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The Lessons of the Iraq War:

Executive Summary

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INTRODUCTION

Some important lessons of the war are clear, and Secretary of Defense Donald Rumsfeld and General Tommy Franks, the commander of the US Central Command (USCENTCOM) and the overall commander of the coalition forces summarized these lessons in testimony to Congress on July 9, 2003. Secretary Rumsfeld summarized the key lessons as follows:¹

...In less than a month, they had developed and were executing a war plan for Afghanistan employing a range of capabilities—from the most advanced (such as laser-guided weapons), to the antique (40 year-old B-52s updated with modern electronics) to the rudimentary (a cavalry charge)—they and our Afghan and coalition allies drove the Taliban and al-Qaeda from power in a matter of months. The plan they developed for Operation Iraqi Freedom was even more innovative and transformational—employing an unprecedented combination of speed, precision, surprise, and flexibility.

The Iraqi regime very likely expected the war to begin, as did the 1991 Gulf War, with a sustained bombing campaign. Instead, General Franks started the ground attack before the air campaign—sending a large force of Special Operators into Western Iraq, followed by thousands of coalition forces streaming across the Kuwaiti border. Instead of a long march through the South, with pitch battles for each city along the way, they drove through to reach the gates of Baghdad in a matter of weeks—liberating the Iraqi capital and toppling theregime in less than a month.

The plan was adaptable and flexible, allowing General Franks and his team to turn difficulties into opportunities. For example, the inability of coalition forces to enter Iraq from the north was disappointing. But instead of bringing the 4th Infantry Division out of the Mediterranean to the Gulf, General Franks kept them in the Mediterranean—creating the impression in Baghdad that the attack would not start until the coalition could open the northern front. This very likely contributed to the surprise of the Iraqi regime when the war began without those forces in the fight.

One of the most interesting aspects of the campaign was the fact that the “lessons learned” process began before the war began. General Franks installed a “lessons learned” team from Joint Forces Command with his command from the start. They did more than take notes to improve our performance for the next war—they provided immediate feedback, allowing CENTCOM leadership to apply “lessons learned” in real time and improve coalition performance in *this* war.

I’ll leave it to General Franks describe in detail the lessons he believes are most important.

For my part, I’d say some key lessons so far include:

- The importance of *speed*, and the ability to get inside the enemy’s decision cycle and strike before he is able to mount a coherent defense;
- The importance of *jointness*, and the ability of U.S. forces to fight, not as individual de-conflicted services, but as a truly joint force—maximizing the power and lethality they bring to bear;
- The importance of *intelligence*—and the ability to act on intelligence rapidly, in minutes, instead of days and even hours;
- And the importance of *precision*, and the ability to deliver devastating damage to enemy positions, while sparing civilian lives and the civilian infrastructure.

Another lesson is that in the 21st century “overmatching power” is more important than “overwhelming force.” In the past, under the doctrine of overwhelming force, force tended to be measured in terms of mass—the number of troops that were committed to a particular conflict. In the 21st century, mass may no longer be the best measure of power in a conflict. After all, when

Baghdad fell, there were just over 100,000 American forces on the ground. General Franks overwhelmed the enemy not with the typical three to one advantage in mass, but by overmatching the enemy with advanced capabilities, and using those capabilities in innovative and unexpected ways.

General Franks added the following points:²

Decisive combat in Iraq saw a maturing of joint force operations in many ways. Some capabilities reached new performance levels. From a Joint Integration perspective, our experience in Operations Southern and Northern Watch, and Enduring Freedom helped to develop a joint culture in our headquarters and in our components. These operations helped to improve joint interoperability and improve our joint C4I networks as joint force synergy was taken to new levels of sophistication.

Our forces were able to achieve their operational objectives by integrating ground maneuver, special operations, precision lethal fires and non-lethal effects. We saw for the first time integration of forces rather than deconfliction of forces. This integration enabled conventional (air, ground, and sea) forces to leverage SOF capabilities to deal effectively with asymmetric threats and enable precision targeting simultaneously in the same battle space.

Likewise, Special Operators were able to use conventional forces to enhance and enable special missions. Operational fires spearheaded our ground maneuver, as our forces sustained the momentum of the offense while defeating enemy formations in open, complex, and urban terrain.

We saw jointness, precision munitions, C2, equipment readiness, state of training of the troops, and Coalition support as clear "winners" during Operation Iraqi Freedom (OIF).

That said, we also identified a number of areas which require additional work. Fratricide prevention suffered from a lack of standardized combat identification. Units in theater arrived with seven different combat ID systems, and our commanders were forced to overcome these shortcomings "on the fly". Deployment planning and execution were cumbersome, and need to be improved to meet the operational demands of the 21st Century. And, Coalition information sharing must be improved at all levels. Finally, human intelligence and communications bandwidth are also areas which will require continuing focus.

General Franks also noted that there were a number of important lessons learned during Operation Enduring Freedom (OEF) in Afghanistan that carried over into Operation Iraqi Freedom (OIF):³

... we saw a number of functional areas and capabilities that reached new levels of performance. In some areas, improvements were made prior to Operation Iraqi Freedom. For example the DoD/CIA synergy which worked well during OEF was built upon the integration of liaison officers in each of our headquarters which facilitated teamwork and paid great dividends in Iraq.

Also, we continued to leverage coalition strengths as new Coalition members were added. "The mission determines the Coalition; the Coalition does not determine the mission." Advanced technologies employed during OEF were also critical. The command and control of air, ground, naval, and SOF from 7,000 miles away was a unique experience in warfare as our forces achieved unprecedented real time situational awareness and C2 connectivity. We learned that precision-guided munitions represent a force multiplier. Low collateral damage during both OEF and OIF was a fundamental factor in achieving our objectives. Early in OEF we saw the need for an unmanned sensor-to-shooter capability to support time-sensitive targeting (TST). The armed Predator demonstrates great potential and will be a high payoff system in the future. Blue Force Tracking and enhanced C4I systems increase lethality and decrease response time, and also represent transformational technologies. We will continue with development of Global Hawk as an unmanned, high-altitude, long loiter time, beyond line-of-sight multi-sensor UAV, and will work to incorporate laser designation and delivery of precision weaponry from that platform.

The integrated common operating picture (COP) was a very powerful tool. Tracking systems were previously Service unique. Workarounds were developed for OIF, but there is a need to develop one integrated, user-friendly, C4I architecture that captures blue and red air, ground and maritime forces.

Strategic lift and tanker aircraft availability were stretched during OEF and OIF. These forces are critical to rapid future force projection and we must enhance this vital capability in the years ahead.

Combined and joint training of our forces was also a key factor during OEF and was carried over into OIF. Our military forces are the best-prepared forces in the world and I thank the members of Congress for providing assets and funding to train these wonderful fighting men and women to give them every possible advantage. Finally, our ability to take action in OEF was predicated on "Strategic Anchors," one of which was "Cooperative Security" relationships, which paid high dividends in basing, staging and overflight rights during the present crisis.

Analyzing the More Detailed Lessons

No one can quarrel with these broad lessons. They have been validated in separate studies of the lessons of the war by the British Ministry of Defense, and the US military services, and they are validated in detail by the analysis in this book. At the same time, 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 is often cumulatively critical to a realistic understanding of what has actually occurred and its lessons for the future.

While it is possible to draw conclusions about many of the broader lessons of the war, there are other lessons 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 WAR PLAN AND TRANSFORMATION DEBATE

The previous comparisons of U.S. and British forces with those of Iraq, and the history of the Iraq War, clearly reflect the transformational character of Coalition forces. The outcome of the Iraq War both demonstrated the value of many such transformations and resolved a debate over one key set of lessons of the war that began even before the main battle for Baghdad.

As has been noted earlier, when the U.S. ground advance slowed in late March, a debate surfaced over charges that Secretary Rumsfeld had forced the U.S. military and USCENTCOM commander General Tommy Franks to accept much lower force levels than they originally had 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 issues over the military doctrine the United States should use in future force planning and whether the United States can now plan to use a “new way of war” that need to be put in careful perspective.

The “New Way of War” Debate

A far more relevant debate over the lessons of the Iraq War is the extent to which the 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 the U.S. and British forces and the Iraqi forces was the result of the fact that the United States was using a new mix of strategy, tactics, and technology and Iraq was not. As chapter 3 has shown, these changes affected virtually every aspect of force quality and, as chapter 4 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 United States 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 civil versus military tensions as well as deep debates within the military. While the United States has benefited from many formal planning efforts, decisionmaking has always been dialectical and never Aristotelian.⁴

The Need to Remember the Past

Although 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 it has gathered a unique momentum since the end of the Cold War.

This is not a casual point 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 U.S. 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 had begun 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 U.S. 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 3, the history of the war in chapter 4, and the discussion of the importance of military fundamentals in chapter 6 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 United States 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 4 can be said to have shown that the U.S. forces fighting in the Iraq War achieved each of the six goals laid out in the Quadrennial Defense Review:⁵

- 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 U.S. joint forces a common operational picture.

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 that doctrine was thought to be.

One report described it as an emphasis on “Rapid Decisive Operations” that stressed,⁶

- fast-moving, lighter forces, that can be moved quickly into battle,
- flexible decisionmaking, 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 account described the Rumsfeld doctrine as being based on⁷

- 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.

In an interview following the war, 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:⁸

- 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. Cebrowski termed this a long process driven by better sensors, good networked intelligence, high-speed decisionmaking, and the ability to exploit the noncontiguous battlefield—the battlefield without a front.
- the need for increased connectivity 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.
- the increased value of Special Forces and the need for greater knowledge of regional factors, the ability to work with friendly local forces, and provide more SOF-like forces to support IS&R.
- 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.
- increased need for strategic mobility, possibly merging inter- and intra-theater 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 perhaps best articulated in the Joint Staff study *Joint Vision 2020*, which was issued before the Bush administration came to office.⁹

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: ¹⁰

- dominant maneuver,
- precision engagement,
- focused logistics, and
- full dimensional protection.

Other key concepts like Network-centric or “netcentric” 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 placed 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. The new military emphasis on “decision dominance” is simply a reminder of basic concepts of eighteenth-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 Forrest 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 U.S. 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 that 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. Then US military services have never forced it to sacrifice proven force elements before the new ones were ready; the resulting process of change has mixed new and old methods of warfighting; and it has been measured and pragmatic. ¹¹

The Need to Redefine “Decisive Force”

There 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, it is clear after the fact that the United States 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 decisionmaking; 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.¹²

At the same time, far too little is yet known about the details of each battle to make sweeping judgments about what forces did or did not contribute to the outcome, and far too little is yet known 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 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 or across the Taiwan Strait, or a conflict with Iran, or—more importantly—an emerging power a 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 United States 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 IS&R and C4I/battlement management systems, jointness, targeting, and effects-based operations—before the very real advantages of transformation in those 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 United States 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 United States has already cut its total deployable force strength by well over 40 percent 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 at crude total force numbers, the army has cut its

active force structure from 18 to 12 divisions and total active manpower from around 800,000 to 480,000. While it committed only some 12 combat brigades to the Iraq War versus 23 in Desert Storm, this was a total of 12 out of 32 combat brigades 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 its 170,000 personnel committed outside the United States at the peak of the fighting.

- It seems clear that the United States did not have the worldwide assets during the Iraq War to effectively fight two major regional contingencies. Many U.S. military experts feel that U.S. 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 risk their lives to defend their nation, while the vast majority of citizens 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 United States or any other Western power have the tools in terms of program management, cost analysis, 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 the US and its allies establish a real-world balance between the ability to create new strategic and tactical concepts, as well as the technologies to implement them, on the one hand; 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 on the other hand?
- Eighth, how do the answers to all of these questions, particularly for the United States, 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 toward 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 fighting another major conflict in order to give British forces time 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 United States and its allies should not pursue continued change and force transformation, or that Secretary Rumsfeld, the Joint Chiefs, and the 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 U.S. strategic and defense planners should engage in. The success of U.S. arms in developing new ways of war and in winning the Iraq War is no excuse for any form of “triumphalism.” The United States 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.

The United States would face much more severe limits in any future war with North Korea or any confrontation with Russia or China. The United States’ ability to 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 still surrounding the Iraq War is 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 United States and Britain had to attack. Saddam Hussein’s long history of tyranny, aggression, and proliferation may well justify the Iraq War, but the war’s timing may yet prove to be “optional.”

The advances in U.S. warfighting capability do not mean America can wander off in search of enemies, or abandon the search to build stronger international institutions and to use diplomacy instead of force. Ultimately, the United States must have the world’s trust to underpin its structure of alliances and to reduce the risk its actions will create 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.

LESSONS ABOUT THE INTERACTION BETWEEN MILITARY FUNDAMENTALS AND NEW TACTICS AND TECHNOLOGY

Whatever the merits of any “new way of war” or “revolution in military affairs” may be, the Iraq War provides important lessons about the continued value of military fundamentals and the need for the successful integration of those fundamentals with new technologies and tactics. It is both easy and dangerous to focus on the “new.” It is intellectually more exciting; it affects more shifts in key programs and resources; and it is far easier to assert that a future mix of strategy, tactics, and technology will solve current problems than it is to come to grips with troublesome realities.

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. The US, Britain, and Australia’s all-volunteer and professional military forces had a massive superiority in professional skills and unit. The US, Britain, and Australia also could not have been half so successful if the coalition forces had not had the motivation and morale to fight under exhausting conditions, often in bad weather, and do so at unparalleled tempos of operation for periods that bordered on 24-hour operations for days at a time.

The value of training and readiness emerged in every aspect of U.S., British, and Australian operations. The low accident rates, the ability to sustain constant combat operations over some 20 days, the ability to manage extremely complex air operations, and the high quality of joint warfare and combined arms are all tributes to the quality of prewar training and readiness. U.S. aircraft and helicopters, for example, had better readiness rates in wartime than in peacetime, often averaging over 90 percent.¹³ The Coalition also benefited from reliance on all-professional active forces and the combat experience of the forces involved. For example, 70 percent of U.S. strike aircraft aircrews already had combat experience at the time the Iraq War began.

The United States’ emphasis on realistic training, combined with the fact that the U.S. 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 United States learned the hard way in past wars that training must be as rigorous and realistic as possible; it must prepare forces to deal with enemy innovation and tactical defeat, and it must force them to realistically practice combined arms and joint warfare.

The British Ministry of Defense drew similar lessons regarding British forces in its assessment of the lessons of the war.¹⁴ It is important to note in this regard that U.S., British, and Australian forces were able to operate effectively even when they were in a protection mode against chemical and biological weapons, and that they emerged with far better training for urban warfare than their Iraqi opponents. More importantly, detailed accounts of the fighting make it clear that it was the ability of junior officers, NCOs, and other ranks to innovate and adapt that compensated for a range of serious

communications and other technical problems, particularly at the battalion level and below. In many cases, tactical communications were not adequate; orders from higher echelons did not keep up with the pace of combat; sensor and intelligence data were not available. In other cases, existing systems were not adequate to ensure the necessary cooperation between combat and support forces, the different elements of combined arms, or different services. Military personnel at all levels acted innovatively and exercised initiative, and the “human factor” was critical.

Morale and Motivation

Morale and motivation are “intangibles” that are almost impossible to measure. The Coalition victory did, however, involve more than training and readiness. U.S., British, and Australian forces had high morale and strong motivation, as well as high professional capability. Iraq’s forces generally did not. It is clear that some elements of Iraq’s force structure continued to fight for Saddam Hussein through the first days of the Battle of Baghdad. The Republican Guard forces fought extensively, although after-action reports increasingly indicate a high desertion rate once they came under intensive air attack. Saddam’s Fedayeen fought well in several urban clashes in the south. Iraq’s regular army, however, showed only a limited willingness to engage, and efforts by the CIA to bribe regular army officers into avoiding combat clearly had an effect. The Iraqi Air Force played no role in the war, and the Popular Army essentially never showed up.

Competence, Adaptiveness, and Flexibility in War Planning

The history of the Iraq War has already shown, in fact, that the United States, Britain, and Australia had an overwhelming advantage over the Iraqis in military professionalism and in dealing with the fundamentals of war. This advantage did as much as superior technology and new tactics did to overcome Iraq’s advantages of fighting on the defensive, on home ground, and with internal lines of communication. The United States and UK began the fight with a war plan that relied on a northern front that did not exist for political reasons, and with significant elements of the deployments and supplies that were 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.

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.

The “war plan” was flexible enough so that the Coalition could rapidly adjust its remaining elements. Adaptiveness and flexibility allowed the United States, Britain, and Australia to exploit precision airpower with extraordinary success. Precision airpower 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.

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. This was particularly important during the advance of U.S. land forces. The I MEF drive up between the Tigris and Euphrates from Nasirya to Al Kut allowed it to largely bypass towns, avoid the Iraqi regular army forces concentrated to the east, and then exploit the main road north of the Tigris. As both advances reached the area near Baghdad, they caught the Iraqi forces unprepared. The Republican Guards were forced to redeploy in the face of near-total Coalition air dominance and then attack the V Corps and 1 MEF forces without the advantage of positioned and prepared defenses under conditions approaching those of a meeting engagement.

This pace of advance could not have happened without a high degree of adaptiveness and initiative at the battalion level and below in both the U.S. Army and U.S. Marine Corps, although combat diaries and accounts by individual soldiers make it clear that adaptiveness was of equally critical value in terms of altering attack helicopter, support, logistic, and C4I operations to support the land advance. 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 U.S. and British commanders adapted rapidly. When new Iraqi tactics and capabilities emerged, they responded.

This adaptiveness also extended beyond the level of planning and tactics. US forces had to modify many aspects of the weapons and equipment they used during the war, and the role other ranks and technical personnel played in making such changes was critical in making such changes. So was the role of US industry and private contractors in rushing forward the delivery or new equipment or making suitable modifications. The British Ministry of Defense made adaptiveness in meeting what Britain calls Urgent Operational Requirements one of its key lessons of the war.¹⁵

Synchronicity, Simultaneity, Speed, Jointness, and Combined Arms

As has been discussed in the previous chapter, advances in synchronicity, simultaneity, speed, jointness, and combined arms all interacted to give the United States, Britain, Australia and the other members of the Coalition the equivalent of “decisive force.” The history of the fighting also demonstrated that the United States 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 from 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.

Some might argue that such jointness should be seen as part of the new way of war rather than as a military “fundamental.” Historically, it seems more valid to argue that synchronicity, simultaneity, speed, jointness, and combined arms have always been fundamentals of war, and that the difficulty has always been the willingness and ability to execute them as effectively as possible. The problems of coordinating cavalry, archers, and infantry are examples of the issues involved that are almost as old as civilization, not ones that began with the computer and modern communications. Certainly, the problem of coordinating air-land-naval operations is at least as old as World War I.

What is clear is that the United States, Britain, and Australia executed joint warfare and combined arms in ways that differed from the timelines and capabilities it had in even as recent a conflict as the first Gulf War. The Gulf 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 Kuwait theater of operations (KTO), and it saw a massive diversionary effort to suppress Iraq's Scuds. The Iraq War began with air superiority and moved on swiftly to air dominance. Although comparable numbers are not available, in the first Gulf War the mission allocation of strike sorties flew roughly 55 percent of all sorties. In the Iraq War, the figures were evidently over 75 percent.¹⁶

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, U.S. 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.

Speed was critical during these operations, but "speed" could never have been effective if it has not been supported by maneuvers that exploited the enemy's weaknesses and bypassed enemy forces where possible. The speed of the ground advance was also made possible by air dominance and overwhelming superiority in firepower backed by far greater situational awareness and a common operating picture (cop) among the US military services and within coalition forces. The ability to use precision weapons throughout day and night and in virtually all weathers allowed the US land forces to exploit their speed, as well as reduced the need to take time to secure their flanks and rear areas. Superior sustainability and logistic support also made speed possible. Finally, the use of air and missile strikes against Iraqi leadership and communications centers further disrupted an already weak and heavily politicized Iraqi command and control system, and ensured that Iraq could not react in time to the speed of the US advance.

Although the US and its allies did have the best common operating picture in military history, General Franks has been among the first to point out that the Iraq War was not fought by U.S. forces using a well-structured architecture for joint warfare, or a "system of systems" that efficiently cut across service lines in any integrated manner.¹⁷ It was fought using a range of evolving C4I and training systems that were still heavily "service-centric," and many of the key systems within each service were in the process of rapid change and evolution. Linkages often had to be cobbled together or improvised, and workarounds had to be put in place during combat at every echelon of command. Many systems and aspects of communication had serious gaps and incompatibilities. The Iraq War occurred before the United States was able to fully act upon the lessons of Afghanistan or even lay out a detailed road map for a more advanced form of force transformation. This need to make further major improvements in jointness is reinforced by virtually every element of combat laid out in this chapter and the next, and it is clear that creating a truly effective structure for joint warfare will take at least another decade and possibly far longer.

Finally, nothing about the lessons of the Iraq War indicates that the broad roles and missions that currently define each U.S. military service are not valid or that the United States could gain from integrating its military services. It is also clear that improved jointness is scarcely the only priority. There also are many lessons that apply only to a single service or to ground, air, or sea operations.

Situational Awareness; Intelligence Surveillance, and Reconnaissance (IS&R); and Command, Control, Communications, Computers, and Intelligence (C4I)

Once again, situational awareness, the value of intelligence, and the need for effective command and communications are fundamentals as old as the history of war. Once again, dramatic changes took place in the quality of their execution during the Iraq War. The United States had vastly improved every aspect of its intelligence, targeting, and command and control capabilities since the last Gulf War, in addition to having 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.

At the same time, the United States still had major problems with many aspects of its IS&R systems. These problems inevitably also affected the British and Australian forces, which were largely dependent on the U.S. systems. Some of these problems were procedural and long-standing. The United States was able to do a much better job of integrating the national intelligence effort by the CIA, NSA, NRO, and NIMA into the warfighting effort, but coordination problems still remained, and warfighters note that overclassification, compartmentation, and restrictions on the release and dissemination of intelligence continued to present major problems. To put it bluntly, many actual users of intelligence in combat still see overclassification and dissemination as major problems and the security officer as much of a threat as the enemy.

As General Tommy Franks noted in his first briefing to the Congress on the lessons of the Iraq War, the steady advances in IS&R systems and technology, and the expansion of analytic assets, have still left the United States with serious intelligence limits.¹⁸ Some of these limits have already been discussed, and others are discussed in more detail in the chapters that follow. Still, the following key problems and shortfalls did emerge during the war:

- The United States simply did not have enough area experts, technical experts, and analysts with language skills at any level to make optimal use of its sensors and collection. This was as true at the national level as at the tactical level, and collection overload was a problem in many areas.
- As has been discussed, the United States had a far greater capability to target buildings than to characterize what went on in those buildings and the effects of strikes on most sets of structures. It could not measure the level of wartime activity in many cases (facilities with high emission levels were an exception), and this made the efforts at “effects-based” operations discussed in later chapters

difficult and sometimes impossible. Moreover, estimates of the level and nature of underground and sheltered facilities and activity were generally highly problematic.

