在日米軍の削減可能性を探る研究

SECTION V: MODERNIZATION

BALLISTIC MISSILE DEFENSE

Throughout the Cold War, both the United States and the Soviet Union conducted research and development on ways to defend against nuclear-armed ballistic missiles. With the signing of the Anti-Ballistic Missile (ABM) Treaty in 1972 banning nationwide ABM systems, the issue of ballistic missile defense (BMD) was relegated to a less prominent status. Beginning in March 1983, ballistic missile defense gained new prominence with the unveiling of the Strategic Defense Initiative (SDI). Throughout the next decade, the SDI program engendered significant debate with regard to its viability and cost.

The Problem

Despite a decade of research and an investment of $30 billion, most experts inside and outside the Department of Defense agree that we are far from deploying a highly effective defense against a large-scale missile attack. Furthermore, as a result of the strategic arms reduction agreements recently negotiated with the former Soviet Union and the dissolution of that country, the principal threat against which such a system was originally designed has drastically declined.

In response to these developments, and because the Congress had consistently failed to fund the scale of SDI program that the executive branch proposed, the Bush Administration refocused SDI toward a more limited defense of the United States and its allies, called Global Protection Against Limited Strikes (GPALS). The Bush program called for spending an additional $39 billion for ballistic missile defense in FY 1995-99 — an amount that would have constituted a significant portion of the modernization dollars in the DoD budget.

In his FY 1994 defense budget request, President Clinton decided to scale back investments in missile defenses from $6.3 billion under the Bush plan to $3.8 billion. This reduction reflected this Administration's skepticism about the need for early deployment of a national missile defense and a desire both to reorient the program toward theater missile defense and to fund overall missile defense research and development at a sustainable level.[1]

The Bottom-Up Review thus examined U.S. missile defense requirements from a perspective of identifying options that could meet future needs at an affordable cost.

The Threat

There are three general categories of long-range missile threats to the United States: deliberate attacks by the former Soviet Union or China, accidental or unauthorized launches from those countries, and the emergence of new long-range missile threats from potentially hostile nations.

If Ukraine, Belarus, and Kazakhstan ratify and implement START I and join the Nuclear Nonproliferation Treaty as nonnuclear states, Russia will be the only country of the former Soviet Union possessing missiles capable of reaching the United States. Once START II is implemented, Russian strategic nuclear forces will be much smaller than they are today and strategic modernization is expected to proceed at a slower pace. While China also has a few nuclear missiles that could reach the United States, its strategic nuclear force is quite small now, and it is likely to grow slowly in both size and capability over the next decade. A deliberate attack by Russia or China on the United States would appear to be highly unlikely.

Accidental or unauthorized launches of Chinese or former Soviet nuclear missiles are also considered

[1] The term *theater missile defense* (TMD) refers to defenses against shorter-range theater and tactical missiles that might be used against forward-deployed U.S. forces or U.S. allies. A *national missile defense* (NMD), by contrast, would defend against long-range strategic missiles that might be used to attack the United States directly.

unlikely. Both countries appear to maintain effective nuclear weapon control procedures to preclude such an event.

Finally, while no other potentially hostile nation currently possesses the capability to threaten the United States with ballistic missiles (and probably none will acquire such a capability for the next several years), the possibility of a limited ballistic missile threat from the Third World sometime in the first decade of the next century cannot be excluded.

However, a different threat of particular concern in the post-Cold War period is the proliferation of shorter-range ballistic and cruise missiles armed with nuclear, biological, or chemical warheads. Ballistic and cruise missile deployments are expected to increase worldwide, despite stepped-up efforts to inhibit their proliferation, and several countries other than the acknowledged nuclear states are developing both nuclear weapons and ballistic missiles. Similarly, a number of countries have or are developing chemical or biological weapons that could be delivered by ballistic or cruise missiles.

Treaty Compliance

The ABM treaty, as amended in 1974, permits a single missile defense site equipped with ground-based tracking and guidance radars and up to 100 fixed, land-based interceptor missiles. The treaty prohibits mobile land-based, air-based, sea-based, and space-based ABM systems or components. The Bottom-Up Review considered program options that are treaty compliant as well as options that would require relief.

One option would be to deploy an ABM system that could provide a limited defense of the continental United States against a small-scale missile attack. Such a system, deployed at a single site in Grand Forks, North Dakota, would consist of a ground-based radar (GBR), 100 ground-based interceptors (GBIs), and upgrades to our existing early-warning radar system. While such a system would provide nationwide coverage against some types of attacks, levels of protection for substantial areas of the eastern and western United States would be inadequate in the event of other attacks.

Other options involve multiple sites, additional interceptor missiles, and/or reliance on missile tracking information from space-based sensors. These options are being examined in the context of a Presidential review of our BMD program and the ABM treaty. They raise ABM treaty compliance issues that must be resolved within the government and within the framework of our dialogue with Russia and perhaps other countries of the former Soviet Union before development or deployment could proceed. The present political instability in Russia could make it very difficult to negotiate such modifications to the ABM treaty for the foreseeable future.

Core Theater Missile Defense Program

To meet the growing threat from shorter-range theater ballistic and cruise missiles, the Bottom-Up Review considered a range of theater missile defense options. All options include a "core" set of TMD systems consisting of an enhanced version of the existing land-based Patriot air and missile defense system, called Patriot Advanced Capability, Level-3 (PAC-3); the sea-based Aegis/Standard Missile Block IVA; and the land-based Theater High-Altitude Area Defense (THAAD) missile system (see Figure 9).

Patriot Advanced Capability Level - 3. Our current ability to intercept shorter-range ballistic missiles is limited to the Patriot PAC-2 missile, which was used with partial success against modified Iraqi Scud missiles during the Gulf War. The immediacy of the tactical ballistic missile threat argues strongly for rapid deployment of improved theater missile defenses, such as PAC-3, that provide greater lethality and range, and are more capable against longer-range threats. PAC-3 would include an improved radar and either an upgraded Patriot missile or a new "hit-to-kill" interceptor missile.

The Aegis/Standard Missile Block IVA. The Navy currently deploys many cruisers and a growing number of destroyers equipped with Aegis radars and

Standard missiles for air defense operations. The Block IVA program would capitalize on this existing infrastructure by fielding upgraded Standard missiles and a modified Aegis radar to provide a sea-based TMD capability and improved performance against antiship cruise missiles. In some circumstances, a naval TMD capability could be in place in the vicinity of a regional conflict, providing protection for land-based targets before hostilities break out or before land-based defenses can be transported to the theater.

Theater High-Altitude Area Defense System. While modifications of existing systems can deal with most existing ballistic and cruise missile threats, the THAAD system is included in the core TMD program because additional capabilities will be needed to counter more advanced threats anticipated in the future. THAAD would defeat longer-range ballistic missiles, thereby minimizing the effects of weapons of mass destruction on the ground, and would also defend a larger area. When combined with either PAC-3 or the Standard Block IVA missile as a lower defensive tier, THAAD would anchor a highly effective layered defense of critical assets.

Brilliant Eyes. Brilliant Eyes (BE) missile tracking satellites offer the potential for significantly enhancing the capabilities of the core theater missile defense effort. Brilliant Eyes satellites would provide an autonomous missile surveillance and tracking capability for a number of regions of interest, or if cued by global surveillance satellites, they could observe missiles soon after launch. The unique contribution of BE is high-precision midcourse tracking, which allows interceptors to be launched when incoming missiles are still beyond the range of land- or sea-based radars. This means that intercept ranges would increase, particularly for long-range, wide-area defensive systems such as THAAD.

Brilliant Eyes missile tracking data could also be used for interceptor guidance updates, further increasing the defended area and offering a hedge against radar countermeasures or the loss of a radar. In

Theater Missile Defense

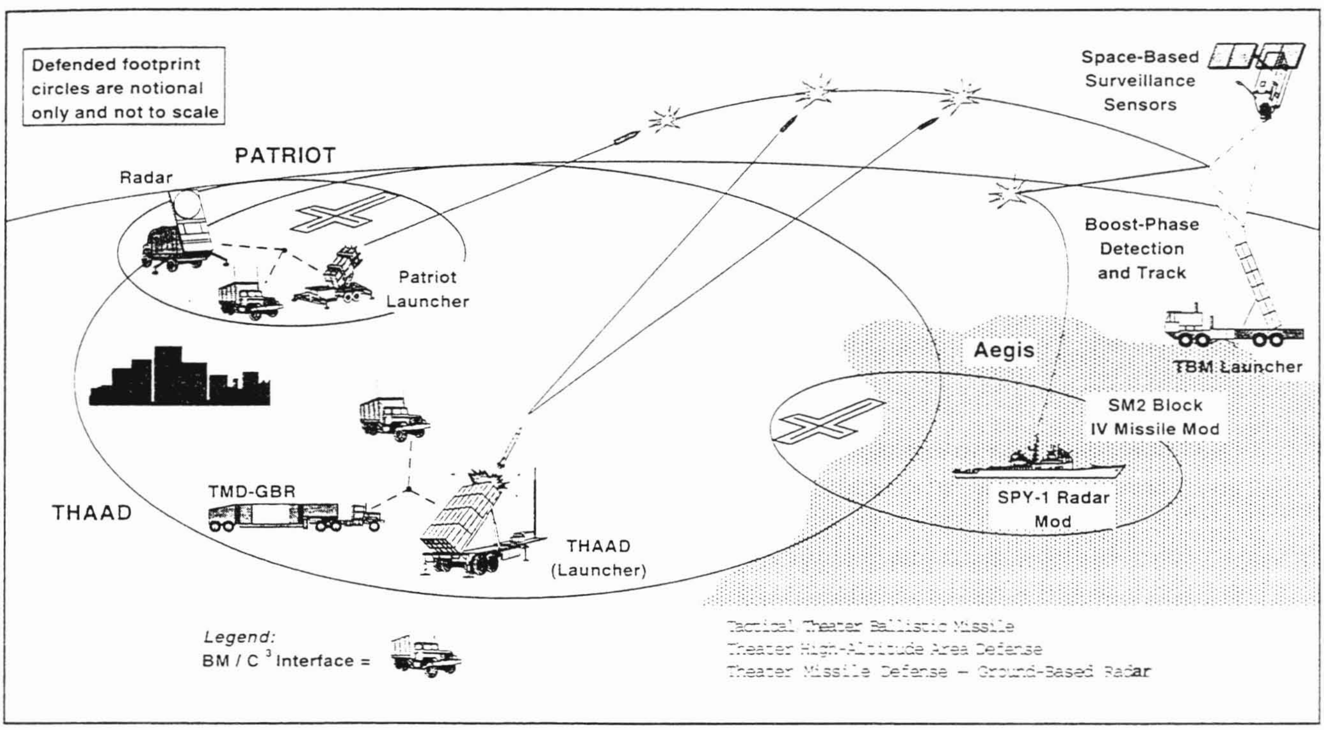


Figure 9

peacetime, the BE constellation could help collect intelligence data on emerging threats. A DoD working group is examining whether Brilliant Eyes might also have a role to play in fulfilling future strategic early-warning and surveillance requirements.

Additional TMD Programs

In addition to the core TMD program and Brilliant Eyes, the Bottom-Up Review examined the advantages and costs of proceeding with several other proposed TMD programs: a sea-based upper-tier program, the Army's Corps Surface-to-Air Missile (SAM) system, and ascent/boost-phase intercept capabilities.

