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DOD ACQUISITION

Case Study of the Air Force Advanced Tactical Fighter Program



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Preface

The Chairmen of the Senate Committee on Governmental Affairs and its Subcommittee on Oversight of Government Management asked GAO to examine the capabilities of the program manager and contracting officer in weapon systems acquisition. As part of this study, GAO examined 17 new major weapon system programs in their initial stages of development. These case studies document the history of the programs and are being made available for informational purposes.

This study of the Advanced Tactical Fighter Program focuses on the role of the program manager and contracting officer in developing the acquisition strategy. Conclusions and recommendations can be found in our overall report, DOD Acquisition: Strengthening Capabilities of Key Personnel in Systems Acquisition (GAO/NSIAD-86-45, May 12, 1986).


for Frank C. Conahan, Director
National Security and
International Affairs Division

Advanced Tactical Fighter

Origin of Start

The original need for an advanced tactical fighter addressing air-to-surface requirements was released in January 1973, but the need for a newer aircraft was withdrawn from consideration due to developments in the A-10, F-15, and F-16 aircraft. In more than 30 studies between 1976 and 1981, many Department of Defense (DOD) and industry participants analyzed factors relating to a next generation fighter, including threat force structure, mission, performance requirements, and needed technologies.

To counter two new generations of Soviet fighters, the next generation fighter aircraft program was restarted. In May 1981, an unfunded fiscal year 1982 request for information was initiated. Seven major airframe contractors were asked to define expected threat characteristics and establish threshold design parameters for the fighter. In September 1981, a Mission Element Need Statement was validated by the air staff and submitted to the Office of the Secretary of Defense to substantiate a fiscal year 1983 budget request for a new start. On November 23, 1981, the Defense Resources Board approved the program as a fiscal year 1983 new start. At this same time, five other technology projects were begun that have a broader application than to the advanced fighter, but also are of great benefit to it. The five projects¹ will develop and validate some key technologies on test bed aircraft (F-16, F-15, and F-111) and will then be available for incorporation into the new fighter.

Formation of the Project Office

In July 1982, the first manager was assigned to the program in the Aeronautical Systems Division of the Air Force Systems Command under the Deputy for Development Planning. A few months later, in October 1982, he was appointed director of the newly formed concept development team within the development planning organization. The manager had no previous program management experience. He had been a test pilot and had completed program manager training at the Defense Systems Management College

The first contracting officer was a GS-12 contract specialist with about a year and a half of college and about 19 years of procurement experience. He was appointed to the program in January 1983.

¹Joint Advanced Fighter Engine, Fighter Attack Technology, Mission Adaptive Wing, STOL and Maneuver Technology, and Reliability and Maintainability for Fighter Technology Integration

In June 1983, the second program manager was appointed. This program manager had no program management experience, but had a bachelor's and a master's degree in aeronautical engineering. He completed two tours at Air Force headquarters—one at the Tactical Weapons Division, Office of Deputy Chief of Staff for Research and Development, and the second as Chief of the Tactical Systems Division, Office of the Assistant Chief of Staff for Studies and Analyses.

In October 1983, the concept development team was officially designated the system program office within the Aeronautical Systems Division. The concept development team director and former program manager became the deputy program manager. In December 1983, a GM-14 with an bachelor's degree and 21 years of procurement experience became the contracting officer. In April 1984, a GM-14 with an engineering degree and 18 years of experience in aircraft acquisition management became deputy program manager.

Development of the Acquisition Strategy

By August 1984, the Air Force finalized some parts of the acquisition plan. At that time plans included (1) an approved strategy for the concept exploration and demonstration/validation phases, (2) a separate competitive program for acquisition of the engine, and (3) a separate competitive program for acquisition of selected critical technologies. Early strategy for the aircraft concept called for narrowing down industry design concepts and selecting up to four concepts for subsequent component development in the demonstration phase.

Within the Air Force, development of a strategy for acquiring a new system is an iterative process which begins with Air Force Systems Command, in responding to an approved operational need statement, providing the program office with some general parameters regarding such things as competition and funding. With these overall conditions, the program office usually develops a skeleton strategy which is given details and specifics as the program progresses through the acquisition phases (conceptual, demonstration/validation, full-scale development, production and deployment).

As the start of each phase is approached, the detailed strategy for that phase is finalized and proposed to a number of management review panels. The review process culminates with Air Force Systems Command approval of the strategy for that particular phase. Consequently, a system's overall strategy is not finalized and approved until the program reaches the last phase (production and deployment) of acquisition.