- The problem was compounded in many cases by an inability to establish clear parameters for operations in “strategic areas” like the value of potential leadership targets, degrading given C4I assets, attacking LOC facilities, or attacking military depots, facilities, and industrial activities. At least some experts feel the end result was that the U.S. IS&R effort mistargeted leadership facilities, exaggerated the importance of C4I strikes, and overtargeted fixed military facilities. It is, however, unclear whether the United States and its allies had any choice. Striking more targets in the face of uncertainty was probably better than striking only those targets where a high confidence could be established as to the effect.
- The IS&R effort was not able to characterize and target the Iraqi weapons of mass destruction effort before or during the war, or to provide reliable warning of the tactical threat. It seems to have been somewhat better in dealing with potential delivery systems. But the level of improvement relative to the inability to locate the Iraqi chemical, biological, and nuclear effort is unclear.
- The IS&R effort often had to take a “worst case” approach to the potential role of Iraq’s security forces, intelligence services, irregular forces like Saddam’s Fedayeen, and unusual military formations like the Special Republican Guards. In fairness, however, it is difficult—if not impossible—to accurately characterize the warfighting capability of forces that have never fought and that do not conduct open and realistic exercises.
- The IS&R sensor and analytic effort focused more on major combat forces, with heavy weapons, than on infantry or irregular forces. It could do a much better job of locating and characterizing weapons platforms and military emitters than of dealing with personnel and forces that relied on light vehicles. It was generally difficult or impossible to locate distributed forces in a built-up or urban environment until they were driven into some form of open military activity, and the United States often lacked the density of specialized assets like UAVs to carry out this mission even when open activity took place.
- The IS&R effort did much to reduce collateral damage and the risk of civilian casualties. It was neither organized nor capable, however, of assessing either civilian or military casualties.
- Improvements in C4I and the structure of the IS&R effort sharply reduced the time between the acquisition of targeting data and actual fire on the target, although many problems remained. The speed and intensity of the war do seem, however, to have led to a major breakdown in the battle damage assessment (BDA) process. Quite aside from the many gaps and uncertainties remaining in the BDA process, the IS&R system could not close the cycle in terms of target-shoot-assess on a timely and accurate basis, and this remains a critical challenge in creating true netcentric war.

None of these problems in analytic and collection capability can be called “intelligence failures.” Rather, they are currently “intelligence impossibilities.” Either the sensors and technology to collect the necessary information are lacking, or suitable analytic tools do not exist, or both. As is the case with so many other aspects of the Iraq War, however, it is important to understand that many major challenges and problems remain to be resolved.

The Impact of Space Warfare

Space is scarcely a traditional fundamental of war. But it has been a fundamental ever since the United States first made use of satellites for intelligence purposes. In the Iraq War, the United States used space for battle management, for communications, to locate its forces and guide its weapons, and to perform a wide range of other missions. It built upon the lessons of the Gulf War and Afghan War and on progress in worldwide communications dating back to the days of Vietnam. At the same time, this was the first large-scale war in which the United States could fight with 24-hour continuing intelligence satellite and sensor coverage over the battlefield, as well as the first major conflict where it could take advantage of full 24-hour coverage by global positioning satellite (GPS) system.

The United States and Britain did not have total dominance of space. 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 system.¹⁹

The Coalition had so great a superiority in every area of space, however, that Iraq’s capabilities were trivial in comparison. The United States was able to build upon the lessons of both the Gulf War and the war in Afghanistan, and although 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 United States made use of more than 50 satellites during the war, including the two dozen satellites in the GPS system.

Space provided 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 United States could bring to managing global military operations, allowed it to achieve near-real-time command and control and intelligence collection, processing, and dissemination. At the same time, GPS allowed U.S. and British forces to locate friendly and enemy forces and both target and guide weapons. The United States also made use of satellites to locate missile launches, predict their target, and provide warning.²⁰ USCENTAF reports that U.S. infrared satellites detected some 26 Iraqi missile launches, 1,493 static events, 186 high-explosive events, 40 hook bursts, and 48 ATACMs events.²¹

At the operational level, a decade of command experience by U.S. Air Force, Army, and Navy commanders who stressed joint operations had helped transform the space operations community from a secretive scientific-based one to a specialized cadre integrated with air, land, and sea combat forces.

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 they scarcely solved the problem.²² There is still a need to redefine “jointness” so that the entire Intelligence Community plays a suitable role in warfighting. Agencies like the CIA, NRO, and NSA may be civilian – and certainly has many other tasks and responsibilities – but they are also a critical part of modern joint and netcentric warfare. Good answers need to be found to fully integrating them into modern military operations, and into joint commands. Moreover, field reports indicate that there are still too many barriers at every level in the chain to the properly flow and dissemination of information because of security classification. As one warfighter put it, “security officers are supposed to be on our side, not on the side of the enemy.”

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.

The Importance of GPS

The importance of the global positioning satellite system is illustrated by the fact that when GPS was introduced into the U.S. 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.²³

These advances scarcely solved all military navigation and guidance problems. In one highly publicized incident near Nasiryah, members of the U.S. Army’s 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.

Although Iraq had at least four jammers designed to jam the Coalition GPS system, 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.²⁴ The very fact such jammers existed, however, is a warning that eventually there is a countermeasure to virtually every tactic and technology. It is also a lesson that GPS modernization remains a critical priority.²⁵

“Owning the Night” and “All-Weather Warfare”

The value of all-weather capabilities has been critical ever since the end of the traditional military campaigning season, a development dating back in some ways to the end of the American Civil War and certainly at a broader level to World War I. The value of “owning the night” dates back to World War II and the first crude infrared searchlights and vision devices. U.S. 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 then only in the form of erratic deliveries of smuggled arms. One of the most critical areas, however, was one in which the U.S.-led Coalition had a somewhat similar advantage in the Gulf War.

U.S. and British forces could both fight and maneuver at night and largely in the dark. U.S. operations also continued despite major sandstorms, cloud cover, and rain. The value of this capability is indicated by the fact that 70 percent of Iraq was cloud free for only 30 percent of the war. The weather was clear or with scattered clouds at or below 10,000 feet, and with little or no dust impact, for only 17 days out of 31. As has been discussed earlier, Coalition land and air forces kept fighting through three days of severe sand and dust storms. The Coalition had to cancel only 4 percent of its sorties due to weather during the entire war, 65 percent of which occurred during this three-day period of bad weather.

At the same time, accounts of combat make it clear that this capability was at least as much a matter of training and readiness as technology. In many cases, particularly for land forces and attack helicopters, sensors and night vision devices had severe limitations and forces had to operate without adequate technology.

This was a critical aspect of logistics of combat forces. One possible lesson of the Iraq War that needs validation in the field is the need to provide better trackers, communications, GPS displays, and night vision systems to logistic and support forces—particularly if they are to move quickly through areas where the flanks and rear sections are not fully secured and also in combat, where the success of maneuver cannot wait on weather problems or night vision conditions.

The Need for Better Radar and Space Capabilities

There is another area where improvements may be needed. The dust storms in the Iraq War highlighted the value of radar imaging versus infrared and electro-optical imaging. The JSATS proved particularly valuable in tracking Iraqi land forces at a time when other sensors had severe limits. Aircraft and UAVs do, however, have limits in terms of coverage and the ability to provide continuous coverage on a “24/7” basis.

While the programs involved are classified, the US does not seem to have pushed forward with creating satellite capabilities to use radar imaging for ground tracking. The Department of Defense sought such a program, called Discover 2, in the late 1990s. It was cancelled by the House Appropriations Committee on the grounds of cost and because it was not integrated into an effective systems architecture and war fighting concepts. Significant progress has been made in technologies like high-resolution synthetic aperture radars, however, and the Department has again requested funds for a space-based program.

The Iraq War is scarcely the only war in which weather has had a powerful impact on US imaging capabilities, however, and it is just as important to “own the weather” as to own the night. As a result, there seems to be good reason why the US should reevaluate the need for a robust radar satellite program.²⁶

The Importance of Sustainability

Sustainability and logistics are more traditional military fundamentals, and their importance was critical at every level. Although the fact gets little attention, U.S. 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 United States can project them virtually anywhere in the world, and the fact that even a force as professional as the British Army had serious problems providing reliable tactical supply in a location as close to Kuwait as the greater Basra area.²⁷ They are also a warning that without such capabilities, cosmetic NATO and EU power projection forces have little real-world warfighting capability against a serious opponent. Any force that can move can be called a power projection force; only a force that 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 11, the United States flew some 7,525 tanker sorties and delivered some 46 million gallons in aerial refueling.²⁸ However, this effort illustrates 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.

Logistics and Power Projection

Advances in logistics allowed the United States to fight halfway around the world with an unparalleled tempo of operations. The ability to refuel aircraft, move fuel and water to 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 U.S. 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 U.S. deliveries because so many competing requests were made that 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 databases on a global basis, and the RFIDs were on the systems from factory to use in the field.²⁹ The British also found the need for such a capability to be one of the lessons of the war.³⁰

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 is familiar to virtually every soldier concerned with supply in the field since World War II.³¹

More generally, unit reports at the company and battalion level, and for detachments of helicopters, are filled with accounts of problems and delays in getting adequate supplies and in coordination between combat, support, and logistic elements. It is obvious that sufficient situational awareness did not always exist to properly synchronize the movement of logistic and support forces with the operations of combat forces. Logistic and support forces had to constantly work around these problems and were not fully equipped to adequately protect themselves. They were not properly organized or equipped to operate as the kind of highly independent elements needed to support high rates of combat unit maneuver and intense combat in an environment where the combat elements of U.S. land forces did not provide anything approaching the past level of effort to protect logistic and support forces by securing the flanks and rear areas of maneuver operations.

The British also discovered an additional problem, and one that affects virtually every NATO ally to a worse degree. A heritage of constant efforts to cut the cost of logistics and supply had created a “just in time delivery” approach which worked in peacetime, but could not react to new and unanticipated demands in war time. It is a historical reality in war that only too much is ever enough, and Britain is now reevaluating the role of its Defense Logistics Organization (DLO) to look at ways in which it could control the entire supply chain from industry to combat unit, and speed orders and delivery. This may well help in reducing the lag in placing orders and between orders and delivery. It also can speed up orders and deliveries for the modification of equipment and new items that are in stock. What it cannot do is compensate for systematic underinvestment in sustainability and logistics systems – a problem that affects almost all nations in NATO, as well as many other US allies.³²

Airlift and Sealift

U.S. and British ability to use sealift to move heavy cargo and equipment to the Gulf and Turkey during the months before the war, and to 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 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 was 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. At the same time, as in the Gulf War and most previous conflicts, 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 90 percent of all combat unit logistic and equipment needs moved by sea.

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.³³

The Role of the Reserves

Making the right trade-offs between active and reserve forces is another longstanding military fundamental, as important in its own right as the trade-offs between all-professional forces and conscript forces discussed in chapter 3. 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 total number of reserves serving in the U.S. 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 had nearly 12,000, the Air National Guard and Air Reserve had over 37,000, the Marine Corps Reserve had over 21,000, and the Coast Guard had over 4,400. This total was surprisingly close to the 265,000 reservists that served in the first Gulf War.³⁴

So far, these call-ups have not led to major recruiting and retention problems. However, 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 U.S. 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 in rapid deployments and be ready instantly fight as fully ready members of a joint force team. The army in particular is over dependent on reserves to provide such combat ready elements as part of a “total force concept” for political reasons and because of congressional mandates. At least some of the army’s 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 impose fewer costs in terms of career and family.

Overdependence on reserves exacerbates the problems in overdeploying US full-time active forces. Large numbers of US active forces have been deployed away from their main base and homes for far larger than the active force structure is likely to be able to sustain and still recruit and retain the quality of the personnel it needs. By the end of the Iraq War, the US had much of seven out its 10 active divisions deployed – leaving little reserve for new missions or a contingency like Korea. This was, in part, the result of the fact that there are political and practical limits to how many reserves the US can call up and keep active in peacetime.

It is dangerous to say that the Iraq War provides some clear lesson as to the need for the US to carry out a major restructuring of its reserve forces. It may well be that the real

answer is to recruit more active troops, or find ways to obtain more allied support. At the same time, the need for continuing US deployments after the Iraq War 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.

LESSONS AFFECTING THE OVERALL CONDUCT OF THE WAR AND JOINT FORCES

There is never a clean break between the lessons of war that emerged long before the Trojan War, or in Thucydides and Sun Tsu, and the lessons that are specific to a modern conflict. This is particularly true of jointness, which the previous chapter has discussed in terms of fundamentals. On the one hand, the improvements in jointness are the result of a long process of evolution. On the other hand, the actual practice of jointness has changed radically even since the Gulf War of 1991.

For all the limits of jointness described in chapter 6 and in the detailed lessons in the chapters that follow, the different problems that emerge reflect a need for improved execution of jointness, and they in no way challenge the validity of the concepts the United States is now pursuing. In fact, in virtually every case, there is substantial interaction between lessons that affect jointness and individual lessons affecting the military services or key weapons and tactics.

Landpower-Reinforced Airpower and Vice Versa

A case in point is the extent to which landpower reinforced airpower and vice versa. The Iraqi land forces were forced to expose themselves by the speed of land operations and then were hit hard from the air, which in turn sharply reduced the Iraqi threat to U.S. and British land forces. Jointness took on a new practical meaning.

These interactions between landpower and airpower may take some time to sort out. Nonetheless, there seems to be a significant contrast between the conduct of the Iraq War and the Gulf War. The long air bombardment in the Gulf War produced a focus on air operations that led some to concentrate on airpower to the exclusion of land power and to claim that airpower alone could be decisive. It also led some to claim that strategic bombing had a decisive effect. In reality, the USAF Gulf War Airpower Survey showed that General Horner, commander the air effort during the Gulf War, was correct in totally rejecting initial plans to focus on strategic bombing at the expense of a proper balance of land forces. Similarly, the role of airpower in Afghanistan against an enemy with virtually no modern weapons led to similar claims about the decisive impact of airpower by those whom General Horner came to call “airheads.”

The key lesson really seems to be that each advance in air capability also advances ground force capability and vice versa. Furthermore, even if one argues that the Iraq War shows that joint forces can rely on airpower to reduce the need for ground troops, the “peace” that has followed has again shown that both asymmetric conflicts and peacemaking eventually tend to be dominated by the need for ground forces. In fact, if one compares the relative weight of ground and air forces in the Iraq War with that of the Gulf War, the main lesson seems to be that it is the ability to tailor new joint mixes of ground-air-sea power to the needs of a particular campaign that proves to be decisive. This not only is a lesson that US commanders have drawn from their experience during the war, but is one reflected in the British Ministry of Defense’s report on the lessons of the conflict.³⁵

Increased Tempo of Operations: Shock and Awe versus Precision and Focus

The Iraq War certainly had an element of “shock and awe.” U.S. airpower may not have been applied in ways designed to maximize the psychological and political impact of U.S. air strikes. However, a combination of nationwide air and missile strikes and the speed and scale of the Coalition land advance certainly had a powerful psychological impact on Iraqi forces and the Iraqi regime. The regime clearly was never able to respond coherently to the Coalition attack—the shock of U.S. airpower led many Iraqi units to disintegrate or largely avoid combat, and the shock of the land advance and initial U.S. land operations in the greater Baghdad area helped lead to the collapse of any last efforts at urban warfare.

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 employed a new strategy of “precision and focus.” This aspect of the war was largely air-dominated. A combination of new IS&R assets, new precision weapons, and much better avionics allowed all-weather precision strike operations with excellent targeting, with an emphasis on “effects-based” strikes and careful limitation of collateral damage. Not only did the United States nearly ten times as many precision-guided weapons relative to unguided weapons as it had during the Gulf War; it was able to target them with far more focus and effect. As for sheer numbers, nearly 100 percent of the combat aircraft the United States deployed in the Iraq War carried precision weapons, versus some 15 percent of the aircraft in Desert Storm. The British made even more use of precision – 85% of the total air munitions used – which compares with only limited British use of precision during the Gulf War and 25% of the munitions Britain used during Kosovo.³⁶

Land forces too had a new degree of precision and focus. The British essentially anchored the Coalition position in the south while the main U.S. forces advanced directly on Baghdad, fighting only those forces that directly opposed their advance. Rather than try to defeat the entire Iraqi force structure, or defeat the nation, U.S. armor concentrated on defeating the regime. At the same time, focused U.S., British, and Australian Special Operations Forces allowed the coalition to strike at selected targets in the west, the north, and many other areas in Iraq—often combining special operations on the ground with the ability to call in air support to provide heavy fire power.

Netcentric Warfare, IS&R Technology, Processing, Integration, and Near-Real-Time Information Flow and Targeting

As shown in chapter 5, many aspects of the C4I and IS&R systems used in the Iraq War reflected an evolution of past capabilities and problems. The Coalition applied such systems, however, in a form of joint warfare that had an unparalleled degree of near-real-time situational awareness that shortened the “kill chain” 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.³⁷ At this point, there is no way to analyze the relative role of space, UAVs, fixed-wing aircraft, SIGINT, ELINT, imagery, Special Forces, and human intelligence in detail. It is clear, however, that the resulting mosaic of intelligence and sensor 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.

It is important to note, however, that many of the US commands supporting USCENTCOM remained focused on the needs of a single service, and that many of the improvements in jointness were the results of improvising new approaches, rather than the result of a solid, well established system for joint warfare. As one example, an Air Coordination Element, led by an Air Force major general supported by 18 airmen, was attached 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, were assigned to each of the land force commanders to similarly improve operations, planning, and liaison. Britain had liaison officers attached to various U.S. elements to improve interoperability.

The Broader Picture: The Need for An Integrated Common Operating Picture, Interoperability, and the Possible Need to Eliminate Service-Oriented Subordinate Commands in the Theater

These experiences raise broader questions about the need to restructure US command and control systems, and the possible need to restructure theater commands. . As General Franks has noted in his analysis of the lessons of the war, one key lesson of the war is the ability to exercise joint command over all the US services, and allied forces, at distances as great as 7,000 miles -- the approximate distance from the theater to the USCENTCOM headquarters in Florida and the US national command authority in Washington.

At a minimum, this requires the US to keep developing the best common operating picture (COP) possible, and to develop a truly integrated, user-friendly, tracking and command and control architecture that brings together the operations of all of the military services. It also requires the US to design this system for information sharing with the allies of the United States.³⁸

The may, however, be broader lessons for "jointness." It is clear from the US experience during the Iraq War that all service-oriented commands should have strong teams from other services as part of their permanent organization and should train with such teams in peacetime. Some have argued that the need for jointness is so great that it requires a separate military profession. At a minimum, it requires that service-centric commands train and operate with joint elements at all times, and that major changes take place in command post and field training exercises to ensure this.

The lessons of the Iraq War also, however, indicate that it may be time to restructure regional commands like that naval, land, and air commands of USCENTCOM into true joint force commands, rather than having subordinate air, army, marine, and naval elements. The trade-offs between the continuing need for service expertise and jointness are difficult ones, and will need careful examination, but jointness should not be a matter of one-time solutions or teams improvised before or during a conflict.

Areas for Improvement and Problems at the Battalion Level

There are many other areas where U.S. and Coalition operations in the Iraq War did not represent the future state of the art. At present, netcentric warfare is not a “system of systems” in any real world sense. It is rather a “systemless mix of systems” where many systems remain service centric, and where the command structure and coordination must be improvised around each new contingency. Almost inevitably, this improvisation works best between the highest levels of command and the major combat unit level. It is weakest at the level of the practical warfighter – particularly the war fighters involved in ground combat.

It is clear from discussions with some of the officers involved, as well as with technical experts in the Department of Defense, that “netcentric” warfare is in a rapid state of flux and that many further advances can be made. Methods and technology could be improved in many areas at every level, from communications in the field to basic procedures for integrating high-level decisionmaking. In case after case, the technology available during the Iraq War was also already in transition. In many cases, parts of U.S. forces were more advanced than other parts, or follow-on technology was already in development or procurement.

One of the key realities of the war, and indeed of all efforts to create a netted or matrix approach to warfare is that some parts of the net or matrix are always much more advanced than others, and some are critical weaknesses. There were still significant communications failures; battle damage assessment was still a major problem; and so was the ability to “characterize” infantry and irregular land forces and the function and actual level of activity and capability in buildings. In fact, one Army analysis of the problems in information technology during the war focused heavily on the need for improved energy sources to replace batteries.³⁹

The most serious problems seem to occur at the level of the land warfighter, particularly at the battalion level and below, and some experts have even called this the “digital divide:” a separation of the military above the division level into a largely digital force while most of the force below that level still relies largely on “analog” human beings.

The U.S. Army, the Marine Corps, and allied forces like the British Army all had different levels of “digitization.” The U.S. Army was the most advanced land force, but its units had different levels of capability. Ironically, the 4th Infantry Division—the unit best equipped to use such capabilities—was not committed. It also is not clear just how much the United States was able to solve the coordination, processing, data allocation, and bandwidth problems exposed in Afghanistan or to 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

Two other areas are of critical importance in determining the efficiency of IS&R systems and of any concept of netcentric warfare. One is target characterization. As was discussed in chapter 6, the United States was far better equipped to target Iraq’s armored and heavy ground forces, active land-based air defenses, and military emitters than it had been in past wars. The ability to strike at Republican Guard forces almost continuously

during the conflict, even during sand and dust storms, is particularly impressive. The United States had far less capability, however, 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 versus 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.

As the British report on the lessons of the war notes, these targeting problems were compounded by the need to subject targeting to careful political review, and to the need to minimize civilian casualties and collateral damage. As is the case in IS&R, jointness has become a civil-military requirement as well as a military one, and the political content of targeting has become an increasingly important issue for warfighting.⁴⁰

For all the advances in sensors, weather remained a problem. The United States was able to locate and target Iraqi forces during the dust storms in late March, but the storms still sharply degraded coverage and made battle-damage coverage of Iraqi ground forces almost impossible. General Myers, the chairman of the Joint Chiefs, has stated that the United States had no clear picture of how successful its air strikes were against the Republican Guards during the dust storms, and the fact that it had a high level of success could only be confirmed once the weather had cleared. As a result, the United States had to persist in its advance in spite of considerable uncertainty.⁴¹

The United States had problems in dynamic targeting of 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 than the US and its allies have during the Gulf War to know when buildings were empty and to locate new dispersed forces and facilities. The United States did not have enough of these need assets establish anything like full coverage, however, and is only beginning to learn how to best use them and fuse them into the overall IS& process.

