personnel are being asked to make sacrifices that cannot be sustained. Force transformation cannot, in a democracy, ask those who do risk their lives to defend their nation while the vast majority of citizen take no risks at all, to assume either the peacetime or wartime burden of operating in a force structure that is either too small or involves too many transformational strains and risks.

- Sixth, even if all of these questions could be answered, does the US or any other Western power have the tools in terms of program management, cost analysis,

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effectiveness analysis, and ability to deliver given technologies and weapons systems in fully trained and converted forces to make rapid shifts in force transformation, take risks in sharply reducing legacy forces before new forces are proven to be ready, and go from "evolution" to "revolution?"

- Seventh, in the process, can we establish a real-world balance between the ability to create new strategic and tactical concepts, and the technologies to implement them, and the ability to deal with the human factors inherent in making military forces effective and properly motivated, and with the need for the proper balance of recruitment and retention, training, basing, deployment cycles, and logistics and sustainment?
- Eighth, how do the answers to all of these questions, particularly for the US, affect the grand strategic posture of the nation involved in force transformation? How do they affect the motivation and interoperability of allies all over the world? How do they affect the nature of alliances? How are they perceived in terms of the political and military impact of forward presence and basing? To what extent do they deter and/or provoke potential enemies and neutral states? To what extent do they push opponents towards asymmetric warfare and terrorism, to proliferate, or use terrorist movements as proxies?

  It is worth noting in this respect, that it is far easier in theory than in practice to disregard the value of arms control treaties, the needs of NATO, the need for cooperation with the UN and EU, the value of NGOs and allies in peacemaking and nation building, the need for an effective regional presence and basing, and the need for interoperability with allies. The fact that the British Chief of Staff concluded that the most important British lesson of the war was that Britain needed to spend some two years without for British forces to recover and transform, is only one of many warnings that American arrogance in force transformation can lead to American isolation in warfighting.

None of these questions mean that the US and its allies should not pursue continued change and force transformation, or that Secretary Rumsfeld, Joint Chiefs, and military services should not push for change. Taking no risks in force transformation is also certain to be more costly and probably more dangerous than taking some risks. What they do mean is that any lessons coming out of the Iraq War are much more likely to provide useful insights in key areas than any basis for reaching radical conclusions about force transformation and military strategy. Put differently, it is precisely the kind of debates and open contention over strategy and force transformation that seems to have taken place before the Iraq War that should continue after it. Peacetime bureaucratic battles and interservice rivalries are far better than peacetime unity and wartime body bags.

The Dangers of American "Triumphalism"

Finally, there is much more important debate that US strategic and defense planners should engage in. The success of US arms in developing new ways of war, and in winning the Iraq War, is no excuse for any form of "triumphalism." The US remains vulnerable to asymmetric warfare and terrorism. It has no good answer to nations that have successfully proliferated, and where preemption or "first strikes" can provoke terrible regional conflicts.

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Any definition of victory cannot ignore the war's cost in human lives, dollars, and property. It also cannot ignore the fact that Iraq was an enemy with all of the defects laid out in Chapters II and III. It is far from clear that the US can plan for a world in which future opponents are equally weak.

The US would face much more severe limits in any future war with North Korea or any confrontation with Russia or China. US ability wage and win wars is in no sense matched by its abilities to win a peace through peacemaking and nation building. Its status as the "world's only superpower" is heavily dependent on a network of regional allies and ultimately on sustaining a favorable balance of global political support.

One of the critical uncertainties surrounding the Iraq War is still how optional the war really was, and whether containment and disarmament could have dealt with Saddam Hussein. The threat Iraq posed under Saddam Hussein does not seem to have been imminent, but it is not yet clear from the discoveries to date how much Iraq's success in retaining weapons of mass destruction made that threat so proximate that the US and Britain had to attack. Saddam Hussein's long history of tyranny, aggression, and proliferation may well justify the Iraq War, but its timing may yet prove to have "optional."

The advances in US warfighting capability also do not mean America can wander off in search of enemies, or abandon the search to build stronger international institutions and use diplomacy instead of force. The US may have the ability to dethrone a series of the world's less powerful and more obnoxious leaders, but "can" is never a synonym for either "must" or "should." As Clausewitz notes,[68]

> "The first, the most far-reaching act of judgment that the statesman and commander have to make is to establish…the kind of war on which they are embarking, neither mistaking it for, nor trying to turn it into, something that it is not. This is the first of all strategic questions and the most comprehensive…"

Ultimately, the US must have the world's trust to underpin both its structure of alliances and avoid creating a network of opposing military, political, and economic alliances. Trust is not earned by new ways of war, it is earned by justice and restraint.

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VI. LESSONS ABOUT THE INTERACTION BETWEEN MILITARY FUNDAMENTALS AND NEW TACTICS AND TECHNOLOGY

Whatever the merits of a "New Way of War," the Iraq War provides important lessons about military fundamentals and the integration of these fundamentals with new technologies. In many areas, the US and Britain had an overwhelming advantage over the Iraqis which overcame the traditional advantages of fighting on the defensive, on home ground, and with internal lines of communication.

Competence, Adaptiveness, and Flexibility in War Planning:

The US and UK began the fight with a war plan which relied on a Northern front that did not exist for political reasons, and with significant elements of the deployments and deliveries planned to be ready in Kuwait still in delivery because of delays resulting from the political sensitivities of dealing with the UN over a Security Council resolution approving the war.

The "war plan" was flexible enough, however, so that the Coalition could rapidly adjust its remaining elements. Adaptiveness and flexibility allowed the US and Britain to exploit precision airpower with extraordinary success. It was used to paralyze many aspects of the Iraqi command and control structure, limit the maneuver capabilities of Iraqi regular army forces throughout the country, destroy many elements of those Republican Guard and regular army units that did move, and then conduct urban close air support operations.

Seapower was exploited to use carriers and cruise missiles as a substitute for air bases, to use sealift to deliver equipment and logistic supplies over an extended period before the war began, and to provide secure access to ports in Kuwait. Lt. General William Wallace provides a good example of Coalition adaptiveness during this phase: [69]

> ,..I think we were right to characterize the fight to get here as a critical part of the equation. Certainly the fact that we only had a single airport and port through which our entire formation had to flow was a limiting factor in our operations. I think we did pretty well in adapting ourselves to that reality, but in hindsight, I might have made some different adjustments in terms of what flowed into the country, and when.
>
> For example, early in the flow we were very concerned about fuel. There was a company' worth of 5,000-gallon tankers sitting in Kuwait, but the truck drivers weren't due into the theater for weeks. Ultimately we asked for an received permission to fly in truck drivers from V Corps to fall in on that equipment, in order to get our truck companies moving. Those kinds of decisions and adjustments were being made virtually every day by our logisticians and leaders in the rear area. And ultimately, it worked.
>
> The lack of many of the original land forces, did not prevent the Coalition from rapidly adapting to a "land attack first" strategy based on the forces in the south. The Coalition adapted its plans to use of the British 1st Armored Division to secure Basra and the southeast, while US V-Corps and I MEF forces drove through Iraq exploited Iraqi strategic geography so the V-Corps forces could largely avoid Iraqi towns and cities and established relatively secure supply lines for a rapid advanced on Baghdad through the desert areas west of the Euphrates.

The I MEF drive up between the two rivers from Nassiryah to Al Kut allowed the 1 MEF to largely bypass towns, avoid the Iraq regular army forces concentrated to the East, and

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then exploit the main road north of the Tigris. As both advances reached the area near Baghdad, they caught the Iraqi forces unprepared and forced the Republican Guards to redeploy in the face of near-total Coalition air dominance and then attack V-Corps and 1 MEF without the advantage of positioned and prepared defenses under conditions approaching those of a meeting engagement.

In spite of political problems that made it impossible to execute many key aspects of the original war plan, adaptiveness and flexibility allowed its key elements to be implemented. Moreover, when some unexpected Iraqi actions did occur – particularly the use of irregular forces in the south and the lack of open popular support from Iraq's Shi'ites -- the US and British commanders rapidly adapted. When new Iraqi tactics and capabilities emerged, they responded.

This professionalism and adaptability in planning was greatly aided by major advances in joint warfare capability and its computerization and integration at every level. It is also a lesson in the fact that one of the most important skills in modern arms is not how to agree on a war plan, but how to change one when reality intervenes and -- if necessary -- abandon key elements of the plan with sufficient adaptiveness to win.

Synchronicity, Simultaneity, Speed, Jointness, and Combined Arms

As has been described in the previous history of the fighting, the US had a major advantage over Iraq in terms of its ability to bring together land and air operations and support them from the sea and friendly bases at very high tempos of coordinated operations and shift the mix of joint operations according to need over the entire theater of operations. The issue was far more than Jointness per se; it was the coordination and sheer speed of operations at every dimension of combat.

It is worth noting in this regard that joint warfare and combined arms radically changed the timelines from the first Gulf War. The first war saw a 38-day air bombardment, much of which had to focus on suppressing the Iraqi Air Force and surface-based air defenses before the campaign could shift to attacking Iraqi forces in the KTO, and saw a massive diversionary effort to suppress Iraq's Scuds. This war began with air superiority and moved swiftly on to air dominance. While comparable numbers are not available, in the first Gulf War, the mission allocation of strike sorties flew roughly 55% of all sorties. In the Iraq War, the figures were evidently over 75%.[70]

Ground and air operations began on day one, but massive countrywide air and missile strikes against Iraqi leadership targets and ground forces began on Day 3 versus Day 7. In the first Gulf War, the ground advance forced Saddam to order the withdrawal of his forces from Kuwait on Day 41. In this war, US forces had already moved the distance of the longest maneuver in the 1991 Gulf War in one quarter of the time. They advanced within 50 miles on Baghdad on Day 8, entered Baghdad International airport on Day 16, and were in the center of Baghdad on Day 20.

As has been discussed in the previous chapter, advances in synchronicity, simultaneity, speed, jointness, and combined arms, all interacted to give the US the equivalent of "decisive force." At the same time, as the following chapter and Chapter VII show, there were many problems in the US approach to jointness and the war occurred before the US was able to fully act upon the lesson of Afghanistan, much less lay out a detailed road

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map for more advanced form of force transformation. The fact that the Secretary of Defense has given the main responsibility for developing the lessons of the Iraq War to the joint forces command is, however, an indication of the value of joint task forces in modern warfighting, the progress jointness had made at the time of the Iraq War, and of the value of integrating service plans at every level to create an even greater degree of synergy.[71]

Situational Awareness; Intelligence Surveillance, and Reconnaissance (ISR); and Command, Control, Communications, Computers, and Intelligence (C4I)

The US had vastly improved every aspect of its intelligence, targeting, and command and control capabilities since the last Gulf War, as well as had spent some 12 years in surveillance of Iraqi operations and military developments. Its combination of imagery, electronic intelligence, signals intelligence, and human intelligence was honed in Afghanistan, and improved communications and command and intelligence fusion at every level gave it near real time day and night situational awareness.

It is arguable whether these changes should be called an "evolution" or "revolution" in military affairs, and it is important to note that much of the so-called "transformational" nature of US forces is the result of trends that are now over thirty years old and which were foreseen in the planning documents of the 1960s. It is clear, however, that the US has made steady advances and that its capabilities are much more advanced than at the time of the Gulf War.

General Richard Myers, the Chairman of the Joint Chiefs, described these changes as follows.[72]

> "…Joint warfighting is the key to greater things on the battlefield. I think that's been clearly proven here. We have very good integration. The thing that enables that and eliminates gaps and seams is the C4ISR (command, control, intelligence, surveillance, and reconnaissance. I think such systems are performing as we thought – all the systems. I am trying to think of something that has not lived up to what we expected and I am hard pressed."

At the same time, V Corps commander, Lt. General William Wallace, makes the following comments about Iraq's performance: [73]

> "We should be careful at this point, because wars are kind of like good wine, they tend to get better with age. But it seems to me that regardless of whether Saddam still had a command-and-control apparatus in place toward the end, it continually took Iraqi forces a long time—somewhere on the order of 24 hours—to react to anything we did. By the time the enemy realized what we were doing, got the word out to his commanders and they actually did something as a result, we had already moved on to doing something different. For a commander, that's a pretty good thing—fighting an enemy who can't really react to you."

Even if one looks only at the air campaign, there are some raw numbers that also highlight the importance of the ISR effort, The US and Coalition had some 80 dedicated Coalition aircraft flying ISR missions, which flew over 1,000 sorties. They gathered some 42,000 battlefield imaged, provided 2,400 mission hours of SIGINT coverage, 3,200 hours of full mission video, and 1,700 hours of moving target indicator coverage.[74] The sheer scale of the battle management takes is indicated by the fact the data base for the command and control of the air battle involved some 1,800 airspace control measures,

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of which an average of 1,200 had to be implemented a day. During the war, battle manage had to deconflict 750 air and TLAM operations and 414 air and ATACMS operations.

Another measure of activity is the massive increase in communications activity that took place between the period before and after the war:[75]

Activity	Prewar	Wartime	Percent Increase
Commercial Satcom Terminals	5	35	+560%
Average Commercial Bandwidth (Mb)	7	10	+47%
Military Satcom Terminals	20	44	+120%
Average Military Bandwidth (Mb)	2	3	+68%
Terrestrial Links	11	30	+173%
Average Terrestrial Bandwidth (Mb)	2	10	+444%
Global Broadcasting System (Mb)	24	24	0%
Total Terminals	36	107	+167%
Total Bandwidth (Mb)	113	783	+596%

The Impact of Space Warfare

The US used space for battle management, communications, to locate its forcesaned guide its weapons, and to perform a wide range of other missions. It built upon the lessons of the Gulf War and Afghan War, of progress in world wide communications dating back to the days of Vietnam. At the same time, this was the first large-scale war in which the US could fight with 24-hour continuing coverage over the battlefield, as well as the first major conflict where it could take advantage of full 24-hours GPS satellite coverage.

Overall Coalition Superiority

The US and Britain did not have total space dominance. Iraq had access to satellites for television transmittal during much of the war and was able to use friendly Arab satellite media to make its case. It had purchased large amounts of commercial satellite photography both directly and through various fronts before the war, and it could make commercial use of the global positioning satellite (GPS) system.[76]

The Coalition had so great a superiority in every area of space, however, that Iraq's capabilities were trivial in comparison. The US was able to build upon both the lessons of the Gulf War and the war in Afghanistan, and while the strengths and weaknesses of its space-centered efforts may remain classified for years, it is clear that major progress was made. One press report indicates that the US made use of more than 50 satellites during the war, including the two dozen satellites in the Global Positioning Satellite (GPS) system.

Space provded a wide range of intelligence, targeting, and battle damage assessment capabilities. It was the key to effective command and control and to netted global military communications. The range of space-based communications and sensor assets, and the vast bandwidth the US can bring to managing global military operations, allows Usthe to achieve near-real time command and control and intelligence collection, processing, and dissemination. At the same time, GPS allowed US and British forces to locate friendly and enemy forces and both target and guide weapons and the. US also made use

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of satellites to locate missile launches, predict their target, and provide warning.[77] USCENTAF reports that US infrared satellites detected some 26 Iraqi missile launches. 1,493 static events, 186 high explosive events, 40 hook bursts, 11 becomes and 48 ATACMs events.[78]

Evolving Space into Jointness

At the operational level, a decade of command experience by Air Force, Army and Navy commanders who stressed joint operations had helped transform space operations community from a secretive scientific-based one to a specialized cadre integrated with air, land and sea combat forces.

Some of this success may stem from organizational changes made in 2002. Prior AFSPC commanders also served as commanders-in-chief of U.S. Space and the North American Aerospace Defense commands, splitting their time among the three. On April 19, 2002, General Lance W. Lord was made a full time commander of Air Force Space Command (AFSPC). General Lord summarized the role of space in the Iraq War as follows: [79]

> " During the Gulf War, milspace was in its formative stages. We only had 16-17 GPS satellites back then [for example]. That was a rudimentary capability compared to what we have now…[Our] people are deployed throughout the Centcom [Central Command] Area of Responsibility . . . and are part of the Expeditionary Air Force, that's for sure.
>
> "One place you see [milspace] capabilities come to bear is in the Combined Air Operations Center at Prince Sultan AB in Saudi Arabia. We have a space team on duty round-the-clock in the CAOC, helping coordinate GPS, intelligence, surveillance, reconnaissance, weather and communications--all the things 'space' is capable of doing.
>
> It makes sure 'space' is fully integrated into any campaign planning and operations [now], and will be fully integrated into any future [war] operations… I think they're growing, and we're out there, spreading the word that we're part of the team," Lord said. "We're really hitting our stride [now]. It's getting better all the time."

One article described the transformation as one from space geeks to space-smart officers, and as an enviroment where enlisted troops worked closely with traditional warfighters in Combined Air Operations Centers (CAOCs). Air strike planners regularly obtained advice and inputs from military space experts on how to ensure a number of GPS satellites would be in view over a target area, particularly when GPS-aided weapons were to be delivered. The same was true of coordination in using satellite-derived weather information and imagery of target areas and in conducting network-centric operations and using space-based communication links.

These changes did much to break down the intelligence rivalries, compartmentation, and emphasis on "keeping the secrets," that badly hurt the space effort during the Gulf War – although preliminary conversations indicate that it scarcely solved the problem. [80]

Space and Communications

The space effort in the Iraq War benefited from improved communications, integration, data processing and analytic methods, and command and control at every level. National, theater, and tactical intelligence had much better integration, processing, and dissemination than during the Gulf War, building on the lessons of that conflict and Afghanistan. As in the Gulf and Afghan Wars, however, space was particularly important

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to military communications. Work by the Marine Corps Systems Command (MCSC) on the lessons of the war also illustrates just how vital space communications were to the Coalition's success:

> Interoperability of various Communications equipment was an issue in all C3 vehicles and COCs (Tanks, LAR, AAVs). Marines were overwhelmed with the high number of varied communications equipment they were expected to use. Routinely, communicators, operations officers, and commanders found themselves in information overload as they received information over too many different networks (e.g. an LAV Marine was connected to the intercom via his CVC headset, receiving information on a personal intra squad radio (requiring him to remove his helmet to talk), while also (depending on the particular LAVs configuration) "working" 2-3 man portable radios to communicate with other units (PVC 5 for SEALs, PRC 148 for fellow Marines, etc) and "monitoring" two laptops). This situation was exacerbated in C3 vehicles where I personally saw that every "shelf" was taken up by a radio and seat spaces and floor spaces were taken up with open computers for communications devices such as Blue Force Tracker, MDACT, or Iridium phones. Marines recounted numerous instances where units would call via radio to verify that a message was received over MDACT, while the receiving unit had just put the MDACT aside to monitor BFT since a previous unit had called asking about the receipt of a digital photo over BFT. Consolidation of communications assets / capabilities is an issue that requires review at the institutional level. Commanders want one box that provides multiple capabilities and that is simple and easy to use.
>
> Overwhelmingly, units were in agreement that communications architecture required an overhaul. There were too many different devices that provided redundant capabilities. Additionally, units never seemed to receive enough of ONE communications asset, forcing them to rely on a "hodge-podge" of assets that were not consistent throughout the force. (e.g. some units had only MDACT for digital communication while another unit had only Blue Force Tracker. These units could not talk to each other unless they went through a third party or used a courier system). A specific case occurred between LAR S-2 and the Div G-2, while attempting to send pictures from the Dragon Eye to Division HQ G-2. The S-2 had BFT readily available while the G-2 did not. The G-2 needed to "borrow" the commander's BFT to receive these messages or simply wait for a courier with a MEMOREX disk to arrive with the pictures. Time lost often rendered the pictures irrelevant in this fast paced fight. As the Operations Officer from 1st LAR stated, "the communications architecture is broken and the interoperability of various communications assets is virtually non-existent."
>
> … The only consistently reliable means of communication was "SATCOM." In this fast paced war, if a communications system was not functioning quickly, alternative methods were employed. This was a specific problem of the EPLRS radio (which relies on Line of Site (LOS)). With units constantly moving, over various terrain, LOS was not possible. Accordingly, any system connected to the EPLRS radio proved unreliable (e.g. MDACT, AFATDS, etc). The only systems consistently praised by the Marines were the Blue Force Tracker (SATCOM- though unsecure) and Iridium Phones (SATCOM). These systems provided reliable communications at all times. In many instances these systems were the sole means of communication.
>
> Many Marines noted MDACT, which has a larger bandwidth and greater capability for sending electronic information was marginalized by its dependence on the EPLRS (LOS) radio. As one commander stated, "Satellite Communications is simply the way of the future and the Marine Corps needs to start focusing on that." Rumor suggested the Army "gave" the Marine Corps satellite time *(note: I believe the USMC contracted bandwidth prior to crossing the LD)* in order to use the BFT; had this not been the case, the Marine Corps would have found itself fighting, in several instances, without tactical communication.

The Ongoing Evolution of Space

The US and Britain made use of numerous communications satellites and about half a dozen electro-optical and signals intelligence satellites. A press report indicates that the

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National Reconnaissance Office (NRO) employed three advanced "KH-11" type visible and infrared imaging satellites, and 2-3 "Lacrosse" type all-weather imaging radar satellites that proved to be especially effective in spotting armored movements and whose data were used in conjunction with data from the E-8 JSTARS. At leas one of these satellites could image the battlefield every 2-3 hours, and they made a total of some 12 passes per day. A total of some 33,500 personnel at 21 US sites and 15 foreign locations were involved in the overall space support effort.[81]

Press reports, however, can only hint at the overall architecture and capabilities of US space systems, and how rapidly they are evolving. As a result, there is no way to quantify or describe recent and planned changes in US space capabilities in detail. Unclassified discussions of the increase in satellite imagery (PHOTINT) coverage and capability simply cannnot be grounded in reality, although the level of resolution and "24/7" persistence of coverage has clearly changed radically. The same is true of any effort to provide an unclassified analysis of the much more complicated problems of assessing the trends in space-based electronic intelligence (ELINT) and signals intelligence (SIGINT).

What is clear is that advances in data processing and the ability to develop complex "mosaics" of all forms of space intelligence are now being mixed in near real time with improved airborne platform coverage of imagery, ELINT, and SIGINT and processing of human intelligence (HUMINT), data from ground units like Special Forces, and open sources. The end result is a new form of space-centered joint intelligence that has led to a massive improvement in situational awareness and targeting capability that is one of the keys to precision warfare and rapid maneuver.

At the same time, those involved in operating and upgrading US space systems are among the first to say that space warfare is still in its early days. Much of the ability to net, process, and utilize space capabilities remains relatively primitive compared to its potential, the human factors and ergonomics of space exploitation remain crude, and joint warfare is only beginning to exploit the potential of space-centered warfare. Iraqi Jammers and the

Importance of GPS

The importance of GPS is illustrated by the fact that when GPS was introduced into US Army during the Gulf War, there was a maximum of one receiver per company or 180 men. In the Iraq War, there were more than 100,000 Precision Lightweight GPS Receivers (PLGRs) for the land forces, and at least one per nine-man squad. The Marines had fewer units, but still had 5,400, or roughly one per Platoon (3-5 squads.) Moreover, a number of Marines carried their own civilian GPS units.[82]

These advances scarcely solved all military navigation and guidance problems. In one highly publicized incident, near Nasiryah, members of the US army 507th Maintenance Company got lost and ran into an ambush. Eight servicemen were killed and six were taken prisoner. It is far from clear, however, that this was related to the capabilities of the GPS system.

In any case, the technology in future wars is likely to be much better. The PLGR now costs roughly $1,000 and weighs about 2.75 pounds, and is accurate to within 10 yards versus 20-25 yards for civilian units. It does not, however, display maps, only location

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and velocity. In contrast, the new FBCB2 system introduced in Army combat vehicles during the war does allow broad electronic display of the battlefield, can track friendly forces using their GPS information, and red forces using intelligence with GPS coordinates.[83]

The US is also developing a new generation of hand-held GPS systems called the Defense Advanced GPS Receiver, or DAGR, which will be more accurate, more resistant to jamming, and have a mapping system that displays both red-blue forces and key terrain features and obstacles like minefields and rivers. The one-pound device can be plugged into military radios to communicate location data.

The military GPS systems used by the land forces now run on the same 1,575 megahertz frequency as civilian systems, although the military system in encrypted. The new systems for land forces will use the same, much more secure, military frequency of 1,227 megahertz used by combat aircraft, cruise missiles, and other airborne systems. It will be able to track all 12 GPS satellites in a given hemisphere at once versus five for the current systems. It will have classified technology to verify that the devices are only reading US military signals and not jamming or deception signals from the enemy.

GPS Jammers and Countermeasures

Iraq had at least four jammers designed to jam the Coalition GPS system although these seem to have been destroyed early in the war and to have had little operational effectiveness. According to one press report, the jammers were successfully attacked by B-1Bs and F-117s, at least some seem to have been attacked with GPS guided weapons.[84] The very fact such jammers existed is, however, a warning that there eventually is a countermeasure to virtually every tactic and technology. It is also a lesson that GPS modernization remains a critical priority.[85]

The GPS satellite signal is roughly equivalent to the light from a 25-watt bulb at a distance of 11,000 miles. The Russian firm Aviaconversia claims that its low power 4-watt jammer can block a receiver from picking up signals up to 124 miles away if there is line of sight. One explanation is that military GPS signals are rough 1,000 times stronger than the civilian signals when they are locked into their military frequency and use the military P-code. As a result, jammer with a potential jamming range of 100 miles against a civilian unit will only work for a few miles against a military unit. These counter-jamming capabilities are also expected to increase strikingly in the near future when the US deploys the G-STAR, a system designed to block the jamming signal and direct the GPS unit to use beam steering to look for other satellites. (Most GPS guided weapons have a fall back. For example, the JDAM defaults to inertial guidance although its accuracy degrades from an average of around 40 feet to 100 feet.)

The Value of Training, Readiness, and Human Factors

No advance in jointness or technology would have mattered without truly professional men and women, trained as fighters, rather than garrison forces or military bureaucrats, had a massive superiority in professional skills and unit cohesion over conscript and heavily politicized forces.

The value of training and readiness emerged in every aspect of US and British operations. The low accident rates, the ability to sustain constant combat operations over some 20

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days, the ability to manage extremely complex air operations, the high quality of joint warfare and combined arms are all tributes to the quality of prewar training and readiness. US aircraft and helicopters, for example, had better readiness rates in wartime than in peacetime. often averaging over 90%.[86] The Coalition also benefited from reliance on all-professional active forces and the combat experience of the forces involved. For example, 70% of US strike aircraft aircrews already had combat experience at the time the Iraq War began.

It seems certain that every commander on the Coalition side would agree with the following comments of Lt. Gen. David D. McKiernan, the commander of the Coalition Forces Land Component Command:[87]

> I will tell you that why the coalition was so decisive in this campaign to date was because we have the military capability, training, leadership and equipment that makes us decisive. And I get very upset when I hear anybody say that this was so easy. There are 600-plus Americans who are dead or wounded in the course of this conflict, and it wasn't easy for them. And anybody that was here and anybody that traveled with those formations, I don't think you'll find anybody that says it was an easy fight. So if I sound a little emotional, I apologize, but there is nothing in wartime that's easy for that formation or for that pilot or for that ship when they're in harm's way.

It is important to note in this regard that US and British forces were able to operate effectively even when in a protection mode against chemical and biological weapons, and emerged with far better training for urban warfare than their Iraqi opponents.

The US emphasis on realistic training, combined with the fact that the US military is now one of the few military forces with wide and diverse combat experience, is a factor that is easy to discount, given the emphasis being placed on new technologies and new methods of war. In practice, however, changes in tactics and technology mean little unless they can be combined with training and readiness. Moreover, the US learned the hard way in past wars that training must be as rigorous and realistic as possible, prepare forces to deal with enemy innovation and tactical defeat, and force them to realistically practice combined arms and joint warfare.

At least in this latter regard, a number of officers serving in the Iraq War, and which helped to prepare for it, feel there is still a need to find better ways to improve joint warfare both in terms of land-air operations and interservice cooperation. They feel that even within the US military, there are also imbalanced advances in C4I and “digital” combat that complicate cooperation between the US Army and Marine Corps or complicate the deconfliction of armor, artillery, rotary wing air, and fixed wing air. They also feel that there is a need for more demanding training for the command of large-scale joint operations in spite of the success of US forces in the Iraq War. There is no way to put such feelings in perspective, except to say that training and readiness are the foundations of all effective military operations, and that each major step in force transformation almost inevitably creates the need for new and even more demanding forms of training and exercises.

The Role of the Reserves

So far, the Iraq War has not produced the same kind of debate over the value and readiness of reserve forces that took place during and after the Gulf War in 1991. The US did commit extensive reserve forces to Operation Iraqi Freedom. These included 10,686 in the US Army Reserve, 8,866 in the Army National Guard, 2,056 in the US Navy

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Reserve, 9,501 in the Marine Corps Reserve, 2,084 in the USAF Reserve, and 7,207 in the Air National Guard. This is a total of 40,400 reservists out of a total of 423,988 US actives and reserves committed to Operation Iraqi Freedom, or 9.5 percent. The Air National Guard deployed 236 aircraft and the Air Force Reserve deployed 70.[88]

The total number of reserves serving in the US military, however, reached a level of nearly 224,000 by late April. The Army Reserve and National Guard had over 149,000, the Navy Reserve has nearly 12,000, the Air National Guard and Air Reserve had over 37,000, the Marine Corps Reserve had over 21,000, and the Coat Guard had over 4,400. This total was surprisingly close to the 265,000 reservists that served in the first Gulf War.[89]

Reliance on this large a reserve force raises several issues. One key issue is equity. Reservists are being called up far more often and for longer periods, in part to compensate for a lack of national service. In practice, this often leads to massive disruption of their family lives and careers, but the pay and career protection they are given dates back to a much earlier era when national service was the rule. The current level of US dependence on reserves – many of whom are now ex-serving military – raises serious questions about fairness, citizenship, and compensation.

There are force transformation issues as well, Only limited numbers of reserves can, in peacetime, maintain the speed of deployability and training levels necessary to be used in rapid deployments and instantly fight as fully ready members of a joint force team. The Army in particular is over-dependent on reserves for political reasons and because of Congressional mandates. At least some of its problems in deployability are Congressionally imposed and beyond its control. Furthermore, this dependence limits the ability to use reserves in homeland defense tasks for which they may be better suited and which imposed fewer costs in terms of career and family.

It is dangerous to say that the Iraq War provides some clear lesson as to the need to make a major restructuring in the reserves. At the same time, it clearly raises the need to at least examine the current role of the reserves and their compensation. If the vast majority of Americans are to rely on active and reserve citizen-professionals for their defense, and to make the resulting sacrifices, the rewards to those who do serve should be proportionate.

The Value of Technology: "Owning the Night" and "All-Weather Warfare

US and British forces had force-wide technical superiority in virtually every area of combat over an Iraqi force that had had only minimal modernization since the summer of 1990, and that only in the form of erratic deliveries of smuggled arms. One of the most critical areas, however, was one where the US-led Coalition had a somewhat similar advantage in the Gulf War.

US and British forces could both fight and maneuver at night and largely in the dark. US operations also continued in spite of major sand storms, cloud cover, and rain. The value of this capability is indicated by the fact that 70% of Iraq was cloud free for only 30% of the war. There were only 17 days out of 31 in which the weather was clear to scattered cloud at or below 10,000 feet, and there was little or not dust impact. As has been discussed earlier Coalition land and air forces kept fighting even through three days of

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severe sand or dust storm. The Coalition only had to cancel four percent of its sorties due to weather during the entire war, and 65% of these cancellations occurred during this three day period of bad weather.

The Importance of Sustainability

While it gets little attention, US armored and mechanized forces are now the only armored forces in the world that can sustain long-range intensive air operations, support armored maneuver movements against hostile forces, and then conduct combat with sufficient combat and service support forces to maintain nearly 24/7 operations with minimal time for rest and regrouping, provide fuel and some 40,000 gallons of water a day, and supply some 300,000 MREs.

These capabilities are particularly striking in view of the fact that the US can project them virtually anywhere in the world. They are also a warning that cosmetic NATO and EU power projection force have little real world warfighting capability against a serious opponent without such capabilities. Any force that can move can be called a power projection force; only a force than can truly sustain long range intensive air and armored maneuver warfare can truly project power.

Airborne Refueling

Once again, the ability to refuel in mid-air and in intense, complex missions proved absolutely critical to power projection and in theater air operations, substituting for aircraft range and payload and allowing long patrol and loiter times. As of April 11th, the US flew some 7,525-tanker sorties and delivered some 46 million gallons in aerial refueling.[90] If one looks at the entire period of the war, the USAF flew 6,193 tanker sorties, the USMC flew 454, the US Navy flew 2,058, and the RAF flew 359, for a total of 9,064.[91]

This effort does, however, illustrate the need for depth in air space to allow such operations to be conducted outside the air battlefield, and the coordination problems in such efforts create a need for dedicated forms of air control management.

Vice Admiral Timothy Keating, commander of all maritime forces involved in Operation Iraqi Freedom, described these problems as follows in a briefing on April 12, 2003:

> "In the early days, …there were some allocations challenges, certainly, that we worked through with Buzz Moseley. It didn't affect the overall campaign. We were able to move gas around tactically and operationally, if you will, near real time, and then make some accommodations in the air tasking order. You have to remember, and some of the guys you may know down from Oceania, for a fighter pilot, there's never enough gas airborne. They can always use more. So, you'll hear that beef from junior through senior fighter pilots of all services. There's never enough gas. There were some early growing pains, if you will, with the hundreds and hundreds of airplanes in the air simultaneously, but those problems were resolved very quickly, and it had no impact on the overall campaign."

Work is still underway on this aspect of the lessons of the war, but one preliminary conclusion seems to be that the US will need to expand and modernize its tanker fleet for longer missions and longer range power projection.[92]

Logistics and Power Projection

Major advances in logistics allowed the US to fight half way around the world with an unparalleled tempo of operations. The ability to refuel aircraft, move fuel and water to

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maneuver units, maintain and repair equipment in the field, and rearm and sustain was critical to every aspect of operations. So were improvements at every level from support vehicles to new forms of packaging for shipping and transponder readable coding, plus half a century of practical experience in projection,

One striking change in the logistic systems in the Iraq War versus the Gulf War was the introduction of "three dimensional" logistics in US forces that allowed near real time tracking and characterization of shipments from origin to deployment. In the Gulf War, logistics management essentially broke down at the peak of US deliveries because so many competing requests were made and it was impossible to properly track actual shipments and deliveries.

In the Iraq War, much of what was shipped had small radio transponders with Radio Frequency Identification (RFID) tags that broadcast a unique code for a given system or package. This allowed the rapid updating of on-line data bases, on a global basis and the RFIDs were on the systems from factory to use in the field.[93]

Such efforts scarcely eliminated the challenges in logistics. While mountains of unidentified supplies did not pile up as they did during the Gulf War, the radio transponders sometimes failed. There was little access to the RFID system at the company level that generally drew down on supplies in the field and allocated them from the rear. The allocation of lift remained a problem, and this created serious problems in providing just in time delivery. The Army also fell short of trucks to sustain long distance supply – a problem that will be familiar to virtually every solider concerned with supply in the field since World War II. [94] the sheer volume of the supply requirement is also indicated by the fact that the Coalition air forces alone used 195,753, 818 gallons of jet fuel, 269, 414 gallons of JPTS, 27,368 gallons of aviation gas, 2,147,248 gallons of diesel fuel, and 368,525 gallons of unleaded gasoline.

Airlift and Sealift

US and British ability to use sealift to move heavy cargo and equipment to the Gulf and turkey during the months before the war, and use Gulf ports, was critical to effective power projection. The combination of military and civil sealift and forward ports and bases made it possible to deliver virtually all of the equipment by sea and achieve a degree of tactical surprise because Iraq focused on personnel movements, rather than the equipment and logistic build-up.

Airlift made a natural partner in rapidly moving men and women without the lengthy delays inherent in sealift, and in dealing with time sensitive cargo and personnel movements. The US deployed 120 C-130s and 7 C-17s full time to the theater, plus large additional numbers of lighter transport aircraft. USCENTCOM reports that the US flew 7,100 airlift sorties between G-Day and April11th, moved about 55,000 short tons, and deployed some 76,000 passengers between G-Day and April 9th. During the full course of the war, the USAF flew 7,413 airlift sorties, and Australia flew 263.

Intratheater mobility was also critical. The USAF flew 2,203 C-130 air mobility sorties, moving some 9,662 passengers and 12,444 short tons. It air dropped 954 personnel, and performed 136 medevac missions, with a total of 1,572 patients.

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Marine Corps, Navy, and US Air Force holdings of helicopters included 67 CH-46s, 11 CH-47s, and 54 CH-53s,

At the same time, as in the Gulf War and most previous conflict, virtually all heavy equipment moved by sealift, as did most munitions, sustainment, and other support equipment. With the exception of light land forces, more than 85% of all combat unit logistic and equipment needs moved by sea. This again illustrates the fact that advances in air mobility in now way reduced the importance of sealift and of efficient and high speed ships capable of rapidly deploying and offloading specialized military equipment.

What is not clear is the extent to which experience during the Iraq War validated USAF and Navy calls for more airlift and sealift. USTRANSCOM, for example, now has authority to buy 180 C-17s, but estimates that a minimum of 222 are required.[95]

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VII. US AND BRITISH LESSONS MORE SPECIFIC TO THE IRAQ WAR

There is never a clean break between the lessons of war that emerged in the Trojan War, Thucydides, and Sun Tsu and the lessons specific to a modern conflict. What does seem clear, however, is that blend of new and old approaches to warfighting in the Iraq War do pose a wide range of useful lessons and many do reflect significant changes from the lessons of the Gulf War and Afghanistan.

Lessons Affecting the Overall Conduct of the War and Joint Forces

The most important lessons seem to be those that that affect changes in the conduct of joint operations, and the related patterns of command and control that helped shape the outcome of the war. General Tommy Franks described the importance of the changes in joint warfare as follows in his USCENTCOM briefing on March 22, 2003:[96]

> "Let me begin by saying this will be a campaign unlike any other in history, a campaign characterized by shock, by surprise, by flexibility, by the employment of precise munitions on a scale never before seen, and by the application of overwhelming force.
>
> Let me talk for a minute about our capabilities. The coalition now engaged in and supporting Operation Iraqi Freedom includes Army and Marine forces from the land component; air forces from several nations; naval forces, to include the Coast Guard, and Special Operations forces.
>
> Our plan introduces these forces across the breadth and depth of Iraq, in some cases simultaneously and in some cases sequentially. In some cases, our Special Operations forces support conventional ground forces. Examples of this include operations behind enemy lines to attack enemy positions and formations or perhaps to secure bridges and crossing sites over rivers or perhaps to secure key installations, like the gas-oil platforms, and, of course, in some cases, to adjust air power, as we saw in Afghanistan.
>
> Now, in some cases, our air forces support ground elements or support special operations forces by providing targeting and intelligence information, perhaps offensive electronic warfare capabilities. At other times, coalition airmen deliver decisive precision shock; such as you witnessed beginning last night.
>
> At certain points, special operations forces and ground units support air forces by pushing enemy formations into positions to be destroyed by air power. And in yet other cases, our naval elements support air, support ground operations or support Special Operations forces by providing aircraft, cruise missiles or by conducting maritime operations or mine-clearing operations.
>
> And so the plan we see uses combinations of these capabilities that I've just described. It uses them at times and in places of our choosing in order to accomplish the objectives I mentioned just a moment ago.
>
> That plan gives commanders at all levels and it gives me latitude to build the mosaic I just described in a way that provides flexibility so that we can attack the enemy on our terms, and we are doing so."

There is no clean break between the lessons regarding jointness and the lessons regarding the other aspects of the Iraq War, In virtually every case, there is substantial interaction between lessons that primarily affect jointness and individual lessons affecting the military services or key weapons and tactics. At the same time, the very term jointness took on a new meaning during the Iraq War in terms of speed of maneuver, tempo of operations, precision, lethality, intelligence and targeting and battle management.

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Landpower Reinforced Airpower and Vice Versa

The Iraqi land forces were forced to expose themselves by the speed of land operations and then hit hard from the air, which in turn sharply reduce the Iraqi threat to US and British land forces. Jointness took on a new practical meaning.

Ironically, this may take some time to sort out. The long air bombardment in the Gulf War produced a focus on air operations that led some to focus on airpower to the exclusion of land power, and claim airpower alone could be decisive. It also led some to claim that strategic bombing had a decisive effect although the USAF Gulf War Airpower Survey showed that General Horner – who commanded the air effort during the Gulf War -- was correct in totally reject initial plans to focus on strategic bombing at the expense of a proper balance of land forces.

Similarly, the role airpower played in Afghanistan against an enemy with virtually no modern weapons led to similar claims about the decisive impact of airpower by those General Horner came to call "airheads."

The irony in the Iraq War is that the delay in moving to a massive air campaign, the lack of any details on the air campaign during the daily briefings during the war, and the fact so many reporters were embedded with ground forces led to a near reversal and a media focus on ground power. The fact remains that the history in Chapter IV shows it was the ability to tailor new joint mixes of ground-air-sea power to the needs of a particular campaign that proved decisive.

Precision and Focus

The Iraq War had an element of "shock and awe," but the need to focus on postwar nation building limited the extent to which the coalition could attempt such an approach. The speed and scale of the Coalition attack certainly must have had a power psychological impact on Iraqi forces as well as the Iraqi regime. At the same time, the Coalition targeted with great restraint. As a result, it may be more accurate to describe the Coalition campaign as having "precision and focus."

A combination of new ISR assets, new precision weapons, and much better avionics allowed all-weather precision strike operations with excellent targeting, an emphasis on "effects-based" strikes, and careful limitation of collateral damage. Not only did the US make nearly ten times as much use of precision guided weapons relative to unguided weapons as in the Gulf War, it was able to target them with far more focus and effect. As for sheer numbers, nearly 100% of the combat aircraft the US deployed in the Iraq War carried precision weapons, versus some 15% of the aircraft in Desert Storm. The Coalition fired some 19,948 precision-guided weapons in the less than four week long Iraq War versus 8,644 in the six week Gulf War, and some 955 cruise missiles versus 300.[97]

Netcentric Warfare, ISR Technology, Processing, Integration, and Near Real Time Information Flow and Targeting

The Coalition applied joint warfare with an unparalleled degree of near-real time situational awareness that shortened the "kill chain" in going from targeting to strike, and the sensors to shooter gap from days to hours in the Gulf War to hours to minutes in the Iraq War.[98] At this point, there is no way to analyze the relative role of space, UAVs,

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fixed wing aircraft, SIGINT, ELINT, imagery, Special Forces, and human intelligence in detail It is clear, however, that the mosaic of intelligence and senor data was far better than in the Gulf War, and was processed and disseminated far more quickly. The time consuming and relatively rigid process of sortie planning and targeting that shaped the Air Traffic Order in the Gulf War was replaced with a far quicker and more responsive system.

One senior officer described this process as follows:

> "All such offensive air operations, manned or unmanned, were coordinated with the USCENTCOM air component command headquarters. The types of targets were broad-ranging. Some of them were time-sensitive targets -- where intelligence that led the US to believe that a particular location was a valuable target. And so in a relatively brief period of time, particularly compared to the years past, the coalition was able to do the planning, get the missile loaded with its mission data, out of a submarine or -- a British or American submarine or American ship -- and down range and export on the target, or some rather more stationary and strategic targets, including missile defense facilities, to Republican Guard headquarters, and some regime structures in and around Baghdad and all throughout the country…I think his degraded ability to command and control his formations meant that those Republican Guard formations had very little situational awareness on the battlefield of where to maneuver to, which played right into the decisive lethality that both the ground and the air component were able to put on him."

Lt. Gen. David D. McKiernan, the commander of the Coalition Forces Land Component Command described the role of such assets, and netcentric warfare, as follows:[99]

> Network-centric warfare is an idea, a concept, and a reality that has been around now for some years. And to give you a good example, much of the command and control that this regime executed for its military was done through fiber optic cable and repeater stations. Through very, very good intelligence, and targeting and execution, that capability was consistently degraded to the point where we think he really had very little ability to command and control tactical formations before we closed with him with ground formations. And that's a reflection of network-centric warfare, of knowing where to go in that command and control network to take it out or degrade it so that he loses his ability to command and control his formations.
>
> … the technology advances in our military today, compared to my experiences in Desert Storm, allowed me to talk via tactical satellite communications and other means across a battle space of hundreds of miles; to be able to conduct, when we need to, video teleconferences, where commanders can plot out where they're at and what decisions they need to do next; and all of that put together in a joint construct, where I could see where all the airframes were, where all the ships are, where my counterparts in the air and the maritime components can see where the ground formations are.
>
> When you put all that together, that allowed us to make decisions with situational awareness of where we were at, where the enemy was at, and our view of the terrain and the weather much, much faster than we ever could in the past and exponentially faster than our opponent could. So when you put all that together, it allowed us to make decisions and then execute those decisions faster than any opponent.

The process was also improved by attaching an Air Coordination Element, led by an Air Force Major General, supported by 18 airmen, to the Army's operations staff so that there would be closer cooperation in providing close air support and liaison with the USCENTCOM command staff in Qatar and the Combined Air Operations Center (CAOC) in Saudi Arabia. The manning of the CAOC was also increased from 672 personnel before the war to 1,966 during the conflict. Seven other teams, headed by a general or colonel, assigned to each of the land force commanders to provide a similar improvement in operations, planning, and liaison.

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Britain had liaison officers attached to various U.S. elements to improve interoperability.

This does not mean that the US and Coalition operations in the Iraq War are representative of the future state of the art. It is clear from discussions with some of the officers involved, as well as technical experts in the Department of Defense that "netcentric" warfare is in a rapid state of flux and many further advances can be made. There were many areas at every from communications in the field to basic procedures for integrating high level decision-making where methods and technology could be improved. In case after case, the technology available during the Iraq War was also already in transition. In many cases, part of t US forces were more advanced than other parts, or follow-on technology was already in development or procurement.

Even in the case of air systems – which generally had the best and most digitized communications – there were many problems in interoperability, communications, and data flow – as well as in procedures and computer support. These included a wide range of problems affecting the "sensor to shooter gap," time urgent targeting, and dynamic targeting, as well as deconflict and avoiding friendly fire. A few of these issues are outlined in this report, but most will require substantial after action study

The US Army, Marine Corps, and allied forces like the British Army had different level of "digitization." The US Army was the most advanced land force, but its units had different levels of capability. Ironically, the 4th Infantry Division – the best-equipped unit to use such capabilities was not committed. It also is not clear just how much the US was able to solve the coordination, processing, data allocation, and bandwidth problems exposed in Afghanistan or deal with new capabilities to retarget aircraft in mid-flight. What is clear is that such technologies offer great promise and will rapidly evolve beyond the level of operations used in the Iraq War.

Target Characterization and Battle Damage Assessment

There are two other areas where almost no data are available on the performance of Coalition and US forces that are of critical importance in determining the efficiency of ISR systems and any concept of netcentric warfare. The data so far available indicate that the US was far better equipped to target armored and heavy ground forces, Iraqi active land-based air defenses, and Iraq military emitters than in past wars. The ability to strike at Republican Guard forces almost continuously during the conflict, and even during sand and dust storms, is particularly impressive.

What is far less clear is that the US had similar capability to deal with light irregular forces or to characterize the size and nature of asymmetric forces, particularly those that sheltered in urban or built up areas. The ability to characterize armor vs. other military vehicles seems to have remained a problem, as did the ability to find well dispersed systems like aircraft and individual surface-to-air missiles or surface-to-surface missiles that were not actively moving or emitting.

Perhaps most seriously of all, the US had problems in dynamic targeting capability to deal with covered and sheltered facilities. UAVs and electronic intelligence assets, plus the use of Special Forces, do seem to have given the Coalition a better capability to know when buildings were empty and locate new dispersed facilities. It is clear, however, that the US did not have enough of these assets to cover all of the areas in needed to cover to

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establish anything like full coverage and that each asset have limits. It still is impossible to see within buildings or shelters without men present, and it is generally impossible to characterize the nature of the equipment and operations in sheltered or covered facilities unless their purpose is clear from previous intelligence sources or their profile of activities is clear.

The issue of battle damage assessment remains a major area of uncertainty. The US has learned not to rush out with statistics and estimates that often proved exaggerated or wrong – although it seems likely that the few estimates made of the level of equipment losses in the Republican Guard may prove to be optimistic. This does not, however, mean that the US has an effective and reliable set of sensors, processors, and methods to support netcentric warfare with reliable battle damage assessment or provide such data quickly effort to support near real time allocation of force assets for either tactical or targeting purposes.

The data the US (and Britain) have made public in the past on battle damage assessment have scarcely been reassuring. The data on kills of large military weapons like armor and ground kills of aircraft and missiles have generally proved to be either exaggerated or uncertain. Data on attacks on C2 facilities, infrastructure targets, leadership targets, industrial base and POL targets have often been able to show the damage to the building but unreliable in assessing the effect – a problem that grows progressively more important if the concept of "effect-based" operations becomes a key factor in war fighting. The long-standing reluctance of the US to estimate enemy casualties ever since Vietnam seems to have compounded delays in finding ways to both target and assess battle damage to infantry and light forces, and paramilitary and terrorist forces, that are primarily people and not things.

This does not mean that the US and Coalition forces did not make improvements target characterization and in battle damage assessment during the Iraq War: It does mean that there is no public evidence that they did so or solved past problems. More generally, it is a reason for analysts to show caution in talking about advances in netcentric warfare; ISR technology, processing, integration, and near real time information flow and targeting as if the key problems were solved or there was a firm empirical base for making clear trade-offs or program decisions.

It is also valuable to remember the past. For most of the 19th Century, well-equipped Western armies achieved quick and decisive victories – often at great odds – against ineffective opponents. These same armies, however, were generally unable to predict their capability to fight each other, or the actual warfighting impact of the tactics and weapons that were felt to be "transformational" at the time. These problems became brutally apparent in the American Civil War, the war of 1980, and World War I. Furthermore, Britain found in South Africa and the Sudan, the French found in Vietnam, and the US learned at the Little Big Horn, that "transformation" cannot always compensate for numbers and overconfidence.

Asymmetric Warfare

One of the key issues shaping the war was the ability of US and British forces to adapt to asymmetric warfare. In practice, US forces responded quickly and effectively to Iraqi tactics, whether in the form of covert mine warfare attempts, dealing with raids by

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"technicals," preventing suicide attacks, or coping with urban stay behinds and diehards., US and British forces demonstrated that they could adapt tactics and force postures to new and surprising uses of asymmetric warfare. The lessons of Somalia, North Ireland, and Afghanistan had been learned and the value of improve training and organization for asymmetric warfare was clear.[100]

At the same time, the US and UK benefited from the lack of large numbers of dedicated irregulars and martyrs. As General Wallace pointed out, Iraq did achieve surprise. There were serious battles involving mixes of regular and irregular forces near Al Hillah, and the situation might have been very different if Iraq had used chemical or biological weapons along with asymmetric warfare, or had been able to launch more than nine Al Samoud missiles and long range tactical rockets.

There still, however, are important "what ifs." One such "what if" is how the Coalition would have fared if Iraq truly had been able to mobile and use the large popular army it had created arms caches for throughout the country , particularly given the increasing need for powers like the US and UK to reduce total casualties, civilian casualties, and collateral damage. Another is how different the war would have been if Iraq had been able to combine guerrilla or irregular warfare with the effective use of weapons of mass destruction and/or covert and terrorist attacks on the US and British homeland. The Iraq War is only a limited warning of the kind of challenge a more effective opponent might pose.

Friendly Fire and Casualty Issues

As of April 12th, the US had lost 108 dead, 14 captured, and 399 wounded. This was about one casualty in 480 soldiers, assuming some 250,000 forces engaged. It compares with 1 per 15 soldiers from World War I through Vietnam. As of April 20th, at a point the Coalition had clearly transitioned to peacekeeping and nation building, the US had a total of 128 dead (KIA and non-combat Dead, with 94 killed in action and 34 in non-combat situations -- largely accidents. The US had two missing. The British had 31 dead.

This was an extraordinarily low rate of overall casualties. The US Marines lost 265 personnel in Lebanon from 1982-1984, including 241 who died in the attack on their barracks. The US lost an average of 211 combat deaths per day in World War II and 18 per day in Vietnam.

These low casualties reflect all of the strengths in Coalition warfighting capabilities, and all of the Iraq weaknesses mentioned earlier. A review of the casualties also indicates that the best-protected soldiers in combat were least likely to be casualties – a predictable point, but one that emphasizes the value of body armor and heavy armor.[101]

The casualty data do, however, reflect a high rate of deaths to "friendly fire"—probably at least 12. The exact number of friendly fire cases remains uncertain at this point, but they seem to include at least five major cases where air or ground forces attack friendly forces. This follows a pattern in the Gulf War where 35 out of 147 combat deaths were the result of friendly fire. There is no way to put these cases in a broader historical perspective, because the historical data on this issue are so flawed that any trend analysis must be based on little more than statistical rubbish.

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This raises questions about the effectiveness of the IFF (identification of friend or foe) systems used, ranging from passive readout systems to transponders. For example, after an F-16CJ fired on a Patriot on March 24th, the US had to refine its IFF procedures during the course of the war, and add a back up check using another system to locking the radar on suspected targets.[102]

It is unclear that major additional efforts to reduce friendly fire to new zero would save more lives than alternative uses of the same resources, or that more stringent rules of engagement would not increase net casualties by slowing down the pace and lethality of operations and giving the enemy more opportunities to kill. It is also important to recognize that much more is involved than finding the right technology. Lt. Gen. David D. McKiernan, the commander of the Coalition Forces Land Component Command described the problems during the fighting as follows:[103]

> What really makes all the difference in mitigating the risk of fratricide has nothing to do with technology. It has everything to do with the tactical discipline of units, of using the right fire support coordination measures, the right tactical graphics and the right weapons control status and discipline of formations. Technology does help mitigate it. The ability to use things like "identification friend or foe" technology or visual infrared reflective markers that help determine friendlies on the battlefield are all very important. All the services have made great strides since Desert Storm. Is there more that we can do? I believe there probably is, and I'm sure we'll address that as we look at resourcing future requirements.
>
> …when you're fighting, for instance, in a dust storm at night in an urban area with special operating forces, conventional forces, air power, all operating in the same battle space, you are never, ever going to completely mitigate the risk of blue-on-blue fire. That's a danger we have in this profession that no amount of technology will ever completely erase.
>
> I don't know what the final numbers are going to look like, but my initial impression is that we have greatly reduced, given the tempo of these operations and the time of this campaign when you compare it to Desert Storm.

It should be noted that one of the key developments intended to solve the problem, the Force XXI Battle Command Brigade and Below (FBCB2) system was not fully available. The system uses a mix of transponders, C4I/battle management systems, and display screens to keep track of both friendly and enemy forces. Its displays are highly sophisticated and can track movements even under complex maneuver conditions.

The army describes the role of the system during the fighting as follows:

> Coalition situational awareness of US and UK ground maneuver forces was accomplished using the Force XXI Battle Command Brigade and Below (FBCB2) System over a commercial satellite-based communications network. The FBCB2 capability was installed onto selective US and UK command and control (C2) vehicles, logistical support vehicles, and rotary-winged aircraft based on a “thin fielding” concept. The fielding concept employed the FBCB2 capability down to the unit company commander level, or as required by the unit mission. The beyond line-of-sight satellite-based communications architecture provided on-the-move combat operations over extended ranges and during adverse weather conditions, e.g., sandstorms. In addition to real-time situational awareness the FBCB2 capability provided reliable e-mail messaging and battlefield maneuver graphics overlays on digitized maps.
>
> The FBCB2 capability integrated coalition “blue force ground tracks” with the Joint Common Operational Picture (COP). Technically, FBCB2 equipped platforms automatically updated their Global Positioning System (GPS) locations onto Blue Force Tracking (BFT) primary and alternate database servers. The BFT situational awareness display was integrated into the Joint COP using the Global Command & Control System (GCCS). The GCCS further disseminated and digitally

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> displayed the Joint COP. The Joint COP displays an integrated air, ground, and sea friendly forces against positively identified and suspected enemy force positions. The Joint COP enabled real-time battle command and control at all levels of command, e.g., Division, Corps, and Theater.
>
> The US Army Central Command's (ARCENT) Coalition Joint Force Land Component Command (CJFLCC) Center was completely modernized with state-of-art digital large screen video and graphic displays. The digitalization of the CJFLCC enabled the battlefield visualization of the Joint COP including the BFT situational awareness.

One problem in making effective use of the system was that the 4th Infantry Division was the only unit fully equipped and trained to use the system before the war. This unit was originally planned to be deployed through Turkey and had to be rerouted through the Gulf once Turkey did not approve the deployment of Coalition forces. As a result. it did not arrive into Iraq until the war was effectively over.

The command center at Doha was equipped with suitable displays and 10-inch mobile terminals and antenna were rushed into the field for the units that did deploy to Kuwait. It is unclear how many systems went into the field, how they performed, and the extent to which they were used by both land and helicopter forces. One report does say that 50 systems were delivered to the UK, that the US army had some 8,000 systems on hand, and that the Marine Corp bought some systems. However, details are lacking and only the 4th Infantry Division seems to have had a key feature in the from of the tactical internet, a mix of elements including the Single-Channel Ground and Airborne Radio System and Enhanced Position Location System with line-of-sight radio transceivers. The others used satellite communications. [104]

It is also unclear what degree of netting the FBCB2 system will have with air units in the future.[105] The Army does have a developmental Airborne Command and Control System (A2C2S), but the links to Air Force, Navy, and Marine Corps C4I, battle management, and air control and warning systems are unclear.[106]

Postwar Review of Force Plans and Transformational Restocking

One obvious lesson of any major war is the need to make a comprehensive review of force plans and modernization plans to reflect the lessons of the war, and to shape restocking plans to modernize and transform forces, rather than simply replace past items with the same thing.[107] This is a lesson that the Department of Defense is already acting upon. Secretary Rumsfeld directed the Office of the Secretary of Defense and Joint Staff to develop such a "Post War Defense Assessment" in mid-April, 2003.[108]

As has been touched upon earlier, a similar direction has been given to the US Joint Forces Command, and the US has commissioned a broader "Global Posture Study" to examine the adjustments the US should make in its force posture and the rest of the world, and Joint Forces Command had a 50-manlessons team assigned to the US headquarters for USCENTCOM and each of its service components before the war began. They and an additional 20 service personnel stationed at the Joint Forces Command in Norfolk will produce a detailed examination of the lessons of the war. [109]

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Lessons Primarily Affecting Air, Missile, and Land–based Air Defense Forces

While no set of lessons can be decoupled from the overall lessons regarding joint operations, there are a number of lesions that primarily affect air, missile, and air defense forces:

Air Dominance

The ability to paralyze the Iraqi air force and systematic suppression of Iraqi air defenses achieved nearly total air dominance – a level of air superiority the US had never enjoyed in any previous major war. The Coalition seems to have lost no more than two fixed wing aircraft (an A-10 and F-F-15E) and two AH-64 Apache helicopters to enemy combat in the entire war. The Iraqi Air force never flew, and the Iraqi land-based air defenses failed to protect Iraqi forces in the field and eventually could not even defend Baghdad against urban close air support strikes by Coalition forces.

What is uncertain is whether such a level of superiority can be achieved in the future. It may be possible with some developing countries, and even with nations with larger and more modern air forces that lack systems similar to the AWACS, a full range of specialized support and electronic warfare aircraft, and modern ISR and C4I assets. One great question will be the extent to which the deployment of advanced land-based air defense systems like the Russian S-300 and Patriot can offset the advantages of modern airpower.

Effects-Based Bombing: Fundamentally Changing the Effectiveness of Airpower While Limiting Civilian Casualties and Collateral Damage

Improved ISR and targeting capabilities allowed the use of a new approach to targeting called "effects-based" bombing where the selective use of precision airpower allowed strikes to produce effects, rather than simply maximize physical damage.[110]

Knocking out power, communications, and fuel supplies to Iraq military forces, rather than attacking major infrastructure facilities is a case in point. So is selectively bombing Iraqi regular army forces to paralyze or reduce their movement rather than destroy them by attrition. Using the E-8 JSTARS to attack actual military units in movement, rather than blow bridges, is still another.

Advances in precision also allowed the US to fundamentally reshape its targeting and choice of munitions to reduce civilian casualties and collateral damage. Even Iraqi claims (Some 1,252 killed and 5,103 injured as of April 3rd) indicate that the US and UK inflicted negligible civilian casualties and collateral damage in historical terms. (The US cannot really estimate Iraqi military casualties. All it has said is that they were more than 2,320 dead as of April 8th, The are no reliable estimates for the entire war, but one press source put the total at 2,320 military dead, 1,500 civilian dead, and 7,000 prisoners of war.[111]

One irony behind the increased lethality of modern weapons and tactics, is that they can be used to defeat the enemy with far fewer secondary costs. Improvements in laser-guided systems and the use of GPS allowed the use of smaller bombs, and often allowed 500-lb bombs to be used instead of 2,000-lb bombs.

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Improved avionics and precision greatly reduced the need for multiple weapons to be used on a given target and for later restrikes. As one senior Air Force general put it, "Even in the Gulf War, the issue was always how many sorties it took to destroy a given target, In this war the issue is how many targets can be destroyed in a given sortie."

The US made use of new targeting aids like the so-called "bugsplat" program.[112] This allowed it to choose the munitions and angle of attack that could destroy the target to the point necessary to produce the desired effect with the smallest munition and the angle and point of attack that would also produce minimal risk to civilians and collateral damage.[113]

It is interesting to note in this regard, that the USAF gave several briefings before the Iraq War that described these concepts in great detail, as well as the concepts behind the use of air power in the war plan. One briefing in particular, by Col. Gary L. Crowder, the chief, Strategy, Concepts and Doctrine, of the Air Combat Command, provides a remarkable picture of the history of the changes in the US approach to air power, an explanation of the air portion of the Coalition War Plan, and what proved to be a remarkably prescient analysis of the impact of effects-based bombing during the war. The following text may be long, but it provides one of the best possible explanations of the lessons that both drove the use of air power in the Iraq war and the lessons that have emerged from it.[114]

> In the first day of Desert Storm, we struck more targets than were struck in all of 1942 and 1943 by 8th Air Force during the combined bomber offensive. And we were able to do that because we took really a radically different approach in terms of how we wanted to prosecute a military operation. And in looking in retrospect, it doesn't seem to be, you know, that cosmic or that innovative, but it really was a rather remarkable series of events and personalities and people in the right place at the right time that brought that campaign together. But it was more than just people, is was the combination of a fortuitous development of different capabilities and …that enabled us to do that.
>
> This is the capabilities that we had of advanced precision and stealth -- gave the Air Force a little bit of a leg up in trying to move into this area of effects based operations as we struggled to figure out how to do those types or exploit those capabilities to the greatest extent possible.
>
> Over the course of the last decade, you have probably heard these terms, the term EBO or effects-based bombing, more and more often with each of the military services as each of the services has tried to…develop capabilities to more effectively and efficiently prosecute military operations.
>
> The first piece, obviously, was the combination of stealth and precision. And I'll show you what that implication is for the conduct of air operations.
>
> But the second thing is a different way of thinking about how we do -- or what we want to achieve on the battlefield. Instead of a traditional attritional approach in terms of listing a bunch of targets and then go bombing targets, or finding where the enemy is and killing all the enemy, we really determined that what we wanted to do was in fact to achieve some sort of policy objective, and that you could, in fact, craft military operations to better achieve those policy operations in a more efficient and effective manner.
>
> This isn't to say that this is all rocket science or that we magically wave wands and turn computer programs on and understand how to win the war. It ain't like that at all. It is a complex business. War is perhaps -- our military campaigns are perhaps the most difficult endeavor in human -- or, in human activity.
>
> And I have been involved in or planned in the last three air operations in Desert Fox and Desert -- or, in Allied Force in the opening months of Enduring Freedom, and all I can tell you about what happens at air operations is how much I don't know. And it requires a great number of people at each of the component headquarters, at the land component, maritime component and air

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component headquarters, each specialized to pull this off. And what the combination, however, of those new ideas on how to do operations and effects-based operations with precision and stealth, they enabled us to do something that was called parallel warfare. And I'll describe a little bit more in detail what that is in a second.

First of all, it's important to understand the evolution and -- or precision technologies since the Second World War. In the Second World War, the CEP of a B-17 was about 3,300 feet. And so if you wanted to destroy and have a high probability of destruction of a point target of about 6,500 feet, you'd need about 1,500 airplanes and about 9,000 bombs. That's a lot of stuff. And that's what drove those military operations and the destructiveness of the military air campaigns against both Germany and Japan, is precision is relative when you look at it today versus 1945.

By Vietnam, we had gotten significantly more accurate in the fact that these -- a lot of these aircraft now were doing the operations were fighter bombers, and dropping at a little lower altitude, we were able to be more precise. But still, it took a large number of airplanes to achieve the desired effect.

With the development of the laser-guided bombs, and specifically the laser-guided bombs on aircraft such as the F-111 and the F-117 in Allied -- or, in Desert Storm, we were able to hit two independent targets very precisely with about 10-meter CEP or 10-foot CEP from a single aircraft. When we added additional aircraft, such as the B-2, that capability is now to the point where we can hit multiple targets on a single pass.

Circular error probable or CEP is the probability that that weapon will -- that 50 percent of the weapons will land inside that line. So, if what I say basically is -- if I say the CEP of a B-17 in World War II was 3,300 feet, that means there was a high likelihood that 50 percent of the bombs dropped landed with inside 3,300 feet. Today it’s a radius of radius of 10 feet.

And it's important to understand that as we also develop Joint Direct Attack Munitions capability -- these are these GPS-guided weapons -- they also give us the ability for a large number of other aircraft besides just stealth aircraft to hit multiple weapons per targets. Navy F-18s are equipped with JDAM, as well as all the Air Force bombers. The B-1, for example, can carry 24 Joint Direct Attack Munitions in an internal payload that could be used against 24 separate targets.

…it's really important as well that what the capability of a Joint Direct Attack Munition has given to us, together with the integration of Global Positioning Systems on our aircraft is we are now able to achieve that near precision. And again, we have to understand that there is a difference between the precision of laser-guided weapons that are described here and the Joint Direct Attack Munition. The Joint Direct Attack Munition is not quite as accurate, although it is much accurate, we are finding in employment than we anticipated.

…But the addition of these capabilities gives us the ability to do a large number, an extremely large volume of fires or effects early in an operation in a very, very short period of time. And it really has been the evolution of about the last 20 years that has -- from the earliest employment of laser-guided bombs in the Vietnam War, through Allied Force, Desert Storm and Enduring Freedom, that has given us this capability.

