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PROCUREMENT

Assessment of DOD's Multiyear Contract Candidates

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National Security and
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The Honorable John C. Stennis
Chairman, Committee on Appropriations
United States Senate

Dear Mr. Chairman:

As requested in your February 3, 1988, letter, we analyzed the seven multiyear contract candidates proposed in the Department of Defense's (DOD) amended fiscal years 1988-1989 biennial budget to determine if each candidate satisfied legislative criteria for multiyear procurement. We discussed the preliminary results of our work with your Office on June 15, 1988, and, as agreed, we are providing this report which summarizes our final results. Appendix I presents our analysis of DOD's multiyear procurement justification package submitted with the amended defense budget. Appendix II provides details on our review of each candidate. Appendix III discusses our objective, scope, and methodology.

Multiyear procurement is a method for acquiring up to 5 years' requirements of systems, subsystems, or other items with a single contract. In 1981 the Congress authorized DOD to use multiyear procurement for major systems. Each year since fiscal year 1982, DOD has proposed candidates for congressional review and approval.

Although multiyear procurement can benefit the government by saving money and improving contractor productivity, it can also entail certain risks, including increased costs to the government, should a multiyear contract later be changed or terminated. Section 909(b) of the Department of Defense Authorization Act of 1982 (Public Law 97-86, 10 U.S.C.2306(h)) established criteria that multiyear contract candidates must meet to ensure a reasonable balance of benefits and risks. The criteria require that (1) the estimated contract costs and projected savings be realistic, (2) the minimum requirement (total quantity, production rate, and procurement rate) for the system be expected to remain substantially unchanged, (3) sufficient funding be requested

by DOD to carry out the contract, and (4) the design be stable. We believe that each candidate should be judged on its own merits through a case-by-case assessment of the potential benefits and risks in awarding a multiyear contract instead of a series of annual contracts.

To calculate an amount of savings for a candidate, the estimated costs of procurement on a multiyear contracting basis must be compared to the estimated costs of the same procurement through a series of annual contracts. DOD estimates that the seven candidates proposed in the amended biennial budget will require about $9.1 billion in then-year dollars[1] to complete the planned multiyear procurements. Compared to DOD's estimated costs of procuring the same quantities through a series of annual contracts, this represents a projected savings of about $943 million in then-year dollars, or about 9.4 percent.

To achieve savings through the use of a multiyear contract, more funding is usually required in the early years of the multiyear contract term than would be required if a series of annual contracts were awarded. Multiyear contracts should require less funding in later years. DOD budget submissions for the seven candidates requested an additional $324.5 million in obligation authority through fiscal year 1989 compared to the estimated requirements for annual procurements.

Our evaluations of the candidates' compliance with the legislative criteria identified two issues that apply to most of the candidates. The issues concern (1) the accuracy and realism of DOD's savings estimates and (2) the stability of funding and/or requirements.

DOD had limited assurance, when the justification package was submitted, that savings estimates were accurate and realistic because they were, in many cases, preliminary budget projections, submitted well in advance of contractors' formal cost proposals, and were often based on limited historical cost data. The accuracy and realism of savings estimates increase when contractors submit firm price proposals to DOD

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[1]Then-year dollar expenditures include estimated inflation for the years in which the expenditures are expected to occur; constant dollar expenditures eliminate the effect of inflation.

and when negotiations are completed. Nevertheless, the basis for congressional evaluation and initial approval of the candidates is, for the most part, the budgetary savings estimates in the justification package. Accordingly, since fiscal year 1984, the Defense Appropriation Acts have required DOD to notify the Senate and House Committees on Appropriations and Armed Services at least 30 days in advance of a proposed multiyear contract award. This allows the Committees to compare the estimates presented in the justification package with the actual proposed multiyear contract amount.

Of the seven candidates for multiyear contracting, five are being procured under existing multiyear contracts. These candidates have no recent annual contract cost experience. Although DOD officials expressed confidence in the estimated multiyear contract cost estimates for these five candidates, they agreed that the comparative estimated costs for annual procurements included in the justification package are only budgetary estimates. Accordingly, the projected savings derived from comparison of the multiyear and annual cost estimates are not firm.

Uncertainty also exists concerning the extent to which the military services and DOD intend to provide funding support in fiscal years 1990 and beyond to carry out the multiyear contracts that were proposed in February 1988. DOD officials told us the proposed budget plans for fiscal years 1990-1994 did not fully support the multiyear funding requirements identified in the justification package submitted to the Congress in February 1988. The budget plans were submitted by the military services to the Office of the Secretary of Defense (OSD) in April 1988. DOD officials said the plans included two instances in which the applicable military service proposed no funding for the candidate systems (CH-47D helicopter and AV-8B aircraft), two instances in which less funding was proposed than required to complete the planned multiyear procurement (H-60 helicopter engine and F-16 aircraft), and one instance in which the planned multiyear contract period was extended 1 year (Defense Meteorological Satellite Program (DMSP)).