Concept Exploration Phase

The strategy approved for the concept exploration phase envisioned awarding contracts to as many as eight sources. Both the concept development team director and contracting officer endorsed heavy competition in this phase.

On November 2, 1982, the Air Force solicited industry via the Commerce Business Daily for eight sources to perform the concept definition studies. The Air Force program element monitor, who is the focal point for the entire program, stated that the amount of competition for this phase was directed from high levels in the Air Force. While both the concept development team director and the contracting officer endorsed heavy competition in the concept exploration phase, the Sources Sought Synopsis (which incorporated the eight source strategy) predated appointment of the contracting officer to the program which occurred in January 1983.

A draft request for proposal for concept definition studies was sent to industry for comment in January 1983. Also, the Aeronautical Systems Division Commander established a special group, later called the special action team, to provide guidance to the concept development team during the conceptual phase. The team consisted of key Aeronautical Systems Division deputies and was chaired by the Aeronautical Systems Division Commander. By involving these key officials in program review, the Commander made use of the collective experience and talents of the staff. At the special team's first meeting in May 1983, the concept development team director and contract officials presented the concept development contracting strategy. The special action team review replaced the usual review by the Aeronautical Systems Division Business Strategy Panel. The concept definition request for proposal was issued in May 1983 after approval by the Aeronautical Systems Division Commander.

The concept development team director and the contracting officer supported competition in concept exploration and as much competition in later phases as funding, sound business and technical judgment would allow. The director advocated a strategy that would (1) maintain ongoing open competition during the concept development phase, (2) preserve competition for the demonstration phase, including critical subsystem technology demonstrations, (3) narrow competition to two or three airframe contractors for the demonstration phase, and (4) explore options for major subsystem competition.

Both the director and the contracting officer participated to varying degrees in several key processes that helped build competition into the concept definition phase. The director assumed responsibility for (1) drafting the proposal evaluation criteria and ensuring that it did not restrict competition, (2) evaluating contractor technical proposals, and (3) setting the competitive range based on available funds and the number of competitors. The contracting officer had primary responsibility for (1) evaluating contractor cost proposals, (2) conducting negotiations, and (3) notifying the winning contractors. Both joined in developing the concept development request for proposal and the statement of work. The director assumed responsibility for the technical evaluation criteria and the contract buyer, under the supervision of the contracting officers, prescribed the business terms and conditions.

In November 1983, about a month after the fighter program was given system program office status, a General Officer Steering Group was established to oversee the program. This group was chaired by the Aeronautical Systems Division Commander. The group evaluated progress made and began formulating a strategy leading to the demonstration phase. Its members agreed that planning for as few as two prime demonstration contractors was too narrow. The group and the program office agreed that the planning should be sufficiently flexible to allow for decisions to be made later concerning the number of demonstration phase prime contractors. Further, the group agreed planning should allow for the possibility of teaming for the advanced development of the integrated avionics for the fighter. The group encouraged continuing competition until the start of full-scale development.

In accordance with the approved strategy, seven concept development contracts were awarded in September 1983 to Boeing, General Dynamics, Grumman, Lockheed, McDonnell Douglas, Northrop, and Rockwell

By May 1984, the contractors had submitted the results of their concept definition studies. However, they agreed to continue their efforts at no cost to the government to bridge the gap between the end of the concept definition contracts and the award of the demonstration phase contracts. This allows the contractors to continue using government test facilities and to have access to sensitive information.

In July 1984, the Aeronautical Systems Division awarded a \$744,038 not-to-exceed technical and analytical study support contract to Veda, Inc. Veda is assisting the program office in assessing preferred concepts,

preparing for the Defense Systems Acquisition Review Council (milestone 1) review, and preparing for the demonstration phase. Veda also assists in preparing the draft system concept paper, cost effectiveness analysis, preliminary integrated logistics support plan, and the demonstration phase statement of work.

The Tactical Air Command drafted a Statement of Operational Need detailing requirements and capabilities for a new air-to-air fighter. The final Statement of Operational Need was forwarded to the air staff for review in October 1984 and was validated in November 1984.

Demonstration/Validation Phase

The initial strategy for this phase provided for awarding up to four firm fixed-price contracts for a 33-month demonstration effort. It evolved from the original program guidance and was refined through industry participation and a series of management reviews.²

The plan was structured to facilitate dual sourcing of critical subsystems during later program phases. The demonstration phase contracts were to be structured to ensure that contractor proprietary data were as available as possible for unrestricted use in later program phases. All solicitations to contractors were to include provisions requesting unlimited data rights and warranty plans to the government after a prescribed number of months of production. Furthermore, selection of the demonstration phase contractors was to be based, in part, on their proposed subcontractor competition plans for full-scale development and production. For limited data rights items included in a proposal, the contractor was to present an alternative plan to ensure subcontractor competition for the item, such as, leader-follower or licensing, to be considered responsive. Airframe contractors were also to maintain design compatibility with the two fighter engine contractors in order to further competition.

