

# **STRENGTHENING AMERICA'S DEFENSE: SIX STEPS**

**by Kim R. Holmes, Ph.D.**

Mr. Chairman, distinguished members of the House Budget Committee Task Force, it is a pleasure and honor to be here today to say a few words about the problem of defense spending in a constrained budget environment. Seven years ago the Reagan Administration embarked on a military modernization program to rectify nearly a decade of neglect of U.S. military forces. At the time there was near unanimity and bipartisan support for the proposition that something had to be done quickly to reverse the dangerous decline which beset U.S. military forces in the wake of the Vietnam War. Up until a year or so ago a bipartisan consensus existed in favor of the need for sustained annual increases in the defense budget. The Reagan defense buildup actually began during the last year of the Carter Administration. Throughout the first five years of the Reagan Administration, many Democrats, including Democratic defense leaders Senator Sam Nunn and Congressman Les Aspin, firmly believed in the need for sustained annual growth in defense spending.

They believed this growth to be necessary for a variety of reasons: because the Soviets continued to invest in defense at a very high rate; because much remained to be done to redress military imbalances with the Soviets, particularly in Europe; and because practically all agreed that some measure of improvement was required to modernize U.S. weapons and equipment, upgrade the quality of U.S. military personnel, and maintain the readiness and sustainability of U.S. forces. Moreover, the growth of international terrorism, the expansion of Soviet military influence in the world, particularly the invasion of Afghanistan, and the emergence of unstable situations in the Persian Gulf and Central America provided additional incentive to maintain continued growth in defense spending.

**Deficit Main Culprit.** Of course all of this has changed. For the past two years the defense budget has declined in real terms by about 2 percent, which followed a 9 percent average annual real growth for the previous five years. It is not so much that the external threat or the international situation have changed as it is that the internal politics of defense budgeting have changed. There are many reasons for this--the high federal budget deficit being the main culprit. While the Reagan buildup has corrected some of the imbalances of the 1970s, the Soviet strategic and conventional force arsenal continues to grow, the Warsaw Pact still maintains conventional superiority in Europe, the Soviets are still in Afghanistan, and the Iranians are threatening the flow of oil from the Persian Gulf as never before.

The point is this: The cutting short of the military buildup of the 1980s, which some expected to continue well into the 1990s, was caused not by some grand

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reassessment of the net defense capabilities of the United States vs. its potential adversaries, but by political and economic developments inside the U.S. that have nothing whatsoever to do with the nature of the various external threats facing U.S. security.

I recognize that this is a political reality. But I also happen to believe, as most defense analysts believed up until a couple of years ago, that three to five percent annual real increases in the defense budget for at least the next five to seven years are required to maintain and modernize current force levels at high levels of operational readiness. I agree with a study of conventional force structures conducted in 1985 by a number of eminent military specialists for the Center for Strategic and International Studies: It concluded that altering strategy or doctrinal options cannot compensate for the decreased military capability resulting from constrained military budgets. We might as well admit that no matter what we do, declining defense budgets are going to have a negative impact on the ability of U.S. armed forces to protect the security of this country.

**Exploiting Qualitative Advantage.** However, that does not mean that nothing can be done to improve U.S. defense capability in this new age of budgetary constraints. The U.S. must begin thinking more intelligently about getting the most capability possible out of the defense dollar. This means not only saving money by doing obvious things like reforming the wasteful way the Pentagon buys weapons and equipment, but by organizing, outfitting, and when necessary, deploying and employing U.S. military forces in such a way that exploits their inherent qualitative advantages over a potential adversary. The United States used to overcome opponents by throwing massive resources at them. It can no longer do this because these resources will not be available, and because its principal adversary, the Soviet Union, has more deployed military forces than the U.S. In short, the U.S. needs to apply more brain to its proverbial brawn.

I will cite a few examples of how this could be done. Some of these initiatives will require additional expenditures, some will actually save money, but all represent a cost-effective approach to improving U.S. military capability.