Sea-Based Upper Tier. All sea-based concepts for higher-altitude missile ("upper tier") intercepts take advantage of the Vertical Launch System on naval combatants and offer very long-range intercept potential when supported by BE or some other over-the-horizon sensor. This is particularly true for concepts using an upper-stage intercept element based on Lightweight Exoatmospheric Projectile (LEAP) technology and carried by the Standard missile. These sea-based systems could provide extensive area protection.

Corps SAM. This new mobile air and missile defense system would protect Army or Marine maneuver forces against short-range ballistic missiles and advanced cruise missiles fired from any direction. In addition, Corps SAM would be more transportable, more mobile, and have more on-line missiles per battery than the Patriot PAC-3.

Ascent/Boost-Phase Intercept. We will also investigate the feasibility of defensive systems having earlier intercept capabilities so that enemy missiles could be destroyed while they are still ascending. This would be a joint Air Force-Ballistic Missile Defense Organization (BMDO) program.

TMD Options

Four TMD options that build on the core program were examined. The options differ with respect to the ways in which they supplement the core program and the time period in which the additional programs they provide would proceed through the acquisition process.

Option 1: Core TMD Program Plus Sea-Based Upper Tier and Corps SAM. This option, consisting of the core TMD program (PAC-3, THAAD, Standard Missile Block IVA) plus both the Sea-Based Upper Tier and Corps SAM systems, was the Bush TMD program. Proceeding with all five of these major system acquisitions would require about $14 billion in investment funding for TMD during FY 1995-99. This option would create a significant bow-wave problem in the period beyond the FYDP, due to the large number of systems acquired during the initial years.

Option 2: Core Program Plus Sea-Based Upper Tier. This option consists of the core TMD program plus the Sea-Based Upper Tier system and a less vigorous development effort for Corps SAM. Under this option, Corps SAM would not enter the demonstration/validation phase any earlier than FY 1998. About $12 billion would be needed in FY 1995-99 to implement the option. Post-FYDP acquisition funding would increase modestly.

Option 3: Core Program and Technology Demonstration. This option would pursue the core TMD acquisition program plus a technology demonstration only for the Sea-Based Upper Tier. Depending on the success of the technology demonstration effort, the Sea-Based Upper Tier system could transition to an acquisition program in FY 1998. Alternatively, development of Corps SAM could be started at that time. The estimated FY 1995-99 cost of this option is about $10 billion; no significant post-FYDP funding bow wave is projected.

Option 4: Core TMD program. This option consists of the core TMD program only, delaying the start of any additional acquisition program — Sea-Based Upper Tier or Corps SAM — until at least FY 1998. This option would require about $9 billion in funding in FY 1995-99 and about the same level of expenditure in FY 2000-06.

National Missile Defense Options

In evaluating options for national missile defense, three main factors were considered: technological promise, responsiveness to the projected threat, and ABM treaty compliance. Various NMD architectures were examined, consisting of the Ground-Based Radar and the Ground-Based Interceptor, with and without Brilliant Eyes. In addition, four different development approaches were analyzed.

Option 1: Standard Acquisition Program. This option would cost approximately $10 billion over the FYDP period. If started now, it could provide an initial operational capability by the year 2004. Pursuit of this type of NMD program might be appropriate if the likelihood that a potential adversary (e.g., Libya, Iraq, or North Korea) might acquire an intercontinental ballistic missile (ICBM) capability by 2004 was substantially higher than it currently appears to be.

Option 2: Systems Technology Demonstration Approach. This option would cost about $7 billion over the FYDP period. It envisions conducting enough development to ensure that the United States — given the knowledge of an emerging threat and the decision to start development — would have the capability to deploy a prototype ground-based system within about five years and production-quality hardware in about eight years. Although this approach could save $3 billion to $4 billion during FY 1995-99 relative to the first option, the total expenditure for a single, fully configured site (with production equipment) would be considerably more than if a standard acquisition program were started now. The specific option considered would permit a prototype deployment by 2003 (given a decision in 1999 to do so), with the first production hardware available in 2007.

Option 3: NMD Technology Program Plus Brilliant Eyes. This option would cost $3 billion over the FYDP years, including about $200 million annually for acquisition of Brilliant Eyes. It preserves a capability in the key technologies being investigated for NMD. Under this approach, it would take 10 to 15 years to deploy an operationally effective system from the time a decision was made to do so. Cost savings relative to Option 1 would be $7 billion to $8 billion during FY 1995-99. The NMD technology alternative would, in conjunction with TMD activities, preserve an adequate industrial base in critical technology areas.

Option 4: NMD Technology Program Without Brilliant Eyes Acquisition. This option would cost about $2 billion over the FYDP period. It is similar to the third option, except that a Brilliant Eyes acquisition program is not included. Option 4 would provide cost savings (relative to Option 1) of $8 billion to $9 billion during the FYDP years.

The Decision

In considering the proper approach to ballistic missile defense, the Bottom-Up Review examined a range of program options that emphasized theater missile defense, national missile defense, both TMD and NMD, or neither. The options ranged in cost from $15 billion to $25 billion, although each would generate significant savings compared with the Bush Administration's planned $39 billion expenditure on ballistic missile defense during FY 1995-99.

Given the nature of the present and projected threat from ballistic and cruise missiles armed with weapons of mass destruction, a decision was made to emphasize protection of forward-deployed U.S. forces in the near term and to proceed with a more robust TMD program, combined with a more limited NMD technology program.

On TMD, we have decided to pursue Option 2 — a TMD program that includes PAC-3, the Standard Missile Block IVA, THAAD, and the Sea-Based Upper Tier system, all funded as major acquisitions in FY 1995-99. We will also examine the feasibility of ascent/boost-phase intercept capabilities. Development of PAC-3 will allow major work on Corps SAM to be deferred until FY 1998.

On NMD, we will fund a technology program at approximately $600 million per year as a hedge against the emergence of a greater long-range missile threat than is now projected. This program, in conjunction with the recommended TMD option, will preserve an adequate technology base in critical ballistic missile defense areas.

Specifically, Brilliant Eyes, or an equally effective alternative, would continue as a technology program; ground-based radar technology would advance through the GBR program for THAAD; and existing interceptor technology efforts, including THAAD and LEAP (if selected for the Sea-Based Upper-Tier system), would provide a development path to a ground-based interceptor for NMD.

Overall, the ballistic missile defense program will require an investment of approximately $18 billion over the FYDP period, with about two-thirds (or $12 billion) of the total expenditure directed toward TMD. This will provide a savings of about $21 billion compared with the previous Administration's BMD program.

We believe the recommended overall BMD program — a robust TMD effort plus a limited NMD technology program — is the best and most cost-effective approach. It is both consistent with our current understanding of the likelihood of a limited missile attack against the United States and provides the capabilities needed to defeat the more pressing theater ballistic and cruise missile threats.

SECTION V: MODERNIZATION

AIRCRAFT CARRIERS

New aircraft carrier procurement represents a significant investment for the Navy. In evaluating future requirements, the Bottom-Up Review assessed aircraft carrier modernization needs in light of the new international security environment. Modernization options — both new procurement and overhaul of existing carriers — were examined in the context of alternative carrier force levels. The review focused on procurement of CVN-76, the next new carrier the Navy has requested.

The review also examined the potential budgetary savings and other implications of consolidating nuclear aircraft carrier and submarine construction at a single shipyard. This issue was considered because reduced procurement rates for both submarines and carriers in the post-Cold War era have resulted in excess production capacity at shipyards.

Current Capabilities and Programs

With the decommissioning of the *Forrestal* (CV-59) and the *Ranger* (CV-61) at the end of FY 1993, the Navy will have 13 aircraft carriers, of which six are conventionally-powered and seven nuclear-powered. The nuclear-powered carriers include the *Enterprise* (CVN-65) and six ships of the Nimitz class.

The planned decommissioning of the *Saratoga* (CV-60) in the near future will result in a 12-carrier force, with no dedicated training platform. Currently, two Nimitz-class carriers, CVN-74 and 75, are under construction, and are planned for delivery by the end of the decade. To maintain a constant force level as new Nimitz-class carriers are introduced, the Navy plans to decommission some additional conventional carriers that still have service life remaining.

The Bush Administration planned to retain 13 carriers as part of the Base Force, 12 of which would be available for routine deployments, with the remaining ship serving as a dedicated training carrier. A contract for construction of the ninth Nimitz-class carrier, CVN-76, was to be awarded in FY 1995. Advance procurement funds for the nuclear propulsion plant for CVN-76 were authorized in FY 1993. The Bush FYDP also contained advance procurement funding in FY 1999 for CVN-77.

Options Examined

Nine options were examined — three variations in aircraft carrier modernization to support three different carrier force levels. Operating conventional carriers to their planned service lives or beyond, consistent with past practice, was considered in order to determine whether our conventional carriers could be kept in service longer than the Navy currently plans. As is discussed in more detail below, retaining these ships for longer periods could help to limit a potential procurement "bow wave" beyond the turn of the century at higher force levels.

The three modernization options evaluated were:

Option 1 would retain the current modernization program. It would procure CVN-76 in FY 1995 and provide advance procurement funds for CVN-77 in FY 1999, at a total acquisition cost of about $5 billion. Overhaul of the *Nimitz* (CVN-68) would also be completed, as scheduled, in FY 1998.

Option 2 would defer CVN-76 construction beyond the FYDP period, to FY 2000. It would extend the operational life of some existing carriers to their estimated service life or slightly beyond. Advance procurement funding for future CVNs would be deferred beyond FY 1999. The *Nimitz* overhaul would be completed on schedule.

Option 3 would procure CVN-76 in FY 1995, provide advance procurement funding for CVN-77 in FY 1999, but retire the *Nimitz* in FY 1998 in lieu of overhauling it.

Initially, a fourth modernization option was also considered. It would have retained the *America* (CV-66) beyond its planned decommissioning in FY 1996 and operated the *John F. Kennedy* (CV-67) for as much as eight years beyond that ship's current estimated service life. These steps would have been taken to compensate for delaying the construction of CVN-76. This modernization strategy was rejected because the technical difficulties involved would make a service life extension program (SLEP) for the *America* prohibitively expensive and further extending the *Kennedy's* service life would require an additional, unplanned and costly overhaul. Another factor in rejecting this option was the training and maintenance efficiency to be gained by transitioning to an all-nuclear-powered carrier force.

Three different force levels were considered in the evaluation of modernization options. The force alternatives included 10, 11, and 12 carriers, respectively. Variations in overall force levels were an important factor in assessing modernization costs and determining the industrial base implications of alternative modernization strategies.