Early 1984 Strategy Reviews

Besides the comments and guidance provided by the General Officer Steering Group, the program office also received comments on its initial strategy from two other Aeronautical Systems Division groups, the Business Strategy Panel and the Acquisition Management Panel. The Business Strategy Panel review is required by the Air Force Systems

²Recent strategy changes are discussed on page 10

Command to assist program managers in developing acquisition strategies. To prepare for this command panel, a similar Business Strategy Panel is conducted at the division level.

The division level Business Strategy Panel was held in April 1984 and was chaired by the Division Deputy for Contracting and Manufacturing. The program office adopted the following recommendations:

- Pursue the strategy of having the Air Force contract for the fighter radar competitively and of having the Air Force manage the program.
- Review the use of firm fixed-price contracts for the demonstration phase. (The contract buyer stated this type of contract had been used in the initial plan to limit the government's contract risk in the "spend-to-win" environment which precedes a major down selection.)
- Review the proposed contract and delete terms and conditions not applicable to firm fixed-price contracts.
- Use a revised Limit of Government Obligation clause, which requires the contractor to continue to perform even though funds have been expended up to the fiscal year limit. (The expenditure of funds over the limit for one period can be reimbursed to the contractor in a later period, but the total price of the contract is fixed.)
- Put the contractors on notice during the demonstration phase effort that a warranty/guarantee provision will be included in any production options included in the full-scale development contract and subsequent production contracts.
- Revise the proposal evaluation criteria to address management, manufacturing, and logistics capabilities as separate evaluation areas.

The panel also recommended that proposal evaluation criteria for full-scale development contractor selection be given to the contractors as early in the demonstration phase as possible.

In April 1984, the program office hosted a series of separate half-day meetings with each concept development contractor. The meetings were suppose to develop a mutually acceptable and understandable business approach, encourage contractors to participate in refining the proposed business approach, and identify innovative solutions to difficult issues—such as, data flow in a competitive environment. The program office presented a summary of the contractor meetings in briefings it later held with the panels. The summary stressed issues like maximizing competition in all phases of the program, data rights, associate contractor relationships, and the need for closely controlled interfacing work groups. The only issue that the contractors could not agree on was

the contract type; the contractors did not all favor the firm fixed-price type of contract recommended by the program office. A consensus was reached on such issues as "not-to-exceed" production options in full-scale development contracts; prior determination of data rights/options; the teaming decision prerogative of industry; a deliverable full-scale development proposal; the demonstration/validation structure of three contracts; a negotiated funding profile and a modified Limitation of Government Obligation; and production warranties for any production option in the full-scale development contract. Program officials viewed industry recommendations as candid, informative, and useful in refining the acquisition strategy.

The Acquisition Management Panel, the second of the Aeronautical Systems Division groups offering comments, is the forum for gaining the Division Commander's approval of the acquisition strategy. It was chaired in May 1984 by the Division Assistant for Acquisition Management. The panel recommended that extending competition into full-scale development should be carefully considered, and questioned the program office's proposal to seek unlimited data rights suggesting that they be secured during the full-scale development phase rather than the demonstration phase. The panel also recommended that the program office obtain a commitment from each contractor on a subcontractor competition plan for full-scale development and production. The plan was to be submitted as part of the demonstration phase proposal and was to be covered by the source selection evaluation criteria. The Acquisition Management Panel recommendations were approved by the Division Commander and were briefed to the Systems Command Business Strategy Panel.

Late 1984 Strategy Reviews

On August 6, 1984, the program manager and contracting officer presented this strategy to the Air Force Systems Command Business Strategy Panel, which is chaired by the Systems Command Competition Advocate. While the strategy the panel approved was basically the same as originally proposed, it did contain some refinements. The original strategy narrowed competition to two or three contractors for the demonstration phase, while the strategy briefed to the Systems Command panel was more specific as to the number of competitors and broadened the term "contractor" to include a team. The latter strategy proposed narrowing competition to three contractors/teams for this phase. Furthermore, technologies to be competed separately were identified and divided into four subprograms: integrated avionics architecture, very high speed integrated circuitry, folding fin Advanced Medium Range

Air-to-Air Missile development, and advanced radar/sensor development. This latter strategy was approved essentially as proposed and the panel recommended the Secretary of the Air Force and the Aeronautical Systems Division Commander as the source selection authorities for the airframe and the critical technology subsystem development programs, respectively. Although a subsequent Business Strategy Panel was to review the full-scale development strategy, the program office had also proposed to the panel that one prime contractor/team be selected for full-scale development.

