

Statement of
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before the
Subcommittee on Conventional Forces and Alliance Defense
Committee on Armed Services
United States Senate

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INTRODUCTION

Mr. Chairman, I appreciate the opportunity to testify today on issues related to Navy aircraft. The Congressional Budget Office (CBO) has been asked by this Committee to study the balance between the Navy's aircraft inventory and its requirements. My testimony today provides preliminary results of that analysis.

Based on assumptions supplied by the Navy, and on the five-year plan for aircraft procurement that accompanies the 1988 budget, the Navy's inventory of combat aircraft will fall short of requirements by a total of 222 planes in 1994, the earliest year when all of the planes procured in the 1988 five-year plan will have been delivered. This shortfall, which equals about 5 percent of requirements, occurs mostly because the Navy plans to buy fewer planes under this year's plan but has not significantly changed its requirements.

The Navy may be able to accommodate these shortfalls, though doing so may adversely affect the fleet in peacetime and even more so in war. If the Navy decides not to accommodate the shortfalls, it would need additional funds for aircraft. The costs of buying planes to meet the shortfall of 222 combat aircraft could total more than \$8 billion in today's dollars.

Moreover, the shortfall of 222 combat aircraft assumes that aircraft retire at an average age of 26 years. Planning factors used by the Navy in the recent past call for retirement at an average age of 23 years; actual

retirement ages for combat aircraft now being retired (**F-4 fighters**) average about 19 years. If aircraft were retired at 23 years, it would lead to a shortfall of about 650 aircraft in **1994**.

AIRCRAFT SHORTFALLS AND COSTS TO MEET THEM_____

My testimony this afternoon deals specifically with Navy combat aircraft and helicopters (those bought in the portion of the **Navy's** aircraft procurement account called Budget Activity 01 or "combat" aircraft). These **aircraft** are **flown** by active and reserve pilots and include:

- o Navy carrier-based forces;
- o Navy antisubmarine warfare (**ASW**) aircraft and helicopters, including those based on land and on ships; and
- o Marine Corps **aircraft**.

In 1988, procurement costs for these combat aircraft amounted to **\$6.4** billion or about 65 percent of all Navy aircraft procurement costs.

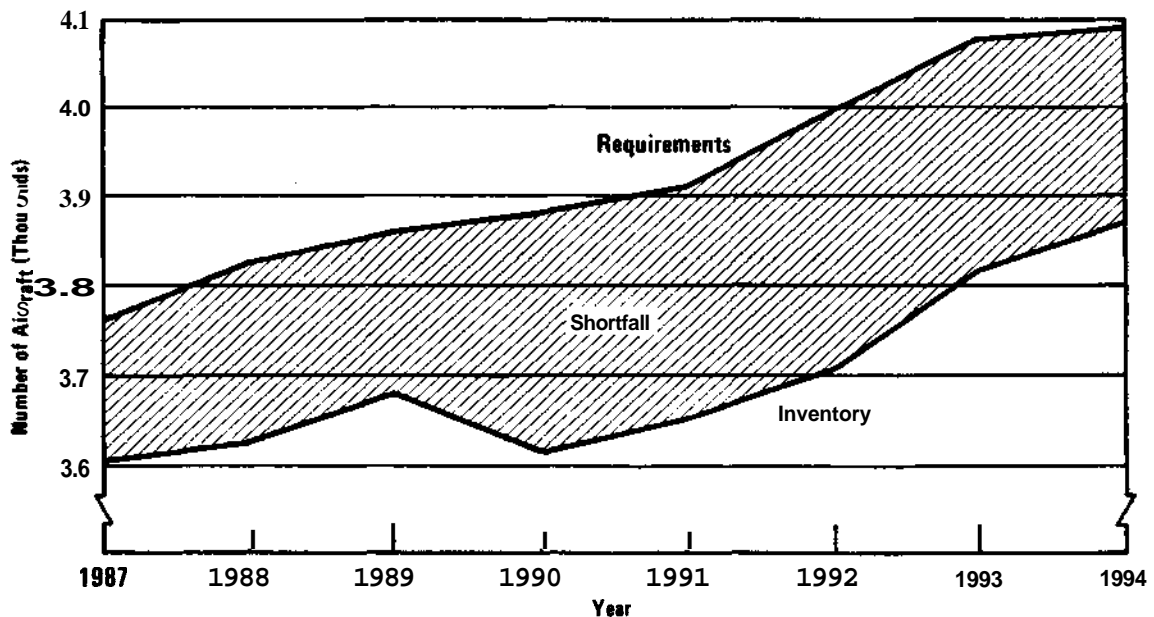
Projected Shortfalls

The requirements for these forces and for the aircraft that are bought to support **them--shown** in the requirements line in the accompanying figure—