Evaluation of Options

Five factors were weighed in evaluating each modernization option: (1) effectiveness in achieving warfighting and overseas presence requirements; (2) effects on the affordability of future carriers (i.e., the

Carrier Force Levels, Warfighting Risk, and Overseas Presence

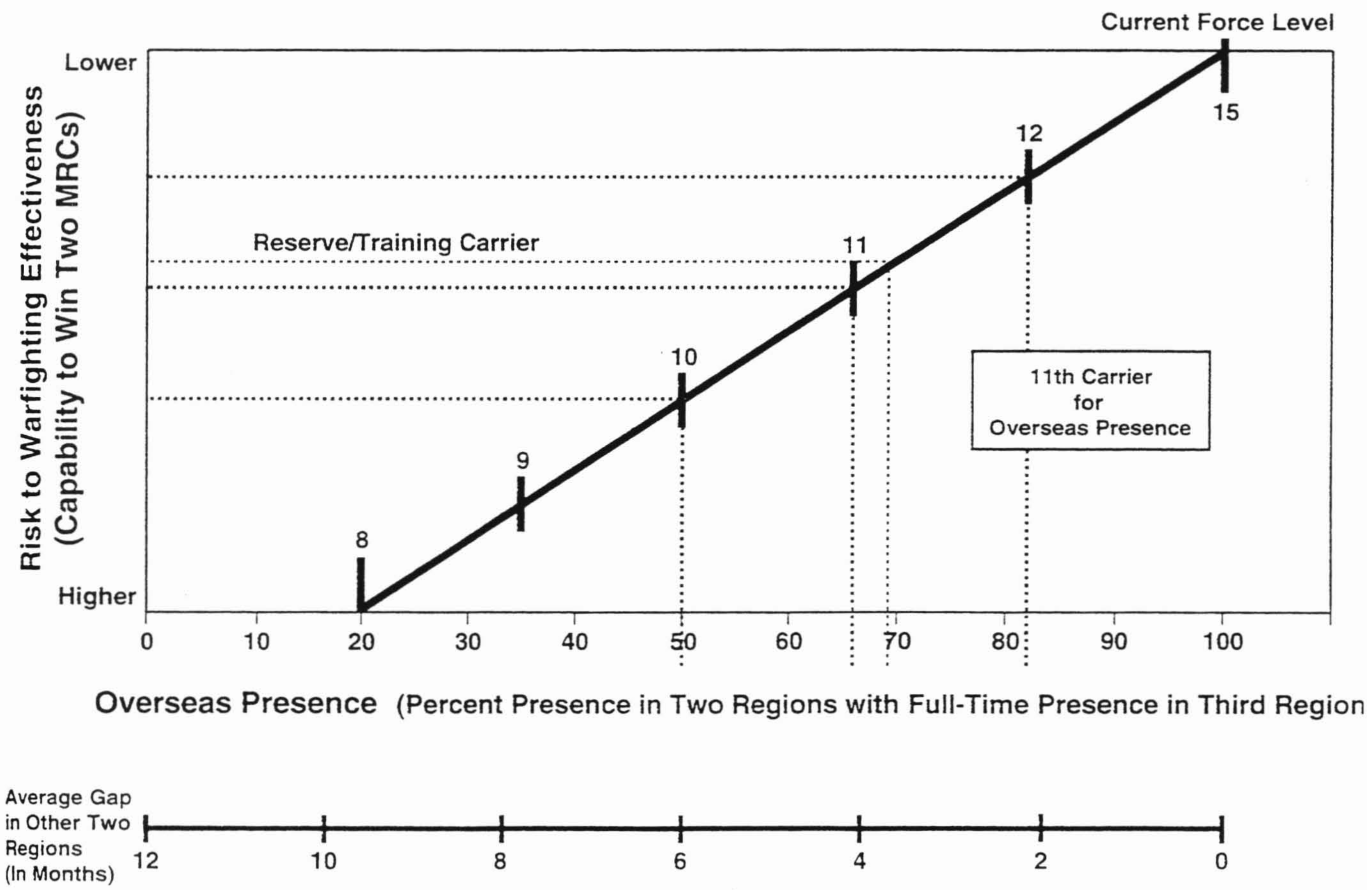


Figure 10

procurement bow wave); (3) the number of useful service years forgone by decommissioning conventional carriers early to maintain force levels constant as new nuclear carriers are delivered; (4) costs, including acquisition and nuclear refueling expenditures in the FYDP years and beyond; and (5) impact on the aircraft carrier industrial base.

Warfighting Effectiveness. First, the relationship of carrier force levels to warfighting capability in regional contingencies was reviewed. Figure 10 illustrates the increased risk to the successful accomplishment of warfighting tasks as carrier force levels are reduced. However, the analysis confirmed that a force of 10 carriers would be adequate to fight two nearly simultaneous MRCs. That assessment was based on many factors, from potential sortie generation capability and arrival periods on station to the independence of carrier-based aviation and its criticality if land-based air elements are delayed in arriving in the theater.

Overseas Presence Effectiveness. With regard to overseas presence, the analysis compared recent experience, with a total force of 14 to 15 carriers, to the peacetime overseas presence implications of a force with 10, 11, or 12 carriers.

As shown in Figure 10, a 15-carrier force could provide virtually full-time presence in three key regions where presence operations are important — the Mediterranean Sea, the western Pacific, and the Indian Ocean/Persian Gulf. A 12-carrier force could maintain a full-time presence in one region, with a minimum of two-month "gaps" in coverage in the other two. If the force were reduced to 11 or 10 carriers, the gap in regional coverage would increase. At a 10-carrier level, the United States could maintain a continuous presence in one region, but gaps in the other two would be as long as six months.

One way of reducing the effect on overseas presence of moving to a smaller carrier force would be to implement a "tether" policy for carriers. Under such a policy, carriers could operate within large areas yet be available to steam to specific staging areas within several days.

Along with implementing a tether policy, other ways of dealing with presence gaps were examined – for example, using ships other than carriers to provide overseas presence or homeporting additional carriers overseas, as is currently done with the *Independence* (CV-62) in Japan. Amphibious ready groups also could substitute for carrier battle groups in some, but not all, peacetime presence missions. Additional overseas carrier homeporting remains another potential option, but significant front-end costs, time, and diplomatic effort would be required to implement this concept successfully.

The interaction between aircraft carrier force levels and naval air wing requirements also was examined, in order to determine the most prudent and effective way to reduce the number of active and reserve air wings as carrier force levels decline. Because at least one aircraft carrier is usually in overhaul and thus not readily deployable, the Navy maintains one fewer air wing than it has carriers. Currently, the Navy has 11 active air wings and two reserve wings.

Also studied was a concept developed by the Navy calling for retention of a dedicated reserve/training carrier. This platform would be manned by a mostly active-duty crew and would be used both by Navy and Marine active and reserve pilots and crews during their initial and refresher carrier training. The carrier could deploy forward for limited periods either with an integrated active/reserve wing or with an active wing whose carrier was in long-term maintenance. This innovative new concept could improve overall reserve readiness, help fill gaps in overseas naval presence, and provide a rapidly deployable carrier for use in crises or conflicts.

Affordability. Deferring construction of CVN-76 to FY 2000 could result in an affordability problem — a procurement bow wave — for carriers constructed in succeeding years. For example, at a 12-carrier force level, slipping CVN-76 construction to FY 2000 would require that four new nuclear carriers be funded during FY 2000-08 if conventional carriers were to be replaced as they reached the end of their service lives. The option of retiring *Nimitz* early in order to save funds over the FYDP period was eliminated at force levels of 11 or 12 carriers, because it, too, would have worsened the procurement bow-wave problem associated with carrier construction beyond FY 2000.

Carrier Useful Life Forgone. Conventional carriers are built to last approximately 30 years. Through the Service Life Extension Program, the useful life of these ships can be extended another 15 years. Because additional nuclear carriers are already funded and under construction, one of the implications of moving to a smaller force level is that conventional carriers would have to be retired several years prior to the end of their service lives in order to make way for the new carriers. The Bottom-Up Review compared the useful service life forgone of three conventional carriers — *Kitty Hawk* (CV-63), *Constellation* (CV-64), and *Kennedy* (CV-67) — for each of the force level and modernization options considered. Under all three force levels, building CVN-76 in FY 1995 would mean forgoing some useful life of these existing carriers.

Cost Analysis. Delaying funding for CVN-76 to FY 2000 (and deferring advance procurement funding for CVN-77) would save approximately $5 billion in aircraft carrier acquisition costs during the FYDP period. However, the delay would add about $2.1 billion to the total cost of CVN-76's construction, including the cost of reconstituting the shipbuilder's production facilities, retraining the work force, requalifying vendors, overhead escalation, and direct construction costs. The annual cost to procure, operate, and maintain a 10-carrier force, averaged out over 35 years, is approximately $3.6 billion. An 11-carrier force costs about 10 percent more, or $4 billion. A 12-carrier force costs about $4.2 billion to $4.3 billion.

Industrial Base Assessment. Also assessed was the aircraft carrier industrial base, focusing on both the shipbuilder and the firms that provide the nuclear reactor and other key nonnuclear components for the ships. Results of the submarine industrial base study, completed as part of the attack submarine portion of the

The aircraft carrier Abraham Lincoln and its battle group.

ies focused on the same shipbuilder and suppliers (or vendors) that manufacture nuclear propulsion systems.

It was concluded that delaying CVN-76 construction until FY 2000 would be a high risk for the shipbuilder. This is because existing contracts will be completed in the mid-1990s and a lack of subsequent orders would threaten the shipbuilder's viability by 1997 without additional work. This risk could be mitigated if certain actions were taken ahead of time. One option would be to do the necessary pre-shutdown planning to minimize the effort and cost that would be entailed in restarting carrier production — a "smart shutdown" of certain carrier construction capabilities. Another option would avoid a shutdown altogether by rescheduling delivery of carriers under contract, overhauls, and other work in order to help keep the facility open and functioning and to maintain essential construction capabilities.

Delaying CVN-76 construction would have less impact on the nuclear vendors, assuming that work proceeds in FY 1996 on components for a new nuclear attack submarine. The analysis indicated, however, that suppliers of nonnuclear and carrier-specific equipment could be affected by a delay in CVN-76 construction.

Consolidating Nuclear Aircraft Carrier and Submarine Construction

Currently, Newport News Shipbuilding Company, in Newport News, Virginia, builds both nuclear aircraft carriers and nuclear attack submarines. General Dynamics' Electric Boat Division in Groton, Connecticut, builds nuclear-powered ballistic missile and attack submarines. Because Newport News is technically capable of building nuclear carriers and submarines, the implications of consolidating construction of these ships at that facility were assessed.

Consolidating carrier and submarine construction at Newport News would save about $1.8 billion during the FYDP period. However, much of these savings are derived from not funding SSN-23, the third Seawolf submarine, which would provide a "bridge" in production to keep the Groton, Connecticut, shipyard viable and preserve the industrial base needed to produce a new attack submarine. Newport News would not need such a "bridge" submarine production contract, even if CVN-76 were delayed, if all future carrier and other submarine construction were consolidated there. This issue is discussed in more detail in the Attack Submarine section of this report.

The Decision

Construction of CVN-76. We have decided to proceed with construction of CVN-76 beginning in FY 1995. This decision preserves some flexibility on the ultimate size of the carrier force, protects the carrier industrial base, avoids the cost increase associated with delaying CVN-76's construction, and avoids a major carrier procurement bow wave beyond FY 1999.

Advance Procurement for CVN-77. We will defer long-lead funding for CVN-77 until after FY 1999, pending completion of a study evaluating alternative aircraft carrier concepts for the 21st century. This latter study will examine a full range of sea-based platforms to project air power and meet our military needs in the period 2020 and beyond. Platforms to be assessed will include Nimitz-sized carriers, both nuclear and conventionally-powered; smaller-sized carriers; larger-sized carriers; and "floating islands."

Consolidating Nuclear Aircraft Carrier and Submarine Construction. Because we remain concerned about the resulting loss of competition as well as other long-term defense industrial base and national security implications that would result from having only one provider for two key classes of naval vessels, we will not consolidate all carrier and submarine construction. However, we will continue to monitor this issue closely while examining other ways to balance industrial base considerations with reduced shipbuilding requirements.

