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DOD ACQUISITION

Case Study of the Air Force Advanced Air- To-Surface Missile 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 Air-to-Surface Missile (renamed the Short Range Attack Missile II) describes 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).



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Advanced Air-To-Surface Missile

Origin of Start

Between 1967 and 1972 Boeing designed and developed the Short Range Attack Missile (SRAM) for deployment on the B-52 bomber force. The SRAM was and is a key but aging weapon used in the penetrating bomber mission that is an essential element of the strategic triad. SRAM II, originally called the Advanced Air-to-Surface Missile (AASM), will replace the SRAM as a key element in the penetrating bomber mission through the 1990's and beyond.

The new missile will augment and then replace the current SRAM. The new system will enhance the penetrating bomber's total effectiveness and feasibility, as well as challenge the enemy's defenses with a highly survivable weapon system. The system consists of the missile (airframe, guidance, warhead, and propulsion), support equipment, mission planning equipment, and carrier interfaces. Like the SRAM, the SRAM II will provide the B-1B and the Advanced Technology Bomber with a supersonic, low-radar-cross section, air-to-ground nuclear missile that can attack fixed and defended targets, and neutralize enemy terminal defenses such as surface-to-air missile sites.

Discussion of a replacement for the SRAM missile began in August 1982 with the Air Force Chief of Staff's order to terminate the SRAM Motor Modification program which was to extend the useful life of the SRAM rocket motor. In July 1983, the Defense Resources Board approved the SRAM II as a fiscal year 1985 major system new start. While the fiscal year 1985 budget was the first to specifically request funds for the AASM program, Congress approved a reprogramming action of fiscal year 1984 funds for system definition studies on September 20, 1984.

During 1982 and 1983, the Strategic Air Command started drafting a Statement of Operational Need. Prior studies such as the Counter Soviet Union Airborne Warning Control System, Advanced Strategic Air Launched Missile, and the SRAM Longer Life Motor Modification did not specifically address Statement of Operational Need requirements.

Formation of Project Office

In March 1983 the first program manager, a major in the Aeronautical Systems Division of the Air Force Systems Command, was appointed. Prior to that and shortly after initiation of the program, Systems Division staff working with the contracting officer began developing a preliminary AASM cost estimate to secure program approval. They completed the preliminary AASM cost estimate, but aircraft integration costs were omitted because sufficient data was unavailable at the time. The program manager had to increase the original budget to reflect the

integration costs while program approval and initial funding were sought.

The program manager, who was promoted to lieutenant colonel, has a bachelor's degree and master's degree in electrical engineering. He also has a master's degree in industrial management. When appointed, he had over 10 years of experience in missile programs, including approximately 3 years on the Air Launched Cruise Missile and the Advanced Cruise Missile programs. Formal designation of the AASM program as a system program office is planned to occur just before the full-scale development milestone decision scheduled for July 1986.

A civilian GS-12 was appointed as the contracting officer in August 1982. He has a bachelor's degree in both business administration and psychology and 15 years experience in procurement. About 11 years of this experience had been in systems related to the AASM, such as the SRAM, the Advanced Strategic Air Launched Missile, and the Counter Soviet Union Airborne Warning Control System.

Both the program manager and the contracting officer were appointed soon after program inception. They inherited no specific program decisions other than the broad condition that up to three missile airframe contractors could be used in the system definition studies and that the program should remain competitive as long as practical.

Development of Acquisition Strategy

Department of Defense (DOD) policy in its Directive 5000.1 calls for flexibility and tailoring of an acquisition strategy to each program's unique characteristics. It suggests that generally competition should be continued through the first two program phases of concept exploration and demonstration/validation. The Directive suggests further competitive efforts into full-scale development and production if they are cost effective.

In January 1983 the Air Force, via The Commerce Business Daily, solicited industry for three sources to perform AASM system definition studies. The degree of competition for this phase corresponds to the Air Force program direction issued in March 1983 which stated that:

"These initial studies should be accomplished by awarding contracts to a maximum of three primary missile airframe contractors. To the extent funding permits, the competitive approach should be emphasized to the maximum extent practicable in the development of the overall acquisition strategy to control program costs."