…It's also important to understand the role that stealth plays. We have an advantage in this conflict, in that the adversary has basically ceded most of his air -- or about two-thirds of the country's air to us early, and so the extremely vicious fights that we had for air superiority -- and even though we didn't lose a very large number of airplanes in Desert Storm and in Allied Force, those were sustained fights for air superiority. We are starting off in a significantly better position as a consequence of the northern and southern no-fly zones, which will enable operations that might not otherwise have been able to commence.

But nevertheless, this is the size of the initial strike packages that went into Basra in January 1991. And if you look at all of the support aircraft that were required for that strike package, you basically had about 41 aircraft with only eight bombers. I mean, we had aircraft to do sweep and escort over the top to protect the air assets from enemy fighters. We had actually used drones to tickle the air defenses and to enable us to more effectively target the enemy surface-to-air missiles.

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You had a variety of SAM suppression airplanes, F-18s and F-4Gs, and you also had electronic attack planes, the Navy's Prowlers, EA-6Bs. And all of that to get eight bombers to a target. That was the way we had to do operations without stealth aircraft.

…If you look at the difference between the employment of the F- 117s on the first night of the Gulf War, we literally had a significantly greater capability because they required a far fewer amount of support assets. Now, we don't throw 117s up by themselves. They like a lot of other people flying around with them and other stuff to get the volume of the radars down for everybody. But nevertheless, it is an almost independent capability, and its stealth qualities enable us to do a large number of things because we don't require all of the support assets necessary that would be used for this.

It's important to understand as well that the evolution of both the Air Force and the Navy and Marine Corps' combat aircraft will enable us to do even the left package or more conventional strike package with a far small number of support aircraft to bombers, just because we have much more dual-use capability in each of the Air Force's, Navy's and Marines' fighter aircraft as well as our bomber aircraft.

… in Desert Storm, the escort package for non- stealth was about 5-to-1…stealth required …a different approach. And I don't want to go into the specific details, but we used an area approach to support assets…the last thing we want -- that F-117 or B-2 pilots want -- is a bunch of wingmen out there that everybody can see. But it's important to understand that these were numbers, on the support side, from the first day of the war. As that operation proceeded, the support requirements obviously went down as we were able to erode the enemy air defenses. So again, this is not a -- you know, a magic rule of thumb on how much support to conventional and stealth aircraft. But it is to understand that the stealth does give us some capabilities in addition to the precision and enables us to do a lot more stuff very early in a fight.

Now kind of to the meat, though I guess somebody had a lot of ideas here, but the old lightbulb chart. The -- everybody is kind of familiar with how a series or a parallel circuit works. In a series circuit, you really talk about -- I mean, as we put lightbulbs on a Christmas tree, you know, one bulb goes out and the whole thing is gone and you have to figure out which bulb was out. …traditional military operations have taken kind of a serial approach, all the way back to time when it was a fact that you didn't have aircraft, so you had to take a linear approach to the battlefield and to defeat the enemy, you know, in turn.

But even with air assets, in terms of having to roll back enemy air defense, those types of things limited your ability to go after what you really wanted, because the air defense aren't the targets; the targets are the targets, and you have to go after the air defense to enable you to do other things, because once you can gain air dominance, then our surface combat forces have a significant greater -- a significantly greater degree of flexibility in different things that they can do early in a fight.

And so, our ability to go after targets, if we had the ability to go after the entire target set from the -- go after we wanted to instead of the air defenses, then go after the leadership, for example, early, or to go after industrial targets or whatever they may be, then that would actually provide us a significantly greater degree of leverage.

… in Desert Storm the traditional approach might have been to slowly roll that system back and to go after elements of the system one at a time. If we had a better way to do business, we might be able to go after that whole integrated air defense system. And that's, in fact, what we did in Desert Storm, is we were able to go right to the heart of the air defenses, take out the critical command and control early through creative use of Special Operations forces, Army Apache helicopters. And so we were able to take down the air defense system or to attack the air defense system as a system.

Again, this isn't…a simple answer that I plug all the answers into a computer and it says, hey, this is how you do business. You have to kind of work it and look at each element of that system and figure out what its vulnerable points are. And if you had the ability to do stealth and precision to give you a higher volume of fire, then you could go and attack this system as a system. But again,

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air defenses aren't the targets, if you had targets. Targets are the targets, or the effects you want to create.

If you had the ability to not only go after that target system that might be air defenses but also simultaneously go after a target that might be military or political leadership, that might be essential industries or transportation, you could actually now attack the enemy as a system and work towards trying to achieve systemic collapse. I really have to contend here that this is -- and I've said it several times. What we have enabled ourselves to do through development of more complex and a better understanding in intelligence and analysis of adversary systems is we have an improved ability to go after adversary's systems. And I'll talk to you how we might go about doing this.

In a -- I'm going to use an example here of electrical power. And I use electrical power -- please don't take that into any consideration that it's our intention to go take out electrical power in Iraq. It's just electrical power is an easier system. And, in fact, we used this approach in Kosovo, in the operation -- the war in Yugoslavia. Electrical power is an easier system for us all to understand, because we all understand that they're all linked together and they talk to one another, and they are, in fact, an electrical power grid.

So if I had a target set -- target system that might be an electrical power grid -- … I would list all those targets -- if I used a traditional attritional approach, I would list all those targets on my target list. And then I would go through and sequentially destroy each of those electrical power stations or power substations or generating plants, and when I got to the end of my list, I was complete.

But when the Air Force leadership was planning the Gulf War, they realized that it's not my objective to destroy electrical power stations. What is my objective? Well, electrical power is in fact a critical commodity that ties together air defenses, national leadership and a large number of other things, to enable a cohesive defense of a nation. So my real effect was to affect that, the adversary's ability to command and control forces and react, and one way I could affect that was to neutralize electrical power.

But if I neutralized electrical power by going after every station, it would take up all my assets to neutralize that electrical power. But the reality is, electrical power is in many ways a fairly fragile grid. When you look at what happens when we have a snowstorm and a couple of power lines go down and 30(,000) or 40,000 people are without electrical power -- and so there you do not have to attack each element of that system to make the system not work.

An effects-based approach might look at that system and say, "If I looked and analyzed the enemy as a system in this particular case, I might only need to have to take out two of those power plants to enable me to go do that."

In such a way, I would prioritize, then, those targets by the manner in which they would enable me to achieve that effect of neutralizing the adversary's electrical power, and I would only have to… strike two targets.

Well, there's a good advantage of that. The first advantage is, one, you created a far less amount of destruction on the ground that you have to go and rebuild. Another advantage of that is that I now only have to attack two targets instead of 12. And so those assets that I was using to attack the other 10 I can now use to attack another system. And so this opportunity shows us ways in -- to more effectively tie the specific effects for which we employ force or information on the battle space to military and political objectives.

But what if there's a problem? What if there's a problem and one of the targets is a no-strike target, because there is no way you can go after that power plant and not create unacceptable civilian casualties? Well, this opportunity -- these analytical tools enable us…to find alternative methodologies. Maybe if you have to attack two additional targets, you can still neutralize the grid. The disadvantage, obviously, is you have more targets to strike, but the huge advantage is, you have achieved the same effect without creating significant collateral damage or civilian casualties.

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Maybe there's an even easier solution. Maybe you go after power lines instead of power plants. An example is, in Allied Force, there were some -- when we attacked the Yugoslavian electrical power system, there were some targets we simply could not take down to achieve the desired effect. As a consequence, the only way we could do that was to go after some of the power poles, or these 250-foot power towers. Difficult targets, and they're very difficult targets because they're designed to not have -- weapons are designed with principally a blast effect, with mainly a blast effect. Well, power towers are designed not to be blown down, because that's their principal design characteristic. Nevertheless, we were able to neutralize those towers without civilian -- or collateral damage, and neutralize the power system.

So there's a lot of different ways to do this. And oh, by the way, you don't even necessarily have to bomb anything. If you can pay somebody to turn the power grid off, that would be almost as effective…for example, in Desert Storm we frequently found instances where -- after the fact, where electrical power plant operators knew they were going to leave their power plant off because if they turned it on, we'd bomb it. I had an instance -- I flew in the Gulf War out of Turkey. I had an instance on the third night of the war where I flew a low-altitude mission into Turkey -- or into Iraq from the north, and I saw the lights go out in a town all at once. The lights were there, and when approached the town, the lights went off. And so maybe just flying airplanes convinces these guys to turn the power off.

But the point here is, is that we don't have to attack everything, nor do you have to destroy everything. If we understood what the effect we desired on the battlefield, we could then figure out ways of creating that effect more efficiently, more effectively, striking less targets, using less weapons and, quite frankly, mitigating or easing potential concerns for collateral damage and civilian casualties.

That brings us back to how we got to enable us to do parallel warfare. By examining each one of those systems and understanding what the different target systems enabled us to do and what the specific political effect that we -- and military objective we desired, we were able to attack a far greater amount of those target systems, creating a greater effect on each individual system, and that, in turn, started to collapse the system from the inside.

Again, I really need to caution that we are not talking about, hey, turning a computer on and finding out the answer to war. But it does provide us methodologies to more efficiently and effectively carry out military operations to achieve fairly clearly defined political and military objectives in ways that mitigates the potential negative side of casualties and collateral damage.

And that actually drives us to one of the principal issues here. The military forces in the Persian Gulf are doing some of the most, quite frankly, sophisticated planning that any military anywhere has ever done. Each of the component commanders and the Central Command planning staff under General Franks, are actually driving us to how in fact we do effects based operations across the military services. A good example of the effects based operations you see going on every day are the leaflet operations. In the '40s or '50s you might have said, Hey, if I -- to defeat the enemy I have to defeat the enemy's army. No, I have to neutralize the enemy's army. And if the enemy's army decides to surrender because I used leaflets and convinced them that there was a better alternative than trying to fight me, then that's somebody I don't have to neutralize. And so there's an advantage here, and what we are trying to do with not only air operations but air and ground operations is really focus on what the desired political and military effect are, and then shape those desired effects on the battlespace.

But it only really truly works if you understand how each event that you do, everything that you do, how that ties back to the specific military and policy objectives that have been established for the commanders. And we do this fairly robustly in the Air Force. And I don't mean to belittle either of the other -- any of the other services, but Desert Storm caused us to try to think about this. And so we literally come up with a high heaven objective -- what are my tasks that I have to come -- build to achieve that objective, what are the effects that I need to create on the battlespace, and then what are the things that I need to do, what targets I need to hit, things I need to jam, information I need to corrupt on the battlespace to achieve those desired effects. So in many ways every single thing I do has to be shown to tie back to a political objective or I'm going to take it off

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the list of things to do, because we have too many things that we have to do to do things that are either not appropriate or not in line with the political or military guidance.

But the system that we develop in terms of developing both desired effects, examining capabilities and desired concepts of operation to achieve those effects doesn't work in isolation. The thing about war is it's against two humans. It's a human against a human, and the adversary is thinking, and he's trying to do something against you. And so, every concept of operations or idea, or capability that you have, you must then vet that against what the adversary is going to do, or what you anticipate the adversary is going to do. In doing that, you can evaluate the enemy as target systems, or as systems of systems. And that will help you understand how those different things interrelate and where the vulnerabilities between, perhaps, an integrated air defense system and communications systems might lie to enable you to more effectively prosecute those operations.

From an air perspective, this is how this is wrapped up and brought together on an air tasking order. We look at the CONOPS, we look at the desired effects we want to create on the battlespace, we look at the available assets. And quite frankly, we have one ATO in this war. And everybody's on the ATO, everybody's integrated and working off that single air tasking order so there's common command and control architecture for all the air players that are involved. And so, it's a critical element in -- we think we learned that lesson a little bit the hard way in Operation Allied Force. But then we evaluate the target sets that we need to do, that -- those effects that we need to create on the battlespace, we bring those together into a integrated plan, and the integrated air and ground and maritime plans are, in fact, that. They clearly have separate elements, but these plans have been more integrated than we have ever seen them in the U.S. military history. The -- one could say that we fought side by side as services in Desert Storm, which that would be a fairly close description. But we didn't fight in an integrated manner.

The Air Force has sent a major general to work at the combined force land component commander's headquarters to enable a significantly greater degree of interaction between air and surface operations to better integrate these plans. But we build those things together and then you come up with something that looks like an air tasking order or a piece of paper, and you send it out to the troops and they execute. It's not quite that easy, but it's -- it is, quite, frankly, I think a significant achievement on all the men and women who are out in the Persian Gulf at this point in terms of bringing all those different effects from each of the capabilities of each of the services together to achieve the best result possible.

There clearly are going to be opportunities to better do this in the future. We have emerging operational concepts. Joint Forces Command has been tasked to develop and further evaluate these. We have emerging capabilities, both in terms of munitions, in terms of aircraft, in terms of information capabilities, that we simply have scratched the surface on. But what in the end we hope to do with concepts such as effects based operations are to fight more effectively, efficiently and to make conflicts shorter because we can attack the adversary more completely as a system in a shorter period of time as opposed to a sequential series of attritional-type operations.

(As for the concept of "shock and awe," … it actually gets right back to some of the discussion on effects operations -- effects based operations. You don't win a war by not intimidating an adversary. The -- I think General Franks -- I don't want to put words in his mouth, but I think the effects that we are trying to create is to make it so apparent and so overwhelming at the very outset of potential military operations that the adversary quickly realizes that there is no real alternative here other than to fight and die or to give up. And so, they really are trying to kind of ensure that everybody in Iraq understands what's coming. Because if they understand what's coming in a macrosense, I think that there will be a greater likelihood that they might choose not to fight for the regime.

… what will happen is the great unknown. And the -- we could speculate all we want, and there's a million answers and everybody's probably got an opinion on that. But quite frankly, we really have little clear understanding of exactly what will happen when we step across that line. I think there's going to be a wide variety of different reactions by the Iraqi people and the Iraqi military forces.

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…One of the issues I think that routinely comes up is for folks who are not involved in military operations and have not been involved in the extensive planning is to understand the difficult and really comprehensive process we use to mitigate collateral damage…

First, there is -- we all have to understand that there is -- the term "collateral damage" is often misused. From a military sense, collateral damage means or by definition is that damage that can be expected from the reasonable occurrence from attacking a system or attacking a target. For example, if I looked at a target and I examined -- I was going to put a 2,000-pound bomb on it, and windows broke across the street, I can plan for that. And that is collateral damage. It is the anticipated effects created by the employment of force.

In collateral damage calculations, we try to make an assessment of human casualties. And you saw, perhaps, a lot of that take place in Allied Force, where targets were struck and timed specifically to minimize the potential for civilian casualties…It includes both structural damage and civilian casualties.

Now that is different from unintended damage, and it is different both philosophically and from a practical manner. Unintended damage is when something goes wrong. Either a fin breaks on a weapon and the weapon goes off course -- and everything we drop is a mechanical device, and as like as we would that these things be perfect, they are in fact not. Mechanical devices that we employ fail. And so we will have some degree of that.

We will also have some degree of intelligence failure. We don't have perfect information. The Al Firdos bunker example or the Chinese Embassy are examples, perhaps, of intelligence failure. But it is what happens when something goes wrong. And it's really important to understand these two distinctions. And it's important because we can do a great deal to plan for and mitigate collateral damage. We can do a great deal to mitigate the potential for unintended damage, but there is very little we can do to plan for or substantially eliminate unintended damage because it is, by definition, something went wrong.

And so when we understand that difference, when you see something that might occur on a battle space, it's important to understand that that doesn't necessarily mean we're throwing something -- the cart out with the bath water, or baby out with the bath water. We still went through a methodical process. But when it comes to pass that we are forced to or we engage in military operations, both of these types of damage will take place.

Let me talk a little bit about how we do this. Everything -- first of all, there's not a target that we would strike that is not specifically struck to achieve a desired effect. And so we look at that target and we say, what do we want to do to that target? I want to neutralize or I want to destroy this bunker. And then I examine what munitions I might use to destroy that bunker. Ideally, if you could turn the lights off and make everybody go to sleep, that would be really nice. …Unfortunately, some of our capabilities are not quite that advanced, and in many cases, we have to resort to physical destruction.

When we do that, we do an analysis not only of the target, the size and the capabilities of the munition designed to create the right effect, but we also do an analysis of the surrounding area to understand what the use of that munition on that target might do to structures outside the facility or to create either collateral or -- I mean, civilian casualties or collateral damage.

…If, however, in the course of dropping that bomb, a laser-guided bomb, for example, a fin breaks off the laser-guided bomb and the thing goes spiraling 3,000 feet away from the target, there was really no practical way for me to plan for that. That is not collateral damage; that is unintended damage, and if there are civilians killed, they are unintended civilian casualties. I don't mean to kind of draw a fine legal line between the two, but it's important to understand that as we plan these things, there are a great deal of things we can do to mitigate collateral damage and in fact have potential to mitigate some unintended damage, but these things, again, are mechanical devices and some will fail. And so if somebody has a hope that we're going to go into a conflict and nothing is going to happen in terms of collateral damage, unintended damage or civilian casualties, I think you should absolve yourself of that hope because that probably is not a realistic expectation.

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… we like to use the term "fast CD," but the -- we do have an improved capability. It is designed principally for kinetic weapons; that is true.

…: We have developed planning tools that are at our air operation centers to enable us to more effectively project the potential explosion of an armament as it hits a particular structure.

…An example: When we were doing operations in Afghanistan, I think that we all need to hire the Afghan workers to build our walls, because we would blow some -- a house up inside a wall, and it seemed like -- that that wall protected all the structures around it. But the reality was -- is when we drew our circle to examine potential collateral damage, we didn't take into consideration that there was another building there, or there was a wall, or that I was hitting one side of the building and the size of the -- and the direction of the explosion that takes place on the ground is in fact not a circle. It's more like a butterfly effect.

…And so by using that tool, you can better understand the environment and the immediate neighborhood of where you're dropping that munition, and then you can do an examination of various things that might include changing the size of the weapon; changing when the weapon fuses, to perhaps fuse the weapon underground, to mitigate that explosion even more; or even changing the direction of your attack axis, because if you attack from one way, you might completely mitigate all effects, if things work properly, but if you attack from another, there might be no way.

…So it is one of a series of planning tools that we have incorporated into our air operations centers and out on the carriers as well, to examine different alternatives on -- to better employ the right weapon and the right target in the right way.

… effects-based operation and collateral damage are fairly well -- closely tied together, because the best way to mitigate collateral damage is only strike the stuff that you need to strike to -- or affect the stuff that you need to affect.

,,,Nevertheless, as we go through, in the simplistic sense, in the macro world, there -- you know, from a targeteer -- Air Force targeteer viewpoint, there are probably 50,000 targets in Iraq, maybe more. But you know, that's only in a development effort. In other words, as we examine a country -- and we know Iraq pretty well -- we look at every bridge, every power station, every military infrastructure, every air defense site, and we catalogue and develop a requirement of what that potential target might look like and what I might have to do to neutralize that target.

,,,Nevertheless, what happens is, as we go through that planning process of defining clearly established political objectives, military objectives, determining the desired effects I want to create and then examine the target sets that I need to attack, I come up out of that 50,000 with some list of targets that I need to examine. Every one of those targets is examined for collateral damage. We first look to ensure that the target is directly tied to an objective. We then ensure that we do -- we know enough about the target so that we can create the desired effect. You don't always know enough about the target, but to the degree that we can, we will try to understand what we need to do to that target to effect it. We choose the right weapon to create the desired effect. We then do a clear examination not only of the collateral damage potential, but also of law of armed conflict potential, and those types of issues, the legal implications of striking that target. And then we do everything we can do in the planning factor in adjusting the weaponeering and providing the tasking to air crews to enable us to most effectively achieve the desired effect with the minimum damage -- minimal potential collateral damage for civilian casualties.

…But the reality is, is that these are very, very tough decisions that the senior military leadership has to make. There is no magic number that says five is acceptable, six is not. There is no magic way to determine when I do something whether the potential of civilian casualties is five or 10 or 20. We do have some ballpark assessments based on the population of an area, of who might be living in that area, whether it's a residential or commercial area, and the time of day you might strike that. But there is simply no way that I can say there is an easy answer.

…But in each case where civilian -- the potential for civilian casualty exists, potential for collateral damage, those targets are all reviewed by the senior commanders.

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… in most instances -- I won't say the majority -- but a large percentage of instances, most of the targets that we are striking are -- actually have very low potential for collateral damage because they're military targets that are generally military installations of that sort.

Nevertheless, there are going to be targets in which a closer evaluation needs to be made and some sort of determination by the commanders in the field of what is an acceptable number, or what we anticipate an acceptable range might be. And there's no one answer. Each target, you look at what the -- for example, if you had a nuclear or a biological weapon sitting on top of a Scud missile that was surrounded by civilians, and that thing had the potential to go off and hit Kuwait or Israel, then I would probably be willing to accept a greater degree of civilian casualties because of the consequences of not acting on that target. If, on the other hand, it was a Scud missile without a warhead parked in a barn, then I probably wouldn't be willing to take as much risk to go after that target. But in each instance, the commanders will look at what the specific effects are, what they intend to achieve and whether or not that desired effect and military worth is worth that trade-off in terms of potential civilian casualties.

…We are finding that our -- both our effects and accuracy with Joint Direct Attack Munition was significantly higher than we anticipated in Enduring Freedom in Afghanistan. However, for both laser-guided weapons -- especially laser-guided weapons and Joint Direct Attack Munitions, we have to understand that a large percentage -- perhaps the highest in modern history -- a large percentage of the missions flown were doing something like time-sensitive targeting, and they took off without the target, and somebody gave them that target airborne. As a consequence, that is a little bit higher risk, because there's a lot of other things that can go wrong if I don't know what the picture of the target looks like. Nevertheless, solid preplanning improves our ability to do this.

…I can't give you a specific number on a specific weapon. But Joint Direct Attack Munition -- the beauty of that weapon is that once it's gone from the airplane, it's going to where it's going -- actually, the highest percentage of the time it's going to where it's going and I don't have to worry about a pilot trying to keep a laser spot on a target or worrying and maneuvering to do that.

… We have to understand that doing CAS out of a B-52 was not anything any of our tactical air control parties or B-52 crews practiced before Afghanistan. Additionally, we -- many of them got that equipment for the first time when they were out in the field. But we have -- the Air Combat Command has spent literally millions of dollars over the last year to get the best possible equipment to our combat controllers in the field so that they have the opportunity not only to have the best equipment but to train with that equipment well prior. So, we have worked on solutions to those challenges, yes.

… it's important to understand that the collateral damage assessment doesn't stop at an air operations center. Each of our -- each of the -- what we call them is JTACs, Joint Terminal Air Controllers, which are personnel from the Air Force, Army, Navy and Marines who are fully qualified as terminal controllers. In the Air Force we call them ETACs. Generally they're enlisted personnel in the United States Air Force.

As well as our airborne forward air controllers and our ground forward air controllers, each of these men and women have been trained to specifically make collateral damage assessments as they are airborne to try to ensure that they can mitigate that. Is that as good as using cosmic analytical tools back at the air operations center? No, it's not. But, it -- literally, every pilot, when they drop a bomb, or every combat controller who -- or terminal air controller who's calling a bomb in is trying to make all the right -- make those decisions based upon the availability of the weapon, using the right weapon on the right target. I mean, working in Enduring Freedom, at the operations center it was absolutely amazing to me that after about a month we could have a conversation with the terminal air controller on the ground, an Air Force staff sergeant who might be 25 years old, and we tell him exactly the different types of airplanes that are available to him, and he will then say, all right, I'm using these weapons off this airplane against these targets, the F-18s with their laser-guided bombs are going to be more accurate so I want to use those weapons on these targets. So all of our personnel, most of our air crews and most of our terminal air controllers are trained specifically to make those assessments. Is the airborne assessment as good

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as a complete analytical assessment in an AOC? No. But I think that these people are about as well trained as we can get them. They are some very, very talented individuals.

… it's a simple fact, as we discussed: we simply do not know exactly what's going to happen if we go to war with Iraq. We simply don't know. The war might be a few days; it might be longer; it might be months. We just have no -- I mean, that's the uncertainty of combat. And as a consequence, if I were to say, well, it's going to be X, well, X would be premised upon a scenario that would anticipate the war was X amount of days long and this is how the Iraqis fight -- are going to fight, and we don't know that. And so, I understand why people have been reluctant to say, hey, this is the amount that might -- of civilian casualties and deaths that might occur. But there is simply no way to accurately calculate that number.

… in order to do adequate military preparation, as we examine a country in which we might engage in conflict, we go through a lot of different things and look at a lot of different potential things that we might have to neutralize in the course of a military operation.

… in the Gulf War. In the Gulf War we had effectively 98 precision-guided munitions, we had 36 F-117s, we had 62 F-111Fs, and then we had a number of E/A-6s on the carriers. Today -- and oh, by the way, most of those aircraft, other than 117s, most of the 111s would go after a single target or maybe two targets.

…Today, virtually every aircraft of the -- I think the number is around 600-odd aircraft -- every combat aircraft in theater has the capability of precisely striking multiple targets, and most of them can do it simultaneously. I mean, F-18s can carry a number -- two to three JDAM, depending upon their anticipated targets. As I said, B- 52s can carry 12 JDAM, plus an internal configuration that might be conventional munitions or cluster munitions. B-2s -- most of the airplanes are out there. So if I have about half the number of airplanes, but each of the airplanes is capable of striking multiple targets on a single day -- on a single mission, and in many cases much more than just two or three, then the numbers of desired impact points -- because each target we have to understand is actually a set of desired -- a set of items. For example, a SAM radar site might be the radar itself, as well as each of the missiles, as well as perhaps a command and control facility. And so when I say an order of magnitude higher, I think we would literally see an order of …we struck approximately 125 -- well, on the first day of the Gulf War, if you looked at it, we probably included somewhere on the number of 400 to 600 precision-guided weapons -- or 300 to 400 precision-guided weapons. I think that number was going to be significantly higher.

…I just want to touch.. on some of these…myths about collateral damage. I mean, first of all, it cannot be avoided. When you employ military force, collateral damage is going to incur, unintended damage is going to incur, and unfortunately, and as tragic as it might be, civilians who have no business in the operation and who are not targets will be killed in the operation.

…We also must assume that we -- we can't assume that intelligence is perfect. We clearly understand that it's not, and there will be some degrees or lack of complete information on targets that is going to cause us to do things that we would have done differently, had we known more information.

…Weapons don't always work. I'd like to give you a perfect answer on a mathematical percentage, but that simply isn't possible. …we do have some historical data on weapons effectiveness and accuracy and reliability, but I think that we just have to understand that these are mechanical devices. Mechanical devices will fail on occasion. We have improved the reliability. We have improved the efficiency, with Joint Direct Attack Munitions. We have improved the ease of delivery, to make it far easier for air crews to get that weapon to the right place and then release it, to get it to the target by itself. But still, weapons will in fact malfunction to some degree.

…Not all damage and not all collateral damage is caused by friendly fire. And clearly, our adversaries in the past, Milosevic, Hussein as well, have taken advantage of collateral damage or damage that has been a consequence of adversary fire, And you simply have to ask a question; all those bullets going up into the sky, they come down someplace. And the missiles go up that miss targets; they come down some place and they cause damage as well. So we just have to be

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cautious about assuming that if something happened, it necessarily was a consequence of direct coalition activity.

…There is a great myth about high altitude and accuracy. The argument that I have to be low-altitude to hit a target is false. It is patently false. Joint Direct Attack Munition actually is far more accurate at high altitude than it is at low altitude, because it has more time to get to the target. Laser-guided munitions, depending upon the weather; if I have cloud decks, then laser-guided munitions can create some problems. But altitude, when you see air crews up at 15,000 or 20,000 feet, in most instances, or even higher, that is not affecting in the vast majority of cases their ability to create the desired effect on a desired target.

…And the other thing I think we need to be cautious about: we're going into an operation, a surface combat operation if we potentially go into Iraq, which we have not seen in a very long time in this country. We have seen and we have developed fairly established and critical procedures to mitigate collateral damage using air operations. And quite frankly, as much as airmen have chafed -- airmen of all the services have chafed under those rules and restrictions, we have learned a very great deal in how to do our jobs better. We have not had as much experience in these issues on the ground.

…And quite frankly, the soldier's and Marine's challenge is a different one. If I'm in an airplane and somebody shoots an M-16 at me or an AK-47, I can fly away. If I'm on the ground, in a house, and somebody shoots an AK-47 at me from across the street, that's a different story. And so our soldiers and Marines will have a much more difficult challenge ahead of them. But I'm confident that the commanders are doing the right thing, they have helped and prepped their folks to do the right thing. But we have to understand that our experiences we have seen in collateral damage in air operations over the last decade is not the same experience we have in mitigating collateral damage in surface combat operations. So our forces are about as well trained as we can get them, but they do have some challenges just because of the nature of ground combat.

…We …have provided our air crews -- or our personnel who are doing the planning for these military operations a set of tools that have simply not existed before. Some are collateral damage mitigation tools, some are the ability to sit at a single computer.

I had the ability even in Enduring Freedom to sit at a computer and go from a one to a million scale map using a track ball, go all the way down to a one to 250,000 scale map and then five-meter imagery and one-meter imagery, all with a track ball on a computer. And that capability gave a lieutenant that was working for me in collateral damage -- he could come up with a collateral damage assessment in some cases in minutes by just -- by attack P reporting a target at an area just with a set of coordinates.

So, some of these tools -- if you add to that our fly-out capabilities that we have and things like Power Scene, that I think Fox News just showed on TV the other day, which gives the ability for air crews as well as ground forces to go through a mission and rehearse a mission to see what they expect to see.

…We have improved munitions. As I mentioned, the Joint Direct Attack Munition, many folks said a few years ago it wouldn't work. And we are finding that it is working and it is working better than we ever anticipated. But that is a significant capability in enabling more efficient and effective operations, because now, most of my platforms can go after multiple targets in a single pass.

Sensor Fused Weapon will probably be employed for the first time in this operation. Sensor Fused Weapon is an anti-armor personnel which has a triple-redundant dudding mechanism if, in fact, it fails to find a target that it wants to employ. It's a great capability and actually is a far more accurate munition that can get -- destroy enemy vehicles, enemy armored forces, even if they're widely dispersed.…I believe F-16s and A-10s both carry them, but F- 15E -- the good news about that weapon is that it's a -- the only thing that we changed was the insides. And so it can -- basically, anybody who could carry a -- or, what we call a tactical munitions dispenser or those cluster munition canisters can be carried -- can carry that weapon.

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…the way the system works is that it will operate at a -- well, we actually have Sensor Fused Weapon with a Wind Corrected Munitions Dispenser, which is the fourth one. Wind Corrected Munitions Dispenser are INS-guided cluster munitions to enable us -- cluster munitions were notoriously unaccurate (sic) from 30,000 or 40,000 feet. But these weapons actually get the weapon to the exact point in space that we want it to open up. When that happens with Sensor Fused Weapon, there are 10 internal canisters inside that weapon, each with four munitions. Those canisters deploy, and they have a parachute that slows the rate of descent of the canister and then those four independent munitions pivot out. And those munitions can then independently seek adversary armored vehicles. But if the weapon fails to detonate in the air and it lands on the ground, after a fairly short period of time, each of the submunitions will disarm itself. And at that point, about the only way to make it go off is a blasting cap.

…But those are the types of capabilities that we're fielding. The Navy's improved both their inventories and the capabilities of the Tomahawk since Desert Storm dramatically. And so all of these I think are a fairly good news story.

…I talked about air crew training, things like Power Scene. Again, air crews from all of the services have had to live with and understand the issue of collateral damage over the last decade. And it's improved in our training programs, it's improved in our documentation, in how we train those air crews from the ground up as well as, as I mentioned, all of the Joint Terminal Air -- TAC Controllers and all the services who do controlling from surface combat operations.

…We have improved weapons assessment and tracking. We now have the ability basically to track every weapon as it's released, or reported back to the air operations center so we can build a detailed map of expenditures post-conflict, which is a really good thing to do if I -- because, in fact, we used this capability in Allied Force. The Germans were going into a destroyed Serbian military camp to set up as their point of operations when they moved the peacekeepers into Kosovo, and we were able to give the Germans a detailed map of expected munitions that we expended and the potential duds that might be in that area. Very helpful if one talks about post-conflict and post-conflict clean-up.

…we've done some tremendous effort in this area. It's not perfect. It's not going to make wars bloodless. But I think that the capabilities that the Air Force has fielded, that the other services have fielded, what we've done in training has also dramatically improved.

… When you start trying to target individuals, the world gets really complicated really fast. And quite frankly, your ability to do something like that is -- especially with an adversary who has specifically made it hard for his own people to target him, it becomes very difficult. But I think -- my point would be, is that because we now have the ability to go after these target systems as a whole, I can now go after what I want to attack as opposed to going after all the air defenses. I mean, I was only attacking the air defenses as a mean to an end. With the ability to rapidly neutralize and collapse air defenses as well as enemy command and control infrastructures, I can now say what is the target and go after those immediately or as soon as I possibly can.

… every bomber we have in the inventory can kill multiple -- in many cases, it least 12-plus targets, 12 to 24 targets, every bomber in the inventory. Every -- or the majority of the Navy's F-18s have the ability of using joint direct attack munitions to kill two, three or four targets in a single mission. Our F-15s and -16s likewise have a similar capability.

So -- and everybody out there, if you're not dropping PGMs, you're probably not close to the fight. I mean, there are a few airplanes that are a little bit less capable, but the vast majority of the Air Force and Navy's inventories are PGM-capable weapons either through laser-guided munitions or joint direct-attack munition. And so, we have to remember, in the Gulf War, only 9 percent of the munitions dropped were precision-guided. As well, only 2 percent of the sorties -- the 117s flew only 2 percent of the sorties, yet they struck 53 percent of the targets in the target deck.

And so if we examine that capability, this -- if that capability that was resident or perhaps airplanes that were only 2 percent of the sorties, 36 airplanes, and with the hundreds we have now, my capability is dramatically -- and I cannot underscore that -- it is dramatically improved over the (percent ?) I had in the Gulf War.

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> … the weapons are tracked in this system -- since we don't have right now -- I would like to have a networked weapon that told me where it hit. That would be really a perfect world. And then it gets right back over the datalink architecture into the air operations center, and then two seconds after it hit, I knew what happened. We're still a few years away from that. But I think that they could probably make that assessment fairly quickly.
>
> Most of those assessments initially are going to be done through air crew reporting upon when they come back from MISREP, and then we have to calculate those numbers and try to make those complete assessments.
>
> But again, I think that even over the end of Allied Force, and even over Enduring Freedom, the capabilities and tools we've given to the men and women in the air ops centers, as well as the connectivity and interconnectivity we have between the land and maritime and air components -- commands, has given us a lot greater degree of flexibility where somebody in General MacEwen's (sp) headquarters -- "I need some information" -- and -- (snaps fingers) -- we can get it to them quickly.
>
> … ACC is the air component -- or we provide forces through 9th Air Force to Central Command. And we work -- since the majority of our 9th Air Force under General Moseley, is the air component to Central Command. We are there, what we call an Air Force forward -- or the commander of the Air Forces -- General Moseley commands all U.S. Air Force personnel in the region. And we provide complete support to him and his planning and Central Command planning efforts.
>
> So that there's a lot of stuff that takes place at Tampa, but there's also a lot of specific challenges that General Moseley asks for some help on, and then we at Air Combat Command have put together some really, really talented people into some dark rooms and wouldn't let them out until they came up with some solutions. So we are at this point supporting General Moseley and supporting General Franks in anything that they need.
>
> …The first question, the strike package I showed you earlier that went into Basra that had the 41 aircraft, that went to Basra. I mean, they were SA-6s and SA-2s and SA-3s and Crotales and Rolands. And not much of that stuff is alive at Basra anymore. We have -- I mean, having lived over the no-fly zones for the last 12 years, it is a significantly less hostile place than it was in northern and southern Iraq on the opening night of the Gulf War. And that simple fact will make the jobs of our men and women, the air crews that are out there doing this, a whole lot easier. And, and it's important to note, that control of the skies that we will have almost from the outset over the southern and northern regions of the country enable our surface combat forces to exploit more quickly, more effectively, more rapidly.

True All-Weather Precision Air Strike Capability

While no battle damage data are publicly available, it is clear from the previous history of the war that the evolution of precision air strike technology greatly improved Coalition capabilities. Even in the Gulf War, only a small number of aircraft like the F-117, F-111, and F-15E were properly equipped for advanced precision strike missions. In the Iraq War, virtually all US aircraft had the avionics necessary to make use of a wide variety of precision weapons by acquiring targets, illuminating them when necessary, using GPS guidance, and acquiring targeting coordinates from the ground.

Their onboard sensors and computer systems was much more capable in both executing preplanned strikes and in acquiring and killing targets dynamics. The integration of intelligence assets into target planning and the speed of execution made precision strikes more effective. All weather coverage was better, and while the term “all weather” will probably always seem at least somewhat ironic in air combat, field reports so far indicate that it was a far more realistic description in the Iraq War than in previous conflicts.

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A combination of UAVs and better sensor aircraft, systems like the E-8, and improved infrared and radar sensors was combined with better command and control to allow the effective use of both better delivery platforms and better precision weapons. For example, experimental use was made of the E-8 JSTARS to target Iraqi armor even under sandstorm conditions. While dust and sand did present problems in some cases, the widespread dissemination of laser illuminators to ground forces and SOF units allowed them to call in precision close air support, as did giving them GPS targeting capability and allowing

As has been discussed in Chapter IV, The Coalition dropped a ratio of 19,948 precision-guided weapons, plus nearly 9,251 unguided weapons, to none.[115] US forces used 19,269 fired guided weapons. Precise comparisons with the Gulf War and Afghan war are far more difficult than it may seem because the counts vary sharply according to source even within the individual military services, and because guided weapons differ sharply by type. For example, some counts put the total number of guided weapons the Coalition fired in the Gulf War at 10,468, others are in the 9,000 range, and the USAF Gulf War Airpower Survey provides detailed annexes that only list 8,644.[116]

If these data are used, the US dropped 5.8% precision weapons in the Gulf War versus 68% in the Iraq War, but most estimates indicate 8-9% of the munitions in the Gulf War were precision guided versus 70% for the Iraq War. [117] Again, sources vary. But the USAF Gulf War Airpower Survey states 4,086 laser-guided bombs were used in the Gulf War. This compares with 8,618 in the Iraq War plus 6,542 of the new JDAM GPS guided weapon. However, the US used 3,065 Hellfires in the Gulf War versus only 562 Hellfires in the Iraq War, and used 5,296 Mavericks in the Gulf War versus 918 in the Iraq War.

What is really important, however, is that the Coalition was able to combine precision with major advances in avionics, ISR, and command and control capability, and conduct an "effect-based" campaign directed primarily at the Iraqi leadership, its command and control assets, and those elements of its forces. fighters and helicopters to perform on-call missions.

In-flight and Rapid Targeting and Retargeting: Time Sensitive Strikes

While the technical details are unclear, the US seems to have flown some 156 time sensitive missions against leadership, missile, and WMD targets that involved rapid retargeting in periods from minutes to two hours. According to USCENTAF, these strikes were allocated as follows:[118]

Location	Terrorist	Leadership	WMD	Total
South	2	40	66	108
West	0	2	19	21
North	2	8	17	27
Total	4	50	103	156

A special Time Sensitive Target cell in the Combined Air Operations Center (CAOC) in Saudi Arabia used intelligence data to "find, fix, track, target, engage, and assess" such strikes; direct attacks with laser or GPS-guided weapons, analyze battle damage, and integrate time sensitive operations with other air operations.

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It helped plan the rapid strikes on Saddam Hussein and the Iraqi leadership on March 19/20th and April 7th. [119]The strike on March 19/20th took about three hours from the intelligence report to an execution that involved two F-117 fighters firing 2,000-pound bombs, and four ships launching 40 Tomahawk missiles. This included approval from Washington of what one commander called a "pop up" target.[120] The target cell also made the first use of the EGBU-27 one-ton penetrating bomb, which uses a mix of GPS and inertial guidance,

It is interesting that the aim point for the underground shelter that use attack was not a visible structure and had intelligence had to rapidly estimate a point some 100-200 feet from the nearest structure. As a result, all four bombs dropped were spread out in an effort to hit and destroy the underground structure in something approaching a square with points at 50-foot intervals. The attack had been considered for several days, but only in an "on again, off again" kind of contingency planning. When the order came, detailed strike planning was authorized at 1:30 AM and executed by 5:30 PM. A planning effort that would have taken some 4 hours in the Gulf War took 30 minutes in the Iraq War. Total mission preparation took two hours and execution two more.[121]

The Time Sensitive Target cell also directed a strike by F-16s using 500-pound laser guided bombs on the home of General Ali Hassan al-Majid ("Chemical Ali") on April 4th. It took about 45 minutes from intelligence to strike for a B-1B raid that dropped four 2,000 GPS guided bombs on a building on April 7th, and 30 minutes to call in a B-1B to drop JDAMs on April 10th in an attempt to kill Hussein's half brother, Barzan Ibrahim Hasan al-Tikriti.

This rapid retargeting capability changed the ability to hit such targets and to respond to active intelligence rather than bomb predetermined or fixed targets by the numbers. For the first time, it deprived leaders of a sanctuary in terms of the slow response cycle between acquiring intelligence indicators and actual ability to strike.

One key example was the ability to call in a B-1 to launch a strike with four GPS-guided 2,000 pound bombs against a location where intelligence indicated that Saddam Hussein and his sons might be meeting on April 7th, during the battle of Baghdad. There were, however, numerous other missions, including the growing use of Special Forces to confirm and illuminate targets that could be struck with precision weapons, or to identify high priority targets which led to the retargeting of aircraft as they approached the battlefield.

The Coalition also launched some 686 additional strikes at "dynamic targets." These included high mobile and otherwise important targets using "reroled" airborne aircraft. There were 243 such strikes in the south, 271 in the West, and 172 in the north.[122]

These are procedures that can be improved significantly in the future with better communications, procedures, software, and equipment. The Marine Corps, for example, has developed procedures to allow forces on the ground to see the spot aircraft are targeting with the LITENING, and verify the image of a target captured by an aircraft's avionics. Such advances may well change retargeting to add a new degree of both precision and insures against friendly fire. The ability to retarget cruise missiles in flight will add another dimension to such capabilities.

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Stealth

Both the B-2 and F-117 played an important role in the Gulf War, although the value of stealth per se remains uncertain. For example, the 12 F-117 stealth strike fighters based at Al Udeid Air Base in Qatar flew 80 out of the roughly 17,000-18,000 sorties classified as strike missions. While the numbers were limited, all of these missions were against heavily defended targets in the greater Baghdad area and struck at key targets like the air defenses, key headquarters, and radio relay stations.[123]

They were able to use GPS-guided weapons for the first time, which unlike the laser-guided weapons used in the first Gulf War could not be obscured by clouds or smoke.[124] Improvements in the ATO also allowed them to be targeted at the last moment, greatly cutting down on the "kill cycle" in the Gulf War, but also freeing the pilot to concentrate on the mission. This rapid decision cycle also allowed the F-117 strikes to be coordinated with the cruise missile strikes launched against Saddam Hussein and the Iraqi leadership on the first night of the war – as well as rapid arming with EGBU-27d that had only arrived in theater the day before, and planning support sorties from F-16CJ anti-radar fighters, EA-6B electronic warfare aircraft, and KC-135 tankers. [125]

About one-third of the F-117 missions came in the first three days, when Iraqi air defense were sill most effective. One interesting aspect of their missions is that a shortage of refueling tankers force two-thirds of the missions flown during the first major night of strikes. This is another demonstration of the value of range-payload in bombers like the B-2 or in new stealth-like aircraft like the FB-22. [126]

At the same time, cost remains a critical issue. Whatever the potential value of stealth aircraft, they are extremely expensive and have a long history of escalating in procurement and operating costs. The F-16 also proved to be highly effective in the Iraq War, as did the A-10 within its mission limitations. The F/A-22 Raptor has increased in cost by 128% since its development started in 1986, and the GAO claims the program has encountered some $20 billion in overruns. The planned buy of the F/A-22 has shrunk from 750 aircraft to around 276, and the procurement cost of the smaller number has risen to $42.2 billion in spite of a congressionally imposed ceiling of $36.8 billion that was imposed in 1998. [127]

This experience is not all that unusual for a new major weapons system, although this fact illustrates the broader risks in force transformation touched upon in Chapter V. At the same time, the F-16 is largely a sunk cost and the more advanced models have recently had a unit cost of roughly $38 million – somewhat similar to the cost of the late model production runs of the F-15. In contrast, the current Air Force estimate of the unit cost of the F/A-22 is $133.6 million and the GAO puts the cost at over $200 million. The new Joint Strike Fighter, or F-35, also has some stealth features and an estimated unit cost between $37 and $47 million, and the US Navy is seeking to buy some 548 F/A-18 E/F Super Hornets. [128]

Like many other possible "lessons" of the Iraq War, this illustrates the danger of generalize from combat experience without explicitly analyzing cost-benefit and cost-risk, the value of alternative uses of money, and the risks inherent in giving up current force capability or force numbers for as yet unproven and uncostable systems.

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Urban Close Air Support is a Reality – Under The Right Conditions

The US conclusively showed that modern air power can target and strike even in cities with great effect and minimal collateral damage.[129] The US effectively set up urban "kill boxes" over Baghdad with strike aircraft on 24/7 patrols with a variety of munitions. It used a variety of UAVs, for surveillance and targeting, including the Predator and high-flying Global Hawk. This allowed strikes to be called in with munitions suited to the precision and warhead size needed for such attacks.

The use of 500-pound bombs and cement bombs reduced collateral damage in hitting "sensitive" targets near civilians or key civilian facilities. Bombers provided the endurance and high payloads necessary to ensure rapid response and the ability to deliver multiple strikes. Close air support aircraft and attack helicopters like the A-10, Harrier and AH-1W provided low altitude coverage over both Baghdad and Basra, and could both provide better angles of attack using weapons like Hellfire and TOW and strike with lower yield weapons that inflicted less collateral damage.[130]

New Fuses on "bunker buster" weapons like the GBU-27 and GBU-28 ensured the weapons exploded underground. Having men on the ground illuminate and verify targets helped. It is not clear how pure kinetic weapons were used, if at all, but accuracy has improved to the point where a cement warhead can be used to demolish key walls and barriers.

At the same time, the war did expose limits. The Coalition was only able to move key aircraft forward such as tankers and the E-8 JSTARS because it had gone far beyond air superiority to air dominance. This also allowed it to use aircraft like the A-10 in low attitude strafing runs at 2,000-3,000 feet and keep "stacks" of different aircraft with different mixes of munitions safely on call near the greater Baghdad area.

The Coalition found that its initial targeting constraints and rules of engagement were too restrictive. They sometimes forced restrikes or failed to accomplish their mission, forcing additional combat without reducing collateral damage. As a result, the Coalition increased the intensity and concentration of some types of strikes against urban targets, inevitably increasing collateral damage.[131]

Many air munitions could not be used in areas with buildings closely place together because they could not be launched with the proper angle of attack. In an number of cases, targets could only be attacked if ground troops were present to illuminate the target, and the troops could not stay in conflict areas long enough to allow aircraft to come in or the laser could not be read because of urban dust and complex visual angles. More flexible munitions may be needed, along with systems like robotic reconnaissance and illuminators to allow ground troops to conduct targeting without being exposed to combat.

The Value of Expeditionary Airpower and Problems in Allied Readiness, Interoperability, and Modernization

The US military has long recognized the need for expeditionary air power. Carriers provide it by definition, all Marine Corps aviation is expeditionary, the US Army is increasingly making its helicopter forces expeditionary, and the US air Force has steadily converted to a lighter posture and one where power is easier to project. As a result, the

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USAF has divided its aircraft into 10 sets called Air Expeditionary Forces (AEFs) that are designed to deliver a full mission capable mix of aircraft in pairs of AEFs that can be deployed for 90 days. Four full AEFs were sent to the war in Iraq, along with parts of four others. In addition, the USAF has worked with the US Navy to develop synergistic packages where scarce special purpose aircraft with similar functions – such as the RC-135 and EP-3 – can either reinforce or replace each other. The US Navy and Marine Corps, in turn, are developing a Fleet Response Concept to allow US Navy and Marine Corps aircraft to deploy more quickly and in greater numbers, to allow carriers to stay longer on station by rotating crews, to use amphibious ships as light carriers, and to improve Marine Corps aviation capability to act as an expeditionary force off ship.[132]

During the Iraq War, USAF Expeditionary Combat Support ECS) was critical to US success. USAF ECS units built and supported 12 new bases (including 5 in Iraq) while expanding capabilities at 10 established sites. At the same time, they maintained, loaded and launched the Combined Forces Air Component Commander's air force.

During the actual operation, ECS units:

- Launched more than 46,000 sorties with a maintenance effectiveness rate of 98%.
- Issued more than 1M gallons of JP-8 per day (5 times the typical rate) at 3 bases in the region, with a high at one base of 1.8M gallons in one day.
- Offloaded 344 different munitions commodities from ships and strategic airlifters with no sorties lost to weapons availability and 21.5M pounds of ammunition delivered.
- Served more than 111,000 hot meals every day and positioned 2.7M MREs in support of combat operations in and around Iraq.
- Positioned 91,000 JSLIST chemical warfare suits, 2,100 gas masks, 1,000 flak vests and 7,200 weapons in-theater to outfit the force after unit reporting instructions changed on the fly.
- Formed the 'Red Tail' express with leased Kuwaiti trucks to transport CFACC combat power deep into Iraq when the need outpaced the availability of coalition trucks.
- Ensured combat readiness at one location by contracting for bare-base support including site prep, building the large expeditionary shelters and putting up billeting tents for 375, and,
- Made purchases off the Iraqi economy to support deployed forces during ongoing combat operations.

The ability of Special Forces, US Army, the US Marine Corps, and US Air Force to rapidly restore airfields, or create ones large enough for C-130 operations was another important aspects of expeditionary airpower. So was the ability of the C-130 and C-17 to operate off of short and unimproved runways.[133]

The British RAF converted to a far more effective expeditionary posture between 1990 and 2003. It was able to rapidly adapt basing and support plans focused on deployment to turkey to allow operations in the Gulf. Like similar changes in the USAF and US Marine

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Corps to support more rapid forward basing and expeditionary operations, the RAF demonstrated that effective power projection planning and equipment is a critical part of effective airpower. It also was able to help the US Navy because RAF tankers use refueling drogues, rather than a piloted boom, and can refuel US Navy Aircraft -- an example of allied interoperability that helped the US.

The RAF also moved away from an outdated reliance on low-altitude penetration using unguided weapons in 1991 to the use of precision guided weapons, aircraft with avionics capable of targeting and fire such weapons (rather than the need to bring in Buccaneers to illuminate the target for Tornadoes), and introduced new weapons like the Storm Shadow stand-off cruise missile, which has a range of up to 300 nautical miles.[134] Britain also introduced the use of the Paveway II GPS-guided bomb and Maverick AGM-65 by its Harrier G7 attack aircraft, and made use of the Paveway II and III with its Tornadoes.

Although the Royal Australian Air Force provided only a limited number of aircraft, it too demonstrated the value of designing an air force for power projection, and tailoring combat aircraft for interoperability with larger air forces like those of the US. Australia had learned from deployments during the Gulf War, East Timor, and Afghanistan, and had acquired new aerial refueling tankers, Airborne Early Warning & Control (AEW & C) aircraft, improved air-to-air missiles and standoff air-to-surface weapons. It had also upgraded the avionics on its F-18 fighters to make the interoperable with US and British forces by taking steps like replacing their APG-65 radars and fire control systems with APG-73s.

There is, however, a much grimmer lesson here for most European air forces, as well as for NATO and the European Union. There is no “western’ advantage in airpower. Most European air forces lack sustainability, modern technology, effective readiness and training, and either the capability to act as independent expeditionary air forces or to be fully interoperable with the US. To be blunt, their civilian masters have allowed them to decay into aging, heavily bureaucratic, forces which often modernize in ways better suited to the politics of European defense industry than effective warfighting.

There are good reasons why most European governments provide virtually no meaningful transparency into the readiness of their air forces and the effectiveness of their modernization plans. In most cases, their five-year plans are simply a cosmetic façade hiding a steady decay in force strength and/or readiness and drift towards high-cost technological obsolescence. This is not helped by NATO and EU force plans that similarly paper over real-world problems, set meaningless or unmet goals, and are triumphs of institution building over military reality.

Changes in Air Combat Packages

No data have been published on the kind of mixes or “packages” of different aircraft types the US and Britain assembled to carry out given missions in the Iraq War, It is clear, however, that substantially fewer air defense and electronic warfare escorts were needed and that the number of electronic intelligence aircraft dedicated to given packages could be reduced because of superior netting, intelligence platforms, and multipurpose aircraft. On the other hand, there are some indications that the number of refueling missions went up because Coalition aircraft had fewer bases near Kuwait, flew longer mission distances, and loitered longer.

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Hard Target Kill Capabilities

It will take sometime before the US and Britain can clearly evaluate the effectiveness of their attacks on hard targets and deep underground shelters. At least one preliminary report indicates, however, that the US at least sometimes failed to kill critical underground facilities. A reporter that walked through one shelter in Saddam Hussein's Abu Ghurayb Palace produced the following report:[135]

> "The bunker, toured several days later by a reporter, withstood the palace's destruction by at least two satellite-guided bombs. The bombs left six-foot holes in the reinforced concrete palace roof, driving the steel reinforcing rods downward in a pattern that resembled tentacles. The subsequent detonation turned great marble rooms into rubble. But the bunker, tunneled deep below a ground-floor kitchen, remained unscathed. The tunnel dropped straight down and then leveled to horizontal, forming corridors that extend most of the breadth of the palace. Richly decorated living quarters were arranged along a series of L-shaped bends, each protected by three angled blast doors. The doors weighed perhaps a ton. In a climate-control room, chemical weapons filters and carbon dioxide scrubbers protected the air and an overpressure blast valve stood ready to vent the lethal shock waves of an explosion. And a decontamination shower stood under an alarm panel designed to flash the message "Gas-Gaz."

More generally, discussions with US targeteers and analysts indicate that in spite of more than a decade of intense analysis, the US have no clear basis for estimate what was in most hard and soft shelters, whether they have been evacuated before the war began, and what the effect of destroying or damaging the building or facility was on Iraqi warfighting capability. In this sense, "effects-based bombing" usually is limited by the fact the US cannot see into a black box either on the surface or underground.

Cruise Missiles

The US used a total of 153 bomb-launched CALCMs and 802 BGM-109 TLAM Tomahawk sea launched cruise missiles, and these cruise missiles proved to be far more effective in the Iraq War than in the Gulf War, in large part because the addition of GPS guidance and improved reliability allowed it to be much more accurate and to fly a much wider range of attack profiles. At the same time, the relatively small warhead size of the Tomahawk limited the range of targets it can attack, and the performance of the CALCM, with a heavier warhead, and hard target penetrator option remains uncertain.

The CALCM has a nominal range of around 600 nautical miles and flies at high subsonic speeds. Some estimates put its warhead at 1,500-2,000 pounds. Other sources put it at 3,000 pounds. Two versions seem to have been used in the Iraq War.

- The Block IA CALCM uses a third generation GPS receiver along with advanced navigation software, and a GPS anti-jam electronics module and antenna for a significant increase in jamming immunity. In order to increase its effectiveness against a wider spectrum of targets, it has a capability for shallow to near-vertical dive angles from any approach reference point. Flight software improvements include a large-state Kalman filter for optimizing GPS accuracy, to include code and phase measurement data, pressure and temperature measurements, and wide-area GPS enhancement to reduce system errors.[136]
- The AGM-86D Block II program is the Precision Strike variant of CALCM. It incorporates a penetrating warhead, an advanced guidance package coupling GPS and intertial guidance, and a modified terminal area flight profile to maximize the

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> effectiveness of the warhead. The penetrating warhead is augmented with two forward shaped charges. To maximize the warhead's effectiveness against hardened targets, the Block II will maneuver and dive onto its target in a near vertical orientation. The updated guidance system is supposed to have obtained a less than 5 meter CEP.

The Navy's BGM-109 Tomahawk Land Attack Missile (TLAM) cruise missile also demonstrated a steadily increasing accuracy, reliability, and lethality. It now combines jam-resistant GPS guidance with its earlier terrain contour matching (TERCOM) radar guidance that compares a stored radar map against the radar signature of the terrain to navigate and optical Digital Scene Matching Area Correlation (DSMAC) to home in on its target be comparing the image to the actual target. The GPS guidance allows the Block III and later version of the TLAM to fly a wide range of attack profiles, making its direction of attack less predictable, and the system can be programmed more quickly. Its improved performance was first demonstrated in Bosnia in 1995, and demonstrated in depth during some 70 attacks on Taliban and al Qaeda targets in the Afghan conflict in 2001. The BGM-109 Block III has both unitary and cluster warheads with combined effect submunitions. Its nominal payload is 1,000 pounds. Its speed is about 550 miles per hour and its range is about 600 nautical miles.

A total of 35 of the 140 vessels the US Navy had in the Persian Gulf, Red Sea, and Mediterranean were capable of firing the missile. They had a total inventory of roughly 1,500 missiles and approximately 800 were fired. Vice Admiral Timothy Keating, commander of all maritime forces involved in Operation Iraqi Freedom, described the role of cruise missiles as follows on a briefing on April 12, 2003:

> "Since we began Operation Iraqi Freedom on the 19th of March, United States and United Kingdom ships have fired over 800 Tomahawk missiles in support of General Franks' campaign. Sailors and ships… we coordinate all those targets with the Air Force. As I think you all talked last week with General Buzz Moseley, he is the air component commander, and so all offensive air operations, manned or unmanned, are coordinated with -- through Buzz Moseley's targeting shops. So, any target that we're assigned and told to prosecute, that is vetted with Buzz Moseley's air component command headquarters.
>
> "The types of targets were broad-ranging. Some of them were time-sensitive targets -- that is to say that we had intelligence that led us to believe that this particular location was a valuable target. And so in a relatively brief period of time, particularly compared to the years past, we were able to do the planning, get the missile loaded with its mission data, out of a submarine or -- a British or American submarine or American ship -- and down range and export on the target, or some rather more stationary and strategic targets, including missile defense facilities, to Republican Guard headquarters, and some regime structures in and around Baghdad and all throughout the country.
>
> "… when TLAM were first introduced into the Navy arsenal, it was a matter of not hours, not even days, but several days for all of the planning to take place. And so it took quite a while from determination of target, through mission planning, to prosecution of the targets. These days it can be measured in hours, due principally to -- well, one reason, we have better computers these days. Another reason, more important, we have smarter kids doing it these days. And third, the fusion of intelligence and operations and our ability to communicate over secure lines worldwide. All of those factors contribute to a dramatic reduction in the time required from determination that's the target we want to hit to Tomahawk impacting the target.
>
> "…You know, as do I, that a few of our missiles have been found in Turkey and Saudi Arabia. We've shot over 800 and we've found less than 10 in -- that didn't get to the target, if you will. That is a very low percentage, as you no doubt -- 1- over-80, what's that .1 -- 1.25 percent. As for

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> the effectiveness of those Tomahawks and the effectiveness of each individual piece of ordnance, I couldn't tell you right now, but I would say, hazarding a guess, that the dramatic success that General Franks and everybody working for him that we've enjoyed is likely due to our ability to prosecute specific targets throughout the entire country of Iraq, and again, prosecuting with remarkable, in our view, remarkable flexibility and this very pinpoint precision so as to be able to, in the aggregate go very quickly around areas where we didn't want to fight or didn't need to fight and get to the heart of the Iraqi regime leadership and topple that leadership in very short order."

The claimed failure rate for the Tomahawk cruise missile was about 2% versus over five times that percentage in the Gulf War. The 800 missiles launched compares 288 in 1991. The time for targeting at the CAOC was reduced to hours and sometimes minutes in comparison with an average of several days during the Gulf War.[137] For the first time, US command and control could also closely coordinate air and cruise missile strikes, as it did in the attack on Saddam Hussein and the Iraqi leadership on March19th.

At the same time, the cost of some 800 missiles approaches $500 million to $1 billion – depending on the costing method used -- and some missiles again went off course in politically embarrassing ways. The need to cost engineer cruise missiles to much lower prices and find some form of self-destruct remains a lesson of this war, as it has in every war since the Gulf War.

The US of Precision Air Weapons

The key precision weapons the Coalition used in its missile and air strikes included 802 sea-launched BGM-109 TLAM or "Tomahawk" cruise missiles and 153 air-launched AGM-86 C/D CALCMs. They included 8,618 laser guided bombs (GBU-10, GBU-12, GBU-16, GBU-24, GBU-27, GBU-28). They also included 98 EGBU-27 weapons with both GPS and laser guidance. The fired 6,542 JDAM GPS-guided bombs (GBU-31, GBU-32, GBU-53, and GBU-37), and 408 AGM-88 HARM high speed anti-radiation missiles.

These figures reflect the fact that the development of inexpensive strap on kits for laser and GPS guided weapons made mass strikes far more affordable and cost effective, and US ability to allow strike aircraft top operate outside of the effective range of most current light air defense systems. It is important to note that while the JDAM got most of the publicity, the US delivered 30% more laser guided bombs than GPS-guided weapons, in part because laser illumination is more rapid and accurate in dynamic targeting.

The GBU-12 Paveway, laser-guided 500-pound bomb was the most commonly used precision weapon in the war. Some 7,114 were used. The weapon has a maximum range of about eight miles and a accuracy of around nine meters. The fact that a 500-pound weapons could be used so often relative to heavier systems is an indication of both improvements in precision and the ability to execute "effects-based" strikes. In contrast, the US used 236 GBU-10s with 2,000 pound conventional or penetrating warheads. It used 1,233 GBU-16s with 1,000 pound warheads, 23 GBU-24 Paveway IIs with 2,000 pound conventional or penetrating warheads and improved maneuverability, 11 GBU-27s which are 2,200 pound weapons specially modified for delivery by the F-117, and 1 GBU-28 5,000-pound bunker buster.

The JDAM was the second most used precision weapon in the war. The JDAM is essentially a cheap GPS guidance strap on kit for regular bombs, allowed all-weather and night operations even in the worst weather.[138] It costs $18,000 for the strap on kit an can

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be launched up to 15 miles from its target and use GPS to strike within 10-20 feet of its target. While much of the force planning before the Afghan conflict focused on expensive guided weapons, the JDAM is The JDAM made up some 4,600 out of the total of 7,200 precision weapons used during the Afghan conflict.[139]

The US delivery 5,086 GBU-31 2,000 pound bombs. It is notable that the JDAM was generally delivered as much heavier weapon than the laser guided bomb. It also delivered 768 1,000-pound GBU-32s, 675 1,000-pound GBU-35 thermally protected bombs for carrier use, and 13 GBU-37s which are special 2,000-pound bombs with special guidance links to the B-2's GPS navigation and Synthetic Aperture Radar (SAR) capabilities.

The US delivered a diverse mix of other guided weapons. These included 88 CBU-105 WMCD (wind-corrected munition dispenser) sensor fused cluster bombs. The CBU-105 is potentially an important new system because it can be employed at low altitude using level or shallow dive delivery angles from altitudes of 200 to 20,000 feet, and at speeds up to 650 knots, as well as at altitudes of up to 40,000 feet and ranges of 12 miles. It contains sensor-fused submunitions for attacking armor using the SUU-66/B Tactical Munitions Dispenser (TMD), with 10 BLU-108/B submunitions, and 40 "hockey puck" shaped skeet infrared sensing projectiles and each weapon can cover an area of about 500 feet by 1,200 feet.[140] After release, the TMD opens and dispenses the ten submunitions which are parachute stabilized. Each holds four armor-penetrating projectiles with infrared sensors to detect armored targets. At a preset altitude sensed by a radar altimeter, a rocket motor fires to spin the submunition and initiate an ascent. The submunition then releases its four projectiles, which are lofted over the target area. The projectile's sensor detects a vehicle's infrared signature, and an explosively formed penetrator fires at the heat source. If no target is detected after a period of time, the projectiles automatically fire to cause damage to weapon and personnel. The weapon is most effective when employed at low altitude from level flight attitudes in a non-countermeasured environment . However, no details are available on its effectiveness.

The US made use of its new wind corrected munitions delivery WMCD) system to fired 818 CBU-103 and 2 CBU-107 WCMD cluster bombs. They also include lighter missiles such as 562 AGM-114 Hellfire and 918 AGM-65 Maverick anti-armor weapons, which sometimes were used against urban targets as well.

What is striking in view of much of the focus on high-cost long-range missile systems during the early 1990s is that the US used only 260 such systems. The US fired 4 longer-range AGM-130s, 3 AGM-84 SLAM ERs, and 253 AGM-154 JSOWs. Little is known about the effectiveness of these systems but their technical features illustrate the range of different precision strike techniques the US can use:

- The AGM-130 is a powered air-to-surface missile designed for high- and low-altitude strikes at standoff ranges against a variety of targets. It has to two variants, based on the warhead: A MK-84 blast/fragmentation warhead and is a BLU-109 penetrator. The AGM-130 is equipped with either a television or an imaging infrared seeker and data link. The seeker provides the launch aircraft a visual presentation of the target as seen from the weapon. During free flight this presentation is transmitted by the AXQ-14 data-link system to the aircraft cockpit

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monitor. Range and speed are classified. The range is believed to be over 40 miles.