Aircraft Carrier Force Structure and the Reserve Carrier. In order to reduce our overall force structure while still meeting our warfighting and

Aircraft Carrier Force Structure and the Reserve Carrier. In order to reduce our overall force structure while still meeting our warfighting and overseas presence needs, we will maintain a naval force structure organized around 11 active aircraft carriers, 10 Navy active air wings, and one composite Navy-Marine Corps reserve air wing. We also plan to establish a reserve/training carrier to provide Navy and Marine active and reserve pilots their initial and refresher carrier training, and for occasional forward operations to cover overseas presence requirements.

SECTION V: MODERNIZATION

ATTACK SUBMARINES

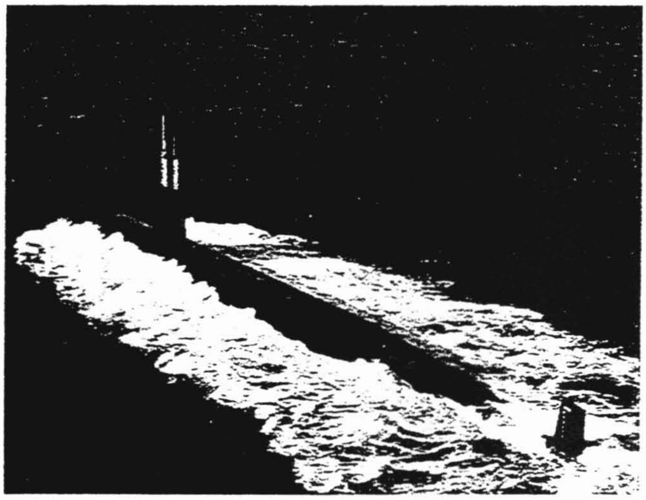
Nuclear-powered attack submarines are a valuable and flexible national asset — combining the elements of stealth, endurance, agility, and firepower on a single, multimission-capable platform. Attack submarines' stealth, combined with their advanced sensors and weaponry, means they can detect and attack adversaries or conduct land attacks with cruise missiles without first revealing their presence. Stealth also means covertness — attack submarines can routinely collect intelligence on enemy forces and movements without revealing that U.S. forces are present. Nuclear propulsion provides submarines with virtually unlimited endurance and the ability to operate at very high speeds for long periods of time. Finally, the diverse firepower of attack submarines gives them the ability to use not only traditional submarine weapons, such as torpedoes and mines, but also antiship and land-attack cruise missiles.

Attack submarine missions include regional sea denial, task force support, precision strikes, forward presence, surveillance, and special operations. Whether serving as key elements of joint task forces or naval battle groups, or deployed as independent units, attack submarines play an important role in U.S. defense operations.

Current Attack Submarine Force Levels and Programs

Today, the Navy has nearly 90 nuclear-powered attack submarines. These include two 594-class submarines, 31 Sturgeon-class (SSN-637) submarines, 39 Los Angeles-class (SSN-688) submarines, and 14 improved Los Angeles-class (SSN-688I) submarines. All of the 594- and 637-class boats will be decommissioned by FY 1999, as the Navy trims its force to approximately 55 attack submarines.

Currently, both Newport News Shipyard in Newport News, Virginia, and Electric Boat Shipyard in Groton, Connecticut, build nuclear-powered attack submarines. Nine improved Los Angeles-class submarines are under construction, three at Electric Boat Shipyard and six at Newport News. The Navy is also building two new Seawolf-class (SSN-21) attack submarines at General Dynamics' Electric Boat Shipyard. These two subs will be completed in 1996 and 1997, respectively.



The USS Alexandria, an improved version of the Los Angeles-class (SNN-688) attack submarine.

The Seawolf, originally slated as the replacement for Los Angeles-class submarines, was designed to counter increasingly more capable Soviet submarines. With the demise of the Soviet Union and the reduced threat of global war, Seawolf production has been sharply curtailed.

At the same time, the Navy has initiated development of a New Attack Submarine (NAS) — designed to be a more cost-effective replacement for the Los Angeles class. Under current plans, acquisition funding for the first NAS would be provided in the FY 1998 budget, with construction commencing in FY 1999.

The Threat

During the Cold War, attack submarines were critical to our ability to counter the Soviet navy, primarily the threat posed by Soviet attack submarines to our surface combatants and merchant ships, which were vital to our ability to reinforce Europe in the event of a NATO-Warsaw Pact conflict. Our attack submarine force was also our principal means of holding Soviet ballistic missile submarines at risk.

Since the end of the Cold War and the dissolution of the Soviet Union, the restructured Russian submarine force has dramatically reduced its operations at sea. However, Russia continues to construct and deploy modern, high-quality attack submarines with capabilities that approach, and in some cases exceed, our own. Russia has also begun exporting some of its modern submarines abroad, including most recently selling three Kilo-class diesel-powered submarines to Iran.

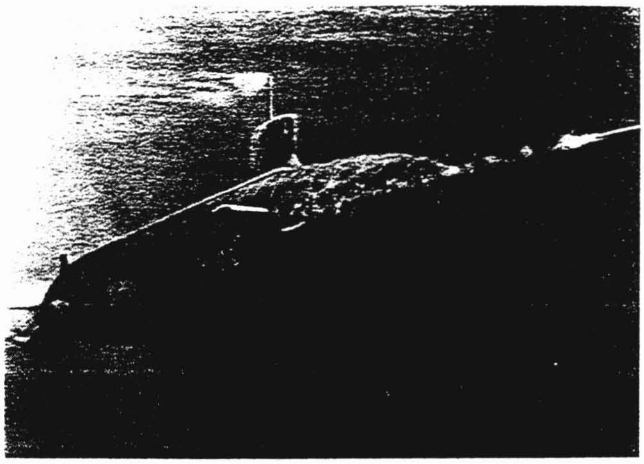
The Problem

The Bottom-Up Review addressed several issues with respect to the future size and shape of the U.S. attack submarine force.

First was the question of how many attack submarines are needed in the post-Cold War era. Ninety attack submarines are more than we need to fulfill the warfighting and overseas presence requirements of our new defense strategy. During the Bottom-Up Review, future requirements for both these missions were analyzed.

Second was the need to devise a cost-effective approach to modernizing the force as the overall number of attack submarines declines.

The third issue, linked to the first two, was the need to preserve our long-term ability to build attack submarines. This problem arises from the fact that the reduced requirement for new submarines as the force is drawn down has created a potential "gap" in new submarine construction that threatens the viability of the submarine production base. There will be a seven-year interval between the time the second Seawolf submarine was authorized (in 1991) and the start of construction of the first NAS, slated for 1998. Ongoing production to fill previous orders for SSN-688,



An artist's concept of the nuclear-powered attack submarine Seawolf (SSN-21)

SSN-21, and Trident submarines will be completed by 1997. When these submarines are completed, the Groton, Connecticut, shipyard will be without any additional submarine production work.

Force Level Options Examined

The elimination of the global threat formerly represented by the Soviet navy has created an opportunity to reduce the U.S. attack submarine force while reorienting it to reflect the new defense strategy and projected forward presence requirements.

Three different force levels were considered in the Bottom-Up Review. The options took into account the requirements of regional conflicts and presence operations, manpower and training needs, the present capabilities of U.S. attack submarines against foreign submarines, overhaul and refueling schedules, force age, and the attack submarine retirement profile. Detailed analyses of the options were performed by the Joint Staff with input from the Navy and OSD.

- **Option 1** would retain a force of 55 attack submarines. The analysis indicated that a force of this size could meet all wartime requirements for regional conflicts, as well as fulfill peacetime needs.

- **Option 2** would reduce the number of attack submarines to 45. This force also was found to be capable of fulfilling warfighting requirements, but it imposed a greater degree of risk to peacetime missions than the larger Option 1 force.

• **Option 3** would reduce the attack submarine force by the greatest margin — to a level of 30 submarines. The analysis concluded that a force of this size would be unable to meet either warfighting or peacetime operational requirements.

Industrial Base Considerations

Several options were considered as a means of avoiding the potential consequences of a gap in submarine construction. Two alternatives emerged as the leading candidates. The first took steps to effect a "smart" shutdown of nuclear submarine construction at Newport News, with an eye to preserving the capability to resume production in the future, when circumstances warrant. A "smart shutdown" approach makes more sense at Newport News, since much of its skilled work force would continue construction of nuclear aircraft carriers. Thus, in effect, this option would end submarine production at the Groton, Connecticut, shipyard. It would require approximately $625 million in shutdown/reconstitution-related costs.

The second option provided for construction of a "bridge" submarine to avoid the adverse consequences of attempting to shut down a nuclear-certified shipyard and then having to reopen it at a later date. This option was more expensive than the first, costing about $1.8 billion, but was judged to be the better industrial practice and had the added benefit of providing the nation with a third state-of-the-art Seawolf attack submarine at a cost of only $1.2 billion more than the first option, which provided no third Seawolf.[2]

The Decision

The Bottom-Up Review concluded that, in response to the changing threat environment, the Navy should reorient its submarine force to focus on regional conflicts and presence operations, keeping in mind the increasing capabilities of foreign, primarily Russian, submarines. Specifically, the review determined that:

• A force of 45 to 55 attack submarines is needed to meet the requirements of our defense strategy, including both regional conflicts and peacetime presence operations.

• Production of a third Seawolf attack submarine in FY 1995 or FY 1996, which will be directed to the Groton, Connecticut, shipyard, would "bridge" the projected gap in submarine production.

• The Navy should develop and build a new attack submarine as a more cost-effective follow-on to the Seawolf class, with construction beginning in FY 1998 or FY 1999 at the Groton, Connecticut, shipyard.

These last two decisions will maintain two nuclear-capable shipyards, thereby mitigating the risk to the industrial base.

[2] The $1.8 billion includes $1.5 billion in the FYDP period for the bridge submarine, as well as $300 million for smart shutdown/reconstitution–related costs. It does not include approximately $900 million in prior appropriations or sunk costs for SSN-23, which brings the total cost to $2.4 billion.

SECTION V: MODERNIZATION

SPACE LAUNCH

Satellites are an essential element of America's military capability, as well as its economic security. These systems provide vital support to our forces in such areas as intelligence-gathering, surveillance, missile warning, communications, weather monitoring, and navigation. A robust space launch capability is integral to our ability to operate in space because it provides the means to place satellites into orbit.

Requirements for space launch are of two types: (1) performance — the ability to deliver a satellite (payload) reliably to a specific orbit, and (2) operational flexibility — the capability to perform rapid and adaptive payload integration, servicing, substitution, and launch. Today's launch systems meet the performance objective, albeit with less than desired reliability, but fall short of the operational flexibility goal.

The Bottom-Up Review evaluated the current and projected status of DoD's space launch capabilities, along with various options for future investments in launch vehicles and infrastructure. The review included an examination of U.S. military, civil, and commercial space launch needs; the international competitiveness of the U.S. commercial space launch industry; and the effect of various modernization options on the industrial base.

The Problem

As indicated in Figure 11, DoD maintains a fleet of expendable launch vehicles (ELVs) and also uses the space shuttle to place military satellites in orbit. The National Aeronautics and Space Administration (NASA) uses the shuttle as its primary launch vehicle, but also employs both DoD ELVs and commercial variants of these vehicles.