total 3,820 in 1987 and increase to 4,085 by 1994. Most of the increases in requirements result from fully equipping squadrons and wings that have less than their complete complement today. These requirements are based on Navy plans detailing, for example, the required numbers of squadrons and planes per squadron. In aggregate, requirements assume 16 carrier-based air wings (14 active and 2 reserve), 37 land-based ASW squadrons, 4 Marine Corps wings (3 active and 1 reserve), and other aircraft.

Inventories of planes to supply these forces total 3,601 now and will increase to 3,863 by 1994, based on the Navy's five-year budget plan for aircraft procurement and a variety of assumptions supplied by the Navy. These assumptions include such factors as how long planes will be in service

Department of the Navy Combat Aircraft (Requirements and Inventory)



SOURCE: Congressional Budget Office from Department of the Navy data.

and how many will crash per year in peacetime accidents. (The accompanying figure shows the **Navy's** inventory from 1987 to 1994.)

Comparing the 1994 total for requirements with the 1994 total for **inventories**--the bracketed difference in the figure—shows that the Navy will be short 222 planes. Details in Table 1 show shortfalls of 12 types of aircraft offset by small excesses of 2 types of aircraft. Net shortfalls grow from a level of 157 in 1987 to 222 by 199*.

Shortfalls in upcoming years may be symptomatic of a longer-run problem. The Navy testified in 1985 that it needed to buy an average of about 350 **aircraft** a year to meet its needs. In the next five years, the Navy plans to buy an average of only 260 **aircraft** a year.

Presumably, the Navy can accommodate some level of shortfalls, as it is doing today. Moreover, it can probably do so without deploying aircraft carriers or other units with fewer than their **full** complement of aircraft in peacetime. Table 2 shows categories of requirements in 199* for one type of aircraft (the **A-6** attack plane). About 67 percent of total required aircraft would be deployed or preparing to be deployed, and only about a third of those would actually be deployed. The remainder of requirements is needed for keeping combat squadrons equipped with planes while some are being repaired and modified (15 percent for its "pipeline"), testing new weapons and tactics (2 percent), and providing training for pilots who have never flown combat aircraft or who have not flown recently (15 percent). The Navy indicates that needs for deployed units can be met by removing

TABLE 1. SHORTFALLS (OVERAGES) OF NAVY AIRCRAFT IN 1994

System	Quantity Short (Over)
F-14	16
F/A-18	5
A-6	61
AV-8	(13)
EA-6	27
E-2	(10)
S-3A	45
SH-60B	10
SH-60F	7
P-3	49
SH-2	9
CH-53	5
CH-46/V-22	4
AH-1	7
Net Shortfall	222

SOURCE: Congressional Budget Office estimates based on Department of the Navy Data.

TABLE 2. CATEGORIES OF AIRCRAFT REQUIREMENTS—
FOR THE A-6 IN 1994

Category of Requirement	Number of Planes	As Percent of Total ^{a/}
Deploying or Preparing to Deploy	352 ^{b/}	67
Deployed		
Just back from deployment		
In workup for next deployment (including squadrons coming up to full strength in personnel and squadrons at full strength)		
Maintenance and Modification ("Pipeline")	80	15
Additional Requirements		
Support of research and development and other miscellaneous requirements	12	2
Training squadrons for pilots with no recent flight experience in combat aircraft (Fleet Replenishment Squadrons-FRS)	81	15
Total Requirement	525	100

SOURCE: Congressional Budget Office estimates from Department of the Navy data.

- a. Details do not add to total because of rounding.
- b. Includes requirements for Marine Corps and Navy Reserve.

planes from squadrons that have just returned from deployment and giving them to squadrons that are about to deploy (a technique known as cross-decking). The Navy also says that, at least temporarily, it can reduce the amount of time spent in routine maintenance or reduce planned modifications, thus freeing some in the aircraft pipeline for duty on deploying units.