DOD officials noted that the services' proposed budget plans are subject to review and adjustment by OSD. However, the services' lack of full support for the multiyear candidates in their proposed budget plans creates uncertainty concerning whether funding will be requested to carry out the contracts. Accordingly, compliance with the multiyear criteria

concerning requirement and funding stability is not clear for many of the candidates.

We discussed this issue with OSD officials who told us that the funding for the multiyear contract candidates will be considered further as the DOD budget process continues. Final decisions about the fiscal years 1990-1994 budget plans will not be made until early in 1989. OSD officials said that multiyear procurement candidates would likely be given high priority.

In addition to the two budgetary issues discussed above, we are concerned about the design stability of the Ultrahigh Frequency (UHF) Follow-on Satellite. This system is still being developed and major design reviews and tests needed to achieve design stability are not scheduled to be completed until after the planned multiyear contract would be awarded and significant funds obligated. Also, the Navy has not yet decided on the launch mode, the amount of contractor support services required, or whether to add an extremely high frequency capability. The resulting cost, schedule, and design impacts of these potential changes have not been assessed.

As requested, we did not obtain official DOD comments on this report. However, we discussed our findings with officials from OSD; Army, Navy, and Air Force Headquarters; and the individual program offices and have included their views where appropriate.

We are sending copies of this report to the Chairmen, House Committee on Appropriations, Senate and House Committees on Armed Services, House Committee on Government Operations, and Senate Committee on Governmental Affairs. Copies are also being sent to the Secretaries of Defense, the Army, Navy, and Air Force, and other interested parties.

Sincerely yours,

Frank C. Conahan
Assistant Comptroller General

Contents

ABBREVIATIONS

DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
EHF	extremely high frequency
FLTSATCOM	Fleet Satellite Communications
GAO	General Accounting Office
MLRS	Multiple Launch Rocket System
OSD	Office of the Secretary of Defense
UHF	ultrahigh frequency

ESTIMATED SAVINGS FOR FISCAL YEAR 1989 MULTIYEAR CONTRACT CANDIDATES

In the amended fiscal years 1988-1989 biennial budget, DOD submitted seven multiyear contract candidates to the Congress for its review and approval. DOD estimated that multiyear procurement could save $942.6 million in then-year dollars, or about 9.4 percent less than the estimated cost of procurement based on annual contracts for the seven candidates. (See table I.1.)

Table I.1: DOD Cost and Savings Estimates for Fiscal Year 1989 Multiyear Contract Candidates in Then-Year Dollars

System	Estimated contract costs and savings			
	Annual	Multiyear	Savings	Percent[a]
	----------(in millions)----------			
Army:				
CH-47D	$ 892.9	$ 774.6	$ 118.3	13.2
H-60 Engine	365.1	320.5	44.6	12.2
MLRS[b]	1,113.5	986.6	126.9	11.4
Navy:				
AV-8B	1,039.3	915.3	124.0	11.9
UHF Follow-on Satellite	1,700.3	1,505.5	194.8	11.5
Air Force:				
DMSP	397.0	325.0	72.0	18.1
F-16	4,561.6	4,299.6	262.0	5.7
Total	$10,069.7	$9,127.1	$942.6	9.4

[a]Savings divided by annual contract costs.

[b]Multiple Launch Rocket System.

Because the rates of government expenditures differ under annual and multiyear procurement methods, present value analysis is used to put the annual and multiyear estimates on a comparable basis. Present value analysis can be used to compare the two procurement alternatives to reflect the time value of money. Although present value analysis is a generally accepted practice, selecting an appropriate interest rate has been a subject of controversy. Because most government funding requirements are met by the Department of the Treasury, we believe its estimated cost to borrow is a reasonable basis for establishing the interest rate to be used in present value analyses. Accordingly, for our analyses, we used the average yield on outstanding marketable Treasury obligations that have remaining maturities similar to the period involved in the analysis and applied that rate to then-year dollars. DOD uses the Office of Management and Budget Circular A-94's prescribed present value method, which applies a flat 10-percent discount rate to constant dollars.

Our present value analysis of all the fiscal year 1989 candidates, as shown in table I.2, shows projected savings of about 7.3 percent. DOD's present value analysis shows savings of about 6 percent.

Table I.2: Comparison of DOD and GAO's Estimated Present Value Savings for Fiscal Year 1989 Multiyear Contract Candidates

System	DOD		GAO	
	Amount	Percent[a]	Amount	Percent[b]
	(millions)		(millions)	
Army:				
CH-47D	$ 65.4	11.7	$ 80.2	12.3
H-60 Engine	25.6	11.7	33.1	11.7
MLRS	58.3	8.8	76.2	9.7
Navy:				
AV-8B	48.9	7.6	77.1	9.4
UHF Follow-on Satellite	93.6	9.5	129.6	10.1
Air Force:				
DMSP	25.8	10.2	40.0	13.5
F-16	51.7	1.9	104.8	3.2
Total	$ 369.3	6.0	$541.0	7.3

[a]Savings divided by DOD's estimated present value annual cost.

[b]Savings divided by our estimated present value annual cost.

