

Can the Navy Maintain a 300-Ship Fleet at Current Budget Levels?

The Congressional Budget Office's analysis of the Navy's budgetary and long-term procurement plans suggests that it will be difficult for the Navy to maintain its current force goal of about 300 ships. Current funding levels are inadequate to cover all of the ships and aircraft the Navy wants to buy and also maintain readiness and a good quality of life for sailors, pilots, and marines.¹ To sustain its 300-ship fleet and inventory of aircraft, as well as the infrastructure that supports them, the Navy will need about \$105 billion annually (adjusted for inflation), CBO estimates. That amount is over \$17 billion more per year than the Navy is expecting to receive, on average, under the Administration's Future Years Defense Program for fiscal years 2001 through 2005 (referred to here as the 2001 FYDP).

The Navy's Modernization Plans Through 2005

The 2001 FYDP would authorize 45 new ships—or an average of 7.5 per year—between 2000 and 2005.

1. Although costs for aircraft are part of the overall modernization bill, CBO's analysis focuses primarily on the Navy's ability to meet its force goal for ships. For a more comprehensive treatment of the Department of Defense's ability to pay for all of its tactical aircraft programs, including those of the Navy, see Congressional Budget Office, *A Look at Tomorrow's Tactical Air Forces* (January 1997). For an update of that analysis, see the statement of Christopher Jehn, Assistant Director, National Security Division, Congressional Budget Office, before the Subcommittee on AirLand of the Senate Committee on Armed Services, March 10, 1999.

Specifically, the Navy would buy one aircraft carrier, 14 DDG-51 and DD-21 destroyers, five Virginia class attack submarines, 11 LPD-17 and LHD amphibious ships, and 14 combat logistics ships and fleet auxiliaries (see Table 4). That shipbuilding program represents an increase from previous plans. The 1998 FYDP, for example, would have built only 6.2 ships per year between 1998 and 2003. However, press reports about the Navy's budget for fiscal years 2002 through 2007 indicate that the planned shipbuilding rate may fall back to 6.5 a year.

For most of the 1990s, the Navy built far fewer ships, on average, than required to maintain a force of 300 in a steady state. Between fiscal years 1992 and 1999, the Navy ordered an average of 4.5 ships per year, about half the steady-state requirement. That low level of shipbuilding was possible because the Navy had many more ships than it needed to fulfill its force goal at the conclusion of the Cold War and was even retiring ships before the end of their useful service life. The shipbuilding plan under the 2001 FYDP would allow the Navy to meet its force goal for the next 10 years or so. Eventually, however, the Navy would have to buy more ships or the attrition that occurs as vessels reach the end of their service life would lead to a smaller fleet.

The planned purchases of naval aircraft under the 2001 FYDP are smaller than the number needed for steady-state replacement. The Navy plans to buy 710 new aircraft, or an average of 118 a year. Those planes include the F/A-18E/F (fighter/attack) aircraft, the tilt-rotor V-22 (which can fly like a helicopter or a

Table 4.
The Navy's Planned Purchases of New Ships and Aircraft Through 2020

	2000-2005		2006-2020 ^a	
	Total Purchase	Annual Average	Total Purchase	Annual Average
Ships				
Aircraft carriers	1	0.2	4	0.3
Surface combatants	14	2.3	48	3.2
Submarines	5	0.8	38	2.5
Amphibious ships	11	1.8	5	0.3
All others	<u>14</u>	<u>2.3</u>	<u>33</u>	<u>2.2</u>
Total	45	7.5	128	8.5
Aircraft				
Fighters	267	44.5	219	14.6
Strike aircraft	0	0	984	65.6
Medium lift aircraft	246	41.0	374	24.9
Trainers	160	26.7	210	14.0
All others	<u>37</u>	<u>6.2</u>	<u>439</u>	<u>29.2</u>
Total	710	118.3	2,226	148.4

SOURCE: Congressional Budget Office based on data from the Navy.

a. These purchases represent the Navy's preliminary projections for the future rather than its official requirements or programmatic decisions.

propeller plane) for transporting Marine Corps troops and equipment, several training aircraft, and an upgraded version of the E-2C early-warning aircraft. Overall, CBO estimates that the Navy's requirement for planes is about 3,500. Assuming an average service life of about 30 years per plane, the Navy would have to buy about 150 aircraft a year to fulfill its steady-state requirement.