These accommodations, however, may reduce defense capabilities, particularly in wartime. Crossdecking of aircraft means they fly more in peacetime and thus age faster. Reducing time in routine maintenance may also make planes wear out faster, while reducing the time for modifications decreases the Navy's ability to offset technological obsolescence by upgrading older planes to enhance their capabilities. Perhaps most important, in wartime the Navy would want to deploy immediately many units that, in peacetime, are in workup for deployment. Shortfalls that can be accommodated in peacetime may lead to units deploying in wartime without all their assigned aircraft. Shortfalls would also mean small reserves available to replace aircraft damaged in combat.

Thus, I think these shortfalls are best interpreted as exacerbating problems of aging and maintenance in peacetime and potentially reducing capability in wartime. They may also suggest an added expense if the Navy decides it must buy more **aircraft** to meet the shortfalls.

Costs of Meeting Shortfalls

The costs associated with buying enough aircraft to meet shortfalls in 1994 would total \$8.2 billion in fiscal year 1988 dollars. This amount represents costs of about \$9.2 billion to meet shortfalls offset by \$1.0 billion associated with not buying as many of the two types of aircraft that are in excess. Table 3 provides the additional costs or savings by aircraft type. For at least one of these aircraft (the S-3, which represents \$1.6 billion or about 20 percent of the net cost), shortfalls could probably not be filled over the next five years because the production line is closed.

These costs are intended as rough approximations of added spending to meet shortfalls, not as an alternative budget. The costs generally assume that planes are bought at the same unit price that the Navy expects to pay for them in 1992, deflated to 1988 dollars. This unit price implies that shortfalls are met by extending procurement at currently planned rates; costs would be lower if shortfalls were met by increasing production rates. Nor are these estimates based on year-by-year costs, which would take into consideration other factors such as learning-curve **effects**.

AIRCRAFT AGE AND SHORTFALLS

The age of aircraft is important in determining the size of shortfalls and, the Navy argues, is also an important indicator of capability and maintainability. A younger fleet can better maintain superiority in the face of an increasingly capable enemy threat. It will also be down for repairs

TABLE 3. COST/SAVINGS OF MEETING SHORTFALLS AND AVOIDING EXCESSES (1988 Budget Authority)

System	1992 Procurement Unit Cost (In millions of 1988 Dollars)	Quantity Short (Over)	Cost (In billions)
F-14	73.7 <u>a/</u>	16	1.2
F/A-18	24.8	5	0.1
A-6	35.3	61	2.2
AV-8	20.7	(13)	(0.3)
EA-6	49.8	27	1.3
E-2	68.8	(10)	(0.7)
S-3	36.2 <u>b/</u>	45	1.6
SH-60B	17.1	10	0.2
SH-60F	16.6	7	0.1
P-3	41.4	49	2.0
SH-2	8.9 <u>c/</u>	9	0.1
CH-53	30.8	5	0.2
CH-46/V-22	36.2	4	0.1
AH-1	8.1 <u>d/</u>	<u>7</u>	<u>0.1</u>
Net Shortfall		222	8.2

SOURCE: Congressional Budget Office from the fiscal year 1988 Budget Submission and Navy data.

- a. 1989 procurement unit cost deflated to 1988 dollars.
- b. V-22 procurement unit cost used as a proxy.
- c. 1987 procurement unit cost inflated to 1988 dollars.
- d. 1988 procurement unit cost.

less in peacetime, which aids in training, and should be cheaper to operate and maintain. In terms of age, the Navy's current plans produce an overall fleet that may be modestly less capable than **today's** fleet. The Navy combat aircraft fleet will have an average age of 12.8 years in **1994** compared with 12.1 years today. However, considering only fighter and attack **aircraft--the** portion of the fleet for which aging is of most **concern--the** fleet averages 10.7 years of age today and decreases to 10.3 years by **1994**.

Navy plans assume that combat **aircraft** will be retired at ages ranging from 13 years to 37 years with an average of 26 years (see Table 4). The Navy argues that, by **modifying** the **aircraft**, it can keep them to an average of 26 years. Currently, for example, the **Navy** plans to modify older **F-14** aircraft and extend their lives, with new engines and avionics designed to meet advanced enemy threats. Similar modifications are also planned for older A-6 **aircraft**.