Just as the estimated savings for each candidate varies, so does the source of the savings. The majority of the savings for DOD's multiyear contract candidates has been associated with procurement of vendor and subcontracted items on a more economical basis than is possible with a series of annual procurements. Multiyear contracting allows economic order quantity procurement. Rather than procuring subcontracted parts and materials in annual lots of limited sizes, the prime contractor can procure parts in larger lots, thereby obtaining lower prices from subcontractors. However, the government must make a contractual commitment to the prime contractor to either procure the total multiyear quantity or pay termination costs if

the quantity is later reduced. The commitment to larger advance procurement usually requires additional funding in the early years of a multiyear contract. Table I.3 shows the sources of savings for the seven multiyear candidates, as estimated by DOD.

Table I.3: Sources of Estimated Multiyear Contract Savings for Fiscal Year 1989 Candidates in Then-Year Dollars

	Savings (in millions)	Estimated savings (percent)
Vendor procurement	$617.2	65.5
Inflation	130.6	13.9
Manufacturing	96.4	10.2
Other	98.4	10.4
Total	$942.6	100.0

ASSESSMENT OF THE FISCAL YEAR 1989 MULTIYEAR CONTRACT CANDIDATES

We reviewed OSD's multiyear justification package submitted to the Congress in February 1988 for the seven multiyear contract candidates proposed in the amended fiscal years 1988-89 biennial budget. We reviewed the candidates to assess their conformance with the legislative criteria for multiyear procurement (Public Law 97-86).

Table II.1 summarizes our views of whether each candidate satisfied the criteria. Each "X" identifies an instance where, in our opinion, a candidate does not clearly meet the criterion. An "X" does not necessarily mean that the system is an inappropriate candidate. Instead, each "X" indicates an area of increased risk that must be weighed against the potential savings to determine whether multiyear procurement authority should be granted. In assessing the realism of savings, we noted that (1) various methods were used, some better than others, to derive the cost estimates and (2) the cost data in the justification package are preliminary budget estimates for most candidates that should become more precise with time. Our assessments of each candidate follow table II.1.

Table II.1: Fiscal Year 1989 Multiyear Contract Candidates Not Clearly in Conformance With Legislative Criteria

System	Estimated multiyear savings percent	Realism of savings	Stability		
			Requirement	Funding	Design
Army:					
CH-47D	13.2	a	-	X	-
H-60 Engine	12.2	b	X	-	-
MLRS	11.4	a	-	-	-
Navy:					
AV-8B	11.9	-	X	X	-
UHF Follow-on Satellite	11.5	X	-	-	X
Air Force:					
DMSP	18.1	a	-	-	-
F-16	5.7	a	X	-	-

[a]This system is being procured under an existing multiyear contract. OSD officials told us that both annual and multiyear contract proposals will be requested from the contractor to document savings. While OSD officials said they have confidence in the multiyear cost estimate because it is based on prior multiyear experience, recent experience on an annual contract basis is not available and the annual estimate at this point in time is only a budgetary estimate. Accordingly, the savings estimate may not be accurate and realistic.

[b]Although this system is also being procured under an existing multiyear contract (see footnote [a]), the Army has competitively negotiated annual and multiyear proposals that provide a realistic estimate of savings.

CH-47D HELICOPTER MODERNIZATION

The CH-47 Chinook is the Army's only active medium-lift helicopter and is used for transport and utility purposes. The CH-47D modernization program updates and upgrades CH-47A, B, and C models to improve reliability and maintainability, increase life expectancy, and reduce vulnerability. The CH-47D features more powerful engines, an improved transmission, advanced flight controls, and fiberglass rotor blades.

The Army awarded the first production modification contract in October 1980 and achieved initial operational capability in February 1984. To date, 472 aircraft have been or are planned to be modified. This includes 240 aircraft on a multiyear contract for fiscal years 1985-1989. The proposed multiyear contract will complete the total planned modernization program of 472 aircraft.

Proposed multiyear contract

Term: Fiscal years 1990-1992. (Advance procurement in fiscal year 1989.)

Type: Firm fixed price; sole source to Boeing Vertol.

Estimated cost: $774.6 million.

Savings: $118.3 million (13.2 percent), compared to DOD's estimated cost of annual contracts.

Quantity: Modification of 144 aircraft and procurement of spare parts.

Review results

Realism of savings

-- The Army based its multiyear contract cost estimate on historical cost data, contractor pricing information, and actual experience on an existing multiyear contract covering fiscal years 1985-1989.

-- The Army did not have recent cost data concerning acquisition on an annual contract basis because modification of the CH-47D has been procured on a multiyear contract since fiscal year 1985. The Army did not request contractor input in developing an annual contract cost estimate. The program office assumed that

a multiyear contract would save 12 percent of the costs of labor and materials and 20 percent of the cost of spare parts. Program office officials (1) assumed the 12-percent savings rate based on their belief that this was the minimum level of savings the Congress would accept and (2) had no documentation to support the 20-percent savings rate.

-- The Army later requested both multiyear and annual contract proposals from the contractor.