### **1) INVEST IN FORCE MULTIPLIERS**

There are a number of ways in which military forces can be organized, equipped, supported, and trained to enhance their combat effectiveness without necessarily enlarging force structure or deploying new weapons systems on a massive scale. This can be done by relying heavily on so-called force multipliers. Force multipliers improve combat effectiveness by making operations more economically and militarily efficient, by ensuring their operation at full combat capability, by raising combat performance levels, and by improving the degree to which military forces cooperate with one another. In terms of military output for the money, spending on force multipliers is a very good deal.

Force multipliers are:

**a) Readiness:** Maintaining high operational readiness of military forces is a good way to get the most combat capability out of these forces. With adequate

training, ammunition stockpiles, spare parts, support equipment, and personnel, combat units can respond quickly to a crisis and perform at optimum levels once they have become engaged in combat. So far the Reagan Administration has increased overhaul and field-level maintenance of ships, aircraft, tanks and missiles, replenished depleted spare parts stockpiles, improved training, and made support equipment more available. What needs to be done is to provide more new support equipment (like trucks) for the Army, ensure that funding for depot maintenance and spare parts does not fall, and maintain high levels of flying/steaming hours and battalion training days for all the services.

**b) Sustainability:** The ability to sustain combat from start to finish is an important measure of combat capability. Combat units require adequate ammunition and spare and repair parts to fight effectively over a long period of time. The Reagan Administration has greatly increased funding for munitions, but funding for war reserve spare and repair parts, after rising from very low levels in 1980 to high levels in 1985, has dropped off in the last two years because of fiscal constraints. This trend should not continue. We need especially to concentrate more on prepositioning war reserves abroad whenever this is politically and physically possible.

**c) Mobility:** Moving troops and equipment quickly and efficiently to theaters of combat, whether by air (airlift) or sea (sealift), optimizes the combat capability of military forces. Getting forces deployed when and where a commander wants them better enables him to choose where, when, and how he wants to fight. Mobility provides a commander with the initiative and flexibility to do the most he can with forces at hand. The Reagan Administration has enhanced U.S. strategic mobility considerably, but some problems still remain. More needs to be done to improve U.S. short-range tactical airlift capability. It is not clear whether the new force of C-17 airlifters will adequately meet our tactical airlift needs.

**d) Command, Control, Communications, and Intelligence:** The commander who better controls and communicates with his forces can operate at a distinct advantage over greater numbered forces which do not enjoy comparable command, control, communications, and intelligence (C<sup>3</sup>I) capabilities. This is true for both strategic and conventional forces. Superior C<sup>3</sup>I systems for strategic forces enhance deterrence by raising the credibility of the U.S. threat to respond to a nuclear attack. Superior C<sup>3</sup>I systems for theater and tactical conventional operations raise overall combat performance by ensuring that forces do what they are supposed to do when they are supposed to do it.

The Reagan Administration has improved C<sup>3</sup>I capabilities for strategic and conventional forces, but the job is by no means over. Much remains to be done to make the national command and control network resistant to nuclear effects, to introduce new, real-time communications capabilities for joint tactical and theater operations, and to complete our space-based navigation and warfare command and control systems. Moreover, the loss of the Challenger has caused the launch schedules for our satellite communications programs and other space-based systems to slip. The space program simply must get back on track to ensure that the U.S. has adequate launch capability to complete space-based C<sup>3</sup>I systems.

e) **Advanced Technology:** The United States and its allies have relied on the superior quality of its weapons technology to offset the greater numbers but lower quality of Soviet and Warsaw Pact military forces. It is imperative that the West maintain this technological lead over the Soviets and their allies. Thus advanced weapons research and development programs should continue to be funded at high levels.