- The US Navy SLAM-ER, or Standoff Land Attack Missile - Expanded Response, is an upgrade to the SLAM. It is a day/night, adverse weather over-the-horizon, precision strike missile with an over-the-horizon, in excess of 150 nautical miles (277.95 km) and high subsonic speeds. It uses ring laser gyro Inertial Navigation System (INS) guidance, with multi-channel GPS; infrared seeker for terminal guidance, man-in-the-Loop control data link from the controlling aircraft, and Automatic Target Acquisition (ATA).
- The AGM-154 JSOW, or Joint Standoff Weapon is a family of air-to-surface glide weapons, in the 1,000-lb class, provides standoff capabilities from 15 nautical miles (low altitude launch) to 40 nautical miles (high altitude launch. It is a launch and leave weapon that employs a coupled Global Positioning System (GPS)/Inertial Navigation System (INS), capable of day/night and adverse weather operations. It uses inertial and global positioning system for midcourse navigation and imaging infra-red and datalink for terminal homing. It has unitary warheads, anti-personnel cluster weapons, and anti-armor cluster weapons.[141]

Anyone looking at the lessons of the war should, however, be careful to remember that 32% of the munitions remained unguided, and the US dropped some 9,251 conventional bombs. Precision is not the solution to every problem. Moreover, a great deal of military analysis tends to ignore the value of strafing and air delivered gunfire. Historically, prison of war interviews indicate that such fire often had a major tactical effect. The US fired 16,901 20mm rounds and 311,597 30mm rounds. The 30 mm round is particularly effective against armored and other vehicles, and the value of "dumb" weapons should not be ignored.[142]

The Problem of Cluster Munitions

In spite of its efforts to reduce civilian casualties and collateral damage, the US repeated a problem dating back to the Vietnam War. US cluster munitions again acted as mines, killing civilians in urban areas like Baghdad long after they were dropped.[143]

There were good reasons for using such weapons, as General Myers, the Chairman of the Joint Chiefs stated after the war,[144]

> Coalition forces dropped nearly 1,500 cluster bombs of varying types during Operation Iraqi Freedom. Most were precision-guided. An initial review of all cluster munitions used and the targets they were used on indicate that only 26 of those approximately 1,500 hit targets within 1,500 feet of civilian neighborhoods. And there's been only one recorded case of collateral damage from cluster munitions noted so far.
>
> We used cluster munitions against surface-to-surface missiles, radar sites, air defense sites, surface-to-air missiles, regime mobile communications, aircraft, armor, artillery, troops, and other select military targets. Because the regime chose to put many of these military assets in populated areas, and then from those areas fired on our forces, in some cases we hit those targets knowing that there would be a chance of potential collateral damage.
>
> Coalition forces used cluster munitions in very specific cases against valid military targets, and only when they deemed it was a military necessity. These are tough choices. And it's unfortunate that we had to make those choices about hitting targets in civilian areas, but as we've said before as well, war is not a tidy affair, it's a very ugly affair. And this enemy had no second thoughts

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> about putting its own people at risk. Indeed, multiple civilian casualties were clearly a high priority for the regime so as to put pressure on the coalition. Now they will not be able to do that any longer.

Cluster munitions were particularly useful in attacking Iraqi armor when it attempted to use the cover of sandstorms to move, and the use of precision guided weapons was difficult to impossible.

Nevertheless, the failure to deal with the inadvertent sowing of cluster munitions as mines is now some three decades old. Some form of deactivation timer is clearly needed once such munitions are released. Similarly, the failure to precisely map where the submunitions were delivered has much of the same impact as failing to precisely map a mine field, particularly when bomblet change in shape as was the case with the new BLU-108, puck-shaped bomblets, used in the Gulf War. The more familiar BLU-97 is a yellow soda can-sized weapon and the KB-1 is the size of a grenade. Ironically, the BLU-108 is supposed to be a more modern self-destruct weapon but this feature does not seem to have functioned reliably. It also often buried itself and was so small that it demolition teams could only be detect it if its parachute was visible in the area. [145]

The Bomber and the Advantage of Range-Payload

The Iraq war will eventually produce detailed lessons for virtually every aircraft used in the war, just as it will for virtually every other land or air system. In the case of aircraft, it is clear from initial pilot reports that virtually every attack fighter benefited from the improvements in sensors, avionics, and precision guided weapons delivery capability. This affects the A-10, AV-8B, F-14, F-15, F-16, F-18, Harrier, as well as future designs. Some of these lessons have been discussed in the course of this report, but many require detailed operations analysis that may take a year or more to complete.

There are, however, some more general lessons, and changes in the role of the bomber are particularly striking. As in the Afghan War, the B-1, B-2, and B-52 all demonstrated the value of the bomber as a precision strike system with stealth penetration or stand-off delivery capability to hit large numbers of aim points or targets with precision weapons in a single sortie. The B-2Bstealth bomber, for example, had the capacity to carry sixteen 2,000 pound bombs like the JDAM, or up to 70 500-pound guided bombs, on a single sortie and fire each at a separate target.

The B-52 and B-1B could also carry large numbers of precision weapons like the JDAM, as well as used the Wind Corrected Munitions Dispenser, and strike at different targets on each sortie, The use of precision guided weapons allowed them to strike from outside the range of all but the most heavily defended areas, and the steady upgrading of their electronic warfare capabilities also improved their survivability. One press reports indicates that the B-52s and B-1B delivered a total of two-thirds of the bombs dropped during the war; another credits the B-1B alone with dropping half of the JDAMs. These numbers may well be exaggerated, but there is no doubt that these legacy systems played the same kind of critical role in terms of total tonnage dropped that they did in Afghanistan.[146]

The B-52 was the long established workhorse of the US bomber fleet. The USAF showed that a bomber as old as the B-52 could be given new life by improving its precision guided weapons targeting and launch capabilities like the LITENING forward

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looking targeting pod, its electronic countermeasures, capability to retargeting in mid flight, and reengining. [147]

The B-1B's mission readiness rate had improved strikingly in the year before the Iraq War. It had not flown in the first Gulf War because it could not carry precision-guided weapons. Giving it such a capability after the war allowed it to fly 74 sorties during Operation Allied Force in Kosovo and eight B-1Bs were deployed to support operations in Afghanistan.[148] In the Iraq War, preliminary reports indicate that it only flew 2% of the total sorties but dropped a significant percentage of the total number of the JDAMs. One press report indicates that B-1 bombers flew 6-7 sorties a day and delivered a total of more than 2,100 bombs and a payload of over 4 million pounds. Another indicates they flew 432 strike sorties and delivered more than 2,250 tons of bombs. Each B-1B could carry 24 on-ton weapons, and most use a mix of bombs fused to delay for 25 milliseconds to penetrate their targets and to explode on contact. The aircraft could loiter for up to 8 hours over the battlefield, with refueling. In one strike on April 7th, for example, a B-1B was called into delivery four weapons against a site near a restaurant in downtown Baghdad where Saddam and his sons were thought to be meeting and then went on to hit 15 additional targets: six Baghdad and nine in Tikrit.[149]

At present, the US does not have enough B-1s to equip its 10 air expeditionary forces, and the USAF must use a mix of six B-1s and six B-52s for each force. There are 67-69 B-1s available, and virtually all of the 96 remaining would have to be operational to rely on the B-1. The USAF is also considering providing full Link 16 and Fully Integrated Data Links to allow more complicated targeting and command and control data digitally to the aircraft. At present, all four crew must verify voice signals. Other possible upgrades include improving the resolution of the radar from 10-feet to one foot, providing cheaper and more effective electronic countermeasures, adding a forward looking infrared system to provide better night and laser guided bomb targeting such as the Litening II pod being installed on some B-52s. Equipping the aircraft to use the 250-pound smart bomb would also allow its revolving launcher to carry between 96 and 144 guided weapons.[150]

High range-payload fighter-attack aircraft like the F-15 demonstrated a similar capability, and the ability to retarget aircraft to use precision weapon on an on-call basis demonstrated the value of range-payload in increasing loiter time as well. So did the F-16C/D, which had had a massive upgrade in its avionics and capability to deliver precision guided weapons since the Gulf War, and far greater range-payload than the original F-16A/B The improved IR sensors in a number of US strike attack fighters allowed them to target Iraqi armor far more effectively than in the past, sometimes in dust storms.

The US also made combat use of the new F/A-18EF Super Hornet for the first time. The F/A-18E/F aircraft are 4.2 feet longer than the F/A-18C/D. They have a 25% larger wing area, and carry 33% more internal fuel. This increases mission range by 41% and endurance by 50%. The nominal mission radius is increased from 369 miles to 520 miles, and the recovery payload from 5,523 pounds to 9,000 pounds.

They also incorporate two additional weapon stations that provide increased payload flexibility by mixing and matching air-to-air and/or air-to-ground ordnance including

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"smart" weapons, like the JDAM JSOW. The F/A-18 E/F also have some stealth features. Although the more recent F/A-18C/D aircraft have incorporated a modicum of low observables technology, the F/A-18E/F was designed from the outset to optimize such features. It also has a new Advanced Targeting Forward-Looking Infra-Red (ATFLIR), the baseline infrared system pod which features both navigation and infrared targeting systems, incorporating third generation mid-wave infrared (MWIR) staring focal plane technology.[151]

Vice Admiral Timothy Keating, commander of all maritime forces involved in Operation Iraqi Freedom, described the range-payload advantages of the new F/A-18E/F as follows in a briefing on April 12, 2003:

> "We've had the introduction of the F-18 E and F, our new Super Hornet, which has longer legs. It can fly further, it can carry more ordnance. It has some very sophisticated radar and electronic improvements, so it has proven -- and it can also, by the way, carry a tanker store to pass gas to other airplanes airborne, which goes back, I think, to Dale's question about gas airborne. We've been able to flex a little bit with the F-18 E/F and do -- accomplish even more missions that we could in 1991."

Once again, questions must be asked as to whether bombers and heavily loaded strike fighters would have been as able to survive as well against an enemy with better air defense or land-based air defense systems. At the same time, few nations have such capabilities and the USAF has shown that a bombers can be steadily modified and upgraded.. [152]It is clear that strike fighter range payload and the ability to carry and deliver large numbers of precision guided munitions, and either fire at standoff ranges or use stealth is a key aspect of fighter performance – perhaps one that is gaining importance relative to advanced air combat maneuver capability in a world where so few air forces have anything like peer capability in air combat and air-to-air encounters increasingly occur at ranges beyond "dogfight" direct maneuver encounters. The Iraq War at least raises the possibility that trade-offs may been needed between an air superiority fighter like the F-22 and new strike-attack fighters like the JSF and FB-22.[153]

The Role of the E-8 JSTARS

There are no combat operations data available in a form where it is possible to precisely define the role of sensor aircraft like the E-8 JSTARS. It is clear, however, that extensive use was made of JSTARS and the Coalition's air dominance allowed it to be deployed forward and nearer the battle space, where it could track Iraq armored and vehicle movements over hundreds of square miles, and that it was use to cover the greater Baghdad area. The "fusion of intelligence" from the E-8 and other sources gave the Coalition the ability to locate and target Iraq forces under weather conditions they felt protected them from the air. Aircraft like the RC-135 Rivet Joint, for example, could characterize and locate the source of Iraqi military communications.[154]

The Joint Surveillance and Target Attack Radar System (JSTARS) is also a symbol of the rapidly evolving role of jointness in the air-land battle. A technical description of the aircraft is in many was a technical description of the new ISR, C4I, and battle management techniques that shape the evolving US approach to war.

JSTARS is a joint development project of the US Air Force and Army which provides an airborne, stand-off range, surveillance and target acquisition radar and command and

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control centre.[155] While it was used experimentally in the Gulf War, JSTARS was approved for full rate production for 14 aircraft, In September 1996, the last of which was delivered in August 2002. The first of three more aircraft were delivered in February 2003 and the USAF plans to acquire a total of 19.[156] The fully operational JSTARS was used for the first time to support peacekeeping operations in Bosnia-Herzegovina and during the Kosovo crisis.

The aircraft provides ground situation information through communication via secure data links with air force command posts, army mobile ground stations and centers of military analysis far from the point of conflict. It provides a picture of the ground situation equivalent to that of the air situation provided by AWACS. JSTARS is capable of determining the direction, speed and patterns of military activity of ground vehicles and helicopters. The aircraft has a flight endurance of 11 hours or 20 hours with in-flight refueling.[157]

The radar system uses a 24 ft antenna installed on the underside of the aircraft, which is mechanically swiveled and pointed to scan in elevation, and scans electronically in azimuth to determine the location and heading of moving targets. The main operating modes of the radar are wide area surveillance, fixed target indication, synthetic aperture radar, moving target indicator and target classification modes.

JSTARS aircraft have 17 operations consoles and one navigation/self-defense console. A console operator can carry out sector search focusing on smaller sectors and automatically track selected targets. Fixed high value targets are detected through synthetic aperture radar (SAR). Signal processing techniques are implemented through four high-speed data processors, each capable of performing more than 600 million operations per second. Processed information is distributed via high-speed computer circuitry to tactical operators throughout the aircraft.

JSTARS has secure voice and datalinks to the Army's ground command and communications stations and to the Air Force command centers. Voice communications systems include 12 encrypted UHF radios, two encrypted HF radios, three VHF encrypted radios with provision for Single Channel Ground and Airborne Radio System (SINCGARS) and multiple intercom nets.

The digital datalinks include a satellite communications link (SATCOM), a surveillance and control datalink (SCDL) for transmission to mobile ground stations, and Joint Tactical Information Distribution System (JTIDS). The JTIDS provides tactical air navigation (TACAN) operation and Tactical Data Information Link-J (TADIL-J) generation and processing. The Cubic Defense Systems SCDL is a time division multiple access datalink incorporating flexible frequency management. The system employs wideband frequency hopping, coding and data diversity to achieve robustness against hostile jamming. Uplink transmissions use a modulation technique to determine the path delay between the ground system module and the E-8 aircraft.

The aircraft will become significantly more effective in the future. The US Air Force has awarded a contract to develop the next generation JSTARS as part of the Radar Technology Insertion Program (RTIP). The new much more powerful radar will be an electronically scanned 2-D X-band active aperture radar which will have a helicopter

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detection mode and inverse synthetic aperture (ISAR) imaging capability, as well as MTI (moving target indicator) mode, allowing real-time imaging of moving objects.

In 1997, the US Air Force awarded two contracts for a computer replacement program to take advantage of the latest commercial off-the-shelf technology (COTS). The program integrates new Compaq AlphaServer GS-320 central computers that are significantly faster than the original system. The programmable signal processors will be replaced and a high-capacity switch and fiber-optic cable will replace the copper-wired workstation network. The Computer Replacement Plan (CRP) has completed EMD testing and the first upgraded aircraft was delivered in February 2002.

Unmanned Aerial Vehicles (UAVs)

While no sortie data are available on the Coalition's use of UAVs, the nature and importance of the data they collected, or the specifics of the role they played in joint operations, it is clear that they had a major impact. The Coalition used more than 10 types of UAVs in the conflict, building on the US success in using such systems in Afghanistan.[158]

These included larger systems like the Predator, Global Hawk, and the Pointer. These were the three systems the US used in Afghanistan. The US had used the Pioneer in the Gulf War. In the Iraq War, however, the Coalition also made use of new tactical systems like the US Army Hunter and Shadow, the Marine Corp's Dragon Eye, and USAF Force Protection Surveillance System.

The upgraded RQ-1 Predator carries the Multispectral Targeting System (MTS) with inherent AGM-114 Hellfire missile targeting capability, and integrates electro-optical, infrared, laser designator and laser illuminator into a single sensor package. The Predators cannot carry MTS and a synthetic aperture radar SAR simultaneously. The aircraft carry and employ two laser-guided Hellfire anti-tank missiles with MTS. The aircraft has a cruise speed of around 84 mph (70 knots), and a maximum speed of up to 135 mph. It has a range of up to 400 nautical miles (454 miles), a ceiling of up to 25,000 feet (7,620 meters), and a payload of 450 pounds (204 kilograms). Its ability to loiter for up to 24 hours at altitudes of up to 15,000 feet also allowed them to support the ground battle and to be used to call in systems like the AC-130 gunship. A-10, and Tornado. Armed Predators, the MQ-1, fired more than 12 Hellfire missiles.[159]

The Predator was flown to support virtually every major mission in the war, providing imagery day and night, and of a quality which under optimal conditions allows the user to distinguish between military civilian personnel at distances up to three miles. Some 15 Predators flew during the war, roughly one-third of the total fleet, and they flew more than 100 missions. These included joint missions like using an RC-135 Rivet Joint electronic warfare aircraft to locate the area of an Iraqi surface-to-air missile, and then sending a Predator to find the target and send back its precise coordinates. Even when the Predator was not armed with Hellfire missiles, this served as an effective way of improving targeting and strike reaction times.

The Global Hawk Unmanned Aerial Vehicle (UAV) provides and joint battlefield commanders near-real-time, high-resolution, intelligence, surveillance and reconnaissance imagery. It cruises at extremely high altitudes, and can survey large

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geographic areas with pinpoint accuracy, to provide information about enemy location, resources and personnel. Once mission parameters are programmed into Global Hawk, the UAV can autonomously taxi, take off, fly, remain on station capturing imagery, return and land. Ground-based operators monitor UAV health and status, and can change navigation and sensor plans during flight as necessary.

The aircraft has a wingspan of 116 feet (35.3 meters) and is 44 feet (13.4 meters) long. It can range as far as 12,000 nautical miles, at altitudes up to 65,000 feet (19,812 meters), flying at speeds approaching 340 knots (about 400 mph) for as long as 35 hours. During a typical mission, the aircraft can fly 1,200 miles to an area of interest and remain on station for 24 hours. Its cloud-penetrating, Synthetic Aperture Radar/Ground Moving Target Indicator, electro-optical and infrared sensors can image an area the size of Illinois (40,000 nautical square miles) in just 24 hours. Through satellite and ground systems, the imagery can be relayed in near-real-time to battlefield commanders.[160]

The Global Hawk operated at higher altitudes than the Predator and its radar imagery allowed it to function even during sandstorms. It can fly for up to 26 hours, and flew missions out of the UAE on every day of the war. It can image some 200-300 sites on a single sortie. One aircraft was deployed. It operated out of the United Arab emirates and was controlled from Beale Air Force Base in California. It was used for time sensitive targeting, which was coordinated through the CAOC in Saudi Arabia, and their synthetic aperture radars provided to be particularly useful in sandstorms and in targeting even static ground forces like elements of the Medina Division which were still in revetments.[161]

Little data are as yet available on the use of the Pointer. It is an older, short-range UAV designed as tactical reconnaissance vehicles with onboard camera (color, or IR day/night vision) relays live video images to the pilot and mission navigator, to a video recorder, or even to other remote ground receivers. It has GPS as a standard version and some seem to have had chemical and biological weapons detection sensors. It has a flight duration 1.5 hours, an airspeed of 29-80 km/hour (22-50 mph), and a patrol radius of 8 km (5 miles).[162]

The Marines deployed 20 Dragon Eyes and10 ground stations with the 1st Marine Division and the US army used the Hunter in a similar role with V Corps.[163] The Dragon Eye is another small UAV designed to provide threat detection small units. It is a fully autonomous, back-able, hand launched UAV that can provide an “over-the-next-hill, or building. Its operating altitude is between 300 and 500 feet above ground level, and it has a video link range in excess of 5 kilometers. The payloads are capable of real-time high resolution day color, and low light black/white imagining. Its electric motors provide a low noise signature, and its small wingspan make it very difficult to detect. The air vehicle’s battery provide up to 60 minutes of flight time, and it has a flight weight approximating 5 pounds. It can be assembled and launched by a two man team in approximately 10 minutes. The aircraft is programmed via a seven pound rugged-ized handheld computer which is capable of flight planning, flight monitoring, and storage of air vehicle transmitted video. The aircraft’s flight profile is GPS waypoint guided, each waypoint allowing for various linear, and orbiting search patterns and altitudes. The aircraft’s flight profile has the ability to be updated or changed in flight.[164]

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The value of the Dragon Eye is illustrated by an incident on April 4th, when an aircraft spotted a large Iraqi Army formation moving out of Baghdad under the cover of darkness. The data were passed to the Marine Combat Operations Center which displayed them as a real time stream of information, It provided grid coordinates which were passed on to Marine F/A-18s and AV-Bs, which attacked the Iraqi formation in a virtual turkey shoot. BDA later claimed some 80 vehicles destroyed.[165] As the same time, a field report by the Marine Corps Systems Command also illustrates that problems inherent in introducing a new system into the field and that small UAVs with "soda straw" coverage as scarcely the answer to every tactical problem:

> *Dragon Eye* ~ Division HQ G-2's Dragon eye was used for a week, prior to crossing the LD. However, prior to crossing the LD the computer went down and there was no maintenance plan in place. *(note: there was a maintenance plan in place. It is not clear, however, how much of this plan the operators were aware of).* Thus, the HQ G-2 did not utilize the system. However, the week that the Dragon Eye was used it received favorable comments. Extensive analysis and feedback was received from 1st LAR's S-2 section on the Dragon Eye. They used this system daily throughout the war. Overall the system was highly regarded and the S-2 section was extremely happy to have it as a tool for their intelligence gathering.
>
> The system's outer shell was characterized as "flimsy" and not durable enough. The harsh sandy environment immediately caused excessive wear. The rubber bands used for launch of the system consistently broke. Users stated that at least 10-15 extra launching bands were needed to be fielded with the system. There was no maintenance plan in case of an item breaking. CLS was discussed and immediately disregarded. Contracted civilians were not desired in the battle-space. Training for the Dragon Eye was minimal and all Marines desired more detailed training. They hoped that this training would be incorporated at the schools and throughout the fleet.
>
> Batteries were a critical vulnerability of the dragon eye. Not only did the battery run out, but finding a replacement battery in a timely manner was nearly impossible. The battery used was company specific. Marines desired a rechargeable battery or as a second choice a battery that was easily purchased on the open market.
>
> Night use of the dragon eye was poor. An infrared camera would be a usable addition to the dragon eye. Also some kind of infrared strobe would be helpful, especially in locating the dragon eye upon landing. Marines had trouble finding the small "plane" when it returned from a mission, especially at night.
>
> The range of the dragon eye was acceptable, but as always, more was desired. A desire for retrans was voiced in order to extend the range. Overall, a recurring concern was communication from the ground with the system. The operators found that the signal received on the computer often "cut out" and no video feed was received. At times the operator desired to abort the mission however he could not "contact" the Dragon Eye. When the system was up and running the video resolution was very clear and easy to read/decipher. However, Marines found the 10km range somewhat insufficient; ideal would be a range of 20km. The current altitude of the system was also found to be insufficient. For clearer pictures and easier deciphering the Marines desired the system to be capable of being flown as low as 100ft. Flight duration (currently 1 hour) was also insufficient; ideal desired time would have been 2 hours.
>
> Finally, the laptop had a few features that could have been a bit more "user friendly." The method of looking at numerous pictures at one time was very cumbersome and needs to become more "user friendly" (i.e. double click on one icon to open a picture vice filtering through various tool bars). Also, the laptop needs to be plugged in; a rechargeable battery option would be good for an infantry Marine in the field. On a "positive note" the size and weight of the Dragon Eye were considered ideal. If given the choice of keeping the current capability and thus maintaining size and weight or increasing the capability/technology with the result of a dramatically heavier and larger machine the Marines overwhelmingly would choose the former.

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The Strengths and Weaknesses of the A-10

It is clear that both attack helicopters and the A-10 played an effective and important role in the fighting, as they did during the Gulf War. The USAF reports that the, A-10s had a mission capable rate of 95.7 percent In the Gulf War, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles. While no similar data or quantified estimates of BDA are available for the Iraq War, it is clear that the A-10 was able to operate effectively in sandstorms using binoculars and sensors in some cases and cluster weapons in others to attack the Republican Guard. It patrolled 30 square mile kill boxes in both the forward and rear areas, helping to secure US lines of communication. [166]

The A-10 operated effectively over Baghdad during the battle for that city, and even dropping down to 2,000-3,000 feet for strafing runs. Several A-10s were hit hard by enemy fire, including one that returns to base with nine hits. Only one A-10 was lost to enemy fire, which is hit by a man portable surface-to-air missile on April 8th. [167]

The avionics on the current A-10 also illustrate the advances in US avionics even in relatively "simple" strike aircraft. Thunderbolt IIs have Night Vision Imaging Systems (NVIS), goggle compatible single-seat cockpits forward of their wings and a large bubble canopy which provides pilots all-around vision. The avionics includes inertial navigation systems, fire control and weapons delivery systems, target penetration aids and night vision goggles. Their weapons delivery systems include heads-up displays that indicate airspeed, altitude, dive angle, navigation information and weapons aiming references; a low altitude safety and targeting enhancement system (LASTE) which provides constantly computing impact point freefall ordnance delivery; Pave Penny laser-tracking pods under the fuselage, and the Global Positioning System.

Similarly, the A-10 illustrates the merits of good protection and the ability to operate effectively as part of an expeditionary force. The A-10/OA-10 have excellent maneuverability at low air speeds and altitude, and can loiter near battle areas for extended periods of time and operate under 1,000-foot ceilings (303.3 meters) with 1.5-mile (2.4 kilometers) visibility. Their wide combat radius and short takeoff and landing capability permit operations in and out of locations near front lines, and they can conduct missions during darkness.[168]

The aircraft can survive direct hits from armor-piercing and high explosive projectiles up to 23mm. Their self-sealing fuel cells are protected by internal and external foam. Manual systems back up their redundant hydraulic flight-control systems. This permits pilots to fly and land when hydraulic power is lost. Many of the aircraft's parts are interchangeable left and right, including the engines, main landing gear and vertical stabilizers. The Thunderbolt II can also be serviced and operated from bases with limited facilities near battle areas. This, and fact the Coalition seized the air facilities at Talil near Nassiryah, allowed them to refuel there and gain an extra hour of mission time.[169]

The Strengths and Weaknesses of the A-64 Apache

The AH-64 and AH-64 Longbow also played an important role in air support. The AH-64D allowed the attack helicopter to use fire and forget air-to-surface missiles for the first time. The AH-64D Longbow is fitted with the Longbow millimeter wave fire control radar and the AGM-114D Longbow Hellfire air-to-surface missile which has a millimeter

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wave seeker which allows the missile to perform in full fire and forget mode. Range is 8km to 12km. The Apache has been equipped with air-to-air missiles (Stinger, AIM-9 Sidewinder, Mistral and Sidearm) and 2.75in rockets. The Longbow Apache can carry 16 Hellfire missiles on four 4-rail launchers and four air-to-air missiles in the close air support role.[170]

The AH-64D Longbow Apache is equipped with the Northrop Grumman wave-wave Longbow radar. The Longbow fire control radar incorporates an integrated radar frequency interferometer for passive location and identification of radar emitting threats. An advantage of millimeter wave is that it performs under poor visibility conditions and is less sensitive to ground clutter. The short wavelength allows a very narrow beamwidth which is resistant to countermeasures.

The Longbow Apache can carry out an attack in thirty seconds. The radar dome is unmasked for a single radar scan and then remasked. The processors determine the location, speed and direction of travel of a maximum of 256 targets. It uses the Target Acquisition Designation Sight, TADS (AN/ASQ-170) and the Pilot Night Vision Sensor, PNVS (AN/AAQ-11). The turret-mounted TADS provides direct view optics, television and three fields of view forward looking infra-red (FLIR) to carry out search, detection and recognition and laser rangefinder/designator. PNVS consists of a FLIR in a rotating turret located on the nose above the TADS. The image from the PNVS is displayed in the monocular eyepiece of the Honeywell integrated Helmet And Display Sighting System, HADDS, worn by the pilot and co-pilot/gunner.

The Apache is equipped with an electronic warfare suite consisting of: AN/APR-39A(V) radar warning receiver from Northrop Grumman (formerly Litton) and Lockheed Martin; AN/ALQ-144 infra-red countermeasures set from BAE Systems IEWS (formerly Sanders, a Lockheed Martin company); AN/AVR-2 laser warning receiver from Goodrich (formerly Hughes Danbury Optical Systems then Raytheon); AN/ALQ-136(V) radar jammer developed by ITT; and chaff dispensers.

The AH-64 also benefited from the fact that the Army rushed in rapid upgrades from the Block 3 modernization program just before the war. These upgrades included an air transportability kit that allowed the Apache to deploy without dislodging the rotors and radar dome, and be made combat ready within 20 minutes after unloading from a C-17 or C-5 rather than two hours. They also included an internal auxiliary fuel system that added 100 gallon of fuel and extended flight time by an average of 50 minutes, although at the cost of reducing the 1,200 round 30mm magazine to 300 rounds.[171]

The success of the AH-64 in Afghanistan, may have been a factor leading the US army to decide to retain the AH-64 as a long term part of its Objective Force, and upgrade it with new computer systems, although the decision to cap production of the RAH-66 Comanche attack-reconnaissance helicopter at 650 aircraft has been a major driving factor. [172]

However, the Iraq War did raise questions about the vulnerability of low altitude fliers like the Apache and AH-1W.[173] One Apache was shot down by small arms fire and its two-man crew was captured. Press reports indicate that another 30 had small arms hits. The US army also had to pull back from long-range attack missions after it sent 34 AH-64Ds from the 11th Aviation Regiment to attack elements of the Republican Guard

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Medina Division near Karbala on March 24th. Instead of ambushing Iraqi tanks by penetrating in undetected low altitude attacks, the helicopters encountered heavy small arms and light AA fire before they closed on the Iraqi armor, and had to retreat back to base after doing minimum damage. [174] Reports from Marines in the field also show that they had to restrict the operations of their AH-1 attack helicopters to avoid using them against Iraqi land forces with heavy short-range air defenses.

This may help explain why General Richard Myers, the Chairman of the Joint Chiefs, described the relative roles of the A-10 and the Apache in the Iraq War as follows.[175]

> "The A-10 is doing good. Always has done good. But, it needs kind of a moderate environment or less to operate. It's had that where its been operating. It's a good machine.
>
> The Apache Longbow system has also done extremely well. Of course the Longbow is a fairly new modification, but it has done very well."

Lt. General William Wallace, the Commander of V Corps, also praised the Apache, but noted that it was vulnerable when it flew long penetration missions into areas with heavy short-range air defenses, and that changes in tactics were needed to use it most effectively: [176]

> "The…adjustment that we had to make during the course fight was the techniques we used for the employment of the Apache helicopter. It's because everybody in this country has a weapon. And if they all shoot them up in the air at the same time at every helicopter that flies over, it becomes a very lethal environment for a low-flying aircraft.
>
> "The attack helicopter doesn't have the luxury of flying at 25,000 feet as the Air Force does. So in order to effectively employ the Apache we had to make adjustments to our tactics. The tactic that we settled on was first of all focusing on close support of ground forces with the Apache, which is called "over the shoulder." It's not really over the shoulder but is close cooperation with ground maneuver and air maneuver. That has proven to be very effective.
>
> "The other tactic that we have come to employ very successfully is using the Apache doing armed reconnaissance.
>
> "For example what the 11th (Aviation) Regiment has been doing the last three days, in areas that we had driven through to engage the enemy but we're not absolutely certain of the degree to which the area was cleared.
>
> "So we've been using the attack helicopters as a reconnaissance platform and as a platform that goes out to see if there's an enemy in a particular area that has been, in some of the less contested areas, to insure that those areas are secure and free of air defense and enemy formations, that sort of thing. And that has proven to be very successful."

There is a debate over what happened on March 24th, and its impact on the use of the AH-64. General Wallace later stated that, "the attack of the 11th Aviation on the Medina Division did not meet the objectives I have set forth for the attack." At the time, however, USCENTCOM spokesman, Brigadier General Vincent Brooks, noted that only one aircraft was lost, and all the other helicopters involved in the mission did accomplish the mission and returned safely to base." General Tommy Franks stated that, "We know that they we very effective in their mission."[177]

This raises the question as to whether the AH-64s had critical mission limitations or were simply restricted in their operations because it was already clear that the US could win this particular war without taking major losses. It also has become clear that one of the reasons that the 11th Aviation ran into so many problems was that it overflew an Iraqi

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post where the end objective of their attack was clearly predictable and the Iraq commander used a cell phone to alert the Medina Division. One key question is whether the loss of tactical surprise was a freak incident or more typical of what can be expected of an alert enemy in the future.

Some experts also feel that the Army might have been able to carry out longer-range strikes more successfully if it had realize that the nape of the earth and pop-up tactics it used to try reduce helicopter vulnerability would not work in heavily defended areas. They argue that long-range attack helicopter strikes, and operations in heavily defend areas, could still be effective if they were carried out joint operations with the air force where aircraft suppressed ground-based air defenses and small arms fire while the helicopters attacked armor. [178]

There are reports of a later joint operation by both AH-64s and the A-10 where the helicopters again went against the Medina Division encountered heavy fire, allowed the A-10s to suppress the Medina Division's air defenses and small arms, and then reentered an destroyed a large number of Iraqi tanks. It also seems clear that the A-10 was more effective in other ways than in the Gulf War because of improvements in its avionics and precision strike capability. The end result may be that attack helicopters and close air support aircraft are another part of the joint arms team.

The US Marine Corps Harrier

The Marine Corps has had a troubled history with the Harrier, and at one point much of its fleet was deadlined. Data are not yet available on the Harriers performance in the Iraq War in either US or British forces. According to one Marine Corps source, however, the Corps was able to base AV-8Bs on its light amphibious carriers, which gave the Coalition 60 more jets in theater which it otherwise lacked the space to base, and which supported 60 of the 76 AV-8s in theater on Amphibious carriers.

The Corps claims the Harriers had 85% aircraft availability and there were Harriers in the air over Iraq 24 hours a day, seven days a week. The AV-8Bs FARPed out of An Numaniyah airfield 60 miles SE of Baghdad and MALS-13 logisticians kept the flow of repairables and consumables moving to the 76 MAG-13 Harriers.

In 25.5 days of combat, AV-8B's flew in excess of 3400 hours and 2000 sorties. They dropped/fired over 1400 weapons, 900 of which were LGBs. Marine corps officers claims that the use of the Litening II targeting pod achieved better than a 75% kill effectiveness on target with GBUs, and laser guided bombs killed the target seven times out of ten. In one wave alone, Harriers operating off of USS the Bonhomme Richard inflicted heavy damage on a Republican Guard Baghdad Division Armored Tank Battalion in advance of the MEF's push on Al Kut.

The AV-8Bs normally flew in close support of tanks, mainly using Hunter/Killer tactics where the lead AV-8B (Hunter) was configured with the Litening pod and one GBU-16. Dash 2. The Killer was configured with two GBU-12s and occasionally MK-82 with VT fusing or Rockeye on Stations 1 and 7.

This was the first time the Corps had ever had so many sea based (plus 16 in Kuwait) under a Marine Group Commander, and they flew combat missions both day and night from both the Bon Homme Richard and Bataan, where 48 of the 60 sea based Harriers

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are located. The aircraft have routinely flew missions off the ships, attacked their targets, gone to a land base or Forward Operating Base or FARP, refueled, rearmed, flew back out for another mission to attack targets for the MAGTF or coalition forces and then recovered back to the LHDs/LHAs.

Not surprisingly, the Corps argues this performance should strongly enforce the need to procure the F-35B Joint Strike Fighter for the Marine Corps.

The US Marine Corps Osprey

The Iraq War did not provide clear lessons for dealing with one of the Marines' most critical force planning and resource decisions: The merits of the V-22 Osprey. Some Marines feel that the war did show that the CH-46 was too limited in range and speed of deployment to keep up with the forward elements of 1 Marine Division, and this affected missions like casualty evacuation. At least some of these problems, however, seem to have been primarily problems in vulnerability – a factor that some reports also indicate limited the use of the Cobra.

Without a great more data, a clearer picture of how the V-22 would have affected a wide range of operations, and data on the tradeoffs necessary to buy and deploy the V-22, any attempt to draw lessons would have to be even more speculative than most of the preliminary conclusions presented in this report.

Suppression of Enemy Air Defense (SEAD)

The US and Britain had some four years of operational experience in suppressing Iraqi air defenses, and were able to use the No fly Zones to sharply reduce Iraqi capabilities before the war began.[179] Operation Northern Watch enforced the no-fly zone north of the 36th parallel in Iraq and monitors Iraqi compliance with UN Security Council resolutions 678, 687, and 688. The United States and the United Kingdom provided about 45 aircraft and more than 1,400 personnel to support the operation. Operation Southern Watch enforced the no-fly zone south of the 33rd parallel in Iraq and monitors compliance with United Nations Security Council Resolutions 687, 688, and 949. The United States and the United Kingdom provided about 150 aircraft and 6,000 men and women to support the operation. During the period from December 1998 onwards, the two No Fly Zones became the scene of a nearly constant duel between US and UK air forces and the Iraqi land-based air defenses, with occasional probes and challenges to the Iraqi air force. The Iraqi lost all of these duels and suffered a steady attrition of their land-based defense capabilities. It must have also become apparent that the Iraqi air force could not successfully challenge US and British forces in air combat.

The sheer scale of the No Fly Zone effort was impressive long before the US and Britain began to carry out a major effort to suppress the system. By August 2002, the US and UK had already flown a total of nearly 300,000 flights in the zones. These included 265,000 sorties in the southern zone since 1992 and 33,000 in the northern zone since 1997. These involved packages of air defense suppression planes like the F-16CJ and EA-6B, strike fighters like the F-16C and F-15E, refuelers, and AWACS air controllers.

During the first four months of 2002, however, the US and UKL struck targets in the Northern and Southern No Fly Zones only six times. During the four months from October to November, they hit them roughly 48 times, and in December the strikes both

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intensified and struck deeper and harder at the entire air defense system, including targets around Al Kut, Nasiryah, Amarah, Basra, and Tallil air base. Iraq charged that US and British aircraft entered Iraqi air space 1,141 times between November 9th and December 6th, while the US and Britain said that Iraqi had fired on their planes more than 470 times since the beginning of 2002.

This duel stepped up after U.N. Security Council resolution 1441 was passed on Nov. 8, 2002, Iraqi forces fired on U.S and British pilots 264 times. In addition to actual firings, Iraq "painted" coalition aircraft with radars far more often. The US and Britain responded with stepped-up air strikes on Iraqi air defenses that concentrated on destroying their command centers, main fire units, and the optical fiber networks that connected them. After March 1st, US forces flew large numbers of sorties that had largely carried out the key phase of the SEAD mission before the war began on March 19th.[180]

The wartime suppression of Iraqi air defenses was remarkably well carried out, did not interfere with an immediate shift to other offensive missions, and both rolled up the Iraqi defenses in key areas, and attrited their numbers to the point they lost much of their low altitude air defense effectiveness.

According to Aviation Week, the US also made effective use of deception in dealing with SEAD, and was even able to use the effort for additional forms of targeting.[181] Aviation Week & Space Technology reports that Iraqis shown on television during the war who thought they were shooting at a crashed US fighter and its pilot were actually shooting at a downed USAF drone sent up as a decoy to draw out Iraq's defenses. According to this account, the plane flew undetected... until running out of gas and crashing.

> "One clue to clandestine U.S. activity came from television footage shot early in the conflict of Iraqi soldiers combing the banks of the Tigris River in Baghdad and shooting into stands of reeds. The hunt for downed coalition pilots was triggered by two over-age U.S. Air Force Predator UAVs that had been stripped of equipment and flown into the city's airspace to probe its air defenses. Intelligence officials also monitored Iraqi communications during the search to see what was left functioning of Iraq's military command and control system.
>
> The unmanned aircraft were never shot down and finally ran out of fuel, which doubtlessly told analysts something about the state of Iraq preparations. Baghdad was the zone of the country's most concentrated air defenses. One Predator plunged into the Tigris and the second into a lake. The UAVs were referred to as "chum" because they served as bait for the anti-aircraft defenses."

Aviation Week also reports that the destruction of secure communication links forced Iraqis to talk on more easily intercepted channels... which helped lead to the opening strike of the war:

> "We spent a lot of time taking out SAMs and radars and breaking open fiber-optic vaults, trying to make [Iraqi] command and control more difficult and visible to us so we could hear what they were saying and suck up the information that we needed," said a senior Air Force official. That effort resulted in the tip-off about Saddam Hussein's whereabouts that launched the conflict with a raid on Iraq's senior leadership. "Within 4 hr., we had four bombs down in the bunker".

At the same time, the SEAD mission should not be seen as easy. As has been discussed in Chapter III, USCENTAF estimated that some 210 surface-to-air missile launchers and 150 early warning radars were still active when the war began. The US deployed a massive electronic warfare effort as part of its air order of battle. It planned some 2,374 sortie equivalents to maintain air superiority and executed 1,441. It fired 408 High Speed

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Anti-Radiation Missiles. The US would also have faced a very different set of mission requirements if it had not been able to hit Iraqi defenses before the war began, or if Iraq had been able to modernize its air defenses and/or had properly organized them. The SEAD mission would be very different, for example, against a defense based around versions of the Russian S-300 or S-400 missile system, or the most modern European short range missile air defenses.[182]

The Role of the Patriot Remains Controversial and IFF Problems Emerge

USCENTCOM claims that the Patriot Pac 2 GEM and PAC-3 intercepted eight to nine of the 12 Al-Samoud 2 and Ababil-100 missiles fired at Kuwait during the conflict. (Only four of the missiles fired were PAC-3 because such missiles are in limited deployment when the war begins.) This performance is striking because the Patriot borders near Iraq had only 2-3 minutes from rocket or missile launch to intercept the target versus 10-12 minutes in the Gulf, where the missiles fired were much further away. It compares with estimates by the GAO that only 9% of the Patriots fired during the previous Gulf War hit their target, and hit only 1 of the 39 Scuds that Iraq fired at Israel.

The performance of the Patriots was also a further demonstration of the value of Space because of the warning of launch and missile vector provided by the infrared detection and tracking satellites in the Defense Support Program (DSP), and seems to have validated the use of the Joint Tactical Air-to-Ground System (JTAGS) that the Army deployed to Jordan. The definition of intercept is unclear, however, in terms of warhead kill as is the decision to not fire at systems that appeared to head into the Gulf or empty desert.[183] The Patriot also failed to detect an Iraqi CSSC-3 Seersucker cruise missile attack on Kuwait on March 20th, and what seems to have been a Silkworm cruise missile attack on march 29th, although the Seersucker is a low flying sea/land skimmer that the Patriot's radar is not designed to detect.[184]

The Patriot firings also expose a problem with identification of friend or foe (IFF). This problem may have been the result of the fact pilots often turn off their transponders to avoid location by enemy surface-to-air defenses, or a fault in the IFF system in the British Tornado. It also, however, may have been the result of problems in the Patriot's IFF detection system and the need for almost instant response to a missile attack that were exposed in Patriot trials in Georgia as much as three years earlier.[185]

Several different kind of incidents are involved. Patriots shot down a British Tornado on March 22nd near the Iraq-Kuwaiti border and two British aircrew were killed. The Patriot locked on an F-16 south of Najaf on March 24th and the F-16 fired a HARM missile that destroys the Patriot radar. In this case, the Patriot crew was taking shelter from enemy artillery fire and had placed the system in the automatic mode. The F-16 may have mistaken the automated radar activity for an Iraqi preparation to fire. The Patriot is suspected of shooting down an F-18 near Karbala on April 2, and killing the pilot. In both cases, the aircraft failed to show up on the Patriot control screens in spite of their identification of friend and foe (IFF) systems.[186]

At this writing, there are no clear statements on the causes, and it should be noted that the Coalition flew some 15,800 sorties over areas covered by the Patriot and any problems were limited in scope. Lt. General Ronald Kadish, head of the Missile Defense Agency, said later that the incidents may have been the result of a combined of flaws in both

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missile and aircraft IFF procedures and systems. General Myers, the Chairman of the Joint Chiefs, responded to a question on the issue by saying that, "procedures and electronic means to identify friendly aircraft…broke down somewhere."

Lt. Gen. David D. McKiernan, the commander of the Coalition Forces Land Component Command described the performance of Patriot as follows:[187]

> …there have been some blue- on-blue incidents. We take every one of those extremely seriously. Every one is investigated individually. And it's premature for me to comment on any of them, because, to my knowledge, none of those investigations have been completed. There were a couple that involved Patriot, but I would tell you on balance that every surface to -- surface missile that was fired that Patriot engaged was destroyed. Some of them we didn't engage because they landed out in places in the desert where it wasn't a threat or they landed out in the North Arabian Gulf. But I will tell you the Patriot's been a big winner over here in our theater missile defense plan…every one of these blue-on- blue incidents is investigated in great detail. And when those investigations are complete, I'm sure all the services and CENTCOM will have comments on all of them.

No Iraqi missiles are fired at Israel and the Arrow and Patriots deployed there were not fired in defense.

Lessons Primarily Affecting Army Land Forces

Once again, no set of lessons can be decoupled from the overall lessons regarding joint operations. The commander, Third U.S. Army and U.S. Army Forces Central Command and the Coalition Forces Land Component Command -- Lt. Gen. David D. McKiernan -- made this clear when he summed up the campaign at a briefing on April 23rd,

> "This has been a joint campaign. We have applied on a continuous basis the power of the air component, of the land component, of the maritime component, of special operating forces and information operations.
>
> My intent for this ground portion of the campaign was basically to put continuous pressure on the regime of Saddam Hussein, and my mission was to remove that regime and search for, and find, and be part of the process of disarming weapons of mass destruction.
>
> This ground campaign to date has reflected itself in high-tempo continuous operations, decisive maneuver, extended logistical support, where I accepted some risk in the length of our lines of communication and our logistical reach, which -- we have overcome that risk, and a execution of a plan that had several options in it but always remained focused on the enemy.
>
> Most of our combat vehicles have driven in excess of a thousand miles to date. They have not run out of fuel. Our maintenance status is in good shape. Our logistics has been sustained and will continue to be sustained.
>
> And I would refute any notion that there was any kind of operational pause in this campaign. There was never a day, there was never a moment where there was not continuous pressure put on the regime of Saddam by one of those components -- air, ground, maritime, Special Forces and so on.
>
> But most importantly, the battles that have been won by the ground component have been won by individual soldiers and Marines and small-unit tactical skill.
>
> It has not come without price. It has been a tough fight. And to date, we have suffered over 600 casualties in this fight. We have not suffered the last casualty.
>
> And today, D plus 35, where we sit is in a blurred transition between combat operations and post-hostilities operations. We're still fighting pockets of resistance throughout Iraq, and we're still dealing with paramilitary forces.

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> … There are some places where we continue to find pockets of regime resistance. We had some fighting last night in the Tikrit area. We'll have some fighting in other places as we continue to expand our control of the battle space. There's a second category of paramilitaries -- some of those, many of those are not Iraqi, they've come in from other countries -- they will continue to have to clear and deal with. And then there is a continued threat of protecting the force from suicide bombers or any other lethal threats that our forces might face. So I would say that the large combat decisive operations are probably coming to a close, but there are still pockets of resistance that we're having to deal with.
>
> We have found probably very small numbers of mechanized or wheeled Iraqi vehicles that are being used, and we also continue to find some that have been abandoned and many that have been destroyed.
>
> …And we're still expanding the ground component battle space. Today we have elements of the 101st Air Assault in Mosul. We have elements of the United States 5th Corps extending out into the western part of Iraq. We're securing -- continuing to secure Baghdad, Tikrit, other urban areas. But rapidly we are transitioning to a focus on civil military operations and an effort to restore basic services to the Iraqi people that are either at or better than their prewar standards.
>
> My commanders have the authority across Iraq to work with local Iraqi workers, clerics, political figures, bureaucrats, to get Iraqis back into the workplace and back in control of their destiny. And at my level, I am teaming very hard with Jay Garner and ORHA, the Office of Reconstruction and Humanitarian Assistance, as we together try to bring civil administration back on line here in Iraq and get the basic services and businesses and economy back on line.
>
> I would tell you that all of us can be very proud of our service members -- all services. They have all participated and all been vital to the success of this campaign to date. You can be proud of our military capability and that of our coalition partners.
>
> …we are more of a joint military organization than we ever have been. And the ability and the coordination between air, maritime, ground, special operating forces has been to a degree that I have -- in over 30 years, I've never witnessed before. It's never perfect -- no military operation is perfect, but jointness has been huge in this campaign. I would also tell you that our training and our training doctrine that is both service-related and joint-related has been -- and I'd kind of like to think I was part of that; that we've been working very hard for the last decade -- paid off in spades in this military operation.

Nevertheless, there are a number of lessons that do primarily affect land forces.

The Value of Main Battle Tanks and Heavy Firepower and Armor:

For all of the talk of force transformation, the accounts of fighting by both the 3rd US Army Infantry Division and 1st Marine Division make it clear that the combination of protection and firepower on the US M-1A1 played a critical role in ensuring Iraq forces could not bring tanks to bear at engagement ranges that allowed them to be effective, and that the superior protection of the M-1A1 greatly reduced losses and casualties. The 120mm gun on the M-1A1, for example, has a nominal maximum engagement range of about 3,000 meters. The T-72 can fire accurately out to about 2,500 meters but has far worse sights, fire control systems, and sensors. The older T-55 is limited to about 2,000 meters but has poor fire control systems and stabilization.[188] The protection and firepower of the Bradley proven to be equally important in dealing with irregular forces like Saddam's Fedayeen and other "technicals," and suicide attacks.[189]

General Richard Myers, the Chairman of the Joint Chiefs, described the role of armor in the Iraq War as follows.[190]

> "well, I don't think anybody has ever said that as you transform the force, and you try to become more easily deployable, you want to get rid of everything old. The Army's Future Combat System

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> which will eventually replace the M-1 tanks, is meant to have as much lethality and survivability on the battlefield, jut be different than trying to do it by adding more and more armor to something.
>
> But, it was never said that things like the M1 tanks and M2 Bradley Fighting Vehicles are not required. That's never been part of the discussion. Some of these systems have a lot of value and will have a lot of value for a long time to come."

There are some indications that the US Army is already rethinking some its plans to cut armor modernization as a result of the lessons of the Iraq War.[191] This does not mean that the US Army and other forces cannot find lighter new combat systems to replace the 70-ton M-1A2, but it does indicate that interim systems like the Stryker could not be an effective substitute for heavy armor in major regional contingencies. Questions also arise, however, about what would have happened if Iraq had large numbers of more modern anti-tank guided weapons like the Russian-designed Kornet. Iraq's anti-armor inventory – like that of most of its other weapons – had been largely frozen in time since the UN embargo on Iraqi arms imports in August 1990. No data are currently available on the details of M-1 and M-2 losses during the Iraq War, but it may be that they would have provided less protection against a force with more modern weapons.

Here it is interesting to note the informal comments of one analyst on reports that the Director of Force Transformation in the Department of Defense had said the Iraq War showed that heavy tanks are no longer needed:

> The Navy gave up its battleships over a decade ago. Except for the CVNs, Navy ships have virtually no armor -- if they get hit, they are seriously damaged or sunk. VADM Cebrowski now wants the Army to follow suit and give up its main battle tanks. The problem is that in a naval environment, one can keep the enemy at a considerable stand-off because sensor ranges are generally many miles out, thus buying time for defenses and countermeasures to work. In land warfare, an ATGM can fly as fast as an anti-ship cruise missile, but thanks to terrain and "cultural features" it may be fired from only a kilometer or two away. A tank main gun round is much faster, and can travel several kilometers, and is even less susceptible to countermeasures. In both cases, the tank has only a very narrow window in which to defend itself or employ countermeasures, and the effectiveness of those countermeasures is likely to be much lower.
>
> Before we try to go from a 70-ton to a nominal 35-ton tank, we need to ascertain the full extent of the changes in doctrine, tactics, equipment, and training that will entail, and whether breakthroughs in armor technology, weapons, active protection suites, power systems, etc. will be able to "deliver the goods." While Russian and French tanks are smaller and lighter than US tanks, it is unclear that they are as lethal, survivable, and reliable/maintainable as US tanks. It is also worth considering that even with an advanced hybrid turbo-diesel-electric drive instead of a fuel-slurping gas turbine, US tanks are expected to have a greater unrefueled range than most foreign tanks, and fuel weights.
>
> Stryker Brigades do not give tactical airlift-delivered light infantry a useful level of protection or firepower. While better protected than Armored HMMWVs, they are more susceptible to hostile fire than the M113 upgrade known as the MTLV, just as vulnerable, while providing less firepower. They are also much harder to squeeze into a C-130. The Stryker's only advantage is for on-road speed/fuel economy. Forces in STRYKER Brigades are still light infantry, albeit motorized light infantry. They must still fight dismounted, since the vehicles provide no protection against RPGs, anti-vehicle mines, or automatic weapons over 14.5mm. The MGS cannot fit into a C-130, and there is still no 120mm mortar variant.
>
> A serious medium force would be based upon the proven, thoroughly developed M2/M3 Bradley, which has ample firepower to overmatch anything short of a tank, and with Javelin ATGMs can handle that threat, too. Of course, this would require the politically unpopular move of replacing

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the Air Force's C-130s with C-17s on a one-for-one basis if the force were to be at least initially emplaced by air, and deploying more fast sealift (both intertheater and intratheater) for maritime deployment where feasible. But Afghanistan and Iraq demonstrated both the current forces' impressive capabilities for difficult (though largely uncontested) entry, and their sustainment limitations over extended overland LOCs.

"Precision Artillery" is a Natural Partner to "Precision Airpower"

As is the case with the use of airpower, there are no battle damage assessment data on artillery. Some preliminary reports indicate that the US was able to use long-range artillery and artillery rockets like the ATACMs to both strike at Iraqi forces long before they could close on US forces and compensate for the problems airpower experienced in flying attack and close air support missions during sandstorms, although there are reports that F-15's used targeting data from the E-8 JSTARS to use of GPS guided bombs during a sandstorm.[192]

Television coverage shows heavy 3rd Infantry Division use of tube artillery and the MLRS/ATACMS during sandstorms, at night, and in clashes with Iraqi forces in better weather and where attack helicopters and attack fighters were present. The Marines also made extensive use of their towed tube artillery, even though it involved much longer set up and emplacement times. According to one press report, "

The Marines' 155-millimeter howitzer is effective at a range of more than 15 miles. With its computerized targeting, it can hit an object the size of a 50-gallon drum. In one 30-minute barrage, 400 rounds were fired at Iraqi positions. So many shells were in the air at once that computers and satellite imagery were used to keep projectiles from colliding: "It's like being an air traffic controller in Los Angeles," said Gunnery Sgt. Will Villalobos of the 1st Marine Division."

At the same time, there are press reports of numerous other incidents that make a strong case for better communications, control, and the "digital army." Targeting was often a problem and ground troops could not coordinate precisely with artillery units to target fires accurately, This was a particularly severe problem in urban areas but also affected combat in the field. Reactions times could still be improved to provide better time on target capability.

It seems likely that the availability of the sensor fused weapon would have helped in artillery attacks on armor in some cases, and guided artillery projectiles would have helped in others. In short, there are important improvements in artillery capability that are now in development that would probably have made artillery significant more effective in the Iraq War if they had already been fielded.

Special Forces are Becoming a Far More Important Element of Joint Warfare

Special Forces and ranger forces played a major role throughout Iraq. It is clear that the new interactions between Special Forces, precision airpower, and advanced ISR systems demonstrated during the Afghan conflict are redefining the role of Special Forces. There are reports that General Tommy Franks found Special Forces to be so effective during the fighting in Afghanistan that he deployed some 9,000-10,000 personnel in similar roles in Iraq. [193] the were generally employed in teams of 12 or smaller, and had numerous special purpose aircraft, including a peak strength of 8 AC-130 gunships, 8 HC-130s, 8 EC-130s, 14 MH-47s, 31 MH-53s, 7 MH-6s, and 18 MH-60s.

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It is clear from Chapter IV that Special Forces often played a critical role in working with friendly Iraqis like the Kurds in the North, in finding and illuminating targets for air attack, in searching for Iraqi missiles and weapons of mass destruction, in securing Iraqi facilities in the West, in other operations in the north and in Baghdad, and in securing Iraqi oil facilities and its export terminals in the Gulf. [194]

It seems clear from press reports and discussions with those involved that the ability of Special Forces to call in air strikes and either illuminate targets or provide GPS, coordinates in at least some cases compensated for their lack of heavy weapons and firepower. Their ability to use secure communications and displays, and their use of new systems like the individual transponders or "Blue trackers," also allowed them to operate with a new degree of situational awareness, coordinate more closely with other ground forces, and operate in ways where higher echelons of command could do more to coordinate their operations.

The two pound transmitters were about the size of a small Walkman and sent codes every 5-10 minutes identifying units and their GPS coordinates. This allowed them to be fully coordinated in battle plans where their location could be mapped relative to friendly armored forces and threat data, and for far more effective coordination on fluid battlefields. The US Special forces Command has purchased some 1,680 transmitters and 27 aircraft mounted receivers, and the transmitters were developed in cooperation with the National Reconnaissance Organization (NRO) and US Space Command, and can be read by US satellites. Representatives of Special Forces at the CAOC helped coordinate the effort to use the data for battle management purposes.[195]

US Special Forces also seem to have been one of the few combat elements with the language skills and area training to work closely with opposition forces like the Kurdish Pershmerga, and to make effective use of the volunteers from the outside Iraqi opposition volunteers trained to act as liaisons between US forces and the Iraqi people. One of the almost constant problems that emerged in Us operations during the war was that US units had far too local Arabic speakers, far too few experts on Iraqi religious and cultural practices, and were not prepared to deal with Iraqi civilians or Iraq military when they attempted to communicate. This was not critical during battles with Iraqi Republican Guards or conventional forces, or in firefights, but it is clear that need for units trained in asymmetric warfare, language skills, and the area was vital in the North and West. Iraq War also demonstrated the natural synergy between the Special Forces of Australia, Britain, and the US and intelligence operations by organizations like the CIA. Special Forces have evolved far beyond the mythos of combat elements like Delta Force and the sheer drama of sudden assaults on terrorists by the SAS. Their training and tactics may still give some the small group warfighting capabilities of capability of "snake eaters," but they are now often high technology "snake eaters" with masters' degrees. They are also forces that employ lasers, new radar sensors, computers, UAVs, and the kind of netting that makes use of GPS, computers, and new communications links for joint warfare.

Lt. Gen. David D. McKiernan, gave special forces the following praise for their role in the battle:[196]

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> Now, I'm not the right one to comment on the special operating forces, because I don't command those. But I will tell you that their effects were felt before D-Day and are still felt today, that they have been a huge combat multiplier in this joint campaign to topple this regime.

It seems likely that Special Forces are becoming a critical new element of joint warfare in an era of asymmetric warfare, but the history in this book can only hint at the details. It is also clear that there were some occasions times when the light weaponry of Special Forces presented serious problems in challenging Iraqi regular forces, particularly when air support was not immediately available. Task Force Red Devil, for example, encountered such problems in dealing with Iraqi artillery in an operation near the Kurdish Security Zone.[197]

As is the case with most of the lessons of the Iraq conflict, and the Afghan conflict as well, it is also important to consider the quality of the enemy. US light forces are almost certain to be more successful when the enemy lacks leadership and motivation, and the definition of "light" is relative when in includes massive amounts of air support with precision guided weapons.

The may well be a reason to seek to provide special Forces with new transformational weapons and even better means of calling in air and missile support. However, most of the presently programmed in improvements in US Special Forces have grown out of the Afghan War, and it is too soon to estimate how the Iraq War will change these requirements.[198]

Urban Land Warfare Does Not Have to Be Fought on Traditional Terms

Much of the concern over urban warfare depends on fighting house-by-house or street-by-street. The US demonstrated that it is possible to use the new degree of situation awareness provided by modern ISR assets to help overcome the enemy's superior knowledge of terrain, and to the open areas of modern cities to conduct armored patrols with helicopter and air support.

Contrary to doctrine, armor often moved swiftly through modern cities without forward screening by infantry patrols, was able to find relatively open routes and exploit the longer fields of fire provided by major streets and boulevards, could bypass crowed and narrowly-pack areas, and either had sufficient protection to survive limited clashes or could dismount infantry once the encounter began.

The US showed it could divide cities using key routes and area of concentrations, rather than seeking to occupy large areas, and "take a city" by focusing on seizing key symbols and centers of regime power.

It is interesting to note the comments that V Corps Commander Lt. Gen. William Wallace made about urban warfare in Baghdad:[199]

> "You have to go back to the battle of Najaf to understand our actions at that point, because that's where we learned we could do better. We learned that armor could fight in the city and survive, and that if you took heavy armored forces into the city—given the way Saddam was defending the city with technical vehicles and bunker positions—we could knock all of those defenses out and survive. As a result of Najaf, I think our soldiers also gained an extraordinary appreciation for the survivability of their equipment. So Najaf made decisions associated with being more aggressive when we got to Baghdad a hell of a lot easier."

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> "In fact, we found that the positioning of our forces around the palace downtown was actually more defensible than our positions on the outside of town, because the parks and broad plazas in the city gave us good fields of fire, and we were in a place where he couldn't mass his artillery on us because we were in the middle of his artillery forces....all of that added up to making our decision to stay in downtown Baghdad a good one. Third Infantry commander Maj. Gen. Buford Blount called me up and said, 'Well, we control all the intersections, and I recommend we stay, because if we stay, we have the city.' I agreed."

> "One day our troops are kicking down doors, and the next they're passing out Band-Aids. And in some cases, they're kicking down doors without really knowing if they are going to have to pull a trigger or pass out a Band-Aid on the other side. And it's really a remarkable tribute to the mental acuity of our soldiers that they are able to do that."

The US experience in Al Hillah and Nasiryah shows these tactics can might be much less effective against better organized defenses. It also seems likely that the outcome would have been different if the Republican Guards had been organized into a cohesive, prepared urban defense, and have not been committed piecemeal into combat outside urban and built-up areas. Accordingly, the lessons of urban warfare could be very different if future enemies are more cohesive and have time to organize.

Try Force the Defender to Maneuver and Move Outside of Cities

One possible lesson is also to force the enemy to move forward and engage outside the urban area. The fact the Republican Guard was forced into meeting engagements helped ensure that Baghdad could not be defended effectively. If maneuver warfare can prevent reliance on urban defenses, and indeed static defenses of any kind, it greatly increases the effectiveness of every element of joint warfare.

Research and Re-research Local Weather and Operating Conditions

No military forces in the world have more experience in operating in a wide range of climates and areas than US military forces, or do more to adapt their equipment to global conditions. At the same time, it is clear that every theater of operations places new and unexpected demands that have to be considered in going to war, and that forward area operations research is critical, as is careful research into weather and other factors that may alter the battlefield.

The US was not surprised by sandstorms during the Iraq War; their effects had been studied in some detail. Nevertheless, the reality was more challenging than US forces expected. V Corps Commander Lt. Gen. William Wallace made the following points the impact of sandstorms and desert terrain after the fighting: about urban warfare in Baghdad:[200]

> I was certainly happy with the way our forces handled the terrain. We captured a map that an Iraqi reconnaissance battalion commander in the Republican Guards was carrying, and it showed they were anticipating our forces to go exactly where we decided not to go, largely because the terrain between the Euphrates and Tigris Rivers was so difficult for maneuver forces.

> Having said that, we were surprised by the texture of the desert terrain. The dust problem in those areas was orders of magnitude worse than any of our terrain analysts had predicted. That caused us a number of problems. It caused us a problem in terms of convoy movement, and in terms of aviation assets. Anytime anything moved out there, it kicked up a dust cloud. It was like driving through talcum powder.

> "Personally, the period during the dust storm was the low point of the entire campaign for me. That was definitely the hardest part and the low point of the war."

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The Problem of Allied Power Projection, Interoperability, and Allied Warfighting Capability

More generally, the Coalition experience in land warfare provides the same grim lessons for most European land forces, as well as for NATO and the European Union, as it did for air forces and does for sea forces. Britain is now the only European power with meaningful experience in modern land warfare, a high degree of combat readiness and professionalism and with serious power projection capability. Even Britain, however, cannot sustain heavy forces in long distance combat maneuvers at long power projection ranges.

While it may not be polite to say so, the European members of NATO and the European Union threaten to create cosmetic power projection forces at a time they are becoming a coalition of the incapable. As it the case with far too many European air and naval forces, there is no "Western' advantage in airpower. Most European land forces lack sustainability, modern technology, effective readiness and training, and either the capability to act as independent expeditionary forces or to be fully interoperable with the US.

Once again, the lack of a central focusing threat, and missions that go beyond limited combat and peacemaking, have led their civilian masters have allowed them to decay into aging, heavily bureaucratic, forces which often modernize in ways better suited to the politics of European defense industry than effective warfighting.

As for air forces and sea forces, there are good reasons why most European governments provide virtually no meaningful transparency into the readiness of their land forces and the effectiveness of their modernization plans. In most cases, their five-year plans are simply a façade hiding a steady decay in force strength and/or readiness and drift towards high-cost technological obsolescence. And once again, this is not helped by NATO and EU force plans that similarly paper over real-world problems, set meaningless or unmet goals, and are triumphs of institution building over military reality.

US ability to work around the broad incapacity of European forces to find elements go great value is not effective interoperability. Neither is the US ability to compartment out forces with inadequate capability and interoperability and give them some mission. Something is better than nothing, but this is not likely to be a particularly beneficial lesson of war.

Lessons Primarily Affecting Marine Corps Land Forces

The Marine Corps provided significantly lesson data on its operations, both during and after the Iraq War, than the US Army and Air Force. This may have been because its lines of advance had to be kept more secret, but it does make it difficult to sort out what often are reports from individual Marines involved in the war from the kind of lessons that may reflect a broader consensus within the Corps. It is also clear that part of the reason is that interviews show that at least some of the tensions that exist between Secretary Rumsfeld and his staff and the command of the US Army also exist between Secretary Rumsfeld and his staff and the Marine Corps.

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The Marines are "Post-Amphibious," and "Post-Littoral Forces"

The US Marines proved they remain true expeditionary forces that can carry out heavy armored combat at long ranges from sea. The danger in this lesson is that it can blur the need for a specialized combat arm trained and organized to work with the Navy, and which is trained and equipped for the kind of littoral warfare that is critical in military operations along the world's sea coasts.

At the same time, the Iraq War shows that the role of the Marines in joint warfare should continue to include training, equipping, and organizing it for heavy armored warfare. It is also a warning against making trade-offs in force planning that preserve the size of the Marine Corps's active combat force structure at the cost of reducing such capabilities. The Marine Corps did, for example, have to fight the Iraq War without self-propelled artillery and using light armored vehicles designed primarily for amphibious warfare and vertical envelopment.

It might well be worth reexamining the force plans of the Marine Corps in light of the Iraq War to see if they adequately preserve the dual role of the Marine Corps in both littoral warfare and traditional land combat missions. It is also worth reexamining the overall balance of funding within the defense budget to see if a larger percentage of total funding should be shifted to the Corps to enable it to preserve this mission, particularly in view of what seems to be at least a decade-long delay in the US Army's ability to convert a force structure it can rapidly deploy. Current Army plans still leave many combat elements that take months to prepare and move, and seems to be on a path that will take over a decade to convert to the Future Combat System force structure it will need to rapidly deploy.

Such tradeoffs will be complex and uncertain. The Marines could not have sustained their operations without support from the US Army. The Marines are, and should remain, light enough to be an expeditionary force. As one Army officer points out,

> "the Marines (and the Army for that matter) are able to maneuver their "heavy" forces only because they plugged into a largely Army support infrastructure at echelon above division, echelon above corps, and theater level. The theater infrastructure is necessary for the successful maneuver and support of the Land Component, regardless of whether it is made up of expeditionary forces from the Army or USMC or both."

Detailed Lessons from Marine Forces: The Marine Corps

Like the other services, the Marines in the field have produced a number of preliminary official reports on the lessons of the war, as well as anecdotal field reports about the course of combat and the lessons learned during the advance of Marine ground forces. Any such lessons can only be suggestive at this point. There is no way to put most into a broad context that can validate whether they represent individual views that others do not share or atypical combat experiences.

