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CRS Report for Congress

Persian Gulf War: Defense-Policy Implications for Congress

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PERSIAN GULF WAR: DEFENSE-POLICY IMPLICATIONS FOR CONGRESS

SUMMARY

The Persian Gulf War will influence congressional views on U.S. defense policy for many years. In considering the defense-policy implications of the Gulf War, a major task for Congress is to determine in what ways the Gulf War is an indicator for future conflicts involving U.S. military forces, and in what ways it is an anomalous case unlikely to be repeated.

The Gulf War has led some Members to question whether U.S. military force structure should be reduced as much as called for under the Administration's proposed FY1992-FY1997 defense plan. The war appears to have reinforced support for high-tech weapons. The performance of the Patriot antimissile system is being cited as a new argument for developing strategic and theater ballistic missile defenses. The war demonstrated the growing importance of space systems to the U.S. military.

The Airland Battle doctrine, which influences Army and Air Force budgets, appears to have been validated by the conflict, though there is an issue as to how severely the war tested this doctrine. The success of airpower in the war has led some to argue that the United States in the future should rely more on airpower to defend its interests. Some argue the war showed the need for new-generation stealthy aircraft; others argue that it showed that new-generation aircraft can be safely deferred. The war has increased interest in developing new measures to prevent ground troops from being attacked by friendly aircraft.

This conflict increased interest in strengthening U.S. defenses against chemical and biological warfare. Amphibious forces were not tested, but their threat tied down a disproportionately larger enemy coastal defense force. Associated naval operations demonstrated the limits of current U.S. naval mineclearing capabilities, particularly in shallower waters.

The war highlighted the importance of special operations forces (SOF) in U.S. military operations. Many observers view U.S. intelligence support for the war as effective, but others have noted deficiencies in that support. The war strengthened an emerging consensus that U.S. strategic sealift capability needs to be improved.

The war appears to have validated many aspects of U.S. policy regarding reserve forces, but may lead to a reassessment of the reserve roundout combat brigades. It highlighted issues regarding women, minorities, and parents in the military. The war appears to have validated the wartime value of the Goldwater-Nichols act reorganizing the Defense Department. In the wake of the war, members of the military reform movement may need to reassess some of their views, but can argue that others were validated.

The war highlighted the U.S. defense industrial base's growing dependence on foreign-made components. The war may lead to changes in U.S. and foreign policies on exports of weapons and military technology to the Third World.

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TABLE OF CONTENTS

TABLE OF CONTENTS -- Continued

PERSIAN GULF WAR: DEFENSE-POLICY IMPLICATIONS FOR CONGRESS

INTRODUCTION AND OVERVIEW

PURPOSE AND SCOPE

As the biggest U.S. military operation since Vietnam, the Persian Gulf War will influence congressional views on U.S. defense policy for many years. The war, moreover, occurred at a critical moment for U.S. defense policymakers: The conflict took place just as the Administration was presenting to Congress its proposed FY1992 defense budget and FY1992-FY1997 defense plan, which are intended to reshape the U.S. military for the post-Cold War era.

The Defense Department is now attempting to identify the military lessons of the war, and many other individuals and organizations are doing the same. This report is distinguished from these efforts by its focus on defense-policy issues of interest to Congress that are now being viewed with fresh perspectives afforded by the Gulf War. It is not strictly a "lessons-learned" report: The emphasis is on identifying and framing policy issues rather than on providing final "lessons" of the war, which in many cases have yet to be determined. Some of the issues covered in the report grew directly out of the experience of the war. Most of the issues covered in the report, however, predate the Gulf War, and in these instances the aim of the report is to show how war may have altered the debates on these issues.

Given constraints on length, not every potential defense-policy issue of interest to Congress could be covered. But an attempt was made to cover a wide range of issues, with a particular focus on choices that might have to be made between competing defense programs in an era of declining defense funding. The intent of the report is to assist Congress in its consideration of the Administration's proposed FY1992 defense budget and FY1992-FY1997 defense plan.

Two other CRS reports deal with closely related matters -- *Desert Shield and Desert Storm Implications for Future U.S. Force Requirements*, by John M. Collins,[1] and *The Persian Gulf War: Preliminary Foreign Policy "Lessons" and Perceptions*, by Mark M. Lowenthal.[2] Some issues not covered in this report may be found in these two other works. In addition, a bibliography showing

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[1] CRS Report 91-361 RCO of April 19, 1991. 30 p.

[2] CRS Report 91-260 RCO of March 18, 1991. 12 p.

additional related CRS Reports and Issue Briefs appears at the end of this report.

PERSIAN GULF WAR: MODEL OR ANOMALY?

In considering the defense-policy implications of the Gulf War, a major task for Congress is to determine in what ways the Gulf War is indicative of characteristics of future conflicts involving U.S. military forces, and in what ways it is an anomalous case unlikely to be repeated. No two conflicts are completely alike, and "lessons" properly identified from one conflict can be misapplied to a subsequent, different conflict. The challenge is to learn from the most recent war, but at the same time not assume and prepare for its repetition.

With the fading of the Cold War, the focus of U.S. defense planning is shifting to conflicts in the Third World, and in this important sense, the Gulf War may yield important insights for future conflicts involving U.S. military forces. The Gulf War is also seen as a harbinger of the access of potential Third World adversaries to sophisticated weapons purchased on the international market.

In other important respects, however, the Gulf War may prove to be an anomalous case. Analysts have pointed out that in future conflicts, the United States may not, for example, (1) enjoy the benefits of international cooperation against the adversary; (2) have anywhere near five months, free from enemy attack, to deploy its forces, conduct in-theater practice, and perfect its war plans; (3) enjoy substantial host-nation support, including large amounts of food and fuel, and use of well-developed bases and ports; and (4) fight in desert terrain against a large, heavily armed, dug-in ground force. A difference in even one of these areas could produce a conflict substantially different from the Gulf War. Recent conflicts in the Third World very different from the Gulf War include the U.S. military intervention in Panama in 1989 and the U.S. tanker-escort operation in the Persian Gulf in 1987-1988. It is also worth noting that potential U.S. adversaries, observing the Gulf War, will presumably seek ways to avoid a repetition of Iraq's experience in the Gulf War.

A future conflict similar to the Gulf War can't be ruled out. And many of the defense-policy implications of the Gulf War will prove valuable in preparing the United States for different kinds of conflicts as well. But the defense-policy implications of the Gulf War, if applied in an unreflective, wholesale manner, might actually reduce U.S. readiness for some kinds of potential future conflicts. The Persian Gulf War has been called by some the first U.S. war of the post-Cold War era. The challenge for Congress is determine what this might mean -- and not mean -- for the FY1992 defense budget, the FY1992-FY1997 defense plan, and future U.S. defense policy.

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DEFENSE BUDGET AND THE SIZE OF THE FORCE

What implications might the Persian Gulf War have for plans to cut defense spending and reduce the size of the force over the next several years?

The Persian Gulf War promises to influence future defense spending by informing debates on a number of key defense policy issues, including: (1) the size of the force; (2) the pace of weapons modernization; (3) readiness and sustainability; and (4) forward deployments.

Size of the Force

Operation Desert Storm occurred just as Secretary of Defense Cheney and other senior defense officials were presenting to Congress the details of Administration plans to reduce the size of U.S. military forces, terminate a number of major weapons programs, close military bases, and restructure U.S. troop deployments over the next several years in order to adjust long-term defense plans to the changed international security environment and declining budgets. The Administration's plan calls for defense spending to fall by about 20% in real, inflation-adjusted dollars between FY1990 and FY1995, in accord with a budget compromise negotiated with Congress in October 1990. To achieve the necessary savings, the Administration is proposing a reduction of about 20% by FY1995 in the overall size of the force.

In the wake of the Persian Gulf War, some Members of Congress have questioned whether the planned cutbacks are advisable. Administration officials acknowledge that it would involve more risk in the future to deploy as large a force as was sent to the Persian Gulf, since fewer troops would be available to respond to crises elsewhere on the globe. For the present, however, senior officials seem disinclined to challenge last fall's budget accord, and they appear willing to accept the premise that the erosion of the Soviet threat in Europe warrants a smaller force. No specific proposals to revise last year's long-term budget agreement have yet emerged in Congress.

Two factors could conceivably lead the Administration to argue for some adjustments in the defense budget caps to accommodate changes entailed by the Persian Gulf War. First, the Defense Department may have difficulty reducing the number of personnel as quickly as it had planned before the war. A second and more substantial problem may arise if the United States decides to maintain an expanded military presence in the Persian Gulf region. The Administration does not want to deploy large numbers of ground forces in the area, but an enhanced naval presence could lead some to argue for smaller cuts in the size of the Navy, which could have significant effects on the defense budget.

Pace of Weapons Modernization

In light of budget constraints, the Administration has become increasingly selective about weapons modernization plans. For the most part, however, it has elected to continue developing the next generation of weapons while terminating production of the current generation relatively early. The Persian Gulf War demonstrated the value of American high-technology weaponry, so one effect may be to give a boost to new weapons programs by making Congress more patient with development problems. Some have suggested, however, that the current generation of weapons worked so well that it may make sense to forgo some new systems and to proceed slowly with development of others.

Readiness and Sustainability

Some Members of Congress have argued that a much longer warning time of a major war in Europe should allow the military services to maintain a "flexible readiness" posture, with some units kept at lower levels of readiness than other quick reaction troops. The services, however, want to keep all active duty troops at high levels of readiness, arguing that readiness is difficult and expensive to restore if allowed to erode. The Persian Gulf War drew on U.S.-based armored and mechanized forces generally considered to be assigned to European contingencies, suggesting that high levels of readiness may be important across a wide spectrum, though perhaps not all, of the force.

The Persian Gulf War, though a massive undertaking, was not nearly as demanding as the major war in Europe for which the U.S. force posture had been designed. It is not surprising, then, that few shortages of munitions, spare parts, or other material appeared. At the same time, planners were reportedly concerned about the status of some equipment stocks and took steps to step up production rates of some munitions. Moreover, the rate at which some weapons, such as Maverick air-to-surface missiles, were used may have been higher than expected. The war may, therefore, suggest a need to reexamine stockpile goals.

Forward Deployments

Some Members question the high priority that the Administration is giving to maintaining large force deployments overseas at a time when the Soviet threat is declining, U.S. forces are shrinking, and basing agreements with host nations are proving difficult to negotiate. The Gulf War demonstrated that the United States can deploy large numbers of troops from the United States and Europe to other regions. Light units deployed initially to the area, however, had limited capability against armored attack. Moreover, over several years Saudi Arabia had built a very large military infrastructure capable of absorbing allied forces, which provided many of the same advantages as a large forward deployment. Alternatives to forward deployment, therefore, may prove costly.

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HIGH-TECHNOLOGY WARFARE

HIGH-TECHNOLOGY WEAPONRY

What implications might the Persian Gulf War have for future investment in high-technology combat systems?

The Persian Gulf War involved an extensive application of high-technology weaponry. The list of high-tech systems used is long and varied. Among some of the more notable are the F-117 stealth light attack plane, cruise missiles, a variety of air-launched precision guided munitions, the Patriot antitactical missile, and the Joint Surveillance Target Attack Radar System (JSTARS) surveillance aircraft. Initial reports on the performance of these systems have generally been very positive. Their effectiveness has been credited with minimizing coalition and civilian casualties, reducing the number of munitions and missions required to destroy enemy targets, and neutralizing Iraqi command, control, and communications.

High-tech combat systems, however, present a number of challenges for military planners. They generally have long, and often troubled, development periods. Both development and production costs tend to be high. They often require skilled, highly-trained personnel to operate and maintain them. As Congress decides upon future investment in high-tech systems, it might consider: (1) How much need is there for newer, more capable systems? (2) Was the Persian Gulf War an adequate proving ground for high-tech weaponry?

The Need for Newer, More Capable Weapons

A major issue for Congress in the wake of the Persian Gulf War is whether U.S. weapons and equipment have attained a sufficient level of technological superiority that programs to develop newer and more advanced systems can be canceled or slowed down. Canceling or deferring development of new systems could have a significant effect on funding requirements for the Defense Department's Research, Development, Test, and Evaluation (RDT&E) account, which makes up $35 billion, or about one-seventh, of the overall defense budget.

Some in Congress, viewing what they see as the overwhelming technological superiority of U.S. and allied forces in the Persian Gulf War, may argue that projects for some new weapons systems can be safely canceled or deferred in favor of upgrades to existing systems. They might argue that other projects should be refocused away from concentrating on greater performance and more toward achieving lower production and maintenance costs.

Others in Congress, concerned about the proliferation of ever-more-advanced weapons in the Third World, much of it from Western countries, may argue that programs for new and more capable high-tech weapon systems should proceed as planned. Canceling or deferring these new stems, they may argue,

would reduce or eliminate in future conflicts the U.S. technological edge that proved so important in the Persian Gulf War.

The Gulf War: An Adequate Proving Ground?

Reports to date suggest that high-tech weapons worked well in the war. But was the war an adequate proving ground for high-tech weapons, whose reliability and effectiveness has been questioned by various critics in recent years?

High-technology advocates maintain that the Gulf War was a challenging proving ground for the U.S. military's high-tech weapons. High-tech weapons, they note, were successfully maintained in harsh field conditions that included temperature extremes and frequent dust storms. They were used in demanding night operations, and they had great effect against one of the most sophisticated military forces the United States could encounter outside the Soviet Union.

Others suggest that the Gulf War was not a severe test of high-technology systems, and that enthusiasm for them should therefore be tempered. The relatively flat and open terrain, and the fact that many Iraqi targets were in fixed positions, they note, made it fairly easy for high-tech weapons to lock on or be guided to their targets. U.S. forces had months to practice using the weapons under local conditions, and in the latter stages of the war pilots flying at higher altitudes could often use them with little fear that the enemy could effectively shoot back. Moreover, U.S. support personnel were able to repair and maintain equipment in rear areas free from any concerted enemy attack. Transportation links from the United States and Europe were also secure from attack, and Saudi airports and harbors were far superior to those U.S. forces could hope to encounter in most of the world. These factors did much to alleviate the heavy logistics burden of high-tech weapons.

Some critics have pointed out that weapon performance reports are still preliminary, and should be subjected to more detailed examination before firm conclusions are drawn. One option already proposed is to have an independent panel or government organization, such as the General Accounting Office or the National Academy of Sciences, undertake such an effort.

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FUTURE OF DOD's SCIENCE AND TECHNOLOGY PROGRAMS

What implications might the Persian Gulf War have for the future of DOD's science and technology programs?

A major issue for Congress in the wake of the Persian Gulf War concerns future support for the Defense Department's Science and Technology (S&T) programs.[3] Most of the technology contained in today's advanced U.S. weapons was developed through investments in S&T programs made in the 1960s and the 1970s.[4] The advanced weapons of the early 21st century will evolve out of today's DOD S&T investment. In an era of constrained funding for RDT&E work, what spending level for S&T programs is appropriate?

Although funding for overall Research, Development, Test and Evaluation (RDT&E) doubled in real terms during the past decade, DOD's S&T programs remained essentially flat. DOD is the only major Federal agency involved in research and development whose basic research program did not grow in real terms in the 1980s.

The overall RDT&E budget has declined 14 percent in real terms since FY1986, and is expected to continue to decline over the next five years. Because DOD's S&T programs did not share in the Reagan buildup, some Members of Congress have expressed a desire for maintaining real increases in S&T funding. In FY1991, Congress increased the Administration's request for S&T programs by 15 percent, while decreasing the Administration's overall RDT&E request by 2 percent. In FY1992, however, DOD proposes to reduce funding for S&T by 3

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[3] DOD's Science and Technology program is considered a subset of DOD's overall Research, Development, Testing and Evaluation (RDT&E) program and is characterized as 6.1 (basic research), 6.2 (exploratory technology development), and 6.3A (advanced technology development), excluding the Strategic Defense Initiative.

[4] For example, powerful phased-array radar and other elements of the Patriot air defense system (formally deployed in 1984) had their genesis in the Army's SAM-D S&T program in the mid-1960s. A single Patriot phased-array radar can perform more tasks than the seven mechanical radars required by the Patriot's two predecessors (the Nike and Hawk air defense systems). The stealth technology incorporated in the F-117 attack plane can trace its development back to an S&T program begun in 1959 which later led to the development of the SR-71 reconnaissance aircraft. In the early 1970s, to discover new ways to avoid the kinds of aircraft losses inflicted by surface-to-air missiles during the Vietnam War, Lockheed convinced the Air Force to apply the technology generated in this program to a new attack plane. And the Joint Surveillance Target Attack Radar System (JSTARS) surveillance plane, which peered deep behind Iraqi lines to detect and target columns of Iraqi troops in both day and night, in good weather and bad, evolved out of a Defense Advanced Projects Research Agency (DARPA) technology demonstration program begun in the later 1970s.

percent in real terms from the FY1991 figure, while increasing total RDT&E by 11 percent.

With overall funding for RDT&E constrained, if Congress seeks options for maximizing the amount allocated to S&T programs, one option would be to cancel or defer work on major weapons now in development. DOD's RDT&E budgets are still dominated by large systems development programs such as the Air Force's B-2 stealth bomber, Advanced Tactical Fighter (ATF), and C-17 transport plane, the Navy's AX medium attack plane, and the Army's Light Helicopter (LH). If DOD and Congress choose to reduce these programs, more funding could be made available within the RDT&E account for S&T programs. Many observers, however, are concerned that canceling or deferring new weapons would threaten U.S. technological superiority in future conflicts (see entry on High-Technology Weaponry).

Another option would be to increase allied participation in some weapon development programs and have the allies pay a greater portion of the development bill for them. Some observers, however, are concerned that greater allied codevelopment will make the United States too vulnerable to supply disruptions in time of a conflict (see entry on the Defense Industrial Base).

An alternative approach would be to stabilize or reduce DOD's S&T budget, develop dual-use technologies in cooperation with the civilian sector, and use more civilian technology in new or modified systems. One concern about civilian products is whether they are rugged enough to withstand a combat environment. The Gulf War should provide potentially important data on this issue.

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BALLISTIC MISSILE DEFENSE AND SDI

What implications might the Persian Gulf War have for ballistic missile defenses and SDI?

One of the star performers of the Persian Gulf War was the Patriot antitactical missile system. As a result of Patriot's apparent battlefield success against Iraqi-modified SCUD missiles, the U.S. domestic debate over ballistic missile defenses (BMD) and the Strategic Defense Initiative (SDI) has been reinvigorated. President George Bush proclaimed that Patriot was "proof positive that missile defenses work," and he has refocused the SDI program to provide protection from limited ballistic missile attacks, whatever their source.

Patriot's role in Operation Desert Storm brought home three lessons for ballistic missile defenses in general. First, Patriot's qualified success as an effective, albeit limited, BMD offers considerable support for the argument that missile defenses can work. Second, threats of military retaliation may not be

sufficient to deter a Third World nation from carrying out missile attacks. Third, a defense against a missile attack can not rely solely on destroying a potential enemy's missiles and launchers on the ground. Despite extensive intelligence gathering capabilities and numerous optimum opportunities to attack Iraq's missiles and launchers, coalition forces could not destroy them all.

The lessons learned from Patriot's performance in the Gulf War for SDI in particular are less clear, primarily because the BMD system envisioned in the SDI would, for three reasons, be technically much more challenging. First, Patriot uses a warhead to destroy or disable an incoming missile and therefore does not have to be as accurate as an SDI interceptor, which must destroy its intended target through direct impact. Second, Patriot missiles encountered limited attacks by large slow missiles against known targets. An SDI system would have to be able to defend the United States and its allies from incoming missiles and smaller, faster warheads with perhaps no warning of where an attack might occur. Third, while the Patriot system did not have to be perfect (the low-yield conventional warhead on an Iraqi SCUD did not make it a militarily significant weapon), a nuclear or chemical warhead would require incomparably better performance of an SDI system.

Nonetheless, the primary effect of Patriot's apparent success has been to inspire a growing belief that the United States should deploy some BMD capability in order to counter the growing threat from global missile proliferation. The major policy debate now forming will be over how much BMD capability should be pursued and whether the United States should continue to adhere to the ABM Treaty (which limits the United States to 100 ground-based missile interceptors against *strategic* ballistic missiles). One option would be to abandon the ABM Treaty in favor of a large-scale BMD system, as well as deploy some number of Patriot or Patriot-like antitactical ballistic missiles (ATBMs). The other option would be to pursue an ABM Treaty compliant BMD system, *and/or* deploy some number of Patriot or Patriot-like ATBMs, which are not constrained by the ABM Treaty.