While modifications may well extend service lives, an average retirement age of 26 years is high by other Navy standards and those of recent experience. For the past few years, the Naval Aviation **Plan--a** document published annually by the service to describe its aviation **requirements--called** for retirement of combat aircraft at around 20 years of service. Retirement ages in the Naval Aviation Plan may be lower than those I discussed earlier because the aviation plan is not constrained by budgets. The **F-4** fighter aircraft that the Navy has retired so far, however,

TABLE 4. NAVY ESTIMATES FOR AIRCRAFT RETIREMENT AGES

	Navy Retirement Estimate <u>a/</u>	Navy Service Life Estimate <u>b/</u>
F-14A	27	18
F/A-18	16	15
F-4	19	19
A-7E	17	17
A-6	32	23
AV-8B	15	15
AV-8A/C	13	13
A-4	33	32
EA-6	37	20
E-2	21	17
S-3A	24	24
SH-3, SH-60F	29	23
P-3	30	30
SH-60B	22	22
SH-2F	34	24
CH-53	28	28
CH-46E/V-22	33	33
AH-13/T/W	30	30
Weighted Average <u>c/</u>	26	23

SOURCE: Congressional Budget Office estimates of Department of the Navy retirement ages.

- a. Retirement estimate supplied by the Navy in March 1987.
- b. Service lives supplied by the Navy in February 1987.
- c. Ages weighted by numbers of aircraft in the 1987 inventory.

have averaged 19 years at retirement. Moreover, the Navy's methods of accommodating shortfalls may make planes wear out faster and decrease their availability for modification, making earlier retirement more likely.

Finally, the Navy does not appear to have always used the retirement ages it is now proposing in preparing its five-year budgets. If the Navy had been using these ages last year, when it planned to buy more aircraft than it now plans to buy, then the service would have been procuring about 230 more aircraft than it needed to meet its requirements.

To illustrate the sensitivity of **aircraft** shortfalls to assumptions about retirement, CBO estimated shortfalls based on service lives supplied by the Navy earlier this year (see Table 4). These service lives represent engineering estimates of when planes should retire, whereas the retirement ages used earlier represent current plans that may reflect budgets and the **Navy's** plans for aircraft modification. Planned service **lives** average 23 years, still greater than the 20-year average in the Naval Aviation Plan but less than the 26 years assumed under current plans. If the Navy were to decide that service lives were the more realistic estimates, then the shortfall in combat aircraft would grow to about 650 planes by 1994. Using the rough costing method discussed earlier, costs to meet this shortfall would total about \$26 billion in **today's** dollars.

CBO cannot judge whether an average age of 26 years is too high or too low and so has accepted the **Navy's** plans in the basic shortfalls noted in

my testimony. Clearly, however, there is some uncertainty about retirement ages that leads to uncertainty about the size of future shortfalls.

COMPARISONS OF 1986 AND 1987 PROCUREMENT PLANS_____

The main reason for shortfalls of combat aircraft is the **Navy's** decision to buy fewer **aircraft**. Each year the Navy supplies the Congress with a five-year plan for aircraft procurement. The latest five-year plan buys **440** fewer aircraft in 1988 to 1991 than did last year's plan. (The years 1988 to 1991 represent the common four years of the two plans.) Generally, the latest Navy plan has not cut back on the total number of aircraft that the Navy eventually plans to buy. Rather this year's plan "stretches out" production by cutting back on the rate of annual procurement. The rate of procurement of four planes was reduced by an average of about 50 percent below last year's rates. Only one combat aircraft (the P-3) has higher rates in this year's plan (21 a year instead of 9).

Stretch-outs lengthen the years that Navy **aircraft** are in procurement, leading to concerns about technological obsolescence. Assuming currently planned rates of buy, Table 5 shows how many years the Navy will have been buying eight major types of combat aircraft when their planned buy is complete. Four of the eight types will have been in procurement for 20 or more years. One (the P-3) will have been in procurement for more than 30 years. Adding development time means that, when buys are completed, the basic design of most Navy aircraft will be 20 to 30 years old and sometimes

TABLE 5. PRODUCTION PERIODS FOR SELECTED NAVY AIRCRAFT,
ASSUMING CURRENTLY PLANNED RATES OF BUYS

System	Years From First to Last Production <u>a/</u>	Year Complete
A-6E/F	24	1993
F-14 A/D	28	1998
F/A-18	17	1995
EA-6	9	1992
E-2C	20	1992
LAMPS	14	1995
P-3 Total Program	36	1995

SOURCE: Selected Acquisition Reports and data from Lockheed Corporation.