The challenge is to ensure that the cost of developing and building advanced technology weapon systems is worth the resulting capability. Advanced technology should not be used for its own sake, since it is very expensive, but only when it is proven that it helps the weapon perform its mission better and more cost effectively than inferior systems deployed in larger numbers. Care must also be taken to avoid making only marginal gains at the cost of deploying very expensive and highly complex weapon systems which are unreliable. Advanced technology should be used to enhance the mission performance of military systems and to make the task of defeating the enemy easier and cheaper, not more difficult and expensive.

## **2) DEVELOP COMPETITIVE STRATEGIES AS GUIDELINES FOR WEAPONS DEVELOPMENT**

A new doctrine has emerged in the Department of Defense for shaping the U.S. force posture. It is called the doctrine of competitive strategies. Jon Englund states that the doctrine "holds that, in casting its force posture, technological strategy and procurement policies, the United States (and the Western Alliance more broadly) should hew to clear and explicit criteria of capitalizing on relative advantages and areas of strength, while exploiting the disadvantages and weaknesses of the Soviet Bloc."

Good examples of using the doctrine of competitive strategies to "trump" Soviet strategic investments are the Strategic Defense Initiative (SDI) to counter heavy Soviet investments in land-based ICBMs; the Advanced Technology Bomber (ATB); Advanced Tactical Aircraft (ATA); and the Advanced Cruise Missile (ACM) to force the Soviets to spend more money on expensive air defenses; anti-submarine warfare to keep Soviet missile submarines far from U.S. shores; and the Army's Airland Battle and NATO's Follow-On Forces Attack (FOFA) doctrines to foil Soviet echeloning of ground forces in Europe.

**West's Advantages.** In general the U.S. and its allies have a number of advantages which they can exploit. The West has a superior technological base; thus the case for using advanced technologies in weapon systems. It has geographical advantages over the Soviets insofar as the latter has difficult access to the world's oceans and is surrounded by U.S. allies from which bombing raids can be launched; hence the case for a strong navy and penetrating bombers. Finally, the inferiority of NATO ground forces requires that it maintain air superiority in Europe; thus the need for superior quality tactical aircraft and possible future deployments of anti-tactical ballistic missile defenses.

The U.S. and its allies, on the other hand, should not try to compete with the Soviets in areas where they have a distinct advantage. Thus we should not try to match the Soviets in ground forces. Improved strategic mobility can compensate for some of the asymmetries in NATO-Warsaw Pact conventional forces in Europe.

Nor need the U.S. deploy large numbers of very accurate, hard-target-kill capable ballistic missiles, where the Soviets now have an advantage, if strategic defenses are deployed.

Each new weapon system should be tested against the guidelines of competitive strategies. This approach should help us set priorities in the future. If hard choices between weapon systems have to be made, they should be done by asking ourselves the basic question of how they fit into the net assessment of U.S.-Soviet military capabilities.

The role of establishing national security objectives and determining basic defense priorities according to competitive strategy guidelines should belong to the National Security Council. It is then up to the Secretary of Defense to implement these policies and to ensure that weapons procurement, force posture, and military strategy conform to them. The active leadership of the National Security Council and the Office of the Secretary of Defense is necessary at the outset to overcome any bureaucratic obstacles created by the military services.

### **3) EXPLORE ADVANCED TECHNOLOGIES FOR CONVENTIONAL DEFENSE**

It is widely known that the U.S. and its allies need to shore up their conventional defenses. The problem has always been that conventional forces, with their high manpower and weapons investment costs, are very expensive, and for this reason are often neglected during periods of budgetary constraints. Now that it is becoming more difficult for the U.S. to rely on its nuclear capability to offset Soviet conventional superiority, more attention is being paid to the problem of NATO's conventional force posture. But how can conventional force deficiencies be corrected in an age of budgetary constraints? The hard things like expanding force structure and deploying greater numbers of weapons systems seem to be out of the question. So what can the U.S. and its allies do to get more conventional capability out of their forces?