Generally, traditional advocates of SDI will favor the first path -- deployment of a relatively robust SDI system such as the GPALS (Global Protection Against Limited Strikes) proposed by the Bush Administration. GPALS would consist of fewer than 2,000 ground- and space-based interceptors, and perhaps a few hundred ground- and space-based sensors. The objective of GPALS would be to provide global protection against accidental or unauthorized, limited ballistic missile attacks from any quarter on the United States and its allies, friends, and forces overseas. Combined with deep arms reductions, GPALS could arguably provide some defense against a Soviet first-strike attack against the United States.

To test and deploy a system such as GPALS, the 1972 ABM Treaty would have to be abandoned or replaced by some new U.S.-Soviet agreement permitting testing of space-based weapons and deployment of large-scale ballistic missile defenses. The Bush Administration has recently begun to argue that given the events in the Gulf War, the United States should explore seriously the feasibility

of such defenses, which it acknowledges would involve going beyond the ABM Treaty. Brent Scowcroft, the President's National Security Advisor, has also said that the United States must do everything possible to defend itself against accidental or unauthorized missile attacks, and that the Administration would prefer that any changes to the ABM Treaty be done in cooperation with the Soviet Union.

Others, favoring the second path, are likely to counter that a large-scale SDI system such as GPALS would be excessive and prohibitively costly. They will likely argue that the Third World ballistic missile threat is much less serious than is now perceived, that the threat of a Soviet first-strike is no longer credible, and that a large-scale SDI system is therefore not warranted. Many of them, however, will also argue that it would only be prudent to provide some limited defense of forward-deployed U.S. and allied forces from attack by *short-range* ballistic missiles. Such an ATBM system, regardless of the number of interceptors deployed, would not be constrained by the terms of the ABM Treaty. Although it does not seem to be a major concern, some might also argue that an ABM system of 100 ground-based strategic ballistic missile interceptors should be deployed as a precaution against limited, accidental or unauthorized Soviet missile launches. Such a system would also be compliant with the terms of the ABM Treaty.

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MILITARY SPACE SYSTEMS

What implications might the Persian Gulf War have for military space systems?

The Persian Gulf War was the first major military conflict in which the United States and its allies could utilize a broad array of satellite assets. Although satellites have played important roles in recent limited military actions, the last major conflict, Vietnam, occurred too early in the Space Age to test the utility of space systems to U.S. and allied strategic and tactical commanders in time of war. In the wake of the Persian Gulf War, Congress may consider two issues relating to military space systems: (1) In what ways did military space systems prove valuable in the war effort? (2) What implications might the war experience have for decisions about the development of new military space systems?

Contributions of Space Systems in the Persian Gulf War

Satellites are often viewed more as strategic than tactical assets. Their role as "peacekeepers," monitoring arms control agreements or giving early warning of missile launches, are relatively well known, while their use for communications, weather, and navigation is less visible but equally vital. In the Persian Gulf War, the full inventory of DOD and intelligence satellites played

a significant role in the strategic conduct of the war, from providing communications between the National Command Authority and Central Command, to warning of Scud missile attacks, to watching troop movements.[5]

Their tactical value also was proven during the conduct of the war. Satellites provided photographic, radar, and electronic intelligence not only to top military leaders, but reportedly to those in the field, too. Satellite intelligence formerly was said to be "for generals." Apparently in this case, it was available, for example, to pilots prior to flying their missions. (See also the entry on Intelligence Issues.)

DOD's early warning satellites proved more useful than many expected in detecting Scud missile launches. The satellites (called the Defense Support Program) are designed to detect intercontinental ballistic missiles (ICBMs) or submarine launched ballistic missiles (SLBMs), rather than shorter range missiles like the Scud. Nevertheless, the DSP system reportedly was able to detect Scud launches, transmit the data to the United States for confirmation and analysis of the impact point, with the resulting information transmitted via communication satellites to Central Command, all within 5 minutes, leaving 2 minutes to alert those in the impact area.

While early warning of short range missile attacks and some other types of intelligence can be collected by alternative means (aircraft, for example), only satellites can provide instantaneous, global communications and navigation. Perhaps the most publicly praised example of military satellites in support of the war was the NAVSTAR Global Positioning System (GPS) of navigation satellites that allowed air, land and ground forces to precisely determine their location and to navigate in a largely featureless terrain. NAVSTAR receivers are also now being installed in some autonomously guided weapons (such as the Standoff Land Attack Weapon and new versions of the Tomahawk cruise missile).

The NAVSTAR system is not fully operational (only 15 of a required 18 satellites are in orbit and many of these are from an older test series), and DOD had to purchase commercial receivers since supplies of special DOD receivers were not available. Still, the system proved so vital that some troops wrote home asking relatives to send them receivers (called SLUGGERs). In a sense, NAVSTAR may have proved one advantage of "dual-use" systems. Though developed by DOD, NAVSTAR was always intended for use by the civilian sector and commercial receivers have been available for several years. Thus, DOD was able to "make do" with the commercial receivers. A potential disadvantage is that the enemy might also buy commercial receivers and use the system against the United States. (DOD designed the system so that the most precise data would be available only to its users, with a less precise capability available to

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[5] All the information in this section is from open sources. See CRS Report 91-215 SPR, *Military and Civilian Satellites in Support of Allied Forces in the Persian Gulf War* by Marcia S. Smith for further information on the sources used, and on civilian and foreign satellites that supported Desert Storm.

non-DOD users, but since the commercial sets were the ones in use by DOD this time, DOD had to permit the commercial sets to receive the more precise data.)

Implications for Development of New Military Space Systems

Two closely related military satellite issues were highlighted by the war: the utility of satellites at the tactical level, and the need for advanced systems. As noted, satellites traditionally have been thought of as strategic assets. This view had been gradually changing prior to the war, but now has taken on added weight, which may influence decisions about the design of future satellite systems (such as ensuring that small, portable, jam-resistant ground stations for communications satellites are widely available).

The Air Force is now developing a new communications satellite system called MILSTAR (Military Strategic and Tactical Relay) which for years was focussed on strategic applications, particularly to support the military during a nuclear war. Congress already has directed DOD to scale back the program and refocus it on tactical uses, but its high cost will continue to make the program controversial. The experience of the war may influence Congress' perception of the need for and design of the system.

Similarly, DOD was planning to develop a new generation of early warning satellites (the Advanced Warning System), but it was not included in DOD's FY1992 request for budgetary reasons. Congressional debate over whether to upgrade DSP or invest in a new, more sensitive system to ensure detection of short range missiles like Scud -- rather than hoping that DSP will turn out to be capable of the task next time -- could be shaped by the events in the Persian Gulf.

The widespread use of satellites demonstrated the military's growing reliance on them, which may affect views regarding the share of the defense budget that should be allocated to space systems and whether the United States should develop an antisatellite weapon (see CRS Issue Brief 85176).

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AIRLAND BATTLE DOCTRINE

What implications might the Persian Gulf War have for the Army's Airland Battle doctrine?

In the early 1980's the Army adopted a new combat doctrine, called Airland Battle, which emphasizes close coordination of air and ground forces, seizing the initiative, rapid maneuver, and attacking the enemy rear area and flanks. Designed to disrupt and defeat a multi-echeloned Soviet attack on NATO, it also sought to take advantage of the increased speed and firepower of a new generation of weapon systems -- the M1 tank, Bradley fighting vehicle, and Apache attack helicopter.

The Persian Gulf War was the first large-scale employment of the Airland Battle doctrine. In its wake, Congress may consider four questions relating to the doctrine and related investment: (1) How severely was the Airland Battle doctrine tested? (2) What might the war mean for Army helicopter procurement? (3) Are the logistical demands of the Airland Battle doctrine overly burdensome? (4) What does the war mean for the Command, Control, Communication and Intelligence (C^3I) systems for Airland Battle?

Severity of Test

In key respects, the war was not a severe test of the Airland Battle doctrine. Iraq's air force put up little resistance, and Iraqi ground forces adopted a static defensive posture in fortified positions, allowing the allies to freely exploit Airland Battle's emphasis on initiative (picking the time and place of attack) and maneuver in their sweeping flank attack through southern Iraq. Iraqi ground forces fought only sporadically against coalition ground forces (although this was due in part to disruption of the enemy's fighting cohesion -- something Airland Battle emphasizes). And the war was of short duration. Nevertheless, the war provided valuable experience for the Airland Battle doctrine in helicopters, logistics, and (C^3I).

Helicopters

The performance of helicopters, which are integral to successful execution of Airland Battle, was noteworthy. Serving as independent maneuver elements, Apache and Kiowa (armed scout) helicopters executed attacks on radar sites, artillery positions, and troop bunkers. Some have likened the helicopter in this role to a tank battalion that travels at 170 miles an hour over any terrain. Blackhawk and Chinook transport helicopters carried elements of the 101st Division for an air assault deep into Iraqi territory on the first night of the ground offensive, and provided indispensable logistical support for fast-moving armored and mechanized units. The role and performance of helicopters in Army combat doctrine takes on particular significance as Congress considers the Army's $33 billion Light Helicopter (LH) modernization program.

Logistical Support

Greater speed and firepower required a mammoth logistics effort. Fuel consumption for the M1 tank and other vehicles presented a major challenge. The Army is now examining ways to reduce fuel consumption, increase helicopter fuel capacity, and improve long-range battlefield fuel transportation. U.S. forces handled the logistics demands. But the war was relatively limited in duration, intensity, and geographical scope. A question therefore remains whether investment in logistics capabilities has been adequate to meet Airland Battle's demands in a longer, wider and more intensely fought campaign.

Command, Control, Communication, and Intelligence (C^3I)

Army and Air Force joint planning for battlefield coordination and communications seems to have been effective. Incidents of Air Force planes accidentally attacking friendly forces involved U.S. Marine and British armored vehicles, but no U.S. Army units. This may argue for closer training and coordination between the Air Force and forces it may be called upon to support.

Another key element of Army/Air Force cooperation for Airland Battle was the E-8 Joint Surveillance Target Attack Radar System (JSTARS) aircraft, which gave Army field commanders real-time intelligence on enemy troop movements, and provided targeting data directly to the Army Tactical Missile (ATACMS) guidance system. JSTARS and ATACMS are still in operational testing and have been considered for termination owing to the decline of the Soviet threat. It is likely, however, their performance in the war will ensure continued investment. Other C^3I systems employed in the war were the NAVSTAR Global Positioning System (GPS) that allowed ground troops to determine their exact location in the desert, and E-3 Airborne Warning and Control System (AWACS) aircraft, which monitored Iraqi air activity and coordinated thousands of coalition aircraft daily.

The Army's new C^3I equipment generally worked well, but some shortfalls became apparent. Switching stations for the new Mobile Subscriber Equipment (MSE) telephone system could not redeploy fast enough to keep up with the ground offensive, perhaps indicating a need for more stations per division. There was insufficient means for secure data transmission in the field. The Army hopes to solve this with the Army Data Distribution System (ADDS), but this system will not be fielded before 1994, and has experienced funding and production delays. The new tactical Single-Channel Ground and Airborne Radio System (SINCGARS) performed well, but units using SINCGARS' predecessor reportedly experienced some difficulties in communicating with SINCGARS-equipped units. Helicopter operations demonstrated the need for improved radios for flying "nap-of-the-earth" missions when terrain features impede communication.

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AIRPOWER

RELIANCE ON AIRPOWER

What implications might the Persian Gulf War have for the issue of reliance on airpower?

As the defense budget declines, Congress will face difficult choices about which military capabilities to retain and which to eliminate. One of the primary choices Congress will face is how much the United States should emphasize airpower in a downsized U.S. military establishment.

Airpower -- "Global Reach, Global Power"

In the months prior to Iraq's invasion of Kuwait, U.S. proponents of airpower argued that given the lethality of modern air-launched weapons and advances in in-flight refueling capabilities, the United States in the post-Cold War era could rely primarily on airpower to defend its interests. A primary implication of this view was that the Army would play a more secondary role in U.S. military planning, and could therefore be reduced substantially (see entry on Size of the Army).

The Air Force in particular last year stressed reliance on airpower, and coined a new slogan -- "Global Reach, Global Power" -- to help disseminate the theme. In the Air Force view, airpower can project massive U.S. force rapidly to any location on the globe and pressure enemy "centers of gravity" until U.S. aims are achieved. In a controversial September 1990 interview that led to his dismissal as Air Force Chief of Staff, Gen. Michael Dugan among other things stressed the prospective value of airpower in defeating Iraq, and suggested that although coalition ground forces might be needed to reoccupy Kuwait, airpower would damage Iraqi forces so extensively that coalition ground forces would be able to "walk in and not have to fight."[6]

Was Dugan Right?

Coalition ground forces didn't exactly walk into Kuwait unopposed, but the surprisingly rapid and completely one-sided nature of the ground campaign confirmed for many the essential validity of the airpower argument in this case. The coalition air campaign destroyed much of Iraq's military equipment and apparently reduced many Iraqi soldiers' will to fight. In light of this, many observers conclude that Dugan's views were essentially correct. The effectiveness of airpower, they argue, is especially noteworthy in view of Iraq's

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[6] As quoted in Atkinson, Rick. U.S. to Rely on Air Strikes if War Erupts. Washington Post, Sep. 16, 1990: A1. See also Morrocco, John D. U.S. War Plan: Air Strikes to Topple Hussein Regime. Aviation Week & Space Technology, Sep. 24, 1990: 16-18.

extensive air defense system and the fact that the weather in Kuwait and southern Iraq in the first few days of the air campaign was the worst for that region in 14 years.

Advantages for Airpower

While it is difficult to contest the success of the coalition air campaign, it is important to note that the Persian Gulf War was a scenario that in many ways played to the strengths of airpower. The terrain was relatively flat and bare, making it hard for targets on the ground to hide from aircraft. Iraq's air force did not participate in the war after the first few days, enabling coalition aircraft to focus on attacking ground targets. Iraq adopted an essentially fixed defensive strategy, which turned many Iraqi units in the desert into ideal targets. Saudi Arabia possessed an extensive network of air bases built and stocked in the 1980s specifically to support an emergency deployment of hundreds of U.S. and other Western tactical aircraft. Iraq possessed very little capability to attack either these air bases or U.S. aircraft carriers in the Persian Gulf and Red Sea. Other coalition members granted overflight rights and permitted their own air bases to be used for refueling, resupply, and long-range bombing missions. And U.S. and coalition military leaders had more than five months to perfect their air campaign plans. In future conflicts, some or most of these advantages might be lacking, and the potential effectiveness of airpower could be reduced, perhaps substantially.

Contributions of Other Forces

It should also be noted that other forms of military power played key roles in the war. Substantial ground forces were considered necessary to help deter an Iraqi invasion of Saudi Arabia. Surface naval forces were critical to enforcing the economic and military embargo against Iraq. The presence of U.S. Marine amphibious forces encouraged Iraqi military planners to assign large numbers of troops to coastal defense positions. A substantial ground offensive was deemed necessary to dislodge Iraqi forces from Kuwait. And ground forces are playing an important role in postwar efforts to secure U.S. and coalition goals in the region.

The Potential and Limits of Airpower

In many ways, the air campaign fulfilled promises that airpower advocates have been making for decades regarding the potential for using aircraft to determine the course of war. At the same time, the war suggested that even in favorable circumstances there are limits to what airpower can accomplish by itself. The Air Force and other airpower advocates have avoided the argument that airpower by itself can do everything. But how much *can* it do? For policymakers attempting to determine the future composition of U.S. military forces, the task is to understand both the potential and the limits of airpower,

and how these can change from one military contingency to the next as a function of differing geographic, strategic, and political circumstances.

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NEXT-GENERATION VS. EXISTING TACTICAL AIRCRAFT

What implications might the Persian Gulf War have for the issue of procuring new-generation tactical aircraft vs. staying with existing designs?

Congress now faces important decisions on whether to procure a new generation of tactical aircraft or instead stay with existing aircraft designs. In the Air Force, the issue is whether to pursue the Advanced Tactical Fighter (ATF) as the successor to the F-15 fighter. In the Navy, the primary issue is whether to pursue the AX all-weather medium attack plane as the successor to the A-6E all-weather medium attack plane.[7] The secondary issue is whether to pursue the Navy version of the ATF (NATF) as the successor to the F-14 fighter. In the Marine Corps, the issue is whether to procure the V-22 tilt-rotor aircraft as the successor to the Corps' medium-lift helicopters.[8] And in the Army, the issue is whether to pursue the new LH light helicopter as the successor to the Army's AH-1 and OH-58 helicopters.

The Administration supports the ATF, the AX, and the LH, but wants to terminate the NATF and the V-22. Congress has kept the V-22 program alive in the development stage for two years. In the wake of the Persian Gulf War, Congress may want to consider the need and urgency for each of these aircraft. Air-launched standoff weapons can be an important factor in decisions on aircraft modernization (see entry on Air-Launched Weapons).

ATF and NATF

With a diminished Soviet threat, can the ATF be canceled or deferred? Those who support canceling or deferring the ATF can note that in the Persian Gulf War: (1) no F-15s were shot down in air-to-air fighting; (2) F-15s were responsible for the vast majority of the Iraqi planes shot down by coalition aircraft; and (3) aircraft shot down by F-15s included export versions of the French-made Mirage F-1 and Soviet-made MiG-29 fighters -- two of the most advanced aircraft now on the international market. They might also argue that improvements to the F-15 or its weapons can keep the F-15 ahead of future Third World air-to-air threats for some time.

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[7] The AX is the planned replacement for the A-12, which was to be the successor to the A-6 until the A-12 program was canceled in January 1991.

[8] Smaller numbers of V-22s were also planned for the Navy and Air Force. See also the entry on Special Operations Forces.

ATF supporters can emphasize the importance of maintaining U.S. technological superiority in fighters as a hedge against the possibility of a resurgent Soviet military threat that included improved Soviet planes. They can also argue that the Soviet Union and Western countries in the future will likely export increasingly advanced planes to the Third World. Lastly, ATF supporters can argue that the successful use of the stealthy F-117 aircraft in the Persian Gulf War confirmed the value of stealth in future air operations. The ATF is designed to be a stealthy fighter, and there are limits to the degree that stealth features can be backfitted into the F-15.

The Navy and the Air Force in the future will face generally the same enemy aircraft. If the Navy can suffice with its existing fighter designs to fight enemy aircraft in the future, then it is not clear why the Air Force needs the ATF for this purpose. Conversely, if the Air Force needs the ATF to face these aircraft, then it is not clear how the Navy can suffice with older fighter aircraft designs. The Navy has suggested that the NATF was terminated mostly due to budget limits. Supporters of naval aviation may argue that the proposed NATF termination indicates that naval aviation is underfunded relative to equally important defense priorities.

AX

In justifying the AX, the Administration emphasizes the need to preserve the survivability of carrier-based attack planes against future improvements in air defenses. The Navy has testified that a new attack plane would be several times as survivable as an upgraded or modified version of an existing airplane. But older-design aircraft flew tens of thousands of sorties against Iraq's air defenses, which were reputedly among the best in the Third World, and loss rates for these aircraft, while not zero, were quite low. The issue is whether a major jump in survivability is needed; if not, it might be sufficient to upgrade or modify the A-6, the F-14, or the F/A-18.

The Administration also emphasizes the value of stealth as a contributor to survivability. No F-117 stealthy light attack planes, it says, were shot down or even damaged by enemy fire, even though the F-117s carried out many of the most dangerous attack missions in the war. But attack speed, electronic jamming, physical protection against enemy fire, standoff weapons, and defense suppression by cruise missiles also contribute to survivability. If a satisfactory level of survivability can be achieved for an attack plane by combining a lower degree of stealth with other contributors to survivability, then it might again be more cost effective to upgrade or modify the A-6, the F-14, or the F/A-18.

V-22

V-22 supporters can argue that the aircraft would have enhanced the Marine Corps' amphibious options in the war, and might have reduced Marine Corps casualties if an amphibious landing had occurred. V-22 supporters can also argue that the aircraft would have been useful in the war for special operations, including long-range rescue operations of downed coalition pilots (see

entry on Special Operations Forces). Opponents of the V-22 can argue that the successful use of medium-lift and other helicopters in the war shows that the tilt-rotor technology of the V-22 is not a critical need at this time.