Requirements and funding stability

-- Army officials told us that the CH-47D modernization program is not funded in the Army's proposed budget plans for fiscal years 1990-1994 because of overall constraints on the defense budget. OSD officials told us that DOD will support the program as shown in the February 1988 multiyear procurement justification package.

-- Because of the uncertainty in the fiscal years 1990-1994 defense budget, the program office intends to include in the multiyear contract a variation-in-quantity clause that would (1) permit a downward adjustment in the procurement rate from 48 to 36 a year and (2) extend the multiyear contract for 1 year.

Design stability

-- The CH-47D design is stable, testing has been completed, and this multiyear contract would complete planned production.

Observations

Because the Army decided not to fund the CH-47D helicopter modernization in its fiscal years 1990-1994 budget plans, we believe the funding stability criteria has not been clearly satisfied. Confidence in the contract cost and savings estimates can be increased once the Army receives and evaluates contractor proposals for both the multiyear and annual contracts.

H-60 HELICOPTER ENGINE

Since 1976 DOD has procured General Electric T-700 series engines for Army and Navy H-60 class helicopters. Multiyear contracts were awarded for procurement during fiscal years 1983-1985 and fiscal years 1986-1988. The Army held a competition for production of an improved, more powerful engine for H-60 class helicopters and selected General Electric to produce a new derivative engine in its T-700 series, the T-701C/401C.

Proposed multiyear contract

Term: Fiscal years 1989-1993. (Advance procurement in fiscal year 1988.)

Type: Firm fixed price; General Electric was selected in a competition with Pratt and Whitney.

Estimated cost: $320.5 million.

Savings: $44.6 million (12.2 percent), compared to DOD's estimated cost of annual contracts.

Quantity: 676 engines.

Review results

Realism of savings

-- The Army plans to submit a revised justification package based on an expanded procurement quantity of 1,156 engines.

-- The Army negotiated annual and multiyear contract proposals for both 676 and 1,156 engines.

-- In May 1988, the Army awarded to General Electric a single-year contract with four annual options and obligated long-lead item funding for the first year of production. The contract also provides an option for converting the agreement to a multiyear contract. Multiyear contract prices and prices of annual production options have been negotiated.

-- Under this contract, the Army could procure a total of 1,156 engines over 5 years rather than the 676 engines proposed in the multiyear justification package. The

negotiated savings from a multiyear contract for 1,156 engines are $65.8 million (10.4 percent), based on negotiated annual contract costs and options of $630.0 million compared with multiyear contract costs of $564.2 million.

Requirement and funding stability

-- Army officials said they expect the procurement quantity to increase to at least 1,156 due to (1) an anticipated increase in the Black Hawk helicopter procurement objective, (2) the potential addition of engines for the Apache helicopter, and (3) possible procurement of a small quantity of engines for the Air Force.

-- Funding for procurement of the Black Hawk helicopter (which accounts for more than one-half the proposed procurement of 1,156 engines) is not included in Army budget plans for fiscal years 1990-1994. This is inconsistent with Army statements that the number of engines to be procured will grow because of increased procurement of Black Hawk helicopters. Army officials told us the Black Hawk is a lower priority program that may be funded if total available funding should increase. OSD officials said its decision on procurement of the Black Hawk helicopter has not been finalized.

-- Variation-in-quantity clauses included in the contract permit acquisition of as few as 276 engines and as many as 2,924 without terminating the contract. According to Army officials, these clauses and the annual option clauses provide substantial flexibility.

Design stability

-- The T-701C/401C engine has not been produced in quantity but is a derivative of the well-established T-700 series of engines. Army officials do not consider the improved, more powerful engine to be significantly different in design from the T-701/401 production engine. According to the contractor, cost and parts commonalities between the T-701C and the T-701 are both over 90 percent.

-- The Army considers the T-701C/401C engine to be fully developed and qualified for production. Flight qualification testing on the using helicopters is scheduled to begin in fiscal year 1989. Army officials

told us changes in engine production and in aircraft design and production as a result of the new model engine will be minimal.

Observation

While uncertainty exists about the total number of engines that need to be procured, the negotiated contract provides the Army with a wide range of procurement alternatives. Until requirements for H-60 class helicopters are clarified, the total engine requirement will remain uncertain.

MLRS

MLRS is a free-flying, multiple firing, surface-to-surface artillery rocket system. It is designed to neutralize or suppress enemy field artillery and air defenses and to supplement conventional cannon artillery. MLRS consists of a tracked, self-propelled launcher, a loader, two pods holding six rockets each, and fire control equipment. The current design employs existing dual-purpose submunitions but is adaptable to alternative warheads currently in development (including the binary chemical warhead, the terminally guided warhead, and the search and destroy armor warhead).

MLRS is jointly developed and produced under a memorandum of understanding among the United States, France, Germany, and the United Kingdom. The Army has procured the system since fiscal year 1979, including a multiyear procurement in fiscal years 1983-1987 that included options for fiscal years 1988 and 1989.

Proposed multiyear contract

Term: Fiscal years 1989-1993.