Moreover, each asset the United States does have has important limits. It still is impossible to see within buildings or shelters without men being physically present. In at least some cases, the United States actually struck at underground facilities or bunkers that postwar examination showed did not exist. These may even have included the "bunker" that the United States attacked on the first night of the war in an effort to kill Saddam Hussein and key elements of the Iraqi leadership.⁴² 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 (BDA) is a particularly important area of uncertainty. The Iraq War showed that the United States and Britain had learned not to rush out with BDA statistics and estimates, although this may have been the result of the fact that the BDA process largely collapsed early in the war. Several U.S. and allied officers have also made it clear since the war that the few estimates the coalition did issue on the level of equipment losses in the Republican Guard may simply have been broad estimates based on rough extrapolations from the improved imagery that became available after the dust storms ended, and could not distinguish battle damage with any

accuracy, or whether the break up of Iraqi combat capability was the result of physical damage to Iraqi weapons or the result of desertions.

The US and its allies simply do not yet have a fully effective and reliable set of sensors, processors, and methods to support netcentric warfare with reliable battle damage assessment or to provide such data quickly enough to support near-real-time allocation of force assets for either tactical or targeting purposes.

This does not mean that the U.S. and Coalition forces did not make improvements in target characterization and in at least some aspects of battle damage assessment during the war. It does mean that there is no public evidence that they did so, or that they solved past problems. More generally, it is a reason for analysts to show caution in talking about advances in netcentric warfare and IS&R technology, processing, integration, and near-real-time information flow and targeting as if the key problems have been solved or there is a firm empirical base for making clear trade-offs or program decisions.

Bandwidth

The US has found in every recent war that it did not have the communications density and capacity to carry out all of the existing aspects of netcentric warfare, much less the additional tasks that have already been discussed, and which are discussed in the following chapters. Secretary Rumsfeld and General Tommy Franks also raised the need for more capacity or “bandwidth” in their initial reports to the Congress on the lessons of the war.⁴³

The almost certainly is a valid need for additional bandwidth. However, there are also serious dangers in assuming that this is a lesson that always ends in increasing the density and complexity of C4I/IS&R operations, and the level of communications and processing density. “Bandwidth creep” threatens to become more and more demanding and expensive. It also tends to push information to virtually all potential users and to centralize decision making and review in the process. It is far from clear that today’s problems are truly bandwidth problems as distinguished from a failure to create efficient systems that limit the need for bandwidth, and equally unclear that careful review has been made of where the flow of information should stop, of how much information can really be used, and of the need to delegate and limit information flow.

Put simply, it is as important to limit bandwidth as it is to increase it. System efficiency is at least as important as systems growth. Avoiding information overload is as critical as jointness. Avoiding overdependence on overcomplex and overvulnerable systems is equally important, as is avoiding overcentralization of review and command.

Asymmetric Warfare

One of the key issues shaping the war was the ability of U.S. and British forces to adapt to asymmetric warfare. In practice, these forces responded quickly and effectively to Iraqi tactics, whether in the form of covert mine warfare attempts, dealing with raids by “technicals,” preventing suicide attacks, or coping with urban stay-behinds and diehards. U.S. and British forces demonstrated that they could adapt tactics and force postures to new and surprising uses of asymmetric warfare. The lessons of Somalia, Northern Ireland, and Afghanistan had been learned, and the value of improved training and organization for asymmetric warfare was clear.⁴⁴

At the same time, US and British success in the Iraq War also does not mean that the US and its allies are ready for every asymmetric challenge. If one looks only at the fighting between March 19 and May 1, there are important “what ifs.” One such “what if” is how the Coalition would have fared if Iraq truly had been able to mobilize and use the large popular army it had created arms caches for throughout the country, particularly given the increasing need for powers like the United States and UK to reduce total casualties, civilian casualties, and collateral damage. Another is how different the war might 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 United States and British homelands. The Iraq War is only a limited warning of the kind of challenge a more effective opponent might pose.

Moreover, it has become all too clear that the fall of Baghdad and Tikrit, and the Coalition victory over Iraq’s conventional forces, did not put an end to the fighting. Instead, the United States, Britain, Australia, Poland, and the other allies involved in nation building found that this process at least had to begin in a climate of low-level asymmetric warfare. As has been the case in Afghanistan, as well as in so many other peacemaking efforts, armed opposition changes, and mutates, even dramatic military victory does not mean that the conflict is over.

There is no way to predict whether future Coalition nation-building and security efforts will bring an end to such violence. As of July 2003, the nation building effort was only beginning to gather momentum, US and British security operations were only in their early stages, the level of combat in Iraq was still very low, and accidents had been far more lethal than combat. At the same time, Iraq is a further lesson that the transition to peacemaking and nation building can also be a transition to asymmetric warfare. Afghanistan is scarcely the only precedent; Lebanon and Somalia are **other** examples of the fact that it “isn’t over when it’s over” and that the conflict-termination process should be as much a matter of limiting or avoiding asymmetric warfare as creating a stable peace.

Moreover, the US and its allies must find solutions to the problem of asymmetric warfare during conflict termination, peace making, and nation building that avoid the trap that small hostile elements can potentially divide the US from the people it is seeking to help by forcing the US to concentrate on the security mission, alienating the US military and the local population, driving both the US military and the civilians involved in nation-building into a fortress mentality where they become increasingly isolated, and sabotaging economic and political progress with relatively limited attacks and acts of sabotage.

For all the West’s conventional war fighting strengths, it is still vulnerable to even relative low-level, but persistent attacks during nation building. This is also a vulnerability that enemies are all too well aware of. Saddam Hussein and Iraqi intelligence cited the US experience in Vietnam and Lebanon as examples of US vulnerability long before the Gulf War. They saw similar weakness in the US approach to Somalia, Kosovo, and Afghanistan, at all least some captured Iraqi documents described the option of a “postwar” asymmetric campaign against the US.

Winning a peace may be anything but peaceful. The US and its allies must be ready to deal with conflict termination and nation building as a new form of asymmetric warfare. They must be ready to deal with postwar power vacuums and a mutating enemy, win hearts and minds, and combine simultaneous political, economic, and security efforts

Friendly Fire and Casualty Issues

The low casualty rate in Iraq reflects all of the strengths in the Coalition's warfighting capabilities and all of the Iraqi 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.⁴⁵

The casualty data do, however, reflect problems with fratricide or "friendly fire." The ABC analysis referenced earlier shows only confirmed wartime losses for the United States, and does not include suspected cases or British losses. As a result, the total losses due to friendly fire were only 3 dead as of June 27, versus 22 from helicopter accidents and 59 from accidents from other causes. If these data are correct, improving safety would be much more important for reducing deaths than dealing with the problems of friendly fire.

Another analysis, however, showed 10 U.S. combat deaths caused by friendly fire and another 10 incidents and 20 deaths under investigation.⁴⁶ The U.S. military has always been slow to analyze and confirm such cases, but it now seems likely that the United States and Britain lost more than a dozen personnel to friendly fire, and dozens more may have been wounded. The exact number of friendly fire cases remains uncertain, but they seem to include at least five major cases where air or ground forces attacked friendly forces. There may also be a sixth case.

Reports indicate that U.S. A-10s killed nine U.S. Marines on March 23, the day on which the United States lost 29 personnel and which some analysts have called the worst day of the war.⁴⁷ These figures are much more consistent with the pattern of fratricide in the Gulf War, where 35 out of 147 combat deaths—some 24 percent—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 would have to be based on little more than statistical rubbish.⁴⁸

If these levels of losses are accurate, they indicate that, in addition to improving safety, reducing friendly fire remains an important priority. This includes dealing with such wartime issues as possible problems with 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 24 the United States had to refine its IFF procedures during the course of the war and add a backup check using another system to lock the radar on suspected targets.⁴⁹

At the same time, there are important limits to what can and should be done to reduce fratricide or friendly fire. Any major additional efforts to reduce friendly fire must be weighed against alternative uses of the same resources to determine which investment would produce the lowest net casualties and/or greatest increase in combat effectiveness. Similarly, more stringent rules of engagement could increase net casualties by slowing

down the pace and lethality of operations and giving the enemy more opportunities to kill. I

The Force XXI Battle Command Brigade and Below (FBCB2) System

U.S. forces in the Iraq War did make good use of position-location-guidance radios, or "pluggers." These were given to platoon leaders and were paired with Force XXI Battle Command Brigade and Below, or FBCB2, software to provide the coordinates of forces down to the platoon level to the joint Global Command and Control System (GCCS) via satellites or radio frequencies. The GCCS could then retransmit the identification and location data to computers inside a company commander's vehicle.⁵⁰

In previous wars, military operations had to be conducted by relying on commanders using radios to repeatedly call in their positions (and on the timeliness and accuracy of such methods). The new Blue Force Tracking, or BFT, system used in the Iraq War provided that information in real time, and the software displayed it in the form of blue icons moving across a commander's screen to identify friendly forces. Commanders could also "click" on these blue icons to communicate with an unknown blue force even if it belonged to a Marine Corps or a British company.⁵¹ This not only reduced friendly fire; it greatly improved situational awareness and the capability to carry out netcentric warfare.

This system has great growth potential. It should be noted that the Force XXI Battle Command Brigade and Below system—one of the key developments intended to improve situational awareness and solve the friendly fire problem—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.

One problem in using the system to its full effectiveness was that the 4th Infantry Division was the only U.S. Army unit fully equipped and trained to use the system before the war. This unit was originally supposed to be deployed through Turkey and had to be rerouted through the Gulf. As a result, it did not arrive in Iraq until the war was effectively over.

Also unclear is the degree of netting the FBCB2 system will have with air units in the future.⁵² 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.⁵³ The USAF has, however, opened a competition for a Battle Management Command (BMC2) system that will perform some of the necessary functions. It will include a network to relay targeting data to manned and unmanned systems, space assets, and ground based systems using common standards and an open architecture. As a result of the lessons of the Iraq War, it will also incorporate a joint system that tracks US and allied personnel, building on the Blue Force Tracking system described in the following section.⁵⁴

Blue Force Trackers

The United States has already taken steps to expand the use of the Blue Force Tracker and other systems that can both improve U.S. capabilities for netcentric warfare and

reduce the risk of friendly fire. The Army was not the only service to find this system extremely useful. The Marine Corps report on the 1st Marine Division's lessons of the war found the Army system so effective that it recommended that it replace the Marine Corps system and be used not only for tactical purposes, but also to improve logistics and vehicle tracking and to correct the Marine Corps personnel system's inability to locate personnel accurately once they deployed to the theater.⁵⁵

The British Ministry of Defense report on the lessons of the war reached similar conclusions:⁵⁶

The end result is that the United States is seeking several improved capabilities as the result of the lessons of both the Afghan and Iraq Wars. It is seeking to reduce the time before blue-force positions show up in the satellite-enabled system. Aircraft were typically identified in one minute, whereas tanks were identified in four to five minutes. This reaction time is adequate for static ground forces, but not for vehicles maneuvering at speeds of up to 30–40 miles per hour. These delays, or “latency,” need to be reduced to reduce fratricide. The new system will also build on another joint program, this one led by the Air Force, called the Family of Interoperable Operational Pictures (FIOP). This system is intended to integrate real-time land, air, and sea data into a single, Web-based mapping application. The Army team will take the lead in creating a single integrated ground picture, the ground piece of the FIOP, which will include coalition combat ID technologies.

Postwar Review of Force Plans, Basing, 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.⁵⁷ The Department of Defense is already acting on this lesson. Secretary Rumsfeld directed the Office of the Secretary of Defense and Joint Staff to develop such a “Post-War Defense Assessment” in mid-April 2003.⁵⁸

As has been touched on earlier, a similar direction has been given to the U.S. Joint Forces Command. The Joint Forces Command had a 50-man lessons team assigned to the U.S. 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.⁵⁹

The United States also has commissioned a broader “Global Posture Study” to examine the adjustments the United States should make in its force posture and basing. Like the Afghan conflict, the Iraq War raises the question of how the US can improve its mix of presence, basing, prepositioning mix, and use of prepositioning ships to best support rapid power projection and take advantage of the advances in joint warfare. No one war can do more than illustrate the value of the advances in US capability in a single contingency, but it is clear that the role of airpower is changing in many important ways, that the projection of land forces bear little resemblance to the needs of the Cold War, and that the US needs a force posture that can be as flexible and adaptive as possible.

The Broader Implications of Cutting Enemy Casualties and Collateral Damage: A New Dual Standard and Form of Asymmetric Warfare?

More broadly, the United States 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, an effort that reflected a steadily growing potential for asymmetry between the Western approach to warfare and that of possible opponents.

The same problems with U.S. sensors, intelligence, and battle damage assessment methods that make it impossible to see into buildings or estimate the number of live military personnel in combat forces make it equally difficult to provide accurate estimates of casualties. The end result, however, is that the United States is seeking to reduce civilian casualties and collateral damage, as well as unnecessary enemy military casualties, without having any clear measures of effectiveness.

The U.S. military deliberately avoids developing better methodologies to make such estimates in part because of the difficulties involved, but also because of the certain public relations backlash from such estimates and the problems caused by the body counts of Vietnam. This, however, creates an analytic vacuum and a lack of any detailed substantive basis for target planning and effects-based operations. It also ensures that the issue of casualties becomes heavily politicized. While some NGOs—such as Human Rights Watch—make an honest effort to establish the facts, many other NGOs, humanitarian organizations, and politicians tend to exaggerate probable casualties, sometimes to ideological extremes.

This inability and unwillingness to make estimates of casualties is not likely to remain an acceptable basis for warfighting in a world where Western powers face more and more pressure to minimize military and civilian casualties. 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 do so. It had to fight in what in many ways was a dual standard: international expectations that casualties and collateral damage would be kept to an absolute minimum, yet 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.

The search to minimize casualties in limited wars also raises serious questions about future wars that are more existential in character. It is easy to show restraint against a weak and ineffective opponent. The situation could be totally different against a terrorist movement equipped with weapons of mass destruction, much less against a modern state. This is clearly an area where the Iraq War raises more legal, ethical, moral, and military questions than it answers.

LESSONS 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 lessons that primarily affect air, missile, and air defense forces. These lessons reflect the fact that the Iraq War probably was the first major war in which airpower could strike with near-real-time precision at many key tactical targets. At the same time, they also reflect the fact that air and missile tactics and technology continue to advance at an extremely high rate, and that future wars are likely to see even more effective use of precision, time-sensitive targeting and the integration of air and missile power into joint operations.

Air Dominance

Much of the air battle was conducted before March 19, 2000. The US and Britain greatly intensified their attacks on Iraq's ground-based air defenses after November 2001, and began an active campaign to suppress them in the summer of 2002 called "Southern Focus" in order to prepare for the US and British invasion to come. The impact of this "war before the war" is indicated by the fact the allies flew 21,736 sorties, struck Iraqi air defense 349 targets, and fired 606 munitions, between June 2001 and March 19, 2003.⁶⁰

Once the war began, the key missions for coalition air forces were to (1) neutralize the ability of the Iraqi government to command its forces, (2) establish control of the airspace over Iraq, (3) provide air support for Special Operations forces and the Army and Marine forces that would advance towards Baghdad, and to neutralize Iraq's forces of surface-to-surface missiles, and suspected caches of biological and chemical weapons.⁶¹ The US, British, and Australian air forces had an unprecedented ability to execute these missions. The coalition's ability to paralyze Iraq's air force and the systematic suppression of Iraqi air defenses allowed coalition air forces to achieve nearly total air dominance shortly after the first air strikes on March 19—a level of air superiority it had never enjoyed in any previous major war.

The coalition allies employed some 1,800 aircraft to deliver approximately 20,000 strikes against Iraq, and no aircraft were lost to air-to-air combat in the process.⁶² According to the USAF, seven aircraft were lost to Iraqi ground fire—one A-10, four AH-64s, and 2 AH-1Ws—although an additional F-15E and a UH-60 may also have been lost to such fire. This total is roughly half the number of aircraft lost to accidents and other non-combat causes. A total of 13 aircraft, including two fighters, were lost to other causes.⁶³ There were a total of 25 aircraft accidents: four serious Class A, five Class B, and 16 less serious Class C, and a total of 32 problems with near collisions or hazardous air traffic reports (HATRs).⁶⁴

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 as well as a full range of specialized support and electronic warfare aircraft and modern IS&R 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

Despite the problems in U.S. and allied IS&R and targeting capabilities, improvements in these areas did allow the Coalition to use a new approach to targeting. This approach is called “effects-based” bombing and involves the selective use of precision airpower to strike at targets to produce effects rather than simply maximize physical damage.⁶⁵ Examples of such targeting include knocking out power, communications, and fuel supplies to Iraq military forces, rather than attacking major infrastructure facilities. Others include selectively bombing Iraqi regular army forces to paralyze or reduce their movement rather than destroy them by attrition, and using sensor platforms like the E-8C JSTARS to attack actual military units in movement, rather than blow bridges and attack lines of communication.

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.” Advances in precision also allowed the United States to reshape its targeting and choice of munitions to reduce civilian casualties and collateral damage. 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-pound bombs to be used instead of 2,000-pound bombs.

The United States made use of new targeting aids like the “bugsplat” program.⁶⁶ 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, but to do so using the smallest munition and the angle and point of attack that would produce minimal risk to civilians and collateral damage.⁶⁷

US and British official sources differ slightly as to the number of strike sorties flown during the Iraq War, although the general scale and nature of these strikes is consistent from source to source. In an analysis presented by Lt. General T. Michael Mosley, the commander of coalition air operations during the war, he stated that some 1,800 aircraft delivered some 20,000 strikes, and that 15,800 of these were directed against Iraqi ground forces versus 1,800 against the Iraqi government, 1,400 against Iraqi Air Force and Air Defense Command targets, and 800 against suspected sites, forces, and installations that might have weapons of mass destruction or surface-to-surface missiles. This meant that 80% of the coalition air strikes hit at Iraqi ground forces, 9% were directed against Iraqi government targets, 7% against Iraqi Air Force and Air Defense Command targets, and 4% against targets like suspected sites, forces, and installations that might have weapons of mass destruction or surface-to-surface missiles.

Lt. General Mosley did confirm, however, that there were serious problems in the battle damage assessment process, and differences between US Air Force and US Army

officers over how to best plan the strikes. This limited the ability to develop a truly joint doctrine for effects-based bombing in the target category where the coalition carried out 85% of its strikes, and as is noted elsewhere, it meant that the coalition could not accurately assess the effect of its strikes on these targets.

These problems were at least as serious in the case of Iraqi government targets, Iraqi Air Force and Air Defense Command targets, and targets like suspected sites, forces, and installations that might have weapons of mass destruction or surface-to-surface missiles. While no quantified data are yet available, it is clear from interviews that many of the strikes against Iraqi government targets did not do the damage originally estimated during the war, hit targets whose nature and value to the Iraqi war effort had not been accurately estimated, or hit targets that had been largely evacuated.

The data on the allies' ability to characterize and achieve the necessary damage against Iraqi Air Force and Air Defense Command targets are more uncertain, but a number of strikes have proved to have been directed against low value or empty targets. As is discussed in Chapter 12, the allies were able to locate and hit some surface-to-surface missiles, but it has been confirmed that virtually all of the suspect chemical, biological, and nuclear targets had no weapons and did not provide an imminent threat. It is also clear that unless a target involved high levels of visible activity or radio frequency emission, there was little way to assess even the broad impact of the "effect" of strikes on these targets.

If one looks at the patterns of bombing by target category, a maximum of 10-12% of the sorties were delivered against targets that are normally close to populated areas.⁶⁸ In practice, the number that risked civilian casualties and collateral damage was far smaller, in part because of both high-level policy and joint coalition review.

There are no reliable estimates of casualties for the war. It is clear from the range of estimates to date, however, that the United States and the UK inflicted negligible civilian casualties and collateral damage in comparison with previous wars. As has been noted, an estimate made in late June stated that hospital records indicated up to 3,240 dead civilians, including 1,896 in Baghdad, and the possibility of thousands more.⁶⁹ Again, the lowest estimate seems to be 1,100-2,355.⁷⁰ The most credible low-end estimate is 1,500 civilian dead.⁷¹

These are still tragic losses. But they are remarkably small for so intensive an air campaign in a country of some 24 million people, and they compare with Iraqi claims of some 2,278 civilian dead in the Gulf War of 1990, where the United States did not invade Iraq and there was no fighting in Iraqi cities. They also include casualties from Iraqi anti-aircraft fire, Iraqi fire directed at coalition troops, and all other causes and do so despite the fact that Iraqi forces made extensive use of civilian facilities to shelter Iraqi military forces and equipment.

True Precision Air Strike Capability

The evolution of precision air strike technology greatly improved Coalition capabilities in carrying out these strikes. 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 U.S. 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. To put these differences in perspective, only one out of five strike aircraft could launch laser-guided bombs in the Gulf War; all strike aircraft could launch laser-guided bombs in the Iraq War.⁷²

The onboard sensors and computer systems on these aircraft were much more capable both in executing preplanned strikes and in the dynamics of acquiring and killing. 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.

A combination of UAVs and better sensor aircraft, systems like the E-8C, and improved infrared and radar sensors interacted 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-8C JSTARS to target Iraqi armor even under sandstorm conditions. Dust and sand did present problems in some cases. Still, 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.

This does not mean that the air and missile campaign achieved anything approaching “perfect war.” Detailed BDA data are lacking, but enough pilot and post-strike reports are available to show that precision is still relative despite all of these advances. The U.S. and British briefings shown during the war provided television footage of weapons that virtually all hit the correct target. In practice, however, there are still major problems in the IS&R effort, and significant numbers of targets were mischaracterized.

“Precision” did not mean that many weapons were not fired at the wrong target, or selected in ways where the munition had the wrong effect, or launched under the wrong conditions, and/or that they did not fail in some way in flight. There also are enough pilot and combat reports to show that major failures of the control surfaces on guided weapons sometimes resulted in the weapon striking far from its intended target, regardless of the target coordinates used to launch the weapon and the potential accuracy of its guidance system. To put this in perspective, it often took several weapons to achieve a kill or the required level of damage—rather than the one kill per weapon generally shown in official briefings.

Yet, it is also clear that the real-world targeting, launch, and weapons performance of precision weapons was generally much more accurate than it had been in Kosovo or the Gulf War. It is also important to note that briefings and battle damage assessment tend to focus on achieving catastrophic damage or enduring functional kills of the target. The Coalition often did achieve these effects, but they are only part of the impact of precision warfare.