Some quotes from these reports do, however, seem representative enough to mention. They provide a useful picture of the fact that the perspective of those actually in combat was very different from one of ease and the ability to rely on technology. As General Wallace pointed out in the case of the US Army, the battle put a nearly continuous stress on troops, there was often hard fighting, and the "friction of war" continued at every level from command and communications to the stress placed on the individual Marine

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The more official source of Marine reporting is a three man Combat Assessment Team which made a preliminary field study for the Marine Corps Systems Command (MCSC):[201]

> *Dust abatement* – remains a high priority for the MEF and affects units throughout the battlespace. My personnel experience suggests that this type of materiel needs to come into theatre ASAP. Dust in certain areas is greater than 6" deep and very much like a fine talcum powder. Foot and vehicle traffic, along with ever-present winds, can reduce visibility to less than 50' feet in a matter of moments. Convoy operations become exceedingly difficult, air operations come to a halt and living conditions for Marines become intolerable. A bigger concern is that commanders in the field are faced with a Catch-22 situation of spraying oil on the ground (hazmat, environmental issues in a "win the hearts and minds environment") vs. functioning.
>
> *Logistics Trains* - CSSG resupply trains were fired upon. However, their technology and armor was inferior to that of the divisions'. Marines without SAPI plates in soft skinned vehicles were the norm. "Rear area" units have elements that routinely operate on the "front lines". Though CSSGs did not face the same intensity and threats of Division units, they received fire and worked in a very hostile environment. As the tempo of the modern fight will cause differences between the front lines and rear areas to blur, Advocate level consideration needs to be given to more equitable fieldings of equipment. FSSG units need to be outfitted with more Blue Force Trackers, more high tech radios, and better-armored protection (SAPI plates, armored HMMWVs, etc).
>
> *Low Cost Receiver* – This system proved very easy to use, was lightweight and "Marine Proof". The system never failed to work and was used to push information around the battlefield and every unit wanted one of these systems.
>
> *Forward Air Controller (FAC) Suite/GLTD II* ~ Operators who used the designator found that it performed acceptably. Operators in vehicle platforms (to include AAVs and tanks) would like to have a stabilized vehicle mounted variant. The FAC suites were not issued as requested in the UNS. The fielding team only issued the GLTD II laser designator suite. The PEQ-4 laser illuminators/markers and AN/PRC-7C night vision goggles went directly to Division and were distributed before the fielding team arrived in country. *(note: as the crossing of the LD became imminent, it was decided to field components as they came in, IOT some capability vice no capability. The GLTD II literally "just made it" and was the last item fielded before the LD was crossed).* Units already have assets to communicate with the aircraft (PRC-113), night vision devices (AN/PVS-7s, AN/PVS-14s) to spot the laser illumination, and AN/PVS-17C to give the GLTD II a "night sight capability". The AN/PVS-17C has a maximum effective range of 500m at a point target in ideal/perfect conditions. This distance is within the "danger close" area, and therefore doesn't give the system a night capability. Units didn't reallocate the AN/PVS-17's for the designators as the capability gained is far less than what is lost by taking them off they intended weapon platforms. Operators would like to be able to see the laser "splash" on the target from a piece of gear mounted to the designator. They were unable to do this with the gear available. They also requested having a thermal site attached or mounted.
>
> Operators were very impressed with the AN/PEQ-4 Laser Illuminator; which was used extensively. It was the primary tool used by the FAC's, especially when working with Cobras. They illuminated the target and once the pilot spotted it, he was able to control the mission. Many would like these issued beyond the FAC's. Often, smaller units (platoons, squads, teams) don't have a school trained FAC with them but need the capability. Users would prefer ISLD 1000 vice AN/PEQ-4 for increased capability; however, the PEQ-4 "answers the mail."
>
> *AN/PVS- 14 Night Vision Equipment* ~ "Great piece of gear, need more." Some infantry units have one per man, (combined AN/PVS-14 and AN/PVS-7 assets), others, one per squad. Operators are asking to have one set of Night Vision Goggles (NVG's) per fire team; one per man is preferred. Units who received the M16A4 with ACOG scope/site would like to mount the NVG in front of the ACOG to give them a night shooting capability. For those who did this, they found the capability worked well. Some units couldn't mount the AN/PVS-14 on the 1913 RAIL

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(unknown if they had a different model, were missing parts, or lacked training). They taped the NVG on and had limited success. Actual mounting would be better.

Long Range Thermal Imager (SOPHIE) ~ Operators were amazed by the capability. They would like more of the capability but would like to see it in a smaller and lighter package that is vehicle mountable and stabilized. Operators needed more extensive training. They didn't really know what they were seeing.

AN-PAS 13 Thermal Weapon Site ~ "Amazing, need more." Many operators were able to see clearly to "10+ kilometers" under good conditions. In mild dust, they were also impressed since they could see "almost as far, 8+." Most reports were that they worked very well in all but the most extreme dust storms. Highlighted the need for thermal AFVID USMC wide! If PAS-13 gets wide distribution, infantry units will need rigorous AFVID ***THERMAL*** training. Currently, Tanks, LAV, Tow, and Air train to such standards. The proliferation of numerous hand held thermal devices without proper training could prove problematic. In addition, infrared can be viewed. Passing lanes proved problematic for some LAR vehicles that relied on thermals. Passives had to be used to spot IR chem.-lights. Thermal chem.-lights or beacons can prove costly.

M249 Squad Automatic Weapon (SAW) ~ The SAW's are worn out and apparently beyond repair. They have far exceeded their service life. Many Marines are duct taping and zip tying the weapons together. Reconnaissance units were requesting parasaw, infantry units requesting collapsible buttstock.

5.56mm vs. 7.62 Lethality ~ 5.56mm "definitely answered the mail" and "as long as the shots were in the head or chest they went down" were typical quotes from several Marines; many who were previously very skeptical of 5.56mm ammunition. Most of the interviewed Marines who reported targets not going down and/or could still fight were referencing non-lethal shots to the extremities. There were reports of targets receiving shots in the vitals and not going down. These stories need not be described, but are of the rare superhuman occurrences that defy logic and caliber of round. Some Marines did ask about getting the heaver-grained 5.56mm rounds, up to 77 grain if possible.

TOW 2 ~ Operators are extremely happy with the performance. Several operators reported tank (T-72) catastrophic (K) kills. TOW 2B caused some concern when shooting over any metal (such as around the oil fields) and around "friendlies" because of the one sensor. The operators already knew these factors. The TOW 2A had no such concerns. The one downside comment (a constant theme by all interviewed), had to do with training. For gunners trained on the newer sight, they are great. For the untrained on the new system, gunners are unable to identify and range targets, etc. Many operators are also having a tendency to follow the rocket with the sight when the rocket rises above the gun-target line, instead of leaving the site on target. This causes the rocket to go higher and higher as the operator follows the rocket. Sometimes they recover and hit the target, most of the time they don't. Additionally, the TOW sites are being successfully used for surveillance purposes. Operators are impressed with the capabilities the site offers in this area.

SMAW Thermobaric (New) Round ~ Only received reports of two shots. One unit disintegrated a large one-story masonry type building with one round from 100 meters. They were extremely impressed. However, another unit tried to breach a wall of a similar masonry building after being unsuccessful at trying to mechanically breach a door. "The round just bounced off the wall." They were not so impressed.

Enemy Engagements ~ Almost all interviewed stated all firefight engagements conducted with small arms (5.56mm guns) occurred in the twenty to thirty (20-30) meter range. Shots over 100m were rare. The maximum range was less than 300m. Of those interviewed, most sniper shots were taken at distances well under 300m, only one greater than 300m (608m during the day). After talking to the leadership from various sniper platoons and individuals, there was not enough confidence in the optical gear (Simrad or AN/PVS-10) to take a night shot under the given conditions at ranges over 300m. Most Marines agreed they would "push" a max range of 200m only.

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LMT (Lightweight Mobile Tactical) Water Purification System ~ There were several complaints about the "flimsy" construction of the LMT. Most components were made of easily breakable plastic. Also, the purification of the LMT was not enough to purify the fresh water from the Euphrates River; its' effectiveness and usefulness was questioned. A small system was a "good concept" however, the purification capability needed to be greater.

3000 gallon Water Bladders ~ Marines in the Utilities field admired the 3000 gallon water bladders used by the Seabees. These bladders were very effective as a sealed water storage capability. The current 3000-gallon "onion skins" were good for raw water storage, but not purified water. Also, the 500-gallon pods were not a large enough storage capability for purified water.

SAPI (Small Arms Protective Insert) ~ To no surprise this item was worth its weight in gold. SAPI plates saved lives. In five separate incidents at 2D Tank Battalion the SAPI prevented death or serious injury. In the words of Capt. David Bardorf, 2D Tank Bn., "SAPI is God's gift to the Marine Corps." Marines were hoping that the future could bring a lighter version that was slightly wider in the front, but these requests for modification were minimal and insignificant compared to the positive feedback and effectiveness of the plates.

LAVs ~ The LAV community had favorable comments about the LAV. However, the concern was raised that LAVs are getting old, requiring increased maintenance. A replacement was desired for the near future.

Combat ID Panel ~ These were highly desired and utilized. However, they were obtained by borrowing panels from the Army as well as fabricating panels prior to crossing the LD. Several Marines emphasized that Combat ID panels are a necessity for war; the USMC needs to field these critical fratricide prevention devices.

Phrase-later ~ This was another small open purchase item that was purchased through unit funds. It consists of a small "palm pilot" size computer system that translates phrases into the desired language. This was used on numerous occasions to ask simple questions of locals and EPWs (with heavy usage at checkpoints). Recommend C4I or CESS look at providing to deploying units. The system is manufactured by Maine Acoustics.

Iridium Phones ~ There was a lot of positive feedback on the Iridium phone. Due to its ability to be used when not in Line of Site, these phones were often used for communication. It was a highly reliable means for the forces to continually be in contact with one another.

AAV as Tank's C3 vehicle ~ A concern was raised with respect to the comparatively lightly armored AAV being the C3 vehicle and thus employed with the Tank battalion. Those in the AAV felt vulnerable to enemy fire when engaged in a battle with the Tank Battalion.

D9 Dozer ~ These bulldozers received highly favorable reviews from all that benefited from their use. They were seen clearing a row of buildings effectively within an extremely short period of time. Also, they were used in quickly clearing a highway for use and constructing hasty combat roads. Marines stated that the D9 can do the equivalent of approximately (4) D7 dozers. They would like to see this Dozer employed in more operations in the future.

Mine Detectors ~ These received poor reviews. They were labeled "flimsy" and "inaccurate." The Marines of the Combat Engineer Battalion recommended a review of the ANPSC-12 (in Albany). They desired to test these to see if they would be more effective.

Anti-Personnel Obstacle Breaching System (APOBS) ~ Each compound is too heavy and the range is considered ineffective. The range of approximately 25 meters was questioned. As one Marine stated, "Why should I lug a 50lb piece of gear around that only clears 25 meters when I can just mark it for EOD and walk around the obstacle?" The Bangalore torpedo was still a preferred breaching system for obstacles.

Imagery ~ Imagery from various systems did not make it to the HQ G-2 level on numerous occasions due to a lack of bandwidth and electronic imagery transferal means. BFT did not

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possess the bandwidth for larger files and MDACT was unreliable as a communications means due to its limitation on Line of Site communication with the EPLRS radio.

Full Width Mine Plows (FWMP) "The Pearson Plow" – in my earlier report I wrote, "*of the 20 plows procured, only 11 went forward. Of this 11, I saw 3 on the highways of Iraq. Presumably cut lose as units went forward, it appears the plows are now combat losses. The 3 I saw were laying in the highway; burned out*." Apparently, the weld mounts on the plows did not hold and broke from the body of the tank. This may account for the 3 I saw on the highway. The fielding team observed an incidence of this during the application of the hardware and repaired. The 5-ton trucks used to transport the FWMPs broke down. At no time did 2D Tank Battalion employ its FWMP or Track Width Mine Plows. Even though 2D Tanks did not use the FWMPs, Lt. Col. Oehl, the battalion commander, stated the item had its merits. It "did not drastically reduce the effectiveness of the tank" as implied by junior Marines in 2D Tank Bn. He noted it would have been a valuable asset had the mission called for breaching a minefield. Lt Col Oehl also supported the FWMP for use on the Armored Breacher Vehicle (ABV).

Blue Force Tracker (BFT) ~ The Blue Force Tracker proved very popular with Marines from both LAR and 2D Tank Battalion. The 5.1 MB download capability proved to be very useful. Real-time information transfer and satellite imagery was mission critical on several occasions. BFT was considered "very responsive" due to instant messaging capability. Most of the commanders agreed that the pace of the battle required a device similar to Blue Force Tracker. Units were, at times, unable to maintain VHF over distance due to the inability to establish retransmission sites. Potential retrans sites would be forecasted to be located in unsecure areas. In the absence of communications, BFT provided units with responsive message traffic. Tanks and LAR used it in the absence of radios. It was, at times, the only means of communication for dispersed units. BFT was considered very reliable for providing friendly situation reports. Many officers and senior enlisted felt that the Scout Platoon and Alpha and Bravo commands needed this capability. It was recommend that at least 24 systems should be fielded per battalion, two tanks at the platoon level.

M-DACT ~ Comments suggest that it was a highly unreliable due to the system's reliance on having the server up constantly. The system was marginalized when an active server hub went down. There were reported instances of units showing up in the "wrong" country. Some units appeared miles away from their known locations. This effected confidence in the system. Some Marines claimed it was too complicated to use. Windows pull down menus on a small screen made accessing information time consuming and difficult under combat conditions. This feature was also cumbersome while traveling at high rates of speed over difficult terrain. Transmission with the 56K modem took four to five minutes to send out a message. Other concerns included the screen being too small and not being user friendly. The MDACT system was noted to have great capabilities and was considered a "good concept" however, on the user level it was not employed due to its unreliability. BFT was preferred and MDACT was ignored.

Firepower Enhancement Program (FEP) Raytheon/ DRS ~ Comments on the FEP include the following: Position location capability and the ability to range a target and get a ten-digit grid were considered very useful. It proved valuable in fire missions and situation awareness. The fifty-magnification sight needs better resolution but proved useful. Thermal Bloom (washout in the TIS sites from fire trenches and burning vehicles) took one to three minutes of recover. Raytheon FEP site engaged vehicles in excess of 2300m. Was used by Bravo Company to Identify Snipers in buildings. Used as land navigation tool during road marches. Worked well in open terrain and built-up areas. One criticism of the Raytheon FEP was that it took four minutes for the Far Target Locator to align. It was the opinion of the experienced crews that it was impractical to sit idle for that period of time in the combat environment. On several occasions, the crew rolled without FTL alignment due to time constraints. The crew then had no option but to fight the tank in degraded mode. They recommend a 30 second alignment process. In static positions the FEP site was used to provide over watch for the tank company and to friendly infantry patrolling forward of lines. Crews recommended retaining the binocular site at the gunner's station. The ability to see in both day and night with the GPS and binocular site was very popular and useful to tank gunners.

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M88A2 Hercules Tracked Recovery Vehicle ~ The M88A2 was rated as an excellent recovery asset. However, the general comment was that there were not enough of them. The original quantity of two M88A1 was reduced to one M88A2 for each tank company on the T/O. The long trek into Iraq resulted in many self-recovery operations (tank towing tank) due to the lack of recovery assets. This tied up needed combat power. Recommend USMC revisit the T/O of tank battalions to add at least two additional M88A2s per battalion on MPF. Some units used M88A2 as an armored ambulance. Cpl. Myhre, Company A. 2D Tank Bn modified one M88A2 with a loaders M240 7.62mm machine mount from an M1A1 tank. This modification gave the M88A2 another weapons station in addition to its .50 M2 Machine gun. Recommend more tow bars for tank units (*note: there are not of enough tow bars of all types to support all equipment in the operating forces. The USMC needs to revisit this issue and invest in acquiring more of these assets).* Number of self-recovers demonstrated this requirement. Need vehicle power source to recharge laptop computers containing Technical manuals for the maintenance crews. The pace of the advance did not allow for time to recharge the set with field generators. Track continued to snap on left side. CWO3 Dan Wittcop speculates possible problem is the torque caused by the more powerful engine of the Hercules. Track would simply "pop". It is recommend at least exploring a sturdier center guide for the track. Winch fragility was also addressed. Some recoveries required off angle approaches outside the recommend 20-degree angle. Recommend that an update to the TM include a reference to use a floating block in recoveries. One snapped cable was repaired in the field. However, at the time of this report a recovery was not attempted with that cable. Skirts on the M88A2 design made it difficult to do rapid track maintenance. During combat operations, removing bolts proved problematic. Recommend exploring a vehicle modification to allow for better access. A Battle Damage Repair (BDR) should, if possible, be developed for fixing cables on M88A2.

Armored Vehicle Launched Bridge (AVLB) AVLB ~ Not employed to any great extent during operations. However, many in the 2D tank battalion cited the need for an improved AVLB variant. Throughout operations, the AVLB was slow, achieving speeds of only 20mph. It was recommended that HETs be used to transport AVLBs. AVLB is at the end of its life cycle. Spares were difficult to get. AVLB track was in short supply. AVLB track was repaired with SL-3 on vehicle. Once that ran out, track from non-operational AVLBs was used. Only two of the battalion's AVLBs made it to the site at Ad-Diwaniyah at the time of this interview. It is recommended that MCSC should coordinate with Requirements and the Advocate IOT POM for a variant that can keep pace with the M1A1. LAR Marines offered some unique perspectives based on their mission experiences. One Marine suggested that AVLB assets were needed forward with LAR. They proposed a lightweight "LAR" MCL Bridge variant or a faster tracked MCL 70 ton variant.

Other Marine field reporting from the 1 Marine Division and individuals within it, provides the following lessons:

- War commenced prematurely due to information received from CIA regarding the presence of Sadam in Baghdad. Likewise CIA liaison at 1 MARDIV HQ was off the mark. Reports of up to 90 T72s advancing towards border pre-D Day forced Div Comd to change plan that had been in place for 6 months. After having changed F15E confirmed report in fact incorrect, tanks were same 6 tanks that had been present since D-20 days. Plan back to the original plan. Sufficient flexibility and training within the organization to make changes at short notice.
- On the commencement of the war first discovered none of the T62s and T72s was occupied which was a bit of a concern. All lined up neatly in tactical formation with Iraqis standing next to them surrendering holding out wads of cash to the Marines. There were competitions being held between the tanks (2nd Tanks led the advance) as to who could get the longest-range tank kill. Longest recorded was 4,100 meters.
- Iraqis feared Tanks and LAR more than anything. However the fanatics were quite happy as long as they didn't have to deal with dismounted infantry. The weather had huge effect on both operations and morale. But the force kept moving on regardless albeit confined to the hardball.

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- The Iraqis had made extensive defensive preparations around all towns. The works had been well planned and sited with engineer input. The trenches were where Marines conducted the majority of fighting around the towns.
- Iraqis would always camp under palm trees and therefore that was where the majority of contact was joined. The Republican Guard were surrendering on masse, however because of the speed of the advance the Marines usually ignored them due to not wanting to take on the burden of EPWs. So we guess they just walked home.
- Fadayeen tactics fell apart the moment Marines dismounted and cleared through the buildings. Their tactics were far more comfortable with dealing with vehicles and Marines that remained mounted.
- The planning cycle was way behind the execution being conducted by the forward commanders. Div HQ was still producing lengthy OPLANS and FRAGOs that were too late for the commanders, as they had already stepped off. Staffs are adhering to the training and requirements they are taught by MSTP for CAX.
- Force Recon suffered from a lack of employment. Their employment was considered far too high risk.
- Nighttime was for driving not operations. Night vision devices were put to very good use for night driving, however only one night attack was conducted by 3/7.
- There was a lack of common intelligence picture throughout the Div. Points that were being picked up as a result of one Battalion's action about the enemy were not being passed up the chain for other units to take not of. Lack of comms had some bearing upon this, in addition personnel are not trained to take note of what will be important both up the chain and laterally to neighboring units.
- Battle preparation, maintenance and prep for the next day was poor. Marines were exhausted by day four with little sleep and rest. Commanders in particular were making questionable decisions due to lack of rest. There was continued implementation of the stand to / stand down procedure, which was compounding the lack of rest for the Marines. Some companies took it upon themselves to remedy the situation such as Fox 2/5 who modified this procedure to allow the Marines to get more sleep.
- About half of our guys who were wounded or killed came from accidents....picking up unexploded ordnance, run over by vehicles, negligent discharges, etc. Much of it was because guys were exhausted and simply got careless.
- Confusion continues between Marines and Army in particular around the vicinity of Nasiryiah where Army re-supply columns were being ambushed. Marines were not aware in many instances of their presence and were tasked at one stage to go back and rescue bulk fuel tankers and their crews who were hiding in the scrub after one contact. Having said that communication within the Marines, in particular 1 MARDIV and Task Force TARAWA did not exist due to not having the same fills. Personal face-to-face comms was the only means of coord between the two forces.
- Nasiriyah saw the culmination of this confusion over MOUT. Commanders were not prepared to go in and clear a town no bigger than Victorville. This was an initial hesitation that eventually subsided to some outstanding MOUT ops later in the action by 5th and 3rd Marines south of Baghdad.
- MOUT continues to be point of contention between Army and Marines. Army plan was always to isolate and conduct limited raids, Marine intention was to penetrate and hold key terrain within the towns and cities. The actions in Baghdad were primarily a result of the actions of Comd 1 MARDIV.
- There was an operational pause. JFLCC imposed a 4 day OP PAUSE prior to final assault on Baghdad.

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- Cobras were employed more as ISR than CAS and suffered from resulting ground fire.
- Mech / Infantry work and protection requires more work. A lack of understanding of how the parts work together to form a team protecting each other's vulnerabilities. There needs to be a clear understanding between a convoy and a tactical movement. 5th Marines line of advance was approx 100km long.
- LAV's rule the desert. Use them if you have them.
- Fire discipline was poor at times with one weapon system opening fire, which led to all weapon systems opening up.
- UAVs were used down to Battalion level and were great value. They need to incorporated into Marine training.
- SMAW thermobaric rounds are awesome. Javelins performed very well in combat too. The M1A1 MPAT rounds are devastating....blow the turrets right off of T-72s. MDACT is a piece of shit
- On the SAPIs, it's give and take. When it gets hot or you are moving significant distances, the SAPI will wear you out and can be counterproductive. However, the stuff works great when you need it. We had a lot of guys shot at close range with AKs and the SAPI saved them. The day a suicide bomber came up and detonated himself at one of our checkpoints was a great example. The Marines all had shrapnel in their arms and legs, but their torso and vital areas were untouched and it saved them. Conversely, we had a guy bleed out from his stomach after catching two rounds in an ambush. Doc thinks if he had his SAPI on he would have lived, but he chose to take it out for the patrol (and he was the PL). I certainly recommend them for MOUT and short duration ops for sure. See if you can make them lighter and everyone will be happy.
- Commanders knew there would be only three supply routes during the war. Two for the Marines one for the Army. Commanders knew they would be long and choked; therefore they took everything with them, which made the supply routes even longer. The long supply lines could not be controlled by the MPs because they were not included in the forward echelons, and due to choked routes could not get to the forward echelons to clear the chock points.
- Logistics drove operations. Ask the 4 before you do any event. We made some long moves, as long as 15 hours on the road at a time. Plan your supplies. Fuel was the key more than water. There is always room for some chow.
- Big convoy on the hardball? At night? Turn the lights on and go fast as the slowest vehicle. Point a few dozen machineguns outboard and drive like hell. LAV's and 7 tons can do 65 at night on the hardball. Tell your Marines to stay off the roads at night. Convoys will go by on short notice. It's better to be going fast and being able to see than trying to have 75vehciles going 20 MPH on NVG's.
- A combat load is heavy on the Marines and the vehicles. Take only what you need.
- Study Convoy operations. If you have CAAT, JAV, or LAR put them in charge and have them run the convoy. You may be senior but they know how to do this and this lets commanders worry about the bigger picture. Brief your convoys. Never "just drive away". Give each vehicle a number, from 1 to the very end. Some convoys were big. We went from 1 to 75. Know the senior man in each vehicle. Know what is in you convoy. An avenger has FLIR. Use everything to your advantage. Forget call signs. Use the vehicle numbers. It worked! Plan for vehicle recovery and brief it. Get more tow bars. Use tow straps. Spread you MT Métis all over the BLT. These guys saved us everyday.
- Strip everything off your vehicles that you don't need. Sandbag your vehicles. Carry as much ammo as you can. Strip highback vehicles down. Hang the packs on the sides and get as many rifles pointing left and right as you can. Take the doors off everything except hardbacks and FAV's. Never let the a-driver attach the handset to his helmet strap. You need to be able to get

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out of the vehicle fast. Pistols suck. Bring and use every weapon. Shotguns are great at close ranges.

- PM everything as time permits. Our vehicles never ran better because the Marines did not want to get stuck on the side of the road. If a vehicle goes down in a convey give them 5 minutes and after that tow it. If several go down plan for multiple tows. If the situation is bad plan to grab mission type gear and radios and blow the vehicle. You can get another vehicle if it prevents a fire fight.
- CASEVAC was predominantly by road through the Battalion Doctor and aid station. Air was at least 45 mins away. The CH46 did not have the legs to keep up with the advance and therefore the Marines saw very little air other than Cobras.
- Comd 1 MARDIV commanded the Div via one HUMVEE and two aides who remained with him throughout. One aide kept the batteries in his IRIDIUM up the other rubbed out red icons on the map. He commanded via the IRIDIUM and the map on the side of the HUMVEE. He was usually no less than 100-200 meters behind the lead Battalion or main effort. He would talk to Regt Comds on the insecure IRIDIUM using veiled speech only. Nothing else!
- Most Marines used commercial GARMIN GPS rather than military issued GPS. Personal preference.
- Communications were particularly poor; one Battalion managed to be out of comms for up to 6 hours, VHF was not the answer and did not perform well in this operation.
- Rumor spreading was rife in particular over the most secure means the SIPRNET. People were using it as a chat room and making unsubstantiated allegations and claims on this means. Commanders lost faith in the SIPR and chose direct voice comms as the best means. It also created confusion and fear amongst Marines that was unnecessary.
- Rumor control again caused a negative effect upon the operations. Marines were hearing negative reports of Iraqi actions and were therefore displaying a negative attitude towards the Iraqi population.
- PRR is invaluable and Marines can't see how they will work without it in the future. Some range problems and comms interference in some buildings but not in others. Otherwise great piece of gear.
- Every Marine was seeking ACOG. Squad leaders were taking it for themselves for reasons unknown, probably for ease of targeting. They all wanted it.

Lessons Primarily Affecting Naval Forces

Some of the most important lessons regarding seapower have been discussed in the previous chapter in discussing the critical importance of the ability to protect air and land power using sealift, access to friendly ports, and as a substitute for land bases. The importance of cruise missiles and of improving the range payload of carrier-based aircraft has also been discussed earlier.

Iraq was a negligible seapower, and could not make effective use of its land-based antiship missiles or mines. It did use irregular forces like Saddam's Fedayeen to help delay Coalition access to Iraqi port cities and its tactics in using ships to help block shipping channels may well be used by other powers.

There are several other lessons that seem worth considering:

Aircraft Carriers:

US carriers again demonstrated that they are critical substitute fort air bases that can now be supplemented with cruise missiles. Vice Admiral Timothy Keating, commander of all

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maritime forces involved in Operation Iraqi Freedom, noted in a briefing on April 12, 2003 that:

> "Since the 20 of March, aircraft flying from our carriers have flown over 7,000 sorties -- 7,000 sorties in support of Operation Iraqi Freedom as part of the air component command power projection mission. Maritime patrol aircraft, our big-wing P-3s principally, have provided valuable intelligence, surveillance and reconnaissance of the battlefield forward into Iraq and over Baghdad as we speak in support of ground and sea assets."

The US carriers made combat use of the F/A-18E/F Super Hornet for the first time. They also could made effective use of large inventories of laser and GPS guided weapons that were not available to the Navy in the Gulf War. During Desert Storm, the Navy had neither. In fact, the carrier aircraft enforcing in the no-fly zone as part of Operation Southern Watch enforcement actions had already been using nothing guided weapons, and the Navy had recently increased the number of aircraft able to drop JDAMs .

The level of "jointness" was much greater than in the previous Gulf War. Major advances have been made in integrating carrier air wings with land-based air and land operations. In the Gulf War, daily air tasking order (ATO), which was a document several hundred pages thick that specified aircraft mission assignments, was physically transported to the carriers. This added delays and coordination problems to an already over-rigid and time consuming ATO process. and even then there was poor integration. It the Iraq War, the ATO was sent digitally from the t air planning cell in the Combined Air Operations Center to the carriers, and each carrier had representatives at the CAOC to help ensure that the ATO would assign the right missions are assigned to the carrier air wings.

The carrier handling of the ATO now used modern computer hardware and software, and there were programs to allow the air wing and squadrons to search the ATO for relevant sections, eliminating the need to study the entire order.[202]

The Navy has sought to further increase coordination with improved joint training and assignments, and is seeking to improve its information sharing. It is creating a Joint Fires network and Cooperative Engagement Capability (CEC) system to allows ships to share radar data and fire missiles based on another ship's information and data from aircraft like the E-2C Hawkeye airborne command and control aircraft. Joint Fires is a Navy version of the US Army's sensor-fusion Tactical Exploitation System (TES) that will allow a carrier to receive imagery from airborne collectors and other sensors. It can also overlay signals intelligence from USAF RC-135 Rivet Joints. A smaller version of the TES called the Remote Terminal Capability (RTC) is on other large ships. The Navy is trying to determine if it should buy the TES or cheaper RTC.

At the same time, the need to deploy five carriers for one major regional contingency validates the US Navy emphasis on new carrier designs that can hold more aircraft and sustain higher sortie rates. Another challenge for the carrier forces is keeping the vast number of aging aircraft flying. Despite the arrival of the F/A-18E/F, most carrier aircraft are old and have steadily more demanding maintenance and logistic burdens. The F-14 and S-3s are aging systems, and the E-2Cs and EA-6Bs have high maintenance requirements and engine maintenance problems. It is clear that new aircraft like the JSF are badly needed.

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Cruise Missile Ships

As has been noted earlier, the heavy use of sea-launched cruise missiles in the Iraq War raises the issue of the need for cheaper and more cost-effective cruise missiles and ones with a wide range of lethality and the ability to attack a broader target mix.

The Iraq War also, however, illustrates the need for some form of "arsenal ship" that can supplement naval aviation with massive long-distance strike power, preferably without major escort forces.

Mine Warfare and Naval Raids

The Iraqis failed to use mines and suicide boats effectively, but it is clear that the anti-mine and ship protection mission remain critical. More broadly, asymmetric warfare remains as much a threat at sea as it does on land and in the air.

Lessons Relating to Weapons of Mass Destruction, Asymmetric Warfare and Intelligence

There are a number of lessons that affect the ability to deal with weapons of mass destruction, asymmetric warfare, and terrorism:

Study of the Enemy:

The Coalition had the advantage of excellent knowledge of the enemy, although Iraq had similar knowledge of the Coalition. The US had used space and other intelligence assets to study and target Iraq for more than 12 years from the summer of 1990 to the beginning of 2003, and had had to prepare for war several times after 1991. The US and Britain carried out major strikes in Desert Fox in 1998, and repeatedly flew reconnaissance missions and strikes over Iraq to enforce the "Ho Fly Zones" during 1998-2003.

This combination of intelligence effort and combat experience provided a unique degree of situational awareness before the war began. It is important to temper any lessons talking about the advantages of US intelligence assets with the understanding similar experience and knowledge may not be present in future contingencies.

The Need for Better Assessment, Characterization, and Location of Weapons \ of Mass Destruction and Key Delivery Systems

It will be months or years before it will be possible to locate and analyze the data the war makes available on Iraq's history of proliferation, its imports, and domestic programs, its capabilities at the time of the Iraq War, and its goals on objectives.

One of the annexes to this book summarizes UN, US, and British efforts to characterize the size and nature of Iraqi weapons of mass destruction before the war. It is clear from this annex, and from the source of the war, that the Coalition had only a tenuous understanding of the threat it faced, or even the scale of an Iraqi effort that had been the key public motive for the conflict.

For all of its advances in ISR capabilities, the US went to war with Iraq without the level of evidence needed to provide a clear strategic rationale for the war, and without the ability to fully understand the threat posed to US, British, and Australian forces. This uncertainty is not an argument against war that responds to grave potential threats, but it

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is a clear warning that this aspect of intelligence and targeting is not yet adequate to support grand strategy, strategy, or tactical operations.

The exact course of events is so classified, that it is impossible to determine. However, both press reporting and interviews indicate that the US intelligence community came under serious political pressure to make something approaching a worst case interpretation of the indicators, and to interpret the inability to account for missing weapons of mass destruction, delivery systems, and production capabilities as meaning Iraq had something approaching matching inventories of deployed weapons. In what bore a striking resemblance to similar worst case interpretations of the global threat from the proliferation of ballistic missiles under the Rumsfeld Commission, US policymakers not only seem to have pushed for the interpretation that would best justify military action, but to have focused on this case as if it were a reality, rather than a possibility.

According to reporting by Barton Gellman of the Washington Post, USCENTCOM seems to have been even less able to characterize and target Iraqi capabilities to use, produce, and deliver weapons of mass destruction than in Desert Storm and Desert Fox – where its limited successes were more the accidental result of hitting secondary targets than intelligence analysis and military planning. By mid-May, US inspections teams had visited 19 top weapons sites, with two left for investigation. It had also survey another 45 out of 68 top "non-WMD sites," without known links to weapons of mass destruction, but suspect as potential sites. It had not found any more evidence than UNMOVIC of an active warfighting effort. This did not mean such weapons were not present in Iraq. Stephen A. Cambone, the Undersecretary of Defense for Intelligence, had said that only 70 of roughly 600 potential weapons facilities on an "integrated master site list" prepared by U.S. intelligence agencies before the Iraq War had been examined. The fact remains, however, that the US – and Britain – clearly did not have firm evidence of Iraqi efforts to maintain and expand a major warfighting capability.[203]

It should be noted in this regard that the key argument for preemptive attack must be that it is in fact preemptive and that the potential threat is real enough to justify a major war. Legalistic arguments over whether threats must be imminent may have only secondary value in the real world, but the need to unambiguously resolve the uncertainties that surrounded the Iraqi effort in weapons of mass destruction in both the Gulf War and Iraq War is a critical national priority. So is the need to examine far more intrusive methods of data gathering, such a unattended ground sensors. If the choice is between infractions of national sovereignty, and war or unacceptable risks, aggressive intelligence gathering and infractions of national sovereignty are by far the better course,

There are also two important corollaries of this lesson. The first is that until this aspect of intelligence can be greatly improved and made far more accurate and reliable, the US, Britain, and other nations must place primary reliance on both operational and national defense and response capabilities. Missile defense is only one of these capabilities and currently may have limited cost-effectiveness. The fact the US could never characterize Iraqi links to terrorism or ability to make covert use of weapons like smallpox is a warning that defense and response must look at the full range of threats and possible asymmetric attacks.

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The second corollary, however, is that over a decade of the most intrusive international inspection of a country in history also failed to characterize its efforts in weapons of mass destruction and delivery systems, and failed to disarm Iraq. It is easy to focus on the fact that the US and Britain may have exaggerated the threat and miss the point,

The UN accomplished a great deal, and the work of the IAEA, UNSCOM, and UNMOVIC merit the world's gratitude and respect. What could be done was done. Nevertheless, an intensive international arms control effort using better means of inspection and arms control than cover any other nation in the world was still inadequate. This is a grim warning that major improvement are needed in the scope, intrusiveness, technology, and intelligence support provided for international arms control efforts if they are to be effective, and if they are ever to be an effective substitute for preemptive or other military action,

Rapid and Reliable Characterization of Chemical and Biological Agents and Proper Protection Gear/Systems

The fact that Iraq did not use chemical and biological weapons did not prevent repeated needs to use protection. In many cases, more sophisticated and quicker reacting detectors and grids could have reduced the strain on US and British forces. It is also clear from the results of search for weapons of mass destruction during and after the war, that field equipment cannot rapidly and accurately characterize some chemical and biological threats and can produce serious false alarms. In case after case, units encountering suspect facilities and weapons trend to produce a false positive that could only be disproved after further testing in the rear. Problems also still exist in using protection suits in combat. While reporting to date is anecdotal, several field reports indicate the equipment produced significant fatigue and interfered in operations. One typical field report states:

> "we had guys tripping over their floppy MOPP boots trying to attack trenchlines. One guy tripped, fell into a trench, and found himself fighting with a Republican Guardsman. Shot him in the head, by the way, and then took his MOPP boots off and tossed them out of frustration. Regardless of what people say, you can't do fire and movement effectively in the shit for extended periods."

Organized Searches for Weapons of Mass Destruction in Proliferating Countries

During the war, the US military tasked various elements of Special Forces and other units to search for weapons of mass destruction As US forces advanced into Iraq. The overall level of equipment and training was limited, however, and many units overreacted to suspected sites and failed to properly characterize the weapons, equipment, facilities and substances they found.[204]

Once combat died down, the US deployed an Iraq Survey Group, but training and deployment was delayed and little preparation was made for the start of a timely disarmament and inspection effort with a credible audit trail. The way the US approached this post-war effort to survey Iraq's weapons of mass destruction was described as follows in a Department of Defense briefing on May 7, 2003:[205]

> The command, USCENTCOM, has a command inside of Iraq known as the Coalition Land Component Commander -- Coalition Forces Land Component Commander or CFLCC...And each day, within that organization in what they have as their operation center, which is known as the C3, they sit down and work through their priorities. That priority list itself has been pulled

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together as a consequence of information that we had going into the conflict of sites that we thought important. As you know, there are some thousand sites that we identified; those sites included not just weapons of mass destruction sites, but also prisoner of war -- prisoner camps -- prisons, rather, prisoner of war locations, terrorist camps and facilities, as well as regime and leadership targets. So there are some thousand of them, roughly, of which about half are related to weapons of mass destruction..

...As it stands now, we have been to about 70 sites that we were looking to cover. Now, what's interesting about that is that those are the 70 sites that were on the list when we started. Since then, we have been to about another 40 which have come to light as a consequence of this process that I have been describing to you here. And the way this works is with respect to a WMD site in particular, once it's been identified, there is a survey team, which may have been there already, having come up with the troops as they came through the countryside, or sent out in advance. And they will go to the site, they will do a survey and determine whether or not it's important for more advanced units to come in and take a look at what's there. So, it's a site survey team. And so their job is done.

Next would come in a mobile exploitation team, an MET, as they're being called, which would do a much more thorough assessment of the site and also inspect any additional sites that USCENTCOM might have recommended.

And then, to the extent you need disablement of a facility or a capability in the site, there are disablement teams that are sent out to disarm, or render safe or destroy those -- any delivery systems, weapons, agents or facilities that might be found.

Now, the organization that currently is assigned this mission is...known as the 75th Group. It is assigned this discovery and exploitation mission. It, in turn, is supported by a military intelligence brigade, the 513th. These units have been, by the by, in theater for a very long period of time.

The expertise within the 75th Group extends across some 600 people, and they are distributed across interrogators, interviewers, people who do the document exploitations, the material exploitation and the analysts; that is, the people who each day sort of come together, take the information that's come on board and try then to make recommendations about what might be done next. The expertise within the group is made up of people from the Central Intelligence Agency, the Defense Intelligence Agency, from the individual services, from DTRA, the Defense Threat Reduction Agency, the FBI, and then there are coalition partners who, themselves, are part of this ongoing effort.

That group, the 75th, will soon, toward the end of this month, begin to have an augmentation take place, and that will be done under the auspices of what we're calling the Iraq Survey Group. That group will be headed by a two-star general, a major general, Keith Dayton, who, as it turns out, is a member of Admiral Jacoby's staff. He will take the lead for the discovery and the exploitation that we have been talking about. And in particular, its mission is to discover, take custody of, exploit and disseminate information on individuals, records, materials, facilities, networks and operations as appropriate relative to individuals associated with the regime, weapons of mass destruction, terrorists and terrorist ties and their organizations, information having to do with the Iraqi Intelligence, Security and Overseas Services, and those accused of war crimes and crimes against humanity, and POWs. So it's a very large undertaking of which the weapons of mass destruction effort is a part in an important part of that effort, but only a part.

The organization will pretty much double or triple in size. There'll be some 1,300 experts who will be associated with this organization, plus another support element of maybe another 800. So you're talking about 2,000 people, more or less, who will begin arriving with the lead elements of the command starting toward the end of this month and the expertise, again, from the organizations I described a moment ago and will include, as well, people from Treasury, some of whom are already in theater, by the way, as well as U.S. citizens who had been in the past UNSCOM inspectors, some other contractors, and again, our coalition partners.

Now, that effort is going to be supported by a fusion cell that is being constructed here in Washington, again under the executive agency of the Defense Intelligence Agency. It is made up

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> of experts from around the United States government. And they receive information from the 75th Group now, and they will receive it from the ISG as it stands up. And their job is going to be to do that kind of in-depth analysis that's necessary in order to make this a successful effort over time.
>
> ...When one comes across a site where we think that we need to be taking samples, for example, there are roughly four sets of samples taken, one for processing in-theater, two are sent here to the United States, and another one is sent to a non-U.S. laboratory for independent analysis and the verification of the results of those tests. And there is a very strict chain of custody process that is put in place to assure that those samples are not tampered with either in the theater, in transit, when they're in the laboratories, or when the results come back to us here. That's all supplemented, then, as I said a moment ago, by interviewing the personnel who we think are involved. I made mention to you of the subordinate scientists as well as the lead scientists are being interviewed. The regime figures are interviewed. We go through the documents and so forth. And then, if we find we've got to dispose of materials, we do so in a way that is safe for all concerned.

Aside from timing, the main problem with this description is that US did not have a clear strategy for dealing with the almost inevitable charges it would conceal the facts and challenges in the UN over the lifting of sanctions. It also seems all too clear that it interpreted the highly uncertain intelligence picture presented in the annexes to this book as if it was nearly certain that it would find large numbers of chemical and/or biological weapons, preparations for their delivery, and evidence of ongoing large scale manufacture. These were valid possibilities, and some of the criticism of such an interpretation is unfair.[206]

Nevertheless, the teams the US sent in after the war did not really have the expertise or language skills to deal with other cases -- such as covert research and development efforts, tracking down complex patterns of illegal imports, locating and interviewing scientists, searching out concealed and dispersed facilities, and analyzing possible destruction sites. They were also US teams operating without international support and observers. It is unclear that UNMOVIC could have added great expertise to the teams, but the mix of biologists, chemists, nuclear experts, arms control experts, computer and document experts, and special forces troops was tailored around the case that Saddam had deployed weapons and given release authority to his commanders to use them under certain circumstances.[207]

A further irony is that Task Force 75 and the smaller effort sent in by the Defense Threat Reduction Agency spent their initial efforts going through known facilities slowly and by the numbers. They focused on the facilities most likely to have been vacated months earlier because they were known to be targets both for UNMOVIC and US military action, and yet they still failed to rushing out and secure key declared facilities like the nuclear facilities subject to IAEA inspection. As reporting in the Washington Post notes, almost a month after the end of Saddam Hussein's control of the country, the US, "had only secured only 44 of the 85 top potential weapons sites in the Baghdad area and 153 of the 372 considered most important to rebuilding Iraq's government and economy."[208]

There are excuses. However, the plain fact remains that the US took far too long to realize that it was dealing with an issue whose politics were clearly -- and from the outset -- at least as important as technical competence. In the event, it failed to demonstrate proper competence in either area.[209]

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Iraqi Asymmetric Tactics and Links to Terrorism

As is the case with the Iraqi effort in weapons of mass destruction, many of the details of Iraq's use of asymmetric forces and tactics came as a surprise to the Coalition forces. Moreover, US and British intelligence could never fully characterize Iraqi links to various terrorist movements and intelligence experts disagreed sharply regarding the details of such ties before the war.

This experience reinforces an intelligence lesson raised long before the events of 9/11. The emergence of new and more lethal forms of terrorism, and the shift that many potential threats nations are making towards the increased use of asymmetric warfare, presents major new challenges to US and British intelligence. Improvements in operational security and the lack of large physical indicators like the movement or aircraft and armor, or major combat units, make it much easier for potential opponents to use new methods of attack without adequate warning.

Lessons Relating to Political, Diplomatic, and Psychological Warfare

The skill and scale of the Coalition military victory does not mean that the US and Britain do not have are painful lessons they need to be learn about the political, diplomatic, and psychological dimensions of the war. One of the key lessons of the war is that the US and Britain failed to conduct a successful political, diplomatic, and psychological campaign at the tactical, strategic, and grand strategic level.

Limited Success in Psychological Warfare

The US and Britain had what seems to have been considerable success in those aspects of psychological warfare that helped cause Iraqi military inaction and expedite surrenders such as dropping of leaflets, etc. The Psyops effort involved some 58 EC-130E Commando Solo sorties, and 306 broadcast hours of radio and 304 hours of broadcast television. Compass Call flew another 125 EC-130H sorties, and many made an effort to jam Iraqi communications. The psyops team prepared some 108 radio messages and 81 different leaflets. The Coalition ultimately dropped nearly 32 million leaflets, and flew 158 leaflet missions both to drop over civilian and military areas, Interestingly enough they included 32 A-10 and 68 F-16CJ HARM sorties – a strong indication that leaflet drops were timed to go to Iraqi combat troops at the most critical moment. The evidence to date indicate that these mission helped considerably to either persuade Iraqi forces not to fight or to defect/desert/surrender.

The Coalition failed, however, to silence Iraqi radio and TV in spite of the fact it included at least 10 major media targets among its total of 116 C4I targets. While the Iraqi Information Minister's daily briefings took on the character of a popular farce in the West, they had considerable impact in Iraq and the Arab world. The continuing presence of the media in Iraq also allowed Iraq to exploit both Arab and Western media and to have a major voice in the world up to the day the regime abandoned its effort to defend Baghdad.

More generally, the Coalition misread the level of popular Iraqi support it had at the time it attacked. The US, in particular, missed the cumulative impact of (a) its failure to support the uprising in 1991, (b) its failure to conduct a meaningful public diplomacy campaign to explain that it was not responsible for the suffering of the Iraqi people under

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UN sanctions, (c) Iraqi and Arab hostility to the US because of its support of Israel and the Arab portrayal of the Second Intifada, and (d) the Coalition's failure to convincing rebut various regional conspiracy theories such as the assumption that its goals were "neoimperialist" or it was fighting to seize Iraqi oil.

Longstanding Failures in Public Diplomacy

The Iraqi land forces were forced to expose themselves by the speed of land operations and then hit hard from the air, which in turn sharply reduce the Iraqi threat to US and British land forces. Jointness took on a new practical meaning.

Ironically, this may take some time to sort out. The long air bombardment in the Gulf War produced a focus on air operations that led some to focus on airpower to the exclusion of land power, and claim airpower alone could be decisive. It also led some to claim that strategic bombing had a decisive effect although the USAF Gulf War Airpower Survey showed that General Horner – who commanded the air effort during the Gulf War -- was correct in totally rejecting initial plans to focus on strategic bombing and that these efforts remained largely ineffective.

Similarly, the role airpower played in Afghanistan against an enemy with virtually no modern weapons led to similar claims about the decisive impact of airpower by those General Horner came to call "airheads."

The irony in the Iraq War is that the delay in moving to a massive air campaign, the lack of any details on the air campaign during the daily briefings during the war, and the fact so many reporters were embedded with ground forces led to a near reversal and a focus on ground power. The fact remains that it was the ability to tailor new joint mixes of ground-air-sea power to the needs of a particular campaign that proved decisive.

Part of the problem lays in the fact that the Clinton Administration relied largely on the impact of the victory in the Gulf War and the Arab-Israeli peace process. It did not attempt to explain the reasons for UN sanctions, the nature of the oil for food program, or deal with aggressive Iraqi efforts to persuade the Iraqi people and many others that the US and UK were responsible for their suffering. It also failed to conduct any meaningful public diplomacy to explain and justify its military presence in the Gulf and Arab world.

The Clinton Administration also never rebutted the exaggerated charges that the US had strongly encouraged public uprisings in Iraq in 190-1991, when a limited US campaign focused largely on persuading the Arab military, It allowed the myth to be disseminated that it was somehow responsible for the ability of Saddam Hussein to put down the uprisings because the ceasefire agreement did not prevent Iraqi use of combat helicopters. It failed to explain the reasons the US had not actively sought to overthrow Saddam Hussein immediately after the Gulf War, and it allowed the INC to claim that it could somehow have threatened Saddam Hussein militarily if it had only had more active US backing.

The Clinton Administration attempted to make a case against Iraqi proliferation without seeming to understand that while much of the region feared Saddam Hussein, it saw proliferation as a legitimate reaction to Israel's possession of nuclear weapons and the conventional strength of the US.

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Problems Stemming from the Bush Administration

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The Bush Administration inherited these failures and the breakdown of the Arab-Israeli peace process. It does not seem to have understood, however, just how angry Arab public opinion became over the Second Intifada, US ties to Israel and the way they were portray by much of the Arab media, hostile Arab governments, and Arab and Islamic extremist movements.

The Bush Administration also dealt with the aftermath of "9/11"by allowing a climate to grow up ion which much of the Arab world perceived it as anti-Arab and anti-Islamic. The fact that this was untrue simply compounds the fact that the US failed in the kind of broader political and psychological warfare that is vital to winning the war on terrorism, as well as failed to lay the political groundwork for war against Iraq. This was made worse by the Bush Administration's failure to explain its support for democracy in terms that did not appear to threaten its Arab allies and that sometimes appeared to be an attack on -- if not contempt for -- Arab societies.

Broader Failures in the US and British Efforts

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Both the US and Britain left their efforts to explain the threat posed by the Iraqi search for weapons of mass destruction until the last moment and issued propaganda-like statements and briefings at a time they seemed to be more a rationale for war than a legitimate warning. They made only belated cases for regime change and then failed to clearly define their goals for Iraqi nation building in ways that defused the host of fears, Arab resentments, and conspiracy theories that war the almost inevitable byproduct of the decision to go to war. The US also obviously badly miscalculated the support it could gain in the UN, its problems with its traditional allies in Europe, and key bilateral relations like those with Turkey.

The end result is that the US and Britain must achieve an extraordinary degree of success in nation building to win the peace that can win the war,. They must also address the Arab-Israeli peace problem in ways that have considerably more visibility and success, and deal with a host of problems in rebuilding their relations in the Arab world and the West.

Some of these problems can be blamed on the ideological tone of the Bush Administration, and on its actions. It is important to note, however, that the Clinton Administration made serious mistakes of its own and that throughout both administrations,, the professionals of the US State Department have failed to articulate and carry out a coherent and effective campaign of public diplomacy. This lack of professionalism, and aggressive action makes an unfortunate contrast to the effectiveness of US military forces.

The Broader Implications of Cutting Casualties and Collateral Damage: A New Dual Standard and Form of Asymmetric Warfare?

More broadly, the US and the West need to examine the long-term diplomatic and political implications of the effort to minimize casualties, and rely on "effect-based" bombing, that reflected a steadily growing potential asymmetry between the Western approach to warfare and that of potential opponents. As in Afghanistan, Kosovo, and the first Gulf War, the Coalition not only made great efforts to minimize casualties, it faced growing domestic and international expectations it would so. It had to fight in what in many ways was a dual standard: International expectations that the casualties and collateral damage it would inflict would be kept to an absolute minimum without similar expectations about the conduct of Saddam Hussein's regime. It also had to operate in a climate where many of the interpretations of the laws of war called for both unilateral restraint and restraint to so great a degree that it could make military operations difficult to impossible.

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This raises serious questions about future wars. It is easy to show restraint against a weak and ineffective opponent. The situation could be totally different even against a terrorist movement equipped with weapons of mass destruction, much less a modern state. This is clearly an area where the Iraq War raises more legal, ethical, moral, and military questions than it answers. Lessons Relating to Peacemaking and Nation Building

The Coalition's success in joint warfare was not matched by it initial efforts at peacemaking and transitioning to nation building. This was partly a matter of force ratios: The same strategy designed to deliver a carefully focused attack on the regime did not provide the manpower to simultaneously occupy and secure the areas that the Coalition liberated and fell short of the manpower necessary to occupy the country. The US had learned from Afghanistan that it is critical to secure the country during the period between the fall of a regime and the moment self-appointed leaders try to seize local power, but could not execute the mission.

Lt. Gen. David D. McKiernan, the commander of the Coalition Forces Land Component Command described the military reasons as follows:[210]

> we had to fight our way into Baghdad. Now, that fight was characterized by decisive armor and infantry actions into Baghdad before he could set an urban defense of Baghdad. And the speed of our campaign allowed us really to seize the initiative and to exploit success, but even with that, we had to fight our way into Baghdad. So I can tell you from being here that those lead formations, both Marine and Army that maneuvered into Baghdad first of all, were killing bad guys, and secondly, were protecting Iraqi people. And so if some of the facilities became subject to looting over that period of time by Iraqis, I will tell you that our priority was to fight the enemy and to protect Iraqi people.
>
> …I am satisfied that the forces are here (now) and are continuing to flow here that will allow me to execute what are my phase four missions, and that is to provide a degree, a certain degree of stability and security in Iraq as we transition back to Iraqis in control of their own country. I would caveat that, though, by reminding everyone that there aren't enough soldiers or Marines to guard every street corner and every facility in Iraq, so there's some risk-taking in some areas. And we try to focus our forces where our intelligence and mission sets drive us to focus those forces. But I am satisfied that I have had enough forces on the ground to execute the campaign very decisively to this point. And we have the additional forces we need for phase four flowing in now.

Lt. General William Wallace, also defended V Corps role in dealing with looting and civil unrest as follows: [211]

> We train for war fighting, but peacekeeping is something that we do. If you look across our formation, I would bet that 30 percent or more of our soldiers have had some real-world peacekeeping experience in the Balkans. So we have a lot of experience in how to deal with civil affairs, with civilian populations, with establishing institutions to get civilian populations involved in their own destiny. There is just a lot of experience in our forces with this civil-military dynamic, largely as a result of our operations in Bosnia and Kosovo.
>
> …One day our troops are kicking down doors, and the next they're passing out Band- Aids. And in some cases, they're kicking down doors without really knowing if they are going to have to pull a trigger or pass out a Band-Aid on the other side. And it's really a remarkable tribute to the mental acuity of our soldiers that they are able to do that.

At the same time, the early days in the peacemaking and nation building efforts indicate that other factors are involved:

- The Bush Administration had received advice from a number of sources that US experience in Panama, Haiti, Bosnia, and Kosovo showed it was critical to

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introduce a trained constabulary or military police force immediate into urban areas after the fall of local and national authority to prevent looting, civil unrest, and acts of revenge. US military forces do not have training for these missions, however, and the countries that do did not participate in the Coalition. As a result, there were no personnel on the ground with the dedicated mission of maintaining order and with the training and skills to do so.

- The Coalition conducted a psychological warfare campaign, but failed to conduct a meaningful campaign to tell the Iraqi people how it planned to allow them to shape the peace, and what the Coalition would do to make that possible. Iraqis had no clear idea of what to expect when the Coalition arrived and many had a conspiracy theory picture of its goals and motives.
- At least some senior US political leaders ignored warnings from intelligence, military, and regional experts that the Coalition forces would not be greeted as liberators, and that the Coalition should expert to deal with a mixture of anti-Western/anti-colonial sentiment and deep ethnic and religious tensions and divisions.
- Too little emphasis was placed on immediately securing key urban areas and centers of government.
- The US failed to develop a coordinated interagency approach to planning and executing peace making and nation building before and during the war. Much of the benefit of detailed planning efforts was lost or made ineffective.
- It may have been impossible to shape an international consensus as to how to deal with the problems involved, but the US and UK did not seem to have a clear plan to either seek such a consensus within the UN, or a clear back up plan if that effort failed.
- The Coalition drew on many Arab allies for bases and support in war fighting but failed to get the level of regional support for peacemaking and nation building it needed after the fighting.
- US forces lacked enough people with the necessary language and area skill, and the limited numbers that were available often had to be dedicated to warfighting tasks.
- Members of the Iraqi opposition had their own goals and ambitions and often proved to be unreliable in such roles.
- The military correctly understood that the enemy had to be fully defeated, the remnants of the regime had to be purged, and order had to be established to allow effective nation building to be established. It did not, however, properly size and train its forces for these missions. It did not properly train forward and combat units for dealing with activities like looting and the problems in distinguishing between hostile and non-violent civilians and irregular forces and enemies. In many ways, troops were trained to fight asymmetric warfare but not to deal with the consequences of victory.

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- The problem of establishing an actual interim authority was addressed by creating a semi-civilian body unprepared to enter and operate a still hostile country at the earliest possible period.
- Humanitarian organizations and non-governmental organizations do not operate in hostile military environments, but demand high levels of protection to perform humanitarian missions with short term goals that ignore the need to fully secure areas and create the political basis for nation building. In contrast, military organization have not yet adapted to the need to provide suitable protection for humanitarian organization and NGOs. Both sides need to change their present procedures.

Western military forces are not political forces, and professional warfighters like the US and British military tend to see peace making and nation building as a diversion from their main mission. In practice, however, an era of asymmetric warfare and instability in many developing states means that peace making and nation building are part of the mission. It also seems far to argue that conflict termination and the role of force in ensuring stable peacetime outcomes has always been a weakness in modern military thinking. Tactics and strategy, and military victory, have always had priority over grand strategy and winning the peace.

The fact remains, however, that it is dangerous to talk about a new way of war without talking about a new way of peace. In the 21st Century, planning and training for conflict termination, peace making and nation building have to be given the same priority as planning for peace. Like it or not, most limited wars will only be won by success in these efforts, and the morality and ethics of the use of force can only be justified in these terms. As a result, jointness must be restructured to provide more capability in these missions if US. British, and other Western power projection forces are to get the domestic, allied, and other foreign support they need to act. Stable war fighting outcomes can only be achieved if the country defeated or fought over becomes stable after the war. Put differently, even the best military victory cannot, by itself, win the peace.

This, in turn, requires political decision makers to accept the lesson they must make the same commitment to winning the peace they make to military victory. The only justification for war is the pragmatic result. Simply defeating today's enemy without creating the conditions for future stability is a near certain recipe for future conflict. As a result, peacekeeping and nation building are even more essential aspects of grand strategic planning by political leaders as for the military. This requires proper organization of civil as well as military activity, the creation of staffs with the skills necessary to carry out the mission and above all the understanding that a political commitment must be made to take the necessary time and spend the necessary resources. Military leaders can be forgiven for concentrating on winning wars, political leaders cannot be forgiven for failing to win the peace.

That said, there is no point in setting impossible standards. Peacemaking and nation building are still experimental activities with no great history of success. There are no rules and procedures that guarantee what will or will not work, and most case studies fail to clearly apply to the next case. In many cases, priorities only become apparent once activity begins. It is also virtually impossible for an effort that is intended to create a

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more democratic government in a non-democratic state to avoid some tension and violence between suppressed factions and groups.

Other Lessons

There are a number of other lessons that seem to be emerging from the war:

The Role of Women in Combat

Women made up roughly 15% of US military forces during the Iraq War, ranging from a high of 19% in the Air Force to 6% in the Marines. The number of women in high risk jobs had increased strikingly compared to those in the Gulf War, although women are still barred from ground combat positions. Perhaps the most striking aspect of this change is that there are no meaningful reports of gender problems in combat or high risk positions. While scarcely unexpected, this experience is a further refutation of the arguments that women could not perform such duties or would disrupt operations in wartime.

Military Medical Facilities and Capabilities:

The Iraq War reflected a continuing progress in military medicine that has steadily reduced the level of fatalities relative to wounds and injuries. It also reflected the critical importance of new on the scene bandages and treatments focused on the most serious wounds and reducing the need for aerial medical evacuation. Some 110 medical evacuation sorties were flown between G-Day and April 11, involving a total of some 1,300 patients, but only 50 urgent patients.

The US forces took other innovative steps. They stationed surgeons nearer the battlefield to provide rapid treatment in the critical first 60 minutes of combat. They provided a wide range of new equipment such as ultrasound to look inside the body, Doppler machines to measure blood flow, and new equipment to stabilize arm injuries. They deployed new blood-clotting bandages and better body armor with ceramic plates. [212] Some preliminary reports do, however, raise questions about the value of the new bandages under combat conditions.

One critical change growing out of the problem of "Gulf War Syndrome" from the previous Gulf War was the use of force-wide medical surveys for each soldier sent to the theater, in theater surveys, and exist surveys, with annual blood sampling. In addition to smallpox and anthrax shots to guard against biological attacks, medical treatment also shifted from a focus on general global needs to a far more detailed survey of the specific risks in the theater. Even so, questions have emerged about the range of sampling and the speed of testing of such samples, and the need for something approaching near real time analysis.[213]

Safety Becomes a More Critical Issue:

Military operations have always been "accident prone," but the ratio of accidents to steadily diminishing combat casualties is creating a new priority for safety consciousness and discipline. Some 36 US deaths, out of a total of 123 from G-Day to April 15th, are classified as accidents. The figures for British forces are 16 accidental deaths out of a total of 31 deaths. The total is 52 accidental deaths and a large number of the total –28

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deaths – are in helicopter accidents. Some 12 are vehicle accidents and the accidental discharge of firearms accounts for a significant number of the others.

Although combat is not over, Lt. General William Wallace, commander of the US Army forces in Iraq, is forced to issue a force-wide warning on April 15th regarding safety: "We cannot, cannot, cannot allow our soldiers to relax their guard."

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VIII. IRAQI PROBLEMS AND SHORTCOMINGS

Many of the lessons regarding Iraqi failures have already been discussed in Chapter III, and in talking about the advantage of US and British forces had in Chapters VI and VII. In many ways, Iraq's military faults were virtually the reverse image of US and British military capabilities.

Iraq may also have made to the mistake of fundamentally underestimating the nature of US military capabilities. Secretary of Defense Donald Rumsfeld suggested this in the Department of Defense briefing on April15th,

> "…this is speculation, but I would speculate that they very likely expected Gulf War II, a long air war that would give them time to do whatever they thought they wanted to do, leave or take cover and what have you, followed at some distance by a ground war, and probably a massive ground war, probably including the 4th Infantry Division, which was still up in the Mediterranean.
>
> "And it's entirely possible when people are interviewed after this is all over that we'll find that they did not expect a ground war to start before an air war and they did not expect a ground war to start without the 4th Infantry Division while it was still up in the Mediterranean. I also suspect that they didn't expect the first air attack that took place the day before the ground war began on the Dora Farms. But one can't know these things; you can't climb into their minds and know what they were thinking.
>
> "But we do know that because of the way General Franks conducted the conflict, a lot of bad things didn't happen. The oil wells were not set afire like they were last time. We don't have massive internally displaced people. We don't have a million refugees flooding into neighboring countries.
>
> "We didn't have high collateral damage because we didn't have a long air war. We had precision weapons instead of dumb bombs. The ground war went so much faster, that the opportunity for people to reorganize and to reconstitute forces in areas where they could provide a more aggressive defense didn't exist; they were passed very rapidly. So there were a lot of things that -- there wasn't time to use ballistic missiles in the western part of the country to attack neighboring countries as happened last time. There's just a whole list of things that didn't go wrong, that could have been terrible and didn't happen, because of the way that General Franks and his team conducted that. They did a superb job."

Others argue that Iraq did have a relatively good idea of how the US would fight, but simply lacked the tools to respond effectively.

It may be years before the Iraqi view of the war is fully understood, if ever, since only the top Iraqi leadership probably knows the calculations involved. There still, however, are some potential lessons about the Iraqi approach to the war that are worth mentioning:

Iraq Really Was a Tyranny:

There is almost no evidence of broad popular support for Saddam Hussein, although the Iraqis scarcely showed an overwhelming welcome to US and British forces. The Popular Army did not emerge as a meaningful force. Virtually all of the resistance in the south came from loyalist cadres and forces Saddam had used to reestablish control over the south after the uprisings in 1991. The same factors meant that Saddam could not develop a popular defense of Baghdad, and his cadres could only fight in scattered areas and without cohesion and coordination. The regular – heavily conscript – army showed far less commitment to the regime than the Republican Guards.

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Iraq Had Rival, Politicized, Bureaucratic, and Compartmented Forces

At the start of the war, Iraq was still the most effective military power in the Gulf, despite the Gulf War, and the loss of some 40% of its army and air force order of battle.

Iraq still had armed forces with around 389,000 full time actives. Its army had some 350,000 actives, including some 100,000 called-up reservists, before it began a serious build-up in reaction to US and British deployments, and an inventory of some 2,200-2,600 main battle tanks, 3,700 other armored vehicles, and 2,400 major artillery weapons.

The Air Force had 20,000 men and over 300 combat aircraft with potential operational status. It had a 17,000-man air defense command with over 850 surface to air missile launchers and some 3,000 anti-aircraft guns. Iraq had a small 2,000 man navy with nine small combat ships and an unknown number of mines and Silkworm land-based anti-ship missiles

However, Iraq's overlapping structure of forces and security elements were often better at watching each other and securing the regime than fighting. There was little coordination except at the local level, and command and control could not direct cohesive action, Iraq also suffered from the fact that it rebuilt its post-Gulf War forces more around internal security missions, regime stability, and static defense against Iraq than the lessons of the Gulf War.

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Large parts of the Iraqi force structure were designed to cover the Iranian border, secure the Kurdish security zone, and fight a low-level battle against the Shi'ites in the south,. Others were designed to protect the regime against other elements of the armed forces. The result was a garrison force optimized around the wrong missions.

The Iraqi air force and ground-base air defense forces, in turn, came to emphasize survival and operations against low-level US and UK air operations in the Northern and Southern "No Fly Zones." They did design their tactics and operations to deal with large-scale operations.

Wasting the Best Forces Wastes all the Forces

A full history of the destruction of the Republican Guard may take years to research and document. Chapter III has shown, however, that the Iraqi regime sent the Republican Guards forces out into exposed maneuvers and combat, and some estimates indicate all

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but two dozen or so of the Guards' operational tanks were destroyed or abandoned by the end of the war.