Type: Firm fixed price; sole source to LTV Aerospace and Defense Company.

Estimated cost: $986.6 million.

Savings: $126.9 million (11.4 percent), compared to DOD's estimated cost of annual contracts.

Quantities: 220 launchers, 113,490 tactical rockets, 23,058 practice rockets, and 440 rocket pod trainers.

Review results

Realism of savings

-- The Army based its estimated multiyear contract costs on historical cost data from the current multiyear contract.

-- The program office used our estimates of savings resulting from the multiyear contract in effect[1] and projected the same level of savings relating to procurement of vendor and subcontracted items for the proposed multiyear contract. The contract now in effect is substantially greater in total cost and procures a different mix of launchers and rockets than the proposed multiyear contract.

-- The program office has requested both annual and multiyear contract proposals from the contractor and expects to receive them in September 1988.

Requirement and funding stability

-- MLRS has high priority within the Army. Multiyear contract cost and quantities are fully funded in the Army budget plans for fiscal years 1990-1994.

-- Proposed quantities are well within the procurement objectives. Army officials expect the total requirement to increase because of threat estimates and the retirement of older systems.

-- The proposed procurement of launchers and rockets exceed the contractor's minimum economic production rates.

Design stability

-- The Army has procured the basic system for 9 years.

-- The launcher is being modified to accommodate several new warheads in development as well as the Army Tactical

[1]An Assessment of the Army's Multiple Launch Rocket System Multiyear Contract (GAO/NSIAD-86-5, Oct. 28, 1985).

Missile System. The modification effort primarily replaces existing equipment with upgraded components.

-- The schedules for the multiyear production contract, the launcher modification effort, and the development of the new warheads are largely concurrent. This concurrency poses potential risks to the stability of design. However, Army officials said the new warheads are required to be compatible with the existing rocket design and the Army can continue to procure the existing launcher should the modification schedule be delayed.

Observations

The Army's cost-estimating methodology assumes that the savings from the proposed multiyear contract will generally accrue at the same relative rate as the existing multiyear contract. It is uncertain whether the same level of savings can be achieved since the existing contract is greater in total cost and procures a different mix of items. When the Army receives both annual and multiyear proposals in September 1988, program officials should have a firmer estimate of savings.

MLRS has high priority within the Army. Potential design stability risks created by the concurrency of the procurement, launcher modification, and warhead development schedules should be minimized by the Army's plans to procure the existing launcher until the modified version is available, as well as the requirement that the new warheads be compatible with the existing rocket design.

AV-8B AIRCRAFT

The AV-8B Harrier is a subsonic, single-engine, vertical/short takeoff and landing light attack aircraft providing close air support for Marine Corps ground forces. It was designed as a replacement for the aging AV-8A and A-4 aircraft.

The first production AV-8B was delivered in 1983. The Marine Corps has procured a total of 204 aircraft on annual contracts through fiscal year 1988. The Marine Corps procurement objective is 328.

Proposed multiyear contract

Term: Fiscal years 1989-1991. (Advance procurement in fiscal year 1988.)

Type: Fixed price incentive; sole source to McDonnell Douglas.

Estimated cost: $915.3 million.

Savings: $124 million (11.9 percent), compared to DOD's estimated cost of annual contracts.

Quantity: 72 aircraft.

Review results

Realism of savings

-- The Marine Corps based its estimated cost of annual contracts on actual cost data from seven previous annual procurements.

-- It based projected savings from procurement of vendor and subcontracted items on price quotes and other pricing information from vendors.

-- For the same annual quantity, the estimated unit prices (in then-year dollars) for the multiyear contract are nearly the same as those for the fiscal year 1988 annual contract. Program officials said total planned production is decreasing because Great Britain's procurements are lower than in the past.

-- The contractor submitted a proposal in June 1988 for procuring 8 aircraft on an annual contract and 64 aircraft on a multiyear contract. The contractor estimated a total price of $931.8 million for the 72 aircraft, which represents a savings of $117.6 million (11.2 percent) compared to its estimated costs for 72 aircraft procured on a series of annual contracts.

Requirement and funding stability

-- While the Marine Corps requirement is longstanding and firm, the Navy's priority and funding commitment to the program is low. When the budget for fiscal years 1988-1989 was first submitted, the Navy planned to reduce future buys of the AV-8B. The Navy's amended fiscal year 1989 budget request submitted to OSD reflected its decision to terminate AV-8B production following the fiscal year 1989 procurement and its fiscal years 1990-1994 budget plans contain no funding for the program.

-- Even if funding is approved, the proposed procurement rate is uneconomical, according to the Navy. Navy officials said the minimum economic production rate for the AV-8B is 36 a year, while the proposed multiyear contract procurement rate is 24 a year.

-- OSD and Navy officials told us that the program is in search of stability and that one reason for proposing a multiyear contract was an attempt to provide the program the stability it has historically lacked.

Design stability

-- The basic airframe design is mature and no major changes are planned.

-- An improved engine, planned for installation on AV-8B aircraft in 1990, is considered by Navy officials to be a low-risk effort with little impact on aircraft design.