Other than these parameters, the program manager and contracting officer inherited no specific program decision. The strategy proposed by the program manager and presented for review was as follows:

- Phase 0: Pre-full-scale development system definition studies would be competitively awarded to three contractors.
- Phase I: Full-scale development design verification through critical design review would be awarded to two contractors under unlimited competition.
- Phase II: One contractor would be selected for completion of full-scale development (including flight tests). This phase would be awarded to one of the two contractors competing in phase I. The contract would be fixed-price incentive fee with not-to-exceed option prices for the first and second lots of production.
- Phase III: The full-scale development contractor would receive a sole-source production contract, though major subsystems (accounting for about 50 percent of the production cost) would be dual sourced.¹

The program manager and contracting officer jointly drafted the detailed acquisition strategy and presented it to a number of management review panels.

Air Force Management Reviews

Air Force Systems Command and Aeronautical Systems Division both require acquisition strategies to be reviewed by a number of panels. These panels help program managers develop the most effective acquisition strategies by sharing experiences and lessons learned from other acquisitions. The Business Strategy Panel is required by Systems Command and is normally preceded by a similar panel at Systems Division. The Division Business Strategy Panel was held in May 1983 and was chaired by the Division Assistant Deputy for Contracting and Manufacturing. The panel at Systems Command was conducted a few months later in August 1983. The Acquisition Management Panel is required by Systems Division and is the forum for gaining the Division Commander's approval of the acquisition strategy before it is submitted up the chain-of-command. This panel was held about a month after the Division Business Strategy Panel and was chaired by the Division Assistant for Acquisition Management.

¹Recent strategy changes are discussed on page 7

Both the Business Strategy Panel and Acquisition Management Panel at the Division recommended continuing competition longer than the program manager proposed. The Business Strategy Panel suggested fostering production competition using either a dual-source or leader-follower approach. The Acquisition Management Panel suggested that the program continue competition through a fly-off, consistent with the policy of maximizing competition. The program manager's proposal to maintain competition only to the critical design review (i.e., through phases 0 and I) was largely based on parametric analysis which concluded that continued competition would be neither affordable nor cost effective, considering the limited production anticipated. In response to panel suggestions regarding the desirability of extending competition, the project office used The Analytical Sciences Corporation's model for analyzing the cost impact of competition. The project office also listed the potential pros and cons of the various alternative strategies.

The project office realized the estimates were not very accurate. The model analysis did not make a convincing case one way or the other. It showed that extending competition might save \$100 million for the estimated \$4 to \$5 billion program. The savings would be less using a present value basis. The program manager consequently decided that his original approach of competition through the critical design review was the best strategy in terms of costs and benefits. This approach would result in a minimum development investment—a real near-term commitment versus an elusive potential future savings. Therefore, he met with the Division Commander and the Division Acquisition Management Panel chairman to resolve the issue. The Division Commander agreed with the program manager that production was insufficient to warrant a fly-off. The Acquisition Management Panel chairman suggested that "teaming" be addressed in the draft system definition request for proposal to elicit industry comment.

Teaming is an agreement between two or more companies to form a partnership or joint venture to function as a single contractor. Teaming can heighten design competition by allowing two contractors to combine their unique capabilities to offer the best design and engineering expertise in producing complex military equipment. Further, teaming can result in production price competition when each team member is equally matched to manufacture the system at the conclusion of research and development.

The Division Commander approved the project office approach of competing two contractors through the critical design review with selected

second-sourcing of major subsystems. On the advice of the Acquisition Management Panel chairman, the project office agreed to issue a draft request for proposal for the system definition phase indicating that although competition through the critical design review would most likely be the ultimate strategy, the project office was seriously considering a teaming approach for full-scale development and wanted the offerors' comments. The potential contractors responded in writing that teaming was feasible, but verbally did not strongly support it. Consequently, the final request for proposal eliminated the teaming option concept and included the following statement.

"The Government intends to require subcontracting competition by the prime contractor either in the planned full-scale development or production phases, or both "

The Business Strategy Panel at Systems Command was held on August 10, 1983, and was chaired by the Command Competition Advocate. The panel concurred in the basic approach presented by the program manager. It agreed that the planned production quantities of 3,500 missiles did not justify dual sourcing at the prime contractor level, but that it should be considered if production quantities increased. Instead of increasing, however, the planned production quantities have been subsequently reduced to 1,633 missiles.

Request for Proposals Issued

In January 1984 the project office issued the system definition study request for proposal to eight aerospace contractors. Only three—Boeing, Martin Marietta, and McDonnell Douglas—submitted proposals. Contracts were awarded to these three firms in February 1985. The system definition contracts will form the basis for defining alternatives for performance characteristics, logistical concerns, full-scale development milestones and planning cost estimates for development and production. The studies will include a defense penetration analysis and generation of system design characteristics: weight, shape, signature, speed, flight trajectory, materials, propulsion, and guidance.