A rough journalistic after-action survey by Time magazine of the Guards performance on seven battlefields in the war – Hindiyah, Hillah, Al Kut, Yusufiyah, Mahmudiyah, Suwayrah, and Dawrah –found that the Guard units rapidly found they simply could not survive in the face of US sensors, targeting capabilities, and precision strikes. As a result, most of the Guards ceased to sleep with their vehicles and abandoned them quickly after initial losses. The end result was that casualties were probably surprisingly limited, but forces ceased to be operational when they came under air attack and often could not recover from the resulting desertions.[214]

Iraq effectively wasted most of the Baghdad, Medina, Nebuchadnezzar, and Hammurabi divisions by sending them into exposed positions some 100 miles south of the capital, where they could be located by UAVs and aircraft like the E-8 and hit from the air. Something like half of the air munitions the US forces dropped were directed against the Guard units, and once the Guard armored forces came under this intensive level of attack they had nowhere to go except to clash with US Army and Marine forces whose sensors, helicopters, tanks, artillery and anti-tank guided weapons could generally destroy the remaining elements of Iraqi forces before they could close on US forces. The Guard units where shattered and demoralized before US forces reach Baghdad and did not sustain combat once the surviving elements clashed with US forces in the city. This, however, meant there was no cohesive or leading element to ensure the regular forces, Special Republican Guards, and most popular forces would fight.

The Problem of Sanctions and Equipment Modernization

The UN embargoed all arms shipments to Iraq after august-1990. Iraq was extremely dependent on arms imports, in spite of grandiose efforts to create its own arms industry. It not only needed the latest technology to compensate for poor military organization and training, it used imports to flood forwards supplies and replacement equipment to make up for its lack of effective combat recovery and repair and a modern and efficient logistics system**.**

Sanctions and the impact of the Gulf War had a major impact on Iraqi war fighting capabilities. Iraq was not been able to fund and/or import any major new conventional warfare technology to react to the lessons of the Gulf War, or to produce any major equipment -- with the possible exception of limited numbers of Magic "dogfight" air-to-air missiles and erratic smuggling of e radars, night vision devices, munitions, and spare parts through Syria.

Iraq's inability to recapitalize and modernize its forces meant that much of its large order of battle was obsolescent or obsolete, it had uncertain combat readiness, and much of its equipment was difficult to sustain in combat. It also limited the ability of its forces to conduct long-range movements or maneuvers, and then sustain coherent operations.

Iraq did, maintain much of the clandestine arms purchasing network that it set up during the time of the Iran-Iraq War. It had prior experience in buying from some 500 companies in 43 countries, and set up approximately 150 small purchasing companies or

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agents. Intelligence experts felt that Iraq also had an extensive network of intelligence agents and middlemen involved in arms purchases.

Iraq probably obtained some air defense equipment from countries like the Ukraine and China, and may have been able to smuggle in some spare parts through Syria, Turkey, and Jordan. Deliveries through Syria became significant after mid-2001, and included parts and weapons assemblies for MIG and Shukoi aircraft, armor, and land-based air defenses.

Nevertheless, Iraq was not been able to restructure its overall force restructure to compensate for its prior dependence on an average of $3 billion a year in arms deliveries. It did not visibly deployed any major new weapon system after 1991, or show it could recapitalize any aspect of its force structure. About two-thirds of its remaining inventory of armor and its aircraft became obsolete by Westerns standards.

Iraq lacked the funds, spare parts, and production capabilities to sustain the quality of its consolidated forces. While it had domestic military production facilities, it was limited to the production of guns and ammunition, and has never succeeded in mass-producing more advanced weapons. Many of its modernization efforts showed some technical skill, but others were little more than unintentional technical practical jokes.

In contrast, Saudi Arabia alone took delivery on over $66 billion worth of new arms since 1991. Kuwait received $7.6 billion, Iran $4.3 billion, Bahrain $700 million, Oman $1.4 billion, Qatar $1.7 billion, and the UAE $7.9 billion. Equally important, the US has made major upgrades in virtually every aspect of its fighter avionics, attack munitions, cruise missile capabilities, and intelligence, reconnaissance, and targeting capabilities.

Iraqi Wartime Preparations Emphasized the Wrong Ideology and Psychological Operations

Iraq circulated literature to its field commanders and troops that emphasized defensive warfare, did not prepare them or air and missile attack, and which called for Jihad and Islamic martyrdom, rather than effectiveness tactics and combat. It called on Iraqi units for chemical warfare to be used against them and for dispersal rather than rapid response.

Instructions to units like the 51st Division near Basra emphasized reliance on faith and sacrifice, tactics like climbing palm trees for reconnaissance purposes, using alternative methods of communication, living on farms and digging wells, and other impractical activities totally unrelated to modern warfare.

The “Suicide Effect”

Rather than train properly for asymmetric warfare, troops were often given pointless ideological nonsense. While martyrdom and suicide attacks present problems for conventional forces, and some extremist elements will support and carry out such operations, large-scale military forces are more likely to take every opportunity to desert or avoid fighting. Ideological extremism motivates a small number of ideological extremists, not popular forces and modern armies.

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Iraqi Command and Control was Never Effective, and Iraq Could Never Recover in the Face of Airpower and the Speed of the Coalition Advance

It is unclear just how much of the Iraqi collapse was the result of attacks on its C4I assets, the ability of allied airpower to paralyze its operations, and the slow-moving nature of Iraq's land forces. Iraq was driven out of balance by the speed of US maneuver, however, and by the flanking movement through the Western edge of the Euphrates and then the drive along the Eastern edge of the Tigris.

Once the US approached Baghdad it could neither maneuver quickly enough to establish a cohesive defense in depth or cope with US penetrations, and its decision-making cycle fell steadily behind the realities on the ground. By the time the US entered Baghdad, it had lost force cohesion and committed its best forces – the Republican Guards – in a piecemeal way in meeting engagements that virtually ensured its destruction.

A Blind Force as Well as One Without a Brain

Iraq had no satellites, minimal UAV assets, no survivable reconnaissance assets, poor artillery radar capability, no other airborne intelligence assets, and conducted minimal active reconnaissance. If its C4I problems deprived it of a functioning brain, its lack of modern ISR assets effectively left it blind in most aspects of combat beyond visual range.

Iraqi Irregular Warfare Tactics Were Unexpected but More an Irritant than Effective

Iraq seems to have badly exaggerated the potential importance of its tactics in trying to drawn US and British forces into the cities in the south and the value of using irregular forces. In practice, these tactics produced clashes and occasional successes, but the US quickly adjusted its tactics to bypass most cities, secure key bridges and routes, and give the pacification of cities secondary importance.

While the regime was often creative, it failed at fundamentals like blowing bridges, creating large popular army forces that could present a serious threat to the US flanks, blowing oilfield, etc. Rather than fright or paralyze US and British forces, it largely succeeded in making them angry and delaying the humanitarian effort.

It is also becoming clearer that the regime fundamentally misjudged the popular support it could obtain from its own people and deployed arms caches in facilities for the Popular army at a massive level without being able to call up, arm, and deploy such forces. This may partly have been a function of time and disorganization at the top, but it seems clear that many – if not most – of the Popular army simply did not support the regime and had no willingness to fight.

Misuse of Urban Warfare:

One ironic sub-lesson is that the bypasses and road nets that avoid cities greatly reduce their importance as potential defenses and barriers, and the best way to win an urban war is to avoid one.

Iraq Failed to Use Its Weapons of Mass Destruction

There is no way to no how many weapons Iraq had or what its plans might be. The war caught Iraq, however, at the moment it was trying to prevent a conflict by complying

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with the IAEA and UNMOVIC and where it may have destroyed many of its holdings or dispersed them too far to recover. [215]

Allied air power probably paralyzed any efforts to recover most such weapons, and certainly destroyed many potential delivery systems. US, UK, and Australian Special Forces were much better organized and equipped for the mission than in 1991, and much better supported with intelligence. The impact of eight years of UNSCOM and IAEA activity may also have done much to force Iraq to destroy its holdings,

There is also the possibility that Iraq felt sufficiently secure from an actual invasion so it shifted to a strategy of research and development and reliance on dual-use facilities to produce more weapons in the future. If so, it never had the chance to produce such weapons. The lesson unfortunately, is that there has never been an assurance Iraq could not use such weapons or that any other proliferating nation will not use them in the future.

Iraq Failed to Use Its Missiles Effectively

Missile, like bombs, are not terror weapons unless they can be used in sufficient numbers or with sufficient lethality to have major killing or destructive effects. Iraq was never credited with more than 12-25 surviving Scuds and its Al Samoud II and Ababil missiles and rockets lacked the range, accuracy, and lethality to be much of a threat. Missile defenses and attacks on delivery systems further degraded a largely symbolic capability.

Failure to Use Water Barriers

For whatever reason, Iraq move too slowly to make use of water barriers, blew only a few bridges and often only partially and failed to defend against bridging and crossings as effectively as it should.

Force Protection

Iraq left many of its soldiers without meaningful protection gear and body armor, wasted committed personnel in suicide attacks, and could not evacuate personnel effectively. Attacks against unprotected civilians are one thing; attacks against alert and well-protected soldiers are another. Committing forces without proper personal protection does not produce martyrs, simply needless casualties.

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IX. THE VALUE OF ALLIES AND BUILD-UP TIME

The Iraq War important lessons about regional friends and allies. In spite of all of the tensions between the US and the Arab world over terrorism and the Second Intifada, the Untied States obtained sustained open support from Kuwait, Oman, Qatar and the UAE, and quiet support from Jordan Saudi Arabia. This illustrated both the general value of regional friends and alliances, and the dangers of assuming that force transformation is a substitute for foreign bases and the support of foreign states.

Access to allied territory in the Gulf allowed the US and Britain to deal with the key logistic problems in their build-up by slowly delivering virtually all of the supplies and major land combat equipment used by sea over the period from June 2002 to February 2003. The two major Coalition partners had access to the critical bases in the Gulf that they needed for operations. Their allies in the Gulf then made substantial adjustments to accommodate a democratic Turkey's refusal to allow the US to create a northern front or use facilities in that country.

In spite of tensions over the aftermath of the terrorist attacks on the US on September 11th, 2001, Saudi Arabia allowed overflights by US aircraft and missiles, allowed the expanded use of Saudi airbases for "No Fly Zone" missions that helped weaken Iraqi air defenses before the war and during the war, provided fuel at minimal cost for AWACS and E-8 missions on Saudi soil, allowed the use of the Combined Air Operations Center (CAOC) to manage Coalition air operations, and made facilities at Ar Ar available for Special Forces search and rescue missions. Above all, it ensured the flow of oil exports in ways that helped compensate for the loss of Iraqi and Venezuelan exports.[216] While US combat forces will leave Saudi Arabia following the Iraq War, it is important to that US advisory teams will remain, that the Kingdom is still taking delivery on tens of billions of dollars worth of US military exports, that joint exercises continue, and Saudi Arabia may be of great value to the US and Britain in the future.[217]

Other Arab allies also helped. Egypt allowed free transit through the Suez Canal and Egyptian airspace, and Jordan quietly allowed US operations in the south as well as overflight operations. Jordan permitted US overflights, and allowed US Patriot units and missile warning systems to operate on its soil. It quietly allowed the USAF and US Special forces to operate from bases in Eastern Jordan. At least 24 F-16s, equipped with Litening II targeting pods and armed with weapons like the GBU-27 laser-guided bomb operated from Jordanian soil. They flew roughly 700 sorties. Special Forces operated from Jordan to search for Scud launch boxes in western Iraq.[218]

The US had assistance from still another ally. Israel permitted overflights, did not increase the tempo of its operations in the Second Intifada, and relied on defense in the initial phases of the war.

In short, no discussion of the lessons of the Iraq War should ignore the continuing value of alliances and foreign bases, and the need for coalition partners. Equally, it should not ignore the value of decades of military relations and engagement with friendly Arab states, and the willingness of those states to support the US even when they sometimes opposed the war or this presented serious problems in terms of domestic political opinion. It is all too easy for the US to be blinded by the beauty of its weapons and ignore these

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lessons. Regardless of force transformation and any new way of war, US strength remains dependent on coalitions, even when these are coalitions of the partly willing.

To be more specific, the defeat of Iraq also does not justify any negligence in rebuilding the relations that underpin the US alliance with Europe, efforts to strengthen relations with Russia, or efforts to strengthen US ties to the Arab world. As the next chapters discuss, it is all too easy to talk about transforming Iraq and the Middle East, and far more difficult to achieve even moderate success. The success of US arms has not been matched by the success of US diplomacy and nation building not only is not a science, it is not yet an art form.

It is absurd to talk about "fourth world wars" with states that have generally been friendly. It is equally absurd to talk about regime change in the Middle East without explaining exactly how this change is to be accomplished, why it will meet the needs of the peoples involved, and why it will produce better and more stable results than encouraging self-reform that addresses demographic, economic, and cultural issues and not simply a demand for instant democracy. Trading Arab friends and allies for radical religious regimes, or "one man, one vote, one time is not a strategy likely to serve any nation's interest.

Once again, military victory in Iraq is not a reason for American "triumphalism." If anything, it should be a prelude to readjusting the US military presence in the Gulf and Middle East to reflect the downfall of a dangerous tyrant and reduction in the threat, to concentrating on nation building in Iraq, to strengthening and rebuilding tie to Arab allies, and using diplomacy and the momentum of victory to discourage proliferation and the threat of terrorism. It is also a time to try to use US prestige and power to offer Israel real and lasting security by advancing a peace process that can seek to end the Second Intifada, and do so on terms that both give Israel security and the Palestinians dignity. The US cannot do this alone, but nothing can succeed without such a US effort.

Similarly, the fact the US now has no military peer, and faces major interoperability problems in integrating its forces with those of most allies, does not mean it does not need NATO or allied countries. It is inconceivable, for example, that the US could fight North Korea without South Korea taking on most of the military burden and Japanese support in terms of basing. Designing transformational forces to be interoperable may have its costs, but the value of allies like Britain and Australia has long been clear, as is the value of new allies like Poland in the Iraq War.

The risk of the US becoming isolated from the warfighting capabilities of even its closest allies is also illustrated by the statement of Admiral Sir William Boyce after the Iraq War. Admiral Boyce took the opportunity of his retirement to state a few lessons from the Iraq War that act as yet another warning about the growing gap between US and allied capabilities. He said that Britain's armed forces were overstretched, and should not pursue another war for eighteen months. Admiral Boyce said: "If you asked us to go into a large scale operation in 2004, we couldn't do it without serious pain. We must allow ourselves time to draw breath…If it was to be something of the scale that we have done this time, it would have to be something that the government is convinced is pretty important because I would tell them it would take a while to recuperate."[219]

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Admiral Boyce said that the armed forces could not handle another "discretionary conflict, a conflict waged by choice" if it were launched in 2004. He also questioned the need to spend £18 billion on 232 Euro fighters when bombers had proved much more important than fighters in the conflict, but said that British plans for two new "super aircraft carriers" had been proved necessary by the diplomatic difficulties of flying planes over sensitive countries in the run up to the invasion of Iraq. The fact that transformational changes are at least as difficult for allies as for the US is not a casual lesson. Cooperation and interoperability are critical unless the US military wish to become very lonely.

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X. GRAND STRATEGY: NATION BUILDING AND THE CHALLENGE OF WINNING THE PEACE

There is nothing new about the lesson that it is harder to implement grand strategy than to be successful in implementing strategy and tactics. It is one of the iron laws of military history that armies are far better equipped to win the war than to win the peace, and that strategic objectives in warfighting are far easier to achieve than to the grand strategic objectives necessary to shape the peace that has lasting value.

The postwar nature of Iraq will take years to develop, and many of the initial indicators will prove to be misleading or false starts. In some areas, postwar efforts at nation building will only have limited impact, while in other cases, changes with slow starts will have a high cumulative impact.

It is already clear, that there are deep divisions in Iraq, and in the world, over how Iraq should change and evolve. It is also clear that there is a long and complex list of factors that will determine the eventual outcome:

- Speed with which security, jobs, and conditions of ordinary life can be restored and improved.
- Quality of US and British peace making and nation building efforts, and their management and funding of the process.
- Effectiveness of peacekeeping and intervention in bringing Iraqi factions together, and/or the level of internal conflicts if any,
- Role and effectiveness of other states, the UN, and NGOs.
- Scale of humanitarian and economic aid,
- Ability to create a stable form of Iraqi federalism and pluralism that can integrate ethnic and sectarian factions into an effective and stable government.
- Ability to limit interference by neighbors into Iraqi affairs, minimize regional competition for influence in Iraq,
- Effectiveness of efforts to reform criminal and commercial justice systems and protect human rights.
- Ability to restructure Iraqi economy from a command to a modern market economy,
- Level of de-Saddamization of the state system, including national oil company,
- Legal status of Iraq as new or inheritor state, and ability to deal with foreign debt, reparations, and existing contingency and ongoing international contracts,
- How well the Iraqi oil industry is reshaped, repaired, and renovated,
- Role of Iraq in OPEC and world oil market,
- Arab and Islamic perceptions of war, conflict termination, and nation building effort – pro or con,

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- Ability to rebuild Iraqi military forces and integrate Iraq into a stable security structure in the region, and
- Post conflict terrorism, if any.

The difficulties involved in transforming Iraq into a modern nation involve so many problems and fracture lines that it may be years before the outcome in Iraq is clear – much less how the nature of a postwar Iraq will impact on the other states in the Middle East. It also seems likely that the fracture lines within Iraq are so great that the US, Britain, and other outside powers can at most place Iraq on the road towards a more pluralistic federation, and economic reform and development.

In practice, however, Iraq's future must be one where Iraq is shaped by the Iraqis. Creating stable new patterns of political, social, economic, and energy development will take at lease 5-10 years, and it seems doubtful that outside powers like the US and Britain can have a major impact on Iraq's decisions for more than two.

Conflict Termination and Transitions

Giving Iraq the right start will, in itself, will be a major achievement. Virtually all wars involve a chaotic transition from war to peace, and the US and Britain do not seem to have properly prepared to secure the areas they liberated, or to deal with the wide range of local, regional, ethnic and religious divisions they encountered. Key objectives were not secured against looting, the flow of aid was slow, and little preparation was made to deal with long-standing historical tensions.

This was partly a result of the sheer speed of the Iraqi regime's collapse at the end of the war, Iraqi tactics that made it impossible to enter cities without diverting forces to secondary missions, and the problems created by not having a second front form Turkey and anything like the force totals originally planned.

General Myers, the Chairman of the Joint Chiefs, described the problem as follows in the Department of Defense daily briefing on April 15, 2003:

> "You know, some have suggested, "Well, gee, you should have delayed combat operations to protect against looting, or you should have had more forces, should have waited till more forces arrived." To that I would say this: The best way to ensure fewer casualties on [the] coalition side and fewer civilian casualties is to have combat operations proceed as quickly as possible and not prolong them. And so it gets back to the -- a matter of priorities. And we're dealing with some of those issues that you just brought up…the first thing you have to deal with is loss of life, and that's what we dealt with. And if you remember, when some of that looting was going on, people were being killed, people were being wounded."

Nevertheless, the US and Britain were not ready to make a smooth transition from war to establishing security and beginning the process of nation building. They failed both in the process of peace making and in setting goals that could convince the Iraqi people of the legitimacy of their efforts. The need to provide better planning and more resources for peace making and nation building at every level, and the moment forces advance in enemy territory is one of the key lessons of the war. So is the need to define and announce goals for nation building that can win the support and trust of the people.

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Looking at Postwar Iraq: The Internal Political Fracture Lines

The key to grand strategic success in winning the peace, will be whether the US and Britain can succeed in the putting the Iraqis on a path where they can transform Iraq into some form of a stable federal republic and one that is on the road to economic development. The answer is unclear, and it is too soon to be either optimistic or pessimistic.

All nations face difficulties in their development, and the fact that Iraq faces serious internal political and economic problems after thirty years of dictatorship is important. There is a need for realism on all sides, and especially for the Iraqi people to understand that everything ultimately depends on their willingness to put nation building before selfish interests and ethnic and religious feuding. The initial postwar problems in Iraq in securing the countryside, looting, rioting, and ethnic issues cannot be ignored. However, it is far from clear whether Iraq is now experiencing the initial teething problems of emerging from dictatorship, or the signs of more enduring problems.

Key Political Fracture Lines

It does not take an act of genius to predict that the political future of a postwar Iraq will not be as good or as bad as the more extreme voices favoring either future have projected. A war can remove a regime, but cannot create a new culture or set of values, or suddenly create a modern and stable political system and an economy. Iraq may be a sophisticated state with some 25 million people, but, it is also a nation with a 30-year old dictatorial regime, and no viable political parties.

Iraq has many political fracture lines, which are summarized in Table One. These include major religious and ethnic fault lines that date back to the Ottoman Empire. It is 60-65% Shi'ite, but has been rule by a Sunni elite than was not even based on broad representation of the entire Sunni community. Iraq is largely urban, but has had a ruling elite more clan and tribally oriented around village society. It is largely Arab (75%+), but has a large Kurdish minority, a significant Turcoman minority, and other minorities – including Assyrian Christians. Its minorities have deep internal fault lines, but have all face significant Arab persecution.

Divisions within Divisions

As Table One shows, there are divisions within these divisions. Saddam encouraged a steady growth of tribal and clan divisions between 1992 and 2003, as part of his divide and rule tactics. The Kurds have long been divided between a "Barzanistan"-- that was more than willing to make alliances with Saddam, the Turcomans, and Turks – and a "Talibanistan" that made occasional alliances with Iran. The shell of a modern Kurdish democracy developed after 1992, but the economy and stability of the Kurdish enclave depended on aid, smuggling, and oil for food income – not economic development. At least some Kurds also took the side of Saddam. The Turcomans came to regard both Kurd and Arab as potential oppressors, and Saddam used the Assyrian Christians to displace Kurds in the north in ways that may come back to haunt them.

The ruling Sunni minority feuded, and divided by town, clan, and family. The Shi'ite divided between secularists, modern religious Shiites, traditional religious Shi'ites, and those who supported the regime. The development of the south received far less attention

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than the development of Sunni areas, except for Basra. A low-level civil war by Shi'ite opponents of the regime targeted fellow Shi'ites as well as the regime, and long-standing feuds over the control of Shi'ite religious shrines and revenues continued to affect Najaf, Karbala, and other cities. As the initial outbreaks of violence showed after the war, there are also tensions between the religiously-oriented segment - led by the Iranian-backed Mohammed Baker Al-Hakim, and the more moderate and pro-Western Shiites -led by the Khoei family and INC.

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Table One

The Detailed Fracture Lines Within Iraq

Insiders versus outsiders

- Outsiders vs. Insiders: INC, INA, Hakim: The enemy of our enemy is not our friend.
- National "interests" include conflicting political lifestyles, competing economies based on the same resource or lack thereof-oil, sectarian and tribal enmities, and level of comfort in a prolonged U.S. military presence in the region.
- Of Iraq's 25 million population, up to 3 million have been in exile, primarily in Jordan, Europe, and the United States. Many of them represent the cream of Iraqi society-its scholars, writers, scientists, intellectuals, technicians, and craftsmen.
- Three wars and the long years of sanctions have decimated the ranks of Iraq's middle class-the talented, educated, doctors, lawyers, professional bureaucrats and civil servants-who ran the government civil service, schools, offices, and hospitals.
- Many who remained in Iraq belonged to the Baa`th Party, but most probably joined for the perquisites a Party credential guaranteed-education, careers, and the promise of a secure future, albeit one in a dangerous political environment. Some, however, were either true Ba'athists or loyal to Saddam Hussein.
- Elements of the Iraqi opposition in exile, such as those led by the Iraqi National Congress (INC) and Ahmad Chalabi, may promise a broad coalition crossing ethnic, political and sectarian elements, but they have no practical experience in governance and are often unpopular inside Iraq.
- The Iranian-backed Supreme Council for the Islamic Revolution in Iraq (SCIRI) led by Ayatollah Muhammad Baqr al-Hakim, was the most effective outside force in creating a military challenge to Saddam Hussein and has considerable support among Iraq's Shi'ites.
- Other outside opposition groups like the Iraqi National Accord, led by a former general and a Baa`th Party refugee, and other once-prominent military and political defectors will compete for power.
- More marginal outside factors include Iraq Sharif Ali, representing the Constitutional Monarchists
- The Kurds inside Iraq are divided into two major factions, the Barzani-led Kurdish Democratic Party and the Talabani-led Patriotic Union of Kurdistan
- There are divisions within the Turkoman, and Assyrian and Chaldean Christian communities in side Iraq and between them and other factions.
- Coalitions have an unlucky history in Iraq. None have survived long enough to govern, the last being the 17 July 1968 coalition that the militant Baptists and Saddam Husayn replaced 2 weeks later.

Political Heritage and Governance Problems:

- Iraq has no democratic tradition. It did not have one under the British, under the King, or under the authoritarian military- and party-dominated regimes that have ruled Iraq since 1920.
- Iraq's political society has been ruthlessly purged ever since 1979. There are no surviving modern and effective political parties, and serious risk of service politics.
- There is no effective rule of law, or functional legal system based on proper legal procedures, human rights, or commercial codes.
- There is no stable pattern of separation of the executive, legislative, and judiciary, and the military and security services have sometimes acted as independent branches of government. Presidential

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and parliamentary systems create the risk of electing another strong man or one man, one vote, one time,

- Iraq will have to build new political institutions that are democratic, pluralistic, transparent, and diverse. At the same time, Iraq's Kurds talk about federalism and many outside Iraq believe Iraq can be easily divided among its ethnic and religious communities.
- Iraq cannot be easily divided in to ethnic and religious areas for the purposes of governance. Sunni, Shi'ite, Turcoman, and Kurdish areas overlap in terms of key urban areas, oil reserves, and control of water.
- Iraq's Sunni Arabs face serious problems in dealing with democratization, pluralism, and federalism. They are only 17 percent of the population, and have ruled Iraq since Ottoman times. The Shi'ites, however, are 60-65% of the population. The Kurds are 15-20%, and the Turcomans, Assyrians and Chaldeans total 5%.

A Shattered military: Restructuring the security and military forces will present both regional and internal problems:

- If a new Iraqi military is to reflect the shape of the new government, it must be turned into a more diverse institution, bringing the right proportion of Shi'ites, Kurds, and Turcomans into all echelons of the military.
- Some Kurds were among the senior ranks but very few;
- Shia recruits were nearly 80 percent of the regular army but few made it into the Republican Guards or ranks of senior officers.)
- Under Saddam the Iraqi Regular Army was stripped of its status, prestige, and weapons and subordinated in the 1980s to the Republican Guard, whose members are recruited from especially loyal Sunni Arab tribes, including the al-Ubayd, al-Jabbur, al-Shammar, and al-Ani.
- Iraq must deal with major military debts to Russia, France, China, and other states. It also must find some way to fund major imparts to rebuild and modernize its forces.
- Some form of paramilitary and security forces must be created to provide local security and help control internal and ethnic divisions. All of the existing structures have been led and largely staffed by the worst of Saddam's loyalists.

Saddam's Exploitation of traditional tribal chiefs and leaders, especially outside the large cities and in the more isolated south and west.

- Saddam restored tribal rights to administer local justice and impose taxes so long as they did not contravene national law and maintained law and order. tribal elements manned local police and security posts and that the national police and security organizations manned border posts, major
- Ba'ath Party members once patrolled the streets of the cities and helped maintain law and order, but some sources report that since the Kuwait War and imposition of sanctions these Iraqis are too busy working 2 or 3 jobs to feed their families and too demoralized to care.
- The constant suppression of Shi'ite secular leaders, and well-recognized clerics, has created a power vacuum in the south that favors Shi'ite religious factions, including the Iranian-backed SCIRI.

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Looking at Postwar Iraq: How Its Political Fracture Lines Interact with Its Neighbors

All of Iraq's internal fracture lines have impacts outside Iraq, as well as within it. Rather than act to stabilize or "reform" the region, they pose potential threats of regional tensions and conflicts.

Iran has a longstanding interest in Iraqi Shi'ite religious politics, and in the overall role and power of Shi'ites in Iraqi society and politics. This interest is religious (key shrines and seminars are in Iraq), ideological (Iran favors a more theological Shi'ite power structure), security (avoiding another war and limiting the impact of a US presence on its border and in the Gulf), power-political (a weak Iraq is a strong Iran in terms of Gulf power politics,), energy (oil production and quotas), and economic (Iran has reparations claims left over from the Iran-Iraq War, and would like to clear the Shatt Al Arab.)

Turkey fears Kurdish autonomy and a lack of security along the border of its own Kurdish area. It is politically committed to supporting Iraq's Turcoman minority (300,000 to 500,000 but Turkey has sometimes claimed 3 million). Turkey needs oil pipeline revenues from Iraq, and sees Iraq as a major trading partner – one where its exports including agriculture and manufactures can be far more competitive than in the EU. As a result, Turkey does not want to see Kurdish control of Mosul or Kirkuk, or a major Kurdish role in control of Iraq's northern oilfields. Iraq's Kurds, in turn, still have some ambitions to create an independent Kurdestan including Turkey's Kurds. They and fear and resent the Turks, who sent in troops to hunt down Turkish Kurdish guerrillas hiding in Iraq five times between 1991 and 2003.

Saudi Arabia and the Gulf Arab states fear the break up of Iraq's territorial integrity, a loss of Sunni control, and a shift in the balance of power in the Gulf. All Arab states fear any weakening of Arab control of Iraq, and any break up that would give Iraq's Kurds independence. The Southern Gulf states are afraid that Shi'ite separatism or control of Iraq would create a major new pro-Iranian power center in the Gulf, potentially destabilizing the balance of power in the Gulf. They are already concerned that Iraq's loss of much of its military power and equipment has gravely weakened its ability to deter Iran.

Jordan fears a loss of trade and low-cost oil: Jordan has long benefited from Iraqi oil subsidies, and from the fact Iraq imported goods through the port of Aqaba because of the Iranian closing of the Shatt al Arab and UN sanctions. The future of such subsidies and trade is now unclear. Jordanians also saw Saddam as a supporter of the Palestinians and Second Intifada.

Syria has lost a major trading partner and counterbalance to Israel. While little love was lost between the two Ba'ath regimes, a rapprochement in recent years led to better relations, more trade, and Syrian profiteering by exporting Iraqi oil sent illegally through a pipeline to Syria. Iraq's proliferation and strong conventional forces also acted as a potential threat to Israel. A new regime with far fewer military forces is much less reassuring.

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Looking at Postwar Iraq: Iraqi Demographic Fracture Lines

The challenges in shaping a postwar Iraq go beyond politics. In spite of decades of war and sanctions, Iraq has serious demographic problems that create additional fracture lines. Iraq's population role from 5.2 million in 1950 to 6.8 million in 1960, 9.4 million in 1970, 13.0 million in 1980, 17.3 million in 1990, and 22.9 million in 2000. UN and US Census Bureau estimates indicate it will rise to 30 million in 2010, 37,1 million in 2020, 43.1 million in 2030, 48.4 million in 2040, and 53.6 million in 2050.

The sheer momentum of this population increase is creating a major problems in terms of scarce water and arable land resources and dropping real per capita oil income. Per capita oil revenue was a little over $700 per capita in 2002 versus over $6,000 in 1980, and had dropped far more in constant dollars. To put this in perspective, Saudi Arabia with somewhat similar population growth, saw its per capita income drop from around $23,820 in 1980 to $2,563 in 2001.

Iraq has a very young population. Roughly 48% of the population is of 14 years of age or younger. The younger job age population from 15-30 years in 2000 totaled some 2.5 million or 28% of the population and the of the total "bow wave" population aged 14 years or younger totaled 9.6 million. This part of the population has never lived under any other rule than Saddam Hussein's, has seen its education collapse since the later 1980s, and has little experience with modern jobs and commerce.

Looking at Postwar Iraq: Iraqi Economic Fracture Lines

Iraq has great mid and long-term economic potential, but its postwar government will inherit a command economy crippled by decades of grandiose mismanagement, war, and UN sanctions. There has been a steady decline in relative wealth since 1982, not 1991; and 70% of the cut in its GDP per capita occurred before the Gulf War. The Iraqi economy has not really functioned as a market economy. It has been ruled by an elite that treated it more as a base for a profiteering kleptocracy than national development. Its criminal justice system was corrupted by Saddam Hussein's regime, but its civil law also failed to develop and implement a modern and effective commercial code.

Economic Strains and Weaknesses

Iraq has long imported over half its food because of a failure to institute effective agricultural reform and invest in and modernize the agricultural sector. Its banking and commercial sectors are outdated and government-dominated. Aside from a state-controlled construction industry, it has no efficient heavy or light industry and its service sector needs major reform.

Iraq's economy has been dependent on UN "oil for food" and its "black" sector in order to operate, and some estimate that Iraq will still have a 50-70% dependence on food imports once the economy recovers. Iraq must pay for a major modernization and expansion of medical and educational services, stabilize its currency, and remove the artifacts of a command economy that has been centered around a dictatorship for three decades. It has some solid economic institutions but no real market system in terms of modern market-driven distribution, banking, insurance, or a uniform commercial code.

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While the current war may have only done limited damage to Iraq's infrastructure, it suffers from underfunding since the first years of the Iran-Iraq War and from a lack of recovery and investment after the Gulf War. According to one estimate, Iraq had 9,800 megawatts of generating capacity before the 1991 Persian Gulf War, Desert Storm left it with only 380. Hussein has since restored about 4,800 megawatts, but the country would need as much as 14,000 megawatts to match its 1990 capacity, adjusted for population growth.

Debt, Reparations, and Contingency Contracts

There are many estimates of Iraq's debt and reparations burden. An analysis by the CSIS is shown in Table Two. They show a total of $127 billion in debt ($47 billion in interest), $320 billion in reparations claims ($148 billion settled), and some $57 billion in pending contracts that Saddam Hussein's regime signed with nations like Russia and France.

These burdens could cripple any hope of recovery even more than the treaty of Versailles and WWI reparations claims crippled the economy and political stability of Weimar Germany. To put them in perspective, US intelligence estimates that the entire GDP of Iraq was only $28.6 billion at market exchange rates in 2002, and only $15.5 billion at market exchange rates. Its total merchandise experts were only $13 billion, of which $12.3 billion were oil export revenues – including the estimated value of some $3 billion worth of smuggled oil.

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Table Two

Iraq's Financial Burden

- **Total Debt: $127 billion**
    - **Interest: $47 billion**
    - **Gulf states: $30 billion**
    - **Kuwait: $17 billion**
    - **Russia: $12 billion**
    - **Bulgaria: $1 billion**
    - **Turkey: $800 million**
    - **Poland: $500 million**
    - **Jordan: $295 million**
    - **Morocco: $32 million**
    - **Hungary: $17 million**
    - **France, Egypt, Others: ?**

- **Pending Contracts: $57.2 billion**
    - **Russia: $52 billion (90%)**
    - **Netherlands: $3.6 billion (6%)**
    - **Egypt: $740 million**
    - **China: $80 million**

- **Reparations (Less claims from Iran-Iraq War): $320 billion claimed**
    - **$148 billion settled**
    - **$172 billion unsettled**
    - **Status of interest on payments unsettled.**

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Looking at Postwar Iraq: Iraqi Energy and Oil Export Fracture Lines

The glue that will hold Iraq together, or the wealth that will divide it, is the revenue from petroleum and petroleum-related exports. Oil underpins Iraq's exports, market economy, and government revenues. Iraqi oil revenues are critical to its development, as is the proper sharing of such revenues to any hope of its political stability.

Iraq's oil wealth is acutely limited in comparison to the past. The EIA estimates that Iraq's oil revenues peaked at $57.8 billion in 2000 dollars in 1980. They were only $15 billion in 2001, and $12.3 billion in 2002. They would only have been $15.7 billion in 2003 with no war and no discount for smuggling.

At the same time, Iraq's oil reserves give it immense future potential. The EIA estimates that Iraq contains 112 billion barrels of proven oil reserves, the second largest in the world (behind Saudi Arabia). Iraq's true resource potential may be far greater than this, however, as the country is largely (90% or so) unexplored due to years of war and sanctions. Deep oil-bearing formations located mainly in the vast Western Desert region could yield large additional oil resources (possibly another 100 billion barrels).

The National Iraqi Oil Company (NIOC) has a large number of competent technocrats and managers, and only had a light top layer of thugs and killers under Saddam Hussein. Iraq has not, however, had adequate development funding, planning, and management since 1982 – the year in the Iran-Iraq War when Syria closed its pipeline to Iraq and Iraq ran out of money. UN surveys by Saybolt are only preliminary but indicate that Iraq's fields suffer from waterflooding and overpumping in most areas, that only 24 of 73 fields were working before the war, and that12-40% of its oil wells were at risk.

Iraqi Oil Development Needs

Iraq needs major funding to rehabilitate and modernize its oil fields, as well as to pay for any wartime damage. At best, it its present economic production capacity is 2.8 MMBD, and possibly only 2.5 MMBD. This amounts to about 3% of world markets, and makes it roughly equivalent to Nigeria.

There is no way to predict the short and mid-term future of Iraqi oil development. Experts simply have too limited a knowledge of Iraq's problems, and investment priorities, costs, opportunities. An Iraqi study in 1996 claimed it would cost $35 billion to get to 3.5 MMBD. Other sources estimate it would take $7 billion and minimum of 3 years to increase capacity to 3.5 MMBD, and $20 billion plus to raise capacity to 6 MMBD by 2010.

In December 2002, the Council of Foreign Relations and the Baker Institute released a report that concluded that:

- Iraq's oil sector infrastructure was being held together by "band-aids," and was experiencing a production decline rate of 100,000 bbl/d per year;
- Increasing Iraqi oil production would require "massive repairs and reconstruction...costing several billions of dollars and taking months if not years;"

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- The costs of repairing existing oil export installations would be around $5 billion, while restoring Iraqi oil production to pre-1990 levels would cost an additional $5 billion, plus $3 billion per year in annual operating costs;
- Outside funds and large-scale investment by international oil companies would be needed; 5) existing oil contracts would need to be clarified and resolved in order to rebuild Iraq's oil industry, with any "prolonged legal conflicts over contracts" possibly "delay[ing] the development of important fields in Iraq;"
- Any "sudden or prolonged shut-down" of Iraq's oil industry could result in long-term reservoir damage;
- Iraq's oil facilities could easily be damaged during any domestic unrest or military operations;

Given these problems, it is unrealistic to expect massive rises in oil export earnings in the near future. According to the Middle East Economic Survey, Iraq's oil sector suffers from years of poor oil reservoir management; corrosion problems at various oil facilities; deterioration of water injection facilities; lack of spare parts, materials, equipment, etc.; and damage to oil storage and pumping facilities required major investment. MEES does estimate, however, that Iraq could reach a production capacity of 4.2 million bbl/d within three years at a cost of $3.5 billion, and a production capacity of 4.5-6.0 million bbl/d within seven years.

Contingency Contracts Signed Under Saddam

The challenge of rebuilding and expanding Iraq's petroleum industry and dividing up its resources and revenues, is compounded by another problem. The EIA reports that Saddam Hussein's regime signed several multi-billion dollar deals with foreign oil companies mainly from China, France, and Russia. Deutsche Bank estimates they are worth a total of $38 billion for new field development -- with potential production capacity of 4.7 million bbl/d.

In 1992, Iraq announced plans to increase its oil production capacity to over 6.3 million bbl/d following the lifting of U.N. sanctions. This plan, which was to be accomplished in three phases over a five-year period, assumed the availability of billions of dollars worth of foreign investment. Much of the production was to come from developing giant fields in the south (Halfaya, Majnoon, Bin Umar, West Qurna), plus the Mishrif reservoir (Luhais, North and South Rumaila, Zubair, etc.), East Baghdad, and others.

The EIA estimates Russia signed a $3.7 billion, 23-year deal with Saddam's regime to rehabilitate Iraqi oilfields, particularly the 11-15 billion barrel West Qurna field (located west of Basra near the Rumaila field). In October 2001, a joint Russian-Belarus oil company, Slavneft, signed a $52 million service contract with Iraq to develop the 2-billion-barrel, Suba-Luhais field in southern Iraq. Full development of the Suba-Luhais field could result in production of 100,000 bbl/d (35o API) at a cost of $300 million over a period of three years.

These contracts may not have been signed under duress, but they certainly were intended to buy political support for Saddam in freeing Iraq from sanctions. The economic

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competitiveness of the French and Russia contracts is unclear, and Iraq may have a strong interest in renegotiating them.

The Ethnic Fracture Lines of Oil Development and Control

The divisions between Kurds, Sunnis, and Shi'ites could greatly complicate the future development of Iraq's present fields, much less its proven and unproven reserves. While some of the current fields are in Sunni areas, and major new potential reserves exist in the Sunni west, Iraq's proven oil reserves are not distributed evenly throughout the country. In fact, prior to Iraq's invasion of Kuwait in 1990, about two-thirds of Iraq's production was coming out of the southern fields of Rumaila, Zubair, and Nahr Umr in Shi'ite areas. Other potentially huge fields such as Majnoon and West Qurna (see below for more details) are also located in the southern part of the country.

The EIA data on these fields show Iraq's main recent exports of crude oil have come from the country's two largest active fields: Rumaila and Kirkuk. It is clear that Iraq needs investment to rehabilitate and modernize these fields, as well as develop others, but the cost and time required can only be guessed at.

Iraq also needs money to develop its gas resources to allow it to meet domestic energy demand while freeing oil for export, and to restore and expand its downstream operations. Iraq's refining capacity in January 2003 was about 417,000 bbl/d, compared to a pre-Gulf War, nameplate capacity of 700,000 bbl/d. Iraq has 10 refineries and topping units. The largest are the 150,000-bbl/d Baiji North, 140,000-bbl/d (or higher) Basra, and 100,000-bbl/d Daura plants.

Iraq needs to create a modern downstream sector. Iraq currently lacks light-end products, and relies on low quality gasoline and the EIA reports that both Baiji in northern Iraq as well as the refineries at Basra, Daura, and Nasiriyah were severely damaged during the Gulf War. Rising pollution levels because of a lack of water treatment facilities are also problems for Iraq's refining sector. Iraq's prewar/post-sanction plans called attracting foreign investment to perform refinery upgrades (Iraq identified dozens of such projects) and for a new $1-billion, 290,000-bbl/d "Central" refinery near Babylon.

The Fracture Lines of Oil and Gas Exports

The movement of Iraqi oil creates additional ethnic and international fracture lines. Iraq's most efficient and profitable shipping route is through the oil terminals in the Gulf to Asia, but then no country other than Iraq benefits. The Kirkuk-Ceyhan pipeline goes through the Kurdish area but favors Turkey. The Kirkuk-Banias pipeline favors Syria. Iraq's oil shipments to Jordan have been a politically motivated subsidy, smuggling oil by truck into Turkey, and by barge through Iranian waters have been the result of UN sanctions. Each nation can be expected to put some form of political pressure on Iraq to ship oil in ways that serve their own interests.

The war does not seem to have damaged Iraq's export facilities, but some still reflect damage from the Gulf War or the result of years of underinvestment. The EIA reports that the 600-mile, 40-inch Kirkuk-Ceyhan pipeline is Iraq's largest operable crude export pipeline. It has a design capacity of 1.1 million bbl/d, but reportedly can handle only around 900,000 bbl/d. A second, parallel, 46-inch line has an optimal capacity of 500,000

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bbl/d and was designed to carry Basra Regular exports, but at last report was inoperable. The two parallel lines have a combined design capacity of 1.5-1.6 million bbl/d.

Iraq has three tanker terminals in the Gulf at Mina al-Bakr, Khor al-Amaya, and Khor az-Zubair (which mainly handles dry goods and minimal oil volumes), and these are Iraq's only way of exporting without paying a premium shipping from a foreign pipeline. Mina al-Bakr is Iraq's largest oil terminal, with four 400,000-bbl/d capacity berths capable of handling very large crude carriers (VLCCs). Gulf War damage to Mina al-Bakr has been largely repaired and the terminal can handle up to 1.2-1.3 million bbl/d. A full return to Mina al-Bakr's nameplate capacity apparently would require extensive infrastructure repairs. Mina al-Bakr also is constrained by a shortage of storage and oil processing facilities, most of which were destroyed in the Gulf War.

The EIA reports that Iraq's Khor al-Amaya terminal was heavily damaged during the Iran-Iraq War (and completely destroyed during Operation Desert Storm in 1991) and has been out of commission since then. As of March 2001, reports indicated that Iraq had largely completed repairing two berths at Khor al-Amaya. Upon full completion of repairs, Iraq projects Khor al-Amaya's capacity will rise to 1.2 million bbl/d.

Iraq's pipelines through Kuwait and Saudi Arabia have been shut since the Gulf War, and its only other line goes through Syria. On August 20, 1998, Iraq and Syria signed a memorandum of understanding for the reopening of the 50-year-old, rusting Banias oil pipeline from Iraq's northern Kirkuk oil fields to Syria's Mediterranean port of Banias (and Tripoli, Lebanon). The pipeline had been shut for 17 years.

Iraq does have an internal pipeline network that cuts across its internal ethnic and religious divisions. In order to optimize export capabilities (i.e., to allow oil shipments to the north or south), Iraq constructed a reversible, 1.4-million bbl/d "Strategic Pipeline" in 1975 and the resulting flow of oil only reached about 120,000 barrels per day. Iraq's other options have been providing subsidized oil to Jordan, and smuggling product through Turkey and Iran, neither of which seem to have much future now Saddam's regime has gone. This pipeline consists of two parallel 700,000-bbl/d lines. The North-South system allows for export of northern Kirkuk crude from the Persian Gulf and for southern Rumaila crudes to be shipped through Turkey. During the Gulf War, however, the Strategic Pipeline was disabled after the K-3 pumping station at Haditha -- as well as four additional southern pumping stations -- were destroyed.

Gas exports are also an issue. The EIA reports that Iraq has a major natural gas pipeline with the capacity to supply around 240 MMcf/d to Baghdad from the West Qurna field. The 48-inch line was commissioned in November 1988, with phases II and III of the project never completed due to war and sanctions. The last two phases of the pipeline project were meant to supply Turkey.

Iraq's Northern Gas System, which came online in 1983, was damaged during the Gulf War as well as by the Kurdish rebellion of March 1991. The system supplied LPG to Baghdad and other Iraqi cities, as well as dry gas and sulphur to power stations and industrial plants. Iraq also has a Southern Gas System, which came online in 1985. Natural gas also used to be pumped from Rumaila into northern Kuwait via a 40-inch, 105-mile pipeline. The gas was used to supply Kuwaiti power stations and LPG plants, but was halted following Iraq's invasion of Kuwait in August 1990.

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The Fracture Lines of Disarmament and Rebuilding Iraqi Military Forces

Another set of fracture lines emerges out of the need to both disarm Iraq of its weapons of mass destruction and to rebuild its conventional forces to give it new capabilities for self-defense. The fact that the US and Britain did not find large "smoking guns" in the form of Iraqi forces capable of using chemical and biological weapons, and/or a major nuclear weapons development effort, has led many to believe that Iraq was not a serious proliferators in spite of eight years of discoveries by UNSCOM and the IAEA and new discoveries by UNMOVIC.

It seems like that the US and Britain will gradually find evidence that Iraq continued to research and develop weapons of mass destruction at the time the Iraq War began, and that it probably dispersed and concealed some weapons or assets to hide them from UNMOVIC. It is also possible, however, that Iraq had adopted a strategy of going on with covert research, of destroying its overt holdings of weapons, of buying dual-use facilities and equipment it could later devote to WMD production, and of trying to both break out of UN sanctions and defer a US and British attack. If so, one lesson of the aftermath of the war is that the US and British failure to internationalize the WMD disarmament effort from the start may lead many countries and exports to question the validity of what the US and British find and others to question whether Iraq was ever a serious threat.

The practical lessons of intelligence and targeting have been discussed earlier, but Iraq will face further fracture lines in view of the fact it has lost many of its conventional forces, will see most of its remaining missile and WMD assets destroyed, and will still exist in a heavily armed neighborhood where powers like Israel, Iran, Pakistan, and Syria have their own weapons of mass destruction. Regardless of any US and British disarmament efforts, Iraq will also retain a large amount of human capital in terms of expert knowledge about how to build and use weapons of mass destruction, and any economic development program will given it new dual-use facilities that presumably will not be under UN inspection.

The full nature of the problems that will occur in rebuilding Iraq's conventional forces remain unclear, although intense land and air combat and the use of some 18,000 precision weapons have almost certainly left Iraq with limited defense capability. When these effects are combined with the near destruction of the Republican Guard, massive air and surface-base air defense losses, and massive desertions in the regular forces, the net result seems to be that Iraq has lost the vast majority of its conventional war fighting capabilities.

The burden of rearming Iraq will also add to all of the economic and energy barriers discussed earlier. It seems extremely unlikely that Iraq will ever return to the militarism it had before the Gulf War. Iraq was spending some 20% of its GNP and 30% of its government revenues on military forces in the late 1970s, before the Iran-Iraq War. It spent spending some 45% of its GNP and 50% of its government revenues on military forces during the most intense periods of the Iran-Iraq War.[220]

Iraqi arms imports averaged more than 35% of all imports in the late 1970s, and roughly 60% of all imports in the 1980s. [221] According to US estimates, Iraq spent some $29.7

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billion on arms between 1984-1988, of which $15.4 billion was spent on imports from the former Soviet Union, $3.1 billion on arms imports from France, $2.8 billion on imports from China, 30 million on imports from the UK, $675 million on imports from West Germany, $675 million on imports from Czechoslovakia, $750 million on imports from Poland, $370 million on imports from Italy, $650 million on imports from Bulgaria, and $5.2 billion on imports from other countries – largely North Korea and Vietnam.[222]

If one looks at the period between 1983 and 1990, the "run-up" to the Gulf War, and only consider arms purchases in excess of $50 million, another source indicates that Iraq imported some $39.6 billion worth of major arms. The Soviet Union sold $19.5 billion worth, major West European nations sold $6.4 billion, other European nations sold $6.4 billion, China sold $4.0 billion, and all other nations sold $3.2 billion. (The US sold less than $50 million worth.) Even though Iraq decisive won the Iran-Iraq War by August of 1988, it still placed $9.97 billion worth of new arms orders between 1987 and 1990, virtually all with the Soviet Union and Europe.[223]

Nevertheless, Iraq only had several hundred million worth of smuggled arms imports after the UN imposed an embargo in the summer of 1990, and lost many during the Iraq war. In contrast, Saudi Arabia alone imported some $65.8 billion worth of arms during 1994-2001, and Iran imported $3.0 billion. The smaller Southern Gulf states imported $19.1 billion.[224] Given the fact, Iran alone is a major proliferator, the challenges of rebuilding an Iraqi security structure, war fighting capability, and deterrent are anything but easy.

As a result, the problems in rebuilding Iraqi military forces will not only be affected by the previous political and economic fracture lines, they will be affected by the following challenges to both Iraq and the US and British effort to turn their military victory into a more stable structure of security within Iraq and the region.

- How can Iraq's conventional capabilities be rebuilt? What force levels, arms modernization, and costs are involved?
- How does one disarm a nation like Iraq with practical experience in making and using CBRN weapons? How does one "disarm" Iraq's intellectual capital and deny it the future capability to make use of what will be steadily growing dual-use facilities?
- How can the "new" Iraqi state deal with mid and long-term impact of Israeli, Syrian, Iranian, Pakistani, and Indian proliferation?
- How can Iraq's military and paramilitary forces be restructured to provide security and prevent factional forces or warlords?
- How can they be restructured to support a transition to a true Iraqi rule of law, the enforcement of human rights, and to support national police activity.
- Finally, the issue arises as to whether the US and UK will guarantee Iraq suitable security in a region where key neighbors like Iran and Syria are major proliferators, and an exposed Iraq could be vulnerable to pressure and attack.

In short, there are two lessons. First, it is impossible to disarm a state of WMD as long as it retains the intellectual capital to build and use such weapons and its economy provides

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large-scale dual-use facilities that can be used to produce weapons of mass destruction. Second, the security aspects of nation building require the victors in modern wars to determine how to rearm their opponent – a challenge that will prove anything but easy.

The Lessons of Peacemaking and Nation Building

As has been discussed earlier in Chapter VIII, one of the most important lessons of the war in Iraq is the need to be ready to make the transition from war to peacemaking and nation building as combat actually proceeds and as each area is liberated. Another lesson, is to prepare the country involved, its people, the nations around it, and the world for the concept of peace making and nation building that will be used. This may not always win popular support. But it will greatly reduce many of the fears and conspiracy theories that arise in the absence of any clear plan and public statements. In this sense, no psychological operation is complete that only focuses on winning the war; "psyops" must give equal weight to preparation for peace making and winning the peace.

A lesson that is less clear, but that may well emerge out of the Iraq War is that the advances in military technology and warfighting that allow reductions in the combat presence on the ground that is necessary to defeat a conventional enemy do not apply to peace making and winning the peace. The world has moved well beyond the point where it will tolerate the delays and problems in dealing with humanitarian needs, reconstruction, and nation building that occurred in Germany and Japan after World War II. The US and the West also cannot afford to ignore the fact that an era of asymmetric warfare will also be an era of political warfare in which true victory means defeating enemy ideologies and political groups by creating stable successor governments and societies. Cutting one head off the Hydra may be militarily impressive, but it has little grand strategic purpose. All it does, is force the enemy to mutate or create new enemies for the future.

Similarly, "coalitions of the willing" require both regional powers and those who actively participate in a conflict to believe in the justice and adequacy of the peace. The same changes in the morality of war that force powers like the US to fighting in ways that minimize civilian casualties and collateral damage, force them to commit themselves to shaping the peace in ways that win the approval of the peoples of the nations they defeat, the nations around them, their coalition partners, and the world. There is no significant operational difference in grand strategic terms between altruism and pragmatism.

Here it is well worth noting the comments of Carl Bildt, one of the few voices with great practical experience in nation building about the lessons. In looking at the situation in Iraq, Bildt outlined seven further lessons:[225]

> Lesson **1: It is imperative to establish a secure environment very fast**. In Bosnia, we failed in the critical transfer of territories in Sarajevo. In Kosovo, the mandate for the troops was clearer, but we still failed to protect minorities. In both cases, we still suffer from the consequences of these initial failures. In Afghanistan there are grave question marks over the consequences of limiting the international security presence to Kabul. As long as the gun remains the fastest way to power and property, there simply will not be room for democratic politics and entrepreneurship. With national police in disarray and international police always taking time to recruit, there is no alternative to using soldiers and armies to keep order.
>
> **Lesson** 2**: The central challenge is not reconstruction, but state-building**. Reconstruction of the physical scars of war is certainly important, and it can be costly and take time. But building a

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political infrastructure that unites competing forces and ensures some sort of order, and an infrastructure of economic governance that promotes jobs and growth, is far more complex. Priorities must be right.

Lesson 3: To build a state, you need to know what state to build. Normally this requires some sort of a peace agreement or constitution. When this is not the case as in Kosovo any initial success risks being short-lived. In the Balkans, we have seen the immense challenge of doing so in a multiethnic environment. We must recognize that Iraq has some issues in common with other former parts of the Ottoman Empire, such as Kosovo and the Kurdish region. The potential of Iraq for disintegration is obvious, as are the consequences if this was to happen. Thus there has to be an early and fast agreement on a constitutional structure that will unite Arabs, Kurds, Turkmen and Assyrians of different beliefs in a state structure acceptable to them all.

Lesson 4: While humanitarian problems are always in the focus in the initial phase, it is dangerous to let them predominate over the long-term issues. There must be an early focus on economic questions such as currency, customs, taxation systems, commercial law, banking, debt restructuring and accessing international capital markets.

The sanctions that were provoked by Saddam Hussein have destroyed much of Iraq's economy. Because Iraq has experienced a population explosion, oil income per capita is unlikely to be substantially more than a tenth of what it was in the early 1980s. Job creation and bringing back a vibrant middle class are the keys to long-term stability.

Lesson 5: There has to be a benevolent regional environment. In the Balkans, regime change in Zagreb and Belgrade was key to improving prospects in Bosnia and Kosovo; in Afghanistan, the open or tacit cooperation of Pakistan and Iran is critical. If neighbors try to destabilize, they will sooner or later succeed.

Iraq is now a fragile zone in one of the most volatile areas of the world. Just about everyone recognizes that if the liberation of Iraq from tyranny is not followed by the liberation of Palestine from occupation giving true security to Israel, too the presence of U.S. and other NATO forces in Iraq will be an extremely challenging operation.

Lesson 6: **Nation-building takes a longer time, and requires more resources, than most initially believe**. As the first High Representative in Bosnia, I was told that everything should be concluded within a year. When the folly of this was recognized, a new deadline of two years was given. But five years after that has expired, the fourth High Representative is hardly less busy than the first. Bosnia and Kosovo might be easy cases compared with Afghanistan and Iraq. Peace-building requires an abundance of patience.

Lesson 7: The greater the international support, the easier the process. If there is international disagreement over the state-building process, this sooner or later risks translating into conflicts in the country in question. Some sort of UN framework normally helps, although it is not a guarantee. Building peace is a far more fragile, complex, costly and drawn-out process than fighting a war. So a peace coalition normally needs to be much broader than a war coalition.

The next chapter suggests that there is only a limited hope that the US and Britain, and others who participate in nation building, can hope for broad regional support from Iraq's neighbors or a peaceful Middle East. This seems equally true of any prospects for a stable regional security structure – a goal that might well be Lesson 8,"if it were feasible. It seems extremely unlikely that Iraq will be admitted to the Gulf Cooperation Council (GCC), at least in the near term, that its forces can be quickly rebuilt in a form that will create a better balance of power in the region, or that it can establish stable security relations with Iran without becoming a Shi'ite dominated state. As the next chapter shows, the only lessons harder to act upon than those of nation-building are those of region-building.

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More broadly, Iraq will have to deal with each of its fracture lines either actively or default in the process of nation building. There is no current way to determine how much the US and Britain can accomplish in helping Iraq to do this while they still have a dominant impact on Iraq's development, or what course Iraq will pursue once a regime emerges that shapes Iraq's longer term destiny.

What is clear is that divisions and fracture lines within Iraq run so deep that achieving a stable path towards unity, pluralism, and economic development will take years—if not a decade. Events may well prove in the process, that the US and Britain cannot impose grand strategic goals on Iraq in terms of "nation-building." If they succeed, it will be because Iraqi's want them to succeed, continue to want these goals years after US and British forces have left, and adopt them as their own goals. One way or another, Iraq will not be an instant example of anything to its neighbors. It also eventually will truly be Iraq for the Iraqi's.

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XI. GRAND STRATEGY: THE OUTCOME OF THE IRAQ WAR AND THE NEW, OLD, MIDDLE EAST

It now seems likely that the Iraq War will be yet another iteration of the lesson that small wars have fewer transformational effects on the regions where they are fought than many of their protagonists have thought in choosing to fight such wars. In fact, this often is true of much larger wars as well. The war to make the world safe for democracy did not and the war to end all wars began more wars than it ended.

In the case of the Iraq War, some neoconservatives and liberals have rushed out to talk about fundamental changes in the region that will put an end of old regimes and many of the region's tensions and conflicts. In contrast, some Arabists have reversed the cloak of Samuel Huntingdon and have warned of "clashes of civilization" and outbreaks of terrorism.

Like most developments in history, the reality is likely to be different. The impact of the war is likely to be more limited and more mixed. In fact, the "new" postwar Middle East may look surprisingly like the old.

An Example of What?

One key problem is the one raised is the previous chapter: it may be years before Iraq is an example of anything other than US military strength, and then it is unclear what it will be:

- At a minimum, Iraq will be a work in progress for several years. It will be a work that outside powers will seek to influence in political and economic terms, with pressures from the UN to internationalize the nation building effort; US pressure to maintain control while internationalizing the border; and French, Russian and other pressures to serve their respective commercial interests and weaken US influence. Turkey, Iran, Syria, and the Southern Gulf states will compete for influence and control over Iraq, almost regardless of what government emerges.

- If Iraq becomes a weak, client democracy, the new regime will do nothing more than appear to validate all of the regional conspiracy theories that see the US as an aggressive power with neoimperialist goals and the desire to take over Iraq's oil resources.

- If Iraq emerges as weak and divided, with feuding or warring Kurdish, Sunni, and Shi'ite factions, this will create a dangerous power vacuum. It will, at a minimum, lead Turkey, Iran, Syria, and the Southern Gulf states to intensify their competition for influence and control.

- If Iraq should tilt towards Iran and/or Syria, or towards any form of theocratic state, would create a new pattern of instability in the Middle East.
- If Iraq becomes a strong and united state willing to act as a "have power" and concentrate on internal development, it will still have to rebuild its military forces and rearm. Even if it is peaceful and democratic, this will still lead to tensions with some of its neighbors.

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It is far too early to know which future Iraq will pursue, how soon the choice of this future will be apparent, and how the Iraqi people will view the US and British role in shaping that future. It now seems that most are grateful for Saddam's fall, but not for war or for American political and economic influence over the peace process. The images of the Second Intifada, the problems of trying to establish a balance between Iraq's factions, and the natural desire for instant economic benefits are all problems in Iraqi perceptions of the US and UK. So are conspiracy theories over the US role in shaping Iraq contracts and its oil industry.

Even if the US is successful in putting Iraq on the road to successful nation building. Success does not necessarily mean popularity and gratitude. There are few – if any –cases where foreign intervention of this kind has met with broad approval, and Iraq remains a very different culture, society, and ethnic/religious mix. In any case, Iraq cannot be an example of anything other than the military defeat of a tyrant to the region until it is (a) clearly Iraq for the Iraqis, and (b) clearly successful. It is hard to see how this can take less than a few years.

Israel and the Second Intifada

There is no reason to assume that the "new" Iraq will be a major military threat to Israel or willing to subsidize Palestinian suicide bombers. At the same time, there is no reason to assume that Iraq will be pro-Israel unless it comes under intense pressure from the US or there is a settlement to the Israeli-Palestinian conflict. Iraqis have seen all of the same images of the Second Intifada from the Arab media as other Arabs and those images will not become more favorable because Saddam has fallen. If anything, these same images are likely to reinforce any resentment of the US.

Many in the Arab world see the end of the Iraq War as the time for more American action to resolve the Arab-Israeli conflict and to advance the "road map of a peace plan developed by the UN, EU, UK, and US. The US has already begun such an effort.

It is clear that the Bush Administration's wartime agreement with Prime Minister Blair will lead the US to at least make another major try at advancing a peace plan. It is also clear that American officials have become more sensitive to Arab concerns in the region and the need to defuse the Second Intifada to both maintain US alliances in the Arab world and reduce Arab hostility to the US.

Making progress, however, may be extremely difficult -- with or without Palestinian reform. Israel sees deep flaws in the "road map," and Palestinian "acceptance" of it is probably more a matter of tactical maneuver than any real support. The US also will not sacrifice Israel's interests, and it is unclear whether the US will take enough action to really alter Israeli-Palestinian tensions or the broader tensions between Israel and the Arab world. There is a good chance that the Second Intifada will go on, and even intensify, regardless of such US efforts and the outcome of the Iraq War.

Iran

Iran and Syria have different interests from the US in both Iraq and the region. On the one hand, Iran has seen a key threat disappear. On the other hand, Iran has seen American triumphant on its borders, and heard US rhetoric that is at least indirectly threatening.

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The end result may deter Iran from some adventures, but it could provoke it into others. It could also exacerbate the fault lines within Iranian politics.

Iran has a longstanding interest in Iraqi Shi'ite religious politics, and in the role and power of Shi'ites in Iraqi society and politics. This interest is religious (key shrines and seminars are in Iraq), ideological (Iran favors a more theological Shi'ite power structure), security (avoiding another war and limiting the impact of a US presence on its border and in the Gulf), power-political (a weak Iraq is a strong Iran in terms of Gulf power politics,), energy (oil production and quotas), and economic (Iran has reparations claims left over from the Iran-Iraq War, and would like to clear the Shatt Al Arab.)

The Iranian "game" in Iraq is almost certain to be to play pro-Iranian Shi'ites off against other factions, seeking to create a friendly and Shi'ite dominated Iraq. It will be careful because of its own military weakness, need to maintain friendly relations with the Southern Gulf states, and desire to keep up its efforts at developing missiles and nuclear weapons without provoking the US. The end result, however, is likely to be a more disruptive Iranian role in Iraq than in Afghanistan and a constant pressure to internationalize the nation-building effort in the US and to push US forces out of Iraq and the Gulf.

Rafsanjani, among others, has talked about finding some way to legitimize a political dialog with the US. At the same time, Iran has done little to encourage SCIRI and other pro-Iranian Shi'ites to cooperate with the US nation building effort in Iraq and is unlikely to do so unless it can see clear tactical value in doing so.

As for the fracture lines in Iran, it is unclear that any major faction in Iran welcomed the US intervention in Iraq. The pro Khatami faction may now be more willing to compromise and seek dialog, but the pro-Khomeini and hard-line factions are more likely to feel threatened and take a hard-line internally while trying to play the nation building game in Iraq against the US, and exploit Arab resentment against the US to reduce its presence in the Gulf.

In balance, the Iraq War may do more to harden the hardliners than push Iran towards a more pro-Western position. In any case, the course of nation building in Iraq will be seen as both a potential win and as a potential threat to Iran's vital interests. At least, some degree of competition with the US seems inevitable.

Syria

The radically differing ideological views of the Bush Administration and Syria make for troubled relations at best. Syria has lost a major trading partner and counterbalance to Israel. While little love was lost between the two Ba'ath regimes, a rapprochement in recent years did lead to better relations, and more trade. Iraq's proliferation and strong conventional forces also acted as a threat to Israel and a new Iraqi regime with far fewer military forces offers Syria far less of a counterbalance to Israel.

Syria clearly sees the US victory as "anti-Arab" removing a potential ally against Israel and placing American forces next to Syria for the first time. Syrian Pan Arab rhetoric and conspiracy theories reinforce a very real fear of US "neocolonialism" and a follow-on threat to the Syrian regime. Syria also sees the US effort in nation building in Iraq as a

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threat to Ba'ath ideals and goals – regardless of the fact they have had limited realization in Syria.

It is not surprising, therefore, that the game that Syria has played in Iraq is one of a spoiler seeking to rebuild some form of Ba'athist role and Syrian influence, and one of harassing the US while pressing for the internationalization of the nation-building process.

What will be interesting is whether the Syrian-Iranian alliance that helped support the Hezbollah in Lebanon can be extended to cooperation in trying to influence the outcome of nation building in Iraq or whether Arab versus Persian become the more important fault line.

Turkey

It is too soon to determine how much residual tension will exist between Turkey and the US as a result of Turkey's refusal to base US forces. What is clear is that Turkish democracy now has a strong Islamic element and the Turkish economy faces what could be a half-decade of crisis.