The psychological impact of near misses and of watching precision kills on other nearby targets is extremely high. It is quite clear from postwar Iraqi accounts that it is not necessary to achieve the desired degree of damage to have forces evacuate a building or desert their equipment. Moreover, the high levels of attrition sometimes claimed against

targets like the major weaponry in Republic Guard units—50 percent, 70 percent, and even 90 percent—are scarcely necessary to force the disintegration of the unit as a functioning warfighting entity. Losses of only 15-20 percent have been enough to achieve such results in previous wars, although the level of damage required varied sharply by military force and unit. The fact that BDA cannot quantify the impact of precision on morale, desertions, and the willingness to fight does not mean that even “misses” are not of vast importance in terms of their real-world military effects.

In-Flight and Rapid Targeting and Retargeting: Time-Sensitive Strikes

While the technical details are unclear, the United States 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. This rapid retargeting capability enabled the United States to respond to active intelligence rather than bomb predetermined or fixed targets by the numbers. For the first time, it deprived enemy leaders of the sanctuary they had enjoyed in terms of the slow response time between acquiring intelligence indicators and actually being able to strike.

Numerous other missions included the growing use of Special Forces to confirm and illuminate targets that could be struck with precision weapons, or to identify high-priority targets that 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 “re-rolled” airborne aircraft. There were 243 such strikes in the south, 271 in the west, and 172 in the north.⁷³

This ability to rapidly target and retarget 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 that aircraft are targeting with the LITENING, and to 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 protection against friendly fire. The ability to retarget cruise missiles in flight will add another dimension to such capabilities.

At the same time, at least the Marine Corps found serious problems in the overall timeliness of the targeting and sortie allocation process. Although its lessons reports note advances in time-sensitive strikes and find that the “kill box” system ensures the availability of on-call air support, at least one report—the report on the lessons of the war by 1 Marine Division—finds that much still needs to be done:⁷⁴

Stealth

Both the B-2 and F-117 played an important role in the Iraq 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 of the roughly 17,000–20,000 sorties classified as strike missions. While the numbers were limited, all of those missions were against heavily defended targets in the greater Baghdad area and struck at key targets like the air defenses, important headquarters, and radio relay stations.⁷⁵

For the first time, these missions were able to use GPS-guided weapons. Unlike the laser-guided weapons used in the first Gulf War, the GPS-guided weapons could not be

obscured by clouds or smoke.⁷⁶ Problems still emerged because of the long time needed to enter targets into the ATO. But the use of time-sensitive targeting and kill boxes allowed Iraqi forces to be targeted at the last moment, greatly cutting down on the “kill cycle” in the Gulf War and also freeing the pilot to concentrate on the mission.

Close Air Support

In spite of all the progress the US and Britain made in jointness, both forces still believe significant improvements can be made in organizing and supporting the close air support mission, and in training for this mission. For example, the British Ministry of Defense concluded that, “The operation...highlighted that the integration of Close Air Support aircraft requires further refinement and practice.”⁷⁷

This message has been reinforced by a recent study by the General Accounting Office, although the study preceded the Iraq War. The study found that troops were not properly trained for close air support, and that the USAF continued to focus more on longer-range interdiction missions. It also found that a joint interservice steering committee still have made only limited progress in standardizing procedures and equipment.⁷⁸ Both British and Australian officers report a similar need to standardize if forces are to be properly interoperable.

One key challenge is to integrate fixed wing, attack helicopter, artillery, and land-based air defense operations. The US seems to have done much better in the Iraq War – partly as a result of lessons learned from Operation Anaconda in the Afghan War – but much of this improved was improvised on an ad hoc basis and much can still be done. It is also clear from the Iraq War that every advance in IS&R, communications systems, and digital management of the battlefield both increase the capability to carry out close air support and the need for tighter integration, better training, and more standardized procedures and equipment.

Urban Close Air Support Is a Reality—Under the Right Conditions

The United States conclusively showed that modern air power can target and strike even in cities with great effect and minimal collateral damage.⁷⁹ The United States effectively set up urban “kill boxes” over Baghdad with strike aircraft on 24/7 patrols **armed** 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 strikes on “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 provide better angles of attack using weapons like Hellfire and TOW and could also strike with lower-yield weapons that inflicted less collateral damage.⁸⁰

At the same time, the war did expose limits. The Coalition was able to move key aircraft forward, such as tankers and the E-8C JSTARS, only because it had gone far beyond air

superiority to air dominance. This also allowed it to use aircraft like the A-10 in low-altitude strafing runs at 2,000–3,000 feet and to 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.⁸¹

Many air munitions could not be used in areas with buildings closely placed together because they could not be launched with the proper angle of attack. In several cases, a target could be attacked only if ground troops were present to illuminate it, but the troops could not remain in the conflict area long enough to allow the 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 Air Power and Problems in Allied Readiness, Interoperability, and Modernization

The U.S. military has long recognized the need for expeditionary air power. Carriers provide it by definition, all Marine Corps aviation is expeditionary, the U.S. Army is increasingly making its helicopter forces expeditionary, and the U.S. Air Force has steadily converted to a lighter posture and one where power is easier to project. As a result, the 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 U.S. 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 U.S. Navy and Marine Corps, in turn, are developing a Fleet Response Concept to allow U.S. 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.⁸²

The ability of Special Forces, the U.S. Army, the U.S. Marine Corps, and the U.S. Air Force to rapidly restore airfields or create ones large enough for C-130 operations was another important aspect of expeditionary airpower. So was the ability of the C-130 and C-17 to operate off of short and unimproved runways.⁸³

The British Royal Air Force 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 U.S. Marine Corps to support more rapid forward basing and expeditionary operations, the RAF demonstrated that effective power projection planning and equipment are a critical part of effective airpower. It also was able to help the U.S. Navy because RAF tankers use refueling drogues, rather than a piloted boom, and can refuel U.S. Navy aircraft—an example of allied interoperability that helped the United States.

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 and aircraft with avionics capable of targeting and firing such weapons (rather than needing to bring in Buccaneers to illuminate the target for Tornados), and it introduced new weapons like the Storm Shadow stand-off cruise missile, which has a range of up to 300 nautical miles.⁸⁴ Britain also introduced the use of the Enhanced Paveway II GPS-guided bomb and Maverick AGM-65 by its Harrier G7 attack aircraft, and it made use of the Enhanced Paveway II and III GPS-guided bomb on its Tornados.

The British Ministry of Defense cited the success of this expeditionary approach to airpower as one of the lessons of the war.⁸⁵ It also recommended that, “Further investment is required in Expeditionary Campaign Infrastructure, Temporary Deployable Accommodation and personal equipment, which should be designed to support expeditionary air operations.”⁸⁶

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 United States. Australia had learned from deployments during the Gulf War, East Timor, and Afghanistan, and it had acquired new aerial refueling tankers, Airborne Early Warning and 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 them interoperable with U.S. 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 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, and effective readiness and training. Most also lack the capability either to act as independent expeditionary air forces or to be fully interoperable with the United States. To be blunt, their civilian masters have allowed them to decay into aging, heavily bureaucratic forces that often modernize in ways better suited to the politics of the European defense industry than to effective warfighting.

There are good reasons why most European governments furnish 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 toward 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 United States 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.

Hard Target Kill Capabilities

It will take some time before the United States 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 United States failed at least sometimes to kill critical underground facilities.

The hard target problem is not simply one of hard target kill, but one of hard target characterization. This involves the existence of the target, its physical nature, its function, whether it is actually occupied and used in wartime, and the effect of any given level of damage. This is a critical problem both in IS&R terms and in the ability to implement a full range of effects-based and netcentric operations. It is also an important caveat regarding the use of very large conventional or small nuclear weapons to kill hard targets. The issue is not simply one of ensuring that the target can be destroyed; it is ensuring whether the target exists and should be destroyed at all.

The problem is also certain to grow with time. While U.S. and allied IS&R coverage is increasing in scope and persistence, the ability of developing countries to create closed structures and then create hardened facilities in or near those structures in ways that are not detectable by imagery is also growing. So is the understanding of both governments and extremist groups that rapid dispersal, the creation of covert dispersal facilities, and the exploitation of natural features like caves present major challenges in terms of both targeting and physical attack.

Cruise Missiles

The United States used a total of 153 bomb-launched CALCMs and 802 BGM-109 TLAM Tomahawk sea-launched cruise missiles in the Iraq War. These cruise missiles proved 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 them to be much more accurate and to fly a much wider range of attack profiles. The operational range of the system also increased from “500 miles plus” to “more than 1,000 miles,” and missiles could be programmed in hours rather than over a period of three days.⁸⁷ At the same time, the relatively small warhead size of the Tomahawk limits 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 claimed failure rate for the Tomahawk cruise missile in the Iraq War was about 2 percent as opposed to more than five times that percentage in the Gulf War. The 800 missiles launched compares to 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.⁸⁸ For the first time, U.S. 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 March 19.

At the same time, the cost of some 800 missiles approaches \$500 million to \$1 billion—depending on the costing method used; the U.S. Navy budgets some \$600,000 per missile, but the Congress still appropriates roughly \$1 million.⁸⁹ Some missiles also went

off course in politically embarrassing ways over countries like Saudi Arabia and affected U.S. overflight rights. 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 Use of Precision Air Munitions

Only minimal data are available on how given air munitions were used in different aspects of the battle, the precise targets chosen, and their battle damage impact. At the same time, the U.S. Air Force has provided significant data on the overall patterns in the use of precision munitions. These patterns provide some important insights and lessons.

Laser-Guided Bombs and the JDAM

The key precision weapons the Coalition used in its missile and air strikes included 802 sea-launched BGM-109 TLAM (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, and GBU-28). They also included 98 EGBU-27 weapons with both GPS and laser guidance. They 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 enabled the United States to allow strike aircraft to 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 United States delivered 30 percent 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 an accuracy of around nine meters. That a 500-pound weapon could be used so often relative to heavier systems is an indication of improvements in both precision and the ability to execute “effects-based” strikes. In contrast, the United States 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 that allows all-weather and night operations in even the worst weather.⁹⁰ The strap-on kit costs \$18,000, and the weapon can be launched up to 15 miles from its target and use GPS to strike within 10–20 feet of its target. Although much of the force planning before the Afghan conflict focused on expensive guided weapons, the JDAM made up some 4,600 out of the total of 7,200 precision weapons used during the Afghan conflict.⁹¹

What is striking in view of much of the focus on high-cost long-range missile systems during the early 1990s is that the United States used only 260 such systems. The United

States 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

Dumb Weapons and Strafing

Anyone looking at the lessons of the war should be careful to remember that 32 percent of the munitions remained unguided, and that the United States dropped some 9,251 conventional bombs. Similarly, the British RAF dropped 138 unguided conventional bombs, or a total of 15% of 919 munitions.⁹² Precision is not the solution to every problem, and the value of “dumb” weapons should not be ignored. This is particularly true when weapons have to be used against area targets for either killing or disruptive effect.

Moreover, a great deal of military analysis tends to ignore the value of strafing and air-delivered gunfire. Historically, prisoner of war interviews indicate that such fire often had a major tactical effect. The United States fired 16,901 20-mm rounds and 311,597 30-mm rounds. The 30-mm round is particularly lethal against armored and other vehicles.⁹³ Available after-action reports from attack helicopter and A-10 pilots on the use of such munitions are anecdotal and cannot be tied to battle damage assessment data, but virtually all stress the value of gun and cannon fire.

The Problem of Cluster Munitions

The problem of cluster munitions dates back to the Vietnam War. Despite the United States' efforts to reduce civilian casualties and collateral damage in the Iraq War, once again U.S. cluster munitions acted as mines, killing civilians in urban areas like Baghdad long after they were dropped.⁹⁴

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 the same impact as failing to precisely map a mine field, particularly when bomblets 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 demolition teams could detect it only if its parachute was visible in the area.⁹⁵

It is also important to note that the United States has recognized this problem to the extent that more modern “smart” cluster munitions, such as the Sensor Fused Weapons, are designed to self-destruct after a fixed time if no target is detected. The original version was designed to inactivate by depleting its battery energy; the more modern CBU-105B/B, which was the weapon used in Iraq, has a triple redundant feature that causes the projectile to self-destruct at a predetermined altitude before it reaches the ground if it cannot find a target.⁹⁶

The Bomber and the Advantage of Range-Payload

The Iraq War will eventually produce detailed lessons for virtually every aircraft used in it, just as it will for virtually every other land or air system. In the case of aircraft, initial

pilot reports make clear 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, and Harrier, as well as future designs. Some of these lessons are discussed throughout this book. Many, however, require detailed operations analysis that may take a year or more to complete.

The Continuing Role of the Bomber

Among the general lessons that are already available, the 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-2B stealth bomber, for example, had the capacity to carry 16 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 use the Wind Corrected Munitions Dispenser and strike at different targets on each sortie. The use of precision-guided weapons allowed these bombers to strike from outside the range of all but the most heavily defended areas, and the steady upgrading of their electronic warfare capabilities improved their survivability. One press report indicates that the B-52 and B-1B delivered 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.⁹⁷

USCENTCOM estimates that bombers flew roughly 555 sorties between March 19 and May 1, with the B-2 flying 50 combat sorties, the B-1B flying 225 sorties, and the B-52 flying 280. This was only 1.7 percent of the 32,850 USAF sorties flown during this period. USCENTCOM also estimates that fighters flew some 17 times more sorties than bombers. The B-1 and B-52, however, delivered a surprisingly high percentage of the total tonnage and precision-guided weapons delivered, and many of these strikes were flown against time-sensitive targets. In many ways, this repeated the experience of bombers in Operation Enduring Freedom in Afghanistan, where bombers flew only 20 percent of the sorties in the first three weeks of the fighting but delivered more than 76 percent of the tonnage.⁹⁸

The United States 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. This helps explain the continued upgrading of the B-52. Similar upgrading is taking place with the B-1B. There are 67–69 B-1s available, and virtually all of the 96 remaining B-1s 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 transmit 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 providing a more reliable communications link to ground forces to eliminate a problem in communications when the B-1B is banking or turning. Another is improving the resolution of the radar from 10 feet to one foot, providing cheaper and more effective electronic countermeasures, and 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.⁹⁹

The Impact of Range-Payload on Fighter Attack Aircraft and the F/A-18E/F

High-range payload fighter-attack aircraft like the F-15, F-16, F-18, and Tornado demonstrated a similar capability to make far more effective use of airpower. The ability to retarget aircraft to use precision weapons 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 had a far greater range-payload than the original F-16A/B. The improved IR sensors in a number of U.S. strike attack fighters allowed them to target Iraqi armor far more effectively than in the past, sometimes in dust storms.

The Issue of Survivability in Future Wars

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 bombers can be steadily modified and upgraded.¹⁰⁰ 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. Moreover, it is 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 where 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 be needed between an air superiority fighter like the F-22 and new strike-attack fighters like the JSF and FB-22.¹⁰¹

The Role of the E-8C JSTARS

There are no combat operations data available in a form where that makes it possible to precisely define the role of sensor aircraft like the E-8C JSTARS, or Joint Surveillance and Target Attack Radar System. It is clear, however, that extensive use was made of JSTARS. The Coalition’s air dominance allowed it to be deployed forward and nearer the battle space, where it could track Iraqi armored and vehicle movements over hundreds of square miles, and it was used to cover the greater Baghdad area. The “fusion of intelligence” from the E-8C and other sources enabled the coalition to locate and target Iraq forces under weather conditions the Iraqis 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.¹⁰²

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 a dozen types of UAVs in the conflict, building on the U.S. success in using such systems in Afghanistan.¹⁰³

The UAVs included larger systems like the Predator, Global Hawk, and the Pointer, the three systems the United States used in Afghanistan. The United States had used the Pioneer in the Gulf War. In the Iraq War, the Coalition also made use of new tactical systems like the U.S. Army Hunter and Shadow, the Marine Corp's Dragon Eye, and the USAF Force Protection Surveillance System. The change was particularly important in the case of field commanders, who had only one type of UAV available in the Gulf War but had 10 types available in the Iraq War.¹⁰⁴ Both the US military services and the Britain Ministry of Defense concluded that the value of these UAVs was one of the major lessons of the war.¹⁰⁵

The UAV Tactical User Interface

As with most other transitional systems, there were important issues in making effective use of UAVs. Informal U.S. Army and USAF reporting tends to concentrate on a lack of adequate assets and problems in the user interface. The report on the lessons of the war by 1 Marine Division provides a more detailed perspective, and the need to develop more effective forces becomes particularly clear when several of the lessons drawn are examined together.¹⁰⁶

As a result, broad examination may be needed of the extent to which warfighting intelligence is tailored to meet the time-sensitive needs of the user on the ground, and UAVs offer a potential way of providing cost-effective direct support to ground combat units. Certainly, the Marine Corps analysis reiterates many other comments that indicate that jointness and netcentric warfare become much less effective at the battalion level and lower.

UAV Procurement and the UAV Road Map

The success of UAVs is indicated by the fact that the United States issued a new UAV "road map" on March 18, 2003, just before the Iraq War. The road map laid out the development and use of unmanned aerial vehicles and unmanned air combat vehicles over the next 25 years based on the lessons of Afghanistan. The road map called for significant advances in UAVs in dealing with missions like the suppression of enemy air defenses. It called for better interoperability and standardization, for improved ability to manage air corridors and deconflict the use of UAVs/UCAVs (unmanned combat aerial vehicles, and for more rapid advances in UCAVs.¹⁰⁷ The road map also called for an increase in the number of UAVs supporting global military operations from around 90 in 2003 to 350 by 2010.¹⁰⁸

The Strengths and Weaknesses of the A-10

Both attack helicopters and the A-10 played effective and important roles 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, where they 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, the A-10 clearly 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 U.S. lines of communication.¹⁰⁹

The A-10 operated effectively over Baghdad during the battle for that city, even dropping down to 2,000-3,000 feet for strafing runs. Several A-10s were hit hard by enemy fire, including one that returned to base with nine hits. Only one A-10 was lost to enemy fire, when it was hit by a man-portable surface-to-air missile on April 8.¹¹⁰

The avionics on the current A-10 illustrate the advances in U.S. avionics even in relatively “simple” strike aircraft, and the merits of good protection and the ability to operate effectively as part of an expeditionary force.

The Strengths and Weaknesses of the A-64 Apache and Other Attack Helicopters

Attack helicopters like the AH-64, AH-64 Longbow, and AH-1 also played an important role in air support. There is, however, some debate over their performance and whether the war shows the need for new technical characteristics or for new tactics.

The Apache and Apache Longbow

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 wave seeker that allows the missile to perform in full fire and forget mode. The range is 8km to 12km. The Apache has been equipped with air-to-air missiles (Stinger, AIM-9 Sidewinder, Mistral, and Sidarm) and 2.75-inch rockets. The Longbow Apache can carry 16 Hellfire missiles on four 4-rail launchers and 4 air-to-air missiles in the close air support role.¹¹¹

The success of the AH-64 in Afghanistan may have been a factor leading the U.S. Army to decide to retain it as a long-term part of its Objective Force and to 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).¹¹²

The Iraq War, however, raised questions about the vulnerability of low-altitude fliers like the Apache and AH-1W.¹¹³ 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 U.S. 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 Medina Division near Karbala on March 24. Instead of ambushing Iraqi tanks by penetrating in undetected low altitude attacks, the helicopters encountered heavy small arms and light anti-aircraft fire before they closed on the Iraqi armor, and they had to retreat back to base after doing minimum damage.¹¹⁴ Reports from Marines in the field show that also 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.

Some experts think that the Army might have been able to carry out longer-range strikes more successfully if it had realized that the nape-of-the-earth and pop-up tactics it used to try to reduce helicopter vulnerability would not work in heavily defended areas. They argue that long-range attack helicopter strikes and operations in heavily defended areas could still be effective if they were carried out as joint operations with the air force, where aircraft suppressed ground-based air defenses and small arms fire while the helicopters attacked armor.¹¹⁵

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 and encountered heavy fire, allowed the A-10s to suppress the Medina Division's air defenses and small arms, and then reentered and 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.

Nevertheless, other commentators like General Merrill A. McPeak, the former chief of staff of the USAF, argue strongly that the AH-64 and other attack helicopters should have their operation restricted to short-range missions directly in combat support of land force commanders. General McPeak argues that nothing can give attack helicopters the stealth and speed necessary to survive, and that aircraft like the A-10 and fighters using stand-off precision weapons are far more effective in the mission.¹¹⁶ Short of a major exercise in joint test and evaluation, there is no clear way to resolve this debate.

At least some Marines also think that their experience with the AH-1 indicates that attack helicopters benefited from support from the combined arms team. Like most reports from AH-64 pilots, however, they chronicle a wide range of operations, in terms of both forward combat and protection of rear areas and lines of supply.

The U.S. Marine Corps AV-8B Harrier

The Marine Corps has had a troubled history with the AV-8B. At one point much of its fleet was deadlined, and detailed data are not yet available on the AV-8B or Harrier's performance in the Iraq War in either U.S. or British forces. However, , the Corps was able to base AV-8Bs on its light amphibious carriers, which gave the Coalition 60 more jets in theater than it otherwise would have had, due to lack of space to base, and which supported 60 of the 76 AV-8s in theater on amphibious carriers.

The Corps claims the Harriers had 85 percent aircraft availability and that 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 southeast of Baghdad. MALS-13 logisticians kept the flow of repairables and consumables moving to the 76 MAG-13 Harriers.

In 25.5 days of combat, AV-8Bs flew more than 3,400 hours and 2,000 sorties. They dropped/fired over 1,400 weapons, 900 of which were LGBs. Marine Corps officers claim that the use of the Litening II targeting pod achieved a better than 75 percent kill effectiveness on target with GBU's, and that laser-guided bombs killed the target seven times out of ten. In one wave alone, Harriers operating off of the USS *Bonhomme Richard* inflicted heavy damage on a Republican Guard Baghdad Division Armored Tank Battalion in advance of the MEF's push on Al Kut.

Not surprisingly, the Corps argues this performance strongly reinforces the need to procure the F-35B Joint Strike Fighter for the Marine Corps. The Corps also has drawn the conclusion, however, that the range-payload and endurance limitations of the AV-8B may have a different solution. The report on the lessons of the war by 1 Marine Division suggests that many of the problems in using the AV-8B could be solved by procuring the AC-130 gunship:¹¹⁷

Suppression of Enemy Air Defense (SEAD)

The United States 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.¹¹⁸ Operation Northern Watch enforced the no-fly zone north of the 36th parallel in Iraq and monitored Iraqi compliance with United Nations Security Council resolutions 678, 687, and 688.