- a. These production periods exclude the time that these **aircraft** spent in development. Total program lives, including development, would be much longer in some cases.

substantially more than 30 years. Many of these **aircraft** have been or will be modified with new avionics, structural enhancements, or other improvements during these long procurement periods. But the basic design of the **aircraft** limits what modifications can do to accommodate new enemy threats. In particular, incorporating stealth **technology**--which helps planes evade enemy radars and is receiving great emphasis in DoD's designs for new **aircraft**--**requires** a new basic design.

Stretch-outs of production could also add to total costs. Generally, weapons bought more slowly cost more per unit than those bought at higher rates. Estimates provided by the Navy indicate that reductions in aircraft buy rates relative to those planned last year would add an average of **14** percent to the unit costs of the four aircraft with slower rates. These results suggest that the Navy's currently planned procurement rates add \$1.7 billion in **today's** dollars to costs (see Table 6). Added costs assume that all aircraft the Navy eventually plans to buy are purchased at the slower rates of procurement in this year's plan rather than the faster rates in last year's plan.

Added costs vary depending on assumptions. One could argue that costs should be based only on aircraft being purchased over the next five years. Under this assumption, added costs amount to \$1.1 **billion**. On the other hand, all these estimates assume that efficiencies in production **affect** only recurring "**flyaway**" costs. (Recurring **flyaway** costs pay largely for the airframe, engine, and systems that make a plane fly.) Total aircraft

TABLE 6. ADDED COSTS (SAVINGS) ASSOCIATED WITH CURRENTLY PLANNED PROCUREMENT RATES FOR NAVY COMBAT AIRCRAFT ^{a/}
(In billions of fiscal year 1988 dollars)

System	Average Annual Rate of Buy in Plan		Change in Costs (In billions)
	Current Plan	Last Year's Plan	
Total Planned Buy (Savings in Recurring Flyaway Costs Only)			
EA-6	8	11	0.1
AV-8	19	37	0.6
F/A-18	73	145	0.8
F-14	12	22	0.9
P-3	<u>21</u>	<u>9</u>	<u>(0.7)</u>
Total	26	45	1.7
Five-Year Buy Only (Savings in Recurring Flyaway Costs Only)			
Total	27	45	1.1
Total Planned Buy (Savings in Total Procurement Cost)			
Total	26	45	2.5

SOURCE: CBO estimates from Department of the Navy data and Selected Acquisition Reports.

- a. Costs are associated with slowing the rate of buy for four aircraft from the average buy in the plan submitted last year to the average buy in this year's plan. Savings for the P-3 aircraft reflect a faster buyrate.

procurement costs, which are substantially higher, include funding for initial spare parts, ground support equipment, and other support items. It may be that spare parts and ground support equipment bought at higher rates would cost less per unit. Basing the analysis on total procurement costs and all the aircraft the Navy intends to buy could lead to added costs of \$2.5 billion in today's dollars.

CBO intends these as rough approximations of the costs of stretch-outs. We have not reviewed the Navy unit-cost relationships, though they are generally consistent with results of CBO's other work on the costs of stretch-outs done for this Committee. Nor have we estimated year-by-year savings and applied economic discounting.

CONCLUSION

Given its current planning assumptions, Mr. Chairman, the Navy is not buying enough combat aircraft to meet its needs. Shortfalls by 1994 would amount to 222 aircraft or about 5 percent of requirements. If the Navy were to retire its aircraft at an average age of 23 years instead of its currently planned 26 years, shortfalls would grow to about 650 aircraft. Retirement at an average age of 23 years is more consistent with some Navy planning factors and with recent experience with retirement of F-4 aircraft.

These shortfalls result from applying planning factors that could change with actual experience. The Navy may also be able to accommodate

some level of shortfall, as it is apparently doing today. But continuing to do so could increase problems associated with aging and could reduce combat capability in war. Alternatively, the Navy may change its aircraft budget requests. If, for example, the Navy decided that it needed to meet all shortfalls suggested by current **planning** assumptions, added costs would exceed \$8 billion in today's dollars.

Alternatives to pay for the added costs of aircraft are beyond the scope of my testimony today. Unless additional dollars are available for the Navy, however, offsetting the added costs would require reductions in operating costs that pay for **day-to-day** readiness or in investment costs not related to aircraft. Such reductions in investment could lead to the purchase of fewer ships or fewer weapons to put on the Navy's fleet of ships and **aircraft**.