

CBO TESTIMONY

Statement of
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on
Aging Military Equipment

before the
Subcommittee on Military Procurement
Committee on Armed Services
U.S. House of Representatives

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NOTICE

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Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to discuss the aging of military equipment. When the Joint Chiefs of Staff testified before the House Armed Services Committee last month, they expressed concerns about the effects of low levels of procurement on their equipment inventories, arguing that the average age of weapons will soon be unacceptably high.

The Congressional Budget Office's (CBO's) analysis suggests that stocks of many kinds of military equipment are already at a higher average age than they have been in the past. Even if the Department of Defense (DoD) increases purchases as its current plans project, that trend will continue. Those added purchases are scheduled to occur in the years beyond 2000, when the Administration projects large real increases in aggregate defense spending, including higher funding for procurement.

The Administration's budget plan, however, depends on savings in other areas of the federal budget that may be difficult to realize. Most of the added funding is premised on the Administration's assumption that Social Security reform will free up significant budgetary resources. But the Administration and the Congress have yet to agree to changes in the Social Security system, much less to reforms that would generate the large savings the Administration's plan banks on. The remainder of the spending increase for defense comes from revisions to the Balanced Budget Act that have not yet been negotiated.

DoD took what some of its leaders termed a procurement holiday in the 1990s and is finding it difficult to recover. In the aftermath of the Cold War, DoD cut its procurement funding more deeply than it cut its forces. Average purchases over the past decade sank well below the quantities needed to sustain the forces; in some cases, procurement dropped to zero. In order to equip all its forces, with deliveries modest, at best, the military services had to extend planned service lives further than in the past. Because of imbalances between the budget and the program, DoD's fleets will grow considerably older.

Neither the Administration nor the Congress appears to support further reductions in the forces DoD can field. But to halt fleet aging—and equipment fleets will, indeed, become very old under current plans—DoD must either add funding to its procurement accounts to increase purchases or cut its forces further. My testimony today will focus on the ages of DoD's current and future fleets and on past, planned, and steady-state purchases and procurement funding.

The consequences of permitting further aging will be discussed in more detail by other witnesses, but the services have argued that they include increased maintenance costs and decreased readiness. The services have also expressed concerns about the possibility that hostile countries or alliances will improve their weapons or tactics in ways that make older U.S. equipment obsolete.

AGING EQUIPMENT

DoD regularly uses the average ages of its fleets as guidelines for the modernity of its forces. If, over a long period, DoD purchases less equipment than it needs to support its chosen force size, its fleets will age. And that is indeed the pattern that we see for DoD's equipment. At least through 2007, when most weapons bought by 2005 (the last year of the current plan) will have been delivered, many of DoD's major systems will grow older. (See Table 1, which shows average ages for weapon systems today and in 2007.) Despite DoD's plans to increase procurement funds and to buy more systems over the next few years than it has recently, the fleets in many of its mission areas are growing older, in some cases substantially older.

Over the current planning period (2000 to 2005), DoD plans to purchase replacements for some types of equipment but not for others. As shown in Table 1, the fleets that age the most over that period are those for which DoD has absolutely no purchases planned. Some of those fleets contain equipment that is already very old, on average. The Air Force's tanker fleet, for which the service plans no replacement purchases at least through the next decade, averages 39 years today and will be 47 years old by 2007. DoD also plans no replacement purchases

TABLE 1. AVERAGE AGES OF SELECTED EQUIPMENT (In years)

Type of Mission	Weapon Systems	Service	Half of the Past or Planned Service Life of Systems ^a	Average Age	
				In 1999	In 2007
Missions Without Replacement Plans					
Tanks	M1 Abrams	Army	15	12	20
Shore-Based Maritime Patrol Aircraft	P-3C	Navy	15-20	23	31
Support Aircraft	E-2, EA-6B, S-3B	Navy	10-18	18	24
Bombers	B-52, B-1, B-2	Air Force	25-35	23	30
Tankers	KC-135, KC-10	Air Force	25-33	39	47
Missions With Replacement Plans					
Light Attack and Scout Helicopters	OH-58 Kiowa, Comanche	Army	10-18	21	28
Surface Combatants	DDG-51, DD-21, CG-47, others	Navy	15-20	12	15
Multirole Fighters, Close Air Support	F-14, F/A-18, AV-8B, Joint Strike Fighter	Navy	10-15	13	16
	F-16, A-10, Joint Strike Fighter	Air Force	10-15	12	19
Air Superiority Fighters	F-15A-D, F-22	Air Force	10-15	18	23

SOURCE: Congressional Budget Office based on data from the Department of Defense.

a. The midpoint of the systems' average service life. In an inventory that has systems evenly distributed between those newly delivered and those nearing retirement, the average age will equal half of the system's service life.

for Army tanks, Navy maritime patrol aircraft, and Air Force bombers according to its 2000-2005 plan.