LH

The Army's AH-1 and OH-58 helicopters performed well in the war. But the war also demonstrated the value of helicopters in the Army's Airland Battle doctrine, and the LH was designed with this doctrine in mind. The LH is also designed to have low maintenance costs. (See entry on Airland Battle Doctrine.)

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LAND- VS. SEA-BASED AIRPOWER

What implications might the Persian Gulf War have for the debate over the merits of land- vs. sea-based airpower?

As defense spending declines and U.S. forces grow smaller, Congress will face important questions on where certain military capabilities should reside within the U.S. military. One of these questions concerns the balance of land- vs. sea-based aircraft in overall U.S. airpower. The Persian Gulf War occurred in the midst of a debate over the relative merits of these two forms of airpower for projecting U.S. power overseas in the post-Cold War era.

The stakes of the debate are high -- the outcome will affect the future balance of Air Force tactical fighter wings and aircraft carrier battlegroups in the U.S. military. Given the dominant role of the Air Force in the air campaign, supporters of carrier-based aviation fear carrier-based aircraft will lose out in the postwar budget debate. Reflecting this anxiety, there have been allegations that the Air Force, which planned the air campaign, assigned carrier-based aircraft to mostly secondary roles and undercounted the number of carrier-based aircraft sorties.

Base Access and Base Capacity

Advocates of carrier-based aviation emphasize its value for projecting U.S. power in regions where the United States lacks access to a nearby air base. The relative freedom of carrier-based aircraft from base access is a major justification for the expense associated with building and operating the aircraft carrier and the other ships in the battlegroup. In the months prior to the war, the Navy and other advocates of carrier-based aircraft had argued that in the post-Cold War era, with the focus of U.S. defense planning shifting to the Third World, limits on overseas base access would become a more important issue.

Land-based aircraft supporters acknowledged that the United States lacks routine base access in many parts of the Third World, but argued that friendly

states would nevertheless open their bases to U.S. aircraft in situations where their security was clearly at risk. (They also argued that with in-flight refueling, U.S.-based long-range strategic bombers and even tactical aircraft could reach any location on the planet, perform their mission, and return home without any intermediate landings.)

In the case of the Persian Gulf War, advocates of land-based aircraft were right. Saudi Arabia and the other Gulf Arab states, as well as U.S. allies in Europe, opened up their air bases to well over a thousand U.S. aircraft. The only reported difficulties concerned the basing of B-52 bombers in certain Arab countries, and it is not clear that this significantly affected the operation.

An issue did arise, however, with respect to base capacity. Saudi Arabia built a lot of excess capacity into its air base infrastructure in the 1980s precisely so that many U.S. and Western aircraft could deploy there in an emergency. In spite of this, there were indications that Saudi and other Gulf Arab air bases were saturated wingtip to wingtip by coalition aircraft. An offer by one NATO ally to send a squadron of planes to the Gulf was reportedly turned down due to lack of basing facilities. Air base saturation may be one reason why an additional three aircraft carriers were sent to the Gulf region in November.

In the wake of the Gulf War, advocates of land-based aircraft can argue that base access is not the problem that some have made it out to be, because access was obtained when it was important. Advocates of carrier-based aircraft, however, can argue that access may be granted only in severe crises where the host government perceives a direct and immediate threat to its security. They can also argue that base capacity may limit the number of land-based planes that can be deployed. This could be important in crises that do not involve Saudi Arabia, which apparently has the most excess air base capacity by far of any country in the Third World.

Responding to Crises vs. Deterring Them

Advocates of land-based aviation argue that it can more efficiently project U.S. power in response to overseas crises. Land-based aircraft, they note, can fly to a crisis area in a matter of hours, as opposed to the days or even weeks it might take a carrier to reach a distant region. Land-based aircraft, they argue, can be more easily massed for large-scale, intensive air campaigns. And land-based aircraft, they argue, are inherently more cost-effective because the carrier-based aircraft concept requires a substantial up-front investment in the carrier and its support ships, and because designing an aircraft to make it suitable for carrier operations exacts a penalty on the aircraft's performance in other respects.

Advocates of carrier-based aircraft emphasize that only sea-based forces can maintain a standing deterrent presence in a region where the U.S. lacks routine access to overseas bases. They argue that since the cost of deterring a war can be incomparably less than that of fighting one, forward-deployed carrier-based

aircraft are very cost effective in terms of their ability to help deter crises from occurring in the first place.

In the wake of the Gulf War, advocates of land-based aircraft can note that the first U.S. land-based fighters arrived in Saudi Arabia the day after the President's decision to send forces to the area. Land-based aircraft eventually greatly outnumbered carrier-based aircraft, and carried out the lion's share of the air campaign. Advocates of carrier-based aircraft can note that two carriers arrived within striking distance of Iraq at about the same time as the first land-based fighters, that carrier-based aircraft provided early air cover while the United States built up its land-based forces, and that carrier-based aircraft participated strongly in the air campaign. To help deter future Gulf crises, the United States may maintain an augmented standing naval presence in the Persian Gulf/Indian Ocean region. Maintaining an aircraft carrier continuously as a part of this force would require 7 or 8 U.S.-based aircraft carriers.

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CLOSE AIR SUPPORT AND "FRIENDLY FIRE"

What implications might the Persian Gulf War have for the issues concerning close air support and the associated problem of "friendly fire" casualties?

The Persian Gulf War came in the midst of a controversy over the future of the close air support (CAS) mission and the aircraft needed to perform it. Close air support is the use of aircraft to attack enemy forces in very close proximity to friendly troops. It requires that aircraft be able to locate, identify, and destroy enemy targets, without inflicting casualties on friendly forces.

Events of the Persian Gulf War have highlighted a number of questions concerning CAS: (1) What aircraft should perform close air support? (2) Should close air support be an Air Force mission? (3) What can be done to reduce "friendly fire" casualties from close air support?

Choosing a CAS Aircraft

Prior to the war, the Air Force was planning to replace the A-10 (the only Air Force aircraft dedicated to close air support) because it was deemed too vulnerable to modern air defenses. Congress has urged the Air Force to conduct competitive testing of candidate CAS aircraft. These included the AV-8B Harrier, A-10, A-7, and other aircraft "which can reasonably perform the CAS mission." The Air Force believes, however, that such testing is unnecessary, and that it would only serve to confirm its decision to modify F-16s for the CAS mission. Congress's concerns over the selection of a new CAS aircraft remain unresolved, and for FY 1991 it deferred funding for modifying F-16s, citing

"major uncertainties concerning ...the future Air Force tactical combat aircraft force structure."

Based upon the A-10's excellent performance against Iraqi forces, the Air Force has decided to retain approximately 150 A-10's, and upgrade the aircraft's night-fighting capabilities. The Air Force believes that the A-10's performed well against the minimal Iraqi air defenses, but the modified F-16 remains its choice in more sophisticated air defense environments. It has once again requested funds (FY1992 $251.0 million, projected FY1993 $508.2 million) to modify 350 F-16 aircraft for close air support. Whether Congress will reaffirm its desire for competitive testing of other aircraft for the mission remains to be seen.

Whose Mission?

Some have suggested that the CAS mission should be taken from the Air Force and transferred to the Army. They argue that the Air Force gives higher priority to other missions (e.g. interdiction, counterair), and that the Army cannot always depend upon receiving adequate CAS from the Air Force when needed. They point to the Army's development of and reliance upon attack helicopters (AH-64 Apache) as evidence of inadequate support from the Air Force. Supporters of this view included a provision in the National Defense Authorization Act for Fiscal Year 1991 that directs the Air Force to begin transferring A-10 aircraft to the Army. Both the Army and the Air Force officially assert that the CAS mission should remain with the Air Force, and want Congress to rescind the A-10 transfer order.

The Persian Gulf War provided little insight into the debate over which service should have the CAS mission. For one thing, forty days of air attacks allowed the Air Force to complete many of its other missions before the onset of the ground war created a need for CAS. The very large number of available coalition aircraft also reduced the competition between missions for air assets. Finally, Iraqi resistance was minimal, most targets attacked were not in close proximity to friendly troops, and the ground offensive was very short in duration. These factors precluded a severe test of the current CAS mission structure.

Reducing Friendly Fire Casualties

The Persian Gulf War did point up one inherent problem in performing close air support -- accidentally inflicting casualties on friendly forces. In two instances, Air Force aircraft mistakenly attacked U.S. Marine and British armored vehicles, resulting in 16 allied deaths. Many observers have pointed out that given the extraordinary number of attack sorties flown, this is a relatively low number of "friendly fire" casualties. But the very low number of combat casualties overall, and the fundamental principle that even one death from "friendly fire" is too many, have highlighted this problem. Both incidents occurred at night and involved A-10's, which do not have night target acquisition systems -- equipment that Air Force now proposes to provide in A-10

upgrades. With the Army's growing emphasis upon night and bad weather combat, it would appear that any CAS aircraft will have to be able to attack accurately in these environments.

The Army and the Air Force have set up a joint task force to determine what other measures can be taken to prevent friendly casualties. These may include a variety of passive measures, such as unique fluorescent identifying markings, or more active measures, such as development of an electronic identification system similar to those used between friendly aircraft. It should be noted, however, that neither "friendly fire" incident involved U.S. Army troops. Both involved services (U.S. Marines and the British Army) for whom the Air Force does not usually provide CAS, and whose armored vehicles may have been unfamiliar. This may argue for joint training with the Air Force-Marine Corps and allied troops.

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STRATEGIC BOMBERS

What implications might the Persian Gulf War have for procurement of the B-2 bomber?

Congress faces a decision on whether to procure a fleet of 75 B-2 strategic bombers as the Administration wants, some lesser number, or no more than the 15 already authorized. The primary justification for the B-2 bomber concerns its role in the U.S. nuclear war plan. A secondary rationale for the program is the B-2's potential value in nonnuclear conflicts such as regional wars and limited military strikes. In the wake of the Persian Gulf War, Congress accordingly is considering two new perspectives relating to the B-2 program: (1) What does the Persian Gulf War say about the need for the B-2 for strategic nuclear war? (2) What does the war say about the B-2's potential usefulness in non-nuclear conflicts?

The Need for the B-2 for Strategic Nuclear War

The Administration's argument on the need for the B-2 for strategic nuclear war essentially has four parts: (1) The nation's strategic nuclear force requires a manned bomber as well as ballistic missiles. (2) The manned bomber must be able to penetrate Soviet air defenses. (3) The nation's current front-line strategic nuclear bomber, the B-1B, eventually will not be able to penetrate Soviet air defenses reliably if the Soviet Union upgrades its air defenses significantly. (4) The B-2, with its high degree of stealth, will be able to reliably penetrate Soviet air defenses in the future. Of these four points, the Persian Gulf War may influence thinking on the final three.

Need for Penetrating Bomber

Critics of the B-2 argue that a new penetrating bomber is unnecessary. They note that B-52s will be able to destroy their assigned targets, including heavily defended ones, from a distance with cruise missiles. The Persian Gulf War demonstrated that standoff weapons are accurate and can work well. Moreover, the B-1B will be able to penetrate to less-defended targets even if the Soviet Union upgrades its air defenses, it can use short-range attack missiles to attack heavily defended targets, and nuclear-armed ballistic missiles can also attack these targets. Critics of the B-2 argue that one mission cited to justify a penetrating bomber -- finding mobile Soviet ballistic missiles -- is impractical, as the difficulty that U.S. aircraft experienced in searching for mobile Iraqi Scud missile launchers appears to confirm. Supporters of the B-2 note that standoff weapons do not work perfectly, as the war demonstrated, so it is important to have pilots on the scene to evaluate the need for and effectiveness of an attack. A multiplicity of means of attacking a target complicates defenses, as the war shows. Finally, a penetrating bomber can perform rapid bomb-damage assessment. The Gulf War underscored the importance of this mission and the difficulty of doing it using satellites alone.

Future Ability of B-1B to Penetrate[9]

Iraq's air defense system -- composed of mostly Soviet-made weapons tied together in a Soviet-style air defense network -- was among the most formidable in the Third World. The very low attrition rate this system inflicted on older U.S. aircraft may suggest that the B-1B will be able to penetrate Soviet air defenses reliably for many years to come. The United States has been honing its nuclear attack plan for decades, would use nuclear missiles to destroy Soviet air defenses, and is learning lessons from the war that would enhance bomber effectiveness. In this view, the B-2 is therefore not needed. On the other hand, the United States had months to prepare its attack on Iraq's air-defense system, was able to commit hundreds of short-range tactical aircraft to that attack, and benefitted from an Iraqi reluctance to commit its own air force to the battle. The Soviets, moreover, watched the war closely and are deriving lessons on how to improve their strategic air defenses. The implications of the war for the B-1B's ability to penetrate Soviet air defenses in the future are thus difficult to assess.

Ability of B-2, a Stealth Plane, to Penetrate

If a penetrating bomber is needed, and if the B-1B will eventually not be able to reliably penetrate Soviet air defenses, then the Gulf War suggests that the B-2, as a stealth aircraft, will be better able to penetrate Soviet air defenses. The Administration has stated that no F-117 stealth attack planes were shot down or even damaged by enemy fire in the Gulf War, even though F-117s were used extensively to carry out the most dangerous air attacks. The

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[9] It should be noted that the B-1B force did not participate in the war, in part because B-1B crews were not trained for conventional bombing missions.

Administration is already arguing on the basis of the F-117's performance that stealth works and that new stealth planes, including the B-2, are needed.

The Usefulness of the B-2 in Nonnuclear Wars and Contingencies

The United States reportedly used about 50 of its B-52 strategic bombers in the Persian Gulf War, indicating that strategic bombers remain useful in nonnuclear, regional wars, particularly for attacking widely dispersed targets with large amounts of bombs. Strategic bombers, with their long range, also have potential value in cases where the United States cannot easily use shorter-range tactical aircraft to attack the target because access to a nearby air base is lacking and carrier-based aircraft are not available.

At issue is whether the B-2 would have a significant value as a conventional bomber when the United States already has a force of aging but serviceable B-52s dedicated to this role. B-52s should be available for this role for decades. Moreover, F-117As would be available for future conventional wars, reducing the need for the B-2 in this role. On the other hand, B-2s could perform attack missions like the 1986 raid on Libya from bases in the United States and, unlike B-52s, could do so in a stealthy manner. With their large fuel capacity and low observability, they could carry out bomb damage assessment in a conventional war. Only a few B-2s, however, might be needed for such roles, so this argument might not justify procurement of many B-2s.

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AIR-LAUNCHED MUNITIONS

What implications might the Persian Gulf War have for air-launched munitions?

The United States used a variety of air-launched munitions in the Gulf War, including unguided ("dumb") gravity bombs, precision-guided ("smart") air-to-ground weapons, and air-to-air missiles. In the wake of the Persian Gulf War, Congress may pursue three issues relating to air-launched munitions: (1) How much should be invested in "dumb" vs. "smart" air-to-ground munitions? (2) Is the U.S. military moving rapidly enough to develop and procure air-to-ground munitions with greater standoff ranges? (3) Are new-generation air-to-air missiles necessary?

"Dumb" vs. "Smart" Air-to-Ground Munitions

Although U.S. military briefings on the air campaign focused on "smart" air-to-ground munitions, the vast majority of air-to-ground munitions used in the Persian Gulf War were gravity bombs. If the extensive use of unguided bombs, in spite of their limited accuracy, was due to a shortage of precision-guided

weapons or planes equipped to use them, this could have implications for weapon procurement rates or airplane upgrade programs.

In judging the balance of "dumb" and "smart" munitions to procure, several factors come into play. Gravity bombs are much less expensive. They are suitable for attacking large-area, unprotected targets, and for encouraging the enemy to stay low and not fire back. Precision-guided munitions, however, can reduce the number of times a target needs to be attacked, thereby reducing the number of planes put at risk. The relatively flat and open terrain of Iraq may have been well suited to precision-guided weapons; future conflicts may take place in terrain where their accuracy is reduced. On the other hand, future conflicts may, like the Gulf War, place a high political premium on minimizing inadvertent damage to civilian areas and populations. In such circumstances, unguided bombs often cannot be used.

Standoff Air-to-Ground Munitions

In the Persian Gulf War, the majority of precision-guided air-to-ground weapons used by U.S. aircraft, such as laser-guided bombs, were relatively short-ranged. Only one relatively long-range air-to-ground weapon was reported used: The Navy fired a few of its new Standoff Land Attack Missiles (SLAMs), which have a reported range of 50 miles or more. SLAM was rushed into service in time for the Gulf War.

Should the U.S. military place more emphasis on long-range air-to-ground weapons? For several years, some observers have criticized the U.S. military for moving too slowly to develop and procure longer-ranged precision-guided air-to-ground weapons. Funding for longer-range precision-guided munitions has been diffused among many research and development programs, reflecting conflicting service interests and technological approaches. Some of these programs have been canceled; others have been classified and have not been widely discussed or strongly supported in Congress.

The Gulf War highlighted a longstanding controversy in Congress and the Defense Department over the issue of investing in better missiles vs. better airplanes. Critics have viewed long-range standoff missiles as too expensive and unreliable, while their supporters have argued that they would be more cost-effective than procuring expensive aircraft.

The Gulf War demonstrated that longer-range standoff weapons such as SLAM can work. But they are much more expensive than short-range laser-guided bombs, which also worked well. Most of the enemy's capability to use longer-ranged surface-to-air missiles was destroyed in the early stages of the Persian Gulf War, reducing the need longer-range standoff weapons. But enemy forces in future conflicts may be better able to use their longer-ranged surface to air missiles. New-generation stealthy attack aircraft may have less need for long-range standoff weapons because they can more safely penetrate intact enemy air defenses. But procuring longer-ranged air-to-ground munitions might enable older attack aircraft to remain in service in lieu of procuring new-

generation stealthy attack aircraft. (See also entry on Next-Generation vs. Existing Tactical Aircraft.)

New Air-to-Air Missiles

The radar-guided Advanced Medium-Range Air-to-Air Missile (AMRAAM) is now entering U.S. service as the successor to the radar-guided Sparrow medium-range missile. AMRAAM, which experienced development problems, was deployed to the Gulf area too late in the war to be used in any air-to-air engagements, so its combat effectiveness was not tested. U.S. planes achieved more than two-thirds of their air-to-air kills with Sparrows, which would appear to confirm the usefulness of a radar-guided medium-range missile. But it is not clear what the Gulf War experience with Sparrow says regarding how quickly AMRAAM should be procured and deployed as Sparrow's successor.

The Navy is now developing the long-range Advanced Air-to-Air Missile (AAAM) as the successor to the Phoenix long-range missile. No Phoenix missiles were reported used in the Gulf War. This may strengthen the case of those who argue that long-range missiles like Phoenix and AAAM might not be important in Third World conflicts. Phoenix and AAAM, they argue, were designed primarily to counter Soviet planes armed with long-range antiship missiles. In Third World conflicts, they argue, enemy aircraft are likely to be armed with shorter-ranged air-to-surface missiles. Third World conflicts, they note, can also feature a mix of civilian and military air traffic that can make the use of a long-range missile problematic.

The nonuse of the Phoenix missile, however, might simply reflect limits on the participation in air-to-air combat of the Navy's F-14 fighters, the only planes equipped to fire Phoenix. Only one Iraqi aircraft -- a helicopter -- was shot down by an F-14. F-14/Phoenix supporters can argue that Iraqi pilots avoided F-14s because F-14s demonstrated in confrontations with the Libya in the 1980s that they could shoot down Soviet-made aircraft. A long-range missile, they can also argue, can be of value in shooting down an enemy aircraft fleeing at high speed. This capability, they can argue, may become more important under Navy plans to shift an increasing share of its air-to-air duties in the future to the F/A-18 fighter, which is slower than the F-14.

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SEA-LAUNCHED CRUISE MISSILES

What implications might the Persian Gulf War have for the issue of using cruise missiles as substitutes for manned aircraft?

The Persian Gulf War saw the first combat use of the Navy's Tomahawk sea-launched cruise missile (SLCM). The weapon appears to have been used very much the way analysts had anticipated -- primarily in the early stages of

the conflict, against fixed, high-value targets, especially air defense and command and control facilities and other well defended sites.