External Influences

DOD reduced the fiscal year 1985 request by \$26 million to \$28.4 million and Congress approved \$3 million less, or \$25 million for fiscal year 1985. Of the \$25 million, only \$12.4 million was released to the Air Force. The program manager stated that the fiscal year 1986 request of \$128 million was reduced by DOD to \$78.9 million and Congress approved only \$35 million. Because of these changes, the missile's initial

operational capability will be delayed from fiscal year 1991 to 1992. Initial operational capability is defined as having five B-1B alert aircraft fully loaded with the new missile.

Funding Impacts Strategy

According to the program office, fiscal year 1986 total obligation authority within Aeronautical Systems Division would not allow funding for two contractors through the critical design review step without eliminating several other higher priority programs, and an option which eliminated the competition was selected.

In September 1984 we met with the Competition Advocate, who chaired the Systems Command Business Strategy Panel and approved the initial acquisition strategy. At the time, he was not aware of this fiscal year 1986 budget reduction. He confirmed the lack of any effective linkage between the acquisition strategy approval process and the funding process. While he had no specific plans for remedying the AASM funding problem, he said that Systems Command directed that all fiscal year 1987 budget submissions for ongoing and new programs identify the cost of competing the programs. Once the cost of competition is adequately identified in the budgets, the Competition Advocate will be in a position to address the consequences of budget reductions. In this regard, the project office has forwarded the following message to the Systems Command:

“Because of the technical excellence and potential cost paybacks resulting from prime competition, the project office fully supports whatever effort you may undertake to restore the program strategy approved by the [Air Force Systems Command Business Strategy Panel] The project office is prepared to provide backup data to support your deliberations ”

Cost Estimate

The following chart shows DOD’s 1987 AASM Research, Development, Test and Evaluation budget submission in then-year dollars.

Departments of Defense’s FY 1987 Budget for AASM Development

Dollars in millions				
Fiscal Year	1985	1986	1987	1988
RDT&E	\$12.4	\$34.1	\$164.7	\$250.4

According to the December 31, 1985, Selected Acquisition Report, the cost including development and procurement is estimated at \$2.23 billion for 1,633 missiles (in fiscal year 1983 dollars).

Evaluation of Roles and Acquisition Strategy

Both the program manager and contracting officer participated in varying degrees in the key processes that built competition into the program. The program manager assumed primary responsibility for developing the overall acquisition strategy, writing the statement of work and evaluation criteria, and evaluating contractor proposals for the concept phase. The contracting officer took responsibility for selecting the contract type, writing the business terms and conditions, performing the cost analyses of the proposals, and negotiating the contracts. The two officials jointly developed the source selection plan and reviewed the acquisition plans and documents to ensure that competition was not unduly restricted.

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. Until September 1985, the Air Force planned to carry two contractors through the critical design review step of the full-scale development phase; based on what the Air Force sees as the low risk nature of the program, the traditional demonstration/validation phase was omitted. Because of funding constraints, the plan to have two contractors through critical design review was eliminated. As of April 1986, the plan called for having one contractor for the entire full-scale development phase.

The Production Competition

The original planned production quantity was considered insufficient for system-level second sourcing, but sufficient for subsystem second sourcing. Although a further reduction in planned production quantities recently occurred, second sourcing of subsystems is still planned.

Present Status

During 1985, the AASM program was renamed the Short Range Attack Missile II (SRAM II) Program. The full-scale development request for proposal was released in April 1986. Contract award is expected in 1987.

Chronology of Events

1974 - 1982	Preprogram technology contracts.
August 1982	Air Force Chief of Staff directs development of AASM. Systems engineer manager and contracting officer appointed.
March 1983	Program manager appointed. Air Force program direction (Terms of Reference) issued.
May 1983	Aeronautical Systems Division Business Strategy Panel held to define system definition strategy. Air Force submitted program objective memorandum for an AASM fiscal year 1985 new start.
June 1983	Statement of Need validated.
July 1983	Defense Resources Board approved AASM development (Milestone 0 program initiation decision).
August 1983	Air Force Systems Command Business Strategy Panel held.
September 1983	AASM is designated XAGM-131A.
January 1984	System definition study request for proposal issued.
February 1985	Concept definition contracts awarded.

Chronology of Events

March 1986

Risk reduction tests substantially completed.

April 1986

Full-scale development request for proposal released.

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