Sustaining the 300-Ship Fleet Beyond 2005

Sustaining the Navy's force goal of about 300 ships over the long term (in this analysis, the next two decades) will require inflation-adjusted budgets of \$105 billion a year, by CBO's estimate. Yet the average Navy budget over the next five years will be \$88 billion, according to the 2001 FYDP. Under that plan, the Navy would not have enough funds to support its

force goals on a steady-state basis. Thus, it would have to either receive more resources than it is now expected to get or reduce its force structure.²

Estimating the Navy's Long-Term Budget Requirements

CBO estimated how much money the Department of the Navy needs to sustain and modernize its force structure between 2001 and 2020 by determining the level of funding necessary in each of the major budget accounts: procurement, personnel, operation and maintenance, research and development, military construction, and family housing.

For ship and aircraft procurement, CBO estimated a sustaining budget under which the Navy

2. The Department of Defense as a whole faces similar problems over the long term. For more details, see Congressional Budget Office, *Budgeting for Defense: Maintaining Today's Forces* (September 2000).

would buy the appropriate numbers each year to replenish its fleet and its inventory of aircraft as they age. To estimate that budget, CBO first determined the annual purchases required for replenishment by dividing the Navy's inventories of ships and aircraft by the service life of each type of vessel and plane. (In the case of aircraft, CBO added an adjustment for expected annual losses through accidents, combat, or other sources of attrition.) Those annual purchases were then multiplied by CBO's estimates of the unit (per-item) cost for each type of ship or plane. The results were a required budget of \$10.8 billion per year (in 2000 dollars) for new ships and \$10.2 billion for new aircraft (see Table 5). By comparison, the average amounts budgeted for those categories under the 2001 FYDP are \$9.4 billion and \$8.1 billion, respectively.

Table 5.
Estimated Annual Budget Needed to Sustain the Planned Navy Through Fiscal Year 2020 Compared with Annual Funding Under the 2001 FYDP (In billions of 2000 dollars)

Budget Category	Average Annual Funding Under the 2001 FYDP	Annual Sustaining Budget (CBO Estimate)
Procurement		
Ships	9.4	10.8
Aircraft	8.1	10.2
Other	7.7	13.9
Military Personnel	26.0	29.5
Operation and Maintenance	26.0	27.4
Research and Development	8.3	10.3
Military Construction	1.0	1.4
Family Housing	1.2	1.1
Other	<u>-0.5</u>	<u>-0.4</u>
Total	88.2	105.0

SOURCE: Congressional Budget Office.

NOTE: 2001 FYDP = Future Years Defense Program for fiscal years 2001 through 2005.

For other procurement—including such items as missiles, trucks, communications equipment, and equipment modifications—CBO's estimate was based on past spending for those items and on the relationship between that spending and spending for ships and aircraft.

For the budget categories of military personnel and operation and maintenance, CBO used the appropriations for fiscal year 2000 and adjusted them for inflation and for anticipated increases in military pay over the 2001-2020 period. Thus, CBO's estimate provides operating and support funding that would maintain the current levels of operations, maintenance, and support. That estimate also includes an allowance for pay increases to keep the compensation of Navy uniformed and civilian personnel competitive with compensation in the private sector (which is expected to increase, in inflation-adjusted terms, along with labor productivity).

For research and development, CBO used a value determined by the historical budget share devoted to that category since 1974. The Navy has generally spent about 10 percent of its total budget on research and development, which would amount to about \$10.3 billion of CBO's estimated annual sustaining budget.

