
should be of high enough priority within DOD to demonstrate stability before receiving multiyear contracting authority. Once this authority is granted, stability of the requirement and funding levels is essential to achieving the projected savings.

The concurrent development and production schedule for the planned modifications to the M1 Tank and the E-2C aircraft creates uncertainty about the design stability of these systems during the proposed multi-year contract period. Because it is a new system that has not yet been designed, tested, or produced, design stability is also uncertain for the Palletized Load System.

As requested, we did not obtain official DOD comments on this report. However, we discussed our findings with officials from the Office of the Secretary of Defense, the 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, the Navy, and the Air Force, and other interested parties.

This report was prepared under the direction of Paul F. Math, Director for Research, Development, Acquisition, and Procurement Issues, who may be reached on (202) 275-8400, if you or your staff have any questions. Other major contributors are listed in appendix IV.

Sincerely yours,


for Frank C. Conahan
Assistant Comptroller General

Contents

Table I.3: Sources of Estimated Multiyear Contract Savings for Fiscal Years 1990-91 Candidates	8
Table II.1: Fiscal Years 1990-91 Multiyear Contract Candidates Not Clearly in Conformance With Legislative Criteria	9

Abbreviations

CEM	combined effects munition
CFMI	Commercial Fan Motor International
DOD	Department of Defense
EPA	Economic Price Adjustment
HEMTT	Heavy Expanded Mobility Tactical Truck
IIR	Imaging Infrared
NDI	nondevelopmental item
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
PLS	Palletized Load System
TIS	Thermal Imaging System

Appendix I
Estimated Savings for Fiscal Years 1990-91
Multiyear Contract Candidates

dollars. DOD uses the Office of Management and Budget (OMB) Circular A-94's prescribed present value method, which applies a flat 10-percent discount rate to constant dollars.

Despite the difference in the two methodologies, the end results are very similar. Our present value analysis of the eight multiyear contract candidates, as shown in table I.2, shows projected savings of about 8.8 percent. DOD's present value analysis shows savings of about 8.7 percent. Therefore, distortions in projected savings rates caused by the time value of money, per se, are not a significant factor for these candidates.

Table I.2: Our Estimated Present Value Savings as Compared To DOD's for Fiscal Years 1990-91 Multiyear Contract Candidates (dollars in millions)

System	DOD present value savings		Our present value savings	
	Amount	Percent ^a	Amount	Percent ^b
Air Force:				
Maverick	\$91.9	12.3	\$99.8	12.4
KC-135R	347.9	12.8	246.2	12.4
CEM	40.9	9.8	44.6	9.9
Army:				
M1 Tank ^c	278.5	10.1	291.2	10.3
Bradley ^c	154.8	11.7	175.1	11.9
PLS	104.9	13.1	118.2	13.0
Navy:				
F/A-18	57.3	1.6	115.8	2.8
E-2C	69.2	7.8	97.3	9.8
Total	\$1,145.4	8.7	\$1,188.2	8.8

^aSavings divided by DOD's estimated present value annual contracts cost.

^bSavings divided by our estimated present value annual contracts cost.

^cThese are composite numbers for the three M-1 Tank systems and two Bradley systems.

DOD's Estimated Source of Savings

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

Our Assessments of the Fiscal Years 1990-91 Multiyear Contract Candidates

This appendix summarizes our assessments of the multiyear contract candidates proposed in the amended fiscal years 1990-91 biennial budget. We also provide background information on each system, including the proposed multiyear contract period.

We reviewed DOD's multiyear contract justification materials submitted to the Congress in January 1989 for eight of the multiyear contract candidates proposed in the amended fiscal years 1990-91 biennial budget. We reviewed the candidates to assess their conformance with the legislative criteria for multiyear procurement (P.L. 97-86).

Table II.1 summarizes our views of whether each candidate satisfied the criteria. Each "?" identifies an instance where, in our opinion, a candidate does not clearly meet one of the criteria. This does not necessarily mean that the system is an inappropriate candidate. Instead, each "?" indicates an area of increased risk that must be weighed against the potential savings to determine whether multiyear procurement approval should be granted. Our assessments of each candidate follow table II.1.

Table II.1: Fiscal Years 1990-91 Multiyear Contract Candidates Not Clearly in Conformance With Legislative Criteria

System	DOD's estimated multiyear savings percent	Realism of savings	Stability		
			Requirement	Funding	Design
Air Force:					
Maverick	12.3	•	?	?	•
KC-135R	13.0	?	•	•	•
CEM	10.0	?	•	•	•
Army:					
M1 Tank ^a	10.9	?	•	•	?
Bradley	12.5	•	•	•	•
PLS	12.7	?	?	?	?
Navy:					
F/A-18	5.5	•	?	?	•
E-2C	13.6	•	?	•	?

^aThe question marks reflect our assessments of all three M1 Tank systems.