The sheer scale of the no-fly zone effort was impressive long before the United States and Britain began to carry out a major effort to suppress the system. By August 2002, the United States and UK had already flown 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. They 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.

The US and Britain began to step up their operations against Iraqi air defenses as early as November 1991. During the first four months of 2002, however, the United States and UK struck targets in the northern and southern no-fly zones only six times. It was in the summer of 2002, that they began to strike at Iraqi air defenses with the deliberate goal of suppressing them in the event of a US and British invasion, and to hit at key command and control targets in the Iraqi air defense command and control system like the repeater stations necessary to allow its buried optical fiber communication system to function.

A postwar briefing by Lt. General T. Michael Mosley, the commander of coalition air forces during the war, indicated that US and British strikes had been intensified in both the northern and southern no fly zones in November 2001 in reaction to increased Iraqi efforts to shoot down a US or British aircraft. They were then further intensified in from the summer of 2002 as part of operation "Southern Focus," which was designed to suppress Iraqi air defense capability in the event of a US and British invasion. Mosley stated that the allies struck 349 Air Defense Command targets in southern Iraq, and fired 606 munitions, between June 2001 and March 19, 2003.¹¹⁹

The wartime suppression of Iraqi air defenses was carried out remarkably well. It did not interfere with an immediate shift to other offensive missions, and it 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.

At the same time, the SEAD mission should not be seen as easy. As has been discussed in chapter 3, USCENTAF estimated that some 210 surface-to-air missile launchers and 150 early warning radars were still active when the war began. The United States 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 Anti-Radiation Missiles. The United States 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 around the most modern European short-range missile air defenses.¹²⁰

The Role of the Patriot

USCENTCOM claims that the Patriot Pac 2 GEM and PAC-3 intercepted 9 of the 12 Al-Samoud 2 and Ababil-100 missiles fired at Kuwait during the conflict. Two intercepts were by Kuwaiti Patriot PAC-2w and seven were by US PAC-2s and PAC-3s (Only two of the Patriot missiles fired were PAC-3 because such missiles were in limited deployment when the war began.)¹²¹ 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 were fired from much further away. It compares with estimates by the GAO that only 9 percent of the Patriots fired during the previous Gulf War hit their target, and they hit only 1 of the 39 Scuds that Iraq fired at Israel.

The performance of the Patriots was 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 it 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.¹²² The Patriot also failed to detect an Iraqi CSSC-3 Seersucker cruise missile attack on Kuwait on March 20 and what seems to have been a Silkworm cruise missile attack on March 29, although the Seersucker is a low-flying sea/land skimmer that the Patriot's radar is not designed to detect.¹²³

The Patriot firings also exposed a problem with identification of friend or foe (IFF). This problem may have been occurred because pilots often turn off their transponders to avoid location by enemy surface-to-air defenses, or it may have been the result of a fault in the IFF system in the British Tornado. However, it may also 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.¹²⁴ There are also some indications that two Patriot units were placed too closely together, and that the electromagnetic radiation from one unit disrupted the operation of the other.¹²⁵

Several different kinds of incidents are involved. Patriots shot down a British Tornado on March 22 near the Iraq-Kuwaiti border and two British aircrew were killed. The Patriot locked on an F-16 south of Najaf on March 24 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 despite their identification of friend and foe (IFF) systems.¹²⁶

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 combination of flaws in both 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.”

LESSONS AFFECTING ARMY LAND FORCES

There are a number of lessons that primarily affect land forces.

The Value of Main Battle Tanks and Heavy Firepower and Armor

For all the talk of force transformation, the accounts of fighting by both the 3rd U.S. Army Infantry Division and 1st Marine Division make it clear that the M-1A1 Abrams Main Battle Tank, and its combination of protection and firepower, played a critical role in ensuring that Iraq's 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 Iraq War demonstrated the value of heavy armor, at least in terms of firepower and force protection. There are some indications that as a result of the lessons of the Iraq War, the U.S. Army is already rethinking some of its plans to cut armor modernization.¹²⁷ Similarly, the House Armed Services Committee has approved \$726.8 million to upgrade elements of US armor like the Abrams tank and Bradley, with \$24 million for the Abrams and \$258.8 million for the Bradley, because of their performance in the Iraq War.¹²⁸

The British Ministry of Defense too has concluded that the war demonstrated the value of the British Challenger tank, as well as of Britain's armored self-propelled artillery.¹²⁹

This does not mean that the U.S. Army and other forces cannot find new, lighter combat systems to replace the 70-ton M-1A2. It does indicate, though, that interim systems like the Stryker could not be an effective substitute for heavy armor in major regional contingencies. An even more serious problem is the extent to which the conversion of systems like the Abrams, with weights of nearly 80 tons, to developmental systems such as 20-ton weapons with similar war-fighting capabilities or to robotic weapons can actually take the place of heavy armor.

The first FCS brigade would not be deployable as a test force before 2012 at the earliest even if its component weapons met their schedule and had the proper effectiveness. But the plans so far have been poorly defined and subject to constant revision. A service with a zero historical success rate in meeting its own cost, performance, and scheduling goals for major new combat systems is not in a position to learn from this war that a tank in the bush is worth more than one at hand.

It is equally important that the Army have a real-world picture of just how much more rapidly it can deploy sustainable FCS for future major regional contingencies than it can its existing force. If such forces still have to move largely by sealift and still require secure major ports and extensive deployments of ammunition, supplies, and fuel, the fact that individual systems are smaller and lighter may not have as significant an impact on total force deployability as equipment comparisons would indicate. Equipment-versus-equipment comparisons are not force-versus-force comparisons, and only the latter are relevant in measuring war-fighting capability.¹³⁰

Questions also arise, however, about what would have happened if Iraq had 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 weapons—had been largely frozen in

time since the UN embargo on Iraqi arms imports in August 1990. No official data are currently available on the exact 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. At the same time, other questions arise as to whether the U.S. Army can justify light AFVs to replace heavy ones when casualties would have been much heavier in Iraq had light AFVs been used.

“Precision Artillery” as a Partner to “Precision Airpower”

As is the case with the use of airpower, there are no battle damage assessment data on artillery. There also is no way to determine the importance of artillery relative to airpower, or the relative usage and effectiveness of given artillery weapons. Some advances are clear. The flow of intelligence and targeting data to artillery units was better than in previous wars, and artillery was more maneuverable and quicker to react. It took eight minutes to set up the standard M109 155mm howitzer in the Gulf War. It took 30 seconds to set up the Army’s Paladin 155mm howitzer in the Iraq War.¹³¹

Some preliminary reports indicate that the United States was able to use long-range artillery and artillery rockets like the ATACMS to strike at Iraqi forces long before those forces could close on U.S. forces and also to compensate for the problems airpower experienced in flying attack and close air support missions during sandstorms. At the same time, other reports state that F-15s used targeting data from the E-8C JSTARS to launch GPS-guided bombs during the sandstorm and were the dominant weapon damaging Iraqi armor.¹³²

Television coverage showed 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.

U.S. artillery forces may also acquire considerably more lethality if the use of the SADARM proves to have been effective. The new M898 SADARM is the artillery's first fire-and-forget multisensor munition. It can be fired from any 155mm howitzer and delivers two separate submunitions with one projectile. It is an indirect fire munition intended primarily to counter enemy artillery, and it is fired after counter-battery radar, such as the Q37 Firefinder, locates enemy artillery. It can also attack other armored vehicles and air defense systems.¹³³

One lesson that the Iraq War does not support is trade-offs between artillery, rotary-wing attack helicopters, and fixed-wing attack aircraft. The data to date indicate that Iraqi forces could rarely close on U.S. Army and Marine Corps forces in sufficient strength to put a major strain on air attack resources. Some have suggested that this makes systems like the MLRS and ATACMS less important. It seems doubtful, however, that many wars against major regional opponents can be fought with a similar degree of air supremacy, and one key to the ability of U.S. ground forces to maneuver so quickly and aggressively is their ability to bring firepower to bear in an emergency. It is dangerous to propose trade-offs based on an opponent that may be unique in many ways without far clearer data in terms of the actual killing power of air and artillery systems, and without full consideration of the risks imposed in terms of maneuver warfare.

Special Forces as an Element of Joint Warfare

Special Forces and ranger forces played a major role throughout Iraq. The new interactions between Special Forces, precision airpower, and advanced IS&R 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.¹³⁴ Some estimates put the total at 8 percent of the forces actually engaged in combat.

Special Forces 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. They were employed in joint operations with small elements of armor and the forces of the 173rd Airborne Brigade, and with strike aircraft. Improvements in communications and command and control allowed commanders and other forces to locate Special Forces units with far more accuracy than in the past and to communicate with them in near real-time in missions like the time-sensitive targeting of strike aircraft.

These missions 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 export terminals in the Gulf.¹³⁵ The role of the CIA has had only limited public discussion. However, at least two Special Operations Groups were in place in Iraq in the Kurdish enclave weeks before the war began, one with Barazani and one with Talibani, and other teams were probably involved. The CIA teams seem to have had Special Forces seconded to them or working closely with them.

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 compensated in at least some cases 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 gave them a new degree of situational awareness and allowed them to coordinate more closely with other ground forces and operate in ways where higher echelons of command could do more to coordinate their operations.

U.S. Special Forces also seem to have been one of the few combat elements with the language skills and area training needed to work closely with opposition forces like the Kurdish Peshmerga and to make effective use of the volunteers from external Iraqi opposition groups who were trained to act as liaisons between U.S. forces and the Iraqi people. One of the almost constant problems in U.S. operations during the war was that U.S. units had far too few local Arabic speakers and far too few experts on Iraqi religious and cultural practices, with the result that they were not prepared to deal with Iraqi civilians or Iraq military who attempted to communicate with them.

This deficiency was not critical during battles with Iraqi Republican Guards or conventional forces or in firefights. But there was a clear and vital need for units trained in asymmetric warfare and equipped with language skills and area training in the north

and the west. The Iraq War also demonstrated the natural synergy between the Special Forces of Australia, Britain, and the United States and intelligence operations by organizations like the CIA. Special Forces have evolved beyond the mythos of combat elements like Delta Force and the sheer drama of sudden assaults on terrorists by the SAS.

The special training and tactics of special operations forces still give them the war-fighting capabilities of capability of “snake eaters” However, special operations forces now do far more than carry covert operations and dramatic raids. They now often are high-technology “snake eaters” with masters’ degrees. They are forces that have special area and language training, and that carry out a variety of specialized intelligence missions. 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.

It is already clear that at least the US has drawn the lesson that such forces are so valuable that they need significant expansion, a better defined role in joint warfare, and higher priority for investment in new equipment. One key question that emerges from both the Afghan and Iraq conflicts, however, is how the structure and composition of Special Operations Forces should change in the process, whether standards should change to create more specialists with less demand for skills as warfighters, and how special operations forces should be commanded and integrated into joint warfighting. The current thinking seems to emphasize placing larger special operations forces elements more directly under joint command, but the nature of such reforms is unclear.

Urban Land Warfare

Much of the past concern about urban warfare has centered on house-by-house or street-by-street fighting and on the risk that this kind of warfare commits Western forces in ways that severely limit their technological advantages and that can produce high casualties. As discussed in chapters 3 and 4, Iraq had some limited success in engaging U.S. and British forces in urban warfare. But it was never able to force them in intensive urban combat; it had lost most of its most effective forces before the battle of Baghdad began; and it was never able to mobilize an effective popular resistance. This makes it difficult to generalize about the lessons of urban warfare based on this experience.

The U.S. Army and Marine Corps did demonstrate, however, that it is possible to use the new degree of situational awareness provided by modern IS&R assets to help overcome the enemy’s superior knowledge of terrain, and move into 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 in Iraq without forward screening by infantry patrols. It was able to find relatively open routes and exploit the longer fields of fire provided by major streets and boulevards. It could bypass crowded and narrow, packed areas, and it either had sufficient protection to survive limited clashes or could dismount infantry once the encounter began.

The United States showed that it could divide cities using key routes and areas of concentration, rather than seeking to occupy large areas, and that it could “take a city” by focusing on seizing key symbols and centers of regime power.

The U.S. experience in Al Hillah and Nasiryah shows that these tactics 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 had not been committed piecemeal to 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 to engage outside the urban area. The fact that the Republican Guard was forced into meeting engagements helped to 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.

Postwar Urban Warfare

At the same time, the losses the United States has taken to Iraqi attacks since the Iraqi Army ceased resistance in late April 2003 show that urban warfare can be serious even in what is supposed to be peacetime. As described in chapter 7, the U.S. Army has taken serious casualties as a result of irregular attacks since the war supposedly ended. Many have been in urban areas, where sniping, rocket-propelled grenades, bombing, and mortar attacks have posed a serious threat to U.S. forces and friendly Iraqis and where economic sabotage has also been an issue.

Urban warfare in Iraq has proved a peacemaking and nation-building problem, not simply a war-fighting problem. Moreover, this form of urban warfare has had to operate under different rules and in a highly political context where it may be impossible to use airpower and where pushing the United States into the use of excessive force may be a major goal for an enemy. Similarly, it may be possible for an enemy to defeat the United States by alienating U.S. troops from the local population, and vice versa; by isolating the U.S. military and civilian presence by pushing it into an emphasis on protection; by blocking progress in the nation-building effort because NGOs and civilians will only take limited risks; and by creating a constant flow of low-level casualties whose political effect is congressional and popular calls for a U.S. withdrawal.

This highlights the need to see urban warfare in peacemaking and nation-building terms and to develop suitable tactics, training, and equipment.

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 U.S. military forces, or do more to adapt their equipment to global conditions. At the same time, every theater of operations places new and unexpected demands that have to be considered in going to war. These demands make forward area operations research critical, as well as careful research into weather and other factors that may alter the battlefield.

The United States was not surprised by sandstorms during the Iraq War; their effects had been studied in some detail. Nevertheless, the reality was more challenging than U.S. forces expected.

The Problem of Allied Power Projection, Interoperability, and Allied War-fighting 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 serious power projection capability. Even Britain, however, cannot sustain heavy forces in long-distance combat maneuvers at long power projection ranges.

Although 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 when they are becoming a coalition of the incapable. In the case of 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 the capability either to act as independent expeditionary forces or to be fully interoperable with the United States. Once again, the lack of a central focusing threat and the absence of missions that go beyond limited combat and peacemaking have led their civilian masters to allow them to decay into aging, heavily bureaucratic forces that often modernize in ways better suited to the politics of the European defense industry than to the requisites of effective war fighting.

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 military 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 toward high-cost technological obsolescence. And, once again, the situation 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.

The United States’ ability to work around the broad incapacity of European forces to find elements of great value is not effective interoperability. Neither is the United States’ ability to separate 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 AFFECTING MARINE CORPS LAND FORCES

In the process of carrying out this role, the US Marines proved that 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: Friction and the Continuing Fog of War

Like the other services, the Marines in the field have produced a number of reports on the lessons of the war, as well as anecdotal field reports from officers and other ranks about the course of combat and the lessons learned during the advance of Marine ground forces. The main report is the report on the lessons of the war from the Commanding General of the 1 Marine Division to the commanding general of the 1 MEF that has been referenced in several previous chapters.¹³⁶

Many of the lessons in this report are highly technical or service specific. Others, however, help illustrate the reality that 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.

Marine Corps Artillery

Few Marine accounts are available of the impact of artillery, but one press report states that, “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.”

Marine Corps Supply and Logistics

Both the US army and the US Marine Corps had problems with logistics in the field, as well as broader tactical problems. They were both affected by weather and by attacks by Iraqi irregulars in the field, and the sheer tempo of operations and speed of maneuver created supply problems and led to continuing detailed coordination problems between forward combat elements and combat support, service support, and logistics forces. these problems were exacerbated at the battalion level and below by tactical and rear area communications problems, and by the fact that neither the Army nor the Marine Corps had advanced digital systems capable of displaying and managing force elements, including logistics.

The 1 Marine Division report on the lessons of the war provided far more serious criticisms:¹³⁷ It should be noted in regard to the latter criticisms, that field reports from individual units and soldiers in the US Army reflect very similar problems. The field logistic effort could not be properly coordinated with forward combat elements, communications between combat and logistic forces were a serious continuing problem, the data management system was inadequate at the data level, and the US Army also often had to operate on the basis of improvisation, work arounds, local unit-to-unit arrangements, and flooding supplies forward in anticipation of need.

In an ideal world, this would lead to the creation of a common management and communication system that could deal with the problems of both the Marine Corps and US Army in every contingency and in ways that allowed a coordinated joint logistic effort with the US Navy and US Air Force. In practice, such a system may not be feasible for a decade or more if ever, although steady improvement can be made as both the Marine Corps and Army become digital forces. It simply is not clear that any system architecture can ever eliminate the need for improvisation, work arounds, local unit-to-unit arrangements, and flooding supplies forward in anticipation of need, and creating over-ambitious systems and solutions may either result in costly failures or an over-rigid “joint” effort that become more of a problem than a solution.

LESSONS 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 for air bases that can now be supplemented with cruise missiles.

The US carriers made combat use of the F/A-18E/F Super Hornet for the first time. They also could make 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 .

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. It also, however, is another reason to give Marine Corps amphibious ships a dual-role as light helicopters and to consider how they can be used to project Special Forces as well as Marine Corps units.

Another challenge for the carrier forces is keeping a large 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.

Jointness in Naval Air Operations

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 some 800 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. In the Iraq War, the ATO was sent digitally by secure internet from the 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.¹³⁸

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.¹³⁹

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 allow 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.

Jointness in C3, IS&R, and "Open Architecture"

Like the other services, including the US Marine Corps, the Navy is evaluating ways to improve its C3 and IS&R systems. This is part of a broader effort to establish an open architecture for US Navy information systems, many of which were designed on a ship-by-ship or platform-by-platform basis, and in some cases, decades ago. The submarine fleet and naval air operations have modernized significantly more quickly than the surface fleet, but it is clear that the Navy needs to make advances in these areas if it is to properly support amphibious and littoral operations and match the USAF's advances in developing joint "digital" communications, control, targeting, and data systems with US and allied land forces.¹⁴⁰

Cruise Missile Ships

As has been noted in Chapter Eight, the coalition made heavy use of sea-launched cruise missiles in the Iraq War. This raises issues regarding 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. More broadly, it raises questions about the cost-effectiveness trade offs between sea and air launched platforms in an era where relatively cheap air launched platforms like the JDAM can be so effective.

At the same time, the value of precision strike capability is so high that questions arise as to what would happen in less permissive environments than Iraq, such as North Korea. In contrast to Iraq, where highly "visible" slow flyers like the B-1B and B-52 were able to loiter and provide time-sensitive strikes, there might well be a need for some form of "arsenal ship" that could supplement naval aviation with massive long-distance strike power, preferably without major escort forces.

Mine Warfare and Naval Raids

The use of Special Operations Forces to seize Iraq's offshore oil export terminals, as well as British Royal Marine and SBS operations in coastal areas, provides yet another illustration of the broad value of special forces in modern warfare. While the Iraq War did not involve amphibious operations, it is clear that control of local waters, and that even small littoral operations can have high payoffs.

The Iraqis failed to use mines and suicide boats effectively against Coalition naval forces and ship, but did succeed in blocking the channels to Iraq's ports. It is clear that the anti-mine and ship protection mission remain critical.

More broadly, Iraq did retain anti ship missile capabilities, and it is clear that asymmetric warfare remains as much a threat at sea as it does on land and in the air.

Value of Sealift and Maritime Prepositioning Ships

The US and Britain could not have fought the war in the way they did without relying on sealift to provide most of the supplies, heavy equipment, and heavy weapons needed to fight the war. The timing of the war was also critically dependent on the ability to carry out this sealift process from a beginning in the spring of 2002 to a peak just before and during the war.

The Value of Allies

The British Ministry of Defense drew the same general lessons about the value of seapower as the US. It also highlighted the value of the long history of close cooperation between the British and US navies, and the value of "jointness" defined in international terms:¹⁴¹ The interoperability of US and British naval forces, and those of Australia as well, is not a new lesson of the Iraq war. This does not, however, make the lesson any less important.

LESSONS RELATING TO INTELLIGENCE AND WEAPONS OF MASS DESTRUCTION

A number of the lessons of the Iraq War affect intelligence, the ability to deal with weapons of mass destruction, and psychological warfare. Although these lessons cannot be fully separated from the analysis of IS&R, targeting, and conflict termination in other chapters, several issues merit detailed examination.

Intelligence Strengths and Weaknesses

The Coalition had overwhelming overall superiority in the intelligence aspects of IS&R. It also had the advantage of experience and a vast range of intelligence collection and analysis to build upon. The United States 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 it had had to prepare for war several times after 1991.

The United States and Britain had carried out major strikes during Desert Fox in 1998, and they repeatedly flew reconnaissance missions and strikes over Iraq to enforce the no-fly zones during 1998–2003. This combination of intelligence effort and combat experience provided a unique degree of situational awareness before the war began. At the same time, it is important to temper any lessons about the advantages of U.S. intelligence assets with the understanding that similar experience and knowledge may not be present in future contingencies.

At the same time, the Iraq War is a warning that even the world's most advanced intelligence systems and more than a decade of intensive intelligence collection and analysis could still leave major gaps and serious intelligence problems. As has been discussed throughout much the preceding analysis, the United States and its allies still had serious problems in the following aspects of intelligence collection and analysis:

- The United States and Britain were never able to establish a credible picture of Iraqi links to terrorist organizations, including Al Qaida. Many charges were made, but none were substantiated.
- The United States did not have enough area experts, technical experts, and analysts with language skills at any level to make optimal use of its sensors collection, and data. This was as true at the national level as at the tactical level, and collection overload was a problem in many areas.
- The United States had a far greater capability to target buildings than to characterize what went on in the building and the effect of strikes on most sets of structures. It could not measure the level of wartime activity in many cases (facilities with high emission levels were an exception), and this made the efforts at “effects-based” operations discussed in later chapters difficult and sometimes impossible. Moreover, estimates of the level and nature of underground and sheltered facilities and activity were generally highly problematic.
- The IS&R effort mistargeted leadership facilities, exaggerated the importance of C4I strikes, and overtargeted fixed military facilities. It is unclear, however, that the United States and its allies had any other choice. Striking more targets in the face of uncertainty was probably better than striking only those targets where a high confidence could be established as to the effect.
- The IS&R effort often had to take a “worst case” approach to the potential role of Iraq's security forces, intelligence services, irregular forces like Saddam's Fedayeen, and unusual military formations like the Special Republican Guard. In fairness, however, it is difficult—if not impossible—to accurately characterize the warfighting capability of forces that have never fought and that do not conduct open and realistic exercises.