Even when DoD plans to purchase new systems—including light attack and scout helicopters in the Army, surface combatants in the Navy, and tactical fighter fleets in the Air Force and Navy—fleets will grow older during that planning period because purchases of replacement systems are too few or begin too late to halt aging completely. Air Force and Navy fighter fleets are in the best shape; planned purchases of F-22s and F/A-18E/Fs will slow increases in the average ages of those fleets.

If the equipment in the fleet is relatively young and has many years of service life remaining, then aging may be of little concern. Table 1 also shows a range of average ages that represent roughly half of the retirement age (or service life) of the weapons in the various mission categories. If weapon systems of a particular type are bought at steady rates and are thus evenly distributed between systems that have just entered the fleet and those nearing retirement, the average age of the fleet will be half of the retirement age. The range of estimates shown in Table 1 show two projections of how long systems will last. The optimistic estimates generally assume that equipment will last longer, and in some cases much longer, than it has in the past.

Comparing the values that reflect half of the planned service lives with the average ages projected for the fleets suggests that DoD could confront problems with aging inventories relatively soon. The average age of the equipment in several mission categories already exceeds half of the shorter service life (in two cases it also exceeds half of the longer, more optimistic service life); by 2007, all but one of the systems shown will exceed half of even the more optimistic service lives. Such patterns might not be a problem if DoD planned to make further force cuts. But today's forces roughly equal the levels the Administration has said it wishes to preserve. It also might not be a near-term problem if equipment in DoD's inventories was bought in a block. Using that approach, those fleets could have average ages that were greater than half their service lives but few systems near retirement. CBO's analysis suggests that although the equipment in DoD's fleets may have been bought unevenly, many platforms are or will soon be older than the ages at which similar equipment would have been retired in the past.

REDUCED PURCHASES

The fleets are elderly because DoD bought relatively small quantities of most types of major equipment during its procurement holiday in the 1990s. The Administration argued that a procurement holiday would be acceptable since large cuts in forces had created a surplus of equipment. Purchasing large numbers of weapons

seemed unnecessary while the services were retiring equipment that had not yet reached the end of its service life. But DoD cut purchases of many types of equipment by a much larger percentage than it cut forces. And even after the Administration decided to end the holiday, it found it difficult to greatly increase procurement. The Administration's planned purchases for the six years of its current plan, though an increase above recent procurement, are still not sufficient to halt the aging of DoD's fleets.

A comparison of historical, planned, and steady-state purchases of selected equipment shows that in most cases, average annual purchases of systems over the 20-year period between 1974 and 1993 were much greater than those over the past six years (see Table 2). They also exceed purchases planned during the six-year period of the current plan. The Army purchased more than 1,400 tanks, infantry fighting vehicles, and artillery systems per year on average over the 1974-1993 period. Average yearly purchases of the same types of systems equaled only 24 over the past six years and are scheduled to rise to only 28 over the next six years (and no tanks or infantry fighting vehicles have been bought since 1992, though the Army has an ongoing program to upgrade its tanks). Over the same 20-year period, the Navy purchased 105 fighter and attack aircraft per year, compared with average annual purchases of about 36 over the past six years and about 46 planned over the next six years. That pattern also applies to most of DoD's major systems.

TABLE 2. COMPARISON OF PAST, PLANNED, AND STEADY-STATE PURCHASES OF SELECTED EQUIPMENT

	<u>Average Annual Purchases</u>			<u>Annual Purchases to Sustain Today's Forces</u>	
	1974-1993	1994-1999	2000-2005	More Optimistic Case ^a	Less Optimistic Case ^b
Tanks, Artillery, and Other Armored Vehicles	1,485	24	28	623	872
Scout and Attack Helicopters	58	2	4	90	152
Utility Helicopters	66	42	26	65	111
Ships	17	7	8	8	10
Fighter and Attack Aircraft					
Navy	105	36	46	70	93
Air Force	203	8	26	104	139
Electronic Warfare Aircraft	6	0	0	6	8
Support Aircraft	13	3	3	6	8
Tactical and Strategic Airlift Aircraft	10	7	14	20	27
Tankers	3	0	0	10	12
Bombers	6	0	0	3	4

SOURCE: Congressional Budget Office based on data from the Department of Defense.

a. Assumes longer service lives.

b. Assumes shorter service lives.