Cruise missiles and manned aircraft can be seen as complementary weapons. Cruise missiles, for example, can be used to suppress air defenses, enhancing the survivability and effectiveness of subsequent manned aircraft operations. But the capabilities of cruise missiles and manned aircraft overlap to some degree, and the use of the Tomahawk in the Gulf War highlighted a long-standing question regarding the extent to which unmanned cruise missiles can substitute for manned aircraft. With defense funding declining, choices must be made as to where to invest scarce airpower dollars. Within overall U.S. airpower, what should be the balance between manned aircraft and unmanned cruise missiles? Three principal factors play into this debate: Weapon reliability, targeting flexibility, and relative cost.

Weapon Reliability

The Tomahawk relies on a complex guidance system to guide itself to a target several hundred miles away, and doubts had been voiced as to whether the weapon could be relied on in combat. Tomahawk's performance in the war appears to have diminished these doubts. The Navy is still reviewing the data, but says that of the 288 Tomahawk land attack missiles (TLAMs) fired in the war,[10] 80 to 85 percent hit their targets.[11] This would be consistent with Tomahawk's performance in tests during the 1980s. Press reports have suggested that up to 95 percent of the sites targeted by Tomahawks were hit by at least one Tomahawk. The Tomahawk is now cited as a principal example of a high-technology weapon that appears to have worked well in the war. Planned upgrades to the Tomahawk promise to improve its reliability.

Targeting Flexibility

At present, Tomahawks can only hit fixed targets. These targets must be mapped beforehand by satellite or other means to prepare a computerized map for the Tomahawk's guidance system. Tomahawk's flight route reportedly takes hours to program into the missile prior to launch and must include terrain suitable for its terrain contour matching (TERCOM) guidance system. Once fired, a Tomahawk cannot be redirected to a different target. Tomahawk has a reported accuracy on the order of several yards. This is better than an unguided gravity bomb, but not necessarily as good as a precision-guided air-

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[10] Most of these were armed with unitary conventional warheads (TLAM/Cs); a few were armed with dispensers for submunitions (TLAM/Ds). Two other Tomahawk variants -- the nuclear-armed version of the land attack missile (TLAM/N) and the conventionally armed Tomahawk antiship missile (TASM) -- were not used in the war.

[11] Press accounts quoting unnamed sources also mostly report a figure of 80 to 85 percent. Some reports, especially earlier ones, cite figures as high as 95 percent; one recent report cites a low figure of 69 percent.

launched weapon like a laser-guided bomb or the Navy's Standoff Land Attack Missile (SLAM), which can be accurate to a few feet, or even a few inches. Tomahawk can penetrate some structures, but has less hard-target penetration capability than a case-hardened bomb. And Tomahawks provide no post-attack bomb damage assessment (BDA). For a large portion of the targets in the Gulf War -- moving targets, newly identified targets that had to be struck right away, targets requiring extreme precision, heavily hardened targets, and targets requiring immediate BDA -- only manned aircraft could be used.

The planned installation of NAVSTAR Global Positioning System (GPS) receivers in Tomahawks, however, promises to increase Tomahawk's flight-route flexibility and shorten the time needed to program a Tomahawk. Other planned modifications promise to increase Tomahawk's range and accuracy. Tomahawk's targeting flexibility, BDA capability, and accuracy could be further improved with other changes, such as installation of a man-in-the-loop terminal guidance system similar to that in SLAM.

Relative Cost

Tomahawk's unit procurement cost in recent years has ranged from $1.4 million to $2.0 million per copy, depending on the rate of procurement. This is a small fraction of what it costs to procure, operate, and support a manned attack aircraft and its supporting electronic warfare and refueling aircraft. But a Tomahawk can be used only once, to deliver a single 1,000-pound bomb. In contrast, a manned attack aircraft, with the help of its supporting aircraft, can deliver several thousand pounds of bombs on a single flight, and can be flown over and over again. The lower the loss rate for attacking aircraft, the more cost-effective they become in relation to Tomahawk. U.S. attack aircraft experienced a very low loss rate in the Gulf War, and future improvements in attack aircraft survivability due to stealth technology and improved air-launched standoff weapons may keep loss rates very low against improved enemy air defenses. But even if aircraft loss rates remain very low, Tomahawk could remain cost-effective as a means of carrying out limited strikes against fixed targets in situations where defenses are formidable, or where carrier-based aircraft are not available and land-based aircraft would have to be deployed from distant bases.

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GROUND FORCES

NEED FOR GROUND FORCES

What implications might the Persian Gulf War have for the issue of the need for maintaining large U.S. ground forces, particularly a large Army?

The Persian Gulf War came in the midst of a debate over the need for the United States to maintain substantial ground forces, particularly a large Army, in the post-Cold War era. The Administration proposes to reduce the Army's total active-duty and selected-reserve end strength by 30% from FY1991 to FY1995. This is far larger than the percentage cuts in total end strength proposed for the Air Force (21%), the Marine Corps (15%), or the Navy (15%). Some observers, however, have proposed even deeper cuts in U.S. ground forces.

In the face of reduced Army funding, Army Chief of Staff Gen. Carl Vuono supports the Administration's proposed end strength reductions as a wiser course than reducing the readiness or quality of the force and its equipment. He warns, however, that the 1995 Army will be "perilously small" for a nation with superpower responsibilities, and suggests that any changes in the security environment may call for reexamining force levels. In the wake of the Gulf War, the debate over the need for maintaining substantial ground forces may focus on three issues: (1) the likely nature of future military contingencies; (2) possible substitutes for U.S. ground forces; and (3) the potential for using technology to reduce U.S. ground force end strength requirements.

Nature of Future Military Contingencies

For many years, the need for maintaining large U.S. ground forces, and particularly a large Army, was justified primarily on the scenario of a NATO-Warsaw Pact conflict in Europe. In 1989 and early 1990, as the likelihood of a major East-West conflict in Europe faded, some observers began to question the need for maintaining a large Army.

In response, Army leaders began to emphasize the usefulness of the Army in non-Soviet-oriented military operations, and coined a new slogan -- "The United States Army: A Strategic Force for the 1990s and Beyond" -- to help disseminate their views. As a part of this new theme, Army leaders prior to Iraq's invasion of Kuwait emphasized that at least a dozen countries, including Iraq, had more than 1,000 main battle tanks, and that the United States needed to maintain a capability to confront large, fully equipped Third World armies.

Some observers believe the Gulf War represented perhaps the most challenging military contingency the Army is likely to encounter, short of war with the Soviet Union. They argue that in the foreseeable future it is unlikely that the Army will be called upon to deploy comparable military power on such short notice. They believe that smaller, lower-intensity conflicts are more likely, and that a smaller Army could meet those contingencies.

Others point out that the Gulf War was not "foreseen" before Iraq invaded Kuwait. They also note that with Saddam Hussein still governing Iraq, and Iran still decidedly anti-Western, the Gulf region is far from stable. They fear that large reductions in the Army will diminish the deterrent effect of U.S. military strength.

Supporters of maintaining large U.S. ground forces point in particular to North Korea, with over 1 million men under arms, as a potential adversary. Advocates of a smaller U.S. ground forces argue that South Korea, unlike Kuwait, has a large army of its own, and that the need for U.S. ground forces in a second Korean war would consequently be minimal.

Lastly, supporters of maintaining a large Army point to the possibility of simultaneous military contingencies. Even if a reduced Army proves sufficient for a contingency on the scale of the Gulf War, they argue, such a force would have much less flexibility to respond to a simultaneous crisis in a different region. Advocates of a small Army argue that the Army and the Marine Corps will together have sufficient strength to cover simultaneous contingencies.

Substitutes for U.S. Ground Forces

Advocates of smaller U.S. ground forces may argue that the Gulf War demonstrated that the United States in the post-Cold War era can rely more heavily on airpower, and less on ground forces, to achieve U.S. military objectives. Supporters of maintaining large U.S. ground forces may argue that even with full exploitation of airpower in the Gulf War, substantial ground forces were necessary to demonstrate U.S. political commitment and resolve, dislodge Iraqi forces, reoccupy Kuwait, and help restore order. They may also argue that future contingencies may not be as amenable to the application of U.S. airpower as was the Gulf War (see entry on Reliance on Airpower).

Advocates of smaller U.S. ground forces may argue that the Gulf War demonstrated that the United States can work in concert with the ground forces of other nations, and that the potential contributions of other countries' ground forces need to be taken into account in sizing U.S. ground forces. Contingencies large enough to strain U.S. ground forces, they may argue, are ones in which the United States will likely be acting in concert with other governments. Supporters of maintaining large U.S. ground forces may argue that the United States cannot count on the cooperation of other countries in future contingencies, and must size its ground forces so it does not have to depend on uncertain international cooperation. They can also note that even major military powers like Britain and France have only a limited ability to deploy ground forces to distant locations and sustain them there.

Technology vs. Manpower

Given the apparent successes of high-technology weapons in the Gulf War, some might argue that a smaller but even better equipped Army might be able to accomplish as much as today's Army. Others, however, note that the Gulf

ground war was short. A small force, even with better equipment, might not be capable of absorbing losses and sustaining operations over a relatively long campaign. They may also argue that the performance of high-tech weapons in the Gulf War was enhanced by a number of factors, such as the open desert terrain, that may not apply in future contingencies requiring major jungle, mountain or urban engagements (see entry on High-Technology Weaponry).

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MIX OF HEAVY AND LIGHT GROUND FORCES

What implications might the Persian Gulf War have for determining the proper mix of heavy and light units in U.S. ground forces?

"Heavy" ground forces are those organized primarily around main battle tanks and armored infantry fighting vehicles -- i.e., armored and mechanized infantry units. Some assume that "light" forces are all those other than heavy forces; others believe that light forces are best defined as those which include no, or very few, motor vehicles of any kind, such as light infantry or airborne infantry units.

In determining their balances of heavy and light combat units, the Army and Marine Corps examine likely threats and available resources, and then make tradeoffs involving firepower, survivability, tactical and strategic mobility, and logistical sustainability. Some have assumed that "light" equates with the Third World and/or low-intensity conflict, and vice versa. Others note that light forces may well have utility on certain types of terrain in a high-intensity global war or in a mid-intensity conflict, and that heavy or medium forces may be imperative in other types of terrain outside of Europe, or even in specialized roles in low-intensity conflict. More specific questions that have been generated by the operations of the Army and Marine Corps in the Persian Gulf War include the following: (1) How many light forces are really needed? (2) Are "medium" forces needed?

How Many Light Forces are Really Needed?

Some feel that the Army and the Marine Corps have and are planning for too many light units. They suggest that the greater strategic mobility of light forces may not compensate for their limitations in firepower, protection, and tactical mobility (due to lack of vehicles). Rapid deployability, they argue, may not be very useful if the rapidly deployable forces are too weak to engage the enemy and win once they are deployed. They note that no Army light infantry divisions were deployed to Saudi Arabia; that the light Army and Marine forces deployed initially by both air and sea would have been at a grave disadvantage had the Iraqis continued their drive into Saudi Arabia; and that the lightest U.S. ground force division deployed -- the 82nd Airborne -- played arguably the most subsidiary role in the final ground attack against Iraq.

Others, however, assert that the rapidly deployed light forces in the early stages of Desert Shield provided invaluable physical evidence of U.S. will and determination. They caution against assuming, post-Gulf War, that all future contingencies will involve terrain so markedly suitable for heavy forces rather than light (an error similar to assuming, post-Vietnam, that future contingencies would involve jungle terrain), or that future adversaries will deploy several thousand main battle tanks, armored fighting vehicles, and self-propelled artillery pieces in the theater of operations. Finally, they note that existing light forces can be deployed in a much wider variety of missions and types of terrain, against a greater variety of adversaries, through the selective attachment of heavy forces (such as the attachment of a brigade of the Army's 2nd Armored Division to the two Marine divisions attacking Iraqi fortifications during Desert Storm).

Are "Medium" Forces Needed?

Some analysts who have emphasized the limitations of existing light and heavy forces suggest that medium forces should be organized and equipped to meet those contingencies which do not require heavy armored vehicles, but which involve an enemy with more firepower and vehicles than can be handled by light infantry units alone.[12] Others, however, believe that existing light forces can be given enough firepower and protection, and heavy forces enough mobility, through the attachment, on a task-oriented basis, of heavy and light units respectively, to handle a wide variety of situations. They argue strongly that the smaller post-Cold War Army, operating in an era of constrained budgets, cannot afford to create yet another type of unit and force structure, with associated specialized doctrine and weapon systems.

Desert Storm may suggest, paradoxically, that all of these assertions regarding medium forces are "correct." U.S. Marine and Saudi Arabian National Guard light armored vehicles -- typical "medium" forces -- operated successfully as part of combined arms teams against much heavier Iraqi armor. U.S. Marine light infantry augmented with U.S. Army armor, as noted above, proved capable of breaching heavy fortifications. U.S. Army airmobile (helicopter-transported) light infantry played a significant role, through vertical envelopment, in the advance of U.S. forces deep into Iraq at a rapid rate. The experience of Desert Storm, in short, may indicate that medium forces, as well as heavy and light, can indeed play a significant role in a combined arms war -- but that the real key to success lies in the integration of existing heavy, medium and light forces on the battlefield, rather than the precise allocation of resources to these different types of forces within broad limits. Finally, it may be that a downsized post-Cold War Army can indeed not afford to devote a major share of its force

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[12]Medium forces are usually assumed to be those units equipped with lighter gun-mounting armored vehicles than main battle tanks; and lighter infantry carriers than the infantry fighting vehicles of U.S. mechanized infantry units. The major criterion for differentiating among "light," "medium," and "heavy" forces is, therefore, the weight of the combat vehicles used, and whether any are used at all.

structure to newly-organized medium forces, but that the concept has enough utility to argue for at least a few medium units, so the Army can continue to refine its ability to use them on the modern battlefield.

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ARMY AND MARINE CORPS ROLES AND MISSIONS

What implications might the Persian Gulf War have for the roles and missions, forces, and budgets required to fund the forces of the Army and the Marine Corps?

The issue roles and missions competition between the Army and Marine Corps revolves around missions to which *both* services contribute forces and doctrine -- regional mid-intensity wars (such as the Korean, Vietnam, and Persian Gulf wars), contingency operations (such as Grenada and Panama), and low-intensity conflict (such as advisory efforts in El Salvador).[13] The general question is how much of each specialized capability found in each of the two services is required to deal with these mission areas, and if the resources devoted to one kind of capability found in one service are excessive, could those resources better be devoted to another capability found in the other service? More specific questions that have been generated by the operations of the Army and Marine Corps in the Persian Gulf War include the following: (1) Does the Marine Corps have more of a role in major mid-intensity conflicts than hitherto envisioned? (2) Is there any distinction between the quality of Army and Marine Corps combat units, particularly infantry, at battalion level and below? (3) What is the proper balance of Army and Marine Corps forces for rapid deployment, quick-response contingency operations?

The Marine Corps and Mid-Intensity Conflicts

Before the Gulf War, it appeared that the major area of overlap between Army and Marine Corps missions was toward the lower end of the spectrum of conflict -- smaller contingency operations and low-intensity conflict. A mid-intensity war involving large armored and mechanized forces, fixed fortifications, and major logistical and sustainability requirements was considered to be primarily an Army responsibility. However, in the Gulf War, over two Marine divisions, including 250-300 Marine tanks, successfully breached extensive fortified lines and defeated Iraqi armored and mechanized formations of division

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[13] The Army's responsibility for sustained land warfare on a large scale -- including primary proponency of armored and mechanized forces, large-scale and long-term sustainability and logistical capacity, and mobilization potential -- is not, and never has been, contested by the Marine Corps. Similarly, the Marine Corps' responsibility for maintaining U.S. amphibious power projection capability, doctrine, and techniques is not contested by the Army.

size.[14] This suggests that the Marine Corps can contribute more to operations in mid-intensity wars, and is not limited to the initial phase of an amphibious assault against a hostile coastline, than at least some had believed. On the other hand, reinforcement of the Marine divisions by at least one Army armored brigade and Army logistical support appears to indicate that, unassisted, the Marine Corps still has limitations, compared to the Army, in confronting heavy forces in a mid-intensity environment.

Quality of Army and Marine Corps Combat Units

The Marine Corps has always had two primary "selling points" for its ground forces. One -- being a repository for amphibious warfare doctrine and techniques -- has been and remains primarily a Marine Corps responsibility.[15] The second has been the widespread perception that Marine ground combat units of battalion size and below, particularly infantry, are superior in morale, discipline, cohesion, and tactical proficiency to most such units in the Army. Army units, however, were at least as competent, aggressive, and well-led as those of the Marine Corps in the Gulf War. This may suggest any distinction between Army and Marine platoons, companies, and battalions has largely vanished, due to Army improvements in personnel quality, discipline, individual training and education, and unit training. Under these circumstances, it can be asked if one of the major, if unspoken rationales for maintaining Marine Corps ground forces well in excess of U.S. amphibious lift capability -- their combat readiness or superiority over Army forces -- is valid now, regardless of whether it was in the past.

Balance of Army and Marine Corps Forces for Contingency Operations

In general, the Persian Gulf War appears to affirm the importance of both airlifted light forces and sealifted heavy forces for the most demanding contingencies. Army units whose personnel and equipment were both moved by air were the first U.S. ground forces to arrive in Saudi Arabia, followed closely by Marine units whose personnel were airlifted to "marry up" with their equipment arriving by prepositioned shipping from the U.S. base at Diego Garcia, in the Indian Ocean. These initial Army and Marine deployments were followed by Army armored and mechanized units whose equipment was shipped by fast sealift from the Continental United States (CONUS), Marine units shipped by much slower vessels from the Western Pacific and CONUS, and later

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[14] In the Korean and Vietnam wars, Marine divisions were involved in standard infantry operations on a conventional battlefield, but the Gulf War was the first time Marine units were used in a heavy armored-mechanized environment.

[15] The major Army amphibious operations of World War II were all based on doctrine and techniques developed between the world wars by the Marine Corps.

by more Army heavy forces, also moved by much slower ships, from CONUS and Europe.

It is not clear, however, that any of these forces necessarily had to be Marine Corps forces, with their specialized amphibious capability, with the exception of the two Marine amphibious brigades (totalling about two-thirds of a division) which remained in the Persian Gulf throughout the war, threatening an amphibious landing against Iraqi forces along the Kuwaiti coast. Maritime prepositioning is as applicable to Army as to Marine ground forces, and can be used as effectively by the Army as the Marine Corps as long as forced-entry amphibious operations are not required. The Gulf War did not invalidate the concept of the Marine Corps as a repository of amphibious capability and doctrine, or imply that much larger forced-landing capabilities may not be needed in the future. But it may well highlight the question of the need for a Marine Corps of three divisions and air wings when the U.S. Navy plan for the future is to have enough amphibious lift for the assault echelons of only 2 1/2 Marine Expeditionary Brigades (40,000-45,000 Marines, or slightly less than a Marine Expeditionary Force built around one full-sized Marine division). (See also the entry on Amphibious Forces.)

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CHEMICAL AND BIOLOGICAL WEAPONS

What implications might the Persian Gulf War have for issues concerning chemical and biological weapons?

After months of speculation over Iraqi chemical and biological warfare (CBW) capabilities and intent, no chemical or biological weapons were used and none were even found deployed with Iraqi troops. It is generally believed that U.S. bombing has destroyed Iraq's CBW production capability and the major part of its stockpiles. Several explanations for Iraq's failure to use chemical weapons have been offered: (1) Iraq failed to deploy the weapons to ground units before CW storage sites were destroyed; (2) allied air superiority precluded Iraqi CW bombing attacks; (3) reports that Iraq had developed CW missile warheads were premature; (4) U.S. threats of unspecified military escalation deterred CW use; and (5) Iraq realized the limited benefits of chemical weapons against protected troops. With regard to biological weapons, little is publicly known. It may be that the factors effecting the non-use of chemical weapons applied in this case as well. Or it could well be that Iraq's BW research had not yet produced a serviceable weapon system.

Nevertheless, The Persian Gulf War served to make the threat of U.S. involvement in chemical or biological warfare more immediate than any time in recent history. In so doing, it highlighted three questions relevant to ongoing congressional defense and arms control deliberations: (1) Is U.S. defensive CBW equipment adequate? (2) What more can be done to stem CBW proliferation? (3)

Should the United States retain a stockpile of chemical weapons for retaliatory purposes?