Observation

The conflicting information and positions of OSD, Navy, and the Marines are indications that neither the requirements nor funding are stable.

UHF FOLLOW-ON SATELLITE SYSTEM

The Fleet Satellite Communications (FLTSATCOM) system provides DOD worldwide UHF communications coverage. The system includes hardened communication satellites, shipboard receivers/communication links with Navy ships and selected Navy and Air Force aircraft, and global ground stations.

DOD put the original FLTSATCOM satellite into orbit in 1978 and will launch the eighth and final satellite of its type during 1989. Its successor, the UHF Follow-on Satellite, which is proposed for multiyear procurement, is planned to have more channels than its predecessor, to provide twice the operational life, and to be radiation hardened. The satellites must be compatible for launch both on the space shuttle and expendable launch vehicles.

Proposed fiscal year 1988 annual contract with multiyear contract option

Term: Fiscal years 1988-1993 (multiyear contract option term: fiscal years 1990-1993 with fiscal year 1989 advance procurement).

Type: Firm fixed price; competitive among TRW, Hughes, and General Electric.

Estimated cost: $1,505.5 million.

Savings: $194.8 million (11.5 percent), compared to DOD's estimated cost of annual contracts.

Quantity: Nine satellites (eight under the multiyear contract option) and nine launch support services (all under the multiyear contract option).

Review results

Realism of savings

-- The UHF Follow-on Satellite has never been produced. The Navy estimated annual contract costs based on historical costs of other communication satellites, including FLTSATCOM, and on cost-modeling techniques.

-- The program office assumed that a multiyear contract would save about 10 percent from procurement of vendor and subcontracted items. Program officials said they based this assumption on the estimated savings from other Navy multiyear contracts.

-- The Navy has received both annual and multiyear proposals from the three competitors, but did not make them available to us because the proposals were considered to be source selection sensitive. According to Navy

officials, the proposals show that the projected multiyear contract savings shown in the February 1988 multiyear justification package are realistic. The program office plans to select the contractor and award an annual contract with a multiyear contract option provision.

-- DOD and the Navy have not agreed on the mode of launch and the amount of contractor support services required, which may significantly impact contract costs and schedule, according to Navy officials. The Defense Science Board is evaluating the issue of launch by the space shuttle versus expendable launch vehicles, and the cost impacts. The Board is expected to report its findings in March 1989.

Requirements and funding stability

-- The program has a firm requirement to replace the existing FLTSATCOM constellation during the 1990s and provide worldwide UHF communication services.

-- The Chief of Naval Operations reported that this program is the Navy's number one priority communication initiative.

-- The program office addressed congressional concerns about procuring satellites greatly in excess of launch requirements and thereby incurring large storage costs. Navy officials said the planned deliveries of the UHF Follow-on Satellite will closely correspond with the Navy's projections for failures of the current satellites on orbit. The Navy requires eight satellites for worldwide coverage with a ninth on orbit as a spare.

Design stability

-- The UHF Follow-on Satellite is in the development stage. The Navy plans to complete a preliminary design review in March 1989 and the critical design review (when relative design stability is considered achieved) by about February 1990. Testing will continue through the initial operational capability date, expected sometime in 1992 (first launch).

-- Navy officials state that the technical risks are minimal because the basic satellite design uses mature technology

and "off-the-shelf" equipment. They expect that production engineering during procurement of the initial satellite in fiscal years 1988-1989 will be carried to a point that will assure design stability for the multiyear contract option term.

-- In April 1988, the House Committee on Armed Services directed the Navy to study the feasibility of adding extremely high frequency (EHF) telemetry and communications to the satellite to increase survivability and provide jamming protection. In May 1988, the Joint Chiefs of Staff directed that the UHF Follow-on Satellite add limited antijamming capabilities with super high-frequency systems on the first three production satellites and with EHF systems on the remaining six satellites. The Navy is evaluating the impacts on program costs and the design, development, and procurement schedules.

Observations

The realism of the savings estimate is not certain, since the Navy has yet to reach decisions concerning the mode of launch, the amount of contractor support services needed, the potential addition of EHF capabilities, and the attendant cost, schedule, and design impacts. Even though the Navy stated that the technical risks for this generation of satellites are minimal, design stability is not certain because under the current schedule the Navy will not complete major design reviews and tests until after it has exercised the multiyear option clause and obligated significant funding on the contract.

DMSP

DMSP is a joint-service program that furnishes meteorological data to support strategic and tactical operations worldwide. The major DMSP components include the spacecraft, the meteorological sensors, launch vehicles, and ground systems.

The block 5D-series DMSP spacecraft has been in production since 1972. The operational 5D-2 model followed the initial 5D-1 design. The Air Force is now acquiring the 5D-2 Improved model under two multiyear contracts (one for the spacecraft and one for the sensors) with first delivery scheduled for December 1988. The first 5D-3 satellite is currently in production with scheduled delivery in September 1990. The Air Force proposes buying the remaining five 5D-3 spacecraft on a multiyear

contract. The Air Force is procuring sensors for these spacecraft on an annual contract with options.