Indeed, the only mission areas in which recent or planned purchases would equal or exceed historical purchases are tactical and strategic airlift aircraft for the Air Force (see Table 2).

The purchases over the 1974-1993 period, however, supported a much larger force structure. In the 1980s, DoD's force goals ranged from a third again to twice the size of today's force structure. The Army had 28 divisions during most of the 1980s compared with 18 today; the Navy had a goal of more than 500 ships compared with about 300 now; and the Air Force had about 37 tactical fighter wings at its peak in the 1980s compared with 20 wings today. DoD does not need as much equipment for today's smaller forces as it bought for the Cold War-era forces.

How many systems *does* DoD need to buy to equip its currently planned forces? A simple way to estimate steady-state purchases is to divide the desired inventory by the expected retirement age. For Navy ships, for example, one can divide the Navy's goal of a 300-ship inventory by a retirement age of 30 or 40 years. If the Navy retired all of its ships after an average of 30 years of service, it would need to buy 10 ships a year. But if ships lasted 40 years, the Navy could sustain its fleet with only 7.5 new ships a year. For many reasons, the services usually purchase their equipment more unevenly than this simple calculation would imply, buying more than steady-state quantities in some years and less in others.

But the steady-state quantity gives a notional number for the average purchases needed. If purchases exceed steady-state quantities for a long period, fleets grow younger; if, as today, steady-state requirements exceed actual purchases, fleets age.

Because our results are so sensitive to assumptions about retirement age, we made two estimates of the steady-state purchases DoD would need. The more optimistic case assumes that DoD is able to keep equipment longer than it has in the past. The other, less optimistic case assumes that DoD is able to keep equipment at least as long as it has in the past. (Both estimates are shown in Table 2.) Steady-state purchases under both assumptions are generally lower than the historical average because today's forces are smaller. But for almost all of the major systems we considered, the steady-state purchases are higher than DoD's average purchases over the past six years and the purchases DoD plans to make over the next six years. That result applies even under the more optimistic assumptions about retirement ages.

DECREASED PROCUREMENT FUNDING AND THE SERVICES' GOALS FOR PROCUREMENT SPENDING

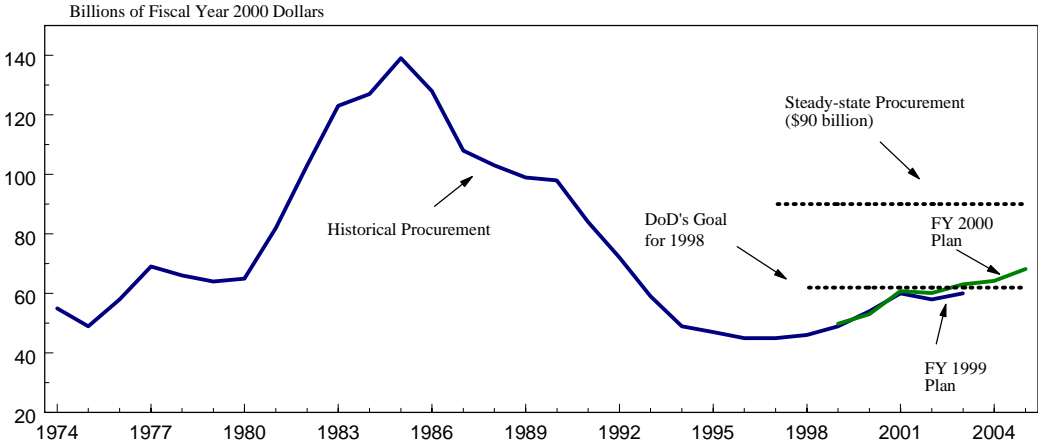
Decreases in DoD's procurement funding led to the cuts the department made in equipment purchases. After adjusting for the effects of inflation, DoD's spending

on procurement declined by roughly two-thirds between the peak in 1985 and the trough in 1997 (see Figure 1). Over that 12-year period, spending was cut from roughly \$140 billion in 1985 to about \$45 billion in 1996 and 1997. (Unless otherwise noted, funds discussed in this statement are expressed in fiscal year 2000 dollars. These "constant" dollars adjust actual appropriations for the effects of inflation. They more accurately represent the true purchasing power of those funds, since a dollar spent in 1980, for example, bought more than the same dollar today. Likewise, a dollar spent in 2005 is worth less than today's dollar because of the inflation that will occur between now and 2005.)

