

August 1993

NAVAL AVIATION

Consider All Alternatives Before Proceeding With the F/A-18E/F



**National Security and
International Affairs Division**

B-248882

August 27, 1993

The Honorable Les Aspin
The Secretary of Defense

Dear Mr. Secretary:

This report discusses the Navy's decision to develop the F/A-18E/F aircraft.¹ We believe the results of our examination should be fully considered in your ongoing review of the type and mix of fixed-wing tactical aircraft that will be required for future conflicts.

Results in Brief

We believe the decision to develop the F/A-18E/F was premature. The F/A-18E/F was not justified to counter a particular military threat that could not be met with current capabilities. Rather, the primary reason for developing the F/A-18E/F was to have available an aircraft large enough to carry improved weapons and electronic systems that were expected to become available in the future.

Even assuming a valid military threat, the Navy made no analyses to determine whether the threat could be met by changing tactics or strategy or by using weapon systems in the inventory of another military service. Further, pursuing F/A-18E/F development at this time may preclude consideration of other viable ways to accomplish the mission.

In this time of changing military threats and reduced military funding, we believe the need for the F/A-18E/F program has not been adequately justified. This justification should have gone beyond a mere attempt to demonstrate which fixed-wing Navy aircraft would be most desirable.

Background

According to the Navy, all three of its carrier-based fighter or attack aircraft—the F-14, the A-6E, and the F/A-18—will reach the end of their fatigue lives after the turn of the century and will need to be replaced. F-14s are fighter aircraft used for air-to-air combat, A-6Es are used to attack surface targets, and F/A-18s are used for both air-to-air and surface attack missions. Because of budget constraints, the Navy plans to reduce the number of carrier-based fighters and attack aircraft from three types to two.

¹The F/A-18E will have one seat, and the F/A-18F will have two.

The Navy decided to develop the F/A-18E/F to eventually replace both the F/A-18 and the F-14 and to develop an entirely new aircraft, the A/FX, to replace the A-6E. Although F/A-18C/Ds are still being produced, F-14s and A-6Es are not.

Compared to the F/A-18C/D, the Navy expects the F/A-18E/F will have a 34-inch fuselage extension, a 25-percent bigger wing, a larger tail, and a new engine with 35 percent more thrust. It will be able to carry 3,600 pounds more internal fuel than earlier versions of the F/A-18. Various changes will be made to increase the aircraft's survivability in combat.

According to the Navy, modifying existing F/A-18s to the F/A-18E/F configuration would not be practicable because of the extensive differences between the F/A-18E/F and prior F/A-18 models. Further, much new tooling will be needed to produce the F/A-18E/Fs. The F/A-18E/F life-cycle cost estimate in 1990 dollars is about \$85 billion.

The F/A-18E/F will conduct strike missions to project offensive power against an enemy on the ground or water and will also conduct anti-air missions to protect the carrier task force from enemy aircraft and missiles. The strike or surface attack mission is now being performed by Navy F/A-18s, A-6s, and Tomahawk cruise missiles launched by surface ships and submarines. It can also be performed by several Air Force and Army aircraft and missiles. Maintaining air superiority by engaging or eliminating enemy aircraft can now be performed by Navy F-14s, F/A-18s, and the Aegis combat system² as well as Air Force aircraft and missiles.

In April 1991, prior to the Defense Acquisition Board review, Grumman Aircraft Company made an unsolicited offer to build a variant of the F-14 aircraft as a competitor to the F/A-18E/F. This aircraft would have added ground attack capabilities to the F-14D. Between receipt of the Grumman proposal and approval for the F/A-18E/F program in May 1992, the Navy made several cost and technical comparisons of the Grumman proposal and the F/A-18E.³

The Defense Acquisition Board, within the Office of the Secretary of Defense, considered the Navy's request to initiate the F/A-18E/F program

²The AEGIS combat system is an integrated network of computers and displays linked to sensors and weapon systems capable of detecting, tracking, and engaging numerous air, surface, and subsurface targets. The AEGIS system is currently carried on Ticonderoga-class cruisers and Arleigh Burke-class destroyers.