For military construction, CBO estimated the amount required to sustain the Navy's existing infrastructure of bases, naval air stations, and so forth. CBO's figure, \$1.4 billion per year (in 2000 dollars), is based on what the Department of the Navy spent on facilities during the 1980s—the last period, according to many defense leaders, in which investment in military construction approached the level needed to sustain the Navy's infrastructure. That estimate does not take into account future base closings that might generate savings.

For family housing, CBO estimated the replacement value of the Navy's stock of family housing, based on recent construction costs per unit. Dividing that sum by 50 produced an estimate of how much the Navy would need to spend annually on construction and revitalization, assuming its housing units have an average service life of 50 years.

Long-Term Shipbuilding Rates

The Navy's long-range planning calls for purchasing 128 new ships between 2006 and 2020—an average of 8.5 per year (see Table 4). Specifically, the Navy hopes to build four aircraft carriers, 48 DD-21 land-attack destroyers and CG-21 air-dominance cruisers, 38 attack and ballistic missile submarines, five amphibious ships, and 33 mine warfare ships and fleet auxiliaries. Under that building program, the Navy would be able to maintain a 300-ship fleet through the next decade, but by 2020, the fleet would fall to about 290 ships, according to CBO's analysis of the Navy's current fleet, the remaining service lives of those ships, and planned commissionings and decommissionings. To maintain a 300-ship Navy through 2020—assuming an average service life of 35 years per vessel fleet-wide—would require a building rate of 8.6 ships a year.

The Navy already plans to keep some ships longer than it had expected when they were first constructed. For aircraft carriers, the Navy used to assume an average service life of 45 years, but today, 50 years is the norm. Similarly, when the Navy first built its force of Trident ballistic missile submarines, it assumed a service life of 30 years, which is typical for a submarine. Now, the Navy assumes that Trident subs will last between 40 and 42 years. In addition, the Navy is planning to make a modest investment in extra maintenance to keep some Los Angeles class submarines for 33 years—up from 30 years. Finally, some new classes of ships may have longer service lives than their predecessors.³

Those planned extensions of service life do not mean that the Navy is continuing to use ships that it should have retired. Projected service lives depend on

many factors such as the amount of time ships spend at sea, the intensity of their use, and the quality of the maintenance they receive. For example, Trident ballistic missile submarines, unlike attack submarines, tend to sail relatively slowly and in relatively shallow water. Their mission is to hide and stay quiet, not track and hunt other submarines. Because their hulls do not undergo the same kind of stress that attack submarines face, they can remain in the fleet longer.

Despite longer service lives, achieving the Navy's force goal for ships over the long term will cost considerably more than the level of funding the service is receiving under the 2001 FYDP. As noted above, CBO estimates that the Navy needs to spend about \$10.8 billion a year on ship construction to maintain a 300-ship fleet through 2020. But under the 2001 FYDP, it will spend an average of \$1.4 billion a year less than that.

The relationship between the Navy's force goals and budget levels is illustrated by its programs for the attack submarine fleet. The Navy plans to build less than one attack submarine a year between 2000 and 2006. That low rate of production is sufficient to maintain a fleet of 55 attack subs through 2015 because the Navy has many more Los Angeles class submarines with useful service life left in them than it needs. But continuing to build one new attack submarine a year indefinitely would lead to a fleet of 28 by 2028, and 33 in the very long term, as older subs were retired at a faster rate than they were replaced. Maintaining the 55-sub force for a longer period means that the Navy must increase procurement to two submarines a year after 2006. Annual costs for producing two submarines a year would be about \$3.5 billion—approximately half of the Navy's total shipbuilding budget for 2000 (a year in which the Navy is not buying an aircraft carrier).