As a result of a 1970s decision to fly all DoD spacecraft on the NASA shuttle, DoD investments in space launch infrastructure and vehicle improvements virtually halted. Expenditures in this area remained relatively dormant until 1986, when the Challenger accident revealed the consequences of such an "all eggs in one basket" approach. Since then, DoD has gradually lessened its reliance on the shuttle to launch defense payloads, while increasing its investments in maintaining and improving the outdated ELV fleet and aging launch infrastructure.

Currently, the main types of launch systems used by DoD are the Delta II (manufactured by McDonnell Douglas), the Atlas I and II (produced by General Dynamics), and the Titan II and IV (made by Martin Marietta). Over the next several decades, launch rates in support of military satellite requirements are expected to be fairly stable at 15-20 per year, spread among the existing Delta, Atlas, and Titan boosters. While we are currently able to place all military satellites into their required orbits with this fleet, maintaining this capability over the long term will require significant investments in both the existing vehicles and the associated launch infrastructure.

Today, U.S. military space launch capabilities are characterized by high cost and serious operational limitations as a result of (1) the need to sustain three separate launch teams (for the three booster types) and associated support equipment, (2) the aging and obsolescence of major ELV components, and (3) continued dependence on outdated launch vehicle production lines and manpower-intensive launch processes. As a result, the performance and flexibility of launch operations is inadequate and system responsiveness in crises or emergencies is limited. For example, the current launch systems do not provide any overlap in performance — individual satellites are tied to specific space launch systems. Thus, Global Positioning System (GPS) satellites must be launched on Delta boosters, Defense Satellite Communications System (DSCS) satellites on Atlas boosters, and Defense Support Program (DSP) satellites on Titan boosters.

Primary U.S. Space Launch Vehicles

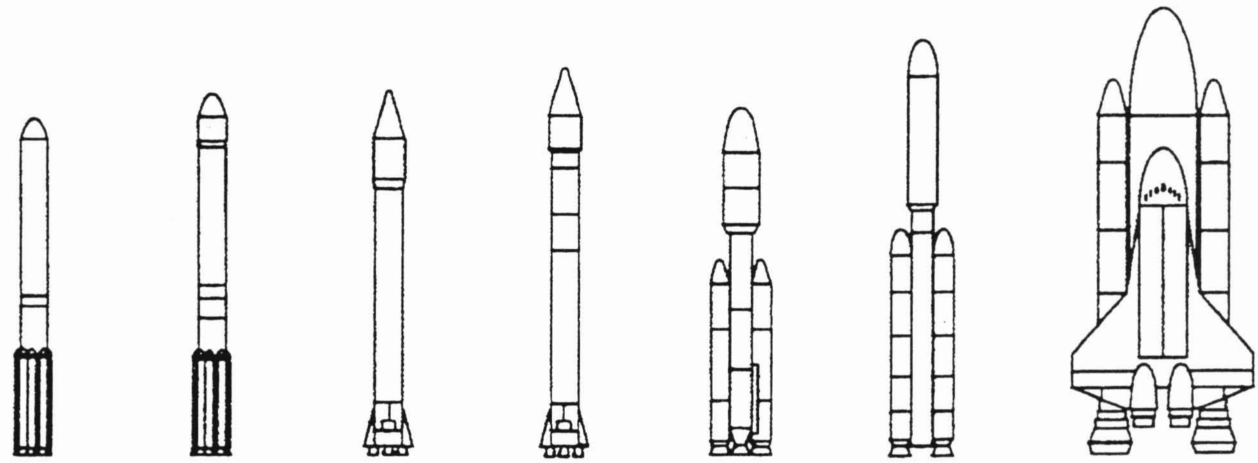


Figure 11

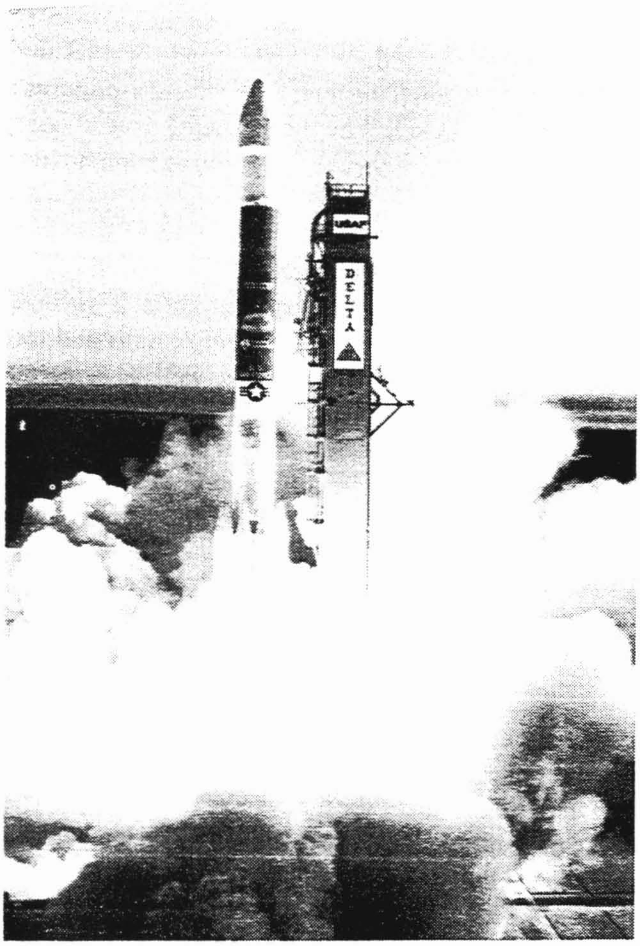
Another problem is the current production overcapacity in the American space launch industry. Because booster production is spread among three manufacturers, the industry is operating at less than 50 percent capacity, raising the unit cost of each booster. To date, there has been little effort to consolidate or reduce capacity, based on current and projected space-launch requirements. As DoD's demand for satellites continues to shrink, the ability to sustain three separate launch suppliers over the long term is in doubt.

Finally, there is the issue of foreign competitors, which have begun to offer reliable and low-cost space launch systems. The U.S. civil and commercial sectors average about 25-30 satellite launches per year — enough, along with the DoD launches, to sustain the three U.S. manufacturers. However, about half of the commercial satellites and some of NASA's satellites now use foreign launch systems. There is also a growing market for commercial space launches outside the United States. If U.S. space launch systems cannot compete better in both the domestic and international markets, the U.S. share of these markets will continue to decline. DoD will account for a larger share of the demand for U.S. launch systems, and consequently, DoD's own space launch costs will increase. If this should occur, DoD's current policy of "launch only on U.S. boosters" would become increasingly expensive.

Options Examined

To address these concerns, the Bottom-Up Review examined three different options for modernizing DoD's space launch capability: (1) extending the life of the current launch vehicle fleet to the year 2030; (2) developing a new family of expendable space launch vehicles to replace the current fleet starting in 2004; and (3) pursuing a technology-focused effort to develop a reusable launch vehicle that would effectively "leapfrog" the next generation of ELVs. In addition, more austere versions of Options 1 and 2 were developed that funded only "must do" improvements for the space launch and range infrastructure.

Option 1: Life-Extension Program for Current Systems. This option retains the three existing major launch systems (Delta, Atlas, and Titan IV) through the year 2030. It includes both robust (Option 1) and austere (Option 1A) variants for upgrading the space launch and range infrastructure, completing



Delta II launch from Cape Canaveral.

necessary maintenance and flexibility improvements, and funding cost-effective launch vehicle flexibility upgrades.

Option 2: New Launch System Development. This option replaces the current ELV fleet with a new family of "space lifter" launch vehicles. It also provides for current vehicle and infrastructure upgrades prior to and during a period of transition, from 2004 through 2013. Robust (Option 2) and austere (Option 2A) upgrade options are included.

Option 3: "Leapfrog" Technology Launch Systems. This option funds the development of an advanced reusable launch system and provides for current vehicle and infrastructure upgrades prior to and during a transition period that starts in 2010, leading up to the introduction of the new launch system.

Evaluation of Options

Option 1 makes investments in launch vehicles and infrastructure. It meets all launch-vehicle performance needs. All upgrades are considered to be cost-effective, and are identified in four priority categories. The robust version of this option includes upgrades in all categories; Option 1A, the austere version, includes only the most necessary enhancements. However, even the more ambitious upgrades to current launch systems fail to satisfy the flexibility requirement or meet improved reliability goals. Consequently, this option offers little potential for reducing the high operating costs of the current systems, since we would still be maintaining three independent launch teams, with the associated inefficiencies, due to overcapacity in the industrial base. This option would have little impact on anticipated U.S. payload development efforts. It appears to be the least expensive option, over the FYDP period, of those examined.

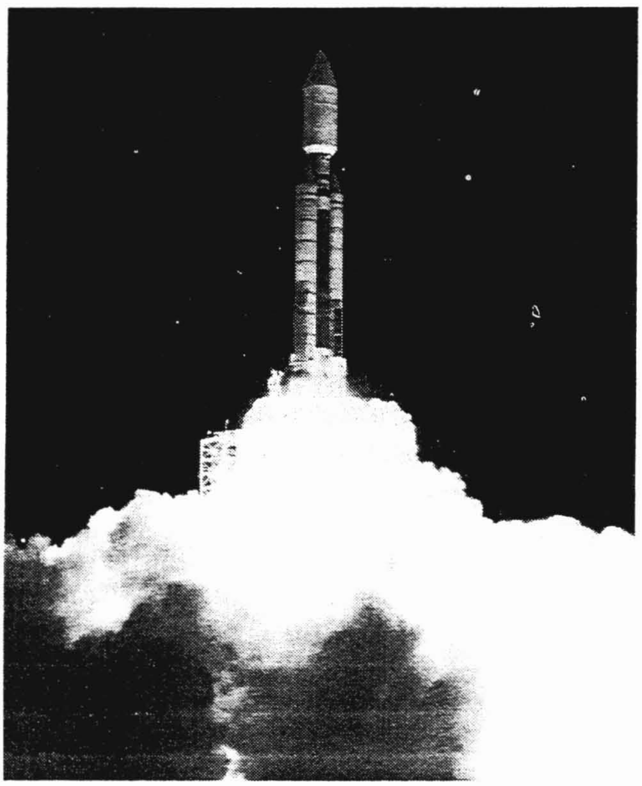
Option 1 also offers little opportunity for cooperative activities with NASA; it offers minimal assistance to the U.S. launch vehicle industry to support commercial competitiveness; and it results in U.S. systems that could be more costly and less reliable than certain foreign alternatives for the foreseeable future.

Option 2 also satisfies launch needs for current and projected U.S. military payloads. The design for this new generation of systems offers the potential for major improvements in both reliability and operational responsiveness, as well as significant reductions in operating costs. Significant investments in research and development would be required both during and beyond the FYDP years. The amount of these investments would depend on the particular design selected; since the new space lifter is still in the concept development phase, it is difficult to determine with accuracy its projected cost.

Because of the time needed to develop a new space lifter and integrate it with the variety of satellites it would carry, there would be a relatively long transition period, from 2004 to 2013, during which space payloads would continue to be launched by current systems. Thus, in addition to the investment in the new space lifter, this option requires the same launch vehicle and infrastructure upgrades to existing systems as Option 1. An austere option, Option 2A, includes only the most necessary upgrades.