Like all of Iraq's neighbors, Turkey has a strong national interest in shaping nation building in Iraq to serve Turkey's goals and objectives, rather than seeing it as an example. Turkey fears Kurdish autonomy and a lack of security along the border of its own Kurdish area. It is politically committed to supporting Iraq's Turcoman minority. Turkey needs oil pipeline revenues from Iraq, and sees Iraq as a major trading partner – one where its exports including agriculture and manufactures can be far more competitive than in the EU. As a result, Turkey does not want to see Kurdish control of Mosul or Kirkuk, or a major Kurdish role in control of Iraq's northern oilfields. Iraq's Kurds, in turn, still have some ambitions to create an independent Kurdistan including Turkey's Kurds. They and fear and resent the Turks, who sent in troops to hunt down Turkish Kurdish guerrillas hiding in Iraq five times between 1991 and 2003.

The Iraq War certainly is not going to help stabilize Turkey. The Kurdish and Turcoman problems in Iraq will be a constant source of tension, and serious questions will arise over Turkey's future role in Iraq's economy. Oil shipments for example, could shift towards more exports through the Gulf. The Kurds may prefer other trading partners, and seek to influence Iraq towards trading policies that favor other countries.

The end result is unlikely to reach the point of a major crisis unless the Kurds show very little judgment and discretion, but the Iraq War will scarcely make things easier for Turkey at least in the near term.

Saudi Arabia and the Southern Gulf States

As far as the impact of Iraq on the Southern Gulf. As is the case in most other parts of the Arab world, much of the popular reaction depends on how successfully, how quickly, and if the US can help create a stable Iraq for the Iraqi's. The US victory has initially been seen by much of the population as motivated by a search for control of Gulf oil, military dominance in the Gulf, and/or helping Israel to secure its position in the region. Regimes may be less concerned about the more extreme version of such fears, but quietly share deep concern about US ability to create a unified and stable Iraq.

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It is difficult to see why a Saudi Arabia so concerned with its own political, cultural and economic issues is going to see Iraq as a useful example of anything. The two states cultures, and societies are simply too different. While Iraq has been a tyranny resisting change, Saudi Arabia has been a nation where the more progressive princes, technocrats, and businessmen have sought to modernize a deeply conservative people and Ulema.

The governments of Saudi Arabia and the southern Gulf states are relieved at the fall of Saddam Hussein, but neither of these regimes nor most of their citizens welcome a growth in the power and role of Shi'ites and Kurds in Iraq.

Saudi Arabia and the Gulf Arab states fear the break up of Iraq's territorial integrity, a loss of Sunni control, and a shift in the balance of power in the Gulf. The Gulf states fear any weakening of Arab control of Iraq, and any break up that would give Iraq's Kurds independence. The Southern Gulf states are afraid that Shi'ite separatism or control of Iraq would create a major new pro-Iranian power center in the Gulf, potentially destabilizing the balance of power in the Gulf. They are already concerned that Iraq's loss of much of its military power and equipment has gravely weakened its ability to deter Iran.

The Kuwaiti reaction has been more favorable in terms of seeing Saddam go, but Kuwait now lacks a unifying threat, the two leading members of the royal family are ill to the point of incapacity, the National Assembly is bogged down in service politics, and the power of Islamists is growing and is scarcely pro-American.

The other Southern Gulf states will continue to focus on their own political dynamics, with a Shi'ite problem in Bahrain and succession issues in Oman. The interest of that societies so dependent on foreign labor and oil wealth shown in pluralism and the Iraqi example – even if there is one – will be limited.

In general, the outcome of the Iraq War has so far added to the concerns and tensions between the US and Southern Gulf states growing out of the Second Intifada, the US reaction to "9/11," and the size of the US military presence in the region. At least in the case of Saudi Arabia, there has also been increased concern about new US efforts at regime change, and US unwillingness to recognize Saudi efforts at economic reform and the problems the regime faces with an ultraconservative population.

Jordan

Iraq will increase Jordan's problems, at least in the short term. Jordan fears the loss of trade and low-cost oil: Jordan has long benefited from Iraqi oil subsidies, and from the fact Iraq imported goods through the port of Aqaba because of the Iranian closing of the Shatt al Arab and UN sanctions. The future of such subsidies and trade is now unclear.

Some Jordanians recognized that Saddam was a tyrant in Iraq, but most saw him as a supporter of the Palestinians and Second Intifada. They now see King Abdullah's support of the US as at least a partial betrayal, and their expectations are likely to be focused more on postwar US efforts to create an Arab-Israeli peace than on Iraq nation building. The Iraq War will not make things in Jordan radically worse, but—at least in the short term—they are unlikely to make them even marginally better.

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Egypt

Egyptian government perceptions of the Iraq War are likely to be one of relief that it is over and did not make the fracture lines between the US and Arab world even worse. They also however, are deeply concerned over the potential emergence of an Iraq that is less Sunni Arab. Popular reactions are far more critical, and many see the government as having betrayed the Arab cause by giving the US basing aid and transit rights through the Suez Canal.

The end result has so far been to increase the resentments growing out of the Second Intifada and the US treatment of "9/11,"and filled with conspiracy theories about US and British motives in Iraq, Gulf, and Arab world. While some Egyptians do see the fall of a tyrant as desirable, even these Egyptians view nation building in Iraq in terms of unrealistic demands for instant success in nation building, instant internationalization, and instant US departure.

In broad terms, however, Iraq is a sideshow in the internal politics of Egypt, which reflect increasing tension over an aging Pharaoh, the lack of a clear succession, and the problems of the Egyptian economy. The successful suppression of Islamist challenges to the government has been suppression, not defeat, or a moment towards a more stable form of pluralism. It is not the example of Iraq. It is also unclear that Egypt's noisy media and secular politicians that seem likely to shape the post-Mubarak era. It is rather the army versus the Islamists.

In any case, years of troubled nation building in Iraq are not going to reshape the perceptions and attitudes of an equally troubled Egypt.

North Africa

Iraq is too far away to have much impact on the Maghreb states, except to serve as one more example of Western interference in Arab affairs – at least in the short term. The image of the Iraq War is likely to blur with the image of US support for Israel and the hostility much of the US media has shown to Islam and the Arab world since "9/11," but it is unclear that the impact will be particularly strong or negative.

A truly successful Iraq in political and economic terms might have a long-term influence on the Arab states in North Africa, but the internal problems of Morocco, Algeria, Libya, and Tunisia are so great – and so driven by internal factors – that Iraq is not likely to have major impact even if it does become a striking success story.

Islamic Extremism and Terrorism

Arabists have argued that the Iraq War will polarize and anger the Arab world, creating new groups of Islamic and other extremists and a new wave of terrorist attacks. Neoconservatives have argued that defeating Iraq will serve as a deterrent symbol, and at worst be the first phase in a series of military operations to defeat terrorist states.

In practice, it is difficult to see why either view should be correct. The war may well stimulate some sources of terrorism and deter others, achieving a rough balance. It is difficult to see those Arabs and Islamic extremists that already resent the US will resent it that much more because of a conflict removing a secular dictator.

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As for deterrence, the message of the war to extremists and terrorists may well be that conventional forces cannot do serious damage to the US but that irregular forces can. In any case, it is far from clear how the message of military victory will deter suicide bombers and violent extremists more than the US victory in Afghanistan, and Iraq's role as a supporter of terrorism was so tenuous that it is unclear why removing Saddam's regime will make that much of a difference.

If anything, it is the quality of nation building in Iraq, and the mid and long-term message this sends, that is likely to be more important than the military outcome.

The US Role and Presence in the Region

The Iraq War is not likely to make the presence of US forces in the region radically more—or less—popular than at the start of the war. Fear may lead some states to want the US to reduce its presence because of the risk the US will push for regime change but it may make others less willing to differ from the US and fail to support its power projection efforts. The US as yet has no way of estimating how many forces it needs to keep in Iraq in the short term, and its security needs relative to Iran in the longer run.

In any case, many of the tensions shaping US presence in the Gulf are more the long-term legacies of the US military presence in Saudi Arabia, and the tensions that grew up between Saudi Arabia and the US following "9/11," than tied to Iraq. The US decision to remove its combat forces from Saudi Arabia should ease these tensions considerably.

The US presence in Bahrain, Qatar, and Oman has never led to serious popular pressure for their removal. It also has generally been more tied to their perception of the threat posed by Iran than the threat posed by Iraq, although Kuwait's fundamentalists may be more willing to oppose US and Kuwaiti military ties now that the threat from Iraq has diminished.

The situation affecting the US presence in the region may be more destabilizing in terms of Egypt and Jordan. The Iraq War has made the quiet support their governments gave to the US more visible, and they already face serious problems because of the Second Intifada, economic problems, and other internal issues. Much will depend both on progress in the Arab-Israeli peace process and the quality of the nation-building effort in Iraq.

Energy Imports and Energy Security

One of the ironies of the Iraq War is that while it was a war about the stability of a region with some 60% of the world's oil reserves, and was a war about the security of oil exports, there is little prospect that it will offer the US or US any particular advantages except in the form of a more stable global oil market. While the liberation of Iraq may ease the price squeeze on world oil prices once Iraqi oil exports resume, no oil deals made by the US and Britain can survive once they leave Iraq unless the Iraqis feel these deals clearly benefit Iraq. In fact, there is no single area where both the US and Britain must do more to show Iraq and the world that all transactions and actions are in the interest of the Iraqi people.

"Oil imperialism" as little practical value to a modern economic power. The flag a multinational oil company uses is no indication of economic benefit to its "host" country

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and the tax and revenue streams from foreign operations have a limited impact on national revenues – if any. The international political costs of backing an oil company in a non-market driven foreign operation almost inevitably outweigh the tenuous economic advantages. Any control over the end-destination of the oil produced is negligible and subject to IEA sharing agreements in an energy emergency. Creating a strong national Iraqi oil industry that can attract global investment and operate on market terms offers far more advantages than a return to the 19th Century and a failed colonialism.

In any case, large-scale expansion of Iraq's oil exports is likely to come only after the US and UK have long gone from Iraq, and its supply and price impact is already anticipated in OPEC, IEA, and DOE forecasts. These projections call from Iraqi production to increase to 3.1 MMBD by 2005, 3.9 MMBD in 2010, 4.5 MMBD in 2015, and 4.8-5.5 MMBD in 2020 if the world is to meet expanding demand with moderate prices. Iraq may or may not meet or exceed these goals, but it will do it long after US and British influence has faded, and do so on its own terms. In practice, it is far more likely to be driven by the world economy, its internal needs, the availability of sustained investment, and the energy politics of its neighbors and OPEC.

The Underlying Factors that Shape the New Old Middle East

The greatest factor limiting the Grand Strategic impact of the Iraq War, however, is that it does not deal with any of the larger forces pressing on the Middle East. In summary, it has removed a major tyrant and a key proliferator, but it has not fundamentally changed the Middle East or even disturbed most fracture lines. In any case, it will be several years before the victory in Iraq, and the nation-building that follows, can be a key example of anything. Even when outcome is clear, it seems doubtful that it will have a definitive impact on any of the other 22 countries in the region, each of which has its own problems, goals, and imperatives. The outcome of the Iraq War will be a factor that affects the future of the Gulf and the Middle East, but only one factor among many.

The broader forces that shape the Middle East are too powerful for any one conflict or example to reshape the region. These factors include massive population growth, and the failure of effective economic development and reform in virtually every country in the region. They include the precipitous decline of agriculture, war shortages, urban migration, hyperurbanization, and the destruction of traditional social structures and force restructuring of extended families.

Iraq's future politics are important, but it is equally important to understand the scale of the other forces at work. The World Bank's report on Global Economic Development for 2003 shows a sharp decline in economic growth in GDP in constant prices from 6.5% during 1971-1980 to 2.5% during 1981-1990. While growth rose to 3.2% during 1991-2000, it barely kept pace with population growth. This is reflected in the fact that growth in per capita income in constant prices dropped from 3.6% during 1971-1980 to –0.6% during 1981-1990, and was only 1% from 1991-2000 – reflected static income over nearly twenty years in a region with extremely poor equity of income distribution.

While inter-regional comparisons may be somewhat unfair, the economic growth in East Asia and the Pacific was 6.6% during 1971-1980, 7.3% during 1981-1990, and 7.7% during 1991-2000. The growth in real per capita income was the economic growth in East

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Asia and the Pacific was 3.0% during 1971-1980, 4.8% during 1981-1990, and 5.4% during 1991-2000.

Demographics are a major problem. The total population of the Middle East and North Africa has grown from 78.6 million in 1950 to 101.2 million in 1960, 133.0 million in 1970, 177.9 million in 1980, 244.8 million in 1990, and 307.1 million in 2000. Conservative projections put it at 376. 2 million in 2010, 449.3 million in 2020, 522.3 million in 2030, 592.1 million in 2040, and 656.3 million in 2050.

This growth will further exhaust scarce natural water supplies, increase permanent dependence on food imports, and raise the young working age population aged 15 to 30 from 20.5 million in 1950 to 87.8 million in 2000, and 145.2 million in 2050. The fact that the age group of 14 years or younger now totals over 40% of the population of the region creates an immense bow wave of future strain on the social, educational, political, and economic system.

The resulting social turbulence is compounded by an extremely young population, overstretched and outdated educational systems, and the failure of the labor market to create productive jobs, or any jobs at all for many of the young men entering the labor force. Emigration creates another source of social turbulence, while religious and cultural barriers to the effective employment of women compound other problems in productivity and competitiveness with other developed regions.

All of these forces affect a regime where political structures remain fragile and large authoritarian regardless of the formal structure of government. Traditional monarchies often interfere less in human rights and normal social conduct than supposed democracies. In broad terms, however, no state in the region has managed to create a secular political culture that provides effective pluralism.

The Middle East us also a region where competing secular ideologies have failed: Pan-Arabism, socialism, capitalism, Marxism, statism, and paternalism have all proved unable to provide adequate development and meet social needs. The fact that so many in the region have turned back to more traditional social structures and religion is scarcely surprising, but it is unclear that this offers any meaningful solution to the problems involved.

Given these regional divisions and pressures, the main grand strategic lesson seems to be that both the results of the Iraq War and the outcome of nation building in Iraq, must be viewed as a one-country solution to a twenty-three country problem. It is an important move in the three-dimensional chess game that will shape the region over the next ten years, but only a move.

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ANNEXES

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Iraq Before the Gulf War and at the Start of the War –I

	1990	2003
Manpower		
Total Active	1,000,000	389,000
Regular	425,000	375,000
National Guard & Other	0	0
Reserve	850,000	650,000
Paramilitary	40,000	44,000+
Army and Guard		
Manpower	955,000*	350,000
Regular Army Manpower	-	375,000
Reserve	480,000(recalled)	650,000
Total Main Battle Tanks***	5,500-6,700	2,200-2,600
Active Main Battle Tanks	5,100	1,900-2,200
Active AIFV/Recce, Lt. Tanks	2,300	1,300-1,600
Total APCs	7,100	2,400
Active APCs	6,800	1,800
ATGM Launchers	1,500	900+
Self Propelled Artillery	500+	150-200
Towed Artillery	3,000+	1,900
MRLs	300+	200
Mortars	5,000	2,000+
SSM Launchers	?	56
Light SAM Launchers	1,700?	1,100
AA Guns	?	6,000
Air Force Manpower	40,000	20,000
Air Defense Manpower	10,000	17,000
Total Combat Aircraft	513	316
Bombers	20	6
Fighter/Attack	284+	130
Fighter/Interceptor	223+	180
Recce/FGA Recce	10	5
AEW C4I/BM	1	0
MR/MPA**	0	0
OCU/COIN/CCT	0	0
Other Combat Trainers	157	73
Transport Aircraft****	63	12
Tanker Aircraft	4?	2
Total Helicopters	584	375
Armed Helicopters****	160	100
Other Helicopters****	424	275
Major SAM Launchers	600+	400
Light SAM Launchers	?	450
AA Guns	-	3,000

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Iraq Before the Gulf War and At the Start of the War II

	1990	2003
Total Naval Manpower	5,000	2,000
Regular Navy	5,000	2,000
Naval Guards	0	0
Marines	-	-
Major Surface Combatants		
Missile	4	0
Other	1	0
Patrol Craft		
Missile	8	1
Other	6	5
Submarines	0	0
Mine Vessels	8	3
Amphibious Ships	6	0
Landing Craft	9	-
Support Ships	3	2

**** Includes navy, army, national guard, and royal flights, but not paramilitary.
***** Includes in Air Defense Command
Source: Adapted by Anthony H. Cordesman from interviews, International Institute for Strategic Studies, Military Balance (IISS, London); Jane's Sentinel, Periscope; and Jaffee Center for Strategic Studies, The Military Balance in the Middle East (JCSS, Tel Aviv)

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The Iraqi Order of Battle of Regular Army, Republican Guard, Special Republican Guard, Paramilitary and Popular Forces at the Start of the War

Regular Army Forces in Northern Iraq:

- The 1st Corps is headquartered at Kirkuk and the 5th Corps at Mosul. They guard the Turkish border area and deploy on the edge of the Kurdish enclave, and guard the oilfields in the north. They have a total of 8 divisions, but only two are heavy mechanized divisions.
    - The 1st Corps includes the 2nd Infantry Division headquartered at Alrabee, the 5th Mechanized division headquartered at Shuwan, the 8th Infantry Division headquartered at Shuwan, and the 38th Infantry Division headquartered at Quader Karam.
    - The 5th Corps has units defending the border area with Syria and Turkey as well as covering other parts of the north. It includes the 1st Mechanized Division headquartered at Makhmur, the 4th Infantry Division headquartered at Bashiqa Maonten, the 7th Infantry Division headquartered at Alton Kopri Castle, and the 16th Infantry Division headquartered near the Saddam Dam and Mosul.
- ***Regular Army Forces in Eastern Iraq***: The 2nd Corps is headquartered at Deyala, and is deployed east of Baghdad to defend against Iran or any attack by Iranian-backed Iraqi opposition forces. It includes the 3rd Armored Division headquartered at Jalawia, the 15th Infantry Division headquartered at Amerli, and the 34th Infantry Division headquartered near Khanaqin
- ***Regular Army Forces in Southern Iraq****:* The Army has two corps that play a major role in securing Shi'ite areas and suppressing Shi'ite dissidents. They have a total of six divisions and two are heavy armored divisions:
    - The 3rd Corps is headquartered in the Nasseria area, and is positioned near the Kuwaiti border. It includes the 6th Armored Division headquartered near Majnoon and Al Nashwa, the 11th Infantry Division headquartered at Al Naserria, and the 51st Mechanized Division headquartered at Zubair. These forces might retreat into the so-called Sunni triangle in the Baghdad area in the event of a US-British attack
    - The 4th corps is headquartered at Al Amara, and defends the border with Iran. It includes the 10th Armored Division headquartered near Al Teab and Al Amarra, the 14th Infantry Division headquartered south of Al Amara, and the 18th Infantry Division headquartered near Al Amara and Al Musharah.

The Republican Guards

The Republican Guard adds two more corps, with seven divisions, to this list:

- ***The Northern or 1st Corps of the Republican Guards*** can act to defend against Iran and Turkey, and operate against the Kurds. And defend the greater Baghdad area and Tikrit.
- The Northern Corps includes the 1st Adnan Mechanized Division at Mosul, the Al Nida (Al Nedaa) Armored Division near Bagubah, the 2nd Baghdad Infantry Division at Maqloob Maontin-Mosul, and the Al Abed (Al Abid) Infantry Division at Kirkuk-Khalid Camp.
- ***The Southern or 2nd Corps of the Republican Guards*** is headquartered at Al Hafreia and the Al Fateh al Mubin Command Center. It helps defend against Iran in the south, as well as any US-led attack, and acts as a deterrent force to suppress any Shi'ite uprising.
- The al Madina al Munawara Armored Division is located at as-Suwayrah and plays a key role in defending the outer Baghdad area. It has three brigades: 2nd and 10th Armored and 14th Mechanized. It is the Special Republican Guards, however, that provide protection and defense within the city.
- Its other forces include the Nebuchadnezzar (Nabu Khuth Nusser) Infantry Division at Al Husseinia-al Kutt, the Hamurabi Mechanized Division in the al-Taji area.

The Special Republican Guards or Al-Haris al-Jamhuri al-Khas

The Special Republican Guards add four brigades, which are located largely within the Baghdad are organized to defend the regime. The Special Republican Guard has four infantry/motorized brigades with 14 battalions, an armored brigade, and an air defense command with elements to secure Baghdad's ground-based air defenses against any coup attempt.

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It is headed by Qusay Hussein, it serves as a praetorian guard, protecting Presidential sites and escorting Saddam Hussein on travels within Iraq. It has a total active strength of about 12,000 to 15,000, but can rapidly mobilize to 20,000 to 25,000. It is the only force stationed in central Baghdad and in the Republican Palace, although these are also brigades of the Special Security Service (SSO), the Iraqi Intelligence Service (IIS), and secret police in the city. British intelligence reports that it has played a role in securing WMD warheads and maintains control of a few launchers.

- ***The First Brigade*** is headquartered at Hayy Al-Qadisiyeh in Baghdad and has five battalions, including ones stationed in the Republican palace and at Saddam International Airport. Additional battalions, including plain-clothes units, are assigned to protect Saddam while he is in transit, and are assigned to guard other palaces and facilities. According to Jane's:
    - The First Battalion protects Saddam in movement.
    - The Second Battalion deploys men on foot to guard Saddam's farms and places near Baghdad's Saddam International Airport.
    - The Fifth Battalion is based inside the Republican Palace and guards it and the National Assembly. It guards the Presidential House in the palace compound and has training from the SSO. Elements travel with Saddam at all times and is commanded by friends and relatives of Saddam.
    - The Seventh Battalion provides plain cloths bodyguards and protects Saddam's private residences in Baghdad, Basra, Mosul. Falojua, Jebel Makhool, and other locations.
    - The Eighth Battalion protects Baghdad's Saddam International Airport.
- ***The Second Brigade*** is headquartered at the Al Rashid military base, and has combat-experience elements outside Baghdad and in the Mosul area.
    - The Fourth Battalion is a significant combat unit that protects Saddam's Saddam's palace in Makhool in the Beiji area that is north of Baghdad.
    - The Sixth Battalion protects the palaces in the Mosul area.
    - The Eleventh Battalion guards the approaches to Baghdad from the direction of Taji.
    - The Fourteenth Battalion guards the approaches to Baghdad from the direction of Salam Pak and Kut.
    - The Fifteenth Battalion is part of the western defenses of Baghdad.
- The ***Third Brigade*** is headquartered at Taji and has four combat battalions to defend Taji and the approaches to Baghdad.
    - The Third Battalion is a rapid reaction combat force.
    - The Ninth Battalion protects the palaces and road approaches in the Tharthar area.
    - The Tenth Battalion is a combat unit in Taji that protects Baghdad from the direction of the north and northwest.
    - The Twelfth Battalion reinforces the defense of Baghdad in the direction of Taji.
- The ***Fourth Brigade*** is motorized and is located at Al Harithiyeh and Al Quadisiyeh, and defends the southern outskirts of Baghdad. It has two regiments with T-72 tanks and BMP-1 and BMP-2 armored fighting vehicles.
- Th***e Armor Command*** (Fourth Armored Brigade) has T-72s, BMP-1 and BMP-2s, and has two armored regiments. The First (Adnan) Regiment is located at the Abu-Ghraib Camp, and the Second Regiment is located near the Al-Makasib village. They provide armored forces to defend the major entrance points to the city.
- There is also an intelligence bureau and a,
- ***Air Defense Command*** with two regiments and three independent batteries, The First Regiment defends the International Airport and has elements near Tharthar Lake and Radwaniyah. The Second Regiment defends key locations in Baghdad. The batteries cover key locations near Door, Tikrit, and Kirkuk.

Military Intelligence and Special Security Forces

Iraq has extensive military intelligence and internal security forces. They include"

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- ***The Military Intelligence Service (MIS), or Al Estikhbarat al Askariyya***, has a 3,000-6,000-man element with a major complex in the Aladhamia area of Baghdad. It also has a base at the Al Rashid Camp, and sectoral commands in Kirkuk, Mosul, and Basra, plus a special regional command for Baghdad.

    - The Special Branch of the MIS is organized to carry out covert operations, infiltrate opposition movements, and provide internal security operations within the military. Its Unit 999 penetrates deeply into the Kurdish enclave.

    - There is an Opposition Battalion organized to operate in various elements of the Iraqi opposition. The First Battalion covers Iran, the Second covers Saudi Arabia, the Third covers Israel, the Fourth covers Turkey, and the Fifth is a specialized unit for riverine and mine operations.

  British intelligence reports that its main functions are ensuring the loyalty of the army's officer corps and gathering military intelligence from abroad. But it is also involved in foreign operations, including assassinations.

  The heads of Al-Istikhbarat al-Askariyya have not been immediate relatives of Saddam. Saddam appointed, Sabir 'Abd al-'Aziz al-Duri as head during the 1991 Gulf War. After the Gulf War he was replaced by Wafiq Jasim al-Samarrai. After Samarrai, Muhammad Nimah al-Tikriti headed Al-Istikhbarat al-Askariyya in early 1992 then in late 1992 Fanar Zibin Hassan al-Tikriti was appointed to this post.

  These shifting appointments are part of Saddam's policy of balancing security positions. By constantly shifting the directors of these agencies, no one can establish a base in a security organisation for a substantial period of time. No one becomes powerful enough to challenge the President

- ***The Military Security Service, or al Amn al Askariyya (Askari***) is a 6,000 man force that operates throughout the armed forces and, reports directly to the Presidential Palace, and deals with subversion within the military forces. The MIS runs parallel internal security operations. British intelligence reports that it was established as an independent entity in 1992, its function is to detect disturbances in the military. The *Amn* was initially headquartered in the Bataween district of Baghdad. In 1990 *Amn* moved to a new headquarters in the Al Baladiat area of the city, with the Bataween building becoming the agency's main prison.

  The Secret Police also has a number of additional facilities and office buildings. *Amn* maintains a presence in every town and village, with personnel stationed in civilian police stations across Iraq -- normally the "ordinary" police are on the ground floor and the Secret Police on the second floor. The Security branch is responsible for monitoring and countering dissent within Amn, and the Military Brigade provides rapid intervention paramilitary capabilities - the Brigade commander was executed in August 1996 for alleged involvement in a coup attempt. *Amn* is currently headed by Staff Major General Taha al Ahbabi, who previously headed the Military Security Service and served as the head of the secret service section of the *Mukhabarat*. As with many other senior Iraqi leaders, he is a native of Saddam's home town of Tikrit.

Iraq's Capability for Popular Mobilization

It is unlikely that Iraq can mobilize the Iraqi people in mass, even in "loyal" areas, but Iraq probably can mobilize significant elements to supplement its military forces, and it *may* be able to use them to create serious problems in terms of urban warfare.

These popular forces include an unknown number of Ba'ath Party loyalists. Almost all of these loyalists and officials are required to receive reserve military training, and many have had annual field training for some time.

Saddam has a significant tribal base, including his own al-Bu Nasser tribe, and citizens from the towns of Tikrit, Dur, Sharqat, Huwayja, Bayji, Samarra and Ramadi. They are located in what Ibrahim al-Marashi calls the Sunni Arab Triangle. Other major Sunni tribes and families that have a record of loyalty to the regime, and which play a key role in the intelligence and security forces, include the Dulaym, the Jubur (mixed Shi'a/Sunni) and the 'Ubayd tribes. There are also loyalist factions in the Duri and Samarrai families. Some tribes, like the Jubur (Juburi) seem to have received arms and there are convincing reports of rising gun sales. Many of these tribal elements now live in Iraqi cities.

In addition, there are a number of popular forces that the regime might use:

- ***Fedayeen Saddam (Saddam's Men of Sacrifice):*** A force of up to 30,000-40,000 men, which was formed by Uday in 1995. Most areyoung men who border on a youth gang, with thugs of age 16 and up, but they are placed under a real Lt. General. All are urban and the force is centered in Baghdad. British intelligence reports that Saddam's Martyrs are composed of young militia press ganged from regions known to be loyal to Saddam.

  British intelligence reports that it was founded by Saddam's son Uday in 1995, and started out as a rag-tag force of some 10,000-15,000 bullies, In September 1996 Uday was removed from command of the *Fedayeen*. Uday's removal may have stemmed from an incident in March 1996 when Uday transferred sophisticated

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weapons from Republican Guards to the *Saddam Fedayeen* without Saddam's knowledge. Control passed to Qusay, further consolidating his responsibility for the Iraqi security apparatus. The deputy commander is Staff Lieutenant General Mezahem Saab Al Hassan Al-Tikriti. According to reports, control of Saddam Hussein's personal militia was later passed back to his eldest son, Uday.

The unit reports directly to the Presidential Palace, rather than through the army command, and is responsible for patrol of borders and controlling or facilitating smuggling. They are supposed to help protect the President and Uday, and carry out much of the police's dirty work. The *Fedayeen Saddam* include a special unit known as the death squadron, whose masked members perform certain executions, including in victims' homes. The *Fedayeen* operate completely outside the law, above and outside political and legal structures.

- **Lions of Saddam (Eshbal or Ashbal Saddam***: A Hitler Youth-like paramilitary training structure for ages 10-16. No one knows how real this force is, or what role it might play in combat, but it cannot be totally dismissed. Young men are often loyal and all have Saddam as the leader during their entire lives.*
- ***National Defense Battalions:*** (Kurdish Jash or Militia Forces): Although it is scarcely the most loyal force, there are still elements of what used to be a massive force of some 100,000 men in 250 battalions. There are still 1,000 man elements from two tribes with ties to Saddam, and which may have much to fear if the other Kurds take over: the Zibar and Herki.
- ***Jerusalem or Al Quds Brigades***: This is intended to be a mass volunteer force, and has female as well as male units. Iraq claims as many as 7 million members, but even a nominal 1 million may be unrealistic. It is usually dismissed as a showpiece force used for propaganda purposes, but may have youth and other elements that would be loyal to Saddam in some areas. At least some of its members have been given rifles, mortars, RPGs, and light automatic weapons in largely Sunni areas.
- ***Youth (Civil Defense) Force***: There are reports that a so-called youth army was formed in 1999 to defend the cities, supposedly out of youths ages 12-17. It is unclear that such a force exists, but some Iraqi media coverage does show youths and adults being training and possibly armed for such a role.
- ***Great Retaliation Force***: Once again, this force may be more a matter of propaganda than real. It was supposedly formed in November 1999 under Qusay to deal with the problem of the Kurdish threat and to limit any entry into non-Kurdish areas, but many reports indicate that this is a military contingency force using regular army units and Republican Guards, and has only limited armed popular forces – including some Christian Arabs.

There are other popular forces like the various tribal militias. These are less disciplined and well-structured, but they cannot be ignored, both in terms of urban warfare and rear area security.

Security Services that Might Support the Armed Forces and Help to Ensure Their Loyalty

It is dangerous to assume that US and British forces can count on uprisings, defections, and being treated as liberators. This may well happen in some areas, but Iraq has a 100,000-man security service and a 40,000-man police force which can help maintain loyalty and be used both to fight on their own and compel Iraqi civilians to do so.

- **The Presidential Secretariat:** The Presidential Secretariat has around 100 staff, which are drawn from the security agencies. The Secretariat is responsible for Saddam's personal security, as well as defense, security and intelligence issues. It is overseen by Saddam's personal secretary, Lieutenant General Abid Hamid Mahmud. Mahmud is Saddam's distant cousin and is the sheikh of both the Al-Bu-Nasir and Al-Khattab tribes. Mahmud is regarded by some as the real number two figure in the Iraqi leadership. He controls all access to Saddam - possibly with the exception of Qusay and Uday Hussein - and has the ability to override government decisions.
- **The National Security Council *(Al-Majlis Al-Amn Al-Qawni):*** Is headed by Saddam Hussein but usually chaired by his son Qusay Hussein, it oversees the work of all other security agencies. Membership in Majlis Al-Amn Al-Qawni includes chosen people from the ;
    - Iraqi Army
    - Special Security Service
    - General Intelligence Directorate
    - Military Intelligence
    - General Security Service
    - Office of the Presidential Palace

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The Majlis Al-Amn Al-Qawni, is headquartered at the Presidential Palace in Baghdad, and meets on a weekly basis. It has a Special Operations Room in the Presidential Palace, and some reports indicate it controls a small brigade that works closely with the Special Republican Guard or has direct control over an element of the Special Republican Guard.

- **Special Security Committee**: Qusay Hussein is the deputy chairman of the Special Security Committee of the Iraqi National Security Council that was created in 1996 as part of the President's office. The Committee membership includes:
    - Tahir Jalil Habbush al-Tikriti, the director of the Public Security Directorate
    - Dahham al-Tikriti, Director of the Iraqi Intelligence Service –Al Mukhabarat
    - Abid Hamid Mahmud, the president's personal secretary.
    - Faris 'Abd-al-Hamid al-'Ani, the director general of the Presidential office

  This special body also includes representatives of the Republican Guard. The Committee is supported by over 2,000 staff. The staff is drawn from the Republican Guard, or the Special Guard, and the intelligence services. Their main task is preventing the United Nations inspectors from uncovering information, documents, and equipment connected with weapons of mass destruction. They are recruited for this specific mission and chosen from the most efficient and loyal units.

  The work is divided between two sections, each of which has a staff of about 1,000:

  The first section focuses on the daily work of the UN monitoring commission, including sites to be visit and inspected, escorting UN inspectors, preventing them from carrying out their mission effectively.

  The second section conceals documents, equipment, and materials and moves them about from one location to another. Several facilities have been especially built for collecting and hiding such selected material. This section is responsible for material that is imported through "special channels" as part of the programme of rebuilding the strategic military arsenal, including chemical and biological weapons as well as missiles and associated technology.

- **The Special Protection Apparatus or *Jihaz al-Hamaya al-Khas***: *British intelligence reports that this is a small unit* charged with protecting Presidential Offices, Council of Ministers and the Regional and National Commands of the Ba'ath Party. It is the only organisation responsible for providing bodyguards to the very top of the regime. Approximately 40 personal bodyguards are responsible for Saddam's immediate security.

  Higher Committee for Monitoring the Inspection Teams: Secretary Powell stated on February 5, 2003 that Iraq had has a high-level committee to monitor the inspectors who were sent in to monitor Iraq's disarmament -- not to cooperate with them, not to assist them, but to spy on them and keep them from doing their jobs. The committee reports directly to Saddam Hussein. It is headed by Iraq's Vice President, Taha Yasin Ramadan. Its members include Saddam Hussein's son, Qusay.

  This committee also includes Lieutenant General Amir al-Sadi, an advisor to Saddam. General Sadi has been the Iraqi regime's primary point of contact for Dr. Blix and Dr. ElBaradei. General Sadi publicly pledged in the fall of 2001 that Iraq was prepared to cooperate unconditionally with inspectors. However, Iraq's security organizations, as well as to Saddam Hussein's own office, have been directed to hide all correspondence with the Organization of Military Industrialization. This is the organization that oversees Iraq's weapons of mass destruction activities. Saddam's son, Qusay, is known to have ordered the removal of all prohibited weapons from Saddam's numerous palace complexes. Iraqi government officials, members of the ruling Baath Party and scientists have since hidden prohibited items in their homes. Other key files from military and scientific establishments have been placed in cars that are being driven around the countryside by Iraqi intelligence agents to avoid detection. Secretary Powell has stated that, "Sadi's job is not to cooperate; it is to deceive, not to disarm, but to undermine the inspectors; not to support them, but to frustrate them and to make sure they learn nothing. This committee must also have the function of trying to manage concealment from the UN and the world in any transition to war."

- ***National Police***: Some 40,000 personnel that have elements of paramilitary forces with light weapons and light armored vehicles.

- ***Frontier Guard***: 30,000-man mobile force, largely equipped with cross-country trucks.

- *Special Security Service (SSS), Special Security Organization (SSO) or Amn al Khass*: Controlled by Saddam's son, Qusay, who supervises the Special Bureau, the Political Bureau and the Administration Bureau, the agency's own military brigade, and the Special Republican Guard.

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It is an ultra loyal force of about 2,000-5,000 men, recruited from loyal tribes around Tikrit, Hawuija, and Samarra, such as Saddam's own tribe, the Abu Nasr. It is headquartered in Palestine Street in Baghdad. According to most reports, it is the key security force and plays a major role in controlling the actions of the Republican Guard and the Special Republican Guard. It is also reported to be in charge of the surveillance of General Intelligence, Military Intelligence, Military Security, and General Security. It is the most critical and powerful security agency.

Its Security Bureau has a Special Office, to assure loyalty in the SSS, and there is an Office of Presidential Facilities that guards such facilities through the Jihaz al-Hamaya al-Khas (The Special Protection Apparatus). It is responsible for guarding the Presidential Offices, Council of Ministers, National Council, and Ba'ath Party Regional and National Command of the Ba'ath Party, and provides bodyguards for Iraq's leaders.

British Intelligence stated in the British White Paper of February 3, 2000 that the SSO is responsible for

- the security of the President and of presidential facilities;
- supervising and checking the loyalty of other security services;
- monitoring government ministries;
- supervising operations against Iraqi Kurds and Shias; and
- securing Iraq's most important military industries, including WMD.

It also stated that the Al-Amn al-Khas is nebulous and highly secretive and operates on a functional, rather than a geographical basis. Its military brigade serves as a rapid response unit independent of the military establishment or Special Republican Guard. In the event of a coup attempt from within the regular military or Republican Guard, Special Security can easily call up the Special Republican Guard for reinforcements as this unit is also under its control.

- **The Security Bureau**: The Security Bureau is divided into a Special Office, which monitors the Special Security agency itself to assure loyalty among its members. If necessary, it conducts operations against suspect members. The Office of Presidential Facilities, another unit of the Security Bureau, guards these places through Jihaz al-Hamaya al-Khas (The Special Protection Apparatus). It is charged with protecting the Presidential Offices, Council of Ministers, National Council, and the Regional and National Command of the Ba'ath Party, and is the only unit responsible for providing bodyguards to leaders.

- **The Political Bureau**: The Political Bureau collects and analyses intelligence and prepares operations against "enemies of the state." This unit keeps an extensive file on all Iraqi dissidents or subversives. Under the Political Bureau, the Operations Office implements operations against these "enemies," including arrests, interrogations and executions. Another division is the Public Opinion Office, responsible for collecting and disseminating rumours on behalf of the state.

The operations of Special Security are numerous, particularly in suppressing domestic opposition to the regime. After its creation in 1984, Special Security thwarted a plot of disgruntled army officers, who objected to Saddam's management of the Iran-Iraq War. It pre-empted other coups such as the January 1990 attempt by members of the Jubur tribe to assassinate him.

It played an active role in crushing the March 1991 Shi'a rebellion in the south of Iraq. Along with General Intelligence, Special Security agents infiltrated the Kurdish enclave in the north of Iraq in August 1996, to hunt down operatives of the Iraqi opposition.

It serves as the central coordinating body between Military-Industrial Commission, Military Intelligence, General Intelligence, and the military in the covert procurement of the necessary components for Iraq's weapons of mass destruction.

During the 1991 Gulf War, it was put in charge of concealing SCUD missiles and afterwards in moving and hiding documents from UNSCOM inspections, relating to Iraq's weapons programmes.

It is also thought that Special Security is responsible for commercial trade conducted covertly in violation of UN sanctions. It seems to be responsible for arms and WMD component smuggling from abroad and for concealing Iraq's WMD efforts. It was a key target in Desert Fox, is believed to control the weapons of the Chemical Corps, manages recruiting for the Republican Guard, and manages key secure aspects of Iraq's military industries..

It staffs and runs the ***National Security Council or al-Majlis al-Amn al-Qawmi***.

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- ***General Intelligence Directorate (GID) or Iraqi Intelligence Service (IID) or Mukhabarat***: This is the unit Saddam used to take control over the Ba'ath Party and eventually the Iraqi state. It is currently directed by Tahir 'Abd al-Jalil al-Habbush. It provides security in the Ba'ath Party, monitors all organizations, monitors foreign embassies and studies, has counter-espionage elements, and has heavily infiltrated most Iraqi opposition groups. It also conducts operations against Syria, Iran, Kuwait, Jordan, and other states, and could be a key source of operations against US and British forces or direct or proxy covert attacks on the US and Britain.

  It has some 4,000 to 8,000 men, according to source. They are carefully screened to be ultra-loyalists, and now with strong ties to Qusay and a series of internal security Directorates plus Directorate 14 which is in charge of covert operations overseas and might organize any CBRN or "terrorist" attack outside Iraq.

  British intelligence reports that Al-Mukhabarat is roughly divided into a department responsible for internal operations, coordinated through provincial offices, and another responsible for international operations, conducted from various Iraqi embassies.

  Its internal activities include:

  - Spying within the Ba'th Party, as well as other political parties;
  - suppressing Shi'a, Kurdish and other opposition;
  - counter-espionage;
  - targeting threatening individuals and groups inside Iraq;
  - spying on foreign embassies in Iraq and foreigners in Iraq;
  - maintaining an internal network of informants.

  Its external activities include

  - spying on Iraqi diplomats abroad;
  - collecting overseas intelligence;
  - supporting terrorist organizations in hostile regimes;
  - conducting sabotage, subversion, and terrorist operations against neighboring countries such as Syria and Iran;
  - murder of opposition elements outside of Iraq;
  - infiltrating Iraqi opposition groups abroad;
  - providing dis-information and exploitation of Arab and other media;
  - maintaining an international network of informants, using popular organizations as well such as the Union of Iraqi Students.

  British intelligence reports that Al-Mukhabarat uses intelligence to target Iraqis .It forces Iraqis living abroad to work for Saddam by threatening dire consequences for relatives still inside Iraq. It is reported that an Iraqi cannot work for a foreign firm inside Iraq without also working for Al-Mukhabarat directly or as an informant. This includes those allowed to work with foreign media organisations. All Iraqis working with foreigners have to have a special permit that is not granted unless they work for Al-Mukhabarat. They carry out tests that include approaches to Iraqi officials with false information to see whether they report it to Baghdad or foreigners

  Al-Mukhabarat manages Iraqi support of the coordinating operations with the Iranian opposition group, the Mojahedin-e Khalq and National Liberation Army elements based in Iraq. It was the key service to infiltrate the INA and defeat CIA efforts to use it in a coup, and worked with Mas'ud Barzani's Kurdish Democratic Party in planning the Iraqi Army advance into the Kurdish areas in 1996 and its purge of the PUK and INC elements in the Kurdish security zone.

  It tracks and sometimes kills students and exiles abroad, and manipulates journalists. It is blamed for the April 1993 Iraqi attempt on President George Bush's life. Its role in assassinations is the reason its headquarters were struck by US cruise missiles in June 1993.

  There are district commands in Basra (South), Mosul (north), Ramadi (West), Karbala (East). It has a light brigade with light armor and heavy weapons. The details of the internal structure of the GID are uncertain.

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According to work by Ibrahim al-Marashi and Jane's Periscope, it is organized so that the following directorates might have an impact in ensuring popular loyalty or play some role in wartime:

- Directorate 3: Surveillance directs the surveillance of suspected traitors and key personnel.
- Directorate 4: Secret Service: Places agents throughout the government in various agencies and is present in virtually every Iraqi embassy and many cover firms overseas. Has offices deal with each major country in the world. Analyzes signal intelligence from the Al Hadi Project (See below).
- Directorate 5: Counterintelligence: Focuses on foreign intelligence operations like the US and Israel, but also on neighboring countries like Syria.
- Directorate 6: GID security: Handles internal security in the GID.
- Directorate 7: Detention and interrogation.
- Directorate 8: Forensics.
- Directorate 14: Special Operations: The unit is located near Salman Pak, about 20 kilometers south of Baghdad. It is responsible for covert operations abroad and is one of the largest elements of the GID. Agents are highly trained, with language and cultural training, and given training in cover attacks ranging from the use of bombs to assassination. Is believed to carry out joint operations against Iran with elements of the People's Mujahideen.
- Directorate 18: Iranian Affairs.
- Directorates 21 through 26 are responsible for monitoring various regional districts in Iraq.
- Directorate 21, the residency located in Baghdad, is in charge of security issues in the capital as well as issuing residence permits to foreigners in Iraq.
- Directorate 23, the Southern District based in Basra, conducts operations in the south of Iraq.
- Directorate 24, the Northern District, does the same in northern Iraq and Iraqi Kurdistan. Based in Mosul, with an office in Kirkuk, it is responsible for infiltrating the opposition in Iraqi Kurdistan.
- Directorate 25, the Western District, is located in Ramadi and maintains a network of informants in Syria and Jordan.
- Directorate 26, the Eastern District, operates in the Karbala Governate.
- Directorate 28: MIO Security: Located at Palestine Street and responsible for the security of the Military Industrial Organization, and overseas security for both the overt operations of the MIO and individuals involved in covert purchasing and probable some aspects of Iraq's WMD programs.

It has shown it can enforce loyalty in various urban areas with consummate ruthlessness.

- ***The General Security Services (GSS) or General Security Directorate (GSD) or Amn al Amm***: It is the oldest security service in the country and used to be part of the Ministry of Interior but now is an independent agency that reports directly to the Presidential Palace. It has about 8,000 men who monitor daily life in every town and village and has elements in every police station. It is headquartered in the al Baladiat area of Baghdad.

  It is the key force monitoring the day-to-day activities and loyalty of ordinary Iraqis. It is also a key force in terms of wiretapping, surveillance, tracking families and foreigners, and watching UN inspectors and virtually all press movements. It hires countless informants, and any media in Iraq will become acquainted with the GSS, either under the cloak of the Ministry of Information, as a helper, or often as a translator or apparent dissident. Many hotels used by foreigners have both GID and GSS staff.

  It has, however, played an active paramilitary and covert role in helping to enforce security and run intelligence operations in Kurdish areas, and seems to have played a role in hiding WMD and missile components.

  British intelligence reports that The Al-Amn Al-Aam supports the domestic counter-intelligence work of other agencies. As a policy, Saddam staffs key positions in Al-Amn Al-Aam with his relatives or other close members of his regime. In 1980, Saddam appointed 'Ali Hassan al-Majid, who would later be the architect of the regime's anti-Kurdish campaign, as its director to instill the ideology of the Ba'ath Party into the agency.

  Al-Amn al-Aam was given more political intelligence responsibilities during the Iran-Iraq War. When Majid was put in charge of repressing the Kurdish insurrection in 1987, General 'Abdul Rahman al-Duri replaced

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him until 1991 when Saddam Hussein's half-brother, Sabawi Ibrahim al-Tikriti, (who had served as its deputy director prior to 1991) then became head of this agency.

*** In 1991, Saddam Hussein provided it with a paramilitary wing, ***Quwat al-Tawari,*** to reinforce law and order, although these units are ultimately under Al Amn al-Khas control. After the 1991 Gulf War, *Quwat al-Tawari* units were believed to be responsible for hiding Iraqi ballistic missile components. It also operates the notorious Abu Ghuraib prison outside of Baghdad, where many of Iraq's political prisoners are held.

Each neighborhood, every office and school every hotel and coffee shop has an officer assigned to cover it and one or more agents in it who report what is said and what is seen. Al-Amn Al-Aam runs a programme of provocation where their agent in a coffee house or work place will voice dissident views and report on anyone who agrees with those views. An Al-Amn Al-Aam agent or officer will sometimes approach an Iraqi official pretending to recruit him for some opposition or espionage purpose and then arrest him if he does not report it. They also look for foreigners who might be breaking Iraqi law or seeking to stir up anti-regime feelings among native Iraqis.

Technically, it is illegal for an Iraqi official or military officer to talk to a foreigner without permission from a security officer.

- ***Al Hadi Project or Project 858***: The *Al Hadi* Project is the organisation responsible for collecting, processing, exploiting and disseminating signals, communications and electronic intelligence. It is a small agency of about 800 that is unlikely to be actively involved in military operations, but which will monitor cell phones, and particularly any signals activity throughout Iraq. Though it reports directly to the Office of the Presidential Palace, *Al Hadi* is not represented on the National Security Council, and the intelligence it collects is passed on to other agencies for their use

- ***Murafaqin or Companions of Saddam (also called the Special Protection Apparatus (Jihaz al-Himaya al-Khasa in other sources):*** A small, tribal, elite group of bodyguards at the Presidential Palace, most of whom have some kind of family relationship. Most are members of Saddam's tribe, the al-Bu Nasir. The Special Location Group protects Saddam in all of his homes and his family. The Salih or Mobile Group protects him while moving.

- ***The Ministry of Information***: Its operations are fully integrated into Iraqi intelligence operations, including all contacts with the foreign media and press. It has many trained agents that appear in front of TV cameras or are trained to act like independent or semi-opposition voices in dealing with foreign reporters.

- ***The Ba'ath Party or Socialist Arab Resurrection Party or Hizb al-Ba'th al-'Arab al-Ishtiraki***: It is not a security service as such but uses its large group of members who hold positions in government, the military, virtually every profession and throughout the legal profession, and in communities and most educational institutions to monitor Iraqis, carry out propaganda activities, and use various benefits to tie Iraqis to the regime. It has a security element called the Amn al-Hizb (Party Security), to maintain party loyalty.

- ***Emergency Force*** of the governates: Each of the 15 governates still under Saddam's control is reported to have its own light brigade of roughly 1,000 men for internal security missions.

- ***National Liberation Army or Mojahedin-e Khalq (MKO or MEK):*** A force of Iranians based in Iraq under the command of the People's Mujahideen, which in the past was a violent left-wing Marxist movement in Iran and assassinated US personnel and officers. Its strength is unclear, but it has some 4,000-8,000 personnel, and Iraq has trained and equipped it to use some 250 T-54/T-55, and Chieftain tanks, other armored vehicles, and artillery.

- **The Tribal Chief's Bureau or *Maktab al-Shuyukh:* British intelligence reports that** this bureau was created after the Gulf war as a vehicle for paying tribal leaders to control their people, spy on possible dissidents and provide arms to loyal tribesmen to suppress opposition.

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Iraq's Search for Weapons of Mass Destruction

(Reports on the status of Iraqi programs prior to the Iraq War)

Delivery Systems

- Prior to the Gulf War Iraq had extensive delivery systems incorporating long-range strike aircraft with refueling capabilities and several hundred regular and improved, longer-range Scud missiles, some with chemical warheads. These systems included:
  - Tu-16 and Tu-22 bombers.
  - MiG-29 fighters.
  - Mirage F-1, MiG-23BM, and Su-22 fighter attack aircraft.
  - A Scud force with a minimum of 819 missiles.
  - Extended range Al Husayn Scud variants (600 kilometer range) extensively deployed throughout Iraq, and at three fixed sites in northern, western, and southern Iraq.
  - Developing Al Abbas missiles (900 kilometer range), which could reach targets in Iran, the Persian Gulf, Israel, Turkey, and Cyprus.
  - Long-range super guns with ranges of up to 600 kilometers.
- Iraq also engaged in efforts aimed at developing the Tamuz liquid fueled missile with a range of over 2,000 kilometers, and a solid fueled missile with a similar range. Clear evidence indicates that at least one design was to have a nuclear warhead.
- Iraq attempted to conceal a plant making missile engines from the UN inspectors. It only admitted this plant existed in 1995, raising new questions about how many of its missiles have been destroyed.
- Iraq had design work underway for a nuclear warhead for its long-range missiles.
- The Gulf War deprived Iraq of some of its MiG-29s, Mirage F-1s, MiG-23BMs, and Su-22s.
- Since the end of the war, the UN inspection regime has also destroyed many of Iraq's long-range missiles:
  - UNSCOM has directly supervised the destruction of 48 Scud-type missiles.
  - It has verified the Iraqi unilateral destruction of 83 more missiles and 9 mobile launchers.
- A State Department summary issued on November 16, 1998, indicates that UNSCOM has supervised the destruction of:
  - 48 operational missiles;
  - 14 conventional missile warheads;
  - six operational mobile launchers; 28 operational fixed launch pads;
  - 32 fixed launch pads;
  - 30 missile chemical warheads;
  - other missile support equipment and materials, and a variety of assembled and non-assembled supergun components.
  - 38,537 filled and empty chemical munitions;
  - 90 metric tons of chemical weapons agent;
  - more than 3,000 metric tons of precursor chemicals;
  - 426 pieces of chemical weapons production equipment; and,
  - 91 pieces of related analytical instruments.
  - The entire Al Hakam biological weapons production facility and a variety of production equipment and materials.

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- The UN estimates that it is able to account for 817 of the 819 long-range missiles that Iraq imported in the period ending in 1988:
  - Pre-1980 expenditures, such as training 8
  - Expenditures during the Iran-Iraq War (1980-1981), including the war of the cities in February-April 1988 516
  - Testing activities for the development of Iraq's modifications of imported missiles and other experimental activities (1985-1990) 69
  - Expenditures during the Gulf War (January-March 191) 93
  - Destruction under the supervision of UNSCOM 48
  - Unilateral destruction by Iraq (mid-July and October 1991) 83
  - UNSCOM's analysis has shown that Iraq had destroyed 83 of the 85 missiles it had claimed were destroyed. at the same time, it stated that Iraq had not given an adequate account of its proscribed missile assets, including launchers, warheads, and propellants.
  - UNSCOM also reports that it supervised the destruction of 10 mobile launchers, 30 chemical warheads, and 18 conventional warheads.
- Iraq maintains a significant delivery capability consisting of:
  - HY-2, SS-N-2, and C-601 cruise missiles, which are unaffected by UN cease-fire terms.
  - FROG-7 rockets with 70 kilometer ranges, also allowed under UN resolutions.
  - Multiple rocket launchers and tube artillery.
  - Experimental conversions such as the SA-2.
- Iraq claims to have manufactured only 80 missile assemblies, 53 of which were unusable. UNSCOM claims that 10 are unaccounted for.
  - US experts believe Iraq may still have components for several dozen extended-range Scud missiles.
- In addition, Iraq has admitted to:
  - Hiding its capability to manufacture its own Scuds.
  - Developing an extended range variant of the FROG-7 called the Laith. The UN claims to have tagged all existing FROG-7s to prevent any extension of their range beyond the UN imposed limit of 150 kilometers for Iraqi missiles.
  - Experimenting with cruise missile technology and ballistic missile designs with ranges up to 3,000 kilometers.
  - Flight testing Al Husayn missiles with chemical warheads in April 1990.
  - Developing biological warheads for the Al Husayn missile as part of Project 144 at Taji.
  - Initiating a research and development program for a nuclear warhead missile delivery system.
  - Successfully developing and testing a warhead separation system.
  - Indigenously developing, testing, and manufacturing advanced rocket engines to include liquid-propellant designs.
  - Conducting research into the development of Remotely Piloted Vehicles (RPVs) for the dissemination of biological agents.
  - Attempting to expand its Ababil-100 program designed to build surface-to-surface missiles with ranges beyond the permitted 100-150 kilometers.
  - Importing parts from Britain, Switzerland, and other countries for a 350 mm "supergun," as well as starting an indigenous 600 mm supergun design effort.
- Iraq initially claimed that it had 45 missile warheads filled with chemical weapons in 1992. It then stated that it had 20 chemical and 25 biological warheads in 1995. UNSCOM established that it had a minimum of 75

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operational warheads and 5 used for trials. It has evidence of the existence of additional warheads. It can only verify that 16 warheads were filled with Sarin and 34 with chemical warfare binary components, and that 30 were destroyed under its supervision — 16 with Sarin and 14 with binary components.

- US and UN officials conclude further that:
    - Iraq is trying to rebuild its ballistic missile program using a clandestine network of front companies to obtain the necessary materials and technology from European and Russian firms.
    - This equipment is then concealed and stockpiled for assembly concomitant with the end of the UN inspection regime.
    - The equipment clandestinely sought by Iraq includes advanced missile guidance components, such as accelerometers and gyroscopes, specialty metals, special machine tools, and a high-tech, French-made, million-dollar furnace designed to fabricate engine parts for missiles.
- Recent major violations and smuggling efforts:
    - In November 1995, Iraq was found to have concealed an SS-21 missile it had smuggled in from Yemen.
    - Jordan found that Iraq was smuggling missile components through Jordan in early December 1995. These included 115 gyroscopes in 10 crates, and material for making chemical weapons. The shipment was worth an estimated $25 million. Iraq claimed the gyroscopes were for oil exploration but they are similar to those used in the Soviet SS-N-18 SLBM. UNSCOM also found some gyroscopes dumped in the Tigris.
- Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- The fact the agreement allows Iraq to continue producing and testing short-range missiles (less than 150 kilometers range) means it can retain significant missile development effort.
    - The SA-2 is a possible test bed, but UNSCOM has tagged all missiles and monitors all high apogee tests.
    - Iraq's Al-Samoud and Ababil-100 programs are similar test beds. The Al-Samoud is a scaled-down Scud which Iraq seems to have tested.
    - Iraq continues to expand its missile production facility at Ibn Al Haytham, which has two new buildings large enough to make much longer-range missiles.
    - US satellite photographs reveal that Iraq has rebuilt its Al-Kindi missile research facility.
- Ekeus reported on December 18, 1996 that Iraq retained missiles, rocket launchers, fuel, and command system to "make a missile force of significance". UNSCOM reporting as of October, 1997 is more optimistic, but notes that Iraq, "continued to conceal documents describing its missile propellants, and the material evidence relating to its claims to have destroyed its indigenous missile production capabilities indicated in might has destroyed less than a tenth of what it claimed"
- The CIA reported in January 1999 that Iraq is developing two ballistic missiles that fall within the UN-allowed 150-km range restriction. The Al Samoud liquid-propellant missile—described as a scaled-down Scud—began flight-testing in 1997.
    - Technicians for Iraq's pre-war Scud missiles are working on the Al Samoud program and, although under UNSCOM supervision, are developing technological improvements that could be applied to future longer-range missile programs. The Ababil-100 solid-propellant missile is also under development, although progress on this system lags the Al Samoud. After economic sanctions are lifted and UN inspections cease, Iraq could utilize expertise from these programs in the development of longer-range missile systems.
- A State Department report in September 1999 noted that:
    - Iraq has refused to credibly account for 500 tons of SCUD propellant, over 40 SCUD biological and conventional warheads, 7 Iraqi-produced SCUDs, and truckloads of SCUD components.
    - Iraq refuses to allow inspection of thousands of Ministry of Defense and Military Industries Commission documents relating to biological and chemical weapons and long-range missiles.
- A Congressional Research Service Issue Brief of February 27, 2002[226] reports:

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- UNSCOM accounted for 817 of the 819 Scud missiles and all 14 mobile launchers and all 60 fixed launch sites.
- U.S. and British analysts believe that Iraq had concealed 10 to 12 Scuds or Scud variants.
- 50 conventional Scud warheads, 300 tons of missile propellant, 30 indigenously manufactured Scud warheads and 7 locally produced missiles as well as substantial documentation were unaccounted for.

- A October 2002 report by the CIA states[227]:
  - Gaps in Iraqi accounting to UNSCOM suggest that Iraq retains a few Scud variants and an unknown number of launchers and warheads.
  - Iraq is deploying al Samoud and Ababil-100 SRBMs which are inherently capably of exceeding the 150 km range prohibition.
  - Iraq admitted to filling at least 75 Scud warheads with chemical or biological agents and deployed these weapons for use against Coalition forces during the first Gulf War.
  - Iraq was pursuing a range of other missile programs:
    - The 900 km al Abbas, based on Scud technology.
    - Multi-stage and clustered-engine programs with 3,000 km ranges.
    - A two-stage missile, the Badr-2000, with a solid-propellant engine capable of ranges up to 1,000 km.
  - Iraq failed to account for the disposition of critical advanced missile components, such as guidance and control systems, that Iraq had no ability to manufacture indigenously.
  - Much of the evidence of Iraq's intentions comes from its work on a number of facilities:
    - Iraq has built a large engine test stand at its al Rafah facility. This test stand is much larger than the one used for Scud testing, suggesting the intention to develop longer-range missiles.
    - The al Mutasim, previously associated with the Badr-2000 program, was rebuilt and expanded. While ostensibly intended for the Ababil-100, the size of facilities suggests that the site has been built to manufacture prohibited missiles.
    - The al Mamoun site, Iraq has rebuilt structures destroyed during the first Gulf War and dismantled by UNSCOM inspectors. In particular, two large casting pits for the construction of large solid-propellant motors for use in rockets exceeding the 150km range prohibition.
  - Although Iraq has been unsuccessful in attempts to convert a MiG-21 into an unmanned drone for delivery of WMD, they have been successful in converting L-29 trainer aircraft for such purposes.

- The September 24, 2002 report by the British Government highlighted many of the concerns stated elsewhere regarding Iraq's program to develop weapons of mass destruction[228]:
  - Iraq had stated that 25 Scud warheads were filled with biological weapons, and 50 warheads were filled with chemical weapons (a mixture of sarin and cyclosarin). UNSCOM inspectors found warheads with VX residue. This suggests that additional warheads may have been filled with VX nerve agents.
  - The British Joint Intelligence Council (JIC) concluded in mid-2001 that the work being done on missiles with ranges less than 150 km was being used to both extend the range of existing, permitted missile beyond the 150 km range limit as well as in the development of larger, longer-ranged missiles. In particular, the British report comments on plans to extend the range of the Ababil-100 to at least 200 km.
  - In early 2002, the British JIC concluded that Iraq had started the development of missiles with a range of more than 1,000 km. It was estimated that if sanctions remained effective that Iraq might be to produce such a missile by 2007.
  - British intelligence concluded that Iraq retained up to 20 al Hussein (Scud variant) missiles from before the first Gulf War.
  - The JIC report also notes the reconstruction and expansion of dismantled facilities such as al Rafah and al Mamoun.

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- Iraq has acquired banned tools and propellant chemicals including ammonium chloride and liquid propellants used in the Scud series missiles.

- The successor to UNSCOM, the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) was established by UN Resolution 1284 on December 17, 1999. UNMOVIC resumed inspections inside Iraq on November 27, 2002 as a consequence of the passage of UN Resolution 1441 passed on November 8, 2002. On March 6, 2003, UNMOVIC released a working document detailing outstanding issues regarding Iraqi disarmament.[229]
  - On the Scud-B:
    - Iraq failed to fully account for 80 Scud firing chamber/nozzle assemblies, 7 "training" engines, 25 locally-produced warheads as well as a number of fuel pumps.
    - Iraq continued work on the Scud-B well into the 1990s.
    - Iraq's claims regarding the destruction of missiles and missile components were not adequately documented or verified.
  - Iraq conducted work on the variety of missiles which used engines from the Soviet-designed SA-2 surface-to-air-missile:
    - Iraq worked on the Fahad 300 and Fahad 500 missiles with ranges of 300 and 500 kilometers, respectively.
      - UNSCOM supervised the destruction of 9 Fahad 300 missiles in 1991, but could not verify Iraq's declaration regarding missiles used in testing or the number of SA-2s modified. It is possible that Iraq retains some Fahad 300 missiles in inventory. Additionally, Iraq would have little difficulty in converting SA-2s into Fahad 300s.
    - Iraq attempted to produce another series of missile, later known as the al Samoud and al Samoud 2 missiles.
      - Iraq conducted 23 tests of the al Samoud 2, 13 of which exceeded the 150 km range limit.
      - In its 2002 declaration, Iraq stated that it had imported 131 SA-2 engines in contravention of the arms embargo.
      - During inspections, UNMOVIC found 231 engines. An Iraqi engineer indicated that Iraq was producing these engines domestically. Following the discovery of the engines, Iraq provided copies of the import contracts which accounted for 234 engines – clearly demonstrating that the engines had been smuggled in contrary to the arms embargo. Iraq further informed the inspectors of the arrival of 149 engines at an al Samoud factory – raising the total of imported engines to about 380.
      - During an inspection an Iraqi engineer indicated that a total of 567 engines were obtained through outside sources and through scavenging of parts to build al Samoud and al Samoud 2 missiles.
      - A November 1997 letter from the Executive Chairman of UNSCOM prohibited use of SA-2 engines in ballistic missiles.
      - Inspectors found limited amount of documentary evidence on SA-2 based projects.
      - Iraq increased the diameter of the al Samoud from 500 mm to 760 mm despite a 1994 letter from the Executive Chairman of UNSCOM directing Iraq to limit the diameter of its liquid fueled missiles to 600 mm.
      - As of March 17, 2003 Iraq had destroyed 72 al Samoud-series missiles and 47 warheads. Iraq reportedly had between 100 and 120 missiles in inventory.
  - Iraq also conducted significant research into solid-propellant missiles. UNMOVIC requested information, including material and equipment import documentation and design drawings for its solid-fuel missile programs.
  - Numerous sources also noted the construction of a large test stand suitable for the development of long range missiles. UNMOVIC also called for Iraq to "Explain with credible evidence the reason for upgrading a test stand in Al Mu'tasim."
  - Iraq declared 75 CBW Scud warheads, 73 of which UNSCOM was able to verify as being destroyed. However, some senior Iraqi officials had indicated that Iraq had 74 chemical and 25

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biological warheads. Furthermore, Iraq declared its ability to produce Scud warheads and inspectors found that 16 to 30 assemblies for warheads remained unaccounted for. Iraq left a number of discrepancies in record keeping for special warheads unresolved.

- Iraqi declarations on the number of R-400 and R-400A aerial bombs produced have been inconsistent, as have explanations about how these bombs were filled. As UNMOVIC found it impossible to verify the production and destruction details pertaining to these bombs, inspectors judged that it was possible that some CW and BW filled bombs remained in Iraqi inventory. Additionally, inspectors did not find credible evidence demonstrating the production line was stopped after September 1990, contrary to Iraqi claims.
- More generally, UN inspectors noted significant discrepancies in bomb inventories – such as an Air Force document indicating that Iraq used 6,526 fewer bombs during the Iran-Iraq War than had been previously declared.
  - Iraq's declarations of its results in BW bomb tests were deemed inconsistent with its declared program actions following those tests.
  - While Iraq's inventories of CBW bombs might have been significantly reduced, Iraq retained the ability to reconstitute its stockpiles of such weapons.
- UNMOVIC has numerous questions regarding artillery shells and short-range missile warheads.
  - Un inspectors had questions regarding the final disposition of some 15,000 155 mm warheads, including 550 missing mustard filled projectiles.
  - Inspectors did find 16 undeclared 122-mm chemical rocket warheads. Iraq's explanations of the disposition and tests conducting using such warheads were found to be inadequate.
  - This uncertainty is further exacerbated by Iraq's ability to manufacture CBW warheads for artillery and short-range rockets. UNMOVIC expressed concern over both record-keeping and supposed usage of such munitions.
- Iraq developed spray tanks and remotely-piloted vehicles (RPVs) for the dispersal of chemical and biological weapons.
  - Iraq failed to provide adequate documentation of its efforts to develop RPVs from existing MiG-21 and L-29 aircraft.
  - Iraq also declared a number of smaller RPVs intended for use with biological weapons. Inspectors felt that insufficient documentation had been provided for these projects.
  - UNMOVIC has a number of outstanding questions regarding chemical spray-devices and tanks for deploying chemical weapons.
- Iraq has also developed cluster munitions for use with chemical and biological agents. Inspectors found components of CBW cluster munitions in February of 2003. Iraq has also indicated that they have researched CBW warheads for RPGs and landmines.
  - Iraq's "Project 101" was intended to pursue the development of cluster munitions for unconventional payloads. Iraq has not provided documentation regarding the activities of Project 101.
- Iraq has also produced 340 liters of concentrated *Clostridium perfringens*, the causative agent of gas gangrene. This agent is often used in fragmentation devices or on anti-personnel flechettes. Iraq has denied having conducted research on the use of this agent in this capacity – this makes the production of 340 liters of the agent particularly puzzling.
- Discrepancies in Iraqi records, particularly with regards to supposed unilateral destruction, combined with the continuation of proscribed research and manufacturing activities have complicated the assessment of Iraqi claims of disarmament.