One option is to develop a long-term strategy of applying advanced technologies to conventional forces. There has been a trend in this direction for quite some time. The Army's and Air Force's Airland Battle doctrine and NATO's Follow-On Forces Attack (FOFA) concept envision the use of emerging technologies to improve the capability of conventional forces. Also, some of the technologies of the Strategic Defense Initiative will have conventional applications as well.

What the U.S. needs is a comprehensive program to bring together all of the potential uses of advanced technologies for conventional defense. It should, however, be realized that the most revolutionary technologies are far off and would not alter the conventional balance significantly in the near term. Also it is very important when considering advanced technology and conventional forces to admit that technology by itself is not a panacea, and if applied wrongly, can actually create more problems than it solves.

But for the battlefield of the future it cannot be denied that the U.S. and the West could do a number of things with advanced technologies which could greatly

redress the current conventional force imbalance with the Soviets and their allies in Europe.

Here are a few examples:

**A) Stealth Technologies:** "Stealth," or so-called low observable technologies which utilize new design and materials to reduce the radar profile of strategic bombers, could prove very promising for conventional forces. They could be used to make fighter aircraft and tactical missiles less observable to enemy radar. And they could be used on long-range, conventionally armed cruise missiles to destroy or damage ships, ports, airfields, bridges, and weapons and supplies depots. Since these weapons are less observable to the enemy, they are less susceptible to interception, and thus more likely of reaching their targets. They also force one's opponent to invest heavily in defensive forces, which means fewer resources for offensive forces. Stealth technologies are thus a good deal not only because they make weapons more effective, but because they provide excellent strategic leverage against one's opponent.

**b) Surveillance and Tracking Technologies:** Optical devices, infrared sensors, acoustic sensors, new signal processors, lasers, and faster computers hold enormous promise for improving the ability of weapons to locate, identify, track, and assess the damage inflicted upon military targets. To see and hear better than the enemy on the battlefield is to hold an enormous advantage over him. The ability of tomorrow's weapons systems to automatically find and track targets, distinguish between them, and very quickly and accurately direct fire at them before the enemy can react could not only serve as a force multiplier but also cut down on manpower requirements.

**c) Directed Energy Weapons:** Directed energy weapons, or lasers, could have enormous impact on the future battlefield. If developed at high energy levels for use inside the atmosphere, directed energy weapons could, in effect, make armored vehicles, including tanks, obsolete. They could have enormous range and rapid refire capability. Microwave lasers could be used to jam the electronic systems of an opponent, while other types of lasers could blind periscopes, telescopes, night vision scopes, tracking devices, fire-and-forget missiles, and remote closed-circuit TV. They could also be used to blind soldiers.

A German firm has already developed a high-energy carbon dioxide laser for use against aircraft and missiles that can kill soft-skinned targets up to 10 kilometers away. Like stealth technologies, lasers can force an enemy to undertake costly countermeasures, such as uncomfortable gear, laser and electronics hardening, and special training, all of which degrade his combat capability and cost him a lot of money.

**d) Railgun Technologies:** Electromagnetic railguns capable of hurling projectiles at enormous speed could be developed for use against armored vehicles and aircraft. Railguns have enormous potential for penetrating armor. They could also be used for close-in air defense. If developed cheaply enough and deployed in sufficient numbers, they could greatly offset the current superiority enjoyed by the Warsaw Pact in armored capability. Although railguns will not be

available soon enough to rectify the Army's current lack of sufficient close-in air defense capability, they could be developed for this purpose in the 1990s and beyond.

**e. Superconductors:** Superconductors, or materials capable of facilitating the flow of electricity, could make future electromagnetic railguns very efficient. They could enable railguns to be put on tanks and ships. A superconductor generator for a laser cannon could be put on a fighter aircraft, and superconductors could increase the output of propulsion systems for aircraft carriers and submarines. With new superconductor supporter propulsion systems, submarines could be made quieter and faster. Also, more space would be made available for weapons because of the smaller size of the propulsion system.