- The IS&R sensor and analytic effort focused more on major combat forces, with heavy weapons, than on infantry or irregular forces. It could do a much better job of locating and characterizing weapons platforms and military emitters than dealing with personnel and forces that relied on light vehicles. It was generally difficult or impossible to locate distributed forces in a built-up or urban environment until they were forced into some form of open military activity, and the United States often lacked the density of specialized assets like UAVs to carry out this mission even when open activity took place.
- The IS&R effort did much to reduce collateral damage and the risk of civilian casualties. It was neither organized nor capable, however, of assessing either civilian or military casualties.
- The speed and intensity of the war seem to have led to a major breakdown in the battle damage assessment process. Quite aside from the many gaps and uncertainties **remaining** in the BDA process, the IS&R system could not close the cycle in terms of target-shoot-assess on a timely and accurate basis, which remains a critical challenge in creating true netcentric war.
- The IS&R effort was not able to characterize and target Iraq's weapons of mass destruction effort before or during the war, or to provide reliable warning of the tactical threat. It seems to have been somewhat better in dealing with potential delivery systems, but the level of improvement relative to the inability to locate the Iraqi chemical, biological, and nuclear effort is unclear.

The Need for Better Assessment, Characterization, and Location of Weapons of Mass Destruction and Key Delivery Systems

The most controversial failures in intelligence lay in the area of weapons of mass destruction. It may 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 war, and its goals or objectives.

It has become clear that the U.S. and British governments had only a tenuous understanding of the threat they faced from Iraqi weapons of mass destruction—and were unable to characterize the scale of the Iraqi effort they described as a key motive for the conflict—during the period before the war began.¹¹⁴²

It is also clear from the previous chapters that Coalition commanders had little intelligence on Iraq's WMD programs and warfighting capabilities as they advanced. A wide range of reports during the war make clear that there were many false alarms—when elements of the advancing forces thought they had found weapons of mass destruction or the facilities to produce them; when Coalition forces donned chemical protection gear they later turned out not to need; or when Coalition commanders, lacking the tactical intelligence support that would give them a clearer picture of the risks involved, had to ignore the risk that Iraq might use such weapons.

Problems in Collecting Data on Iraqi and Other Country WMD Capabilities and Delivery Systems

Even a cursory review of this list of U.S. and British charges about Iraq's WMD capabilities shows that point after point that was made was not confirmed during war or after the first two months of effort following the conflict. Despite all of the advances in their IS&R capabilities, the United States and Britain went to war with Iraq without the

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level of evidence needed to provide a clear strategic rationale for the war, and without the ability to fully understand the threat that Iraqi weapons of mass destruction posed to U.S., British, and Australian forces. This uncertainty is not a definitive argument against carrying out a war that responded to grave potential threats. It *is* a definitive warning that this intelligence and targeting are not yet adequate to support grand strategy, strategy, and tactical operations against proliferating powers or to make accurate assessments of the need to preempt.

It is difficult to put these problems into perspective without access to classified material. Past declassified U.S. intelligence reporting on proliferation has made it clear, however, that proliferation presents very serious problems for intelligence collection and analysis. UNSCOM and UNMOVIC reports show that Iraq was well aware of these problems and how to exploit them:

- Iraq and other powers sophisticated enough to proliferate are also sophisticated enough to have a good understanding of many of the strengths and limitations of modern intelligence sensors, the timing and duration of satellite coverage, and the methods use to track imports and technology transfer. They have learned to cover and conceal, to deceive, and to create smaller and better disseminated activities.
- Intelligence collection of relies heavily on finding key imports and technology transfers. Such reports, however, only usually cover a small fraction of the actual effort on the part of the proliferating country, and the information collected is often vague and uncertain, in part because importers and smugglers have every incentive to lie and are also familiar with many the ways to defeat intelligence collection and import controls. When information does become available, it is often impossible to put in context, and a given import or technology transfer can often be used in many difficult ways, often was other than proliferation. Such import data can hint at the character of a proliferation effort, but give no picture of the overall character of the activity.
- Even when data are available on given imports or technology transfers, they generally present three serious problems. One is that there is no way to know the end destination and use of the import and how it is integrated into the overall effort. The second is there is no way to know if it is integrated into an ongoing research and development effort, a weapons production effort, being procured or stockpiled for later use, or simply an experiment or mistake that is never further exploited. The third is that many imports have civilian or other military uses. These so-called “dual-use” imports may have legitimate use.
- The very nature of arms control agreements like the Nuclear Non-Proliferation Treaty (NNPT), Biological Weapons Convention (BWC), and Chemical Weapons convention (CWC) encourages proliferating nations to lie and conceal as effectively as possible. The same is true of supplier agreements like the Missile Technology Control Regime (MTCR) and Australia List, and any form of sanctions. Arms control only encourages compliance among non-proliferators and non-sellers, and current enforcement efforts are too weak to be effective while their provisions effective license technology transfer to those nations who succeed in lying or concealing.
- The technology of proliferation generally permits the research and development effort to be divided up into a wide range of small facilities and projects. Some can be carried out as legitimate civil research. Others can be hidden in civil and commercial facilities. As proliferators become more sophisticated, they learn to create dispersed, redundant and parallel programs, and mix high secret covert programs with open civil or dual-use programs. Chemical, biological, and cruise missile programs are particularly easy to divide up into small cells or operations. However, this is increasingly true of nuclear weapons centrifuge programs, plutonium processing and fuel cycles, and the testing and simulation of nuclear weapons that does not involve weapons grade materials. Many key aspects of ballistic missile R&D, including warhead and launch system design fit into this category.

- Iraq and most other proliferators have, in the past, focused on creating stockpiles of weapons for fighting theater conflicts against military forces. These stockpiles require large inventories, large-scale deployments, and generally mixes of training and warfighting preparations that create significant intelligence indicators. There are, however, other strategies and many proliferators may now be pursuing them. One is to bring weapons to full development, and to wait until a threat becomes imminent to actually produce the weapon. A second is to follow the same course, but create large dual-use civil facilities that can be rapidly converted to the production of weapons of mass destruction. These can include pharmaceutical plants, food-processing plants, breweries, petrochemical plants, and pesticide plants, but key assembly lines can be concealed in a wide range of other commercial activities.¹⁴³ Weapons production facilities can be stockpile for a later and sometimes sudden breakout. A third is to focus on creating as few highly lethal biological or nuclear weapons to attack key political or civilian facilities in a foreign country, rather than its military forces. Highly lethal non-infectious or infectious biological agents are one means of such an attack, biological weapons directed at crops or livestock are another.
- Countries can pursue very different strategies in dealing with their past inventories of weapons. They can disclose and destroy them, knowing they do not face an urgent warfighting need, better weapons are coming, and this suits current political objectives. They can claim to destroy and hide the remaining weapons in covert areas known only to a few. They can claim to destroy, or lie, and disperse weapons where they can be used for warfighting purposes. In many cases, intelligence collection may not be able to distinguish between such strategies, and a given proliferator like Iraq can pursue a mix of such strategies—depending on the value of the weapon.
- In many cases, there is no clear way to know whether a program is R&D, production and weapons deployment, or production capable/breakout oriented. The problem is further complicated by the fact that Iraq and other countries have learned to play a “shell game” by developing multiple surface and underground military facilities and dual-use facilities and to create relatively mobile mixes of trailer/vehicle mounted and “palletized” equipment for rapid movement. Large special-purpose facilities with hard to move equipment often still exist, but they are by no means the rule. Intelligence collection takes time and may often lag behind country activities.
- Unless a country keeps extremely accurate records of its programs, it is often far easier to estimate that maximum scale of what it might do than provide an accurate picture of what it has actually done.
- In most cases, it is impossible to know how far a given project or effort has gotten and how well it has succeeded. The history of proliferation is not the history of proliferators overcoming major technical and manufacturing problems. It is the history of massive management and systems integration problems, political failures, lying technical advocates and entrepreneurs, project managers who do not tell their political masters the truth, and occasional sudden success. Short of an intelligence breakthrough, it is rarely possible to assess the success of a given effort and even on the scene inspection can produce vary wrong results unless a given project can be subjected to detailed technical testing. For example, UNSCOM and the IAEA found that virtually all of their preliminary reporting on Iraq’s nuclear effort in 1992-1993 tended to exaggerate Iraqi capabilities once they had had the time to fully assess the efficiency of key efforts like the Calutron and centrifuge programs.
- The only definitive way to counter most of these collection problems is to have a reliable mix of redundant human intelligence (HUMINT) sources within the system or as defectors. The United States, however, has never claimed or implied it had such capabilities in any proliferating country, and the history of U.S., British, UNSCOM, and UNMOVIC efforts to deal with Iraq makes it painfully clear both that such transparency was totally lacking in Iraq and that most Iraqi defectors and intelligence sources outside Iraq made up information, circulated unsubstantiated information, or simply lied. Breakthroughs do occur, but HUMINT is normally inadequate, untrustworthy, or a failure, and these shortcomings cannot generally be corrected with data based on other intelligence means. Either inside information is available or it is not. When it is, imagery and signals intelligence generally do far more to indicate that HUMINT is wrong or suspect than to reveal the truth.¹⁴⁴

- In many cases, even the leaders of a proliferating country may not have an accurate picture of the success of their efforts, and most probably do not have a clear picture of the accuracy, lethality and effects, and reliability of their weapons. U.S. and British research efforts have long shown that even highly sophisticated technical models of the performance and lethality of chemical, biological, and nuclear weapons and delivery systems can be grossly wrong, or require massive levels of human testing that simply are not practical even for closed authoritarian societies. No declassified intelligence report on any proliferation effort in any developing country has yet indicated that Iraq or any other proliferator has sophisticated technical and testing models in these areas. Intelligence cannot collect data that do not exist.

Problems in Analyzing Iraqi and Other Country WMD Capabilities and Delivery Systems

Many of the resulting problems in the analysis of the WMD capabilities of Iraq and other countries are the result of the previous problems in collection. The details of U.S., British, and allied intelligence analyses remain classified. At the same time, background discussions with intelligence analysts and users reveal the following additional problems in analyzing the WMD threat:

- The uncertainties surrounding collection on virtually all proliferation and weapons of mass destruction programs are so great that it is impossible to produce meaningful point estimates. As the CIA has shown in some of its past public estimates of missile proliferation, the intelligence community must first develop a matrix of what is and is not known about a given aspect of proliferation in a given country, with careful footnoting or qualification of the problems in each key source. It must then deal with uncertainty by creating estimates that show a range of possible current and projected capabilities—carefully qualifying each case. In general, at least three scenarios or cases need to be analyzed for each major aspect of proliferation in each country—something approaching a “best,” “most likely,” and “worst case.”¹⁴⁵
- Even under these conditions, the resulting analytic effort faces serious problems. Security compartmentation within each major aspect of collection and analysis severely limits the flow of data to working analysts. The expansion of analytic staffs has sharply increased the barriers to the flow of data, and has brought large number of junior analysts into the process that can do little more than update past analyses and judgments. Far too little analysis is subjected to technical review by those who have actually worked on weapons development, and the analysis of delivery programs, warheads and weapons, and chemical, biological, and nuclear proliferation tends to be compartmented. Instead of the free flow of data and exchange of analytic conclusions, or “fusion” of intelligence, analysis is “stovepiped” into separate areas of activity. Moreover, the larger staffs get, the more stovepiping tends to occur.
- Analysis tends to focus on technical capability and not on the problems in management and systems integration that often are the real world limiting factors in proliferation. This tends to push analysis towards exaggerating the probable level of proliferation, particularly because technical capability is often assumed if collection cannot provide all the necessary information.
- Where data are available on past holdings of weapons and the capability to produce such weapons—such as data on chemical weapons feedstocks and biological growth material—the intelligence effort tends to produce estimates of the maximum size of the possible current holding of weapons and WMD materials. While ranges are often shown, and estimates are usually qualified with uncertainty, this tends to focus users on the worst case in terms of actual current capability. In the case of the Iraq, this was compounded by some 12 years of constant lies and a disbelief that a dictatorship obsessed with record keeping could not have records if it had destroyed weapons and materials. The end result, however, was to assume that little or no destruction had occurred whenever UNSCOM, UNMOVIC, and the IAEA reported that major issues still affected Iraqi claims.

- Intelligence analysis has long been oriented more towards arms control and counterproliferation rather than war fighting, although DIA and the military services have attempted to shift the focus of analysis. Dealing with broad national trends and assuming capability is not generally a major problem in seeking to push nations towards obeying arms control agreements, or in pressuring possible suppliers. It also is not a major problem in analyzing broad military counterproliferation risks and programs. The situation is very different in dealing with war fighting choices, particularly issues like preemption and targeting. Assumptions of capability can lead to preemption that is not necessary, overtargeting, inability to prioritize, and a failure to create the detailed collection and analysis necessary to support warfighters down to the battalion level. This, in turn, often forces field commanders to rely on field teams with limited capability and expertise, and to overreact to any potential threat or warning indicator.
- The intelligence community does bring outside experts into the process, but often simply to provide advice in general terms rather than cleared review of the intelligence product. The result is often less than helpful. The use of other cleared personnel in U.S. laboratories and other areas of expertise is inadequate and often presents major problems because those consulted are not brought fully into the intelligence analysis process and given all of the necessary data.
- The intelligence community does tend to try to avoid explicit statements of the shortcomings in collection and methods in much of its analysis and to repeat past agreed judgments on a lowest common denominator level—particularly in the form of the intelligence products that get broad circulation to consumers. Attempts at independent outside analysis or “B-Teams,” however, are not subject to the review and controls enforced on intelligence analysis, and the teams, collection data, and methods used are generally selected to prove given points rather than provide an objective counterpoint to finished analysis.¹⁴⁶

More broadly, the users of intelligence are at best intolerant of analysis that consists of a wide range of qualifications and uncertainties even at the best of times, and the best of times do not exist when urgent policy and warfighting decisions need to be made. Users inevitably either force the intelligence process to reach something approaching a definitive set of conclusions, or else they make such estimates themselves.

Intelligence analysts and managers are all too aware of this fact. Experience has taught them that complex intelligence analysis—filled with alternative cases, probability estimates, and qualifications about uncertainty --generally go unused or make policy makers and commanders impatient with the entire intelligence process. In the real world, hard choices have to be made to provide an estimate that can actually be used and acted upon, and these choices must either be by the intelligence community or the user.¹⁴⁷

The Need for Rapid and Reliable Characterization of Chemical and Biological Agents and the Coalition Intelligence Effort

The problems in the intelligence efforts of the United States and other Coalition members affected warfighting as well as the politics of the war. Despite all of the advances in IS&R capabilities, and despite more than a decade of additional intelligence collection and targeting experience, the United States and its allies were just as unable to characterize and target Iraq’s capabilities to use, produce, and deliver weapons of mass destruction during military operations as they had been during Desert Storm and Desert Fox. If anything, the United States was more successful in the Gulf War, although many of its limited successes during that war were more the accidental result of hitting secondary targets than the product of intelligence analysis and military planning.

Each of the military services had to plan before and throughout the Iraq War for the risk that Iraq would use weapons of mass destruction. It is important to note that from an

operational point of view, no commander could know whether weapons of mass destruction could or would be used until the end of the war. There were many cases where units had to use protective gear, and the speed of maneuver involved significant potential risk in the face of any sudden Iraqi escalation to the use of such weapons.

In many cases, more sophisticated and quicker reacting detectors and grids could have reduced the strain on U.S. and British forces. It is also clear from the results of the search for weapons of mass destruction during and after the war that **current** 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 produced a false positive finding that could be disproved only 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.

proliferation is not simply an intelligence or policy problem, it is an operational problem. The greater the uncertainty, the greater the operational dilemma in choosing between protective and defensive measures and in maintaining the tempo and focus of combat. If the Iraq War provides a lesson in this area, it is that the United States and its allies have no reliable way as yet to reduce this dilemma, reduce the risks involved, or reliably deal with this aspect of asymmetric warfare.

Organized Searches for Weapons of Mass Destruction in Proliferating Countries: The Search During and After the War

The Iraq War provides important lessons about the need to search for possible weapons of mass destruction and sensitive facilities during a war, and the need to secure such facilities as soon as possible. The United States did carry out an ongoing effort to find and secure Iraqi weapons of mass destruction and related facilities as it advanced. But this effort had limited manning and uncertain intelligence support, and could provide only limited coverage. The United States lacked an effective plan and coordinated effort to secure Iraq's WMD and missile facilities as U.S. forces advanced, and some—including nuclear facilities—were looted as a result.

Lessons for the Future

The end result so far of the entire intelligence and search effort relating to Iraqi weapons of mass destruction has been to strengthen those who argued against the war and who have since sought to discredit or block a Coalition-led nation-building effort. It also threatens to become a specter that will haunt any future U.S. and allied efforts to deal with the threat of proliferation, particularly in winning domestic and international political support for military or preemptive action.

The solution to some extent is to admit the scale of problems that exist in the collection and analytic effort and then make major efforts to reduce them. It is also to lay the groundwork for any future action in a crisis by systematically educating decision makers, the media, and the public about the inevitable level of uncertainty in such assessments; this can be done through a series of classified and unclassified intelligence products that

are as detailed and objective as possible. Credibility and understanding have to be created over a period of years, not in a crisis. Moreover, the United States and Britain need to understand that the Iraq War has left a heritage of distrust that must be overcome.

It is not enough to have a preemptive strategy. 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. The need to unambiguously resolve the kind of uncertainties that surrounded the Iraqi effort in weapons of mass destruction in both the Gulf War and Iraq War is a critical national priority, however. So is the need to examine far more intrusive methods of data gathering, such as unattended ground sensors. If the choice is between infractions of national sovereignty, on the one hand, and war or unacceptable risks on the other, aggressive intelligence gathering and infractions of national sovereignty are by far the better course,

There are 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 United States, 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 United States could never characterize Iraqi links to terrorism or Iraq's 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.

The second corollary is that the problems involved go far beyond any failures on the part of the United States. 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 it. It is easy to focus on the fact that the United States and Britain may have exaggerated the threat and miss the point,

The United Nations accomplished a great deal, and the work of the IAEA, UNSCOM, and UNMOVIC merits the world's gratitude and respect. What could be done was done. Nevertheless, an intensive international arms control effort by UNSCOM, the IAEA, and UNMOVIC -- using better means of inspection and arms control to deal with Iraq than now cover any other nation in the world -- was still inadequate. This is a grim warning that major improvements 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.

LESSONS FROM IRAQI PROBLEMS AND SHORTCOMINGS

It may be years before the Iraqi view of the war is fully understood, if ever. Only the top Iraqi leadership probably knows the calculations involved. Still, however, there 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 U.S. 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 loyal 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 Guard did. In spite of Saddam Hussein’s attempt to buy it loyalty, many officers saw the regime as corrupt and as favoring the Republican Guards and security forces at the expense of the nation and the regular army.¹⁴⁸

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 percent 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 U.S. 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 Iraqi Air Force had 20,000 men and more than 300 combat aircraft with potential operational status. It had a 17,000-man air defense command with more than 850 surface-to-air missile launchers and some 3,000 anti-aircraft guns. Iraq’s small, 2,000-man navy was equipped with nine small combat ships and an unknown number of mines and Silkworm land-based anti-ship missiles

But Iraq’s overlapping structure of forces and security elements were often better at watching one another and at securing the regime than at 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 had rebuilt its post-Gulf War forces more around internal security missions, regime stability, and static defense than around the lessons of that war.

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. However, the Iraqi regime sent the Republican Guard forces out into exposed maneuvers and combat, and some estimates indicate that all but two dozen or so of the Guards’ operational tanks were destroyed or abandoned by the end of the war. It seems far more likely that many were actually abandoned, and such counts must be kept in

careful perspective because there were serious problems in the coalition's battle damage assessment problems throughout the war.

Some 80% of the coalition air strikes hit at Iraqi ground forces.¹⁴⁹ It is not surprising, therefore, that this treatment of the Republican Guards compounded the impact of all of the political and other problems in the Iraqi command structure, the divisions between its military services, and its problems in mounting a cohesive defense of Baghdad. A 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 quickly realized that they simply could not survive in the face of U.S. sensors, targeting capabilities, and precision strikes. As a result, most of them stopped sleeping with their vehicles and abandoned them quickly after initial losses. Many units also had mass desertions after their initial clashes with US land forces or after they began to take serious equipment losses because of coalition air attacks. The end result was that casualties were probably surprisingly limited, as the forces ceased to be operational when they came under air attack and often could not recover from the resulting desertions.¹⁵⁰

Iraq effectively wasted most of the Baghdad, Medina, Nebuchadnezzar, and Hammurabi divisions of its Republican Guard by sending them into exposed positions some 100 miles south of the capital. There they could be located by UAVs and aircraft like the E-8C and hit from the air. Some reports indicate that more than half of the air munitions dropped by U.S. forces were directed against the Guard units. Once the Republican Guards came under this intensive level of attack, their armored forces had nowhere to go and could do nothing but clash with U.S. Army and Marine forces, whose sensors, helicopters, tanks, artillery, and anti-tank guided weapons could generally destroy the remaining elements before they could close on U.S. forces.

Making Urban Warfare in Baghdad Difficult to Impossible

This left the defense of Baghdad to be improvised around the Republican Guards as the only force that was truly loyal to the regime and willing to fight. In practice, however, the Guard units were shattered and demoralized before U.S. forces reached Baghdad. This meant there was no cohesive or leading element to ensure that the regular forces, Special Republican Guards, and most popular forces would fight to defend the greater Baghdad area.

The regime lacked the command and control capability, and possibly the communications capability, to conduct any kind of cohesive retreat and concentration of forces around Baghdad. While the historical record is far from clear, the way in which the regime had effectively wasted the Republican Guards seems to have convinced most of the Special Republican Guards and different security services that there was little point in continuing the 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. Not only did it need the latest technology to compensate for poor military organization and training; it used imports to flood forward 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 able to fund and/or import any major new conventional warfare technology to react to the lessons of the 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 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, that its combat readiness was uncertain, and that 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.

Iraqi Wartime Preparations Emphasized the Wrong Ideology and Type of Psychological Operations

Iraq circulated literature to its field commanders and troops that emphasized defensive warfare. It did not prepare them for air and missile attacks, and it called for Jihad and Islamic martyrdom rather than effective tactics and combat. It prepared Iraqi units for US and British use of chemical warfare against them, and trained them to disperse, rather than make the kind of rapid conventional response that might have delayed the coalition advance

Rather than being trained properly for asymmetric warfare, troops were often given pointless ideological nonsense. Martyrdom and suicide attacks do present problems for conventional forces, and some extremist elements will support and carry out such operations. But 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.