- The CIA estimated in September 1999 that although the Gulf war and subsequent United Nations activities destroyed much of Iraq's missile infrastructure, Iraq could test an ICBM capable of reaching the United States during the next 15 years.
  - After observing North Korean activities, Iraq *most likely would pursue* a three-stage Taepo Dong-2 approach to an ICBM (or SLV), which could deliver a several-hundred kilogram payload to parts of the United States. If Iraq could buy a Taepo Dong-2 from North Korea, it *could have a launch capability* within months of the purchase; if it bought Taepo Dong engines, it *could test* an ICBM

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by the middle of the next decade. Iraq probably would take until the end of the next decade to develop the system domestically.

- Although much less likely, most analysts believe that if Iraq were to begin development today, it *could test* a much less capable ICBM in a few years using Scud components and based on its prior SLV experience or on the Taepo Dong-1.
- If it could acquire No Dongs from North Korea, Iraq *could test* a more capable ICBM along the same lines within a few years of the No Dong acquisition.
- Analysts differ on the likely timing of Iraq's first flight test of an ICBM that could threaten the United States. Assessments include *unlikely* before 2015; and *likely* before 2015, possibly before 2010—foreign assistance would affect the capability and timing.

- A CIA report in January 2002 estimated that,
  - Baghdad's goal of becoming the predominant regional power and its hostile relations with many of its neighbors are the key drivers behind Iraq's ballistic missile program. Iraq has been able to maintain the infrastructure and expertise necessary to develop missiles, and the IC believes it has retained a small, covert force of Scud-type missiles, launchers, and Scud-specific production equipment and support apparatus. For the next several years at least, Iraq's ballistic missile initiatives probably will focus on reconstituting its pre-Gulf war capabilities to threaten regional targets and probably will not advance beyond MRBM systems.
  - Prior to the Gulf war, Iraq had several programs to extend the range of the Scud SRBM and became experienced working with liquid-propellant technology. Since the Gulf war, despite UN resolutions limiting the range of Iraq's missiles to 150 km, Baghdad has been able to maintain the infrastructure and expertise necessary to develop longer range missile systems.
  - A military parade in December 2000 showcased Al Samoud missiles on new transporter-erector-launchers (TELs). The liquid-propellant Al-Samoud SRBM probably will be deployed soon.
  - The IC assesses that Iraq retains a small covert force of Scud-variant missiles, launchers, and conventional, chemical, and biological warheads.
  - We cannot project with confidence how long UN-related sanctions and prohibitions will remain in place. They plausibly will constrain Iraq during the entire period of this Estimate. Scenarios that would weaken the prohibitions several years from now also are conceivable, allowing Iraq to reconstitute its missile infrastructure and begin developing long-range missiles before the end of the decade. The discussion that follows addresses developments that could and are likely to occur should UN prohibitions be significantly weakened in the future.
  - Iraq is likely to use its experience with Scud technology to resume production of the pre-Gulf war 650-km-range Al Hussein, the 900-km-range Al Abbas, or other Scud variants, and it could explore clustering and staging options to reach more distant targets. Iraq could resume Scud-variant production—with foreign assistance—quickly after UN prohibitions ended.
  - With substantial foreign assistance, Baghdad could flight-test a domestic MRBM by mid-decade. This possibility presumes rapid erosion of UN prohibitions and Baghdad's willingness to risk detection of developmental steps, such as static engine testing, earlier. An MRBM flight test is likely by 2010. An imported MRBM could be flight-tested within months of acquisition.
- For the first several years after relief from UN prohibitions, Iraq probably will strive to reestablish its SRBM inventory to pre-Gulf war numbers, continue developing and deploying solid-propellant systems, and pursue MRBMs to keep pace with its neighbors. Once its regional security concerns are being addressed, Iraq may pursue a first-generation ICBM/SLV.
- Although Iraq could attempt before 2015 to test a rudimentary long-range missile based on its failed Al-Abid SLV, such a missile almost certainly would fail. Iraq is unlikely to make such an attempt. After observing North Korean missile developments the past few years, Iraq would be more likely to pursue a three-stage TD-2 approach to an SLV or ICBM, which would be capable of delivering a nuclear weapon-sized payload to the United States. Some postulations for potential Iraqi ICBM/SLV concepts and timelines from the beginning of UN prohibition relief include:
- If Iraq could buy a TD-2 from North Korea, it could have a launch capability within a year or two of a purchase.
  - It could develop and test a TD-1-type system within a few years.

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- If it acquired No Dongs from North Korea, it could test an ICBM within a few years of acquisition by clustering and staging the No Dongs—similar to the clustering of Scuds for the Al Abid SLV.
- If Iraq bought TD-2 engines, it could test an ICBM within about five years of the acquisition.
- Iraq could develop and test a Taepo Dong-2-type system within about ten years of a decision to do so.

- Most agencies believe that Iraq is unlikely to test before 2015 any ICBMs that would threaten the United States, even if UN prohibitions were eliminated or significantly reduced in the next few years. Some believe that if prohibitions were eliminated in the next few years, Iraq would be likely to test an ICBM probably masked as an SLV before 2015, possibly before 2010. In this view, foreign assistance would affect the timing and the capability of the missile.
- Foreign assistance is key to Iraqi efforts to develop quickly longer-range missiles. Iraq relied on extensive foreign assistance before the Gulf war and will continue to seek foreign assistance to expand its current capabilities.
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
  - On the missile side, the proliferation of ICBM and cruise missile designs and technology has raised the threat to the US from WMD delivery systems to a critical threshold. As outlined in our recent National Intelligence Estimate on the subject, most Intelligence Community agencies project that by 2015 the US most likely will face ICBM threats from North Korea and Iran, and possibly from Iraq. This is in addition to the longstanding missile forces of Russia and China. Short- and medium-range ballistic missiles pose a significant threat now.
  - Several countries of concern are also increasingly interested in acquiring a land-attack cruise missile (LACM) capability. By the end of the decade, LACMs could pose a serious threat to not only our deployed forces, but possibly even the US mainland.
  - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.
  - Iraq maintains a large purchasing network with some 100 middlemen and 150 known import companies. It has past contact with more than 500 foreign companies and has made purchases in 43 countries.

Chemical Weapons

- Iraq is the only major recent user of weapons of mass destruction. US intelligence sources report the following Iraqi uses of chemical weapons:

Date	Area	Type of Gas	Approximate Casualties	Target
August 1983	Haij Umran Iranians/Kurds	Mustard	Less than 100	
October-November 1983	Panjwin Iranians/Kurds	Mustard	3,000	
February-March 1984	Majnoon Island	Mustard	2,500	Iranians
March 1984	Al Basrah	Tabun	50- 100	Iranians
March 1985	Hawizah Marsh	Mustard/Tabun	3,000	Iranians
February 1996	Al Faw	Mustard/Tabun	8,000-10,000	Iranians
December 1986	Umm ar Rasas	Mustard	1,000s	Iranians
April 1987	Al Basrah	Mustard/Tabun	5,000	Iranians
October 1987	Sumar/Mehran	Mustard/Nerve Agents	3,000	Iranians
March 1988	Halabjah Iranians/Kurds	Mustard/Nerve Agents	Hundreds	

Note: Iranians also used poison gas at Halabjah and may have caused some of the casualties.

- In revelations to the UN, Iraq admitted that, prior to the Gulf War, it:

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    - Procured more than 1,000 key pieces of specialized production and support equipment for its chemical warfare program.
    - Maintained large stockpiles of mustard gas, and the nerve agents Sarin and Tabun.
    - Produced binary sarin filled artillery shells, 122 mm rockets, and aerial bombs.
    - Manufactured enough precursors to produce 70 tons (70,000 kilograms) of the nerve agent VX. These precursors included 65 tons of choline and 200 tons of phosphorous pentasulfide and di-isopropylamine
    - Tested ricin, a deadly nerve agent, for use in artillery shells.
    - Had three flight tests of long-range Scuds with chemical warheads.
    - Had a large VX production effort underway at the time of the Gulf War. The destruction of the related weapons and feedstocks has been claimed by Iraq, but not verified by UNSCOM. Iraq seems to have had at least 3,800 kilograms of V-agents by time the of the Gulf War, and 12-16 missile warheads.
- The majority of Iraq's chemical agents were manufactured at a supposed pesticide plant located at Muthanna. Various other production facilities were also used, including those at Salman Pak, Samara, and Habbiniyah. Though severely damaged during the war, the physical plant for many of these facilities has been rebuilt.
- Iraq possessed the technology to produce a variety of other persistent and non-persistent agents.
- The Gulf War and the subsequent UN inspection regime may have largely eliminated some of stockpiles and reduced production capability.
- During 191-1994, UNSCOM supervised the destruction of:
    - 38,537 filled and unfilled chemical munitions.
    - 690 tons of chemical warfare agents.
    - More than 3,000 tons of precursor chemicals.
    - Over 100 pieces of remaining production equipment at the Muthan State Establishment, Iraq's primary CW research, production, filling and storage site.
- Since that time, UNSCOM has forced new disclosures from Iraq that have led to:
    - The destruction of 325 newly identified production equipment, 120 of which were only disclosed in August, 1997.
    - The destruction of 275 tons of additional precursors.
    - The destruction of 125 analytic instruments.
    - The return of 91 analytic pieces of equipment to Kuwait.
- As of February, 1998, UNSCOM had supervised the destruction of a total of:
    - 40,000 munitions, 28,000 filled and 12,000 empty.
    - 480,000 liters of chemical munitions
    - 1,800,000 liters of chemical precursors.
    - eight types of delivery systems including missile warheads.
- US and UN experts believe Iraq has concealed significant stocks of precursors. Iraq also appears to retain significant amounts of production equipment dispersed before, or during, Desert Storm and not recovered by the UN.
- UNSCOM reports that Iraq has failed to account for:
    - Special missile warheads intended for filling with chemical or biological warfare agent.
    - The material balance of some 550 155 mm mustard gas shells, the extent of VX programs, and the rationale for the acquisition of various types of chemical weapons

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- 130 tons of chemical warfare agents.
- Some 4,000 tons of declared precursors for chemical weapons,
- The production of several hundred tons of additional chemical warfare agents, the consumption of chemical precursors,
- 107,500 empty casings for chemical weapons,
- Whether several thousand additional chemical weapons were filled with agents,
- The unilateral destruction of 15, 620 weapons, and the fate of 16,038 additional weapons Iraq claimed it had discarded. "The margin of error" in the accounting presented by Iraq is in the neighborhood of 200 munitions."
- Iraq systematically lied about the existence of its production facilities for VX gas until 1995, and made "significant efforts" to conceal its production capabilities after that date. Uncertainties affecting the destruction of its VX gas still affect some 750 tons of imported precursor chemicals, and 55 tons of domestically produced precursors. Iraq has made unverifiable claims that 460 tons were destroyed by Coalition air attacks, and that it unilaterally destroyed 212 tons. UNSCOM has only been able to verify the destruction of 155 tons and destroy a further 36 tons on its own.

- Iraq has developed basic chemical warhead designs for Scud missiles, rockets, bombs, and shells. Iraq also has spray dispersal systems.
- Iraq maintains extensive stocks of defensive equipment.
- The UN feels that Iraq is not currently producing chemical agents, but Iraq has offered no evidence that it has destroyed its VX production capability and/or stockpile. Further, Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- Recent UNSCOM work confirms that Iraq did deploy gas-filled 155 mm artillery and 122 mm multiple rocket rounds into the rear areas of the KTO during the Gulf War.
- Iraq's chemical weapons had no special visible markings, and were often stored in the same area as conventional weapons.
- Iraq has the technology to produce stable, highly lethal VX gas with long storage times.
- May have developed improved binary and more stable weapons since the Gulf War.
- Since 1992, Iraq attempted to covertly import precursors and production equipment for chemical weapons through Qatar, Saudi Arabia, and Jordan since the Gulf War.
- The current status of the Iraqi program is as follows (according to US intelligence as of February 19, 1998 and corrected by the National Intelligence Council on November 16, 1998):

Agent	Declared	Potential Unaccounted For	Comments
Chemical Agents	(Metric Tons)	(Metric Tons)	
VX Nerve Gas	3	300	Iraq lied about the program until 1995
G Agents (Sarin) agents	100-150	200	Figures include weaponized and bulk
Mustard Gas agents	500-600	200	Figures include weaponized and bulk
Delivery Systems	(Number)	(Number)	
Missile Warheads	75-100	2-25	UNSCOM supervised destruction of 30
Rockets	100,000	15,000-25,000	UNSCOM supervised destruction of 40,000, 28,000 of which were filled.
Aerial Bombs	16,000	2,000-8,000	High estimate reflects the data found in an Iraqi Air Force document in July 1998.
Artillery shells	30,000	15,000	

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Aerial Spray Tanks ? ?

- A US State Department spokesman reported on November 16, 1998 that Iraq has reported making 8,800 pounds (four tons) of VX nerve gas, 220,000 pounds (100 tons) to 330,000 pounds (150 tons) of nerve agents such as Sarin and 1.1 million pounds (500 tons) to 1.32 million pounds (600 tons) of mustard gas. Data from UN weapons inspectors indicates that Iraq may have produced an additional 1.32 million pounds (600-tons) of these agents, divided evenly among the three. ``In other words, these are the differences between what they say they have and what we have reason to believe they have."
- The CIA reported in January 1999 that Iraq has purchased numerous dual-use items for legitimate civilian projects—in principle subject to UN scrutiny—that also could be diverted for WMD purposes. Since the Gulf war, Baghdad has rebuilt key portions of its chemical production infrastructure for industrial and commercial use. Some of these facilities could be converted fairly quickly for production of CW agents. The recent discovery that Iraq had weaponized the advanced nerve agent VX and the convincing evidence that fewer CW munitions were consumed during the Iran-Iraq war than Iraq had declared provide strong indications that Iraq retains a CW capability and intends to reconstitute its pre-Gulf war capability as rapidly as possible once sanctions are lifted.
- A State Department report in September 1999 noted that:
  - In July 1998, Iraq seized from the hands of UNSCOM inspectors an Iraqi Air Force document indicating that Iraq had misrepresented the expenditure of over 6,000 bombs which may have contained over 700 tons of chemical agent. Iraq continues to refuse to provide this document to the UN.
  - Iraq continues to deny weaponizing VX nerve agent, despite the fact that UNSCOM found VX nerve agent residues on Iraqi SCUD missile warhead fragments. Based on its investigations, international experts concluded that "Iraq has the know-how and process equipment, and may possess precursors to manufacture as much as 200 tons of VX ... The retention of a VX capability by Iraq cannot be excluded by the UNSCOM international expert team."

- An October 2002 CIA report states: "Baghdad has begun renewed production of chemical warfare agents, probably including mustard, sarin, cyclosarin, and VX." The report goes on to indicate that while general chemical weapons production capacity has fallen since 1990, the ability to produce VX and increase the shelf life of other agents has probably improved.[230]
  - The CIA estimates that Iraq probably has a few hundred metric tons of CW agents in its stockpile.
- The 2002 British report estimates that Iraq has retained sufficient agents, precursors, production equipment and weapons that they would be able to produce significant quantities of mustard gas within weeks and nerve agent within months of a decision to do so.[231]
- The report also notes that when confronted with questions about unaccounted for CW stocks, the Iraqis usually state that the stocks are now so old that they will have deteriorated to the point of uselessness. However, Iraq has admitted to having developed and used stabilizers to increase the shelf life of chemical weapons. In 1996, UNSCOM found some munitions which had allegedly been filled before 1991 but remained quite potent and showed few signs of deterioration as of their testing in February 1998. This would seem to indicate that either stabilizers had been used successfully, contrary to Iraqi claims or that the filler had been manufactured recently, also contrary to Iraqi claims.
- UNMOVIC inspectors raised numerous questions about Iraq's chemical warfare program.[232]
  - Iraq is known to have produced Tabun, a nerve agent:
    - Tabun has three precursor chemicals: the stocks of one of the three precursors have been successfully accounted for.
    - Inspectors found significant discrepancies in the total quantities of Tabun and the other two precursors produced, imported and consumed. Both of these precursors are relatively stable and while small amounts have been declared used in legitimate civilian applications, questions remain about the balance of the stocks unaccounted for.
    - UNSCOM found Iraq's declaration that Tabun production had stopped in 1986 to be credible.
  - Iraq also produced Sarin and cyclosarin, two other potent nerve agents.
    - Iraq has developed binary agents as a means to combat the poor shelf-life of the Sarin compounds they've produced indigenously.

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- Consequently, Iraq has ceased production of Sarin itself.
- UNSCOM could not account for some 1,772 tons of precursor chemicals.
- Iraq has been unable to verify the nature and status of its production facilities for binary Sarin.
- UNMOVIC found that it is possible for Iraq to manufacture Sarin-type agents of storable quality. If Iraq is unable to do so, Iraq is capable of producing storable precursors. UNMOVIC has not found evidence of stockpiles of such precursors.

- Approximately 70% of Iraq's CW arsenal is composed of mustard agents.
  - Iraq has not accounted for 190 tons of thiodiglycol, 100 tons of thionylchloride and an indeterminate portion of 1,772 tons of phosphorus trichloride – all mustard precursors.
  - A total of 550 mustard gas artillery shells, 450 mustard aerial bombs and an unknown number of 6,526 CW bombs have not been satisfactorily accounted for.
  - Iraq is self-sufficient with respect to its ability to manufacture mustard gas and its precursors. While no large-scale industrial production is known to have occurred, mustard agents would be the easiest chemical warfare agent for Iraq to produce domestically.
- Iraq is also known to have produced quantities of the persistent, highly-lethal nerve agent, VX.
  - Iraq has extensively researched VX production and, following several years of inspections was compelled to declare that it had, in fact, produced VX.
  - Subsequently Iraq has failed to account for large quantities of VX precursors.
  - Iraq has also failed to provide documentation or sufficient accounting with respect to its actions on its research programs and development efforts.
  - Iraqi authorities have not satisfactorily explained several very incongruous pieces of evidence regarding the production and presence of VX in laboratories and VX stabilizers.
- Iraq has not given sufficient documentation outlining its research and production of Soman. Iraq has also failed to account for large quantities of soman precursors.

- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
  - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.
  - Iraq continues to build and expand an infrastructure capable of producing WMD. Baghdad is expanding its civilian chemical industry in ways that could be diverted quickly to CW production. We believe it also maintains an active and capable BW program; Iraq told UNSCOM it had worked with several BW agents.

Biological Weapons

- Had highly compartmented "black" program with far tighter security regulations than chemical program.
- Had 18 major sites for some aspect of biological weapons effort before the Gulf War. Most were nondescript and had no guards or visible indications they were a military facility.
- The US targeted only one site during the Gulf War. It struck two sites, one for other reasons. It also struck at least two targets with no biological facilities that it misidentified.
- Systematically lied about biological weapons effort until 1995. First stated that had small defensive efforts, but no offensive effort. In July, 1995, admitted had a major defensive effort. In October, 1995, finally admitted major weaponization effort.
- Iraq has continued to lie about its biological weapons effort since October, 1995. It has claimed the effort was headed by Dr. Taha, a woman who only headed a subordinate effort. It has not admitted to any help by foreign personnel or contractors. It has claimed to have destroyed its weapons, but the one site UNSCOM inspectors visited showed no signs of such destruction and was later said to be the wrong site. It has claimed only 50 people were employed full time, but the scale of the effort would have required several hundred.

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- Since July 1995, Iraq has presented three versions of FFCDs and four "drafts" and a "Currently Accurate, Full and Complete Declaration" (CAFCD).
- A FFCD was presented by Iraq on 11 September 1997. This submission followed the UNSCOM's rejection, of the FFCD of June 1996. In the period since receiving that report, UNSCOM conducted eight inspections in an attempt to investigate critical areas of Iraq's proscribed activities such as warfare agent production and destruction, biological munitions manufacturing, filling and destruction, and military involvement in and support to the proscribed program. Those investigations, confirmed the assessment that the June 1996 declaration was deeply deficient. The UNSCOM concluded that the new FFCD, it received on 11 September 1997, contains no significant changes from the June 1996 FFCD. The most recent CAFCD issued in 2002 in response to UN Resolution 1441 was found to contain little new information.
- Iraq has not admitted to the production of 8,500 liters of anthrax, 19,000 liters of Botulinum toxin, 2,200 liters of Aflatoxin.
- Reports indicate that Iraq tested at least 7 principal biological agents for use against humans.
- Anthrax, Botulinum, and Aflatoxin are known to be weaponized.
- Looked at viruses, bacteria, and fungi. Examined the possibility of weaponizing gas gangrene and mycotoxins. Some field trials were held of these agents.
    - Examined foot and mouth disease, hemorrhagic conjunctivitis virus, rotavirus, and camel pox virus.
- Conducted research on a "wheat pathogen" and a mycotoxin similar to "yellow rain" defoliant.
    - The "wheat smut" was first produced at Al Salman, and then put in major production during 1987-1988 at a plant near Mosul. Iraq claims the program was abandoned.
- The August 1995 defection of Lieutenant general Husayn Kamel Majid, formerly in charge of Iraq's weapons of mass destruction, revealed the extent of this biological weapons program. Lt. General Kamel's defection prompted Iraq to admit that it:
- Imported 39 tons of growth media (31,000 kilograms or 68,200 pounds) for biological agents obtained from three European firms. According to UNSCOM, 3,500 kilograms or 7,700 pounds) remains unaccounted for. Some estimates go as high as 17 tons. Each ton can be used to produce 10 tons of bacteriological weapons.
- Imported type cultures from the US which can be modified to develop biological weapons.
- Had a laboratory- and industrial-scale capability to manufacture various biological agents including the bacteria which cause Anthrax and botulism; Aflatoxin, a naturally occurring carcinogen; *Clostridium perfringens*, a gangrene-causing agent; the protein toxin ricin; tricothecene mycotoxins, such as T-2 and DAS; and an anti-wheat fungus known as wheat cover smut. Iraq also conducted research into the rotavirus, the camel pox virus and the virus which causes hemorrhagic conjunctivitis.
- Created at least seven primary production facilities including the Sepp Institute at Muthanna, the Ghazi Research Institute at Amaria, the Daura Foot and Mouth Disease Institute, and facilities at Al-Hakim, Salman Pak Taji, and Fudaliyah. According to UNSCOM, weaponization occurred primarily at Muthanna through May, 1987 (largely Botulinum), and then moved to Al Salman. (Anthrax). In March, 1988 a plant was open at Al Hakim, and in 1989 an Aflatoxin plant was set up at Fudaliyah.
- Had test site about 200 kilometers west of Baghdad, used animals in cages and tested artillery and rocket rounds against live targets at ranges up to 16 kilometers.
- Took fermenters and other equipment from Kuwait to improve effort during the Gulf War.
- Iraq had least 79 civilian facilities capable of playing some role in biological weapons production still in existence in 1997.
- The Iraqi program involving Aflatoxin leaves many questions unanswered.
    - Iraqi research on Aflatoxin began in May 1988 at Al Salman, where the toxin was produced by the growth of fungus aspergilus in 5.3 quart flasks.
    - The motives behind Iraq's research on Aflatoxin remain one of the most speculative aspects of its program. Aflatoxin is associated with fungal-contaminated food grains, and is considered non-lethal. It normally can produce liver cancer, but only after a period of months to years and in intense concentrations. There is speculation, however, that a weaponized form might cause death within days and some speculation that it can be used as an incapacitating agent.

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- Iraq moved its production of Aflatoxin to Fudaliyah in 1989, and produced 481 gallons of toxin in solution between November, 1988 and May, 1990.
- It developed 16 R-400 Aflatoxin bombs and two Scud warheads. Conducted trials with Aflatoxin in 122 mm rockets and R-400 bombs in November 1989 and May and August 1990. Produced a total of 572 gallons of toxin and loaded 410.8 gallons into munitions.
- UNSCOM concluded in October, 1997, that Iraq's accounting for its Aflatoxin production was not credible.

- Total Iraqi production of more orthodox biological weapons reached at least 19,000 liters of concentrated Botulinum (10,000 liters filled into munitions); 8,500 liters of concentrated Anthrax (6,500 liters filled into munitions); and 2,500 liters of concentrated Aflatoxin (1,850 liters filled into munitions).
- It manufactured 6,000 liters of concentrated Botulinum toxin and 8,425 liters of Anthrax at Al-Hakim during 1990; 5400 liters of concentrated Botulinum toxin at the Daura Foot and Mouth Disease Institute from November 1990 to January 15, 1991; 400 liters of concentrated Botulinum toxin at Taji; and 150 liters of concentrated Anthrax at Salman Pak.
- Iraq is also known to have produced at least:
  - 1,850 liters of Aflatoxin in solution at Fudaliyah.
  - 340 liters of concentrated *Clostridium perfringens*, a gangrene-causing biological agent, beginning in August 1990.
  - 10 liters of concentrated Ricin at Al Salam. Claim abandoned work after tests failed.
  - Iraq weaponized at least three biological agents for use in the Gulf War. The weaponization consisted of at least:
  - 100 bombs and 16 missile warheads loaded with Botulinum.
  - 50 R-400 air-delivered bombs and 5 missile warheads loaded with anthrax; and
  - 4 missile warheads and 7 R-400 bombs loaded with Aflatoxin, a natural carcinogen.
  - The warheads were designed for operability with the Al Husayn Scud variant.
- Iraq had other weaponization activities:
- Armed 155 mm artillery shells and 122 mm rockets with biological agents.
- Conducted field trials, weaponization tests, and live firings of 122 mm rockets armed with Anthrax and Botulinum toxin from March 1988 to May 1990.
- Tested Ricin, a deadly protein toxin, for use in artillery shells.
  - Iraq produced at least 191 bombs and 25 missile warheads with biological agents.
  - Developed and deployed 250 pound aluminum bombs covered in fiberglass. Bombs were designed so they could be mounted on both Soviet and French-made aircraft. They were rigged with parachutes for low altitudes drops to allow efficient slow delivery and aircraft to fly under radar coverage. Some debate over whether bombs had cluster munitions or simply dispersed agent like LD-400 chemical bomb.
  - Deployed at least 166 R-400 bombs with 85 liters of biological agents each during the Gulf War. Deployed them at two sites. One was near an abandoned runway where it could fly in aircraft, arm them quickly, and disperse with no prior indication of activity and no reason for the UN to target the runway.
  - Filled at least 25 Scud missile warheads, and 157 bombs and aerial dispensers, with biological agents during the Gulf War.
  - Developed and stored drop tanks ready for use for three aircraft or RPV s with the capability of dispersing 2,000 liters of anthrax. Development took place in December 1990. Claimed later that tests showed the systems were ineffective.
  - The UN found, however, that Iraq equipped crop spraying helicopters for biological warfare and held exercises and tests simulating the spraying of Anthrax spores.
- Iraqi Mirages were given spray tanks to disperse biological agents.

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- Held four trials from December 1990 through January 13, 1991.
- The Mirages were chosen because they have large 2,200 liter belly tanks and could be refueled by air, giving them a longer endurance and greater strike range.
- The tanks had electric valves to allow the agent to be released and the system was tested by releasing simulated agent into desert areas with scattered petri dishes to detect the biological agent. UNSCOM has video tapes of the aircraft.

- Project 144 at Taji produced at least 25 operational Al Husayn warheads. Ten of these were hidden deep in a railway tunnel, and 15 in holes dug in an unmanned hide site along the Tigris.
- Biological weapons were only distinguished from regular weapons by a black stripe.
- The UN claims that Iraq has offered no evidence to corroborate its claims that it destroyed its stockpile of biological agents after the Gulf War. Further, Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- UNSCOM reported in October 1997 that:
  - Iraq has never provided a clear picture of the role of its military in its biological warfare program, and has claimed it only played a token role.
  - It has never accounted for its disposal of growth media. The unaccounted for media is sufficient, in quantity, for the production of over three times more of the biological agent — Anthrax — Iraq claims to have been produced.
  - Bulk warfare agent production appears to be vastly understated by Iraq. Expert calculations of possible agent production quantities, either by equipment capacity or growth media amounts, far exceed Iraq's stated results
  - Significant periods when Iraq claims its fermenters were not utilized are unexplained
  - Biological warfare field trials are underreported and inadequately described.
  - Claims regarding field trials of chemical and biological weapons using R400 bombs are contradictory and indicate that, "more munitions were destroyed than were produced.
  - The Commission is unable to verify that the unilateral destruction of the BW-filled Al Hussein warheads has taken place."
  - There is no way to confirm whether Iraq destroyed 157 bombs of the R400 type, some of which were filled with botulinum toxin or anthrax spores.
  - "The September 1997 FFCD fails to give a remotely credible account of Iraq's biological program. This opinion has been endorsed by an international panel of experts."
- As of February 19, 1998, the status of the Iraqi program was as follows (according to US intelligence).

Agent	Declared Concentrated Amount		Declared Total Amount		Uncertainty
	Liters	Gallons	Liters	Gallons	
Anthrax	8,500	12,245	85,000	22,457	Could be 3-4 times declared amount
Botulinum toxin	19,400	NA	380,000	NA	Probably twice declared amount. Some extremely concentrated.
Gas Gangrene (*Clostridium perfringens*)	340	90	3,400	900	Amounts could be higher
Aflatoxin	NA	NA	2,200	581	Major uncertainties
Ricin	NA	NA	10	2.7	Major uncertainties

- UNSCOM cannot confirm the unilateral destruction of 25 warheads. It can confirm the destruction of 23 of at least 157 bombs. Iraq may have more aerosol tanks.

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- UN currently inspects 79 sites — 5 used to make weapons before war; 5 vaccine or pharmaceutical sites; 35 research and university sites; thirteen breweries, distilleries, and dairies with dual-purpose capabilities; eight diagnostic laboratories.
- Iraq retains laboratory capability to manufacture various biological agents including the bacteria which cause anthrax, botulism, tularemia and typhoid.
- Many additional civilian facilities are capable of playing some role in biological weapons production.
- A State Department spokesman reported on November 16, 1998 that there is a large discrepancy between the amount of biological growth media -procured and the amount of agents that were or could have been produced. Baghdad has not adequately explained where some 8,000 pounds (3,500 kg) of the material went out of some 68,000 pounds (31,000 kg) of biological growth media it imported. Iraq's accounting of the amount of the agent it produced and the number of failed batches is seriously flawed and cannot be reconciled on the basis of this full disclosure Iraq has made.
- The CIA reported in January 1999 that Iraq continues to refuse to disclose fully the extent of its BW program. After four years of denials, Iraq admitted to an offensive program resulting in the destruction of Al Hakam-a large BW production facility Iraq was trying to hide as a legitimate biological plant. Iraq still has not accounted for over a hundred BW bombs and over 80 percent of imported growth media-directly related to past and future Iraqi production of thousands of gallons of biological agent. This lack of cooperation is an indication that Baghdad intends to reconstitute its BW capability when possible.
- A State Department report in September 1999 noted that:
    - Iraq refuses to allow inspection of thousands of Ministry of Defense and Military Industries Commission documents relating to biological and chemical weapons and long-range missiles.
    - In 1995, Iraqis who conducted field trials of R-400 bombs filled with biological agents described the tests to UNSCOM experts in considerable detail, including the use of many animals. These field trials were reflected in Iraq’s June 1996 biological weapons declaration. Yet, amazingly, Iraq now denies that any such trials were conducted at all.
- In September 1995, Iraq finally declared the existence of two projects to disseminate biological agents from Mirage F-1 and MiG-21 aircraft, yet there is no evidence that the prototype weapons and aircraft were ever destroyed. There is also no evidence that the 12 Iraqi helicopter-borne aerosol generators for biological weapon delivery were ever destroyed.
- Apart from one document referring to a single year, no Iraqi biological weapon production records have been given to the UN — no records of storage, of filling into munitions, or of destruction. This is why UNSCOM refers to Iraq’s biological weapons program — which deployed SCUD missile warheads filled with anthrax and botulinum toxin to be ready for use against Coalition forces — as a “black hole.”
- The Iraqis have repeatedly changed their story about their biological weapons warheads. Iraq has revised several times its declarations regarding the precise locations of warhead destruction and the fill of warheads. The movements of concealed warheads prior to unilateral destruction, claimed by Iraq, have been proven to be false.
- A Department of Defense report in January 2001 stated that Iraq’s continued refusal to disclose fully the extent of its biological program suggests that Baghdad retains a biological warfare capability, despite its membership in the BWC. After four and one-half years of claiming that it had conducted only “defensive research” on biological weapons Iraq declared reluctantly, in 1995, that it had produced approximately 30,000 liters of bulk biological agents and/or filled munitions. Iraq admitted that it produced anthrax, botulinum toxins and aflatoxins and that it prepared biological agent-filled munitions, including missile warheads and aerial bombs. However, UNSCOM believed that Iraq had produced substantially greater amounts than it has admitted —three to four times greater. Iraq also admitted that, during the Persian Gulf War, it had deployed biological agent-filled munitions to air-fields and that these weapons were intended for use against Israel and coalition forces in Saudi Arabia. Iraq stated that it destroyed all of these agents and munitions in 1991, but it has provided insufficient credible evidence to support this claim. The UN believes that Baghdad has the ability to reconstitute its biological warfare capabilities within a few weeks or months, and, in the absence of UNSCOM inspections and monitoring during 1999 and 2000, we are concerned that Baghdad again may have produced some biological warfare agents.
- Director of Central Intelligence George J. Tenet’s testimony Before the Senate Select Committee on Intelligence: February 6, 2002:

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    - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.
    - Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002: Iraq continues to build and expand an infrastructure capable of producing WMD. Baghdad is expanding its civilian chemical industry in ways that could be diverted quickly to CW production. We believe it also maintains an active and capable BW program; Iraq told UNSCOM it had worked with several BW agents.
- John R. Bolton, Under Secretary for Arms Control and International Security described Iraq's status as follows in a speech on May 6, 2002: "Foremost is Iraq. Although it became a signatory to the BWC in 1972 and became a State Party in 1991, Iraq has developed, produced, and stockpiled biological warfare agents and weapons. The United States strongly suspects that Iraq has taken advantage of more than three years of no UN inspections to improve all phases of its offensive BW program. Iraq also has developed, produced, and stockpiled chemical weapons, and shown a continuing interest in developing nuclear weapons and longer range missiles."
- A 2002 CIA report quotes UNSCOM inspectors as stating that Iraq had produced two to four times the amount of biological agents they had admitted to producing, including anthrax and botulinum toxin.[233]
    - The report highlights three facilities of particular concern: the al Dawrah Foot-and-Mouth Disease Vaccine Facility, the Amiriyah Serum and Vaccine Institute and the Fallujah III Castor Oil Production Facility.
    - The CIA report also notes that UNSCOM uncovered a document from the Iraqi Military Industrial Commission indicating that Iraq was interested in developing mobile fermentation units and an Iraqi scientist told UN inspectors that Iraq was trying to develop such a program.
- UNMOVIC's March 6, 2003 working document discusses questions about the Iraqi biological weapons program at great length:[234]
    - UNMOVIC has credible information that the total quantity of BW agents in bombs, warheads and in bulk at the end of the first Gulf War was 7,000 liters greater than declared by Iraq. The additional 7,000 liters is thought to be almost entirely anthrax.
    - Iraqi claims about the scope and destruction of its anthrax program are, inconsistent with uncovered evidence, claims about the disposition of growth media and Iraqi activities in other programs:
        - The report states that Iraqi claims regarding the end of anthrax production in 1990 "do not seem plausible."
        - Discrepancies in records regarding the production, storage and supposed destruction of anthrax raise significant issues of concern.
        - The UNMOVIC report states "Based on all the available evidence, the strong presumption is that about 10,000 liters of anthrax was not destroyed and may still exist."
    - Iraq has also produced botulinum toxin for use in biological weapons.
        - Iraq indicated in its various Full, Final Complete Declarations and its Currently Accurate, Final, Complete Declaration that they had only investigated type A botulinum toxin. UNSCOM inspectors found the type B toxin at a facility, despite Iraqi claims that the type B toxin had not been investigated or produced.
        - Iraq has claimed that they have destroyed all of their production records, making quantitative verification of Iraqi statements difficult.
        - Iraq's statements about the numbers and types of weapons filled with botulinum toxin, as well as the destruction and lack of documentary evidence raise questions about the disposition of weaponized botulinum toxin.
    - Iraq also pursued the development of aflatoxin, a potent carcinogen. Evidence presented by Iraq and uncovered by inspectors left open questions about the amount produced, weaponized and placed in bombs and warheads.
    - Iraq tested wheat smut as a biological weapon intended to damage the food production capabilities of its opponents. Iraq's claims regarding the research program, as well as the quantity of agent produced,

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consumed, weaponized and destroyed cannot be confirmed on the basis of the evidence that has been provided.. UNMOVIC stated that it is "especially concerned with the broader question of Iraq's intention with regard to biological agents that could be used as economic weapons."

- Iraq pursued the development of *Clostridium perfringens*, the causative agent of gas gangrene. Iraq's statements regarding the production of *C. perfringens* are inconsistent with the stocks declared.
  - The reasons Iraq claims to have ceased production of the agent are not plausible.
  - Quantities of one of the precursor agents have not been accounted for.
- Ricin, a derivative of castor beans, is a potent biological toxin and was researched by Iraq.
  - Documents uncovered in April 1997 by UNSCOM inspectors contradicted Iraq's declarations about its Ricin program and raised significant doubts about the Iraqi program.
  - Discrepancies between the documents and the Iraqi statements raise questions about the starting date of the Ricin program and the quantities of agent produced.
- UNMOVIC inspectors also had questions regarding the total quantities of growth media unaccounted for.
  - Based on significant discrepancies in the material balance of growth media, UNSCOM inspectors estimated that the additional quantities of undeclared agents could have been produced were:
  - 3,000 – 11,000 liters of botulinum toxin,
  - 6,000 – 16,000 liters of anthrax
  - up to 5,600 liters of Clostridium perfringens
  - and a significant quantity of an unknown bacterial agent.
  - Based on the availability of Iraqi fermenters and the uncertain disposition of growth media, inspectors feel that there is a significant possibility for the production of undeclared biological agents.
- UNMOVIC also stated that it could not discount the possibility of either mobile BW labs or production equipment hidden at other sites.
- Iraq also pursued research into viral BW agents: enterovirus 70 (infectious hemorrhagic conjunctivitis), rotavirus and camel pox. Research into camel pox was pursued with the belief that it would selectively infect non-Arabs.
- UNMOVIC inspectors found that the complete lack of documentation to support Iraq's claims of unilateral destruction of its BW materials created large uncertainties in Iraqi holdings of produced biological agents as well as accounts of the dispositions of precursors and production materials.
- Peculiar administrative changes regarding the administration of Iraq's BW program have given rise to concerns that there may have been other biological weapons programs, or elements of programs, that have not been fully disclosed.

Nuclear Weapons

- Inspections by UN teams have found evidence of two successful weapons designs, a neutron initiator, explosives and triggering technology needed for production of bombs, plutonium processing technology, centrifuge technology, Calutron enrichment technology, and experiments with chemical separation technology. Iraq had some expert technical support, including at least one German scientist who provided the technical plans for the URENCO TC-11 centrifuge.
- Iraq's main nuclear weapons related facilities were:
  - Al Atheer - center of nuclear weapons program. Uranium metallurgy; production of shaped charges for bombs, remote controlled facilities for high explosives manufacture.
  - Al Tuwaitha - triggering systems, neutron initiators, uranium metallurgy, and hot cells for plutonium separation. Laboratory production of UO_2, UCl_4, UF_6, and fuel fabrication facility. Prototype-scale gas centrifuge, prototype EMIS facility, and testing of laser isotope separation technology.
  - Al Qa Qa - high explosives storage, testing of detonators for high explosive component of implosion nuclear weapons.

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    - Al Musaiyib/Al Hatteen - high explosive testing, hydrodynamic studies of bombs.
    - Al Hadre - firing range for high explosive devices, including FAE.
    - Ash Sharqat - designed for mass production of weapons grade material using EMIS.
    - Al Furat - designed for mass production of weapons grade material using centrifuge method.
    - Al Jesira (Mosul) - mass production of UCl_4.
    - Al Qaim - phosphate plant for production of U308.
    - Akashat uranium mine.
- Iraq had three reactor programs:
    - Osiraq/Tammuz I 40 megawatt light-water reactor destroyed by Israeli air attack in 1981.
    - Isis/Tammuz II 800 kilowatt light water reactor destroyed by Coalition air attack in 1991.
    - IRT-5000 5 megawatt light water reactor damaged by Coalition air attack in 1991.
- Iraq used Calutron (EMIS), centrifuges, plutonium processing, chemical diffusion and foreign purchases to create new production capability after Israel destroyed most of Osiraq.
- Iraq established a centrifuge enrichment system in Rashidya and conducted research into the nuclear fuel cycle to facilitate development of a nuclear device.
- After invading Kuwait, Iraq attempted to accelerate its program to develop a nuclear weapon by using radioactive fuel from French and Russian-built reactors. It made a crash effort in September, 1990 to recover enriched fuel from its supposedly safe-guarded French and Russian reactors, with the goal of producing a nuclear weapon by April, 1991. The program was only halted after Coalition air raids destroyed key facilities on January 17, 1991.
- Iraq conducted research into the production of a radiological weapon, which disperses lethal radioactive material without initiating a nuclear explosion.
    - Orders were given in 1987 to explore the use of radiological weapons for area denial in the Iran-Iraq War.
    - Three prototype bombs were detonated at test sites — one as a ground level static test and two others were dropped from aircraft.
    - Iraq claims the results were disappointing and the project was shelved but has no records or evidence to prove this.
- UN teams have found and destroyed, or secured, new stockpiles of illegal enriched material, major production and R&D facilities, and equipment— including Calutron enriching equipment.
- UNSCOM believes that Iraq's nuclear program has been largely disabled and remains incapacitated, but warns that Iraq retains substantial technology and established a clandestine purchasing system in 1990 that it has used to import forbidden components since the Gulf War.
- Work by David Albright indicates that Iraq still holds approximately 1.7 metric tons (MT) of low-enriched uranium (LEU) and several hundred MT of natural uranium. He estimates that if Iraq should master one of the uranium enrichment technologies that it was pursuing before the Gulf War, its LEU stock would provide a means to rapidly make enough HEU for at least one nuclear weapon, and that the natural uranium could become the feedstock for many more. This uranium remains in Iraq because the UN Action Team did not have a mandate under resolution 687 to "remove, destroy or render harmless" this uranium. Without further enrichment or irradiation in a nuclear reactor, it is not "weapons-usable nuclear material."
- Dr. Khidhir Hamza a highest-ranking Iraqi scientist who defected from Iraq claims Iraqi scientists were commanded to build one nuclear bomb immediately after Saddam invaded Kuwait in 1990, and that the resulting device was crude and untested and might even could fall apart. In an April 2, 2001 edition of Middle East Forum Wire, he says that,
    - Iraq still runs its nuclear program and distributes its nuclear program infrastructure among dozens of small corporations, as it does with biological and chemical weapons.

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    - One group was responsible for enrichment of uranium by diffusion, and did this under the front of a large refinery in Baghdad. A refinery and a uranium enrichment plant require similar piping, structures, compressors, and handling of gases. He says
    - His assistant, who designed bombs under Hamza, is now running the program while also doing seismic prospecting for oil maps. Apart from designing weapons, he engineers underground explosions that generate seismic waves in order to locate oil. When an inspector visits, all programs relating to the bomb design are put aside, and replaced with seismic prospecting maps. The bomb designer is a real expert at seismic prospecting, so he is very convincing to the inspectors.
    - He now estimates that Iraq will have between three to five nuclear weapons by 2005. Iraq now has twelve tons of uranium and 1.3 tons of low enriched uranium. This is enough for at least four bombs already.
- IAEA inspectors feel that Iraqi exiles have little credibility, but note that there is no way to detect basic weapons research, development and testing of weaponization electronics,further work on explosive packages for weapons, simulations using depleted Iranium, development and testing of single centrifuges and experimental cascades, and development of Uranium casting and machine techniques using depleted Uranium.
- The major remaining uncertainties are:
    - Iraq still retains the technology developed before the Gulf War and US experts believe an ongoing research and development effort continues, in spite of the UN sanctions regime.
    - Did Iraq conceal an effective high-speed centrifuge program?
    - Are there elements for radiological weapons?
    - Is it actively seeking to clandestinely buy components for nuclear weapons and exami9ning the purchase of fissile material from outside Iraq?
    - Is it continuing with the development of a missile warhead suited to the use of a nuclear device?
    - A substantial number of declared nuclear weapons components and research equipment has never been recovered. There is no reason to assume that Iraqi declarations were comprehensive.
- The CIA reported in January 1999 that Iraq continues to hide documentation, and probably some equipment, relating to key aspects of past nuclear activities. After years of Iraqi denials, the IAEA was able to get Iraq to admit to a far more advanced nuclear weapons program and a project based on advanced uranium enrichment technology. However, Baghdad continues to withhold significant information about enrichment techniques, foreign procurement, and weapons design.
- Press reports in February 2000 claimed that Iraq might have developed biological warfare agents it had kept secret from UNSCOM inspectors and which were never discovered. The reports followed similar warnings by UNSCOM experts on January 25, 2000 that Iraq might have done so, that not all suspected biological weapons production and research facilities had been inspected, and that the undiscovered weapons might include infectious viral agents.
- George Tenet, the Director of the CIA, testified before the Senate Foreign Relations Committee on March 20, 2000 and stated that, “We are concerned about the potential for states and terrorists to acquire plutonium, highly enriched uranium, and other fissile materials, and even complete nuclear weapons…Iran or Iraq could quickly advance their nuclear aspirations through covert acquisition of fissile material or relevant technology.”
- A Department of Defense report in January 2001 stated that,
    - Despite these severe pressures on its economy, Saddam Hussein’s government continues to devote Iraqi resources to rebuilding certain portions of its development program that was focused on building an implosion-type device. The program was linked to a ballistic missile project that was the intended delivery system. From April 1991 to December 1998, Iraqi nuclear aspirations were held in check by IAEA/ UNSCOM inspections and monitoring. All known weapons-grade fissile material was removed from the country.
    - Although Iraq claims that it destroyed all of the specific equipment and facilities useful for developing nuclear weapons, it still retains sufficient skilled and experienced scientists and engineers as well as weapons design information that could allow it to restart a weapons program.

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    - Iraq would need five or more years and key foreign assistance to rebuild the infrastructure to enrich enough material for a nuclear weapon. This period would be substantially shortened should Baghdad successfully acquire fissile material from a foreign source.

- The CIA estimated in January 2002 that Baghdad had a crash program to develop a nuclear weapon for missile delivery in 1990, but coalition bombing and IAEA and UNSCOM activities significantly set back the effort. The Intelligence Community estimates that Iraq, unconstrained, would take several years to produce enough fissile material to make a weapon. Iraq has admitted to having biological and chemical weapons programs before the Gulf war and maintains those programs.

- Director of Central Intelligence George J. Tenet's tstimony Before the Senate Select Committee on Intelligence: February 6, 2002: We believe Saddam never abandoned his nuclear weapons program. Iraq retains a significant number of nuclear scientists, program documentation, and probably some dual-use manufacturing infrastructure that could support a reinvigorated nuclear weapons program. Baghdad's access to foreign expertise could support a rejuvenated program, but our major near-term concern is the possibility that Saddam might gain access to fissile material.

- As of late 2002 both the CIA and the British governments both expressed concern about the state of the Iraqi nuclear program.

    - The CIA report indicated that Iraq retained its technical base, program documentation and wide-spread dual-use manufacturing facilities, as well as a strong interest in reviving its nuclear program. The report cites Iraqi failure to produce documentation on procurement, technical design documents, experimental data, materials inventories and foreign assistance. The report also notes that there have been several meetings between Saddam and nuclear scientists over the last few years, signaling Iraq's continued interest in a nuclear weapons program.[235]

    - The British report stated that Iraq had continued its efforts to procure uranium enrichment equipment. While it acknowledged that IAEA inspections had addressed much of the physical infrastructure, the report noted that much of the knowledge base and administrative organization of the Iraqi nuclear program had been left intact. Additionally, the report lists several questionable Iraqi dual-use procurement efforts since the 1998 withdrawal of inspectors.[236]

- The IAEA stated on March 7, 2003, that Iraq's nuclear program had been effectively stopped: According to its statement, inspectors found no evidence that Iraq had restarted its program since 1998, expressed satisfaction with Iraq's explanations of it's dual-use technology acquisition and had not imported uranium since 1990. However, the IAEA's working document identified the key remaining tasks:[237]

    - "Provide a complete description of all technical activities that may be related to (or interpreted as being related to) nuclear weapons components research and development and production, and uranium conversion and enrichment developments, in particular through ensuring access to associated sites and the provision of relevant samples."

    - "Provide access to all documents (e.g., progress reports, exchanges between governmental and operational organizations, minutes of meetings, computer files) on activities that could be interpreted as being related to nuclear activities, and allow the implementation of measures with respect to such documents that would allow proper forensic analysis, on-site or remotely (e.g., removal, copying)."

    - "Provide the names and whereabouts, including current workplaces and positions, of all individuals requested by the IAEA, and grant full access to Iraqi officials and other personnel for purposes of interviewing, inside and outside of Iraq, in accordance with IAEA modalities."

    - "Provide a complete description of the evolution of its industrial infrastructure since 1998, with the provision of decrees and official documents as well as access to all sites."

    - "Explain and document procurement attempts and offers, solicited and unsolicited, that may be related to the possible development of Iraq's nuclear-related capabilities."

    - "Provide a full description of its current (post-1998) procurement system, whether within or outside the mechanisms established in resolutions 986 (1995) and 1409 (2002)."

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The Iraqi Top 55: The Iraqi Leadership Figures Most Wanted by USCENTCOM[238]

1. Saddam Hussein--President of Iraq/CINC of Military
2. Qusay Hussein--SSO, SRG & RGFC Commander
3. Uday Hussein--Saddam Fedayeen Commander
4. Abid Hamid Mahmud Al Tikriti--Presidential Secretary (WMD Release Authority)5. Al Hasan Majid--Pres. Advisor, Fmr South Reg Cmdr
6. Izzat Ibrahim al Duri--Vice Chair of the RCC, North Reg Cmdr
7. Hani Abd Latif Tilfa al Tikriti--SSO Director
8. Kamal Mustafa Abdallah Sultan Tikriti--RG Secretary
9. Barzan Abd Ghafur Sulayman al Tikriti--SRG Commander
10. Muzahim Sa'b Hassan al Tikriti--Air Defense Force Commander
11. Ibrahim Ahmad Abd al Sattar Muhammad al Tikriti--Armed Forces Chief of Staff
12. Sayf al Din Fulayyih Hassan Taha al Rawi--RGFC Chief
13. Rafi Abd Latif al Tilfah--DGS Director
14. Tahir Jalil Habbush al Tikriti--IIS Director
15. Hamid Raja Shalah al Tikriti--Air Force Commander
16. Abd al Tawab Mullah Huwaysh--OMI Director (WMD Production)
17. Aziz Salih Numan--BP Regional Cmdr/Cmdr BP Militia - Reg Cmd
18. Muhammad Hazmaq al Zubaydi--Central Euphrates Reg Cmdr
19. Sultan Hashim Ahmad al Tal--Minister of Defense
20. Ayad Futayyih Khalifa al Rawi--Al Quds Force Chief of Staff
21. Zuhayr Talib Abd al Sattar al Naqib--DMI Director
22. Abd al Baqi abd Karim al Sadun --BP Chmn & Cmdr BP Militia - Baghdad
23. Muhammad Zimam Abd al-Razzaq al Sadun --BP Chmn & Cmdr BP Militia - Ta'mim & Ninawa Gov
24. Samir abd al Aziz al Najm --BP Chmn & Cmdr BP Militia - Diyal Gov.
25. Yahya Abdallah al Ubaydi --BP Chmn & Cmdr BP Militia - Basrah Gov.
26. Nayif Shindakh Thamir --BP Chmn & Cmdr BP Militia - Salah ad Din Gov.
27. Sayfal al Din al Mashhadani --BP Chmn & Cmdr BP Militia - Muthanna Gov.
28. Fadil Mahmud Gharib --BP Chmn & Cmdr BP Militia - Babil/Karbala Gov.
29. Muhsin Khadar al Khafaji --BP Chmn & Cmdr BP Militia - Qadasiyah Gov.
30. Rashid Taan Kazim --BP Chmn & Cmdr BP Militia - Anbar Governate
31. Ugla Abid Sighar al-Kubaysi --BP Chmn & Cmdr BP Militia - Maysan Governate
32. Ghazi Hamud al Adib --BP Chmn & Cmdr BP Militia - Wasit Gov.
33. Adil Abdallah Mahdi al Duri al Tikriti --BP Chmn & Cmdr BP Militia - Dhi Qar Governate
34. Husayn Al Awawi--BP Chmn & Cmdr BP Militia - Ninawa Governate
35. Khamis Sirhan al Muhammad--BP Chmn & Cmdr BP Militia - Karbala Governate
36. Sad Abd al Majid al-Faysal--BP Chmn & Cmdr BP Militia - Salah ad Din Gov.
37. Latif Nussayif Jasim al Dulaymi--Dep Chmn Baath Party
38. Taha Yasin Ramadan--Vice President
39. Rukan Razuki abd Al Ghaful Sulayman al Tikriti--Chief of Tribal Affairs
40. Jamal Mustafa Abdallah Sultan al Tikriti--Deputy Chief of Tribal Affairs
41. Mizban Khidir Hadi--RCC Member, Reg CDR Central Euphrates Region
42. Taha Muhyl al Din Maruf--Vice President and RCC Member
43. Tariq Aziz--Deputy Prime Minister
44. Walid Hamid Tawfiq al-Tikriti--Governor of Basrah Governate
45. Hikmat al Azzawi--Dep Prime Minister, Economics & Finance Min.
46. Mahmud Dhiyab al Ahmad--Minister of the Interior
47. Amir Rashid Muhammad al Ubaydi--Former Oil Minister
48. Muhammad Mahdi al-Salih--Minister of Trade
49. Husam Muhammad al-Yasin--National Monitoring Director
50. Sabawi Ibrahim--Baath Party, Saddam Maternal Half Brother
51. Watban Ibrahim Hasan al Tikriti--Baath Party, Saddam Half Brother
52. Barzan Ibrahim Hasan al Tikriti--Baath Party, Saddam Half Brother
53. Huda Salih Mahdi Ammash--Party Youth & Trade Bureau Chairman
54. Humam Abd al-Khaliq Abd al-Ghafur--Min of Higher Education & Scientific Research
55. Amir Hamudi Hasan al-Sadi--Presidential Scientific Adviser/NMD Dir Gen

Source: USCENTCOM

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US Forces in the Gulf At the Start of the War: A Rough Working Estimate

KUWAIT

• Elements of 3rd Infantry Division - 13,500 soldiers
• 325th Airborne Infantry Regiment, 82nd Airborne Division – 4,000 soldiers
• Other Army elements – 10,800 soldiers
• Army reservists – 3,000 soldiers
• Elements of 293rd Infantry, Indiana National Guard - 600 soldiers
• 190th Fighter Squadron, Idaho National Guard - 200 soldiers
• Elements of I Marine Expeditionary Force – 35,000 Marines
• Amphibious Task Force West – 6,000-7,000 Marines
• 15th Marine Expeditionary Unit – 2,200 Marines
• A-10 and F-16 aircraft
• 2nd Marine Expeditionary Brigade – 6,000 to 7,000 Marines
• 1042nd Medical Company, Oregon National Guard - 18 soldiers

Army

1st Brigade, 3rd Infantry Division (Mechanized)
4,500 soldiers
Based at: Fort Stewart, Ga.
Deployed: early January
2nd Brigade, 3rd Infantry Division (Mechanized)
4,500 soldiers
Units:
• 3rd Battalion, 15th Infantry Regiment
• 1st Battalion 64th Armored Regiment
• 4th Battalion, 64th Armored Regiment
• E Troop, 9th Cavalry Regiment.
Based at: Fort Stewart, Ga.
Deployed: early January
3rd Brigade, 3rd Infantry Division (Mechanized)
4,500 soldiers
Units:
• 1st Battalion, 15th Infantry Regiment
• 1st Battalion, 30th Infantry Regiment
• 2nd Battalion, 69th Armored Regiment
• 1st Battalion, 10th Field Artillery
• D Troop, 10th U.S. Cavalry Regiment
• 203rd Forward Support Battalion
• 317th Engineer Battalion
Based at: Fort Benning, Ga.
Deployed: early January

Other Army elements
10,800 soldiers

325th Airborne Infantry Regiment, 82nd Airborne Division
4,000 soldiers

Army reservists
3,000 soldiers
Units include:
• 3rd Personnel Command, Camp Arifjan
55 soldiers
Based at: Jackson, Miss.
Mission: theater-level personnel support headquarters
• 377th Theater Support Command
• 355th Signal Command

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1st Battalion, 293rd Infantry, Indiana National Guard
600 soldiers
(The Nightfighter Battalion)
Units:
• B Company
• C Company
• Headquarters Company
Based at: Fort Wayne, Ind.

1042nd Medical Company, Oregon National Guard
18 soldiers

Air Force

190th Fighter Squadron, Idaho Air National Guard
200 soldiers, A-10 aircraft
Based at: Gowen ANGB, Boise, Idaho

F-15s, F-16s
2,500 airmen

Air Force 729th Air Control Squadron
Based at: Hill Air Force Base, Utah
120 airmen

Marine Corps

2nd Marine Expeditionary Brigade
6,000 to 7,000 Marines
Units:
• 2nd Marine Regiment – part or all of the infantry regiment
• Marine Aircraft Group 29 – part or all of the group
• II Marine Liaison Element – entire 38-man unit
Deploying with brigade, 300 reservists mobilized Jan. 6
Units:
• Charlie Company, 4th Reconnaissance Battalion
• Alpha Company, 8th Tank Battalion
• Headquarters and Service Company, 4th Light Armored Reconnaissance Battalion
• Detachment Bravo, 4th Civil Affairs Group

Amphibious Task Force West
6,000 to 7,000 Marines

Camp Commando
• I Marine Expeditionary Force command element
1,000 Marines
Includes command elements from major subordinate commands
Home base: Camp Pendleton, Calif.
Deployed: about Nov. 21

Elements of I Marine Expeditionary Force
35,000 Marines

15th Marine Expeditionary Unit
2,200 Marines

8th Communications Battalion
60 Marines
Home base: Camp Lejeune, N.C.
Deployed: Dec. 20

FORCES IN OTHER SOUTHERN GULF STATES AND IN DEIGO GARCIA

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BAHRAIN
• Navy 5th Fleet headquarters - 1,200 sailors
• Joint Venture HSV-X1 – 50 troops

Navy

5th Fleet Headquarters
Manama, Bahrain
1,200 sailors
Facility in Manama, Bahrain, is also headquarters of U.S. Naval Forces Central Command. Vice Adm. Timothy J. Keating commands U.S. Naval Forces Central Command and the U.S. 5th Fleet.

Joint Venture HSV-X1

44 sailors, 6 Army mariners
The Joint Venture HSV-X1 — a high-speed, wave piercing catamaran — is a joint-service experiment coordinated by the Navy Warfare Development Command in close partnership with elements of the Army, Navy, Marine Corps and Coast Guard.

OMAN
• B-1B bombers and AC-130 gunships

QATAR
• Al Udeid Air Base – F-15 and F-16 fighters, KC-135s and KC-10s, 3,500 airmen
• Camp As Sayliyah - Central Command battle command
• 205th Area Support Medical Battalion, Missouri National Guard – 50 soldiers

Army

Camp As Sayliyah
Units:
• Central Command battle command
Mission: to carry out attack orders
• Combat Equipment Battalion-Qatar

Large stocks of prepositioned military equipment are in place here.

205th Area Support Medical Battalion, Missouri National Guard
50 soldiers

Air Force

Al Udeid Air Base
F-15s
KC-135s
KC-10s
3,500 airmen

SAUDI ARABIA
• Prince Sultan Air Base - F-15 and F-16 fighters
• 1042nd Medical Company, Oregon National Guard - 10 soldiers

Army

1042nd Medical Company, Oregon National Guard
10 soldiers

Patriot unit?

Air Force

Prince Sultan Air Base
4,500 US military personnel
Undisclosed number of aircraft, including F-15 and F-16 fighters

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UNITED ARAB EMIRATES
• Al Dhatra Air Base – reconnaissance aircraft, 500 airmen

Al Dhatra Air Base
Reconnaissance aircraft
500 airmen

DIEGO GARCIA
• AF 20th Bomb Squadron
• 917th Bomb Wing, Air Force Reserve

20th Bomb Squadron

Home base: Barksdale Air Force Base, La.
Flying the B-52H (Stratofortress)

917th Bomb Wing, Air Force Reserve

Home base: Barksdale Air Force Base, La.
Consisting of the 93rd Bomb Squadron
Flying the B-52H (Stratofortress)

IN AREA/UNKNOWN LOCATION
• 30,000 airmen
• 2nd Force Service Support Group (Fwd)
• Offload Preparation Parties, II Marine Expeditionary Force

PERSIAN GULF: NAVY AND MARINE FORCES
• Constellation Carrier Battle Group/Carrier Air Wing 2 (Marine Fighter-Attack Squadron 323) – 7,900 sailors and Marines
• Abraham Lincoln Carrier Battle Group/Carrier Air Wing 14 – 8,000 sailors
• Amphibious Task Force East – 5,000 sailors
• Amphibious Task Force West – 4,500 sailors
• Nassau Amphibious Ready Group with 24th Marine Expeditionary Unit – 1,700 sailors, 2,200 Marines
• Tarawa Amphibious Ready Group – 1,700 sailors
• Hospital ship Comfort – 300 sailors

Abraham Lincoln Carrier Battle Group/Carrier Air Wing 14

8,000 sailors
Units:
• Abraham Lincoln
Nimitz-class carrier (CVN-72)
5,680 sailors — ship's company, 3,200; air wing, 2,480
Homeport: Everett, Wash.
Deployed: July 20
• Shiloh
Ticonderoga-class guided-missile cruiser (CG-67)
364 sailors
Homeport: San Diego
Deployed: July 24
• Mobile Bay
Ticonderoga-class guided-missile cruiser (CG-53)
364 sailors
Homeport: San Diego
Deployed: July 24
• Paul Hamilton
Arleigh Burke-class guided-missile destroyer (DDG-60)
323 sailors
• Reuben James
Oliver Hazard Perry-class guided-missile frigate (FFG-57)
300 sailors

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Homeport: Pearl Harbor, Hawaii
Deployed: August
• AOE-2 Camden
(Supply vessel for combat ships that has air and surface defense capabilities itself)
300 crewmen
• Cheyenne
Los Angeles-class attack submarine (SSN 773)
130 sailors
Homeport: Pearl Harbor, Hawaii
Deployed: August
• Honolulu
Los Angeles class attack submarine (SSN-718)
130 sailors
Homeport: Pearl Harbor, Hawaii
Deployed: August
Carrier Air Wing 14
Comprises more than 80 attack and support planes, including the first operational F/A-18E Super Hornet squadron. The Super Hornets have greater range than the older Hornets.
• VF-31 Tomcatters (fighter squadron)
• VFA-25 Fist of the Fleet (strike fighter squadron)
• VFA-113 Stingers (strike fighter squadron)
• VFA-115 Eagles (strike fighter squadron)
• VAW-113 Black Eagles (carrier airborne early warning squadron)
• VAQ-139 Cougars (electronic attack squadron)
• VS-35 Blue Wolves (sea control squadron)
• HS-4 Black Knight (helicopter antisubmarine squadron)
• VRC-30 Providers (fleet logistics support squadron)

Constellation Carrier Battle Group w/ Carrier Air Wing 2 (Marine Fighter-Attack Squadron 323)

7,900 sailors and Marines
Deployed: Nov. 2
Ships:
• Constellation (CV-64)
Kitty Hawk-class carrier
5,600 sailors
• Valley Forge (CG-50)
Ticonderoga-class guided missile cruiser
385 sailors
• Bunker Hill (CG-52)
Ticonderoga-class guided missile cruiser
385 sailors
• Milius (DDG-69)
Arleigh Burke-class guided missile destroyer
346 sailors
• Higgins (DDG-76)
Arleigh Burke-class guided missile destroyer
346 sailors
• Fletcher (DD-992)
Spruance-class destroyer
382 sailors
Homeport: Pearl Harbor
• Thach (FFG-43)
Oliver Hazard Perry-class guided missile frigate
209 sailors
• Columbia (SSN-771)
Los Angeles-class attack submarine
133 sailors
Deployed: Dec. 6
• Rainier (AOE 7)
fast combat support ship
300 crewmembers
• USCGC Boutwell (WHEC)

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Hamilton-class Coast Guard cutter
167 Coast Guardsmen
Carrier Air Wing 2 (includes Marine Fighter-Attack Squadron 323)
• VF-2 (fighter squadron)
• VFA-137 (strike fighter squadron)
• VFA-151 (strike fighter squadron)
• VAQ-131
• VAW-116
• VS-38
• HS-2
• VRC-30 Det. 2

Amphibious Task Force West

4,500 sailors, 6,000 to 7,000 Marines
Ships:
• Bonhomme Richard
Wasp-class amphibious assault ship (LHD 6)
1,292 sailors
Deployed: Jan. 17
Homeport: San Diego
• Boxer
Wasp-class amphibious assault ship (LHD 4)
1,292 sailors
Deployed: Jan. 17
Homeport: San Diego
• Cleveland (LPD 7)
Austin-class amphibious transport dock (LPD 7)
420 sailors
Deployed: Jan. 17
Homeport: San Diego
Comstock (LSD 45)
Whidbey Island-class dock landing ship
340 sailors
Deployed: Jan. 17
Homeport: San Diego
Anchorage
Anchorage-class dock landing ship (LSD 36)
358 sailors
Deployed: Jan. 17
Homeport: San Diego
• Dubuque (LPD 8)
Austin-class amphibious transport dock
420 sailors
Deployed: Jan. 17
• Pearl Harbor (LSD 52)
Whidbey Island-class dock landing ship
340 sailors
Deployed: Jan. 17

Amphibious Task Force East

5,000 sailors
Seven amphibious ships:
• Bataan (LHD 5)
1,292 sailors
Wasp class
Deployed: Jan. 12
Homeport: Norfolk, Va.
• Kearsarge (LHD 3)
1,292 sailors
Wasp class
Deployed: Jan. 12

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Homeport: Norfolk, Va.
• Ashland (LSD 48)
340 sailors
Whidbey Island class
Deployed: Jan. 12
Homeport: Little Creek Amphibious Naval Base, Va.
• Portland (LSD 37)
358 sailors
Anchorage class
Deployed: Jan. 12
Homeport: Little Creek Amphibious Naval Base, Va.
• Saipan (LHA 2)
964 sailors
Tarawa class
Deployed: Jan. 10
Homeport: Norfolk, Va.
• Ponce (LPD 15)
428 sailors
Austin class
Deployed: Jan. 10
Homeport: Norfolk, Va.
• Gunston Hall (LSD 44)
340 sailors
Whidbey Island class
Deployed: Jan. 10
Homeport: Little Creek Amphibious Naval Base, Va.