This option would be particularly effective in reordering the industrial base and reducing significantly the production and operating inefficiencies of current systems. There would also be greater opportunity for technical and fiscal cooperation with NASA in the development, production, and operations phases. Moreover, this option would improve the international competitiveness of the U.S. commercial launch industry.

Option 2 also offers the opportunity to expand cooperative efforts with Russia on commercial uses of space by introducing Russian technology into vehicle development and launch processing. The use of Russian technology, especially advanced liquid rocket engines, could also reduce the development time and cost of a new launch system. However, a principal policy concern is whether the United States should consider relying on a non-U.S. system to launch military satellites.



Titan IV launch from Cape Canaveral, Florida, carrying DoD satellite into orbit.

Although difficult to measure, this option offers the potential for reduced long-term costs if savings from higher reliability (less frequent failures and the associated cost of stand-down) as well as benefits (lower unit and operations costs) for the civil and commercial launch sectors are taken into account. Nevertheless, preliminary analyses indicate that it could be several decades before this "payback" in savings would be realized.

Option 3 was the most difficult to quantify, because of the large uncertainties inherent in the cost estimates, the high technical risk of some of the launch systems, and the breadth of the technologies that require significant investments within and beyond the FYDP period. During the analysis of this option, some of the new approaches were found to entail less technical risk and thus could be considered as variants within Option 2. Because Option 2 would have a concept development phase that considered all possible alternatives – including expendable, partially reusable, and fully reusable launch vehicles – it was determined that the concept phase would result in a better understanding of the technical and cost risks associated with those concepts.

Option 3 provides the long-term potential for the lowest operating and maintenance costs, primarily because of reusability. It would also offer the greatest change to the industrial base, because of the significant differences associated with producing a small number of advanced launch vehicles (4-6) and the operations of a reusable system. There would also be a significant opportunity for cooperation with NASA in developing the technologies, since most would be applicable to both manned and unmanned systems. Nevertheless, the near- and mid-term costs of developing and producing these advanced launchers would be very high.

Because of the need to structure a technology readiness program that would last through the end of the decade, and given the fact that development of such a vehicle would extend well into the first decade of the 21st century, we would need to maintain the current fleet much longer (until the year 2015). This would result in significant investment costs at a time when development expenditures for the new system would be at their highest. For these reasons and because there are concepts that have less technical risk, this option was not considered to be viable, especially given current and projected budget constraints.

The Decision

After reviewing the alternatives, we selected the austere life-extension option (1A). This option adequately fulfills DoD's projected space launch needs at the lowest cost over the next decade. It includes the improvements needed in our space launch infrastructure. It also retains the option for incremental improvements to the current launch fleet to support future needs. Although a new launcher development effort would have permitted us to attain our desired goals for operational flexibility and reliability, and would have contributed toward improved competitiveness of the U.S. commercial space launch industry, those benefits did not outweigh the near-term costs of such an approach.

SECTION V: MODERNIZATION

MILITARY SATELLITE COMMUNICATIONS

There are four segments to the military satellite communications (MILSATCOM) architecture. First, ultrahigh frequency (UHF) satellites are the workhorses for tactical ground, sea, and air forces. Second, the superhigh frequency (SHF) Defense Satellite Communications System (DSCS), first deployed in the 1970s, supports long-distance communications requirements of military forces that cannot be met by ground-based communications systems. The DSCS system satisfies the majority of DoD's medium- and high-data-rate communications requirements. Milstar will soon be integrated as the third segment of the MILSATCOM architecture. It will provide a worldwide, secure, jam-resistant communications capability to U.S. civilian and military leaders for command and control of military forces. The fourth segment consists of commercial communications satellites, which are used to support DoD's MILSATCOM capabilities where jamming protection is not required.

The Bottom-Up Review evaluated MILSATCOM program alternatives in light of the projected threat, operational requirements, cost and effectiveness trade-offs, and affordability. The primary emphasis was on providing low-data-rate (LDR) and medium-data-rate (MDR) communication capabilities for U.S. tactical forces employed in one or more major regional conflicts, although the review also addressed requirements for strategic forces.

While all current MILSATCOM programs were reviewed, the focus was on identifying and evaluating lower-cost alternatives to Milstar. Milstar is a joint-service program to develop and acquire satellites, mission control elements, and new or modified terminals to support extremely high frequency (EHF) communications. The Milstar system would directly support the National Command Authorities (NCA) and the tactical and strategic forces of the unified and specified commanders-in-chief (CINCs) during all levels of conflict.

The Problem

The original Milstar program, initiated in the early 1980s, was designed to provide LDR communications for strategic and tactical military forces, primarily during a nuclear conflict. The highest-priority users were expected to be strategic and nonstrategic nuclear forces, with tactical naval, ground, and air forces having a lower priority. The original design included many special features intended to allow the system to survive and operate during a nuclear conflict.

Because of the greatly reduced threat of nuclear war in the post-Cold War era, Congress directed DoD in the fall of 1990 to restructure the Milstar program (now designated Milstar II) to emphasize its utility for tactical military forces and to reduce system costs. The system's survivability and endurability features and constellation size also were reduced.

Nevertheless, during preparation of the FY 1994 defense budget, the issues of Milstar affordability and alternative satellite designs were raised again. The Bottom-Up Review thus undertook a comprehensive evaluation aimed at determining the costs and effects on military capabilities of the Milstar program and alternatives to it.

Current Program

The current Milstar program would launch the first two Milstar satellites (Milstar I, LDR-only) in FY 1994 and FY 1995, respectively, and would develop an MDR payload for the first Milstar II satellite, scheduled for launch in FY 1999. The current program also includes funding for an as-yet-undefined "polar adjunct" to Milstar and would continue preparations for a Defense Acquisition Board program review of that adjunct. A complete constellation of LDR and MDR satellites would be achieved with the launch of the fourth Milstar II satellite. Replenishment of the four-satellite Milstar II constellation would occur between FY 2006 and FY 2009, with the exact launch dates to be determined by actual satellite longevity. Ultimately, nine Milstar II satellites would be bought through FY 2011, including a spare satellite planned for delivery in FY 2003. Total expenditures for the Milstar program during FY 1994-99 would be almost $12 billion, including satellites and terminals.

Options Examined

As indicated in Figure 12, all alternatives to the current program would deploy advanced EHF satellites, and would therefore provide significantly more capability than we have today. All options would also launch the original two Milstar I satellites and eventually transition to Advanced EHF satellites that would be developed in the mid-to-late 1990s. The successor system would maintain as much LDR and MDR capability as possible while reducing satellite weight, which should help to reduce costs. The alternatives to the current program differ as to when the initial Advanced EHF satellite would be launched and, consequently, the MILSATCOM capabilities that would be provided in the meantime.

Option 1 (Milstar II/Advanced EHF) would retain four Milstar II satellites, with a first launch in FY 1999 (as in the current program), but it would eliminate the fifth Milstar II satellite (planned for delivery as a spare satellite in FY 2003) as well as subsequent Milstar II satellites. Full operational capability for LDR and MDR would be achieved on the same schedule as under the current program. Under this option, Advanced EHF satellites would be developed using advanced technology, to provide LDR and MDR capabilities comparable to those of Milstar II. Advanced EHF satellites would begin replenishing Milstar satellites around FY 2006.

Option 2 (MDR-Only/Advanced EHF) would cancel Milstar II and replace the four Milstar II satellites with satellites providing an MDR capability, but eliminating the LDR capability. The first MDR-only satellite would be launched in FY 2000, with a four-satellite constellation on orbit in FY 2003. This option would also develop Advanced EHF satellites with both MDR and LDR capability. The first of those satellites would be launched in about FY 2007.

Option 3 (Advanced EHF Only) would also cancel Milstar II, but it would replace that system with

MILSATCOM Launch Schedule

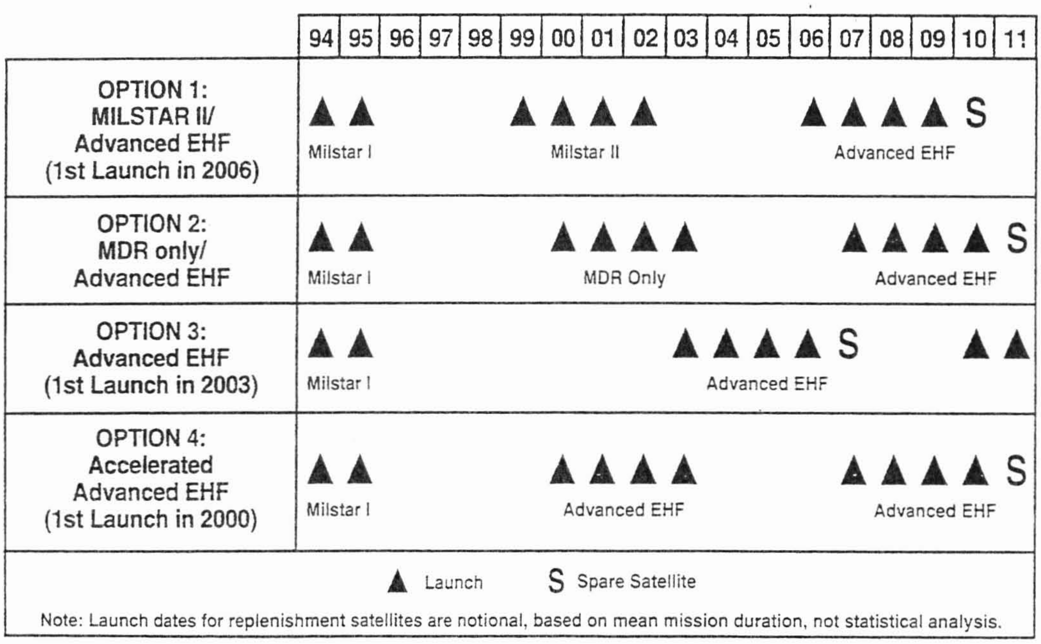


Figure 12

Advanced EHF satellites having both MDR and LDR capabilities. The first Advanced EHF satellite would be launched in FY 2003, with a four-satellite constellation in place in FY 2006.

Option 4 (Accelerated Advanced EHF) is similar to Option 3, except that it accelerates development of the Advanced EHF satellite, achieving a first launch in FY 2000 and a four-satellite constellation in FY 2003. This alternative would, if necessary, trade capability for weight on the initial satellites to maintain an FY 2000 launch date. Subsequent satellites could incorporate performance improvements, if needed.

Evaluation of Options

Two factors guided decisionmaking on Milstar alternatives. First, the military requirement for a jam-resistant advanced EHF communications system providing capability equivalent to Milstar II was reaffirmed early in the process. Second, while future national security requirements guided the evaluation of program alternatives, another important objective was to identify options that offered substantial cost savings relative to the current Milstar program.

An outside Technical Support Group was established to review the options and assess the level of risk, as well as to develop and evaluate additional Milstar alternatives. The Technical Support Group concluded that the most effective way to provide the desired communications capability in a cost-constrained environment would be with the new-design Advanced EHF satellites, deployed in geostationary orbits and providing both LDR and MDR capability.

The primary reason for considering options to the current Milstar program was to reduce system cost. Milstar II satellites would weigh approximately 10,000 pounds and, consequently, would have to be launched on Titan IV rockets — an expensive launching mode. The Technical Support Group recommended that DoD take advantage of recent technological advances to build substantially lighter satellites that could nevertheless provide performance comparable to Milstar II. The group concluded that a reasonable objective would be to transition to a lighter, advanced EHF satellite that could be boosted into orbit by a medium-launch vehicle (MLV). This would limit costs, which have historically been related to satellite weight.