Spending on defense procurement not only fell in absolute terms but also shrank below its historical average. Over the 1974-1993 period, procurement appropriations averaged almost \$90 billion a year, and for a short period in the 1980s, they may have equaled the funding required to sustain the larger forces of the Cold War era. But procurement spending over the past six years (1994 to 1999) averaged only about \$47 billion annually, which is much less than DoD might need to sustain forces at today's levels.

Even before procurement funding reached its nadir in 1997, DoD's leaders recognized their problem. In 1995, General John Shalikashvili, then Chairman of the Joint Chiefs of Staff, argued that DoD needed to increase its spending for pro-

FIGURE 1. PAST, PLANNED, AND STEADY-STATE PROCUREMENT FUNDING



SOURCE: Congressional Budget Office estimates based on data from the Department of Defense.

curement to at least \$60 billion a year by 1998 (that would be about \$62 billion in 2000 dollars). And at least since 1995, a hallmark of the department's Future Year's Defense Programs is that they have included that \$60 billion goal, usually at the end of the proposed planning period.

A second hallmark is that each plan projects sizable increases in procurement funding in the years beyond the budget year, and those crests have shifted outward in bow-wave fashion from one plan to the next (see Figure 2). DoD's procurement funding has yet to reach General Shalikashvili's target. Actual funding was \$16 billion below his goal in 1998 and \$13 billion below it in 1999, and DoD's request for fiscal year 2000 is still about \$10 billion short. The department's inability to reach its procurement goals has resulted, at least in part, from the difficulty it has had wresting savings from the operating side of its budget.

In 1998 and 1999, procurement funding finally increased in real terms—though by less than DoD's earlier plans had projected and largely as a result of action by the Congress that increased the defense budget. And increases in the defense budget, rather than savings from efficiencies, accounted for most of the added procurement funds.

The budget DoD submitted for fiscal year 2000 differs from earlier plans in two major ways: its procurement increases are projected to occur near the

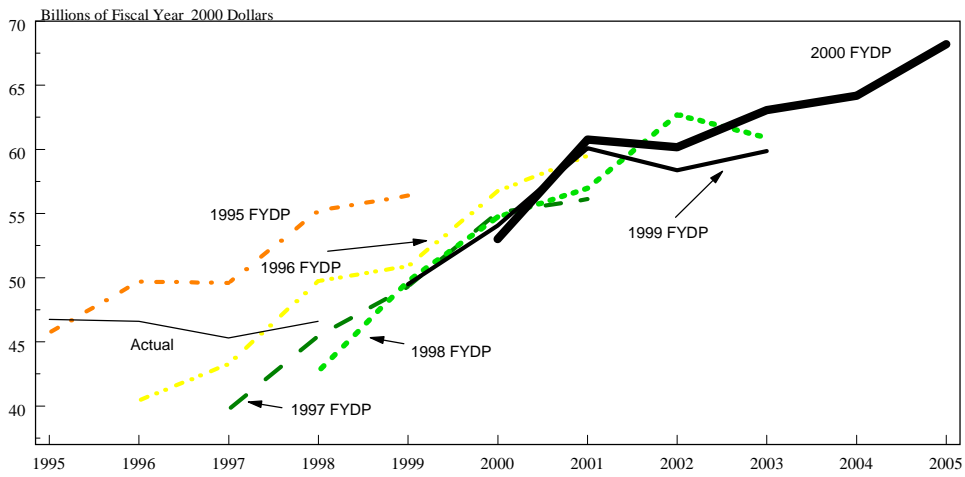
beginning of the plan rather than at the end (DoD expects to reach Shalikashvili's goal in 2001), and it is premised on a real increase in aggregate defense spending, not vague savings from efficiencies.

But several things could prevent DoD from realizing the increases in its new plan. First, the plans still present the bow-wave pattern, with the largest procurement funding increases toward the end of the plans (DoD proposes to spend about \$67 billion in 2005). That pattern imposes the burden of financing those increases on future Administrations. Second, and more important, future increases in the defense budget are predicated on achieving savings in other areas of the federal budget that may be difficult to realize. Specifically, the Administration's current plan finances increases in defense spending through assumed savings from Social Security reform and a new balanced budget agreement. Neither of those changes have been negotiated as yet.