Defensive Equipment

U.S. CBW defensive equipment was not put to the test in combat. The Department of Defense said that U.S. troops were adequately prepared and equipped for chemical/biological warfare. Sporadic complaints from soldiers in the field and press reports appear to have identified some areas for improvement: (1) Most often cited was the debilitating heat of wearing full protective clothing, a problem in most climates that was exacerbated in the high temperatures of the Middle East. This poses the challenge of developing protective gear impermeable to lethal agents, yet sufficiently "cool" to allow activity in combat. (2) Soldiers voiced concern that face mask filters could not be safely replaced (as is periodically required) in a CBW environment. (3) There were conflicting reports on whether U.S. masks would be effective against biological agents. (4) Defensive equipment stockpiles were initially inadequate to outfit the large number of troops deployed, and domestic suppliers received surge production orders. (5) The U.S. Army had not fielded an up-to-date CBW reconnaissance vehicle, and had to accept a German offer of 10 Fuchs CBW vehicles for rapid deployment early in the crisis. (6) The M1 Abrams tanks of some early-deployed armor units did not have CBW protective systems, and many of the Bradley fighting vehicles deployed also lacked protective systems.

Although U.S. investment in CBW defensive research was substantial during the 1980's, averaging several hundred million dollars annually, this area has not received the same level of public attention and congressional scrutiny that was given the chemical *weapons programs* over the last decade. Nevertheless, in view of continuing CBW proliferation, up-to-date defensive equipment appears to remain a vital priority for U.S. forces.

Stemming the Proliferation

The Persian Gulf War has spurred international interest in stemming the proliferation of chemical and biological weapons. As U.S troops deployed to Saudi Arabia, Congress passed the Omnibus Export Amendments Act of 1990 (H.R. 4653), which would have provided for mandatory sanctions against nations and individuals who aided CBW proliferation. President Bush vetoed the legislation, arguing that it infringed upon the Executive branch's foreign policy prerogative. At the same time, he announced the Administration's own Enhanced Proliferation Control Regime (EPCR).

The EPCR, based upon Executive Order 12735, tightens export licensing controls on certain chemicals and dual-use technologies and equipment, particularly for exports to politically unstable regions such as the Middle East. Critics say the EPCR allows too much discretion in the application of sanctions against violators, and does not adequately address the problem of preventing foreign companies re-exporting U.S. technology. Responding to these criticisms, the Senate on Feb. 20, 1991 passed the Omnibus Export Amendments Act of

1991 (S. 320), whose CBW proliferation measures are substantially similar to H.R. 4653.

The problem of re-exporting points up the need for international cooperation in controlling proliferation. The Administration believes that the 20 industrialized nations composing the informal antiproliferation Australia Group will voluntarily stiffen their export controls, and pay greater attention to enforcement. Observers believe that the embarrassing media revelations of certain member nations of the Group (primarily Germany) aiding Iraq's CBW development will stimulate greater effort. Nonetheless, the process of amending export laws and strengthening enforcement may be a lengthy one. (See also entry on Technology Exports)

U.S. Chemical Weapons Stockpile

Current U.S. policy is to retain a "security stockpile" of chemical weapons until all "CW-capable" nations have ratified an international convention banning production, stockpiling, and use of chemical weapons. The Administration believes that a limited retaliatory CW capability is a necessary deterrent. Critics say that the U.S. policy is slowing progress in the CW disarmament negotiations in Geneva, and that protective equipment and the U.S. capability for massive conventional retaliation is an adequate deterrent.

The implications of the Persian Gulf War for the "security stockpile" policy are ambiguous. Those who oppose the policy maintain that the Administration's repeated assertions that the United States would not retaliate in kind if Iraq used chemical weapons demonstrates that a security stockpile is unnecessary. Supporters of the policy believe that, Administration assurances aside, the existence of U.S. chemical weapons possibly played a significant role in deterring Iraqi use, and could do so in future conflicts.

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NAVAL FORCES

(See also the entries on Land- vs. Sea-Based Airpower and Sea-Launched Cruise Missiles in the chapter on Airpower.)

AMPHIBIOUS WARFARE

What implications might the Persian Gulf War have for issues relating to amphibious forces?

The United States deployed an amphibious assault force of about 17,000 Marines to the Gulf. The force conducted practice and demonstration landings in the Gulf region prior to the outbreak of hostilities, but did not carry out a wartime assault on the Kuwaiti or Iraqi shores. In the wake of the Gulf War, Congress may consider three issues relating to amphibious forces: (1) Are they worth their cost? (2) How large an amphibious assault capacity should the United States maintain? (3) Is the amphibious assault concept still viable in today's world of early warning assets and precision-guided weapons?

Worth Their Cost?

Amphibious forces are relatively expensive to maintain because they require specialized ships and equipment, and extensive training. Supporters argue that they are worth their cost for three reasons: (1) An amphibious assault may be needed to establish an initial ground-force presence in an area of operations. (2) An amphibious landing on the enemy's flank or in his rear area can disrupt the enemy's operations and achieve high payoffs (as with the Inchon landing in the Korean War). (3) The enemy, not knowing where an amphibious landing might occur, must tie-down a disproportionate number of troops and equipment to properly defend multiple potential landing areas.

No amphibious assault was needed to establish the initial U.S. ground-force presence, and no amphibious assault was carried out in the war. But the war did provide evidence in support of the third argument. Administration officials have stated that Iraqi military leaders tied down seven of their divisions, including about 2,000 tanks and artillery pieces, to defend against the threat of an amphibious landing. Iraqi leaders, moreover, apparently spent a considerable amount of time planning a defense against such an assault.

How Big An Assault Capability?

The Reagan-era 600-ship Navy plan envisioned building up to a 75-ship amphibious fleet sufficient to lift the assault echelons of a Marine Expeditionary Force (or MEF -- about 50,000 Marines) and an additional Marine Expeditionary Brigade (or MEB -- about 16,500 Marines). This level was never achieved, and the new FY1992-FY1997 defense plan envisions reducing the current amphibious fleet to a level sufficient to lift the assault echelons of two and one half MEBs (about 41,000 Marines).

Those who favor a smaller Marine amphibious assault capability point to the reduction in the Soviet threat and to the fact that for the Gulf War, the largest U.S. military deployment since Vietnam, the United States deployed a 17,000-man amphibious force -- the equivalent of a little more than one MEB. The Administration's plan calls for more than twice this level of capability.

Those who favor a larger Marine amphibious assault capability point to the need for maintaining a force capable of handling multiple contingencies, including forced-entry landings from the sea. During the Gulf War, Marine amphibious forces were involved in over-the-shore evacuation operations in Liberia and Somalia, and conducted patrols in other potential crisis spots, such as the Philippines. Deploying the 17,000-man force required 32 amphibious ships -- about half of the Navy's current amphibious fleet.

Still a viable concept?

Critics of maintaining large amphibious forces question the viability of the amphibious assault concept in an era of early warning assets such as satellites and aircraft, and precision-guided munitions such as antiship cruise missiles. Supporters of large amphibious forces maintain that with changes in equipment and tactics, the amphibious assault concept can be kept viable well into the 21st Century.

Since there was no amphibious assault in the war, there was no direct test of the current viability of the amphibious assault concept. The Gulf War highlighted concerns about the ability of the Navy and Marine Corps to counter shallow-water mines, which can pose a potentially serious threat to Marine landing craft. But Marine Corps officials state that shallow-water mines, though a concern, would not have prevented an amphibious landing had one been deemed necessary (see entry on Mine Warfare). The Gulf War also demonstrated that Third World coastal defenses can be considerably eroded by pre-assault air attacks and surface-ship bombardment.

To maintain the viability of the amphibious assault concept in the 21st Century, the Marine Corps in the mid-1980s developed the over-the-horizon (OTH) assault concept, in which the assault is launched from a much greater distance from shore. The intent of OTH assault is to (1) launch the assault from beyond the range of the enemy's precision-guided weapons, and (2) lengthen the coastal segment susceptible to a landing, thus maintaining the potential for tactical surprise and for making a landing in a weakly defended area.

Three systems were identified in the 1980s as key to eventually attaining an OTH assault capability: (1) the air-cushioned landing craft (LCAC), procurement of which is to be completed in FY1992; (2) an Advanced Amphibious Assault Vehicle (AAAV), which is scheduled to enter procurement toward the end of the decade; and (3) the V-22 tilt-rotor aircraft, which the Administration has attempted to cancel for two years, but which Congress has kept alive in research and development. Views in Congress on whether the

OTH assault plan can (or is needed to) maintain the viability of the amphibious assault concept will affect the fate of the latter two programs.

Prepared by Ronald O'Rourke, Specialist in National Defense, Foreign Affairs and National Defense Division.

MINE WARFARE

What implications might the Persian Gulf War have for U.S. naval mine warfare programs?

The Persian Gulf War was the third time in seven years in which events in the Persian Gulf/Middle East region highlighted the ability of Third World states to use mines as an inexpensive but effective means for disrupting international merchant shipping or interfering with U.S. and allied naval operations. The two previous incidents were the mines laid in the Red Sea in 1984, an act eventually attributed to a Libyan-flag merchant ship, and Iran's use of mines in the Persian Gulf in 1987 and 1988 in the "tanker-war" component of the Iran-Iraq war. In the tanker-war episode, the U.S. Navy was embarrassed when the Bridgeton, the first reflagged Kuwaiti tanker to be escorted by the U.S. Navy, struck a mine, and when a U.S. Navy frigate in the Gulf, the Samuel B. Roberts, months later also struck a mine and was badly damaged.

In the Persian Gulf War, two major U.S. Navy ships supporting mineclearing operations in the northern Gulf struck mines within hours of one another on February 18. The 18,300-ton amphibious assault ship Tripoli -- a helicopter carrier -- was hit by a mine near its bow. The blast reportedly ripped a 16-foot hole in the ship below the waterline, causing some internal flooding and immobilizing the ship for several hours. The ship remained in operation, but a damage-control officer reportedly said that if the mine had struck the ship 20 feet further aft, it could have detonated the ship's ammunition magazine, destroying the ship.

The 9,500-ton Aegis-equipped guided missile cruiser Princeton -- one of the Navy's most capable surface combatants -- was struck by a large mine and seriously damaged in the rudder area and the midsection, where a crack was reported. The ship was diverted to Bahrain for repairs.[16] The Navy has released few other details about the damage sustained by the ship, but the shock from the mine blast could have damaged ship structures and equipment in a variety of locations. In light of the costs to repair the Samuel B. Roberts (about $65 million) and the U.S. Navy frigate Stark, damaged in the Gulf in 1987 by

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[16] Dobbs, Michael. Gorbachev Offers Peace Plan to Iraq. Washington Post, Feb. 19, 1991: A1, A12; Murphy, Caryle. Iraqi Mines in Persian Gulf Damage 2 U.S. Warships. Washington Post, Feb. 19, 1991: A7; Atkinson, Rick, and Ann Devroy. Soviet Proposal 'Falls Well Short,' Bush Says. Washington, Post, Feb. 20, 1991: A1, A9; Branigin, William. Iraqi Losses 'Horrendous,' Official Says. Washington Post, Feb. 20, 1991: A7-A8.

an antiship cruise missile (about $27.5 million),[17] the cost to repair the Princeton could range from $10 million to $100 million.

Given the Navy's previous experiences with mines in the Red Sea and during the tanker war, Congress may look into the circumstances of how two valuable U.S. warships were struck by mines during the war with Iraq.

The Navy in 1982-3 identified a shortfall in its mine countermeasure capabilities and instituted a number of programs to redress the situation, including two mine warfare shipbuilding programs and a mine warfare helicopter procurement program. These programs, however, experienced several problems and were substantially delayed.

For much of the 1980s, several Members of Congress with an interest in naval mine warfare expressed concern with or strongly criticized the Navy's efforts to improve its mine countermeasure capabilities. They argued that the Navy was giving insufficient funding priority to mine warfare, and insufficient management attention to its mine warfare programs. The Navy's experience with mines in the Gulf War will likely reaffirm for many in Congress the importance of protecting mine warfare as a high priority in the Navy's declining budget, and of avoiding further delays in the execution of the Navy's current mine warfare programs.

In the mid-1980s, Navy and Marine Corps officials acknowledged a particular concern with their capability to counter mines in shallow waters, and these concerns were highlighted in the Gulf War. The waters off Kuwait and Iraq are generally very shallow, and there was a report that the Marine Corp's planning for amphibious assaults was complicated by the more than 1,000 mines that Iraq reportedly sowed into these waters.[18] Marine Corps officials, however, have stated that an amphibious assault would have been launched if necessary and would not have been prevented by the presence of the mines. The Navy and the Marine Corps are both pursuing shallow-water mine countermeasures programs, and Congress has expressed an interest in ensuring that the two services' efforts are coordinated and not duplicative.

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[17] Sources for cost figures: For the Samuel B. Roberts: Matthews, William. Frigate Roberts Returns to Fleet "Better Than New." Navy Times, Nov. 6, 1989: 14. For the Stark: Senate Appropriations Committee hearings on Department of Defense Appropriations for FY1990, Part 3, page 161. This is the figure for battle damage. When costs for medical expenses, personnel compensation, memorial expenses and air travel are also included, the total cost to the Navy associated with damage to the Stark was about $89.1 million.

[18] Apple, R. W. Jr. U.S. Cites "Tremendous Success" in Kuwait Action. New York Times, Feb. 26, 1991: A13.

The Princeton was reportedly damaged by a bottom influence mine,[19] and the Navy in the wake of the Gulf War has expressed a concern regarding its ability to counter this particular kind of mine.

Prepared by Ronald O'Rourke, Specialist in National Defense, Foreign Affairs and National Defense Division.

SURFACE COMBATANTS AND ATTACK SUBMARINES

What implications might the Persian Gulf War have for the roles and missions of surface ships and attack submarines?

The Persian Gulf War occurred in the midst of a debate over the future of the Navy's surface combatants and attack submarines. Congress may consider three issues on which Gulf War experience will be searched for guidance: (1) Should one or two battleships be kept in service? (2) How well can formations of surface combatants substitute for aircraft carrier battlegroups? (3) How many attack submarines, and what kind, does the United State need in the post-Cold War era?

Battleships

Of the four Iowa-class battleships that were modernized and reactivated during the Reagan-era defense buildup, two (the Iowa and the New Jersey) were deactivated under the FY1991 defense budget. The Administration is proposing to retire the other two (the Missouri and the Wisconsin) under the FY1992 defense budget, principally because the Navy must reduce its end strength and the two battleships are manpower-intensive, requiring 1,600 sailors each. In November 1990, the General Accounting Office recommended that the two remaining battleships be retired "unless current Middle East operations convincingly demonstrate their unique utility. . . ."[20] In hearings this year on the proposed FY1992 defense budget, some Members have questioned whether, given the experience with the battleships in the Gulf War, one or both of the two remaining ships should be retained in service.

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[19] Bottom mines rest on the bottom. There are also moored mines that are anchored to the bottom but float upward to a certain depth determined by the length of their tether, and free floating mines, which can result when the tether on a moored mine breaks due to rough weather or degradation over time. Older-design mines have contact fuzes. Newer mines have more sophisticated influence fuzes that are sensitive to a ship's magnetic field, its acoustic signature, the change in water pressure when the ship passes overhead, or some combination.

[20] Statement of Frank C. Conahan, Assistant Comptroller General, National Security and International Affairs Division, General Accounting Office, before the Subcommittee on Economic Stabilization of the House Committee on Banking, Finance and Urban Affairs, Nov. 8, 1990. p. 5.

The battleships can launch Tomahawk cruise missiles and fire 16-inch guns, and have massive armor protection. The latter two capabilities are unique among the Navy's surface combatants. Each battleship costs about $60 million per year to operate and support (O&S), including personnel-related costs. This figure is roughly equal to the O&S cost of four frigates, or two guided missile destroyers, or two nuclear-powered attack submarines, or one nuclear-powered cruiser, or one-sixth of an aircraft carrier with airwing embarked.

Both of the battleships participated in the Gulf War. They launched numerous Tomahawks, but since several other ships did the same, it does not appear that this use of the battleships will by itself be a strong argument for keeping them in service. The battleships also fired their 16-inch guns in support of coastal ground operations, and might also have done so in support of an amphibious landing had one been attempted. Little information, however, has come out regarding the extent or the value of their gunfire. Iraq launched two shore-based Silkworm antiship cruise missiles at one of the battleships. One malfunctioned and fell into the water; the other was shot down by a British destroyer. If one of these missiles had hit the battleship, it would have tested the battleships' value as the Navy's only surface combatants that can absorb cruise missiles attacks without necessarily being heavily damaged.

Surface Combatants

With the Navy projected to have fewer aircraft carriers in the future, the service is now exploring the potential for using formations of surface combatants to substitute for aircraft carrier battlegroups in certain overseas U.S. naval deployments. Surface combatants in the Gulf War used the Tomahawk cruise missile, which enables surface combatants to strike deep-inland targets, and unmanned airborne vehicles (UAVs), which enable surface combatants to conduct overhead and deep inland surveillance. Tomahawks and UAVs are much less flexible than a carrier's manned aircraft. But the apparently successful use of Tomahawks and UAVs in the Gulf War may increase Navy confidence in these systems. The damage inflicted by Tomahawks may also increase the deterrent value of forward-deployed naval formations that lack aircraft carriers but include Tomahawk-equipped surface combatants.

Attack Submarines

Until recently, the Navy has justified the need for a large attack submarine force, and for the new SSN-21 Seawolf attack submarine, primarily on the basis of the Soviet military threat. With the focus of U.S. defense planning shifting to the Third World, the Navy is also now arguing that attack submarines play important roles in Third World operations, including covert surveillance and reconnaissance (especially in situations where the overt use of surface ships and aircraft is undesirable); covert insertion and extraction of personnel; mining of enemy harbors and choke points; establishment and maintenance of local U.S. sea control through attacks on enemy ships and submarines; and Tomahawk land attacks (especially from surprise directions and with no warning).

Thirteen U.S. attack submarines were deployed to the Gulf region. Two of them fired Tomahawks, and some of them monitored merchant ship activity in support of the embargo. But the potential contributions of attack submarines in the conflict were limited by the exceedingly shallow waters of the northern Persian Gulf, which probably made submarine surveillance/reconnaissance and insertion/extraction operations difficult there, and by the weakness of Iraq's navy, which posed little threat to local U.S. sea control. Future military contingencies may differ in these respects and therefore employ attack submarines more substantially. But even in such cases, the United States may not need more than a few attack submarines to do the job. The Navy, moreover, is now studying options for an attack submarine that will be smaller and less expensive than the SSN-21, and more focused toward non-Soviet-oriented military operations. The case for a large attack submarine force, and for the SSN-21, is thus probably more firmly grounded in the need to hedge against a resurgence of the Soviet military threat.

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SPECIAL OPERATIONS FORCES

What implications might the Persian Gulf War have for special operations forces?

Army, Navy, and Air Force special operations forces (SOF) were used more extensively in the Persian Gulf War than at any time in the past twenty years. Their missions were executed for the most part behind enemy lines and before the ground offensive began. Since the Vietnam War, special operations forces mostly have been used to train foreign military forces. (Today there are training teams in 35 countries.) Some SOF, chiefly Navy SEALS, and elements of the Army's "Delta" hostage rescue team, saw direct military action in *Operation Just Cause* in Panama in December 1989). These units achieved mixed success and experienced relatively high casualty rates, causing some observers to question whether SOF were properly employed or equipped. In the Persian Gulf War, however, initial reports on SOF performance have very been favorable.

In 1987, Congress established the position of Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (ASD/SOLIC) and the U.S. Special Operations Command (USSOCOM) to oversee the training and equipping of SOF from all services. Congress took this step to better coordinate SOF activities, and to eliminate the perceived status of SOF as "stepchildren" within their parent services. As assessments of the Persian Gulf War continue and Congress considers the FY1992 USSOCOM request, three questions are being considered: (1) Were SOF appropriately integrated in Persian Gulf military operations? (2) Is the continued investment in SOF worthwhile? (3) In what areas do SOF need improvement?

SOF Integration in Military Operations

From what can be gleaned from public reports, SOF appear to have played a role in almost every aspect of Desert Storm military efforts on land, sea and in the air. SOF units operated both independently and in cooperation with other air and ground force units. Among the missions that have been reported: (1) reconnoitering inside Iraq and Kuwait; (2) locating and designating high-priority targets (e.g., Scud launchers, air defense installations, and communications links) for air attack; (3) rescuing downed allied pilots; (4) providing assistance to resistance groups inside Kuwait; and (5) performing psychological warfare to encourage Iraqi troops to defect or surrender.