The consensus of the Technical Support Group was that an Advanced EHF satellite that could be launched from an MLV could be available by 2003. However, the four-year delay between the scheduled launch of the first Milstar II satellite and the postulated launch of the first Advanced EHF satellite was a concern. Consequently, the Technical Support Group considered what capabilities could be provided on an Advanced EHF satellite if the first launch was accelerated to 2000.

The Technical Support Group did not reach a consensus on whether such an accelerated deployment of Advanced EHF satellites was possible. It identified as a major risk the lack of maturity in the packaging for microwave and digital electronics. A first launch in 2000 would be possible, according to some of the group members, using technology already developed or currently under development. Other members of the group concluded that there would be major risks associated with the concurrent technology demonstration, satellite design, and streamlined test program inherent in Option 4.

Cost Comparison

Total space segment costs (including launch costs) in FY 1994-2011 for the alternatives considered in the review ranged from \$6.1 billion for the least costly option (Option 3) to \$13.9 billion for the current program. Cost estimates for Option 4 varied from \$7.2 billion to \$11.3 billion, depending upon assumptions about risk of payload weight growth or schedule slippage.

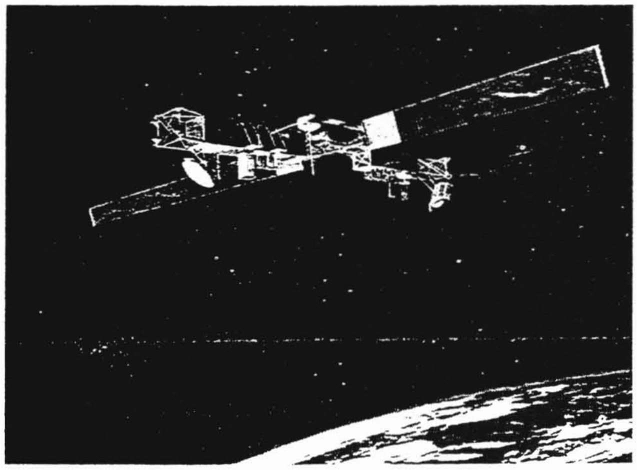
Option 1 has essentially the same FY 1994-99 costs as the current program because it retains the first four Milstar II satellites, although it does achieve about \$300 million in cost savings by canceling the Milstar II spare satellite. Further cost savings are achieved beyond the FYDP period by transitioning to the lower-cost Advanced EHF satellite. FYDP savings of the other three options come predominantly from canceling the Milstar II program immediately and deferring MDR capability.

There are also differences in launch costs among the options, driven primarily by the differences in costs of the launch vehicles for the Milstar II satellites (Titan IV) and Advanced EHF satellites (Atlas IIAS). The Titan IV costs approximately $285 million per launch and the Atlas IIAS about $115 million.

Effectiveness Comparison

All of the alternatives to the current program would eventually provide sufficient LDR and MDR capability, although each has some shortfalls compared to the current program. The LDR shortfall is most severe in Option 2 because that option provides no substantial LDR capability until Advanced EHF satellites are launched beginning in 2007. Option 3, which provides for initial operations of Advanced EHF satellites in FY 2003, would delay initial MDR service by four years relative to the current program. Options 2 and 4 would delay MDR service by one year.

The Joint Staff assessed each option's ability to fulfill military requirements for EHF communications. It concluded that, while the concept of an advanced EHF follow-on to Milstar II is acceptable, the system should be designed to meet military requirements, not cost or weight limits. Options 2 and 3 were judged unacceptable because their schedules provide capabilities much later than does the current program or Option 1. The technical, cost, and schedule risks of Option 4 were considered to be too high. The Joint Staff also concluded that the LDR capability provided by Advanced EHF satellites would be reduced relative to Milstar II because these satellites would provide fewer antennas than Milstar II.



Milstar

In summary, the options differ in cost, capability, risk, and schedule. Those options that do not contain Milstar II satellites trade costs for capability and/or schedule. As cost savings increase, risk increases and deployment of EHF capability is delayed.

The options containing four Milstar IIs were determined to be most preferable because a constellation of that size would meet military requirements and provide the most operational capability at the earliest date. Option 3 was considered unacceptable because it would delay LDR and MDR capability by four years. Option 4 would provide capability sooner, but its schedule was considered high risk.

The Decision

After reviewing the alternatives, we decided to proceed with Option 1, deploying both Milstar I and the initial constellation of Milstar II satellites, then transitioning to a lower-cost, lower-weight Advanced EHF satellite that would be launched initially by FY 2006. We believe that this represents the best means of achieving a needed military communications capability in the near term while potentially reducing the long-term costs associated with sustaining this capability.

SECTION V: MODERNIZATION

V-22 OSPREY TILT-ROTOR AIRCRAFT

In 1981, the V-22 program was initiated as a joint-service effort to develop a tilt-rotor aircraft incorporating advanced avionics and composite technologies. Such a system would offer significant improvements over existing and projected helicopter capabilities. As originally envisioned, the V-22 Osprey aircraft was to be produced in various versions for use in a range of military missions. Initially led by the Army, the V-22 program was transferred to the Navy in 1982, when the Army withdrew because of concerns about the system's affordability. One of the principal intended users of the V-22 was to be the Marine Corps, which has an acute need to replace the CH-46 and CH-53 helicopters that fulfill its medium-lift requirement — that is, transporting personnel, supplies, and equipment ashore during amphibious assaults. The V-22 was intended to satisfy certain Navy, Air Force, and special operations force (SOF) needs as well.

V-22 Osprey.

In 1989, the V-22 program was terminated by the Bush Administration, and then-Secretary of Defense Cheney directed the Navy to develop an alternative aircraft. In response, the Navy established and funded a program to investigate an alternative, called the Medium Lift Replacement (MLR). However, Congress consistently voted to fund continued V-22 development and refused to provide funding for the MLR program.

In July 1992, DoD and Congress worked out a compromise that added funding to the defense budget for demonstrations of both V-22 technology and other medium-lift helicopter technology, leaving for future years the decision on which technology would best meet DoD's medium-lift needs. Over the succeeding years, development of the V-22 at a limited funding level proceeded and study of an alternative MLR helicopter was begun.

The Problem

While the Congress and the Bush Administration dueled over the merits of the V-22, the Marine Corps' need for a medium-lift replacement aircraft grew. Its inventory of CH-46s and CH-53As and Ds continued to age and decline through attrition, resulting in a fleet that cannot currently meet Marine Corps requirements. Moreover, while the compromise on V-22 worked out between the Congress and the Bush Administration kept the V-22 program alive, the Bush 1994-99 FYDP did not fund V-22 development at a level sufficient to allow the system to proceed toward production.

Status of the V-22 Program

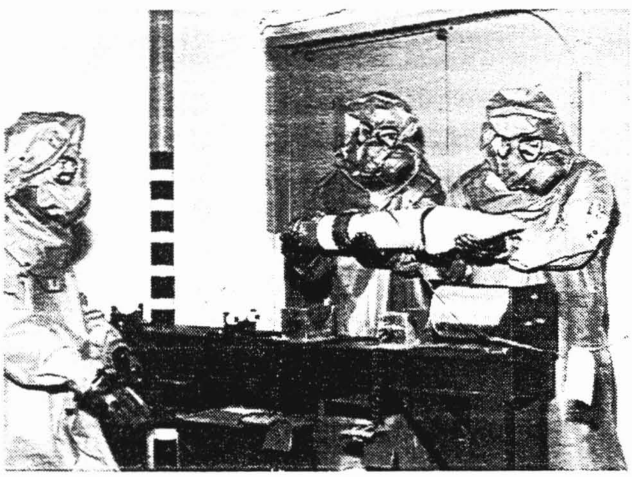
No task force was established under the Bottom-Up Review to examine the V-22 program because the program is being reviewed under the auspices of the Defense Acquisition Board (DAB). On June 30, a committee within the DAB reported to the Under Secretary of Defense for Acquisition on the status of its V-22 review, taking into consideration applications of the V-22 for both the Marine Corps and special operations forces, and the status of the alternative MLR program.

The purpose of this review was to: (1) decide on a path for defining the right program to meet relevant requirements for the Marine Corps and SOF; (2) review the status of the V-22 and MLR programs, including the technical objectives, milestones, funding, contract structure, and technical and cost risks entailed; and (3) provide guidelines to support a future decision on the requirements, structure, and funding of the two programs. The review also examined potential commercial applications of tilt-rotor technology. The range of V-22 options examined over the past several months covered various funding and procurement profiles for SOF and the Marine Corps.

In June, the DAB concluded that a focused effort should be undertaken over the next few months to define the acquisition options more precisely. There will be a series of reports and progress reviews, all coordinated by the Under Secretary of Defense for Acquisition, leading to a program decision in the fall of 1993. We expect that these efforts will provide a range of V-22 options and MLR helicopter alternatives to guide the Department in choosing the right option to fulfill SOF air transport and Marine Corps medium-lift requirements in a cost-effective and affordable manner.

The United States has made political commitments to provide approximately $420 million in Nunn-Lugar assistance to Russia, at least $175 million to Ukraine, and up to $75 million to Belarus. To date, the Department of Defense has notified Congress of proposed obligations totaling $488.5 million for specific Nunn-Lugar projects for which the necessary agreements are signed or awaiting signature or parliamentary ratification. If ongoing discussions with the eligible states prove successful, additional implementing agreements could be signed in the next few months that would absorb nearly all of the remaining $311.5 million.

The Cooperative Threat Reduction initiative for the FY 1994-99 period retains key elements of the existing "Nunn-Lugar" legislation — in particular, its emphasis on the safe and secure transportation, storage, and elimination of nuclear weapons and on nonproliferation — and targets some new areas for additional assistance as well:



Workers disassembling chemical munitions.

• Destroying weapons of mass destruction in the FSU and removing all nuclear weapons from Ukraine, Belarus, and Kazakhstan, including dismantling strategic nuclear delivery vehicles to comply with the START I and II treaties and destroying chemical weapons.

• Constructing a safe, secure, and environmentally sound storage facility for fissile material from dismantled nuclear weapons in Russia.

• Preventing the proliferation of weapons of mass destruction, their components, related technology, and expertise within and beyond FSU borders, including the establishment of effective export-control systems, fissile material control and accountability systems, physical protection systems and, possibly, additional resources for the science and technology centers being established in Moscow and Kiev.

• Advancing the complex and costly effort to achieve the environmentally safe elimination of the chemical weapons arsenal in Russia.

• Other projects to keep the process of denuclearization and demilitarization on track in the FSU, including environmental restoration of former strategic offensive arms bases, defense conversion, retraining and housing of former military officers, and expanded military and defense contacts.

To implement this initiative, a separate Cooperative Threat Reduction line-item account is being proposed with an additional $400 million in DoD funding for FY 1994, to remain available until expended.

The United States cannot and should not bear the entire threat reduction bill for these four newly independent states, and we will continue to insist that they do their part. We are also pressing key European allies and Japan to increase their helpful, but relatively modest, assistance to the FSU in this area.