Iraqi Command and Control was Never Effective, and Iraq Could Never Recover in the Face of Airpower and the Speed of the Coalition Advance: A Blind Force as Well as One Without a Brain

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 had no satellites, minimal UAV assets, no survivable reconnaissance assets, poor artillery radar capability, and no other airborne intelligence assets. It conducted minimal active reconnaissance. If its C⁴I problems deprived it of a functioning brain, its lack of modern IS&R assets effectively left it blind in most aspects of combat beyond visual range.

It is clear, however, that Iraq was thrown off balance by the speed of U.S. maneuver as well as by the flanking movement through the western edge of the Euphrates and, then, the drive along the eastern edge of the Tigris. Once the United States approached Baghdad, Iraqi forces could neither maneuver quickly enough to establish a cohesive, in-depth defense nor cope with U.S. penetrations. The Iraqi decision-making cycle fell

steadily behind the realities on the ground. By the time the United States entered Baghdad, Iraq had lost force cohesion and committed its best forces—the Republican Guards—in a piecemeal way in meeting engagements that virtually ensured its destruction.

Iraqi Irregular Warfare Tactics Were Unexpected but More an Irritant than Effective

Iraq seems to have badly exaggerated the potential importance of using irregular forces and trying to draw U.S. and British forces into the cities in the south. In practice, these tactics produced clashes and occasional successes. But the United States quickly adjusted its own tactics to bypass most cities, secure key bridges and routes, and give the pacification of cities secondary importance.

The regime was often creative, but it failed at fundamentals like blowing up bridges and oilfields and at creating large, popular army forces that could present a serious threat to the U.S. flanks. Rather than frightening or paralyzing U.S. and British forces, the regime largely succeeded in making them angry and delaying humanitarian efforts.

Irregular Tactics Have Limited Success Unless They Have Popular Support

As has been mentioned, the regime fundamentally misjudged the popular support it could obtain from its own people. It cached massive levels of arms in facilities for an “Al Quds” or Popular Army it was never able to call up, arm, and deploy. This may in part 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. Problems in Urban Warfare

Iraq deployed some of its most loyal irregular forces, like Saddam’s Fedayeen, in the south. These units had some successes in ambushes, but could not survive open combat with US or British forces and lacked mobility other than light civilian vehicles. This made them relatively easy to bypass or force out into open combat. One ironic sub-lesson of the war is that the bypasses and roads that went around many cities in Iraq greatly reduce their importance as potential defenses and barriers, and that one way to win an urban war is to avoid one.

It seems equally clear that the divisions and political tensions between various elements of the Iraqi armed forces severely limited the regime’s ability to use irregular forces in the defense of Baghdad. There is no real evidenced that the regime ever had a master plan to pull together its irregular forces, the Special Republican Guards, the Republican Guards, the regular army, and the security services into a cohesive defense.

Baghdad’s physical defenses, the rings of trenches around the city, and use of burning oil-filled trenches, concealed a reality where every Iraqi force element pursued its own goals, power, and survival rather than the actual defense of the city. The more the US advanced, the more survival became the key goal, and the more the various Special Republican Guard, Republican Guard, and security service elements that might have led the irregular forces lost the will to fight and deserted.

Iraq Failed to Use Its Weapons of Mass Destruction, *if It had Them*

There is no way to know how many weapons of mass destruction Iraq had or what its plans might have been. The war caught Iraq at the moment it was trying to prevent a conflict by complying with the IAEA and UNMOVIC, and it may have destroyed many of its WMD holdings or dispersed them too far to recover.¹⁵¹

Allied air power may have paralyzed any efforts to recover dispersed or hidden weapons, and it certainly destroyed many potential delivery systems. U.S., UK, and Australian Special Forces were much better organized and equipped for the mission of suppressing missile attacks than they had been in the first Gulf War in 1991, and were 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 had felt sufficiently secure from an invasion during the years from 1991 on wars so that it destroyed its weapons, and 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 and deploy them before and during the Iraq War.

As is discussed in Chapter XII, however, there are so many uncertainties regarding Iraq's actual holdings of weapons of mass destruction that there has never been an assurance that Iraq could not use such weapons, and the Iraq War does not provide any lesson that other proliferating nations will not use them in the future.

Iraq Failed to Use Its Missiles Effectively

Missiles, like bombs, are not terror-producing weapons unless they can be used in sufficient numbers or with sufficient lethality to cause major killing or destruction. Iraq was never credited with having 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 moved too slowly to make use of water barriers. It blew only a few bridges and often only partially, and it failed to defend against bridging and crossings as effectively as it should have.

Force Protection

Iraq left many of its soldiers without meaningful protection gear and body armor, it wasted committed personnel in suicide attacks, and it 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.

LESSONS REGARDING THE VALUE OF ALLIES AND BUILD-UP TIME

The Iraq War provides important lessons about regional friends and allies. In spite of all the tensions between the United States and the Arab world over terrorism and the Second Intifada, the United 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.

Both Britain and Australia took considerable political risks in supporting the United States, and the prime ministers of both countries did so in the face of considerable parliamentary opposition and uncertain public opinion. Both have paid a political price since the war for the exaggerated statements made about the risk posed by Iraqi weapons of mass destruction. One lesson of the Iraq War is that there are generic "allies" and there are real allies. It is often easy to talk about NATO or large blocs of allies, but only a few allies are actually willing to take risks in both political and war-fighting terms. It is the real allies that count.

Allies and Interoperability

The fact the United States now has no military peer, and faces interoperability problems in integrating its forces with those of most allies, does not mean that it does not need NATO or allied countries. It is inconceivable, for example, that the United States could fight North Korea without South Korea taking on most of the military burden and without Japan's 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.

As has been touched on in previous chapters, this means that the United States must design its forces for as much interoperability as possible and must train with its allies. Just as modern joint warfare requires the United States to blend its military efforts with those of its civilian agencies, true jointness means interoperability.

The risk of the United States becoming isolated from the war-fighting capabilities of even its closest allies is also illustrated by the statement of Admiral Sir William Boyce, the British Chief of Defense Staff, 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 U.S. and allied capabilities. He said that Britain's armed forces were overstretched and should not pursue another war for 18 months: "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."¹⁵²

In Admiral Boyce's estimation, Britain's 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. He did say, however, 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 United States is not a casual lesson. Cooperation and interoperability are critical unless the United States' military wish to become very lonely.

The Value of Regional Allies

Another lesson is the value of regional allies. Access to allied territory in the Gulf allowed the United States and Britain to deal with the key logistic problems in their build-up by slowly delivering virtually all of their supplies and major land combat equipment by sea over a period extending 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 United States to create a northern front or use facilities in that country.

In spite of tensions over the aftermath of the terrorist attacks on the United States on September 11, 2001, Saudi Arabia allowed overflights by U.S. aircraft and missiles; it allowed the expanded use of its airbases for "no-fly-zone" missions that helped weaken Iraq's air defenses both before and during the war; it provided fuel at minimal cost for AWACS and E-8C missions on Saudi soil; it allowed the use of the Combined Air Operations Center (CAOC) to manage Coalition air operations; and it 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.¹⁵³ Although U.S. combat forces will leave Saudi Arabia following the Iraq War, it is important that the U.S. advisory teams will remain in the Kingdom, that the Kingdom is still taking delivery on tens of billions of dollars worth of U.S. military exports, and that US and Saudi joint exercises continue. Saudi Arabia may be of great value to the United States and Britain in the future.¹⁵⁴

Other Arab allies also helped. Egypt allowed free transit through the Suez Canal and Egyptian airspace Jordan permitted U.S. overflights and allowed U.S. Patriot units and missile warning systems to operate on its soil. It quietly allowed the USAF and U.S. 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 and flew roughly 700 sorties, while US Special Forces operated from Jordan to search for Scud launch boxes in western Iraq.¹⁵⁵

The United States 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 United States even when they sometimes opposed the war or when their support presented serious problems in terms of domestic political opinion. It is all too easy for the United States to be blinded by the beauty of its weapons and ignore these lessons. Regardless of force transformation and

any new way of war, U.S. strength remains dependent on coalitions even when these are coalitions of the partly willing.

The Value of Rebuilding Alliances

The defeat of Iraq does not justify any negligence in rebuilding the relations that underpin the U.S. alliance with Europe. As importantly, there is no room for negligence in efforts to strengthen relations with Russia or strengthen U.S. ties to the Arab world. War-fighting allies are the most important allies in a crisis. It is all too clear, however, that even the most impressive U.S. military victories still leave political alliances as important as ever, and that nations that do not support the United States in war can be very important in conflict termination, peacemaking, and nation building.

As the next chapters show, 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 U.S. arms has not been matched by the success of U.S. diplomacy. Nation building is not only 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 is not simply a demand for instant democracy. Trading Arab friends and allies for radical religious regimes or “one man, one vote, one time elections 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 U.S. military presence in the Gulf and Middle East to reflect the downfall of a dangerous tyrant and reduction in the Iraqi military threat to other countries; to concentrating on nation-building in Iraq; to strengthening and rebuilding ties to Arab allies; and to using diplomacy and the momentum of victory to discourage proliferation and the threat of terrorism. It is also a time to try to use U.S. 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 give Israel security and the Palestinians dignity. The United States cannot do this alone, but nothing can succeed without such a U.S. effort.

MILITARY LESSONS RELATING TO CONFLICT TERMINATION, PEACEMAKING AND NATION BUILDING

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 the grand strategic objectives necessary to shape the peace that has lasting value.

It is also unfair to exaggerate the scale of the problems that emerged during conflict termination, peace making, and the transition to nation building. The war itself did considerably less damage than many feared.

- There was little initial resistance to US and British forces, and Saddam's regime failed to mobilize any significant portion of the Iraqi people to resist the Coalition advance.
- An expected humanitarian crisis did not emerge. Problems rapidly developed in security, in terms of looting, medical services, and in the material aspects of life -- ranging from the availability of utilities like water and power to continuity in trade and employment. In broad terms, however, there were no major life-threatening problems with food or basic services.
- While the US and Britain failed to halt looting, they largely succeeded in preventing Saddam's supporters from destroying Iraq's oil production and export facilities or crippling the economy.
- For all of the postwar chaos and tensions in Iraqi city, the "Battle of Baghdad" was quick and involved minimal collateral damage and most Iraqi cities emerged intact.
- No major crises or clashes emerged in the north between Kurds and Arabs and Turkey did not intervene.
- Iran did not intervene and the Iranian-sponsored outside opposition did not take military action.
- Although attacks on Coalition forces and sabotage began almost immediately, the level of such action was very low for a nation of some 25 million people that had been ruled by Saddam and the Ba'ath Party for nearly 30 years, whose economy had begun to collapse as early as 1982 as a result of the cost of the Iran-Iraq War, and where power had always been given to a small Sunni elite at the expense of a Shi'ite majority and a large Kurdish minority.

Many of the problems that occurred during conflict termination and early in the nation-building phase were all beyond US and coalition control. They were the result of some thirty years of mismanagement by an Iraqi tyranny that stifled initiative and prevented market forces from working, and of the fact that Iraq's economy was crippled from 1982 onwards by the costs of the Iran-Iraq War, and then never recovered from the costs of the Gulf War and Iraq's refusal to meet the terms of UN Security Council Resolutions and put an end to sanctions.

The fact remains, however, that many of the problems the US encountered were caused by the failure of the US and its allies to provide adequate security, prevent looting, and take immediate action to ensure continuity of government. The Coalition's success in joint warfare was not matched by its success in conflict termination, peacemaking, and in 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

enough manpower to simultaneously occupy and secure the areas that the Coalition liberated and fell short of the manpower necessary to occupy the country.

The Impact of Limited Military Resources

Virtually all wars involve a chaotic transition from war to peace, and the US and British governments had ample warning from their intelligence services, diplomats, and area experts that this might be the case in Iraq. Yet, neither their governments nor their military forces were properly prepared to secure the areas they liberated, and 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.

Once again, there are mitigating factors. The problems during and immediately after the fighting were 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 from Turkey and anything like the force totals originally planned.

The Coalition might have been better prepared if, as had originally been planned, it had been able to internationalize some aspects of conflict termination and nation building by gaining the support of a second UN Security Council Resolution, and had been able to draw upon the support of a wide range of other nations immediately after the end of the war. This, however, is questionable. It is easy to task the UN and "international community," but they have no resources other than those contributed by individual states. Moreover, only a limited number of countries have forces trained and equipped for actual "peacemaking" under conditions that involve actual combat.

Most foreign forces are not capable of dealing with local military and security threats in actual combat and would have had little value, and would have presented a host of interoperability problems from language to a lack of self-protection capability. Moreover, other nations have a very finite supply of either "peacemakers" or "peacekeepers," and most of these resources were already deployed in other contingencies and crises. International forces also would have had to rely on the US for lift and sustainment at a time when the US had limited capacity and Iraq did not have functioning ports and airports.

Avoidable Problems

The fact remains, however, that many of the problems and limitations in military resources the coalition faced during and after the war, and certainly its the lack of a coordinated military-civilian effort, were the result of US failures to properly plan for conflict termination before the war and to then provide the proper resources.

In retrospect, the US -- the leader of the Coalition and the only power with the necessary resources to act -- failed to effectively terminate the conflict for the following list of reasons:

Problems in International Coordination

- 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.

Failures in US Policymaking and Leadership

- 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 introduce a trained constabulary or military police force immediately 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 expect to deal with a mixture of anti-Western/anti-colonial sentiment and deep ethnic and religious tensions and divisions.
- The National Security Council failed to perform its mission. It acted largely in an advisory role and did not force effective interagency coordination.
- The US failed to develop a coordinated interagency approach to planning and executing peace making and nation building before and during the war. A State Department-led effort during 2002 produced many of the need elements of a plan, but the decision was taken to give the lead to the Department of Defense, and senior civilians in the Office of the Secretary of Defense believed that the coalition would have strong popular support from the Iraqis, that other agencies were exaggerating the risks, that the task of nation-building could be quickly transferred to the equivalent of a government in exile, and that the US and its allies would be able to quickly withdraw. As a result, they focused on humanitarian problems that failed to materialize and were unprepared to deal with the problems that did.
- Much of the benefit of detailed planning efforts for nation-building were lost or made ineffective because of the deep divisions between the State Department and Department of Defense over how to plan for peacemaking and nation building. When Defense was put in charge in late 2002, evidently because the problem of establishing security was given primacy, much of the State Department and other interagency efforts were dropped or given low priority.
- The US saw its mission in terms of defeating Iraqi military forces in main battles, rather than ending all armed opposition. It may have 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. The US military 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 up to the point of dealing with the consequences of victory.

- The mistakes of senior US civilian policymakers were compounded by a US military approach to the doctrine and planning for asymmetric warfare which in practice reflected the strong desire of US military commanders to avoid deep involvement in the complex political issues of nation building, and prolonged military commitment to missions other than direct warfighting.

Failures at the Field and Tactical Levels

- The US failed to create an effective structure for managing the peace making and nation building effort in the field, to clearly subordinate the military to General Garner and Ambassador Bremer on a timely and effective basis, and to task the military accordingly. 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.
- The National Security Council failed to organize effective interagency cooperation in Washington and had no coordinator in the field. There was no NSC representative in the field to oversee the conflict termination and nation building efforts and ensure suitable coordination.
- The lack of civil-military coordination greatly complicated the practical problems in actually providing aid and keeping promises. It also interacted with a lack of practical US military planning for continued violence and “guerrilla warfare” during a prolonged period of conflict termination. The military gave priority to security and only limited support to nation building. The nation builders had no real security capability or safe transportation of their own.
- The direction of the nation building effort initially lacked the kind of driving leadership needed for success, and few involved had real area expertise or experience with peacemaking and nation building. This led to an embarrassing change in the midst of conflict termination and the start of nation building from the Office of Reconstruction and Humanitarian Assistance (ORHA) directed by Lt. Gen. Jay M. Garner, and the Coalition Provisional Authority (CPA) directed by Ambassador L. Paul Bremer III.
- From the start, a major gap existed between the State Department personnel serving in the field, the civilian team sent to Kuwait and then Iraq under General Garner, and the US military in the Gulf and the field. State Department personnel were largely excluded. General Garner and his team refused an invitation to collocate with the US military forces that would advance into Baghdad from the land forces commander, Lt. General David McKiernan, and stayed in the Hilton Hotel in Kuwait, out of touch with conditions in the field and waiting for humanitarian crisis that never came.
- Even in mid-July 2003, the nation-building team had little meaningful guidance from the Office of the Secretary of Defense or National Security Council, and was not coordinating effectively with the State Department. It was not organized or equipped to move forward with US combat forces and act immediately in rear areas, took far too long to move to Iraq, and then chose a location isolated from the US military forces that were its only practical source of logistic support and security.
- When the team under General Garner did finally relocate to Iraq, it made a classic US mistake in choosing its headquarters. It located in a highly visible site in downtown Baghdad, in the Al Rashid Hotel, and in the former palaces of Saddam Hussein. While the real-world conditions were scarcely luxurious, the image this create and sustained was one of luxury and an occupying proconsul with a filled swimming pool at a time many Iraqis had no water. The situation was made worse by the fact this physically isolated the nation-building team from the US military, and created unnecessary security and transportation problems,
- Quite aside from these problems in leadership and focus, the nation building team often had to rely on experts in US activities relating to nation building that had little meaningful expertise in working in developing countries. Its experts on the Middle East often had little or no prior

experience in working in Iraq and/or were regional experts with little experience in the activities involved in conflict termination and nation building.

- These problems were compound by the failure to ensure members of the team were committed to full time, long-service support of the effort. Far too many people were short termers or part timers.
- This “downtown palace” approach has caused tension in many friendly countries like South Korea in the past. It reinforced the gap between the nation building team and the military at a time the military gave priority to security and helped ensure that the gave less support to nation building. It also cut the nation builders off from the military communication and support infrastructure, and added to the team's security and transportation problems.
- The “downtown palace” approach also forced the US military to create a major security or “no go zone” in the middle of Baghdad, draining troops and creating problems for the Iraqis who had to drive around an “occupier” in the center of their own city.
- Looting and criminal activity were not seen as major problems during the war or in preparing for conflict termination in spite of several thousand years of warning that this could be the case, and the fact that it was clear that Iraq ‘s prewar economy was driven by nepotism and influence and much of Iraq’s population had reasons to feel it was justified in acting against the regime and strong reasons to do so.
- Humanitarian efforts and expertise were sometimes confused with the very different missions of nation building and conflict termination, and critical weeks were wasted making the transition from planning to deal with a non-existent humanitarian crisis to very real and immediate problems in peacemaking and nation building. Key issues like jobs and economic security were addressed much later than should have been the case.
- Military commanders do not seem to have fully understood the importance of the peacemaking and nation-building missions. They often did not provide the proper support or did so with extensive delays and little real commitment.
- The “jointness” that helped the US win the war was almost totally lacking during the conflict termination and peacemaking stage. No US commander seemed to have responsibility. Even within the Army, major difference emerged in how given units performed their tasks (The 3rd Infantry Division favored reacting to incidents; the 4th Division aggressively patrolled.) There was no cohesion to the military effort.
- Even where military resources were clearly available, too little emphasis was placed on immediately securing key urban areas and centers of government.
- The two US Army divisions, the US Marine forces, and the British forces all took different and inconsistent approaches to enforcing security. These problems were compounded in the case of the US Army by a lack of consistency in both supporting the nation-building effort in the field and in the treatment of Iraqis in carrying out the security mission. In many cases, the emphasis on force protection ignored the political impact on the Iraqi and the fact it might prove more provocative than helpful in enforcing security.
- In urban areas, the initial security efforts were generally reactive rather than part of a cohesive effort to provide security for the entire area. This left constant gaps in coverage and allowed looting, firefights, and ambushes to occur before an effort was made to act.
- US forces lacked enough people with the necessary language and area skills, and the limited numbers of such experts that were available were dedicated to warfighting tasks.
- The effort to create an effective Iraqi police force, and provide local security using Iraqis, rather than occupying troops, came far too late and had far too little initial resources and support. The analysis of the Iraq police force before the war was misleading and led US planners to assume it had far more capability than it did, but they were slow to react once the

truth became apparent and did not rush together an advisory team with all of the necessary mix of police and area expertise or provide the necessary resources.

- The US and its allies failed to assess the motives and competence of the outside Iraqi opposition. Members of the Iraqi opposition had their own goals and ambitions and often proved to be unreliable in such roles. Some US policymakers planned to rely on the secular, pro-US opposition to act as a de facto government in exile when it lack the unit, competence, and popular support in Iraq to do so.
- At least initially, the US tried to select leaders and representatives from within Iraq on the basis of its views of what Iraq should be, rather than letting such leaders emerge from within key Iraqi ethnic and sectarian groups.
- The “De-Ba’athification” effort was handled in too rigid a way for a country that had been under the same dictatorship for nearly three decades. Senior officials and officers were excluded from the nation-building role simply because of rank and Ba’ath membership, rather than screened on a person-by-person basis. The end result was to compound the power vacuum created by the systematic murder and purging of secular opposition from 1979 onwards,
- Many aspects of the US operation were overcentralized in Baghdad and in Ambassador Bremmer’s office. Teams were needed to work with the local governments of each of Iraq’s governates and in its major cities. The US was particularly slow to see the need to establish a large number of liaison offices to deal with the divided Shi’ite majority in the south and Kurds in the north, although the offices that were established quickly demonstrated their value.
- The US and its allies lacked an accurate picture of the problems in Iraq’s infrastructure, and an understanding of the problems a dictatorial command economy would face once the regime fell. In spite of considerable warnings from area experts and some intelligence experts. The Iraqis as a whole were unprepared to take the initiative in any major ministry or area of economic activity without guidance and direction. A long history of nepotism and seizing nay opportunity to gain wealth or power also created large numbers of Iraqis who were far more ready to loot than participate in nation-building.
- Like security and the prevention of looting, neither the US nation builders nor the US military were ready for the impact of attacks on nation builders and advisory teams or for acts of sabotage. They had to be reactive when they should have focused on prevention and deterrence.
- The problems in the US effort greatly complicated the problems for NGOs, international organizations, and other countries in the nation building effort. 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.

It is important to note that these failures did much to create a climate of continuing violence after May 1, and to create the threat of low intensity and asymmetric warfare. They contributed to an important to degree to the killing or wounding of every US soldier, British soldier, and Iraqi civilian that became a casualty in the months following the “end” of the war.

There is No “New Way of War” Without Successful Conflict Termination, Peacemaking, and Nation building

The US and its allies must also make this lesson a basic part of force transformation. This is a dangerous time 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 on a civil-military, and interagency, basis 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 requires both political decision makers, and military planners and commanders, 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.