Lack of coordination or "bickering" between SOF and regular commanders seems not to have been an issue. Mission success and casualty rates appear to have been acceptable. Whether this success is the product of improved institutional organization, or attitudes of the commanders involved, is not yet clear. Nevertheless, the Persian Gulf War may provide a useful case study of the employment of SOF as integral part of a large-scale military operation.

SOF Budget Considerations

The National Defense Authorization Act of 1987 made USSOCOM the first unified military command with the authority to present its own budget request. General Carl Stiner, USSOCOM commander, has noted that special operations forces historically account for less than 1% of DOD's manpower and budget. He suggests that SOF are a great value considering the range and utility of the missions they perform in both peace and war.

For those who question a growing influence of SOF and increased investment, concern about SOF peacetime activities overshadows SOF Persian Gulf War accomplishments. Their concerns are that: (1) SOF may become too independent within their parent services; (2) extensive overseas SOF activity may inadvertently involve the United States in regional conflicts, and; (3) covert operations, often involving SOF personnel, are subject to inadequate oversight.

Improving SOF Capabilities

Discussions about improving the capabilities of special operations forces have centered on development of equipment tailored for specific SOF missions. For the most part, SOF units have relied upon standard U.S. military equipment, occasionally modified, or off-the-shelf purchases of foreign equipment. In December 1990, USSOCOM established the Special Operations Research, Development, and Acquisition Center to address this problem. However, a number of factors may reduce its effectiveness: (1) budget constraints have kept the Center at two-thirds its authorized civilian personnel strength; (2) past DOD budget cuts in basic technology research have eliminated USSOCOM participation and; (3) the military departments still control most research and development relevant to SOF.

USSOCOM has identified improvements in transportation and communication as its highest equipment priorities. Specific shortfalls noted are: (1) long-range aircraft capable of infiltrating and exfiltrating SOF personnel; (2) cold-weather delivery systems for Navy SEAL teams; and (3) long-range, high-speed communication systems.

The need for better air transport has led some SOF supporters to join the debate over the future of the V-22 tilt-rotor aircraft. DOD has deemed the V-22 unaffordable, but Congress has resisted canceling the program. Though the V-22 is being developed primarily for the Marine Corps, USSOCOM is sharing some development costs ($15 million in FY1991). V-22 supporters believe that its vertical takeoff and landing capability, long range, and payload would make it an excellent tool for SOF operations, especially long-range exfiltration, that are beyond the capabilities of current airplanes and helicopters.

Prepared by Steven R. Bowman, Analyst in National Defense, Foreign Affairs and National Defense Division.

INTELLIGENCE AND THREAT ASSESSMENT

INTELLIGENCE ISSUES

What implications might the Persian Gulf War have for the role of intelligence in U.S. defense policy?

The Persian Gulf War generated or highlighted several issues concerning the role of intelligence in U.S. defense policy, including the following: (1) How effective was overall intelligence support to the war effort? (2) Should the United States focus more of its intelligence resources on the Third World? (3) Does the United State need to improve its human intelligence (HUMINT) capabilities? (4) Should spending on intelligence activities be reduced? (5) Was intelligence effectively transmitted to subordinate U.S. commanders in the field?

Overall Effectiveness of Intelligence Support to the War Effort

Many observers have praised the contributions of the intelligence community to the Desert Shield/Desert Storm effort. Battlefield commanders have rarely been as well supported. Most notably, intelligence obtained through a variety of collection means provided the targeting information that made possible the pinpoint accuracy for "smart weapons". Some observers, however, have noted major or minor areas where intelligence capabilities proved limited. The intelligence community may have misread Iraqi intentions prior to the actual invasion of Kuwait in August 1990. There was an apparent overestimation of the number of Iraqi troops in the Kuwaiti theater and a reputed failure to predict the flight of Iraqi aircraft to Iran. Locating SCUD missile launchers and estimating the number of missiles available to the Iraqis also proved difficult. Intelligence limitations may have also contributed to delays in completing bomb damage assessments.

Emphasis on Third World Areas

The U.S. intelligence community has traditionally focused on the Soviet Union, its Warsaw Pact allies, and China. The military threats posed by these countries have also been the central concerns of American defense policy. With the end of the Cold War and the dissolution of the Warsaw Pact, some argue that this traditional focus may require reconsideration. War in the Persian Gulf dramatically illustrated the need for detailed intelligence on Third World areas where the U.S. may by involved in future contingencies. Thus, they suggest that the intelligence community should develop greater capabilities, both in terms of collection and analysis, for providing intelligence on such areas even at the expense of traditional targets. This new emphasis, they suggest, should include the training of analysts and linguists as well as the building of new databases to support Third World operations.

Emphasis on HUMINT

Although the intelligence community was able to provide large amounts of data regarding Iraqi military dispositions, much of it derived from electronic intelligence and photography, intelligence from human sources, especially from within Iraqi leadership circles, has been judged by some observers as inadequate. Although such sources are difficult to establish in highly secretive countries under any circumstances, these observers suggest that the intelligence community should nevertheless place more emphasis on human intelligence (HUMINT) capabilities which can provide unique intelligence for gauging the intentions of foreign countries.

Future Size of Intelligence Community

Legislation enacted in 1990 called for considerable reductions in defense intelligence spending over the next five years. The Persian Gulf experience demonstrated that even with current capabilities there can be serious limitations to analyzing and disseminating the large amounts of data that are collected. There were reports that during the Persian Gulf crisis, analysts were pulled off other tasks and asked to work overtime. If the U.S. had to face more than one crisis simultaneously, it is possible that intelligence capabilities might be seriously degraded. Many of the technical reconnaissance systems which were relied upon during Desert Shield/Desert Storm are highly expensive. On the other hand, reductions in Soviet/Warsaw Pact coverage might provide adequate resources for greater flexibility in the future even at reduced levels of expenditures.

Greater Availability of Intelligence to Combat Commanders

Vast quantities of satellite-derived intelligence (see also the entry on Military Space Systems), along with data produced by sophisticated airborne platforms, including the new Joint Surveillance Targeting Attack Radar System (Joint STARS) aircraft, were available not only to Washington agencies and the U.S. Central Command in Riyadh, but also to subordinate combat commanders through the use of small portable image readout systems. The widespread availability of near real-time intelligence from "national technical means" could mark an important shift towards increasing the tactical flexibility of subordinate commanders -- a goal of the Goldwater-Nichols Defense Reorganization Act. In the past much sensitive intelligence was usually handled in Washington and theater headquarters in tightly controlled channels which may have restricted its utility; as one observer noted, until recently satellites were "for generals. Now it's the lieutenants and captains that are using them."[21]

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[21] John Pike, Federation of American Scientists, quoted in John Burgess, "Satellites' Gaze Provides New Look at War," Washington Post, February 19, 1991, p. A13.

THREAT ASSESSMENT PROCESS

What implications might the Persian Gulf War have for U.S. assessments of the military capabilities of the Soviet Union or other potential adversaries?

Congress' decisions on U.S. defense programs are strongly influenced by assessments of the military capabilities of the Soviet Union and other potential adversaries. Such "threat assessments" are a central feature of the defense planning process. They are routinely used by Administration officials to justify to Congress the size and structure of U.S. forces, the need for new weapons, and the levels of readiness and sustainability that are to be maintained in U.S. forces. In the wake of the Persian Gulf War, Congress may want to pursue three questions relating to the threat assessment process. (1) Was Iraqi military capability overrated? (2) Was Iraq's defeat due in significant part to the inferiority of its largely Soviet-made equipment? (3) What implications might the Gulf War have for U.S. assessments of the military capability of the Soviet Union and other potential adversaries?

Was Iraqi Military Capability Overrated?

Prior to Iraq's invasion of Kuwait, Administration officials cited Iraq as a primary example of a heavily armed Third World country that would justify maintaining extensive U.S. military capabilities, including heavy U.S. Army armored forces, independent of the Soviet military threat. After Iraq's invasion, Iraq was often characterized as having the fourth largest army or military force in the world.[22] The modernity of some of Iraq's equipment, and the battle experience of many of its troops, were often emphasized.

In the wake of the Gulf War, some observers are arguing that Iraq's military capability was overrated. They point to the rapid and one-sided nature of the coalition victory, and to the unexpectedly low coalition casualties and equipment losses. Others, however, disagree. They note that defeating Iraqi forces required a sustained air campaign involving tens of thousands of individual attacks from the air, and that in a least one area -- the number of Iraq's mobile Scud launchers, and the difficulty of finding them -- the Administration appears to have underestimated Iraqi military capability. After the fighting stopped, military officials hinted at briefings that they knew Iraqi forces were not as capable as press reports often made them out to be, but didn't say so openly because they wanted to give Iraq a false sense of security.

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[22] A review of the 1990-1991 edition of The Military Balance, a widely used reference source on international military power, shows that in terms of number of people in uniform, Iraq before the war actually had the seventh largest army or military force in the world, the first six being China, the Soviet Union, the United States, India, North Korea, and Vietnam. Iraq's pre-war total of a million men under arms came close to the figures for India, North Korea, and Vietnam, but it included a large number of men over 45 years old.

Was Iraq's Defeat Due Mainly to Inferior Equipment?

Soviet officials have stated that poor strategy, training, and troop discipline, rather than the inferiority of Soviet-made equipment, were largely to blame for Iraq's defeat, and there is merit to this view. As U.S. officials have remarked, Iraqi leaders turned their military units into sitting ducks by adopting a fixed, passive defense strategy and by refusing to adapt to the withering coalition air campaign. Iraq's pilots, apparently intimidated, mostly refrained from participating in the conflict. Iraq's front-line troops in many cases were barely trained conscripts. Virtually abandoned in the field by their leaders, they had little will to fight when the ground war came.

On the other hand, the coalition was able to destroy much of Iraq's air defense network early in the conflict in no small part because advanced weapons and equipment like the F-117 Stealth attack plane, electronic warfare systems, and radar-destroying missiles, simply outmatched Iraq's largely Soviet-made equipment. And the superiority of U.S. coalition thermal sights for seeing at night and through smoke proved decisive in several ground engagements.

Implications for Assessments of the Other Countries' Military Forces

Does the overwhelming defeat of the largely Soviet-armed Iraqi military imply that the United States has overrated the military capabilities of the Soviet Union and other countries with Soviet-made weapons? This isn't clear, because Iraq's defeat was due in part to poor strategy, training, and troop discipline -- characteristics which cannot necessarily be carried over to the Soviets or other countries. The inferiority of Soviet-made equipment was in many instances dramatically demonstrated, but it isn't clear that Soviet-made equipment, when operated properly, performed any less well than U.S. officials expected.

Part of Iraq's strategic vulnerability was its centralized command and control structure, and this is a feature of the Soviet military and some other military forces as well. Questions about the training and discipline of Soviet troops, particularly those belonging to non-Russian-speaking ethnic groups, may bear reexamination in light of the Iraqi experience, and certain other countries may have analogous personnel-related problems. One effect of the Gulf War might be to reinforce the importance of difficult-to-quantify factors such as strategy and troop training and discipline in the process of making of overall military assessments, which often tend to focus on "bean counts" of equipment.

Military leaders in the Soviet Union and other countries watched the war closely and are deriving their own lessons regarding strategy, tactics, and equipment performance. The war probably confirmed or revealed a number of things about U.S. and Western military tactics and equipment. U.S. assessments will need to take into account improvements in capability that the Soviets or other countries may achieve by applying these lessons.

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MOBILITY

AIRLIFT

What implications might the Persian Gulf War have for U.S. airlift programs?

In the initial stages of the Persian Gulf crisis, getting troops to Saudi Arabia was not the problem. The difficult task was to transport their heavy equipment, fuel, and ammunition -- items that usually go by ship in wartime. Fortunately, Iraq did not continue its attack into Saudi Arabia and the United States was able to use available Saudi airfields during the critical days before the first cargo ships began arriving from the United States.

As successful as the airlift operation was, the Gulf War raised questions about the future of U.S. airlift now that the Soviet threat has diminished and U.S. troops are being brought back from overseas stations. (1) Does the Air force still need additional airlift capacity and, specifically, does it still need the C-17 cargo plane currently under development? (2) How well did reserve Air Force transportation units perform as part of the total force concept? (3) What about the Civil Reserve Air Fleet (CRAF), which was called up for the first time in its history? And finally, should the United States be prepositioning heavy military equipment and supplies overseas near potential problem areas and not have to depend on airlifting such materiel in the initial stages of an emergency deployment?

Is there a continued need for the C-17?

As long as the Soviet threat was the driving factor, the United States could never have "enough" cargo airlift. The Air Force goal has been to reach a airlift capability for 66 million ton miles per day (MTMD) to meet requirements for one of several lesser contingencies, one of which was a war in the Persian Gulf. The current capability is just under 48 MTMD, and some critics are suggesting that is enough, considering the absence of the Soviet threat.

Opponents will argue that the Gulf airlift, as successful as it was, was a demonstration of the maximum capability of the United States to project power by air which might not have been adequate had circumstances been different. The entire operation took place without losses that would accrue if the lift were into a nonfriendly country and under enemy fire. Older airplanes like the C-5 and the C-141 were stretched to their operational limits and the already limited service life of the C-141 was probably shortened by the accelerated pace of the operation.

Meanwhile, the C-17, which was justified as a replacement for the C-141 and to some extent the C-5, has yet to fly and has been experiencing production and design difficulties together with substantial price increases. In April 1990,

Secretary of Defense Cheney reduced the size of the program from 210 aircraft to 120. Later, the Air Force lowered several contractual performance standards for the C-17 in an attempt to reduce its price, and, some say, enable the developer to meet contract specifications. The reduced requirements included a reduced cargo capacity and longer runway minimums.

Critics are now arguing that the C-17 is no longer more cost effective than the C-5B and are urging the Air Force to buy additional C-5Bs and perhaps cancel the C-17 program altogether. C-17 supporters counter that the new plane will still be cheaper to fly over the long run and be closer to the state of the art than the thirty year old C-5. They also point out that additional airlift is still needed and that there is very little alternative to the C-17 in view of how long it would take to develop an entirely new aircraft.

How well did reserve military airlift units perform in the war?

About 35-40 percent of the Gulf War missions were flown by reserve crews and about half of the overall ground support role was performed by Air Force reserve personnel. While this went very well overall, there were still problems that could have been magnified if circumstances had been more hostile. Stress on personnel and equipment was exacerbated by extreme terrain and weather conditions and the absence of specialized equipment usually available at U.S. bases. These problems indicated a need for additional training and exercises in "bare-base" operations in remote areas such as the Persian Gulf.

Did the Civil Reserve Air Fleet (CRAF) perform as expected?

This was the first time in its history that the Civil Reserve Air Fleet (CRAF) was activated during an emergency and, while only the first of three levels of callup was activated, the planes that were activated or volunteered accounted for 20 percent of the cargo flown to the Gulf and 60 percent of the passengers.

Problems experienced during the operation were relatively small, but there were indications that a larger CRAF activation might have caused more serious difficulties. There was a shortage of specialized ground equipment found only at civilian airports and some confusion with scheduling the CRAF planes efficiently. These problems brought complaints from participating airlines and crews and there were indications that any larger activation could cause major disruption of civilian airline schedules or loss of market shares. There were also several administrative problems with the airline unions that bear correction before the next callup.

Is prepositioned equipment an alternative to airlift?

Time is one of the most critical factors once a decision is made to move military units to a distant location and the task is greatly simplified if some heavy and bulky weapons and supplies are already stored close to the area of operations. However, prepositioning may be vulnerable to preemptive attack

and is expensive because the stored materiel is in effect a duplicate set and not available for issue to troops or for use elsewhere in the world. These are important considerations in an era of fiscal constraint, but they can be offset if the area is vital to the United States and the threat is serious enough. In an area as important as the Persian Gulf, prepositioning equipment would not only alleviate the initial lift requirement in an emergency but would serve to guarantee friends and enemies alike that the United States is ready to defend its interests in the area.

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SEALIFT

What implications might the Persian Gulf War have for U.S. sealift programs?

The Persian Gulf War occurred in the midst of a debate between Congress and the Administration on three issues relating to military sealift: (1) Does the United States need more strategic sealift capability? (2) If so, what kind of sealift ships are needed? (3) Should the United States, to improve U.S. military sealift, take steps to strengthen the U.S.-flag merchant marine fleet?

More Sealift Capability Needed?

One of the Gulf War's clearest effects on U.S. defense policy has been to strengthen an emerging consensus that the United States needs more strategic sealift capability. Prior to the war, many in Congress expressed both a desire to improve U.S. sealift capabilities and frustration at perceived Administration footdragging on the issue. The Administration prior to the war acknowledged the importance of sealift, but resisted expending substantial additional funding to build new sealift ships. The U.S. sealift effort in the Gulf War has been given generally good marks, but the Gulf War also highlighted the limitations of U.S. sealift capabilities. In the wake of the war, support in Congress for additional sealift appears to have grown, and the Administration now supports expending substantial funding to build new sealift ships.

What Kind of Additional Sealift?

The Administration is now conducting a congressionally-mandated Mobility Requirements Study to examine U.S. airlift, sealift, and prepositioning requirements and capabilities in light of the Gulf War. The study won't be completed until the end of 1991, but Members interested in taking immediate steps to strengthen sealift have asked the Administration for some preliminary recommendations that can be incorporated into the FY1992 defense budget.

In response, the Defense Department officials have said they are examining a program to build 8 to 10 new strategic sealift ships to join the 8 fast sealift

ships now in the Navy's rapid-response Reduced Operating Status (ROS) fleet. These ships would have a roll-on/roll-off (Ro/Ro) capability for wheeled vehicles. They would be powered by diesel engines for a maximum speed of 25 knots. Some in Congress have questioned why the new ships shouldn't have steam engines and a maximum speed of 33 knots, like the 8 fast sealift ships. The Administration says diesel-powered ships would be easier to man in an emergency by diesel-familiar U.S. merchant mariners, and that in real-world conditions the average transit speed of the new ships (21 knots) would be only one knot less than that of the 8 fast sealift ships. These new ships, together with the 8 existing fast sealift ships, would be able to lift two armored or mechanized divisions to any port in 30 days -- a level of capability that is emerging as a key U.S. sealift requirement for the post-Cold War era.

The Administration also says it wants to restructure the Ready Reserve Force (RRF), the nation's supplementary fleet of high-readiness reserve sealift ships. It is considering purchasing about 20 existing Ro/Ro ships off the international market to add to the 17 now in the RRF, and it wants to replace older, steam-powered ships in the RRF with newer, diesel-powered ships. Some Members, concerned about the decline in the U.S. shipbuilding industry, have proposed leasing 20 existing Ro/Ro ships for the RRF until 20 new ones can be built in U.S. shipyards to replace them. Most of the RRF ships used in the Gulf War sealift effort missed their prescribed activation deadlines. As a result, funding levels and procedures for maintaining the RRF will be reexamined, and the activation deadlines for the ships may be adjusted to make them more realistic.

The Marine Corps' Maritime Prepositioning Ship (MPS) concept is widely viewed as having been validated by the Gulf War. As a result, some observers have proposed extending the MPS concept to the Army. The Army, however, appears to be leaning against this option, in part because it would prefer to select from its equipment stocks in the United States to put together a custom-tailored the mix of equipment for an overseas crisis.

Strengthen the U.S.-Flag Merchant Marine?

In the wake of the Gulf War, a split appears to have emerged between the Administration and congressional supporters of the merchant marine. U.S. merchant ships participated the sealift effort, and the Administration in the wake of the war has reaffirmed the merchant marine's role in contributing to U.S. sealift capability. But the Administration has evinced little enthusiasm for potentially expensive proposals to strengthen the declining U.S.-flag merchant marine fleet. The Administration says its greatest sealift need is for additional rapid-response ships capable of moving military unit equipment. To meet this need, it prefers acquiring the above-discussed Ro/Ro ships for the ROS fleet and the RRF. U.S.-flag merchant ships, it has suggested, are not as suitable because they can be far from the United States when a crisis arises, and because they are likely to be container ships that are not designed for military unit equipment.