Air Force Systems Command concurred in this initial demonstration phase acquisition plan in August 1984. The plan was forwarded to Air Force headquarters in September and the program office expected to obtain concurrence during the Defense Systems Acquisition Review Council milestone I review. The milestone was originally scheduled for November 1984, but was postponed to allow the Air Force time to consider the affordability of the advanced fighter in relation to other needed systems. The milestone I review has been rescheduled for August 1986, with source selection evaluation and award of the demonstration/validation contracts immediately thereafter.

External Influences

As part of an overall Air Force budget reduction, Air Force headquarters reduced the fiscal year 1985 budget from \$162.3 million to \$90.9 million. This caused an 18-month delay in the program (slipping the full-scale development program from fiscal year 1987 to fiscal year 1989, and the initial operational capability from fiscal year 1993 to fiscal year 1995).

Cost Estimate

As the advanced fighter becomes better defined and technologies are developed and demonstrated, development cost will be better defined and the current estimate will be revised accordingly. The following table shows DOD's 1987 research and development budget for fiscal years 1983-88.

Table 1: DOD's Fiscal Year 1987 Budget

	Fiscal Years						Additional To Completion
	1983 ^a	1984 ^b	1985	1986	1987	1988	
Advanced tactical fighter	\$4.3	\$5.1	\$2.0	\$15.1	\$94.1	\$106.5	7.8
Engine development	16.5	29.0	81.2	138.5	154.0	144.0	128.0
Critical subsystems development	0	0	7.7	11.0	46.0	93.0	57.0
Total	\$20.8	\$34.1	\$90.9	\$164.6	\$294.1	\$343.5	\$192.8

^aFrom fiscal year 1985 budget

^bFrom fiscal year 1986 budget

Evaluation of Roles and Acquisition Strategy

The program manager, the deputy manager, and the concept development team director had lead roles in developing the acquisition strategy. The contracting officers were active participants and advisors to program management. Their initial strategy was accepted by Air Force management with some modification.

The Design Competition

DOD Directive 5000.1 encourages competitive design work up to full-scale development (the third program phase) or beyond, if cost effective. The Air Force has carried competition through the concept exploration phase and plans to continue competition through the second phase—demonstration/validation.

Present Status

In early 1986, the Air Force restructured its acquisition strategy for the Advanced Tactical Fighter Program. Instead of awarding demonstration/validation contracts to three or four of the original seven concept definition contractors, the Air Force has adopted a prototype approach with a modified flyoff. It plans to award contracts to two contractors to build prototypes. The demonstration/validation phase will be continued to 1991 rather than 1989 as previously planned.

Chronology of Events

1976 - 1981	Preprogram technology studies.
May 1981	A request for information unfunded effort was initiated with seven air-frame contractors to identify potential system alternatives.
September 1981	Mission Element Need Statement for a fiscal year 1983 new start budget request validated by air staff.
November 1981	Milestone 0 program initiation decision—Defense Resources Board approved a fiscal year 1983 new start.
July 1982	Manager assigned.
October 1982	Concept development team formed.
January 1983	Contracting officer appointed.
May 1983	Special action team approves concept definition strategy. Definition study request for proposals issued.
June 1983	Program manager appointed.
September 1983	Concept definition contracts awarded.
October 1983	Program office formed.
December 1983	Second contracting officer assigned.

Chronology of Events

April 1984	Aeronautical Systems Division Business Strategy Panel held to formalize the acquisition strategy for demonstration/validation.
May 1984	Aeronautical Systems Division Acquisition Management Panel held for commander's approval of the demonstration/validation phase acquisition strategy. Contractors submit results of concept definition contracts.
July 1984	Technical analytical study support contract issued to Veda Inc., to help the systems program office evaluate concept study reports and prepare for milestone I review.
August 1984	Systems Command Business Strategy Panel approved acquisition strategy for demonstration/validation.
October 1984	Draft demonstration/validation request for proposal released.
November 1984	Final Statement of Operational Need validated by air staff.
October 1985	Demonstration/validation request for proposal released.
August 1986	Joint Requirements and Management Board review scheduled.
October 1986	Demonstration/validation contract award scheduled.
Fiscal Year 1991	Milestone II full-scale development decision scheduled.

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