**f) Microelectronics:** Making electronic components smaller can greatly improve the performance of weapon systems. For example, advances in microelectronics for ballistic missiles could be used for conventional missiles as well. New millimeter-wave missile guidance systems could be adapted for conventionally armed, stand-off missiles that can destroy targets in fog, dust, and smoke. Such a capability would enable a commander to strike with confidence at targets which are now beyond the reach of missile systems.

**g) New Propulsion Technologies:** New high-efficiency propulsion technologies now under research for a space plane could be developed for very long-range cargo aircraft and strategic bombers as well. Since these aircraft have high operational and maintenance costs because they spend so much time in the air, they would benefit immensely from breakthroughs which allow them to fly at greater distances on less fuel.

**h) Robotics, Unmanned and Automated Systems:** Although human beings can never be entirely eliminated from combat operations, their combat performance could be improved by having some tasks taken over by robots and automated systems. Unmanned, tele-operated mobile anti-armor vehicles, remotely piloted aircraft for reconnaissance and anti-armor operations, and automatic and/or real-time, remote control weapon systems could increase combat effectiveness, reduce casualties, and cut back on manpower requirements.

**i) Fire-and-Forget Weapons:** These "supersmart" weapons, sometimes called "brilliant guidance" weapons, would employ advanced acquisition and tracking devices, data and signal processors, sensors, and monolithic wave integrated circuits to "fire and forget" missiles at a variety of targets. They could pick up and track targets on their own and require no intervention after the missile is fired. Also they could be capable of hitting targets under all kinds of conditions, including in fog, smoke, and dust. The advantages of such a weapon system, if operating properly, are obvious. They could have devastating accuracy and could be used under all sorts of combat conditions.

**j) Advanced Data and Image Processing:** Superfast computers could improve combat capability in a number of different ways. They could be used to give a commander greater command and control over his forces. They could improve communications, speed up the processing of weapons sensor and signal information,

help achieve real-time surveillance of enemy forces, help to direct, coordinate, and control artillery and missile fire, and thereafter assess the damage done. They could also be used to keep weapons from failing by constantly testing them with built-in data processing systems. Finally, advanced computers could not only provide a knowledge base for routine combat problems when human specialized expertise is not available, but with the aid of artificial intelligence, even analyze non-routine problems and make decisions (while not necessarily executing them) more quickly and reliably than humans.

Image and data processing will also be instrumental in developing the so-called supercockpit for the fighter aircraft of the future. The pilot with this system will be able to see the terrain in three dimensions and operate the aircraft and its weapon systems with his eyes, voice, and other psychosomatic responses.

**k) New Designs and Materials:** New materials and designs could be developed for ultralightweight airframes. It is possible that airframes could be made up to 50 percent lighter than they now are. Lighter airframes means greater combat performance and lower fuel consumption. Low-cost materials could also be used for expendable remotely piloted vehicles for lethal attack, the jamming of an opponent's electronic systems, surveillance and reconnaissance, and communication relay systems.

#### **4) RECTIFY WEAKNESSES IN NATO'S DEFENSE POSTURE**

Because of budgetary constraints it appears that the era of sustained growth in defense spending by NATO is over. This is in spite of widespread recognition inside NATO councils that more needs to be done to shore up NATO's conventional defenses. The 1978 NATO decision to increase annual defense spending in real terms by 3 percent is history. And the program begun by former Supreme Allied Commander General Bernard Rogers to develop new technologies and tactics for deep attack and mobile warfare appears also to be beyond the budgetary pale.

Still, it is clear that some things can be done to improve NATO conventional defenses without necessarily increasing defense accounts by leaps and bounds (although additional expenditures would be necessary). Understandably, what could now be done could have been done before. But in the past a variety of primarily political obstacles stood in the way of improving NATO's defensive posture. Perhaps the time has come, in this new age of budget austerity, to recommend some new initiatives, which albeit politically difficult for the West Europeans to achieve, are nonetheless more politically palatable now than huge annual increases in defense spending for expanded force structure or new weapon systems.