³The Navy used only the F/A-18E in its comparisons since it does not intend to use the F/A-18F operationally. The Marine Corps intends to use both types operationally.

on May 6, 1992. The Under Secretary of Defense for Acquisition approved the Navy's development plans on May 12, 1992. The Navy awarded an undefinitized contract to McDonnell Douglas Corporation in July 1992. At the same time, it awarded a similar contract to the General Electric Company to develop the engine.

The Navy's fiscal year 1992 budget request included \$351 million to begin development of the F/A-18E/F. Through fiscal year 1993, the Congress appropriated about \$1.2 billion for the F/A-18E/F program. Of that amount \$510.7 million was obligated by December 3, 1992. The contract was definitized on December 7, 1992.

However, you informed the Congress that an ongoing bottom-up review will determine the type and mix of fixed-wing tactical aircraft needed for future conflicts. The F/A-18E/F is included in that review, which we understand should be completed later this summer.

Anticipated Threat Is Not the Basis for the F/A-18E/F

Documentation presented to the Defense Acquisition Board indicates that the primary reason for developing the F/A-18E/F is to have available an aircraft that can carry more equipment, including electronic equipment, than current F/A-18 models. The Navy also wants an aircraft with greater ability to survive in combat.

A memorandum dated March 24, 1992, from the Vice Chairman of the Joint Chiefs of Staff to the Under Secretary of Defense for Acquisition, stated that

The main consideration in the timing of the need for F/A-18E/F is not an emerging threat nor a declining inventory of existing aircraft but the approaching limit in F/A-18C/D growth potential. In the normal course of incorporation of incremental system upgrades over the years, the F/A-18C/D will have used nearly all its excess volume, electrical capacity, and cooling capacity by FY 1996. In order for us to take advantage of further technology advances as they become available, we will need the growth capacity embodied in the F/A-18E/F.

Documentation presented to the Defense Acquisition Board does not identify what equipment or other improvements are expected to be incorporated in F/A-18E/Fs in the future.

Alternatives Not Fully Considered

Before deciding to acquire the F/A-18E/F, the Navy considered various upgrades to the F-14, but it did not consider weapon systems other than fixed-wing Navy aircraft, such as Air Force bombers or missiles.

According to Department of Defense (DOD) acquisition principles, the services should consider ways of meeting perceived mission needs that do not require developing a new weapon system. For example, changes might be made in tactics or strategy. Alternatively, another military service might be able to meet mission needs with existing systems. Documentation submitted to the Defense Acquisition Board does not show that such alternatives were considered.

Acquisition principles also advise that if no nonhardware solutions are available, consideration should be given to widely divergent types of hardware. For example, in addition to Navy aircraft, Navy or Air Force cruise missiles or Air Force aircraft such as bombers might achieve the desired increases in mission capability. There are no indications that hardware solutions other than fixed-wing aircraft were considered.

Documentation presented to the Defense Acquisition Board indicates that the Navy considered variants of the F-14 and various other new or modified aircraft. Except for one F-14 variant, the Board's deliberations appeared to be based on individuals' knowledge and judgment or on information derived from prior analyses that were only minimally documented in the materials submitted to the Board, rather than on studies performed specifically to compare the F/A-18E/F with other alternatives.

The Office of the Assistant Secretary of Defense for Program Analyses and Evaluation reviewed the Navy's justification for the F/A-18E/F prior to the Board's review. The Office noted that the analyses dealt mainly with aircraft specifications viewed narrowly and that more broadly based analyses of cost and operational effectiveness were not available.

We noted, as did the DOD Inspector General,⁴ that a Cost and Operational Effectiveness Analysis (COEA) was not prepared for the F/A-18E/F program. DOD regulations normally require the preparation of a COEA before a major weapons system is allowed to enter certain phases of the acquisition cycle. The purpose of the COEA is to demonstrate that the

⁴See F/A-18E/F Program as a Part of the Audit of the Effectiveness of the Defense Acquisition Board Review Process—FY 1992 (Report Number 92-097, June 5, 1992).

weapon system to be developed is the most cost-effective solution to a recognized military need.

The Inspector General concluded that without a formal COEA, there were no assurances that alternatives to developing the F/A-18E/F were adequately assessed. Your office responded that a formal COEA was not required, since the F/A-18E/F would be a modification of an existing aircraft rather than a new aircraft. According to departmental regulations, a COEA is not necessarily required for modifications.