The Defense Department chartered a large number of foreign-flag merchant ships to support the war effort, in part because it didn't want to pull operating U.S.-flag merchant ships off their commercial routes. The Administration says this would have resulted in the permanent loss of these routes for U.S.-flag ship operators. This point, if true, raises a critical question concerning the national-security rationale for maintaining a large active U.S.-flag merchant fleet: Why maintain a merchant fleet for defense purposes, if the ships in that fleet are not used to support a war because doing so would put them out of business?

The Administration says it is concerned by the decline in the merchant fleet because the current downward trend would leave the United States in several years without enough merchant sailors to man the Defense Department's sealift ships in an emergency. But rather than supporting potentially expensive measures to strengthen the merchant fleet, the Administration instead has proposed addressing the projected shortage of sailors by giving reserve merchant mariners reemployment rights similar to those of military reservists.

Prepared by Ronald O'Rourke, Specialist in National Defense, Foreign Affairs and National Defense Division.

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ORGANIZATIONAL/PERSONNEL

RELIANCE ON THE RESERVES

What implications might the Persian Gulf War have for the extent to which the U.S. Armed Forces should rely on their reserve components?

All the services, especially the Army, have become dependent on reserve augmentation in time of crisis. The armed forces ordered almost 228,000 reservists to active duty to support the Persian Gulf War. The callup took place amidst a debate over the maximum-size conflict for which the armed forces can, or should, plan to fight with active forces only. In the post-Cold War environment, the Congress is considering reducing active force strength to a much greater degree than that of the reserves, while DOD argues that reductions in the active forces and reserves must be broadly symmetrical. The reserve callup for the Persian Gulf War raises three issues for Congress relating to reliance on the reserves: (1) In which areas were concerns about reliance on the reserves not borne out by the Persian Gulf War experience? (2) What are the implications of the Persian Gulf War for the concept of reserve roundout combat brigades? and (3) What are the political implications of relying on reserves in time of crisis and war?

Concerns Not Borne Out

The Persian Gulf War experience suggests that some fears about reliance on the reserves have been unfounded. First, the callup apparently proceeded smoothly, and the overwhelming majority of activated reserve units performed well, both in the United States and in the Persian Gulf. This was true of support and service units from all services (the maximum Desert Storm force of 540,000 U.S. troops could not have been sustained without reserve support units); Army field artillery and aviation units; Marine Corps infantry, artillery and armor units; and Navy and Air Force combat aviation units. Second, opposition from the general public and among reservists was minimal compared to previous callups. Third, there is no evidence that the activation of reserves exacerbated an already tense international situation prior to the outbreak of war, or that, had reserves not been called up, the danger of war with Iraq would have been less.

Roundout Brigades

One area of concern resulting from the Gulf War relates to the Army National Guard's "roundout" brigades. Two of the Army divisions initially deployed to Saudi Arabia had National Guard "roundout" brigades (there are three brigades in a full-strength Army division) designated to bring them to full war strength. The decision was made, in August 1990, *not* to order these roundout units to active duty, but to replace them for deployment purposes with Active Army brigades. After three Guard roundout brigades were called up in

early December 1990, they could not attain full combat readiness without four or more months of additional training.

The post-activation readiness problems of the roundout brigades appear to validate the prewar beliefs of some that the stamina, skills, and coordination required of major ground combat maneuver units are very different from, and arguably much more difficult to develop among reservists, than those required of reserve support units. Support units are usually much smaller than combat units of brigade size, and many of the duties performed by their members are similar to those reservists' civilian jobs. Large ground combat units, however, require the synchronization of a variety of complex skills, techniques, and operations which cannot readily be imparted in other than a full-time military environment.

The Army's experience with the roundout brigades raises a variety of issues for Congress: Should active duty divisions earmarked for rapid-response, no-notice deployment contingencies continue to be maintained at less than full active duty strength? Should the roundout concept be applied only to units which can count on having several months of post-activation training to achieve full readiness for war? Could roundout be better applied at a lower unit level -- battalions (500-800 soldiers) or companies (90-180 soldiers) rather than brigades (4,000 soldiers)? Are reserve combat brigades and divisions (10-16,000 soldiers) viable entities worth the resources being devoted to them? Can reserve officers realistically attain sufficient military proficiency to command at the brigade and division level?

Political Implications

The second area of concern about reliance on the reserves resulting from the Gulf War is as much political as military. The projected political liabilities and implications of a contemplated reserve callup may add to the legitimacy and strategic prudence of any military action the United States may undertake. However, they may also limit the willingness to use force and the scope and nature of military action. It appears that reliance on the reserves did, in the case of the Gulf War, assist in forcing the President to secure public and congressional support and move rapidly to a military decision. However, as both supporters and opponents of President Bush's policy have noted, the heavy reliance on reserves may also have precluded a more prolonged major military deployment in Saudi Arabia short of war, due to the perceived political problems in sustaining such a deployment with massive reserve callups.

Questions raised by the political and social implications of a reserve mobilization may be the most important of all regarding reliance on the reserves: Should the reserve mobilization threshold -- i.e., the size of military contingency for which a reserve callup is required -- be *low*, so as to require U.S. political leaders to be assured of popular support for military action, and prevent such action if there is insufficient popular support? Should the threshold be *high*, so as to insure that the commitment of U.S. forces to even a comparatively small conflict is not overly sensitive to fluctuations in the perceptions and

resolve of the nation's political leadership? Although there are technical military arguments for and against either position, it can be argued that such arguments are ultimately far less significant than these acutely, and properly, political questions.

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WOMEN IN THE MILITARY

What implications might the Persian Gulf War have on the role of women in the military?

Prior to the end of the draft in 1973, the number of women and the types of duties that women could perform were limited. The advent of the All-Volunteer Force, coupled with the movement for women's rights, increased the proportion of women in uniform from less than two percent in 1973 to nearly 11 percent in 1989. Although women are still restricted by law or regulation from certain types of duties (particularly combat arms), the types of duties in which women may serve have been expanded significantly in several areas, including combat-support duties. The increased number of women in uniform and types of duties they may perform have meant that more women will be deployed to areas designated as "hostile fire or imminent danger."

According to Department of Defense (DOD) statistics, approximately six percent of the troops in the Persian Gulf were women. Although the war was short and U.S. casualties remained low, women were subjected to hostile fire or imminent danger. Six women were killed, others were wounded and two were taken prisoner by hostile forces. Although relatively few women were killed, wounded or taken prisoner, many of the arguments concerning the role of women in the military remain.

In general, given the experiences of the Persian Gulf, many of the arguments against deploying women appear to have been overstated. While problems did arise concerning pregnancy, sanitation, rape, and harassment, these problems did not prove to be extensive or debilitating. In fact, they were of little consequence in terms of the overall deployment. In addition, given the limited number of U.S. casualties and prisoners of war (including women), negative public response to female casualties or prisoners was nearly nonexistent. The presence of women did have an effect in terms of sociocultural differences with the host nation.

While those deployed carried out their duties as expected, little was arguably gained from this experience that directly justifies expanding the role of women to include the combat arms or other currently prohibited duties. That is, since women were not placed in roles other than those in which they have been serving for some time, little new information is gained with regard to yet untested roles. It can be argued, however, that some women were subjected to

hostile fire and performed well, that more women than ever before were militarily vital in a combat zone, and that public sensitivity to female war casualties was less severe than many feared.

Perhaps the most significant outcome of having deployed a large number of women performing varying duties to the Persian Gulf is that the role of women in the military is more deeply ensconced and institutionalized. In other words, women have generally established their ability to be deployable and to serve well in their assigned duties. Arguments claiming the role of women should be more limited are not supported by the Gulf experience.

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MINORITIES IN THE MILITARY

What implications might the Persian Gulf War have for the issue of minority representation in the military?

The percentage of minorities (particularly blacks) in the military has exceeded the percentage in the general population. Consequently, the percentage of minorities deployed to the Persian Gulf exceeded the percentage in the general population. The large proportion of minorities in the Persian Gulf led to criticism that minorities were shouldering an unfair share of the defense burden. Further, it was argued that minorities, given their concentration in ground units, would be even more disproportionately represented in terms of those wounded or killed in action.

While the Department of Defense acknowledges that minorities are disproportionately represented in the military, they note that personnel are recruited on a voluntary basis (i.e., it was the individual who chose to join the service). Charges of over-representation in the military based on these numbers are, in the view of some, an indication of discrimination and unfair treatment in the civil sector. They argue that discrimination in the civilian marketplace channels minorities into the military, where they are more likely to be treated fairly. In addition, it is argued that attempts to make the services more socially representative would displace qualified minority personnel from the military, possibly to the unemployment line.

According to DOD statistics, of the maximum of 539,000 troops deployed to the Gulf, the Army had the largest concentration of minorities (35.5 percent, with 29.8 percent being black) while the Air Force had the lowest (19.0 percent, with 13.5 percent black). At the end of the 40-day air war and the 5-day ground war, the total number of U.S. killed was 182, of which blacks accounted for 15 percent. The breakdown was as follows: 142 white, 27 black 8 Hispanic, 1 Asian-American and 4 'other.'

The relatively low proportion of blacks among those killed is likely due to the fact that this was predominantly an air war -- the fewest number of blacks were in the Air Force. Had the ground war been longer, a larger proportion of minority casualties could have been expected.

In the wake of the Persian Gulf War, the issue of racial representation in the armed forces will likely remain contentious. Efforts to encourage a more balanced force in terms of racial composition could require (1) displacing minorities from the service, via a draft or some racially based criteria, and/or (2) providing greater opportunities to minorities in civilian life so they will be less likely to seek employment in the armed forces.

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FAMILIES IN THE MILITARY

What implications might the Persian Gulf War have on policies concerning families in the military?

As a result of the large-scale mobilization of military personnel, a large number of single parents or dual-service couples with dependents were deployed to the Persian Gulf. Issues that resulted included the separation of parents (particularly mothers) from very young children or the possibility that such children may become orphans should the parent(s) be killed during deployment. A number of bills were introduced that would limit, restrict or provide for flexible treatment of such parents during deployment.

Prior to the end of the draft, the military was predominantly a male, bachelor force, especially among the lower ranks. With the transition to the All-Volunteer Force, larger numbers of married personnel were recruited. While single parents are currently not eligible for recruitment, there are no restrictions concerning the reenlistment of personnel who become single parents subsequent to recruitment.

At a hearing earlier this year on the issue of families in the military, the Department of Defense testified that its policy for maintaining an effective All-Volunteer Force, emphasizes (1) the needs of the services to meet military requirements; (2) career paths and opportunities for service members; and (3) concerns for military families and children.

> The current policy of the Department of Defense is to require military members to be deployable, each taking his or her turn of assignment in imminent danger areas. Department policy also requires military members to make necessary and supportive dependent care arrangements in case military events require them to leave their family behind. This policy applies equally to military

couples and single member parents. The purpose of this policy is to ensure combat readiness of our armed forces.[23]

Under current policy, service members who are unable to serve in the armed forces can be discharged (for hardship) to allow them to attend to the needs of their families. Some have argued that such discharges, although providing the individual with time to attend to family matters, may make a difficult situation worse since the member would be left unemployed. They argue that proposed policy changes or legislation to protect the family unit would properly recognize the family as the central institution of American society.

Others argue that subjugating national security interests to service-family welfare undermines U.S. defense and international security interests. It is also unfair and wasteful, they argue, for those who have been recruited, trained, paid and provided benefits at taxpayers' expense to unilaterally renounce their oath of service.

The conference report accompanying the final version of the Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991 contains language directing the Secretary of Defense to examine military family policy. Language inserted by the House conferees expresses the sense of the House that the Secretary of Defense "should strive to develop and implement a uniform policy with respect to the deployment of a member of the Armed Forces who is a mother of a child under age of six months. Such a policy should provide that, to the extent possible, a member of the Armed Forces who is the mother of a child under the age of six months shall not be (1) deployed, in the case of a member of a regular component; or (2) activated (if such activation requires separation of the member from her child) or deployed, in the case of a member of a reserve component."

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DOD ORGANIZATION AND COMMAND

What implications might the Persian Gulf War have for the organizational structures and command arrangements of U.S. forces, particularly those affecting joint (interservice) matters?

The Persian Gulf War was the first major U.S. war fought since enactment of the Goldwater-Nichols DOD Reorganization Act of 1986 (G-N). G-N greatly strengthened the authority of the Joint Chiefs of Staff (JCS) Chairman, and the commanders-in-chief (CINCs) of the unified commands, at the expense of the

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[23] Written statement of Christopher Jehn, Assistant Secretary of Defense (Force Management and Personnel), before the Subcommittee on Military Personnel and Compensation of the House Armed Services Committee, Feb. 19, 1991: 1.

collective JCS and the individual services; and created a new joint military occupational specialty for the management of officers of all services trained and oriented toward joint, interservice operations and plans. Implicit in these and other changes enacted in G-N was the assumption that the inability of the armed forces to both (1) conduct joint operations in the field and (2) acquire weapon systems and equipment capable of meeting operational requirements at reasonable cost were due in large part to excessive service independence and autonomy, and inadequate central planning, direction, and leadership.

In the wake of the Persian Gulf War, Congress may examine two issues relating to G-N and U.S. military organization and command: (1) What effect did G-N have on the U.S. ability to conduct the war? and (2) What further questions relating to organization and command might Congress want to pursue as a result of the war?

Goldwater-Nichols in the Persian Gulf War

Overall and Theater-Level Command in Desert Shield and Desert Storm

G-N apparently provided decisive advantages for top-level command and control of the Gulf War. JCS Chairman Gen. Powell had a direct and explicit chain of command between himself (acting, formally, as the conduit for the President's instructions and the directives of the Secretary of Defense) and U.S. Central Command (CENTCOM) headquarters under CENTCOM CINC Gen. Schwarzkopf. Gen. Schwarzkopf, in turn, had direct and unequivocal control over his individual Army, Navy, Marine Corps, and Air Force component commanders. Both of these situations were in vivid contrast to past situations, such as (1) the six or seven layers of command that existed between the JCS and the Marines in Lebanon in 1982-84; (2) the failures of coordination between all services during the Grenada operation in 1983; and (3) most significantly, the geographically and functionally muddled command structure of the Vietnam War during 1965-73, when U.S. ground operations were directed by U.S. headquarters in South Vietnam, air operations were controlled by various headquarters in Thailand, Guam, and Hawaii, and all was subject to detailed management from Washington.

New Unified Commands in Desert Shield and Desert Storm

The creation of the U.S. Transportation Command (TRANSCOM), a unified command with the mission of controlling all DoD transportation assets and operations worldwide, was the direct outgrowth of G-N, and was bitterly opposed by many. The same was true of the U.S. Special Operations Command (USSOCOM). However, the existence of TRANSCOM as a central management and control agency for the huge logistical and personnel buildup of Desert Shield and Desert Storm has been cited as crucial to the success of the operation. Similarly, U.S. special operations forces, it is becoming clear, were extraordinarily successful in a variety of operations against key Iraqi targets. (See also the entry on Special Operations Forces.)

A "Culture of Jointness"

Although it is much more difficult to measure, observations from within the Pentagon and from CENTCOM suggest that G-N-driven measures to create the joint officer specialty and improve the quality of officers assigned to joint staffs had, by the beginning of Desert Shield, already produced a measurable effect on the conduct of planning and operations. Service turf-protection and parochialism appear to have decreased, and the quality of officers -- and hence their plans and actions -- assigned to joint staffs have increased.

Organization and Command Issues for the Future Suggested by the Persian Gulf War

The experiences with G-N during the Persian Gulf War raises several potential issues relating to organization and command that Congress may wish to investigate, including: Does the success of TRANSCOM and USSOCOM argue for the further unification of various service-wide assets, functions, and missions, both combat and noncombat, such as health care, major weapon system acquisition, and/or strategic nuclear forces? Is the "culture of jointness" established by G-N for operational matters transferable, through equivalent structural and personnel management changes, to the resource management and procurement areas of DoD? Is the increasing number of unified and specified commands -- however successful in Desert Storm -- in an era of shrinking defense resources, still supportable, or should they be reduced in number as the operating forces shrink in the 1990s? To the extent that the JCS Chairman, the CINCs of the unified commands, and the Secretary of Defense exert more and more control over DoD, what are the remaining useful functions of the civilian service secretariats and military departments?

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MILITARY REFORM MOVEMENT

What implications might the Persian Gulf War have for the status of the military reform movement?

The remarkable success of the U.S. military in the Persian Gulf War, including above all the televised effectiveness of high-technology U.S. weapons, might be expected to devalue the stock of frequent critics of U.S. military policy who are identified as members of the military reform movement. As Secretary Cheney pointedly said shortly after the war, the outcome proves that the Defense Department spent its money on something besides $600 toilet seats. The reform movement represents a very broad school of thought, however, and the outcome of the Persian Gulf War represents a test case not only for arguments over high-tech weaponry, but also for opinions that reformers have proffered on a wide range of military doctrine and acquisition policy issues.

Any overall assessment of the military reform movement is made difficult by the diversity of reform proponents. Well-known reformers include Pierre Sprey and John Boyd, members of the so-called "fighter mafia" who championed development of the F-16 aircraft in the early 1970s; William Lind, who first came to prominence with criticisms of Army doctrine in the mid-1970s, and later served as an aide to Senator Gary Hart; Steven Canby, a NATO expert who advocated larger ground forces and more emphasis on maneuver in NATO strategy; Tom Amlie, an engineer critical of reliance on radar guided air-to-air missiles, the Aegis shipboard radar, and other weapons technology; Dina Rasor, a conduit for internal DOD criticism of the M-1 tank, the Bradley Fighting Vehicle, and other systems; and Franklin C. (Chuck) Spinney, a Pentagon analyst often critical of reliance on high-priced, difficult-to-maintain weaponry. Other analysts like Jeffrey Record and Edward Luttwak are often counted as members of the military reform movement.

The views of the reformers are extremely disparate, but a number of broad themes frequently recur in their arguments. First, reformers have often been critical of the value of specific high-technology weapons systems, such as the LANTIRN night navigation and targeting system for aircraft, the imaging infrared (IIR) Maverick air-to-ground missile, the M-1 tank, the Bradley, the Sparrow radar-guided air-to-air missile, AWACS and JSTARS radar-equipped command aircraft, and many other weapons. These weapons reportedly worked very well in the war. Reformers have also, however, frequently been advocates of simpler weapons, like the A-10 aircraft, that also worked well.

A second recurrent military reform theme is that the military services and defense contractors generally overemphasize high performance at the expense of reliability, maintainability, and operability in weapons design. In the Persian Gulf War, it appears that high levels of mission readiness were attained by virtually all of the weapons used, and that high levels of performance, especially in night fighting and electronic warfare, gave U.S. forces a decisive advantage.

These achievements came at a price, however, in that going to war required moving a mountain of material and tens of thousands of support personnel to the theater. It also appears that operating costs in the Persian Gulf War substantially exceeded comparable costs a generation earlier in Vietnam.

A third, related military reform argument is that quantity, not just quality, is important. The United States military developed high-technology weapons during the Cold War in part to make up for potential quantitative disadvantages against the Warsaw Pact in Europe. In the Persian Gulf War, it appears that precision-guided munitions and other advanced technology multiplied the effectiveness of U.S. forces. Allied forces, however, were not substantially outnumbered.

A fourth common military reform argument is that the U.S. military relies too heavily on complex command, control, communications, and intelligence (C^3I) systems that would be vulnerable in wartime to technical failure or to disruption by a capable enemy. If one element of the system breaks down, the reformers argue, an entire campaign can collapse. In the war with Iraq, it appears that U.S. C^3I and other "force multipliers" worked very well, but it remains possible to question whether U.S. command and control systems would fare nearly as well against a more capable foe.

A final, more positive military reform theme is to advocate aggressiveness, surprise, and maneuver as elements of military doctrine and to endorse military education, extensive large-unit training, and unit cohesion in preparing soldiers for war. The U.S. military has wholeheartedly adopted many of these prescriptions in recent years, to evident effect in the Gulf War, though officials are reluctant to give outsiders credit for advancing these military virtues.

An evaluation of the arguments of the military reformers in light of the Gulf War, therefore, suggests several negatives, a couple of positives, and a number of remaining uncertainties. On the whole, the reformers' criticisms of high-technology weaponry appear unsupported by the results of the war, though the simpler weapons favored by reformers performed well, too. U.S. advantages in night fighting, electronic warfare, command and control, precision guidance, and other areas appear valuable enough to outweigh the logistics burdens and financial costs the technology imposed. To the credit of the reform argument, surprise, maneuver, and training also contributed strongly to U.S. success.