For example, the U.S. could:

**a) Have NATO create anti-tank barriers along the inter-German border.** This could consist of buried pipes filled with explosives during wartime to blow out huge ditches over which tanks cannot pass. The West Germans have, however, consistently opposed this suggestion.



**b) Insist that the Europeans increase their war stockpiles.** The U.S. has done much to build up its supplies of ammunition and spare parts for Europe, but the Europeans are still behind in this regard.

**c) Have the Europeans create more operational reserves.** This would greatly extend the amount of time NATO could sustain conventional combat, which could forestall the need for using nuclear weapons.

**d) Consider redeployment of its ground forces in Europe.** As of now the likely invasion paths in northern and central Europe are weak points in NATO's defenses. American troops are deployed south in Bavaria away from likely invasion routes. Deploying some U.S. forces north, however, would be expensive, and would upset longstanding arrangements.

**e) Recommend that France develop tactical nuclear weapons** for possible stationing in West Germany. This initiative would meet resistance, possibly both in France and Germany, but extending the protection of French nuclear forces to West Germany could bolster deterrence, especially if U.S. intermediate-range missiles are taken out as result of an arms control agreement with the Soviets.

**f) Assign to NATO two or three U.S. ships** armed with large numbers of nuclear-tipped sea-launched cruise missiles. This would shore up theater nuclear deterrence.

**g) Develop a replacement for the F-111 fighter bomber** deployed in Europe which can carry long-range cruise missiles. This new fighter bomber armed with cruise missiles could be stationed in Great Britain where F-111 forces are currently deployed.

**h) Recommend that NATO develop** and deploy an anti-tactical ballistic missile defense force for protection against Soviet shorter-range ballistic missiles.

**i) Insist that NATO's air warfare capabilities** be improved by having the Europeans build more shelters for aircraft, harden runways, and improve the training of pilots.

**j) Purchase more European weapon systems.** This would save vast sums of money on U.S. research and development costs. A good place to start would be for the U.S. Army to buy the West German Milan 2 anti-tank system.

All of these initiatives would cost money. But they would not require massive increases in defense budgets. The question should be how they affect the net assessment of NATO-Warsaw Pact capabilities in accordance with the competitive strategies doctrine. If it turns out that they nullify a Warsaw Pact advantage considerably, as many of them would do, or enhance NATO capabilities at relatively low cost, then they would clearly be more cost-effective than many more expensive alternatives.

## **5) INCREASE DEMANDS FOR ALLIED ASSISTANCE**

The United States has long tried to get its allies to do more for the common defense of Western security. So far the U.S. has not been very successful. U.S. calls for a more equitable sharing of the burden of Western defense have been met with stonewalling, rationalizations, apologies, and in some cases, even silence. But the U.S. still spends far more proportionately on defense than its allies, and still protects European and Japanese oil in the Persian Gulf without any direct assistance from its allies.

There are no easy ways to get the allies to do more. Ultimately they are sovereign nations which understand very well that our interests as a global superpower demand that we help protect their security in ways that cost us more money than it costs them. But clearly in this new age of budgetary constraints, demands for unilateral actions against the allies will increase. In order to forestall the more extreme demands for unilateral troop withdrawals, a series of reasonable requests needs to be made of the allies.

At the least the allies should be asked to help offset the costs of stationing U.S. troops overseas. The U.S. cannot expect an agreement to offset all the costs, but the allies can surely do more in this regard. Unreasonable demands on the part of Greece, Portugal, and the Philippines for better basing deals or more foreign aid should be resisted. Also, the Japanese should be asked to underwrite the costs of any U.S. naval escort which protects tankers or oil destined for their shores. Finally, the Japanese and the West Europeans could provide more military assistance to countries which the U.S. finds it politically difficult to aid.