Any effort to act on this lesson of the Iraq War must also recognize that peacemaking and nation building are still experimental activities and that no one as yet has a clear 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 more democratic government in a non-democratic state to avoid some tension and violence between suppressed factions and groups.

¹ Prepared testimony by US Secretary of Defense Donald R. Rumsfeld, Senate Armed Services Committee, July 9, 2003.

² Statement of General Tommy R. Franks, Former Commander of US Central Command, Before the Senate Armed Services Committee, July 9, 2003.

³ Statement of General Tommy R. Franks, Former Commander of US Central Command, Before the Senate Armed Services Committee, July 9, 2003.

⁴ There is no way to even begin to list all of the reports and studies over the years that helped shape the forces, tactics, and technologies used in the Iraq War and the current force transformation debate. Some recent works include Harlan K. Ullman and James P. Wade, *Rapid Dominance: A Force for All Seasons*, Whitehall paper series 43 (London: Royal United Services Institute for Defence Studies, 1998); Douglas A.

Macgregor, *Breaking the Phalanx* (Westport, Conn.: Praeger, 1997); Stephen A. Cambone, *A New Structure for National Security Planning* (Washington, D.C.: CSIS, 1997); Hans Binnendijk, *Transforming America's Military* (Washington, D.C.: National Defense University, 2002); Tom Czerwinski, *Coping with the Bounds: Speculations on Nonlinearity in Military Affairs* (Washington, D.C.: National Defense University, 1998); Daniel Goure and Jeffrey M. Rankin, *Averting the Defense Trainwreck* (Washington, D.C.: CSIS, 1999); and Michael O'Hanlon, *Technological Change and the Future of Warfare* (Washington, D.C.: Brookings, 2000).

⁵ Taken from the testimony of Deputy Secretary of Defense Paul Wolfowitz to the U.S. Senate Armed Services Committee, April 27, 2002.

⁶ This summary is adapted from Toby Harnden, "Fight Light Fight Fast Theory Advance," *Daily Telegraph*, April 14, 2001, p. 1.

⁷ Brad Knickerbocker, "War Boosts Rumsfeld's Vision of an Agile Military," *Christian Science Monitor*, April 11, 2003, p. XXX. 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.

⁸ David A. Fulghum, "Fast Forward," *Aviation Week*, April 28, 2003, p. 34.

⁹ See [Chairman of the Joint Chiefs of Staff Vision Statement](#), *Joint Vision 2020* (Washington, D.C.: Government Printing Office, June 2000). Much of the work on force transformation also took place under the Clinton administration, and a key study shaping the later elements of the force transformation exercise was issued in June 2001. See Jim McCarthy et al., *Transformation Study Report: Transforming Military Operational Capabilities*, Washington, Office of the Secretary of Defense, April 27, 2001.

¹⁰ For a fuller discussion, see Merrick E. Krause, "Decision Dominance: Exploiting Transformational Asymmetries," *Defense Horizons*, no. 23, Center for Technology and National Security Policy, National Defense University, Washington, D.C., February 2003.

¹¹ 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," *U.S. News & World Report*, April 21, 2003, p. XXX; Toby Harnden, "Fight Light Fight Fast Theory Advance," *Daily Telegraph*, April 14, 2001, p. 1; and Vago Muradian and Riad Kahwaji, "War Puts Transformation to the Test," *Defense News*, March 24, 2003, p. 1.

¹² For some interesting early debates over the issues raised in this section, see Thom Shanker, "Assessment of Iraq War Will Emphasize Joint Operations," *New York Times* May 1, 2003, p. XXX; Robert J. Caldwell, "Rumsfeld versus the Army," *San Diego Union Tribune*, May 4, 2003, p. XXX; Rowland Scarborough, "Decisive Force Now Measured by Speed," *Washington Times*, May 7, 2003, p. 1; Vernon Loeb, "Commander Defends Iraq War Comments," *Washington Post*, May 8, 2003, p. 18; Fulghum, "Fast Forward"; Seth Stern, "Transformation May Not Mean Smaller Forces," *Christian Science Monitor*, DATE, p. XXX; Tom Bowman, "Rumsfeld Conducting War on Army," *Baltimore Sun*, May 7, 2003, p. XXX; Thom Shanker and Eric Schmitt, "Latest Mission for Forces: Analyze New Ways to Prepare for Conflicts," *New York Times*, April 30, 2003, p. XXX.

¹³ Lt. General T. Michael Mosley, "Operation Iraqi Freedom—By the Numbers," USCENTAF, Assessment and Analysis Division, April 30, 2003.

¹⁴ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office, July 2003, London, Her Majesty's Stationary Office, July 2003, pp. 19, 28.

¹⁵ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office, July 2003, London, Her Majesty's Stationary Office, July 2003, pp. 22-23.

¹⁶ Adapted from Mosley, "Operation Iraqi Freedom—By the Numbers," and Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War*, vol. 4, *The Gulf War* (Boulder, Colo.: Westview, 1996), p. 443.

¹⁷ Statement of General Tommy R. Franks, Former Commander of US Central Command, Before the Senate Armed Services Committee, July 9, 2003

¹⁸ Statement of General Tommy R. Franks, Former Commander of US Central Command, Before the Senate Armed Services Committee, July 9, 2003.

¹⁹ For a good discussion of many of the issues involved, see Lt. Colonel Peter L. Hays, *United States Military Space Into the 21st Century* (Maxwell AFB, Ala.: Air University Press, September 2002). There are many earlier works outlining the possible uses of space the United States made in the Iraq War and

illustrating the evolutionary nature of the changes taking place. For example, see Stuart E. Johnson and Martin C. Libicki, *Dominant Battlespace Knowledge: The Winning Edge* (Washington, D.C.: National Defense University, 1995).

²⁰ Vernon Loeb, "Intense, Coordinated Air War Backs Baghdad Campaign," *Washington Post*, April 6, 2003, p. 24.

²¹ Adapted from Mosley, "Operation Iraqi Freedom—By the Numbers."

²² Ibid.

²³ Seth Schiesel, "On the Ground in Iraq: The Best Compass Is in the Sky," *New York Times*, April 17, 2003.

²⁴ Stephen Trimble, "GPS is Surviving Jamming Threat, Pentagon Says," *Aerospace Daily*, April 22, 2003; David Whitman, "Keeping Our Bearings," *U.S. News & World Report*, October 21, 2002.

²⁵ Whitman, "Keeping Our Bearings."

²⁶ James T. Hackett, "Tracking Targets from Space," *Washington Times*, July 8, 2003, p. 18.

²⁷ Michael Smith, "Frontline Troops Had Only Five Bullets to Defend Themselves," *London Daily Telegraph*, June 18, 2003.

²⁸ Henry Cunningham, "Airlift Capabilities Strained," *Fayetteville Observer*, November 17, 2002; David Wood, "U.S. Doesn't Travel Light in Going to War," Newhouse News Service, www.newhouse.com, October 10, 2002.

²⁹ Gopal Ratham, "War-Supply Tracker," *Defense News*, March 24, 2003, p. 25; Michael Shaw, "Computers Track Supplies for Buildup in the Gulf," *St. Louis Post Dispatch*, January 1, 2003, p. B-1.

³⁰ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 26-27.

³¹ See Sean Naylor, "Logistics Still Tough Despite High Tech Help," *Defense News* March 24, 2003, p. 1.

³² Andrew Chuter, "UK to Untangle Logistics Delivery Chain," *Defense News*, June 16, 2003.

³³ Kim Burger, "U.S. Build-Up is Fast, But Not Fast Enough," *Jane's Defense Weekly*, March 19, 2003.

³⁴ Thom Shanker, "Guard and Reserve Members Likely to Begin Return Home," *New York Times*, April 25, 2003; "Guard, Reserve Plan to Be Ready Next Fall," *Aerospace Daily*, April 25, 2003.

³⁵ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 19-20, 28.

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³⁹ Joe Burlas, "G-6 Says OIF Validates Transformation Path," Army News Service, May 27, 2003. ["G-6" OK?OK]

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⁴¹ Rowan Scarborough, "Myers Says Annihilation of Iraqi Army Wasn't Goal," *Washington Times*, June 30, 2003.

⁴² "No Bunker Found Under Bomb Site," *New York Times*, May 29, 2003.

⁴³ Prepared testimony by US Secretary of Defense Donald R. Rumsfeld, Senate Armed Services Committee, July 9, 2003; Statement of General Tommy R. Franks, Former Commander of US Central Command, Before the Senate Armed Services Committee, July 9, 2003.

⁴⁴ For a technical explanation of some of the adaptations in helicopter tactics, see Robert Wall, "Guerrilla War," *Aviation Week*, March 31, 2003, pp. 24–25.

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⁵³ Frank Tiboni, "US Army Seeks New Transports by 2008," *Defense News*, April 21, 2003, p. 22.

⁵⁴ Gail Kaufman, "USAF C2 Contest Gets Off Ground," *Defense News*, June 23, 2003, p. 18.

⁵⁵ Commanding General, 1 Marine Division, "Operation Iraqi Freedom: OIF Lessons Learned," Reference MEF Frago 279-03, May 29, 2003.

⁵⁶ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 25.

⁵⁷ The United States did have an inventory capable of supporting two major regional contingencies. At the end of the Iraq War, the United States still had some 17,000 JDAMs, 25,000 laser-guided bombs, and 6,500 **Wind Corrected Munitions**. The war consumed roughly 30 percent of U.S. TLAM assets. *Inside the Air Force*, April 11, 2003, p. 3.

⁵⁸ Jason Sherman, "Restock and Rethink," *Defense News*, April 21, 2003, p. 1.

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⁶³ Lt. General T. Michael Mosley, "Operation Iraqi Freedom—By the Numbers," USCENTAF, Assessment and Analysis Division, April 30, 2003.

⁶⁴ Lt. General T. Michael Mosley, "Operation Iraqi Freedom—By the Numbers," USCENTAF, Assessment and Analysis Division, April 30, 2003.

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⁶⁶ Bradley Graham, "Military Turns to Software to Cut Civilian Casualties," *Washington Post*, February 21, 2003, p. 18.

⁶⁷ The details of these efforts are described in U.S. Central Command, "Target and Collateral Damage, 5 March 2003 (background briefing), and Senior Defense Official, "Background Briefing on Targeting," Department of Defense News Transcript, March 5, 2003.

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⁷⁰ Laura King, "Baghdad's Death Toll Assessed," *Los Angeles Times*, May 18, 2003, p. 1; Peter Ford, "Survey Pointing to High Civilian Death Toll in Iraq," *Christian Science Monitor*, May 22, 2003, p. 1; Associated Press, May 15, 2003; Iraqbodycount.net.

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⁷⁴ Commanding General, 1 Marine Division, "Operation Iraqi freedom (OIF): Lessons Learned," MEF-FRAGO 279-03, May 29, 2003.

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⁷⁷ British Ministry of Defense, Operations in Iraq: First Reflections, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 21.

⁷⁸ Christian Lowe, "Joint US Training Vital to Close Air Support," *Defense News*, June 16, 2003, p. 38.

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⁸⁰ Eric Schmitt, "Baghdad Air War Shifts with GI's In the City," *New York Times*, April 6, 2003; Vernon Loeb, "Intense, Coordinated Air War Backs Baghdad Campaign," *Washington Post*, April 6, 2003, p. 24; Christian Lowe, "Urban Combat Role Grows for Airstrikes," *Defense News*, April 21, 2003, p. 19.

⁸¹ William M. Arkin, "The Price of Precision Bombing," *Los Angeles Times*, April 6, 2003.

⁸² Thom Shanker and Eric Schmitt, "Latest Mission for Forces: Analyze New Ways to Prepare for Conflicts," *New York Times*, April 30, 2003.

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⁸⁴ Douglass Barrie, "Storm Trials," *Aviation Week*, March 31, 2003, pp. 25-

⁸⁵ British Ministry of Defense, Operations in Iraq: First Reflections, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 21.

⁸⁶ British Ministry of Defense, Operations in Iraq: First Reflections, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 21.

⁸⁷ Rowan Scarborough, "Myers Says 'Annihilation of Iraqi Army Wasn't Goal," *Washington Times*, June 30, 2003.

⁸⁸ Tony Capaccio, "Raytheon Tomahawks Miss Few Iraqi Targets, Navy Says," *Bloomberg News*, April 12, 2003.

⁸⁹ Dan Morgan and Walter Pincus, "High Cost of Defense Plan Gets Little Discussion," *Washington Post*, May 26, 2003, p. 2.

⁹⁰ 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>

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⁹² British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, p. 48.

⁹³ Adapted from Lt. General T. Michael Mosley, "Operation Iraqi Freedom—By the Numbers," USCENTAF, Assessment and Analysis Division, April 30, 2003

⁹⁴ 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.

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⁹⁶ Textron Comments on prior drafts of this analysis, dated June 17, 2003.

⁹⁷ William M. Arkin, "It Ain't Broke After All," *Los Angeles Times*, April 27, 2003; David A. Fulghum and Robert Wall, "Baghdad Confidential," *Aviation Week*, April 28, 2003, p. 32.

⁹⁸ Lance M. Bacon, "Back in the Big Game," *Air Force Times*, June 16, 2003, p. 14.

⁹⁹ David A. Fulghum and Robert Wall, "Baghdad Confidential," *Aviation Week*, April 28, 2003, p. 32.

¹⁰⁰ Gail Kaufman, "B-52 Gets Refits for New Roles," *Defense News*, March 24, 2003, p. 18.

¹⁰¹ Gail Kaufman, "USAF to Speed Long-Range strike by 2012," *Defense News*, April 7, 2003, p. 20.

¹⁰² Bradley Graham and Vernon Loeb, "An Air War of Might, Coordination, and Risks," *Washington Post*, April 27, 2003, p. A1.

¹⁰³ 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..

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¹⁰⁵ British Ministry of Defense, *Operations in Iraq: First Reflections*, London, Her Majesty's Stationary Office. July 2003, London, Her Majesty's Stationary Office. July 2003, pp. 21.

¹⁰⁶ Commanding General, 1 Marine Division, "Operation Iraqi freedom (OIF): Lessons Learned," MEF-FRAGO 279-03, may 29, 2003.

¹⁰⁷ Department of Defense, http://www.defenselink.mil/news/Mar2003/t03182003_t0318uav.html.

¹⁰⁸ http://www.defenselink.mil/news/Mar2003/n03182003_200303186.html

¹⁰⁹ http://www.af.mil/news/factsheets/A_10_OA_10_Thunderbolt_II.html

¹¹⁰ Bradley Graham and Vernon Loeb, "An Air War of Might, Coordination, and Risks," *Washington Post*, April 27, 2003, p. A1.

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¹¹³ Richard Whittle, "Military Mulls the Lessons of War," *Dallas Morning News*, April 22, 2003

¹¹⁴ Rowan Scarborough, "Apache Operations a Lesson in Defeat," *Washington Times*, April 22, 2003, p. 1.

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¹¹⁷ Commanding General, 1 Marine Division, "Operation Iraqi Freedom (OIF): Lessons Learned," MEF-FRAGO 279-03, May 29, 2003.

¹¹⁸ See David Fulghum, "Info Warfare To Invade Air Defense Networks," *Aviation Week*, November 30, 2003, p. 30; "US, Britain Double Dailey flights Over Southern Iraq," *Baltimore Sun*, March 6, 2003; Eric Schmitt, "Air Patrols Shift Targets in Iraq, Clearing the Way for Attack," *New York Times*, September 17, 2002, p. 1; "Strikes in the No Fly Zones," *International Herald Tribune*, October 2, 2002, p. 4; "No Fly Zone Pilots to Benefit in Case of War with Saddam," *Washington Times*, August 27, 2002, p. 7; Hugh Pope and Christopher Cooper, "Iraqi Fire in No Fly Zones Provokes Divisions at UN," *Wall Street Journal*, November 20, 2002; Peter Baker, "Casualties of an Undeclared War," *Washington Post*, December 22, 2002, p. A1; Rowland Scarborough, "US Offers Proof of Iraqi Defiance," *Washington Times*, October 1, 2002, p. A1; Todd Zeranski and Tony Capaccio, US, UK Strike No Fly Target in Iraq, Bloomberg.com, September 9, 2002.

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¹⁴⁰ See Jason Sherman, “US Navy Seeks Open Info Architecture,” Defense News, June 23, 2003, p. 18.

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¹⁴² Many of the comments made in this section are based on interviews with U.S., British, and Australian officials, officers, and experts after the war, and the author’s prior experience in analyzing proliferation. There are many useful press reports that have emerged since the war. **In addition to those referenced later in this chapter**, these include Warren P. Strobel and John Walcott, “CIA Lack Info To Counter Claims About Iraqi Weapons,” Miami Herald, June 3, 2003; James Risen, “Word that US Doubted Iraq Would Use Gas,” New York Times, June 18, 2003; Bruce Auster, Mark Mazetti, and Edward Pound, “Truth and Consequences,” U.S. News and World Report, June 9, 2003; Evan Thomas, Richard Wolffe, and Michael Isikoff, “Where are Iraq’s WMDs?” Newsweek, June 9, 2003; Michael Duffy, “Weapons of Mass Disappearance,” Time, June 9, 2003; James Risen, “Iraq Arms Report Now the Subject of A CIA review,” New York Times, June 4, 2003; Maggie Farley, “Blix’s Final Words to Security Council are Words of Caution,” Los Angeles Times, June 6, 2003; Tony Capaccio, “Pentagon 2002 Study Reported No Reliable Data on Iraq Weapons,” Bloomberg.com, June 6, 2003;

¹⁴³ For an interesting discussion of the problems in assessing dual-use facilities in Iraq, see Walter Pincus, “Weapons Linked to Dual Use Facilities in Iraq,” Washington Post, June 2, 2003.

¹⁴⁴ For some additional data on this aspect of these assessments made of Iraq, see Bill Gertz, “Iraqi Group Aid CIA Intelligence,” Washington Times, June 12, 2003; John Diamond, “Broad Purges Wiped Out Most Iraqis Helping CIA,” USA Today, June 17, 2003; John Diamond, “Weak Spy Network Hurt Hunt for Arms,” USA Today, June 17, 2003.

¹⁴⁵ Earlier unclassified CIA reports on problems like the ballistic missile threat often projected alternative levels of current and future capability. The qualifications and possible futures are far less well defined in more recent reports. For example, see CIA, Unclassified Summary of a National Intelligence Estimate, Foreign Missile Developments and the Ballistic Missile Threat Through 2015, National Intelligence Council, December 2001, http://www.cia.gov/nic/pubs/other_products/Unclassifiedballisticmissilefinal.htm.

¹⁴⁶ There is no way to determine just how much the Special Plans Office team set up within the office of the Secretary of Defense to analyze the threat in Iraq was designed to produce a given conclusion or politicized intelligence. The Department has denied this, and stated that the team created within its policy office was not working Iraqi per se, but on global terrorist interconnections. It also stated that the Special Plans Office was never tied to the Intelligence Collection Program—a program to debrief Iraqi defectors—and relied on CIA inputs for its analysis. It states that simply conducted a review, presented its findings in August 2002, and its members returned to other duties. See Jim Garamone, “Policy Chief Seeks to Clear Intelligence Record,” American Forces Information Service, June 3, 2003; and Briefing on policy and intelligence matters, Douglas J. Feith, under secretary of defense for policy, and William J. Luti, deputy under secretary of defense for special plans and Near East and South Asian affairs, June 4, 2003, <http://www.defenselink.mil/transcripts/2003/tr20030604-0248.html>.

Some intelligence experts dispute this view, however, and claim the team’s effort was used to put press on the intelligence community. Such “B-teams” also have a mixed history. They did help identify an intelligence community tendency to underestimate Soviet strategic nuclear efforts during the Cold War. The threat analysis of missile threats posed to the United States by the “Rumsfeld Commission,” however, was a heavily one-sided assessment designed to justify national missile defense. Also see Greg Miller, “Pentagon Defends Role of Intelligence Unit on Iraq,” Los Angeles Times, June 5, 2003; and David S. Cloud, “The Case for War Relied on Selective Intelligence,” Wall Street Journal, June 5, 2003..

¹⁴⁷ Some press sources cite what they claim is a deliberate effort to ignore a September 2002 DIA report on Iraqi chemical weapons capabilities called “Iraq-Key WMD Facilities-An Operational Support Study.” See

James Risen, "Word that US Doubted Iraq Would Use Gas," *New York Times*, June 18, 2003 and Tony Capaccio, "Pentagon 2002 Study Reported No Reliable Data on Iraq Weapons," *USA Today*, June 6, 2003.

In fact, the unclassified excerpts from the DIA report, show that DIA was not stating that Iraqi did not have chemical weapons, but rather that it had, No reliable information on whether Iraq is producing and stockpiling chemical weapons, or where Iraq has—or will—establish its chemical weapons facilities." The report went on to say that, "although we lack any direct information, Iraq probably possess CW agent in chemical munitions, possibly include artillery rockets, artillery shells, aerial bombs, and ballistic missile warheads. Baghdad also probably possess bulk chemical stockpiles, primarily containing precursors, but that also could consist of some mustard agent of stabilized VX."

If anything, the report is a classic example of what happens when intelligence reports do state uncertainty and of how the user misreads or misuses the result.

¹⁴⁸ For good postwar interviews of Iraqi officers, see Molly Moore, "A Foe that Collapsed from Within," *Washington Post*, July 20, 2003, p. A-1. This article reflects the same range of Iraqi views found by a number of US experts interviewing Iraqi officers after the war.

¹⁴⁹ Michael Gordon, "US Attacked Iraqi Air Defenses Starting in 2002," *New York Times*, July 20, 2003; Bradley Graham, "US Moved Early for Air Supremacy," *Washington Post*, July 20, 2003.

¹⁵⁰ As the previous chapter showed, these conclusions track well with the other data available on this aspect of the war. See Terry McCarthy, "Whatever Happened to the Republican Guard," *Time*, May 12, 2003, p. 38 and Molly Moore, "A Foe that Collapsed from Within," *Washington Post*, July 20, 2003, p. A-1.

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¹⁵² Bill Jacobs, "Defense chief warns against another war," *Edinburgh Evening News*, April 29, 2003, www.edinburghnews.com/index.cfm?id=488602003.

¹⁵³ See Michael Dobbs, "US-Saudi Alliance Appears Strong," *Washington Post*, April 27, 2003, sec. A, pp. 20–21; Usha Lee McFarling, "The Eyes and Ears of War," *Los Angeles Times*, April 24, 2003, p. 1.

¹⁵⁴ Vernon Loeb, "US Military Will Leave Saudi Arabia this Year," *Washington Post*, April 30, 2003, p. 1; Eric Schmitt, "US to Withdraw All Combat Units from Saudi Arabia," *New York Times*, April 30, 2003, p. 1.

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