Nassau Amphibious Ready Group with 24th Marine Expeditionary Unit

1,700 sailors
Deployed: Aug. 26
Expected to return: early March 2003
Ships:
• Nassau (LHA 4)
Tarawa-class amphibious assault ship
964 sailors
• Austin (LPD 4)
Austin-class amphibious transport dock
420 sailors
• Tortuga (LSD 46)
Whidbey Island-class dock landing ship
340 sailors

Tarawa Amphibious Ready Group

1,700 sailors
Deployed: Jan. 6
Ships:
• Tarawa (LHA-1)
Tarawa-class amphibious assault ship
964 sailors
• Rushmore (LSD 47)
Whidbey Island-class dock landing ship
340 sailors
• Duluth (LPD 6)
Austin-class amphibious transport dock
420 sailors
Hospital ship Comfort (T-AH 19)
300 sailors
Chinook (PC 9)
28 sailors
Cyclone-class coastal patrol ship
Homeport: Little Creek Naval Amphibious Base, Little Creek, Va.

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Firebolt (PC 10)
28 sailors
Cyclone-class coastal patrol ship
Homeport: Little Creek Naval Amphibious Base, Little Creek, Va.

Marine Corps

Marine Fighter-Attack Squadron 323 (with Constellation Carrier Battle Group/Carrier Wing 2)
Deployed: Nov. 2
Based at: Marine Corps Air Station Beaufort, S.C.
Marine Fighter Attack Squadron 323

24th Marine Expeditionary Unit (with Nassau Amphibious Ready Group)

2,200 Marines
Deployed: Aug. 26
Expected to return: early March 2003

Echo Company, Battalion Landing Team 2nd Battalion (with Nassau Amphibious Ready Group)

CLOSING ON THE PERSIAN GULF AREA AND ADDITIONAL NAVAL FORCES

• Kitty Hawk Carrier Battle Group/Carrier Air Wing 5 – 8,350 sailors
• Coast Guard patrol boats – 600 Coast Guardsmen
• Military Sealift Command ships Dahl and Bob Hope/Elements of 101st Airborne Division – 30 soldiers
• 3rd Brigade Combat Team, 4th Infantry Division - 4,800 soldiers
• 11th Air Defense Artillery Brigade - 125 soldiers

Army

Elements of 101st Airborne Division
30 soldiers
Moving helicopters and other heavy equipment aboard Military Sealift Command Ships Dahl and Bob Hope

3rd Brigade Combat Team, 4th Infantry Division
4,800 soldiers

11th Air Defense Artillery Brigade
125 soldiers
Based at: Fort Bliss, Texas

Kitty Hawk Carrier Battle Group w/ Carrier Air Wing 5

8,350 sailors
Includes Carrier Group 5, Destroyer Squadron 15 and Amphibious Squadron 11
Ships:
• Kitty Hawk
Aircraft carrier (CV 63)
Homeport: Yokosuka, Japan
• Vincennes
Guided-missile cruiser (CG 49)
Homeport: Yokosuka, Japan
• Chancellorsville
Guided-missile cruiser (CG 62)
Homeport: Yokosuka, Japan
• Curtis Wilbur
Guided-missile destroyer (DDG 54)
Homeport: Yokosuka, Japan
• John S. McCain
Guided-missile destroyer (DDG 56)
Homeport: Yokosuka, Japan
• O'Brien
Destroyer (DD 975)

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Homeport: Yokosuka, Japan
• Cushing
Destroyer (DD 985)
Homeport: Yokosuka, Japan
• Vandergrift
Guided-missile frigate (FFG 48)
Homeport: Yokosuka, Japan
• Gary
Guided-missile frigate (FFG 51)
Homeport: Yokosuka, Japan
• Bremerton
Muclear-powered submarine (SSN 698)
Homeport: San Diego

Eight Coast Guard patrol boats

600 Coast Guardsmen
• Adak
• Aquidneck
• Bainbridge Island
• Baranof
• Grand Isle
• Knight Island
• Pea Island
• Wrangell

Air Force

30,000 airmen
Units include (but not limited to):
• 28th Bomb Wing
Six B-1B bombers
300 airmen
Based at: Ellsworth Air Force Base
• 43rd Operations Group
Based at: Pope Air Force Base, N.C.
• 43rd Logistics Readiness Squadron
Based at: Pope Air Force Base, N.C.
• 43rd Maintenance Squadron
Based at: Pope Air Force Base, N.C.
• 43rd Services Squadron
Based at: Pope Air Force Base, N.C.
• 621st Air Mobility Operations Group
120 airmen
Based at: McGuire Air Force Base, N.J.
• 49th Communications Squadron
35 airmen
Based at: Holloman Air Force Base, N.M.
• 74th Medical Group
50 airmen
Based at: Wright-Patterson Air Force Base, Ohio
• 52nd Fighter Wing
F-16s
200 airmen so far, 300 more to deploy
Based at: Spangdahlem Air Base, Germany
• 66th Rescue Squadron
HH-60 Pave Hawks
Based at: Nellis Air Force Base, Nev.
• 58th Rescue Squadron
Based at: Nellis Air Force Base, Nev.
• 757th Maintenance Squadron
Based at: Nellis Air Force Base, Nev.• 15th Reconnaissance Squadron
RQ-1 Predator
Based at: Nellis Air Force Base, Nev.

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•99th Air Base Wing
Based at: Nellis Air Force Base, Nev.

Marine Corps

2nd Force Service Support Group (Fwd)
700 Marines
Units contributing troops:
8th Engineer Support Battalion
2nd Transportation Support Battalion
2nd Dental Battalion
2nd Maintenance Battalion
2nd Military Police Battalion
Headquarters and Service Battalion
Deployed: on or about Dec. 27
Commanded by Col. Steve Otto, commander of 2nd FSSG Forward

Offload Preparation Parties, II Marine Expeditionary Force
400 Marines from II MEF
Deployed: Jan. 10
Mission: to serve as Offload Preparation Parties to ready gear and vehicles aboard Maritime Prepositioning Force ships in the Mediterranean Sea for offload and use

MEDITERRANEAN AND LEVANT

EGYPT
• 1st Battalion, 180th Infantry Regiment, Oklahoma National Guard - 865 soldiers

ISRAEL
• Patriot air-defense missile batteries - 600 soldiers

View country map
• Harry S. Truman Carrier Battle Group/Carrier Air Wing 3 (Marine Fighter-Attack Squadron 115) – 8,300 sailors and Marines
• Theodore Roosevelt Carrier Battle Group/Carrier Air Wing 8 – 8,000 sailors

NAVAL FORCES

Harry S. Truman Carrier Battle Group w/ Carrier Air Wing 3

8,300 sailors and Marines
Deployed: Dec. 5
Expected return: June 5
Ships:
• Harry S. Truman
  Nimitz-class carrier (CVN-75)
  5,700 sailors
• San Jacinto
  Ticonderoga-class guided-missile cruiser (CG-56-)
  385 sailors
• Mitscher
  Arleigh Burke-class guided-missile destroyer (DDG-57)
  346 sailors
• Donald Cook
  Arleigh Burke-class guided-missile destroyer (DDG-75)
  346 sailors
• Oscar Austin
  Arleigh Burke-class guided-missile destroyer (DDG-79)
  346 sailors
• Deyo

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Spruance-class destroyer (DD-989)
345 sailors
• Hawes
Oliver Hazard Perry-class guided-missile frigate (FFG-53)
209 sailors
• Pittsburgh
Los Angeles-class submarine (SSN-720)
133 sailors
• Montpelier
Los Angeles-class submarine (SSN-765)
133 sailors
• Kanawha
Henry J. Kaiser-class USNS oiler (T-AO 196)
23 crew members
Carrier Air Wing 3 (includes Marine Fighter-Attack Squadron 115)
• VF-32 (fighter squadron)
• VFA-37 (strike fighter squadron)
• VFA-105 (strike fighter squadron)
• VAQ-130 (electronic attack squadron)
• VAW-126 (carrier airborne early warning squadron)
• VS-22 (sea control squadron)
• HS-7 (helicopter antisubmarine squadron)
• VRC-40 (Det.) (fleet logistics support squadron)

Theodore Roosevelt Carrier Battle Group w/ Carrier Air Wing 8

8,000 sailors
Deployed: Jan. 6
Ships:
• Theodore Roosevelt
Nimitz-class carrier (CVN 71)
5,700 sailors
Homeport: Norfolk, Va.
• Stump
Spruance-class destroyer (DD 978)
345 sailors
Homeport: Norfolk, Va.
• Carr
Oliver Hazard Perry-class guided-missile frigate (FFG-52)
209 sailors
Homeport: Norfolk, Va.
• Anzio
Ticonderoga-class guided-missile cruiser (CG 68)
385 sailors
Homeport: Norfolk, Va.
• Cape St. George
Ticonderoga-class guided-missile cruiser (CG 71)
385 sailors
Homeport: Norfolk, Va.
• Arleigh Burke
Arleigh Burke-class guided-missile destroyer (DDG 51)
346 sailors
Homeport: Norfolk, Va.
• Porter
Arleigh Burke-class guided-missile destroyer (DDG 78)
346 sailors
Homeport: Norfolk, Va.
• Winston S. Churchill
Arleigh Burke-class guided-missile destroyer (DDG 81)
346 sailors
Homeport: Norfolk, Va.
• Attack submarine
Nuclear-powered submarine (unnamed)

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• Attack submarine
Nuclear-powered submarine (unnamed)
• USNS Arctic
Fast combat support ship (T-AOE 8)
300 crewmembers
Carrier Air Wing 8 ((includes Marine Fighter-Attack Squadron 312)
70 aircraft
Based at: Oceana NAS, Va.
• VF-213 Blacklions (fighter squadron)
• VFA-15 Valions (strike fighter squadron)
• VFA-87 War Party (strike fighter squadron)
• VFA-201 Hunters (strike fighter squadron)
• VS-24 Scouts (sea control squadron)
• VAW-124 Bear Aces (carrier airborne early warning squadron)
• VAQ-141 Shadowhawks (electronic attack squadron)
• HS-3 Tridents (helicopter antisubmarine squadron)
Battle group commanded by Rear Adm. John C. Harvey Jr.

Marine Corps

Marine Fighter-Attack Squadron 115 (with Truman Carrier Battle Group/Carrier Wing 3)
Deployed: Dec. 5
Expected return: June 5
Based at: Marine Corps Air Station Beaufort, S.C.

Marine Fighter-Attack Squadron 332 (with Roosevelt Carrier Battle Group/Carrier Wing 8)
Deployed: Jan. 6
Expected return: June 5
Based at: Marine Corps Air Station Beaufort, S.C.

PERIPHERAL FORCES

TURKEY

• Elements of 1st Infantry Division – 2,000 soldiers
• Incirlik Air Base – F-15 and F-16 aircraft, 4,000 airmen
View country map

AFGHANISTAN
• Air Expeditionary Force 7 - A-10 Thunderbolt II aircraft
• Marine Attack Squadron 513 - Harrier strike aircraft
View country map

AFGHANISTAN, PAKISTAN, UZBEKISTAN
• Elements of 82nd Airborne Division – 3,500 soldiers
• Other Army elements – 7,950 soldiers
• AC-130 gunships

• 1042nd Medical Company, Oregon National Guard - 40 soldiers

DJIBOUTI
• Camp Lemonier – 1,000 U.S. troops

Army

Camp Lemonier
• 5th Special Forces Group
Based at: Fort Campbell, Ky.

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Air Force

Camp Lemonier
• 87th Expeditionary Security Force Squadron, 824th Security Forces Squadron
Home base: Moody Air Force Base, Ga.
Mission: protect the flight line and air assets of Combined Joint Task Force — Horn of Africa
See story.
Air Force
Djibouti
20th Special Operations Squadron
Based at: Hurlburt Field, Fla.
One of eight flying squadrons within the 16th Special Operations Wing, the "Green Hornets" fly the MH-53J Pave Low IIIE, the Air Force's most sophisticated helicopter.
Mission: to conduct day or night low-level penetration into hostile enemy territory, to accomplish clandestine infiltration and exfiltration, aerial gunnery support and resupply of special operations forces

Marine Corps

Camp Lemonier
1,000 troops
U.S. troops from Marine Corps, Army and other services, including Special Operations Forces
Mission: Logistical support for Combined Joint Task Force — Horn of Africa, which is responsible for rooting out terrorists in Ethiopia, Sudan, Yemen, Eritrea, Somalia, Kenya and Djibouti
Lemonier, which the United States took charge of in June 2002, is a former French Foreign Legion base.

HORN OF AFRICA
• Command ship Mount Whitney - 700 sailors, 400 troops

Navy

Amphibious command ship Mount Whitney (LCC 20)
(Headquarters for Combined Joint Task Force Horn of Africa)
700 sailors
Blue Ridge class
Arrived off the Horn: about Dec. 14
Homeport: Norfolk, Va.

Marine Corps

Combined Joint Task Force Horn of Africa
(Headquartered aboard amphibious command ship Mount Whitney)
400 troops from all branches in task force command element
Mission: Cut off terrorists using the Horn of Africa as a regional transit point. The Horn of Africa and neighboring Yemen, Kenya and Sudan have been cited as security concerns by the United States.
Task force commander: Maj. Gen. John Sattler, commander of 2nd Marine Division, Camp Lejeune, N.C.
Arrived off the Horn: about Dec. 14

Source: Adapted from Military City.com, "Order of Battle: A Closer Look At Military forces in the Middle East, "http://www.militarycity.com/map/, accessed March 19, 2003, and material provided by Brian Hartman of ABC News.

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Task Force Ironhorse (US Forces Originally Planned for Turkey, Deploying to Gulf from Early April On)

In total, the task force will have roughly 30,000 troops, 500 vehicles and 18-attack helicopters. Major units include:

Army 4th Infantry Division

- NICKNAMES: "Iron Horse," "Ivy Division"
- TROOPS: About 12,500 soldiers.
- EQUIPMENT: M1A1 tanks. Bradley Fighting Vehicles. Army's most modern, computerized division. Helicopters.
- STATUS: 16,000 pieces of equipment has sat off the coast of Turkey for more than a month. Diverted through Suez Canal, all equipment expected to be offloaded in Kuwait by middle of April. Soldiers moving this week.
- COMMANDER: Major Gen. Raymond Odierno
- HOMEBASE: Fort Hood, TX

Army 3rd Armored Cavalry Regiment

- NICKNAME: "Brave Rifles"
- TROOPS: More than 5,000 soldiers.
- EQUIPMENT: M1A2 Abrams, M3A2 Cavalry Fighting Vehicles, M109 Howitzers. Also conventional Apaches and Kiowa Warrior
- helicopters.
- STATUS: Farewell ceremony a couple days ago. Leaving anytime. More than two million square feet of equipment loaded out of Corpus Christi, TX is starting to arrive in Kuwait now and should be fully there by the first week of April.
- HOMEBASE: Fort Carson, CO

13th Corps Support Command

- NICKNAME: "Phantom Support"
- TROOPS: 3,500 have deployed already
- EQUIPMENT: Logistics and medical support.
- HOMEBASE: Fort Hood, TX

Source: Brian Hartman, ABC News

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British Forces in the Iraq War as Reported by the British Ministry of Defense[239]

Overall, some 45,000 personnel involved.

British Naval and Amphibious Forces

British Naval Task Group 2003

Personnel: More than 4,000

Home port: Portsmouth, England

Deployed to: Mediterranean Sea

Units: The task force is headed by aircraft carrier HMS Ark Royal, accompanied by helicopter carrier HMS Ocean, destroyers HMS Liverpool, HMS Edinburgh, HMS York, an unidentified nuclear-powered submarine and 11 other support ships.

The amphibious force deploying with the ships numbers 4,000 and includes the 40th Commando Royal Marines, 42nd Commando Royal Marines, Headquarter 3rd Commando Brigade and helicopter air groups aboard Ark Royal and Ocean.

HMS Ark Royal leaves Portsmouth, England, on January 13, 2003, at the head of Naval Task Group 2003.
The fifth vessel to bear the proud name. Ark Royal was built by Swan Hunters Ship Builders' yard at Wallsend in December 1978 and launched by Her Majesty Queen Elizabeth the Queen Mother. HMS Ark Royal was accepted into service on July 1 1985. HMS Ark Royal is larger than her 2 sisters, Invincible and Illustrious, at 210 metres (683 feet) long. She has a maximum beam of 36 metres (117 feet) and a displacement of 20,000 tonnes. 4 Olympus gas turbine engines (like Concorde's) propel the ship, which give a maximum speed in excess of 30 knots. A steeper ski jump than in the other ships of this class is fitted at the forward end of the flight deck. HMS Ark Royal is planned to remain in active service until 2015 when the next generation of aircraft carriers will enter service.

Duties: The task force is one of the largest military deployments ordered by Great Britain since the 1982 Falklands War.

Naval Task Group 2003, was augmented to provide a significant maritime and amphibious capability. The Task Group comprised:

* HMS Ark Royal (aircraft carrier)
* HMS Ocean (helicopter carrier)
* HMS Liverpool (Type 42 destroyer)
* HMS Edinburgh (Type 42 destroyer)
* HMS York (Type 42 destroyer)
* HMS Marlborough (Type 23 frigate)
* HMS Richmond (Type 23 frigate)
* HMS Grimsby (mine-hunter)
* HMS Ledbury (mine-hunter)
* RFA Argus
* RFA Sir Tristram
* RFA Sir Galahad
* RFA Sir Percivale
* RFA Fort Victoria
* RFA Fort Rosalie
* RFA Fort Austin
* RFA Orangeleaf
* plus a Fleet Submarine

The amphibious force numbered some 4,000 and includes:

* HQ 3 Commando Brigade
* 40 Commando Royal Marines

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* 42 Commando Royal Marines
* Helicopter air groups aboard Ark Royal and Ocean

Some 14 other Royal Navy and Royal Fleet Auxiliary vessels were also involved in the operation to some extent, including ships such as HMS Chatham that was assigned to the enforcement of United Nations sanctions, and an additional pair of minehunters, HMS Brocklesby and HMS Blyth.

British Land Forces

Soldiers: 26,000

Home garrison: Herford, Germany

Units: The division includes the 7th Armored Brigade, 16th Air Assault Brigade, 102nd Logistics Brigade and various support units.

Duties: A heavy armor division, the 1st includes the 7th Armored Brigade, nicknamed "Desert Rats," and the 16th Air Assault Brigade, which is a combination of helicopter and parachute units designed to open or secure points of entry for other land or air forces.

Elements of the division were deployed to the Persian Gulf during the 1991 Persian Gulf War and the division has sent units to Kosovo as a part of U.N. peacekeeping efforts.

The primary units being deployed in whole or in part include:

1(UK) Armored Division:

* Headquarters and 1 Armored Division Signal Regiment
* 30 Signal Regiment (strategic communications)
* The Queen's Dragoon Guards (reconnaissance)
* 1st Battalion The Duke of Wellington's Regiment (additional infantry capability)
* 28 Engineer Regiment
* 1 General Support Regiment, Royal Logistic Corps
* 2 Close Support Regiment, Royal Logistic Corps
* 2nd Battalion, Royal Electrical & Mechanical Engineers
* 1 Close Support Medical Regiment
* 5 General Support Medical Regiment
* 1 Regiment, Royal Military Police
* plus elements from various units including:
    o 33 Explosive Ordnance Disposal Regiment
    o 30 Signal Regiment
    o 32 Regiment Royal Artillery (Phoenix UAVs)

7th Armored Brigade:

* Headquarters and Signal Squadron:
* Royal Scots Dragoon Guards (Challenger 2 tanks)
* 2nd Royal Tank Regiment (Challenger 2 tanks)
* 1st Battalion The Black Watch (Warrior infantry fighting vehicles)
* 1st Battalion Royal Regiment of Fusiliers (Warrior infantry fighting vehicles)
* 3rd Regiment Royal Horse Artillery (AS90 self-propelled guns)
* 32 Armored Engineer Regiment
* plus elements from various units including:
    o Queen's Royal Lancers (Challenger 2 tanks)
    o 1st Battalion Irish Guards (Warrior infantry fighting vehicles)
    o 1st Battalion The Light Infantry (Warrior infantry fighting vehicles)
    o 26 Regiment Royal Artillery
    o 38 Engineer Regiment

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16 Air Assault Brigade:

* Headquarters and Signal Squadron
* 1st Battalion The Royal Irish Regiment
* 1st Battalion The Parachute Regiment
* 3rd Battalion The Parachute Regiment
* 7 (Para) Regiment Royal Horse Artillery (105mm Light Guns)
* 23 Engineer Regiment
* Household Cavalry Regiment (1 x armored reconnaissance squadron)
* 3rd Regiment Army Air Corps (Lynx & Gazelle helicopters)
* 7 Air Assault Battalion, Royal Electrical & Mechanical Engineers
* 13 Air Assault Support Regiment, Royal Logistic Corps
* 16 Close Support Medical Regiment
* 156 Provost Company RMP

102 Logistics Brigade:

* Headquarters
* 2 Signal Regiment
* 36 Engineer Regiment
* 33 and 34 Field Hospitals
* 202 Field Hospital (Volunteer)
* 4 General Support Medical Regiment
* 3 Battalion, Royal Electrical & Mechanical Engineers
* 6 Supply Regiment, Royal Logistic Corps
* 7 Transport Regiment, Royal Logistic Corps
* 17 Port & Maritime Regiment, Royal Logistic Corps
* 23 Pioneer Regiment, Royal Logistic Corps
* 24 Regiment, Royal Logistic Corps
* 5 Regiment, Royal Military Police
* specialist Royal Engineer teams
* airfield engineer support units from 12 Engineer Brigade
* elements from 11 Explosive Ordnance Disposal Regiment
* elements from additional Royal Logistic Corps Regiments

Air Forces

Personnel: 7,000

Home base: Multiple Royal Air Force bases in Great Britain.
Aircraft: The deployment includes 100 fixed-wing aircraft.

Duties: The aircraft being deployed include including E3D Sentry aircraft for airborne command and control; Jaguar GR3 fighters and Tornado GR4 bombers in reconnaissance mode; VC10 and Tristar air-to-air refueling aircraft; Hercules transport aircraft; Tornado F3 air defense aircraft with the newly integrated ASRAAM missile; and Tornado GR4 bombers and Harrier GR7 fighters to provide offensive capability, including precision-guided weapons.

The RAF's Joint Helicopter Command also will provide helicopter support, consisting of 27 Puma and Chinook helicopters and about 1,100 personnel.

The air component being deployed on Operation Telic numbers about 100 fixed-wing aircraft and 27 support helicopters, supported by some 7,000 personnel. Aircraft types involved include:

* Sentry AEW1 command & control aircraft
* Tornado GR4 bomber/reconnaissance aircraft
* Jaguar GR3 attack/reconnaissance aircraft
* Harrier GR7 attack aircraft
* Tornado F3 air defense aircraft
* VC-10 tanker aircraft
* Tristar tanker aircraft
* Hercules transport aircraft

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* Nimrod maritime patrol aircraft
* Chinook helicopters
* Puma helicopters

RAF Regiment units provided ground defense for the force. The Army's 21 Signal Regiment provided communications support for the Joint Helicopter Force.

Notes:
HMS Ark Royal was capable of operating the new Merlin helicopter RAF Chinook helicopters were also embarked in Ark Royal
HMS Liverpool and her Type 42 sister ships provided air defense cover
RAF Jaguars, upgraded to the GR3 standard, had improved attack and reconnaissance capabilities
The Tornado F3 was deployed for air defense duties, armed with AMRAAM, ASRAAM, Sidewinder and Sky Flash missiles
The Harrier GR7 was recently upgraded to carry Maverick precision attack missiles
RAF E-3D Sentry AEW1 aircraft provided airborne early warning, surveillance, and command & control capabilities
The Irish Guards gained valuable experience operating their Warrior vehicles in the Gulf during Exercise Saif Sareaa II in 2001
The all-terrain BV206 vehicles of 3 Commando Brigade were suited for desert warfare.
RAF tankers, such as the VC-10, were also able to refuel US Navy and Marine Corps aircraft. The Tristar tanker force allowed combat aircraft to be deployed rapidly around the world

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Australian Forces in the Iraq War in Operation Falconer as Reported by the Australian Ministry of Defense[240]

Australia's contribution to the coalition, known as Operation Falconer, involved about 2000 Australian Defense Force personnel.
These personnel were deployed in the Middle East under Operation Bastille, the forward deployments to prepare for potential operations against Iraq, and Operation Slipper, Australia's contribution to the war against terrorism.

Operation Falconer included:

- About 250 airmen and women and support crews deployed with a squadron of 14 F/A-18 Royal Australian Air Force Hornet fighter aircraft.
- About 150 personnel deployed with three RAAF C130 Hercules transport aircraft.
- About 150 personnel deployed with two P-3C Orion maritime patrol aircraft.
- An Air Forward Command Element of about 70 personnel responsible for coordinating air operations with coalition partners and providing national control of RAAF assets.
- Approximately 350 sailors and soldiers embarked on the sea transport ship HMAS Kanimbla with a Sea King helicopter, Army landing craft and Army air defense detachment and a specialist explosives ordnance team.
- About 600 personnel embarked on Royal Australian Navy frigates HMAS Anzac and Darwin, who have been part of the Multinational Interception Force enforcing United Nations sanctions against Iraq.
- A Navy clearance diver team capable of locating, rendering safe and disposing of mines.
- A Special Forces Task Group of about 500 personnel. The Task Group comprises an advance party including a Special Air Service squadron, CH-47 troop-lift helicopters and personnel from 5th Aviation Regiment, specialist troops to deal with the threat of weapons of mass destruction drawn from the newly-established Incident Response Regiment based at Holsworthy, New South Wales and a quick reaction support force drawn from the Holsworthy-based 4RAR Commando unit and a Combat Service Support Group that provides the essential logistic support necessary for all these elements to remain functional.
- An Australian National Headquarters of approximately 60 personnel, headed by the Australian National Commander, Brigadier Maurie McNarn.

Royal Australian Air Force
Units: A squadron of 14 F/A-18 Hornet fighter aircraft deployed on February 8 from RAAF base in Tindal, Northern Territory while three C-130 Hercules transports left from RAAF base in Richmond, New South Wales, on February 7.

An Air Forward Command Element responsible for coordinating air operations with coalition partners and providing national control of RAAF assets also has deployed. A small air force reconnaissance team was already in the Middle East to prepare for the F/A-18 deployments.

Duties: The F/A-18 Hornet fighter is designed for both air-to-air and air-to ground missions, including air combat, close air support of ground troops and interdiction of enemy supply lines, including maritime environments. The RAAF's Hornets are based at Williamtown, New South Wales, and Tindal, Northern Territory.

The full complement of ADF elements the Government has decided to forward deploy under Operation Bastille comprises about 2000 personnel:
Air Force Crest

A squadron of 14 F/A-18 Hornet fighter aircraft farewelled from RAAF base Tindal, Northern Territory, on Saturday 8 February 2003.

Three C130 Hercules transport aircraft farewelled from RAAF base Richmond, New South Wales, on Friday 7 February 2003.

An Air Forward Command Element responsible for coordinating air operations with coalition partners and providing national control of RAAF assets.

A small RAAF reconnaissance team already deployed to the Middle East who have been preparing for the possible deployment of the Hornets.

Royal Australian Navy: Navy Crest
Units: Sea transport ship HMAS Kanimbla left Sydney on January 23 carrying about 350 sailors and soldiers, a Sea King helicopter, Army landing craft, an Army air defense detachment and a specialist explosives ordnance team.

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A Navy clearance diver team capable of locating, rendering safe and disposing of mines left Sydney on February 14.

Duties: The Kanimbla will join frigates HMAS Anzac and Darwin in the Persian Gulf, where they are deployed as part of the multinational force enforcing the U.N. sanctions against Iraq.

Australian Army: Army Crest
An advance party for the Special Forces Task Group, including a Special Air Service squadron which was farewelled from Perth on 24 January 2003. Units: An advance party for the Special Forces Task Group, including a Special Air Service squadron, left Perth, Australia, on January 24. CH-47 transport helicopters and personnel from 5th Aviation Regiment deployed from Townsville on February 11.

Other Special Forces support elements deployed on February 14, including troops from the newly established Incident Response Regiment (IRR) based at Holsworthy, New South Wales, and a quick reaction support force drawn from the Holsworthy, Sydney-based 4th Battalion Royal Australian Regiment (Commando) unit.

Duties: The Special Air Service squadron is capable of providing long-range, small-group reconnaissance capability, and can also conduct limited direct-action offensive operations.

The IRR is a specialized unit for response to chemical, biological, radiological, nuclear or explosive incidents. It includes intelligence, signals, medical, nursing, ordnance, transport, electrical and mechanical engineers, scientists and catering officers. It has no offensive capability.

The 4th Battalion Royal Australian Regiment (Commando) is trained to operate in air, ground and maritime environments, and also has counterterrorism training.

CH-47 troop-lift helicopters and personnel from 5th Aviation Regiment farewelled from Townsville on Tuesday 11 February 2003.

Special Forces support elements that include:

- Specialist troops to deal with the threat of weapons of mass destruction drawn from the newly-established Incident Response Regiment based at Holsworthy, New South Wales.
- A quick reaction support force drawn from the Holsworthy-based 4RAR Commando unit.

These deployments will not affect the ADF's capability to respond effectively to contingencies in our region or at home.
Source: Australian Ministry of Defense

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Polish Forces in the Iraq War

On 17 March, after putting forward a motion by the Council of Ministers of the Republic of Poland, President Aleksander Kwasniewski agreed to use Polish Military Contingent as a component of international coalition for extorting realization by Iraq the UN Security Council Resolution 1441 from 8 November 2002 and earlier UN Security Council resolutions, connected with it.

The Polish Military Contingent comprised:

- Sub-unit of "GROM" (56 soldiers). It means strengthening of 24-people sub-unit participating in operation "Enduring Freedom" by adding 32 soldiers and changing the character of their engagement;

- Decontamination platoon (74 soldiers) with proper equipment;

- ORP "Czernicki" vessel (53 soldiers), that is already in the Persian Gulf, participating in "Enduring Freedom" operation.

The units sent included only professional soldiers doing permanent or contract service. A rule was accepted that all the soldiers agree in writing for participation in the operation, however, according to the law from 17 December 1998 about the rules of using Polish Armed Forces abroad: "In case of directing military units selected from Polish Armed Forces abroad for participation in a military conflict... - soldier's agreement is not required".
Soldiers to be "transferred" to the new contingent were e asked about their agreement once more.

The decontamination platoon was deployed beyond the territory of Iraq. The ORP "Czernicki" vessel did logistical tasks. Soldiers from unit "GROM", in accordance with their purpose, training and equipment, were used for special tasks. The authorities of MOD e made the greatest effort possible to equip Polish soldiers participating in international coalition in the best way within available means. All soldiers were additionally insured.

Moreover, Polish authorities, answering the USA request to Polish government, let American units, acting within that coalition, use Polish air space and use the right of land transit through the territory of Poland.

Source: Polish Ministry of Defense

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US Airpower in Recent Regional Conflicts

	Desert Storm	Serbia/ Kosovo	Afghanistan
Area of Operations in Square Miles	176,000	39,500	250,000
Length of War in Days	43	78	?
Total Sorties During Period Reported	118,700	37,500-38,000	29,000-38,000*
Percentage of Total Sorties Flown by US*	85	60	92
Offensive Strike Sorties	41,300	10,808-14,006[241]	17,500
Sorties per Day	2,800	200, climbing to 2,000	25, climbing to 200
Total Bombs Delivered*	265,000	23,000	22,000
Precision-Guided Bombs Delivered*	20,450	8,050	12,500
Percentage of Total Munitions that are Precision-Guided	7-8%	35%	56%
Percentage of Precision-Guided Weapons Delivered by US	89	80	99
Combat Losses	38	2	0

* Data based on Michael O'Hanlon and an estimate of 38,000 total sorties flown
Note: Significant definitional problems exist in making such counts and historical sources differ. This count is based on the work of Thomas Keaney at Johns Hopkins University and on an article authored by Michael E. O'Hanlon entitled "A Flawed Masterpiece" (Foreign Affairs, Vol. 81, No. 3, March/April 2002, p. 52). O'Hanlon evidently reports on a longer period than Keaney does.

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America's Involvement in Past Wars and Casualties

	Population	Military Personnel		Fatalities	
		Total	% of Pop	Total	% of Pop
Revolutionary War	3.5	200	5.7%	4,435	0.127%
War of 1812	7.6	286	3.8%	2,260	0.030%
Mexican War	21.1	79	0.4%	1,733	0.008%
Civil War					
Union	26.2	2,803	10.7%	110,070	0.420%
Confederate	8.1	1,064	13.1%	74,524	0.920%
Combined	34.3	3,868	11.1%	184,594	0.538%
Spanish-American War	74.6	307	0.4%	385	0.001%
World War I	102.8	4,744	4.6%	53,513	0.052%
World War II	133.5	16,354	12.2%	292,131	0.219%
Korean War	151.7	5,764	3.8%	33,651	0.022%
Vietnam War	204.9	8,744	4.3%	47,369	0.023%
First Persian Gulf War	260.0	2750	1.1%	148	0.000%

Source: American Academy of Arts and Scientists and Principal Wars in which the US Participated: US Military Personnel Serving
and Casualties, Washington Headquarters Services, Directorate for Information Operations and Reports, U.S. Department of Defense Records, Table 2–23. Casualties are limited to U.S. military forces.

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Total Direct Cost of Major Past Wars

	Total Direct Cost in $US billions		Per Capita Cost	Cost as % of Annual GDP
	[current $]	[2002 $]	[2002 $]	
Revolutionary War (1775 – 1783)	0.1 2	.2	447	63%
War of 1812 (1812 – 1815)	0.09	1.1	120	13%
Mexican War (1846 – 1848)	0.07	1.6	68	3%
Civil War (1861 – 1865)				
Union	3.2	38.1	1,357	84%
Confederate	2.0	23.8	2,749	169%
Combined	5.2	62.0	1,686	104%
Spanish American War (1898)	0.4	9.6	110	3%
World War I (1917 – 1918)	16.8	190.6	2,489	24%
World War II (1941 – 1945)	285.4	2,896.3	20,388	130%
Korea (1950 – 1953)	54.0	335.9	2,266	15%
Vietnam (1964 – 1972)	111.0	494.3	2,204	12%
First Persian Gulf War (1990 – 1991)	61.0	76.1	306	1%

Source: U.S. Commerce Department, Historical Statistics of the United States, Government Printing Office,1975, vol. 2, series Y, and Al Nofi, Statistical Summary: America's Major Wars at <http://www.cwc.lsu.edu/cwc/other/stats/warcost.htm>. Estimates in 2002 dollars are reflated using the GDP deflator. The costs include only costs to the U.S. federal budget and generally exclude postwar costs of veterans' pensions and health benefits.

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The House of Representatives and CBO Cost Estimate of the Cost of an Iraq War

House Estimate (In billions of 2002 dollars)

Cost Category	Persian Gulf	New Iraq War
Airlift/Sealift (Buildup)	10.6	6.6
Personnel & Personnel Support	21.5	11.3 – 13.4
Operating Support & Fuel	32.2	14.6 – 24.1
Investment	10.1	10.1
All Other	5.6	5.6
Subtotal, Cost of Defeating Iraq	*79.9*	*48.3 – 59.8*

Source: Assessing the Cost of Military Action Against Iraq: Using Desert Shield/Desert Storm as Basis for Estimates, an Analysis by the House Budget Committee, Democratic Staff, 23 September 2002

The CBO Estimate of Costs of Different Components of a War in Iraq for Heavy Ground Force Option (in billions of 2002 dollars)

Cost Category	Deployment (3 months)	First Month of Combat	Each Next Month of Combat	Redeployment (3 months)	Occupation (per month)
Personnel and personnel support	4.3	1.4	1.4	4.3	n.a.
Operations support	5.4	7.1	5.4	1.5	n.a.
Transportation	2.8	0.7	0.7	1.5	n.a.
Total	12.5	9.2	7.5	7.3	1.4 to 3.8

Source: Congressional Budget Office Study, Table 3. Congressional Budget Office, "Estimated Costs of a Potential Conflict with Iraq," September 2002, available at <http://www.cbo.gov/> ("CBO study").
Willliam D. Nordhaus comments that: The two studies come to a slightly different conclusion, which is not surprising given that they use completely different methodologies. A reasonable ballpark estimate based on these two studies is that the cost of a short and successful war would be around $50 billion. This compares with the cost of $80 billion (in 2002 dollars) for the first Persian Gulf war. Neither report estimates the costs of a protracted war. These costs would depend upon the length of the conflict, the extent to which it spread to other countries, and the need for the United States to devote more resources to the conduct of the war. In this situation, the conflict, including buildup and mopping up operations, might drag on for a year, and the United States might need to devote 50 percent more resources than in the "heavy ground" option analyzed by the CBO. In that case, the cost would rise from $50 billion to around $140 billion. While much larger, these military costs would still be only around 1.5 percent of GDP – on the scale of the Mexican or Spanish-American wars rather than the more costly Vietnam or Korean wars.

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The Oil Costs of the War (Pessimistic View) George L. Perry Estimate of Cost of War in Terms of Oil Supply Disruption

Cost Element	Baseline	Bad Case	Worse Case	Worst Case
World production shock (mbpd)	0	-3.5	-7	-10
Less: supply from reserves (mbpd)	0	2.5	2.5	2.5
Net supply change (mbpd)	0	-1	-4.5	-7.5
Crude oil prices ($/barrel)	25	32	75	161
Gasoline price ($/gallon)	1.60	1.76	2.78	4.84
Change in real GDP				
Percent	0.0%	0.6%	2.7%	4.6%
Billions (2002 $)	0	62	282	478

Source: George L. Perry, "The War on Terrorism, the World Oil Market and the US Economy," Brookings Institution, Analysis Paper #7, 24 October 2001, available at <http://www.brook.edu/views/ papers/perry/20011024.htm>.

William D. Nordhuas estimates that the impact of the "worse" oil shock is a reduction in real national income of $175 billion in the first year and $778 billion over the entire decade (the full results are shown in Table A-1 in the appendix). One-seventh of the decadal cost comes in higher cost of imported oil, while the balance comes in lower domestic production. For the first-year cost, $148 billion comes from the higher cost of imported oil and $27 billion in lower domestic output. The first-year numbers are considerably lower than Perry's estimates because they assume full employment, whereas Perry's GDP loss primarily arises from business-cycle impacts, which are analyzed in the next section. Our summary estimate is that an oil-price shock of the kind seen in the 1970s and assumed in Perry's "worse" case would have extremely adverse impacts totaling $778 billion over the decade following the war. The impact would be smaller if the price shock were smaller or more short-lived than assumed, and it would be larger if macroeconomic, economic, or political frictions were added to the irreducible minimum for the full-employment economy modeled here.

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Total Cost to the United States of a Potential War in Iraq (in billions of 2002 dollars) Under Best and Worst Case Assumptions

(Based on the work of William D. Nordhaus in the "Economic costs of a War with Iraq," in War With Iraq, American Academy of Arts and Sciences, 2003.

Source of Cost	Costs of War (billions of 2002 $) Low (short and favorable	High (protracted and unfavorable)
Direct military spending	$50	$140 [1]
Follow-on costs		
Occupation and peacekeeping	75	500 [2]
Reconstruction and nation-building	30	105 [3]
Humanitarian assistance	1	10
Impact on oil markets	-40	778 [4]
Macroeconomic impact	-17	391 [5]
Total	$99	$1,924

These costs are the total for the decade following the conflict (e.g., 2003–2012). Negative numbers are benefits.
Notes:
[1] Protracted conflict assumes that the monthly cost is 50 percent greater than the CBO estimate and that the conflict lasts 8 months longer.
[2] The low and high numbers assume, respectively, peacekeeper costs of $200,000 to $250,000 per peacekeeper per year, with the numbers from 75,000 to 200,000, and for periods of 5 to 10 years. [3] This includes, at the low end, reconstruction costs of $30 billion and minimal nation-building costs.
At the high end, it adds a "Marshall Plan for Iraq" as described in the text. [4] These estimates refer to a full-employment economy. The high estimate is based on Perry's "worse" or middle case, which assumes a production decline of 7 million bpd offset by withdrawals from reserves of 2.5 million bpd. The "happy" case assumes that OPEC increases production by 0.67 million bpd in the five years after the end of hostilities and that production stays at the higher level. The sign is negative to indicate a benefit or negative cost.
[5] The macroeconomic impact excludes the full-employment impacts in [4] and includes only the first two years of a cyclical impact.

The high case is a collage of potential unfavorable outcomes rather than a single scenario. It shows the array of costs that might be incurred if the war drags on, occupation is lengthy, nation-building is costly, the war destroys a large part of Iraq's oil infrastructure, there is lingering military and political resistance in the Islamic world to U.S. occupation, and there are major adverse psychological reactions to the conflict. The outer limit of costs would be around $1.9 trillion, most of which fall outside of the direct military costs. Be warned that this discussion vastly oversimplifies the analysis by constructing only two cases, whereas reality presents a dizzying array of outcomes. Returning to the metaphor of war as a giant roll of the dice, we might say that the United States could end up paying the low costs of around $100 billion if the dice come up favorably. If some dice come up unfavorably, the costs would lie between the low and the high cases. However, if the United States has a string of bad luck or misjudgments during or after the war, the outcome could reach the $1.9 trillion of the high case.

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[1] Sortie and munitions numbers shown here include CFACC strike and strike support missions; they do not include CFSOCC sorties or munitions or CFLCC and CFMCC helicopter and small fixed-wing sorties.

[2] Reporting by Stephen Trimble indicates that Air Force B-52s dropped six CBU-97 SFWs column of Iraqi vehicles moving south out of Baghdad on April 2nd. The Air Armament Center (AAC) has developed and fielded two versions of the weapon. The baseline SFW is anti-armor and identifies targets by sensing heat radiating from their engines. An upgraded variant - called the Pre-planned Product Improvement (P3I) SFW - can identify "cool" man-made objects that are not emitting a heat signature. Both versions are designed with a dispenser that ejects four BLU-109 canisters, each containing a "smart" skeet warhead, for a total of 40 bomblets. Each variant uses a different skeet. The baseline SFW's skeet munition is a solid warhead, but the P3I variant contains 16 tiny projectiles that create an effect similar to a shotgun blast. Air Force officials are discussing integrating a single smart skeet on unmanned aerial vehicles. The concept is to employ the roughly eight-pound projectile on individual targets without the cluster effect that is dangerous in urban warfare settings. The Army also is testing skeet for use with the Guided Multiple Launch Rocket System. See Stephen Trimble, "Pentagon Eyes Larger Role for Battle Tested Sensor Fused Weapon," Aerospace Daily, April 22, 2003.

[3] Many of the Iraqi war plan documents were captured but were not exploited at the time of this writing. See Los Angeles Times, April 25, 2003.

[4] Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003. The reader should note that the data in this report are not based on an analytic review, but on a listing of facts as collected. The scope of this report is 0300Z 19 March 2003 (ATO M/D-Day) until 0259Z 18 April 2003 (ATOP1/D+29), a total of 720 hours inclusive. All numbers are reported to the nearest level of certainty. Members of all US services, the United Kingdom, Australia and Canada contributed to the collection and collation of this data. "Total" figures presented represent peak numbers employed in the operation. In some cases, multiple sensors or aircraft were used simultaneously in slightly overlapping areas or methods; this is represented by indicating "hours of coverage/24 hour period." In these cases, the "total coverage" could exceed 24 hours in a given day due to the number of sensors available during that time period

[5] The data on Iraqi forces are taken largely from Anthony H. Cordesman, Iraq's Military Capabilities in 2002: a Dynamic Net Assessment, Washington, CSIS, September 20002. Also from the IISS, Military Balance, 2002/2003, and the Jane's Sentinel series, on-line edition, accessed March 2003.

[6] Where possible, the data on US force strengths and combat history are taken from the daily briefs of USCENTCOM at http://www.centcom.mil/, and from the data the US Department of Defense makes available at Defense Link, http://www.defenselink.mil/.

[7] The data on British forces in this section and the others in this book are taken largely from the British Ministry of Defense web page on Operation Telic. See http://www.operations.mod.uk/telic/index.htm/.

[8] The data on Australian forces in this section and the others in this book are taken largely from the Australian Ministry of Defense web page on Operation Falconer. See http://www.defence.gov.au/opfalconer/.

[9] Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[10] Jane's Sentinel Security Assessment, Iraqi Air Force, on-line edition, accessed May 7, 2002

[11] US Central Command, Atlas, 1996, MacDill Air Force Base, USCENTCOM, 1997, pp. 16-18.

[12] Washington Times, September 5, 1996, p. A-1.

[13] USCENTCOM briefing by "senior military official. For further background, also see Washington Times, February 1, 1997, p. A-13; Reuters, September 4, 1996, 0911; Jane's Pointer, November 1994, p. 2;

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Associated Press September 9, 1996, 0129; Washington Times, January 30, 1997, p. A-3; February 1, 1997, p. A-13; The IISS, Military Balance, 2002/2003, and Jane's Sentinel: The Gulf States, "Iraq," on-line edition, accessed March 2003; Andrew Rathmell, The Changing Balance in the Gulf, London, Royal United Services Institute, Whitehall Papers 38, 1996; Edward B. Atkenson, The Powder Keg, Falls Church, NOVA Publications, 1996; Geoffery Kemp and Robert E. Harkavy, Strategic Geography and the Changing Middle East, Washington, Carnegie Endowment/Brookings, 1997; and Michael Eisenstadt, Like a Phoenix from the Ashes? The Future of Iraqi Military Power, Washington, The Washington Institute, Policy Paper 36, 1993.

[14] The main source for these data is Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003. The US Department of Defense has not published precise data in some of these areas. Some of the figures used at taken from Military City, http://www.militarycity.com/map/, and others from the Washington Post, April 20, 2003, p. A20.

[15] The main source for these data is Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[16] The main source for these data is Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003. Some adjustments have been made in the numbers to try to exclude allied aircraft, but the totals do not allow this to been done for some types.

[17] The main source for these data is Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003. These figures do not include special forces, US army helicopter attack, and coalition sovereignty sorties.

[18] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[19] The reader should be aware that these estimates are extremely uncertain and are based largely on expert estimates of the losses during the Gulf War. There is a sharp difference of opinion among some US experts as to the size of Iraq's losses during the conflict. The US Central Command listed 150 SA-2 launchers, 110 SA-3 launchers, 150 SA-6/SA-8 launchers, 30 Roland VII launchers, and 5 Crotale launchers in Atlas, 1996, MacDill Air Force Base, USCENTCOM, 1997, pp 16-18. Also see the IISS, Military Balance, 2002/2003, and the Jane's Sentinel series, on-line edition, accessed March 2003.

[20] Anthony H. Cordesman, Iraq's Military Capabilities in 2002: a Dynamic Net Assessment, Washington, CSIS, September 20002. Also see Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, pp. 121-127. March, 1993; Jane's Sentinel: The Gulf States, "Iraq," London, Jane's Publishing, 1997.

[21] USCENTCOM briefing by "senior military official,; The IISS, Military Balance, 2002/2003, and the Jane's Sentinel series, on-line edition, accessed March 2003..

[22] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[23] Based on work by Brian Hartman of ABC News.

[24] US basing areas and facilities in Kuwait included:

- Ahmed Al Jaber Air Base - AF
- Ali Al Salem Air Base - AF
- Camp Arifjan - Army, Marines
- Camp Commando - HQ, Marines
- Camp Doha - CFLCC HQ

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- Failaka Island - 82nd Airborne
- Camp Matilda - Marines
- Camp Grisley - Marines
- Camp Shoup - Marines
- Camp Peleliu - Marines
- Camp Coyote - Marines
- Camp New Jersey - 3rd ID
- Camp New York - HQ, Army 3rd ID
- Camp Pensylvania - 3rd ID
- Camp Virginia - 3rd ID
- Kuwait IAP - AF?
- LSAs [Several "Living Support Areas"] - Marines
- Udairi Range

[25] Washington Post, April 20, 2003, p. A20.

[26] Washington Post, April 20, 2003, p. A20; London Daily Telegraph, March 17, 2001, p. 1..

[271] Earlier estimates by US Central Command (USCENTCOM) indicate that the Iraqi land forces had a total mobilizable strength of 700,000 personnel, including reserves. These estimates indicate that Iraq's major combat formations included 17 regular army divisions (6 heavy and 11 light), and 6 Republican Guards Divisions (3 heavy and 3 light). USCENTCOM also estimated that the total Iraqi Army order of battle include six armored divisions, 4 mechanized divisions, 10 infantry divisions, 2 Special Forces divisions, 1 Special Republican Guards or Presidential Guard Division, 19 reserve brigades, 15 People's Army Brigades, and 25 helicopter squadrons..

[28] Estimate first provided by USCENTCOM in June, 1996 plus later interviews.

[29] USCENTCOM briefing by "senior military official.

[30] London Daily Telegraph, July 19, 2002, p. 1.

[31] Based on interviews; Anthony H. Cordesman, Iraq's Military Capabilities in 2002: a Dynamic Net Assessment, Washington, CSIS, September 20002; and material in the Jane's Sentinel series on Iraq, on-line edition, accessed March 2003.

[32] Based on interviews; Anthony H. Cordesman, Iraq's Military Capabilities in 2002: a Dynamic Net Assessment, Washington, CSIS, September 20002; and material in the Jane's Sentinel series on Iraq, on-line edition, accessed March 2003.

[33] USCENTCOM briefing by "senior military official."

[34] Elliot Blair Smith, "Marine Tanks May Fire First Shots," USA Today, March 18, 2003, p. 5.

[35] These estimates are based primarily on interviews; Anthony H. Cordesman, Iraq's Military Capabilities in 2002: a Dynamic Net Assessment, Washington, CSIS, September 20002; and material in the Jane's Sentinel series on Iraq, on-line edition, accessed March 2003.

[36] "Interview: General Richard Myers," Defense News, April 14, 2003, p. 46.

[37] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[38] "Interview: General Richard Myers," Defense News, April 14, 2003, p. 46.

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[39] Steven Komarow, "General Recounts Key Moments in Baghdad's Fall, USA Today, April 14, 2003, p. 5.

[40] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[41] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[42] March 22, 2003, USCENTCOM Release Number: 03-03-44

[43] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[44] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[45] For a good description of Iraq attitudes and the combined impact of such runs and Coalition air attacks, see William Branigan, "A Brief Bitter War for Iraq's Military Officers," Washington Post, April 27, 2003, p. A25.

[46] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[47] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[48] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[49] Steven Komarow, "General Recounts Key Moments in Baghdad's Fall, USA Today, April 14, 2003, p. 5.

[50] Steven Komarow, "General Recounts Key Moments in Baghdad's Fall, USA Today, April 14, 2003, p. 5.

[51] The sortie and munition numbers shown here include CFACC strike and strike support missions; they do not include CFSOCC sorties or munitions or CFLCC and CFMCC helo and small fixed-wing sorties.

[52] David E. Sanger, "President Says Military Phase in Iraq Has Ended," New York Times, May 2, 2003, p. 1; Karen DeYoung, "Bush Proclaims Victory in Iraq," Washington Post, May 2, 2003, p. 1.

[53] Mark Helprin, "Analyze This: Civilian Officials Only Reached a Point of Sufficiency Because They Were Pushed to It," National Review, May 5, 2003.

[54] Rowland Scarborough, "Decisive Force Now Measured by Speed," Washington Times, May 7, 2003, p. 1

[55] For an anti-Rumsfeld critique, see Seymour M. Hersh, "Offense and Defense," New Yorker, April 7, 2003, pp. 43-45.

[56] Department of Defense briefing on April 23, 2003, http://www.defenselink.mil/transcripts/2003/tr20030423-0122.html.

[57] Vernon Loeb, "Commander Defends Iraq War Comments," Washington Post, May 8, 2003, p. 18; Roland Scarborough, "General Tells How Cell Phone Foiled US attack in Iraq," Washington Times, May 8, 2003, p. 13.

[58] Interview with James Kitfield, "Attack Always," in National Journal, April 25, 2003.

[59] There is no way to even begin to list all of the reports and studies over the years which helped shape the forces, tactics, and technologies used in the Iraq War and the current force transformation debate. Some recent works include Dr. Harlan K. Ullman and Dr. James P. Wade, Rapid Dominance, A Force for All Seasons, London, RUSI Whitehall Series, 1998; Douglas A. Macgregor, Breaking the Phalanx, Westport, Praeger, 1997; and Stephen A. Cambone, A New Structure for National Security Planning, Washington, CSIS, 1997; Hans Binnendijk, Transforming America's Military, Washington, National Defense

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University, 2002; Tom Czerwinkski, Coping with the Bounds: Speculations on Nonlinearity in Military Affairs, Washington, National Defense University, 1998; Daniel Goure and Jeffrey M. Rankin, Averting the Defense Trainwreck, Washington, CSIS, 1999; and Michael O'Hanlon, Technological Change and the Future of Warfare, Washington, Brookings, 2000.

[60] Taken for the testimony of deputy Secretary of Defense Paul Wolfowitz to the Senate Armed Services Committee, April 27, 2002.

[61] This summary is adapted from Toby Harnden, "Fight Light Fight Fast Theory Advance," Daily Telegraph, April 14, 2001, p. 1.

[62] Brad Knickerbocker, "War Boosts Rumsfeld's Vision of an Agile Military," Christian Science Monitor, April 11, 2003. For a more general discussion of factors relating directly to the Iraq War, see Greg Jaffe, "Rumsfeld's Vindication Promises a Change in Tactics, Deployment," Wall Street Journal, April 10, 2003, p. 1.

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[65] For a fuller discussion, see Merrick E. Krause "Decision Dominance: Exploiting Transformational Asymmetries," Defense Horizons, Washington, NDU, February 2003.

[66] For some of the press debate over these issues contemporary with the Iraq War, see Vince Crawley, "Less is More," Army Times, April 21, 2003, p. 18; Mark Mazzetti and Richard J. Neuman, "The Seeds of Victory," US News & World Report, April 21, 2003; Toby Harnden, "Fight Light Fight Fast Theory Advance," Daily Telegraph, April 14, 2001, p. 1; Vago Muradian and Riad Kahwaji, "War Puts Transformation to the Test, Defense News, March 24, 2003, p, 1.

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[69] Interview with James Kitfield, "Attack Always," in National Journal, April 25, 2003.

[70] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003, and Anthony H. Cordesman and Abraham R. Wagner, The Lessons of Modern War, Volume IV, The Gulf War, Boulder, Westview, 1996, p. 443.

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[72] "Interview: General Richard Myers," Defense News, April 14, 2003, p. 46.

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[74] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[75] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

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[79] William B, Scott, "Milspace will be Major Player in Gulf War 2," Aviation Week & Space Technology, January 12, 2003.

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[84] Stephen Trimble, "GPS is Surviving Jamming Threat, Pentagon Says," Aerospace Daily, April 22, 2003; David Whitman, "Keeping Our Bearings," US News & World Report, October 21, 2002.

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[86] Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003.

[87] Department of Defense briefing on April 23, 2003, http://www.defenselink.mil/transcripts/2003/tr20030423-0122.html.

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[103] Department of Defense briefing on April 23, 2003, http://www.defenselink.mil/transcripts/2003/tr20030423-0122.html.

[104] Frank Tiboni, "US, UK Troops Carry Force Trackers," Defense News, March 24, 2003, p. 6; Kim Burger, "US Army Shares Radios to Avoid Fratricide, " Jane's Defense Weekly, March 12, 2003; Vernon Loeb, "Digitized Battlefield Puts Friend and Foe In Sight, Washington Post, March 3, 2003, p. 15.

[105] Frank Tiboni, "US, UK Troops Carry Force Trackers," Defense News, March 24, 2003, p. 6; Kim Burger, "US Army Shares Radios to Avoid Fratricide, " Jane's Defense Weekly, March 12, 2003...

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[107] The US did have an inventory capable of supporting two major regional contingencies. At the end of the Iraq war, the US still had some 17,000 JDAMs, 25,000 laser guided bombs, and 6,500 Wind corrected Munitions. The war consumed roughly 30% of US TLAM assets. Inside the Air Force, April 11, 2003, p. 3.

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[121] David A. Fulghum, "Opening Night in Baghdad," Aviation Week & Space Technology, March 21, 2003.

[122] Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom – By the Numbers, "USCENTAF, Assessment and Analysis Division, April 30, 2003

[123] This compares with a total force of 42 F-117s that flew 1,300 missions in the Gulf War.

[124] Eric Schmitt, "High Tech Fighter Pilots Recount Exploits," New York Times, April 25, 2003.

[125] This compares with a total force of 42 F-117s that flew 1,300 missions in the Gulf War.

[126] Eric Schmitt, "High Tech Fighter Pilots Recount Exploits," New York Times, April 25, 2003.

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[133] For examples, see Robert Wall, "Foss Field," Aviation Week, March 22, 2003, and David Hughes, "Heavy Lift as War Looms, Aviation Week, March 9, 2003.

[134] Douglass Barrie, "Storm Trials," Aviation Week, March 31, 2003, pp. 25-

[135] Barton Gellman, "Frustrated, U.S. Arms Team to Leave Iraq: Task Force Unable To Find Any Weapons," Washington Post, May 11, 2003, p. A1.

[136] This description is adapted from http://www.fas.org/nuke/guide/usa/bomber/calcm.htm.

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[137] Tony Capaccio, "Raytheon Tomahawks Miss Few Iraqi Targets, Navy Says," Bloomberg News, April 12, 2003.

[138] The Joint Direct Attack Munition (JDAM) is a guidance tail kit that converts existing unguided free-fall bombs into accurate, adverse weather "smart" munitions. With the addition of a new tail section that contains an inertial navigational system and a global positioning system guidance control unit, JDAM improves the accuracy of unguided, general purpose bombs in any weather condition. The navigation system is initialized by transfer alignment from the aircraft that provides position and velocity vectors from the aircraft systems.

It uses the 2,000-pound BLU-109/MK 84, 1,000-pound BLU-110/MK 83 warhead, or new MK-82 500-pound warhead as the payload. JDAM enables employment of accurate air-to-surface weapons against high priority fixed and relocatable targets from fighter and bomber aircraft.

Once released from the aircraft, the JDAM autonomously navigates to the designated target coordinates. Target coordinates can be loaded into the aircraft before takeoff, manually altered by the aircrew before weapon release, and automatically entered through target designation with onboard aircraft sensors. In its most accurate mode, the JDAM system will provide a weapon circular error probable of 13 meters or less during free flight when GPS data is available. If GPS data is denied, the JDAM will achieve a 30-meter CEP or less for free flight times up to 100 seconds with a GPS quality handoff from the aircraft.

JDAM can be launched from very low to very high altitudes in a dive, toss and loft or in straight and level flight with an on-axis or off-axis delivery. JDAM enables multiple weapons to be directed against single or multiple targets on a single pass. JDAM is currently compatible with B-1B, B-2A, B-52H, F-16C/D and F/A-18C/D, the A-10 F-15E, F-22, F-117, AV-8B, F-14A/B/D, F/A-18E/F, S-3, and the Joint Strike Fighter.

Desert Storm highlighted a shortfall in air-to-surface weapon capability. Adverse weather conditions limited employment of precision guided munitions. Unguided weapon accuracy was also degraded when delivered from medium and high altitudes. Research and development of an "adverse weather precision guided munition" began in 1992. The first JDAMs were delivered in 1997 with operational testing conducted in 1998 and 1999. More than 450 JDAMs were dropped during testing, recording an unprecedented 95 percent system reliability while achieving a 9.6-meter accuracy rate. JDAM and the B-2 made their combat debuts during Operation Allied Force. The B-2s, flying 30-hour, nonstop, roundtrip flights from Whiteman Air Force Base, Mo., delivered more than 600 JDAMs during Allied Force. The Navy is currently studying the effects of adding enhancements such as improved GPS accuracy, a precision seeker for terminal guidance and additional warheads.

Source: http://www.af.mil/news/factsheets/JDAM.html

[139] Arnaud de Borchgrave, "War by Remote Control," Washington Times, April 28, 2003, p. 17.

[140] Source: http://www.fas.org/man/dod-101/sys/dumb/cbu-97.htm; http://www.globalsecurity.org/military/systems/munitions/cbu-105.htm; and http://news.bbc.co.uk/1/hi/world/americas/2911327.stm.

[141] Adapted from http://www.globalsecurity.org/military/systems/munitions/agm-154.htm.

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[143] Carol Rosenberg and Matt Schofield, "Bombs Sow Rage in Baghdad," Philadelphia Inquirer, April 16, 2003; Laura King, "Bombing Ends But not Danger," Los Angeles Times, April 22, 2003, p. 1; Paul Watson, "Lack of Data Slowing Cluster bomb cleanup," Los Angeles Times, April 27, 2003.

[144] Department of Defense, Transcript, Press Briefing, Secretary Rumsfeld and General Myers, April 25, 2003, http://www.defenselink.mil/transcripts/2003/tr20030425-secdef0126.html

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[147] Gail Kaufman, "B-52 Gets Refits for New Roles, Defense News, March 24, 2003, p. 18.

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[153] Gail Kaufman, "USAF to Speed Long-Range strike by 2012," Defense News, April 7, 2003, p. 20.

[154] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[155] This description is adapted from the USAF data base at http://www.airforce-technology.com/projects/jstars/.

[156] The 116th Air Control Wing operates the JSTARS aircraft at Robins Air Force Base in Georgia. The 116th is a new "blended wing" with both Air Force and Air National Guard personnel.

[157] On a standard mission the aircraft has a crew of 21 with three flight crew and 19 systems operators. On a long endurance mission the aircraft has a crew of 34, with 6 flight crew and 28 system operators. The Boeing 707-300 series aircraft is the JSTARS airframe. The aircraft are remanufactured at Northrop Grumman in Lake Charles, Louisiana, then transferred to the Battle Management Systems Division in Melbourne, Florida where the electronics are installed and tested. The propulsion system of the JSTARS aircraft consists of four Pratt and Whitney JT3D-3B turbojet engines, each providing 18,000 pounds of thrust.

[158] Eric Schmidt, "In the Skies Over Iraq, Silent Observers Become Futuristic Weapons," New York Times, April 18, 2003; Marc Selinger, US Using More than 10 Types of UAVs," Aerospace Daily, April 22, 2003..

[159] The RQ-1 Predator is a medium-altitude, long-endurance unmanned aerial vehicle system. It is a Joint Forces Air Component Commander-owned theater asset for reconnaissance, surveillance and target acquisition in support of the Joint Force commander. It is a system, not just aircraft. A fully operational system consists of four aircraft (with sensors), a ground control station (GCS), a Predator Primary Satellite Link (PPSL), and 55 personnel for continuous 24 hour operations. The basic crew for the Predator is one pilot and two sensor operators. They fly the aircraft from inside the GCS via a C-Band line-of-sight data link or a Ku-Band satellite data link for beyond line-of-sight flight.

The first aircraft were equipped with a color nose camera (generally used by the aerial vehicle operator for flight control), a day variable aperture TV camera, a variable aperture infrared camera (for low light/night), and a synthetic aperture radar (SAR) for looking through smoke, clouds, or haze. The cameras produced full motion video and the SAR still frame radar images. The three sensors were carried on the same airframe but could not be operated simultaneously. The upgraded Predator carries the Multispectral Targeting System (MTS) with inherent AGM-114 Hellfire missile targeting capability, and integrates electro-optical, infrared, laser designator and laser illuminator into a single sensor package. These Predators cannot carry MTS and the SAR simultaneously. The aircraft carry and employ two laser-guided Hellfire anti-tank missiles with MTS.

Each Predator aircraft can be disassembled into six main components and loaded into a container nicknamed "the coffin." This enables all system components and support equipment to be rapidly deployed worldwide. The largest component is the GCS and it is designed to be rolled into a C-130. The air transportable PPSL consists of a 6.25 meter Ku-Band satellite system mounted on a trailer. It provides

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communications between the ground station and the aircraft when it is beyond line-of-sight and is a link into secondary intelligence dissemination networks.

The RQ-1B system needs 5,000 feet by 125 feet (1,524 meters by 38 meters) of hard surface runway with clear line-of-sight to each end from the GCS to the air vehicles. The RQ-1B includes an ARC-210 radio, an APX-100 IFF/SIF with Mode 4, an upgraded turbo-charged engine and an ice mitigation system.

Source: http://www.af.mil/news/factsheets/RQ_1_Predator_Unmanned_Aerial.html

[160] Source: http://www.af.mil/news/factsheets/global.html

[161] David A. Fulghum and Robert Wall, "Baghdad Confidential, Aviation Week, April 28, 2003, p. 32.

[162] Source: http://www.aerovironment.com/area-aircraft/prod-serv/pointer.html.

[163] Jonathan Finer, "With the Dragon Eye," Washington Post, March 7, 2003, p. A14.

[164] Adapted from http://www.globalsecurity.org/intell/systems/dragon-eye.htm.

[165] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[166] http://www.af.mil/news/factsheets/A_10_OA_10_Thunderbolt_II.html.

[167] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

[168] http://www.af.mil/news/factsheets/A_10_OA_10_Thunderbolt_II.html.

[169] Bradley Grahm and Vernon Loeb, "An Air War of Might, Coordination, and Risks, Washington Post, April 27, 2003, p. A1.

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