STEADY-STATE PROCUREMENT

Even if future Administrations and Congresses increase funding to the \$62 billion that is DoD's goal, that may still not be enough for DoD to achieve steady-state

FIGURE 2. PLANNED SPENDING FOR MILITARY PROCUREMENT



SOURCE: Congressional Budget Office based on data from the Department of Defense.
NOTE: FYDP = Future Years Defense Program

quantities of equipment that would, over the long run, halt aging and support forces of today's sizes indefinitely. CBO estimates that DoD would need to spend about \$90 billion a year to maintain steady-state procurement funding for today's force structure (see Figure 1). That amount includes the costs of the weapons purchases discussed earlier. But those costs typically account for only about half of total DoD procurement spending. The other half purchases more minor equipment and modifications, for which CBO lacks the data to make individual estimates. To complete the estimate, we assumed that total procurement funding would maintain its past relationship to funding for major weapons.

DoD plans to spend much less than \$90 billion a year. Average annual spending in the Administration's six-year plan equals \$62 billion, which is DoD's goal. Planned purchases do not equal steady-state procurement since they do not halt fleet aging. And planned funding is only two-thirds of the funding DoD would need to maintain its forces.

The cost of steady-state procurement for DoD is sensitive to a number of assumptions, changes in which could raise or lower that cost. The estimate of \$90 billion assumes that DoD will keep its major weapons longer than it has in the past. If DoD was unable to extend service lives as long as it plans, the estimate would be much higher. The \$90 billion estimate also incorporates CBO's prices, which assume that DoD's weapons will be somewhat more expensive than current plans

suggest. But weapons costs could grow more than we estimated and drive funding for steady-state procurement higher.

Other changes might lower the cost of steady-state procurement. CBO assumed that weapons in today's force structure would be replaced on a one-for-one basis. If, as seems likely, DoD cut the number of weapons with which each unit is equipped, requirements for purchases would fall. The costs of steady-state procurement would also fall if DoD purchased fewer highly capable systems, such as the F-22 or the F/A-18E/F, and replaced them with a larger number of cheaper but less capable alternatives, such as the Joint Strike Fighter. Costs would also decline if DoD kept equipment even longer than the increased service lives reflected in the more optimistic assumptions.

CONCLUSION

Unless either the increased funding for the procurement accounts exceeds DoD's expectations by about 50 percent or forces are cut well below today's levels, DoD's fleets will probably continue to age. DoD has permitted most systems in its fleet to age over the past decade. During that period, DoD's procurement budgets did not provide enough funding to purchase the weapons necessary to equip the forces the department felt it needed. Since the department did not cut force structure to

bring it in line with available funding, DoD's equipment has grown older. Although the Administration's current projections for procurement funding represent an increase from the recent past, they would continue that imbalance between budget and program, even if they are realized, which is far from assured. As a result, DoD's weapons will continue to grow older throughout the period of the current plans.

DoD may be able to allow some weapons to age indefinitely, although it may need to spend more on modifications or overhauls to do so. In many cases, modifying systems is cheaper than buying new ones, and in some cases it is much cheaper. And overhauls—which simply replace worn-out parts—are likely to be even less expensive than modifications.

The military services, however, have argued against permitting large portions of their inventories to age beyond the estimated service lives. Their concerns include the possibility that enemies will develop weapons that make older U.S. weapons obsolete; that maintenance and modification costs will increase as the fleet ages; and that older weapons will develop unexpected defects that could render them unavailable for conflicts until major, and perhaps time-consuming, modifications or overhauls were completed.

The first concern—obsolescence in the face of an increasing threat—may be less of an issue today, at least in comparison with the Cold War years. No current enemy comes close to matching the efforts of the former Soviet Union to develop and buy sophisticated weapons. Of course, DoD is assuming that it will retain weapons some 30 years or more into the future. Ensuring that obsolescence will not be an issue for 30 years or more is much harder.

The two other concerns that the services have raised in the past may have received support from recent research. Until recently, DoD was unable to document an empirical relationship between the age of its fleets and increased costs to operate them, largely because the services had few platforms in the fleet that greatly exceeded the expected retirement ages. Several recent studies, including one to be discussed in this hearing by Dr. Raymond Pyles from RAND, have begun to document some effects of aging on both costs and the time during which systems are down while awaiting repair. If problems are magnified as systems are kept beyond their retirement ages, a very large portion of DoD's fleets could deliver some costly surprises in the not too distant future.