Proposed multiyear contract

Term: Fiscal years 1989-1991.

Type: Fixed price incentive fee; sole source to General Electric/RCA.

Estimated cost: $325 million.

Savings: $72 million (18.1 percent), compared to DOD's estimated cost of annual contracts.

Quantity: Five spacecraft.

Review results

Realism of savings

-- The program office based its estimate of multiyear contract costs on adjusted costs for the 5D-2 Improved model, which it procured on a multiyear contract.

-- Limited cost data was available for estimating annual contract costs. Officials used information from a 1983 proposal and cost-modeling techniques to derive an estimate of the costs of annual contracts.

-- Air Force budget plans for fiscal years 1990-1994 delay the schedule for procuring two satellites and extend the multiyear term by 1 year. Because of the time and expense involved and the possibility that the plans could change again, the program office did not revise its contract cost and savings estimates based on these plans, nor does it intend to revise the February 1988 multiyear justification materials, unless instructed to do so.

-- In May 1988, the contractor submitted preliminary cost data for annual and multiyear contract costs based on three alternative procurement schedules. These estimates generally support the amount and percent of savings contained in the Air Force multiyear procurement justification package. However, based on these estimates, the actual budget requirements and fiscal year

phasing of the funding required would be different than submitted in the justification package.

Requirement and funding stability

-- As discussed above, Air Force budget plans provide for a 4-year multiyear contract buy of five spacecraft instead of the 3-year profile shown in the justification package. The budget plans delay the procurement of two spacecraft from fiscal year 1991 to fiscal year 1992. According to an Air Force official, the schedule change is permitted because of the increased operational life of newer satellites, and is not due to affordability concerns.

-- Compared to the multiyear procurement justification package, the change in the procurement rate would increase total program funding requirements by only 3 percent ($9.8 million), but would substantially change funding requirements in fiscal years 1991-1992.

-- The program office addressed congressional concerns about procuring satellites greatly in excess of launch requirements and thereby incurring large storage costs. Production and delivery schedules would permit the Air Force to maintain an average of two satellites in storage, which meets program requirements for replacing failed satellites on orbit. According to program officials, the annual cost to store each satellite in a controlled environment is $400,000 at the contractor's plant and $488,000 at the launch site; the Air Force will procure storage services under a separate contract and the costs will be the same whether it procures the satellites on an annual or multiyear contract.

Design stability

-- Air Force officials stated that the 5D-3 satellite is a technically low-risk evolutionary follow-on to the current operational 5D-2 satellite. They reported that the National Oceanographic and Atmospheric Administration is successfully operating a very similar satellite.

-- The Air Force identified 13 changes between the 5D-3 satellite and its predecessors. Of the 13 changes, 8 have been approved and incorporated into the design. Another change involving the apogee kick motor is

undergoing final analysis. Later this year, the Air Force expects to approve the use of the Titan II as the launch vehicle, instead of the Atlas. The remaining three changes are continuing efforts to improve the reliability and survivability of the satellite.

-- The block 5D-3 critical design review was successfully completed in December 1987; most detailed design changes were approved and incorporated.

Observations

The Air Force needs to update its contract cost and savings estimates to correspond with the procurement schedule and funding contained in the budget plans for fiscal years 1990-1994. The contractor's cost estimates generally supported the level of savings submitted in the budget justification materials. If the multiyear contract term is extended 1 year, total budgetary requirements may increase slightly and the fiscal year phasing of funds will change. Our concerns about design stability expressed in a prior report[2] have been lessened because the Air Force successfully completed the critical design review and incorporated most of the major changes between this satellite model and its predecessor.

F-16 AIRCRAFT

The F-16 Fighting Falcon is a single-engine, lightweight, high-performance fighter aircraft designed for air-to-air combat and air-to-ground weapons delivery. The F-16 is replacing aging F-4 aircraft in the active and reserve forces. The current production versions are the F-16C single-seat and the F-16D two-seat trainer.

Full-scale development was completed in 1979 and initial operational capability was achieved in 1980. Through fiscal year 1989, the Air Force will have procured 1,859 aircraft on annual contracts and on two multiyear contracts for fiscal years 1982-85 and 1986-1989. As of March 31, 1988, the contractor has delivered 1,297 aircraft to the Air Force.

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[2]Assessment of DOD's Multiyear Contract Candidates (GAO/NSIAD-87-202BR, Aug. 31, 1987).

Proposed multiyear contract

Term: Fiscal years 1990-1993. (Advance procurement in fiscal year 1989.)

Type: Firm fixed price; sole source to General Dynamics, Fort Worth Division.

Estimated cost: $4,299.6 million.

Savings: $262 million (5.7 percent), compared to DOD's estimated cost of annual contracts.

Quantity: 630 airframes and contractor-furnished equipment.

Review results

Realism of savings

-- The Air Force based its annual and multiyear contract cost and savings estimates primarily on extensive production cost history and actual experience gained on the two prior multiyear contracts.