Long-Term Aircraft Procurement

To fulfill its long-term requirements for aircraft, the Navy plans to buy 2,226 planes during the 2006-2020 period, or an average of 148 a year. Those planes consist of various types of fixed-wing aircraft: the F/A-18E/F, two versions of the Joint Strike Fighter (one for the Navy's carrier air wings and one for the

3. Some analysts question whether the Navy will be able to keep its ships as long as it plans. For example, the average service life for surface ships historically is less than 30 years (indeed, most classes are well below that), but the Navy's notional service life is 35 years. That historical average is based on Navy data, but those data do not distinguish between ships that were retired because they wore out and ships that were retired because the Navy no longer wanted or needed them. During the 1990s, the Navy retired many ships before they reached the end of their notional service life because Navy budgets were declining and the service could no longer afford to keep a larger fleet. There are increased costs associated with retaining ships longer, but it is not clear whether those costs are to keep the ship operating or for technological improvements.

Marine Corps), new support aircraft, a new jammer to replace the Navy's EA-6B, and a new early-warning aircraft to replace the E-2C. The Navy also intends to buy the V-22 tilt-rotor aircraft (as medium lift to transport troops and equipment for the Marine Corps) and to remanufacture (completely overhaul) the SH-60 antisubmarine helicopter and various support aircraft. However, those plans would leave the Navy with fewer aircraft than it needs to maintain its inventory on a steady-state basis—continuing a trend evident during the 1990s.

Even though it would be buying many fewer aircraft than its steady-state requirement, the Navy's planned purchases are sizable. The schedule for the F/A-18E/F calls for producing 48 planes annually for most of the next decade. Purchases of that plane are expected to total 548 (much less than the original goal of about 1,000 aircraft for the Navy and Marine Corps). Production of the Joint Strike Fighter is expected to start with 12 aircraft in 2006. Purchases increase to 84 per year by 2011, for a total of about 1,000 planes between 2006 and 2020. The Navy's schedule for the V-22 completes production at 403 aircraft by 2014.

Increasing aircraft production by enough to sustain the Navy's inventory would be virtually impossible at current budget levels. By CBO's estimate, the steady-state procurement costs for that inventory are about \$10.2 billion a year (in 2000 dollars). But aircraft production is budgeted for an average of about \$8 billion a year under the 2001 FYDP.

The Increasing Age of the Fleet

Today's fleet is relatively young. Under the Navy's procurement plans, the average age of many of the principal classes of ship in that fleet would increase, but only slightly. The average age of attack submarines would initially rise and then fall back to about 16

Table 6.
Average Age of Navy Ships, 2000 and 2020
(In years)

	2000	2020	Expected Service Life
Aircraft Carriers	21	25	50
Surface Combatants	13	18	35
Attack Submarines	13	16	33
Ballistic Missile Submarines	11	29	40
Amphibious Ships	20	20	40
Combat Logistics Ships	19	16	35
Mine Warfare Ships	8	21	30
Fleet Auxiliaries	15	14	35

SOURCE: Congressional Budget Office.

years by 2020, as the Virginia class submarines were procured in quantity. The average age of surface warships would increase from about 13 years today to 18 years by 2020; the average age of amphibious ships would initially decline from its current level of 20 years and then return to that number by 2020; and the average age of aircraft carriers would increase from about 21 years to 25 years (see Table 6). One notable problem could be the Navy's ballistic missile submarines. Under current plans, the average age of that fleet would increase from about 11 years today to 29 years by 2020. Apparently, the Navy does not plan to buy any new boats until that latter date. Overall, the average age of the total fleet would rise from about 14 years now to 19 years by 2020. Moreover, in that year, almost two-thirds of the fleet would be older than the midpoint of the ships' average service life of 35 years.⁴

4. For a discussion of the aging of the Navy's aircraft, see Congressional Budget Office, *A Look at Tomorrow's Tactical Air Forces*, and the statement of Lane Pierrot, Senior Analyst, National Security Division, Congressional Budget Office, before the Subcommittee on Military Procurement of the House Committee on Armed Services, February 24, 1999.