Your office also said that the Navy had done several studies and analyses that complied with other DOD documentary requirements. However, the Inspector General concluded that the F/A-18E/F would be so different from existing versions of the F/A-18 that it would essentially be a new aircraft. He also concluded that the Navy's studies and analyses were not adequate substitutes for a formal COEA.

In a subsequent letter dated December 28, 1992, the Inspector General wrote that the Navy's A/FX COEA, dated November 19, 1992, compared the F/A-18E/F to the current F/A-18 configuration and to the proposed A/FX. According to the Inspector General, this analysis responded to his report and demonstrated that the F/A-18E/F was cost and operationally effective against the current threat and would sustain naval superiority against more advanced future threats.

The Inspector General noted, however, that recent events significantly affected the F/A-18E/F program. These events include congressional direction to build prototypes that will extend the engineering and manufacturing development schedule; reductions in the number of deployable aircraft carrier battle groups, which will result in decreased air wing requirements; defense planning guidance mission changes; and cancellation of the Airborne Self-Protection Jammer that was to be installed on the aircraft. He concluded that these events made revision of the COEA essential before low-rate and full-rate production of the F/A-18E/F is approved.

Recommendation

Whether the F/A-18E/F is viewed as a new system or a modification of an existing system, prudence dictates that a comprehensive analysis be done before spending \$85 billion for the program. Therefore, we recommend that you direct the Secretary of the Navy to revalidate the need for another strike/fighter aircraft by demonstrating that there is or will be a military

threat that it cannot meet with present weapon systems and force structure. We recommend that in conducting this analysis the Navy consider the following:

- Can changes be made in military operations, such as modifications to military tactics or strategy to obviate the need for developing a new weapon system?
- Can another military service meet the threat with existing capabilities?
- If the development of a new weapon system cannot be avoided, can another type of weapon system, for example, a missile system, be developed to counter the threat?

If the Navy finds that it needs to develop an aircraft, we recommend that it conduct a thorough analysis of all reasonable alternative aircraft designs on a comparable basis before proceeding with a development program.

Agency Comments

DOD provided written comments on a draft of this report. (See app. I.) Since that time, the economic environment, coupled with reevaluations of U.S. defense needs, has resulted in numerous studies of the affordability and structure of U.S. tactical air needs. We have thus revised the report to which DOD responded to better reflect these changed circumstances.

In responding to our examination of the Navy's decision to develop the F/A-18E/F, DOD agreed that the Navy did not justify the development to respond to a specific threat and did not identify additional systems or equipment that would be incorporated in the future to justify the need for the F/A-18E/F's greater carrying capacity. However, DOD commented that

- expected threats after the year 2000 would require survivability improvements to fixed-wing aircraft and
- current F/A-18s are approaching capacity margins in their ability to safely return to carriers and land without jettisoning some unused fuel and possibly expensive munitions.

The Navy COEA Summary, transmitted by the Assistant Secretary of the Navy (Research, Development and Acquisition) to the Under Secretary of Defense (Acquisition) by memorandum dated May 4, 1992, recognized that while these limitations are significant, the F/A-18C/D could continue to be used well into the next century. The summary also recognized that while the F/A-18C/D's limited range and survivability would constrain

operations, potential threats have stabilized and the anti-air warfare threat has declined due to Eastern European political and economic shifts.

In projecting that the F/A-18C/D would not accommodate additional improvements beyond the planned fiscal year 1996 configuration, the Navy assumed that the threat would increase at the same rate as in the past and that technical improvements to the aircraft to counter the threat would add weight at the same historical rate. Recent analysis appears to dispute this assumption and would give the Navy time to reassess its needs.

While DOD did not fault our finding that the Navy had not made an analysis to determine whether the threat could be met by changing tactics or strategy or by another military service with equipment it had, it believed that the need to develop the F/A-18E/F was documented by various aircraft studies and by a COEA prepared for the Navy's proposed A/FX aircraft. These studies, however, were not conducted as part of the process to determine whether the F/A-18E/F should be developed. Furthermore, they were not adequately documented in the materials considered by the Defense Acquisition Board in their review of the Navy's decision. Finally, the A/FX COEA, which was completed after the decision to develop the F/A-18E/F, compared the F/A-18E/F only with the current F/A-18 and the A/FX.