-- The program office has conducted several cost-estimating exercises to estimate the cost impact from potential decreases in the annual F-16 procurement rate. One exercise would decrease the total multiyear contract quantity to 480. Another alternative would lengthen the multiyear contract period from 4 to 5 years.

Requirement and funding stability

-- Air Force budget plans for fiscal years 1990-1994 provide funding for a total buy of 480 aircraft during the proposed multiyear contract period, a decrease of 150 aircraft from the 630 aircraft shown in the multiyear procurement justification package. The budget plans reduced the annual procurement rate to 120 a year and extended the F-16 production schedule. Reductions are related to affordability concerns about the number of tactical wings the Air Force can support.

-- The budget plans also reduced total program funding requirements for fiscal years 1990-1993 from the $11,040 million shown in the justification package to $9,260 million, a decrease of $1,780 million. The plans would

also reduce fiscal year 1989 advance procurement funding requirements by $207.7 million due to the decreased procurement quantity.

-- The Air Force was also considering further reducing the F-16 program to provide funding for the A-7F program. This could reduce F-16 procurement to 100 a year during fiscal years 1991-1993 and add a fifth year (fiscal year 1994) to the proposed multiyear contract in order to procure a total of 480 aircraft. Some Air Force officials do not expect the procurement of A-7Fs to affect F-16 procurement during the proposed multiyear contract term because the A-7F is still in early development.

-- OSD and Air Force officials believe the F-16 should be procured on a multiyear contract even if quantities are reduced.

Design stability

-- Nearly 1,300 F-16s have been delivered to the Air Force. According to Air Force officials, the current production models, the F-16C and F-16D, exceed operational requirements and have achieved a high mission capability rate (over 90 percent).

-- Preplanned product improvements are part of a time-phased program to modify and enhance the aircraft.

Observations

The total quantity of aircraft to be procured on a multiyear contract, the annual procurement rate for the F-16, and the resulting effects on contract costs and savings are uncertain. Program direction and multiyear contract savings may be more definite after OSD completes its review of the Air Force's proposed budget, and the contractor submits formal contract proposals.

OBJECTIVE, SCOPE AND METHODOLOGY

The Chairman, Senate Committee on Appropriations, asked us to review the systems proposed for multiyear procurement in DOD's amended fiscal years 1988-1989 biennial budget. The objective of the review was to determine whether the proposed multiyear contracts meet the criteria in Public Law 97-86. The criteria require that (1) the estimated contract costs and projected savings be realistic, (2) the minimum requirement (total quantity, production rate, and procurement rate) be expected to remain substantially unchanged, (3) sufficient funding be requested by DOD to carry out the contracts, and (4) the design be stable.

We reviewed the February 1988 multiyear procurement justification package submitted by OSD to the Congress with the amended budget. We evaluated each program office's specific support and underlying assumptions used to prepare the justification package. We also reviewed other information concerning the program's cost, schedule, and performance. To determine whether the candidates met the criteria outlined in Public Law 98-86, we made the basic analysis described below for six of the seven candidates: CH-47D Satellite, DMSP, and F-16 aircraft. These analyses were supplemented as necessary to develop specific issues.

To evaluate the realism of estimated contract costs and projected savings, we reviewed the cost estimating methodology, the past procurement history, acquisition strategy, schedule for executing a multiyear contract, funding profiles, and present value analyses of estimated expenditure flows. We also calculated present values of the estimated expenditure flows using a different method than is used by DOD.

To evaluate whether the minimum requirement was expected to remain substantially unchanged, and whether DOD planned to request funding necessary to complete the multiyear contract, we evaluated the service's procurement objective, reviewed the historical and proposed rates of production, and requested the services and DOD to confirm that service and DOD plans for future budget years included sufficient funds to complete the multiyear program as proposed to the Congress. We also reviewed congressional actions on the candidates.

To evaluate whether the design of the item was stable, we determined whether research and development funding and testing of the system were complete. We reviewed the history of production deliveries, test results, and engineering changes in process.

Although our review of the H-60 helicopter engine program covered these same general areas, as agreed with your Office, our work was limited in scope compared to the other six programs reviewed. That is, we primarily relied on the statements of Army officials and on a limited review of a recently awarded engine production contract for information on this program.

We preformed our work at the following locations:

-- Office of the Assistant Secretary of Defense (Comptroller), Washington, D.C.

-- Headquarters, U.S. Army, Washington, D.C.

-- Headquarters, U.S. Navy, Washington, D.C.

-- Headquarters, U.S. Air Force, Washington, D.C.

-- U.S. Army Aviation Systems Command, St. Louis, Missouri.

-- U.S. Army Missile Command, Huntsville, Alabama.

-- Naval Air Systems Command, Washington, D.C.

-- Space and Naval Warfare Systems Command, Washington, D.C.

-- Air Force Systems Command's Aeronautical Systems Division, Dayton, Ohio.

-- Air Force Systems Command's Space Division, El Segundo, California.

We discussed our findings with officials at OSD, the military service headquarters, and the program offices. Our work was performed from March through July 1988 in accordance with generally accepted government auditing standards.

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