This initiative will require a significant effort by the Administration, Congress, and ultimately the American people. But it is essential to U.S. and international security in the post-Cold War era. This is not "foreign assistance" as traditionally defined. Rather, it is a unique and relatively small investment in U.S. national security from which we stand to reap great benefits, including savings in defense programs that might otherwise be necessary to deter or defend against FSU weapons of mass destruction in the future.

Counterproliferation

More than 25 nations either have or are attempting to acquire weapons of mass destruction — nuclear, biological, or chemical. In most areas where U.S. forces could potentially be engaged, our likely adversaries already possess chemical and biological weapons. Most of these states are striving to acquire nuclear arsenals as well.

Several new realities are contributing to the spread of WMD and related technology. First, alternative suppliers of WMD technologies and delivery systems are emerging, with countries such as North Korea offering to sell technologies and missiles with little regard for the ambitions of recipient states. In addition, the indigenous capabilities of countries of concern are improving. There is also the new danger of nuclear, biological, and chemical weapons, materials, equipment, and knowledge leaking from the former Soviet Union. Further, the challenges associated with controlling dual-use technologies have grown.

In the hands of a hostile regional power, weapons of mass destruction could threaten not only U.S. lives but also the viability of our regional power projection strategy. For example, if a state opposed to U.S. interests were to acquire nuclear weapons, it could use them in a conflict or crisis in any number of ways, from threatening to attack a neighboring state in an effort to dissuade it from requesting U.S. assistance to threatening American and allied forces or cities in an effort to deter U.S. intervention altogether. Furthermore, the unpredictable nature of some Third World regimes, coupled with the fact that potential adversaries may have more at stake in a regional conflict than the United States, means that the United States' ability to deter such actions may at best be uncertain.

In these circumstances, our nation not only must seek to prevent the spread of weapons of mass destruction, but it must be prepared to respond to the military threat posed by these weapons should nonproliferation efforts fail. We are not resigned to the failure of nonproliferation regimes; rather, confronted with the possibility of even limited failure, we must ensure that our forces have the capabilities they would need to confront an opponent armed with weapons of mass destruction in a future crisis or conflict. The counterproliferation initiative is designed to develop a coherent strategy to prevent additional countries from acquiring WMD and, should such efforts fail, to deter these weapons' use against the United States and its allies, to defend against them if they are used, and to ensure that U.S. armed forces can successfully carry out operations in a conflict involving the use of nuclear, chemical, or biological weapons.

Toward that end, we are assessing the military capabilities needed and correcting any deficiencies that may exist. Our assessment will cover the following broad areas:

- Intelligence
- Battlefield detection
- Passive defenses
- Active defenses
- Counterforce capabilities
- Inspection and verification support
- Export control support

DoD's counterproliferation approach, which is designed to complement and strengthen the traditional nonproliferation efforts of other U.S. government agencies, will be implemented in three parts. First, we will strive to foster an international environment that discourages the proliferation of weapons of mass destruction and to strengthen export controls and related arms control arrangements. Second, in our forces and programs, we will determine the specific capabilities needed to counter proliferation, identify existing DoD efforts that contribute to these capabilities, specify remaining deficiencies vis-a-vis threats from weapons of mass destruction, and devise programmatic options to address those deficiencies. Finally, in our tactics and contingency plans, we will seek to improve our ability to deter the use of nuclear, chemical, and biological weapons, to develop doctrine and tactics for dealing with them, and to incorporate WMD threats into our planning.

This initiative will be a multifaceted, multiyear effort involving numerous and diverse components of DoD. Not all of these activities are captured in the $40.5 million requested for counterproliferation in FY 1994.

Countering proliferation is central to addressing both nuclear and regional dangers in the post-Cold War world. Strengthening the U.S. military's capabilities for meeting the threat of the proliferation of weapons of mass destruction is one of the Department's most important responsibilities in the new security environment.

FSU Defense/Military Partnership

The post-Cold War trend toward democracy and liberal reform only bolsters the security of the United States. Not only are Western values ascendant, but prospects for the peaceful resolution of disputes improve as democracy spreads, and the potential for global prosperity increases as more countries adopt market reforms.

But these trends are not irreversible. In most former communist countries, democratic institutions are not yet firmly in place, and market reforms have yet to produce tangible improvements in the standard of living. The reversal of these trends could have a profound impact on U.S. security and on U.S. defense requirements. Nowhere is this more true than in the former Soviet Union.

The FSU Defense/Military Partnership initiative seeks both to lessen the likelihood of the failure of reform and to hedge against it. Its primary objective is to develop a solid partnership between the defense establishments of the United States and the former Soviet Union in an effort to encourage support for reform, develop FSU militaries responsible to democratically elected officials, encourage U.S.-FSU defense cooperation in areas ranging from regional conflicts to counterproliferation, and convince an expanding circle of officers and officials that the United States seeks a real partnership. Particular attention will be paid to Russia, Ukraine, Kazakhstan, and Belarus — the four FSU states with nuclear weapons still maintained on their soil. Enhancing our military cooperation with these states and building partnerships with them will be crucial in facing the dangers of the post-Cold War era.

Russian Federation Minister of Defense Grachev and Secretary Aspin signing memorandum of understanding on defense contacts.

This initiative has three main components:

- ***Expanded defense and military contacts***, moving beyond a series of single contacts to programs that foster ongoing relationships between individual U.S. and FSU military/defense leaders or provide concrete technical assistance.

- ***Enhanced military cooperation***, expanding on unit exchanges, sister base/unit programs, and ship visits, and developing the capability for combined peacekeeping, humanitarian assistance, and other noncombat operations.

- ***Support for transition and reform***, focusing on concrete measures to address pressing social concerns affecting the military, such as military housing shortages, inadequate medical care, and environmental degradation at military sites.

FY 1994 funding for this initiative comes from the Cooperative Threat Reduction line item.

Global Cooperative Initiatives

The Global Cooperative Initiatives seek to improve our ability to respond to new regional dangers while positioning us to capitalize on a number of post-Cold War opportunities. They do not, however, prejudge when or how we should respond to a given situation. Rather, they seek to enable DoD, in cooperation with other U.S. government agencies, to prepare the ground for a more effective U.S. response if and when such a response is deemed appropriate and necessary by the President and the Congress.

More specifically, these initiatives seek to enhance DoD planning and capabilities for peacekeeping and peace enforcement operations, humanitarian assistance measures, disaster and famine relief activities, and the promotion of democracy. As such, they are only one part of what must be a national, multi-agency effort in these areas.

Peacekeeping and Peace Enforcement Operations

Traditionally, ***peacekeeping*** — military operations, undertaken with the consent of all major belligerents, that are designed to monitor and facilitate implementation of an existing truce agreement in support of diplomatic efforts to reach a political settlement to a dispute — and ***peace enforcement*** — military intervention to compel compliance with international sanctions or resolutions designed to maintain or restore international peace and security — have been seen as secondary missions for the U.S. military. They have been lesser-included cases of more demanding missions, such as fighting and winning major regional conflicts. Accordingly, planning for these missions has often been undertaken on an ad hoc basis, and funding has generally been drawn from operations and maintenance accounts as needed. As a result, these operations have often been funded at the expense of readiness, pending subsequent reprogramming or supplemental funding. Keeping our forces ready to fight requires that we do business differently in the future.

As peacekeeping and peace enforcement gain new prominence among U.S. military missions in the post-Cold War era, DoD will earmark funds for these missions to help other countries and the United Nations strengthen their peacekeeping and peace enforcement capabilities, and in so doing reduce the demand for U.S. forces. Investments in this area also will facilitate rapid military responses to decisions to commit U.S. forces to such operations; they will minimize the impact of U.S. participation in such operations on service budgets; and they will permit greater policy oversight of these operations.

Proposed funding for these initiatives is $300 million in FY 1994: $260 million for reimbursement of incremental DoD costs for peacekeeping and peace enforcement and $40 million for assistance to third countries and international organizations in support of sanctioned international peacekeeping or peace enforcement activities.

Humanitarian Assistance and Disaster/Famine Relief

The rise of regional dangers on the U.S. security agenda has increased the importance of the U.S. military's role in providing humanitarian assistance and disaster and famine relief to foreign populations in need. Operations directed at alleviating human suffering and meeting the basic needs of victims of social dislocation, economic strife, political conflict, or natural disasters can, in some cases, be the best foreign policy instrument available to the United States. Humanitarian operations can also prove an effective means of addressing potential sources of regional instability before they lead to armed conflict, and of promoting recovery and nation-building after crises have occurred.

In FY 1993, $28 million in DoD funds were appropriated for humanitarian assistance programs, $50 million was provided for disaster relief activities, and $10 million was allocated for disaster relief planning. In addition, $40 million was provided in supplemental appropriations for Kurdish relief efforts in FY 1992 and $115 million was transferred from other DoD appropriations to provide humanitarian assistance to the former Soviet Union in FY 1992-93. Much of this assistance took the form of DoD deliveries of excess property as well as privately donated supplies — including medical supplies, clothing, shelter, food, heavy equipment, and vehicles. It also included coordinating large-scale air, land, and sea operations and evacuating refugees and disaster victims in need of medical care.

The Humanitarian Assistance and Disaster/Famine Relief initiative will consolidate a wide variety of existing programs under a single umbrella within DoD to:

- Develop and refine strategies for delivering excess DoD property, privately donated supplies, and other assistance to countries in need.

- Improve the efficiency, effectiveness, and timeliness of DoD's existing humanitarian assistance and disaster and famine relief efforts.

- Facilitate contingency planning with other U.S. government agencies as well as international and nongovernmental organizations to ensure DoD relief preparedness.

- Expand cooperative relationships with leading U.N., private voluntary, and other international organizations to facilitate non-U.S. government humanitarian assistance efforts.

Proposed funding for FY 1994 is $48 million for humanitarian assistance and $50 million for disaster/famine relief, including:

- ***Excess property donations:*** Repairs, packing, processing, warehousing, and other costs associated with preparing property for delivery.

- ***Transportation assistance:*** Air, sea, and overland transportation of personnel and materiel.

- ***Planning and training:*** Preparedness and assessment activities, including studies, exercises, and specialized training.

- ***Relief activities:*** Provision of shelter, food, water, and medical supplies to countries in need.

Promotion of Democracy

One of the most significant dangers in the post-Cold War era is the possibility that democratic reform in newly independent states might fail, reducing the chances that a coalition of democracies favoring peaceful means of resolving disputes will take root and flourish. One of the most significant opportunities for the United States in this new era is the chance to promote democracy in other countries and, in so doing, to promote a more peaceful world.

The Department of Defense has an important role to play in promoting democracy. Toward this end, it has requested $50 million in FY 1994 to develop and integrate a variety of military-to-military programs and associated defense contacts as well as other activities designed to promote democracy. These efforts focus on countries other than those targeted for assistance under the Cooperative Threat Reduction initiative. The programs include:

- ***Ongoing military and defense contacts*** that focus on familiarizing military and defense officials from emerging democracies with appropriate roles of a professional military in a constitutional democracy, such as the Army European Command's Joint Contact Team program in central and eastern Europe.

- ***Expanding such military and defense contacts*** to additional countries in eastern Europe.

- ***Developing similar contact programs in other regions,*** namely Africa, Latin America, Asia, and the Pacific.

Promoting democracy in other countries is central to international stability and to the prospect of a more peaceful world. This relatively small expenditure of DoD resources has the potential to obviate the need for the far more costly defense efforts that might be necessary should democratization fail.