## **6) REFORM PROCUREMENT PROCESS**

Pentagon management and procurement reform are long overdue. Between \$10 billion to \$20 billion could be saved this year if rigorous procurement reforms were enacted. The President's Blue Ribbon Commission on Defense Management, the so-called Packard Commission, made some significant headway in reforming the weapons acquisition process. But more can be done. What follows is a list of recommendations, some contained in the Packard Commission Report and some not, which I believe would provide the greatest savings.

**a) Multiyear Procurement:** Multiyear procurement contracts reduce weapons costs. They allow more efficient planning and thus lower administrative costs. Most current defense contracts extend only one year at a time. This should be increased to more than one year. The average cost savings from procurement contracts that extend three years are estimated at 10 to 20 percent of the cost of weapon systems.

**b) Competition and Dual Sourcing:** As a general rule the more competition involved in a weapon's research, development, and production, the cheaper the weapon will be. Companies already are required to compete during the initial research and development phases of a project, but competition normally ends once the contract is awarded. Competition should be extended into the production phase of the weapon system. This approach, called "dual sourcing," has some drawbacks. It can eliminate savings accumulated from large economies of scale, and it may also

require higher start-up costs. Yet it may save about 30 percent in the overall costs of weapons. On balance, therefore, dual sourcing makes sense, particularly for weapons with long production runs.

**c) Better Cost Estimates:** In 1982 the Department of Defense calculated that errors in projecting the cost of weapons systems resulted in underestimating weapon unit cost by some 9 percent. False cost estimates are a source of cost overruns. The rising annual cost of a weapons program can very often be traced back to an original underestimation of the weapon's cost. This can be remedied by 1) establishing new baseline cost estimates before full-scale production (Milestone III) begins; 2) always using the higher estimate when more than one exists; and 3) holding back internal Pentagon cost estimates during bidding to dissuade contractors from proposing unrealistically low prices.

**d) Increased Standardization of Weapons and Spare Parts:** The use of common components, equipment, and subsystems in different weapons systems would reduce costs greatly and streamline the weapons procurement process. The Grace Commission estimated that savings from increased standardization could amount to as much as \$2.3 billion a year. Greater standardization could be achieved by demanding that managers most closely associated with the various weapons programs have a greater role in reporting standardization progress.

**e) Weapons Testing Improvement:** Malfunctioning weapons systems not only waste money but, more important, endanger the lives of combat troops. Weapons testing could be improved by 1) adopting the Packard Commission recommendation to begin operational testing of a weapon early in the advanced stages of development and to continue through full-scale development using prototype hardware; 2) testing weapons under realistic conditions and with the support of the logistical structure that will actually accompany the weapon in the field; and 3) evaluating weapon systems not according to some hypothetical or abstract criteria but according to existing alternatives.

**f) Contract Out:** A myriad of regulatory obstacles now inhibit the Pentagon from hiring private firms to provide services, a process known as "contracting out." An expanded Pentagon program for contracting out commercial and industrial activities could save as much \$4.5 billion per year after five years. Contracting out, therefore, should be used as extensively as possible.

**g) Improve Management of Inventory:** The Pentagon claims that improvements in the way that it handles spare parts already have saved more than \$2.5 billion from 1985-86. Making other management improvements in inventories, such as extending the tours of officers in inventory, and providing new automated systems, could save \$1 billion over five years for the Navy alone. Although start-up costs would be high at first, savings would accrue in the long run from inventory reductions, fewer losses of inventory items, and the reduced personnel requirements arising from greater automation.

**h) Repeal Congressional Obstacles to Management Efficiency:** Legislative obstacles impede efficient management of the Pentagon. These include the Service Contract Act, which requires payment of prevailing wage rates to workers

covered by a service contract, and the Davis-Bacon Act, which requires that workers on public projects, too, be paid prevailing wages. Repealing these bills would result in significant savings. Though estimates vary, savings could exceed \$3 billion a year if applied to all contracting employees of the Department of Defense.