Many issues raised by the military reformers, however, remain unresolved following the Persian Gulf War. Could the logistics burden created by the nature of modern U.S. military forces be sustained in a long war against a more capable enemy? Would (C^3I) systems prove vulnerable to disruption by an effective opponent, and would the results be catastrophic? Would a substantial enemy advantage in numbers overwhelm U.S. technological superiority?

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DEFENSE INDUSTRIAL BASE

What implications might the Persian Gulf War have for policy concerning the U.S. defense industrial base?

A Shrinking U.S. Defense Industrial Base

DOD spending is projected in FY1996 to comprise only 3.6 percent of the U.S. gross national product (GNP), the lowest since the beginning of World War II. This reduced level of spending will further contract the U.S. defense industrial base, which has been shrinking since the mid-1980s. Industry experts believe that many smaller U.S. defense contractors, and quite possibly some larger ones, will be pushed out of the defense business. Against this backdrop, the Persian Gulf War highlighted three specific issues relating to the U.S. defense industrial base: (1) To what extent is the U.S. defense industrial base dependent on foreign-made components? (2) How might sales of U.S.-made arms to foreign buyers help preserve the U.S. defense industrial base? (3) How does the U.S. defense industrial base fit into the Administration's new defense-planning concept of "reconstitution"?

Foreign Dependency

Although U.S. weapon inventories were generally adequate to meet the needs of the recent conflict, some spot shortages revealed a significant dependency on foreign-made components. A warning on the foreign dependency issue was sounded in 1988, when the Defense Science Board, a DOD advisory panel, found the U.S. military was "dangerously dependent" on foreign suppliers. That conclusion was reiterated by two subsequent reports by the Office of Technology Assessment and the General Accounting Office. The war, brief as it was, confirmed these findings. In several cases, foreign reliance complicated the smooth flow of U.S. supplies to the Persian Gulf -- even with the full cooperation of foreign governments. For policymakers, the issue in the wake of the Persian Gulf War is how to insure future U.S. military readiness in the event of shortages of foreign components from countries that may not be so cooperative.

How to deal with potential shortages of critical defense items as a result of increasing foreign dependency is highly controversial. Some believe the United State should build larger stockpiles. Others, however, think that identifying all the parts to stockpile would be difficult, and that the costs of maintaining large stockpiles would be high. Another solution to foreign dependency is to develop a U.S. production capability for these components. Proposals to begin developing the necessary technology include DOD providing greater incentives to U.S. companies, for example, through its independent research and development (IR&D) program. These, however, are long-term proposals that do not address dependency in the short run.

Foreign Sales

The Persian Gulf War demonstrated the superiority of U.S. weapons in battle, and will likely increase international demand for U.S.-made weapons. Already, members of the U.S.-led coalition, such as Saudi Arabia and Egypt, have requested permission to buy such weapons as the F-15 Eagle fighter, M1 Abrams tank, and the Patriot antitactical missile system. Increased foreign sales will extend the life of the weapons' production lines, some of which were scheduled for shutdown soon due to expiring DOD procurement contracts. But increased foreign sales will help only a relatively small number of the many U.S. contractors that are facing reduced sales and in many cases the possibility of going out of business. Because foreign sales comprise only a small share (usually less than 10 percent) of total U.S. weapons sales, an increase in such sales as a result of the Persian Gulf conflict is likely to only minimally benefit the U.S. defense industry as a whole.

Reconstitution Capability

The size of Iraq's military force used against the allies underscores the risk of reducing U.S. military capability too far, creating difficulties in meeting future requirements for a large-scale military deployment. To prevent such a contingency, U.S. defense planning is incorporating the concept of reconstitution, i.e. the ability for the United States military to regenerate part of its force structure and thereby expand its capability to protect U.S. interests. Since industrial capability is an inherent part of reconstitution capability, the issue is how the state of the U.S. defense industrial base will bear on this new policy. A recent DOD joint military net assessment report warns that the combination of foreign sourcing by the U.S. defense industry and reduced defense spending is seriously threatening the ability of the U.S. defense industry to reconstitute itself in the event of a major emergency. The problem is particularly acute with U.S. "subtier suppliers" -- manufacturers of subsystems and components of larger U.S. weapon systems.

To strengthen the U.S. defense industrial base, some experts are recommending greater use of U.S. commercial technologies in weapons systems. Such an approach, they argue, could lead to a larger industrial base available for future defense production, because these industries would not depend entirely on DOD contracts for their economic existence. A larger industrial base could result in larger economies of scale and lower unit production costs. Greater commercial-military integration, however, would also mean implementing significant changes in the DOD-U.S. private sector business relationship in such areas as accounting requirements, technical data rights and the military specification process.

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ARMS SALES AND TECHNOLOGY EXPORTS

ARMS SALES

What implications might the Persian Gulf War have for U.S. policy regarding arms sales?

During the Gulf War, Allied forces faced the massively armed Iraqi military, which had purchased weapons from a host of eager supplier nations -- primarily the Soviet Union, France, and China. The ability of a nation to acquire such an arsenal, invade its neighbor, and threaten the security of the region and even Western countries raises a number of questions concerning U.S. policy regarding arms sales to the Third World, including: 1) Should arms export controls be extended to limit *conventional* weapons? 2) To what extent can *all* major arms suppliers act in concert to embargo weapons exports, particularly advanced weapons, to the Third World? 3) To what extent have U.S. arms sales served the policy goals of helping to maintain regional power balances and avoiding U.S. military involvement? 4) What effects might military crises have on arms sales and regional arms races?

Conventional Arms Sales

Arms sales to the Middle East fueled an expensive Mideast arms race and provided an aggressive nation -- Iraq -- with the capability to attack its neighbors. Arms sales to Iraq were partly driven by economic gains for the suppliers and the desire of many countries to prevent Iran from dominating the Middle East region. The paucity of controls on conventional arms transfers permitted some countries -- primarily the Soviet Union -- to help build the massive Iraqi war machine that ultimately threatened the interests of the United States and its allies. Iraq, the top importer of weapons in the Middle East, spent more than $52.5 billion on arms imports during 1974-88, due in part to its 9-year war with Iran. During 1985-89, Iraq, Saudi Arabia, Syria, and Egypt were among the world's top five arms importers. Besides Iraq, seven other countries in the Mideast/North Africa region could have used missiles at least as capable as the Scud, including Saudi Arabia with Chinese-supplied CSS-2 intermediate range ballistic missiles and Syria with Soviet-supplied SS-21 surface-to-surface and Sepal cruise missiles.

One result of the war has been increased calls to limit conventional arms sales to the Third World, particularly the volatile Middle East. In considering such control initiatives, U.S. policy-makers will have to weigh various factors, including the maintenance of adequate security for allies and increased pressure at home from American defense firms seeking to expand foreign sales to compensate for declining U.S. military procurement.

Multilateral Arms Embargo

In August 1990, the United Nations imposed a mandatory arms embargo on Iraq and authorized countries to use national armed forces for enforcement of the ban. Because the embargo was in place only a brief time before the Persian Gulf War started, the value of a weapons embargo for the stability of a volatile region was not tested. However, the unity and decisiveness of efforts to stop the flow to Iraq of major weapons demonstrated the efficacy of cartel-like action by world's dominant arms suppliers -- the Soviet Union, United States, France, China, and the United Kingdom. The embargo on Iraq showed that under certain circumstances, these top arms suppliers can act in concert to halt significant arms transfers to a specific country. Many analysts believe that efforts to control conventional arms transfers can only be achieved through multilateral initiatives and that the experience during the Gulf crisis offers evidence that future cooperation might be possible.

Arms Sales and U.S. Military Involvement

U.S. arms sales policy stems from the 1969 Nixon Doctrine, which proposed that the United States supply weapons to key Third World allies to strengthen their self-defense capabilities and help to stabilize contentious regions while avoiding direct American military involvement. Arming moderate Arab allies and Israel, however, did not provide them sufficient capability to deter or repel aggression in some cases, leading some observers to question whether arms sales can be an effective tool in avoiding the deployment of American troops abroad. Saudi Arabia bought in total $34.7 billion worth of arms from 1974 to 1988, including U.S. F-15 fighters and AWACS (airborne warning and control system). After the 1978 Camp David accords, the United States supplied Egypt with $5.2 billion of arms from 1979 to 1988, including advanced F-16 fighters and E-2C Hawkeye airborne early-warning aircraft. Secretary of Defense Dick Cheney said on March 19, "the policy we're pursuing now is . . . to *minimize* the U.S. military presence on the ground in the region. It's probably easier to do if we help out friends like the Saudis and the gulf states to have sufficient capability to be able to defend themselves *long enough for us to be able to get back* [emphasis added]."

Effect of Military Crises on Arms Demand and Supply

In times of military crises, demand for U.S. arms often increases, thus sustaining regional arms races. After Iraq's invasion of Kuwait in August 1990, the United States transferred an emergency $2.2 billion package of weapons to Saudi Arabia, including an additional 24 F-15 fighters, which breached a Congressional limit of 60 F-15s for the Saudis. In September, the Bush Administration offered a second weapons sales package estimated to cost over $7.3 billion. Congressional opponents consented to the arms deal after the Administration agreed to support an enhancement of U.S. arms transfers and military assistance to Israel worth up to $1 billion.

The superior performance of U.S.-made weapons during the war may also increase the demand for them. Such interest in U.S. military technology could advance American arms sales opportunities and lead to closer security relationships between the United States and certain Third World countries. The demand for U.S. weapons, however, might also provide the United States with broader leverage with which to reduce and control the global arms flow.

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TECHNOLOGY EXPORTS

What implications might the Persian Gulf War have for U.S. policy concerning military and dual-use technology exports?

During the past decade, Iraq was able to acquire technology to develop its weapons of mass destruction from a number of sources, including Western firms. Widespread reporting of technology transfers from the West to Iraq led Germany to revise its trade control laws and has brought urgency to questions about export controls generally, including: 1) Should U.S. export controls be reformed and/or better enforced? 2) Should the United States encourage other countries to tighten their more liberal trade control systems up to the levels of U.S. export controls? 3) Do multilateral non-proliferation regimes need to be reoriented or strengthened to prevent sensitive technology transfers to the Third World?

Strength and Enforcement of U.S. Export Controls

U.S. concerns about technology exports traditionally focused on the risks of communist countries acquiring sophisticated military capabilities. Iraq's aggression in the Persian Gulf highlighted the newly emerged threat posed by transfers of technology to some Third World countries, like Iraq, which allowed them to obtain nuclear and biological materials and technology and to amass chemical weapons and missiles. The war also showed that U.S. export controls did contribute to U.S. national security by helping to maintain the technological edge of Western military power over Soviet and Iraqi military capabilities.

While the United States maintains the most stringent non-proliferation laws, the specter of Iraqis using weapons enhanced by American-supplied technology against American troops in the Gulf War revealed the dangers of the imperfections of U.S. export control practices. From 1985 to 1990, the Department of Commerce approved 771 (or 68 percent of the total) applications for licenses to export controlled items to Iraq. Reportedly, some requests had been granted despite opposition from the Department of Defense. Critics charge that the Commerce Department's mission to advance U.S. exports conflicts with its duty to implement trade controls. Commerce Department officials contend, however, that Commerce restricts the exports of dual-use commodities to the full extent that is legally authorized, that they coordinate with other departments as required by law, and that they rigorously meet these requirements and seek

to do so at minimal injury to U.S. exporters in international competition. In addition to the technologies that were legally exported, items were diverted from legitimate end users or smuggled to Iraq. In awarding $64 million in damages to Consarc Inc., whose sale of furnaces to Iraq was halted at the urging of the Defense Department and which sued Iraq for misrepresenting the intended use of the furnaces, U.S. District Judge Stanley Sporkin noted, "the case showed the need for better contacts between the U.S. Department of Commerce and the intelligence community, as well as the need for better enforcement of U.S. export control laws."

Liberal National Export Control Systems

The Gulf War highlighted the lax European trade-control and judicial systems, which contributed to the ability of Iraq to acquire technology for its military industry. West German firms reportedly played major roles in Iraq's chemical warfare, conventional arms, and missile production, as well as nuclear weapons development. Reports on the sources of Iraq's weapons technology heightened efforts by Germany to tighten its export control laws. Iraq's configuration of front-company labyrinths in the United States and Europe also helped it to acquire export licenses for dual-use technology. To further hinder transfers of sensitive know-how to the Third World, the United States may increase intelligence-sharing with other suppliers and encourage other states to enact stricter export controls, strengthen law enforcement, or improve intelligence activities to verify end users. This said, the regulation of dual-use technology trade remains a most complex and difficult undertaking. Stringent restraints may block significant, potentially beneficial technology transfer. The conscientious policies of one nation or group may simply divert sales and profits elsewhere with little gain to security or stability.

Multilateral Non-Proliferation Regimes

The war experience provided some support for the premise on which supplier control regimes -- such as the nuclear non-proliferation regime -- are based, namely, that foreign acquisition and development of weapons of mass destruction can be delayed and made more expensive and difficult if the major producers agree to control exports of the necessary hardware. Iraq was less successful in the critical nuclear field than in chemical warfare and missiles.

However, the Gulf War also highlighted the potential nuclear threat from Iraq given Baghdad's very serious and aggressive determination to acquire nuclear weapons technology, and its proven ability to do so secretly and even legally. Scientists estimated that Iraq -- before the war -- was at least five to ten years from attaining the ability to produce highly enriched uranium for a nuclear bomb. France and the Soviet Union supplied weapons-grade uranium to Iraqi research reactors, which was permitted by the minimum requirements of the International Atomic Energy Agency safeguards structure. Baghdad, however, did not accept full-scope safeguards, or inspection of all nuclear facilities in addition to verifying peaceful usage of uranium. Firms from the United States, Brazil, United Kingdom, West Germany, Chile, and Switzerland

were reportedly involved in nuclear-weapons-related technology and equipment transfers to Iraq. Technology transfers probably would have continued if the United Nations ban were not imposed. These instances strengthened the case for greater U.S. leadership in tightening export controls on dual-use nuclear technology and equipment under the Nuclear Suppliers Guidelines.

The threat of Iraq's use of chemical weapons and its repeated missile attacks showed the weaknesses of other multilateral non-proliferation agreements, like the Australia Group (for chemicals) and the Missile Technology Control Regime (MTCR). Iraq's chemical weapons plants at Samarra reportedly received Western equipment. Also, Western aid to Iraq's Saad 16 research and development complex was found to have enabled Baghdad to build improved missiles based on the Scud. These technology transfers showed the limitations of the Australia Group and the MTCR which employ voluntary export controls by each member state with no mechanisms for verification and enforcement. The United States, with the strongest anti-proliferation laws, may find it useful to advance the effectiveness of the chemical/biological and missile non-proliferation regimes and to encourage the Soviet Union and China to join the associations. (See also entry on Chemical and Biological Warfare.)

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APPENDIX: RELATED CRS PRODUCTS

INTRODUCTION AND OVERVIEW

Defense goals in the 1990s; issue brief, by Robert L. Goldich and Stephen Daggett. Updated regularly. IB90013

Desert Shield and Desert Storm: implications for future U.S. force requirements, by John M. Collins. April. 19, 1991. 30 p. 91-361 RCO

New directions for national defense, by John M. Collins. July 6, 1990. 29 p. 90-323 RCO

Operation Desert Storm: an assessment; audio brief, by Robert Goldich, Steven Bowman, and Ronald O'Rourke. Mar. 7, 1991. AB50219

Persian Gulf Conflict: post-war issues for Congress; issue brief, by Raymond W. Copson, Coordinator. Updated regularly. IB90132

The Persian Gulf War: preliminary foreign policy "lessons" and perceptions, by Mark M. Lowenthal. Mar. 18, 1991. 12 p. 91-260 RCO

Persian Gulf War: summary of U.S. and non-U.S. forces, by Steven R. Bowman. Feb. 11, 1991. 20 p. 91-167 F

DEFENSE BUDGET AND SIZE OF THE FORCE

The FY 1992 budget debate: how much for defense; issue brief, by Stephen Daggett. Updated regularly. IB91066

Persian Gulf War: U.S. costs and allied financial contributions; issue brief, by Stephen Daggett and Gary J. Pagliano. Updated regularly. IB91019

HIGH-TECHNOLOGY WARFARE

ASATs: antisatellite weapons systems; issue brief, by Marcia S. Smith. Updated regularly. IB85176

Military and civilian satellites in support of the Persian Gulf War, by Marcia S. Smith. Feb. 27, 1991. 12 p. 91-215 SPR

Research and development funding: FY1992; issue brief, by Science Policy Research Division, Research and Development Team; Michael Davey, Coordinator. Updated regularly. IB91033

The Strategic Defense Initiative: issues for Congress; issue brief, by Steven Hildreth. Updated regularly. IB85170

AIRLAND BATTLE DOCTRINE

LHX and Army aviation modernization: issues for Congress; issue brief, by Steven R. Bowman. Updated regularly. IB88086

AIRPOWER

Advanced tactical fighter (ATF) aircraft (weapons facts); issue brief, by Bert H. Cooper. Updated regularly. IB87111

B-2 strategic bomber; issue brief, by Dagnija Sterste-Perkins. Updated regularly. IB90156

Navy carrier aircraft: issues and options; issue brief, by Bert H. Cooper. Updated regularly. IB89156

Navy carrier-based fighter and attack aircraft in the FY 1992 budget: issues for Congress, by Ronald O'Rourke. Mar. 13, 1991. 23 p. 91-253 F

V-22 Osprey tilt-rotor aircraft (weapons facts); issue brief, by Bert H. Cooper. Updated regularly. IB86103

GROUND FORCES

Chemical and biological weapons in the Persian Gulf area: health effects and protections, by Michael M. Simpson. Jan. 11, 1991. 91-46 SPR

Chemical weapons: a summary of proliferation and arms control activities; issue brief, by Steven R. Bowman. Updated regularly. IB89042

Chemical weapons proliferation: issues for Congress; issue brief, by Steven R. Bowman. Updated regularly. IB90084

NAVAL FORCES

Seawolf or SSN-21 nuclear powered attack submarine; issue brief, by Ronald O'Rourke. Updated regularly. IB90051

SPECIAL OPERATIONS FORCES

United States and Soviet special operations, by John M. Collins. April 28, 1987. 174 p. 87-398 RCO

INTELLIGENCE AND THREAT ASSESSMENT

Intelligence issues for 102d Congress; issue brief, by Richard A. Best. Updated regularly. IB91017

MOBILITY

The C-17 cargo plane production status; issue brief, by James P. Wootten. Updated regularly. IB90090

Sealift and Operation Desert Shield, by Ronald O'Rourke. Sept. 17, 1990. 28 p. 90-446 F

ORGANIZATIONAL/PERSONNEL

Legislation would be required to reinstate the draft, by Robert B. Burdette. Feb. 12, 1991. 3 p. 91-168 A

Military assignment and separation policies based on certain family considerations, by Robert B. Burdette. Jan. 22, 1991. 19 p. 91-101 A

The Persian Gulf War and the draft, by Robert L. Goldich. Jan. 22, 1991. 9 p. 91-103 F

Persian Gulf War: key U.S. military personnel and compensation questions; issue brief, by Robert L. Goldich. Updated regularly. IB90124

Persian Gulf War: U.S. reserve callup and reliance on the reserves; issue brief, by Robert L. Goldich. Updated regularly. IB90144

Women in the armed forces; issue brief, by Ellen C. Collier. Updated regularly. IB79045

ARMS SALES AND TECHNOLOGY EXPORTS

Arms sales to Saudi Arabia: current status; issue brief, by Richard F. Grimmett. Updated regularly. IB91007

The Commercial implications of exporting and importing military technology: a review of the issues, by John D. Moteff. Aug. 24, 1990. 40 p. 90-409 SPR

Middle East arms control and related issues, by the Foreign Affairs and National Defense Division. May 1, 1991. 117 p. 91-384 F

Missile proliferation: survey of emerging missile forces, by the Foreign Affairs and National Defense Division. Revised Feb. 9, 1989. 107 p. 88-642 F

Trends in conventional arms transfers to the Third World by major supplier, 1982-1989, by Richard F. Grimmett. Revised June 19, 1990. 90-298 F

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