DOD disagreed with our recommendation that the Navy revalidate the need for another aircraft and indicated that the bottom-up review would determine whether another service could counter the threat for which the F/A-18E/F was intended. This review is now expected to be completed by late summer 1993.

Because the Navy has proposed several aircraft initiatives that would add to its inventory of attack aircraft, which should also be considered in determining the need for the F/A-18E/F, and since the study is expected to be completed shortly, we believe our recommendation to you is appropriate.

Scope and Methodology

In conducting our review, we interviewed officials and reviewed documents from the Offices of the Secretary of Defense, the Secretary of the Navy, the DOD Inspector General, the Chief of Naval Operations; the Navy F/A-18 and F-14 program offices; McDonnell Douglas Corporation; and Grumman Aircraft Company.

We performed our work from March through August 1992 in accordance with generally accepted government auditing standards.

This report contains recommendations to you. The head of a federal agency is required under 31 U.S.C. 720 to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the Senate and House Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Navy; and appropriate congressional committees. We will also make copies available to others on request.

I may be reached at (202) 512-3504 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix II.

Sincerely yours,



Richard Davis
Director, National Security Analysis

Comments From the Department of Defense



ACQUISITION

OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301-3000

20 MAY 1993

Mr. Frank Conahan
 Assistant Comptroller General
 National Security and International
 Affairs Division
 U.S. General Accounting Office
 Washington, D.C. #20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "NAVAL AVIATION: Consider all Alternatives Before Proceeding with the F/A-18-E/F," dated March 26, 1993 (GAO Code 394476), OSD Case 9140-A. The DoD partially concurs with the report.

The GAO implies that the Department of Defense allowed the Navy to proceed with modifying the F/A-18 C/D to become the F/A-18 E/F without adequate justification. In the report, the GAO specifically pointed out that there was not a threat rationale to justify the F/A-18 E/F. In response to the Department of Defense Appropriations Act, 1993 (Public Law 102-396, Section 9141), the DoD issued the classified "Report to Congress on Fixed-Wing Tactical Aviation Modernization," in April 1993. The report includes intelligence data on projected threats in the post-year 2000 period which require improvements in the survivability of tactical fixed-wing aircraft. Those improvements were part of the Department of Defense consideration during the acquisition process for approving the modification of the F/A-18 C/D to the F/A-18 E/F configuration. Immediate requirements for the F/A-18 E/F focused on range, payload, and additional capacity for other weapon systems. The requirements for the F/A-18 E/F are formally documented in the Operations Requirement Document, which was validated by the Joint Requirements Oversight Council.

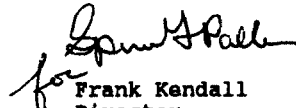
The GAO report confirmed that the F-14D Quickstrike would cost more and be less capable than an F/A-18 E/F. However, the DoD estimates that the savings in life cycle costs when comparing the two aircraft are greater than stated by the GAO.

The Secretary of Defense has informed the Congress that a "Bottom Up Review" is presently underway, which will determine the type and mix of fixed-wing tactical aircraft that will be required for future conflicts. The results of the review should be available by later this summer and will be reflected in the future budget process. Therefore, since an examination of our

Appendix I
Comments From the Department of Defense

fixed-wing tactical aircraft is underway, the DoD does not agree with the GAO suggestion that the Congress withhold funds on F/A-18 E/F. That action could require the Department of Defense to issue stop-work orders regarding on-going contracts if funds are not available.

The detailed DoD comments on the GAO findings, recommendations and matters for congressional consideration are provided in the enclosure. The DoD appreciates the opportunity to comment on the GAO draft report.


for
Frank Kendall
Director
(Tactical Systems)

Enclosure

Major Contributors to This Report

**National Security and
International Affairs
Division, Washington,
D.C.**

**Norman J. Rabkin, Associate Director
William C. Meredith, Assistant Director
Harold D. Padgett, Evaluator-in-Charge
Joseph P. Raffa, Evaluator**

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

**U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015**

or visit:

**Room 1000
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC**

**Orders may also be placed by calling (202) 512-6000
or by using fax number (301) 258-4066.**

**United States
General Accounting Office
Washington, D.C. 20548**

**Official Business
Penalty for Private Use \$300**

<p>First-Class Mail Postage & Fees Paid GAO Permit No. G100</p>
--