Imaging Infrared Maverick Missile

The Imaging Infrared (IIR) Maverick is a rocket propelled, air-to-surface guided missile that develops tracking signals from the naturally occurring thermal energy of the target. The Maverick is a stand-off weapon that can be used in day, night, and in limited adverse weather against tanks, small ships, and other battlefield hard targets. The IIR Maverick is

- The January 1989 multiyear contract estimate was based on an Air Force cost model that estimated material, manufacturing, and inflation savings for multiyear procurement. Due to the competitive nature of the award, the two contractors did not provide any current cost information for the January 1989 justification package.
- In June 1989, the Air Force revised its prior multiyear contract justification submission to the Office of the Secretary of Defense (OSD) to reflect the lack of Navy commitment to the proposed multiyear contract quantities and the latest production prices from the fiscal year 1989 contract award. If the Navy does not buy the projected fiscal years 1991 and 1992 quantities, the number of missiles will be reduced by 4,270, or about 38 percent. The Air Force's projected savings percent remained essentially the same because of the overriding effect of a winner-take-all competition. The Air Force believes that a multiyear program for Air Force only requirements would be executable and beneficial.

Requirement and Funding Stability

- Beginning in fiscal year 1990, the IIR Maverick program will be significantly curtailed. Because of budget constraints and reconsideration of DOD's anti-armor requirements, the Air Force cut the program by 37,168 missiles (61 percent), 5 years, and \$4.42 billion. Air Force officials have stated that the revised quantities and funding levels in the Air Force portion of the multiyear contract justification package are firm and should not change. However, recent Senate Armed Services Committee language calls for the Air Force to assess whether the Maverick should remain in production beyond fiscal year 1992.
- Due to testing concerns, the Navy had not committed to the multiyear contract quantities as of August 1989. The Navy's limited production decision for the fiscal year 1990 buy is expected to occur before the award of the proposed multiyear contract in April 1990, but the Navy has not yet scheduled a full production decision for the fiscal years 1991 and 1992 buys. As a result, the Air Force plans to procure the fiscal years 1991 and 1992 Navy quantities as options to the multiyear contract.
- Although the recent House Armed Services Committee report did not recommend altering the funding or quantities requested for fiscal year 1990, it denied multiyear contracting approval in favor of another dual-source competitive procurement for fiscal year 1990. The Senate Armed Services Committee also questioned whether a winner-take-all multiyear contract approach is more advantageous than continued dual-source contracts. The Air Force has estimated that another dual-source award would exceed the planned fiscal year 1990 portion of the multiyear contract costs by \$66.4 million.

Proposed Multiyear
Contract

Term: Fiscal years 1990-94. (No advance procurement.)

Type: Kits - Fixed-price to Boeing with Economic Price Adjustment (EPA) clause.

Engine - Fixed-price to CFMI with EPA and variation in quantity clause. Component breakout items - Numerous.²

Estimated cost: \$2,614.6 million.

Estimated savings: \$388.6 million (13 percent overall), compared to estimated annual contract costs.

Quantity: 140 aircraft (24/22/22/36/36 per year, respectively).

Unfunded cancellation ceiling: \$0

Review Results

Savings Realism - Engine

- The Air Force's multiyear contract savings estimate for the engine was based on unit pricing data from CFMI for 36 sets, each consisting of 4 engines, a year through fiscal year 1993, including base-year price increases. Air Force officials assumed that their projected multiyear contract would avoid base-year price increases, even though the quantities to be procured were below 36 in some years. However, CFMI projected no savings at quantities less than 36. Also, the Air Force used OMB inflation rates for its multiyear contract estimate and higher contractor-generated inflation rates for its annual contract estimate.
- This methodology resulted in 16.8 percent savings for the multiyear contract period. We recalculated the estimated savings at about 2.7 percent. Our calculations assumed that base-year price increases were not avoided. We used OMB rates rather than the higher contractor-generated inflation rates. A CFMI proposal for quantities similar to the justification package identify savings of only 2.4 percent.

Savings Realism - Airframe Kit

- The basis for DOD's annual and multiyear contract estimates of the airframe kit cost is an informal proposal from Boeing, the prime contractor. This proposal was based on 50 kits per year and projected multiyear

²These items include a new electrical power generation system, a strengthened main landing gear, and a new rudder actuator.

of a tactical munition dispenser containing 202 bomblets. CEM contains fuzing options for both time and altitude release and can be delivered by all U.S. Air Force tactical aircraft.

CEM is an Air Force weapon system that is procured by the Army's Armament, Munitions, and Chemical Command at Rock Island, Illinois. The program was initiated in fiscal year 1974 with a design, development, fabrication, and test contract awarded to Aerojet Ordnance Company. In fiscal year 1985, Honeywell, Inc., was awarded a contract as the second prime contractor.

Through fiscal year 1989, the Army has purchased about 94,700 systems for the Air Force. The proposed multiyear contract for about 41,000 systems will complete the buyout of the program. The Army intends to select down to one contractor in fiscal year 1990 because the remaining quantities are insufficient to maintain two production lines. If approved, this will be the first multiyear contract for the program.

Proposed Multiyear Contract

Term: Fiscal years 1990-93. (Advance procurement in fiscal years 1990-92.)

Type: Firm fixed-price; competitive down selection to one contractor in fiscal year 1990.

Estimated costs: \$555.6 million.

Estimated savings: \$63.3 million (10 percent), compared to estimated annual contract costs.

Quantity: 40,908 systems.

Unfunded cancellation ceiling: \$0

Review Results

Savings Realism

- The Army's estimate of annual contract costs was based on the Air Force funding forecast and the average unit price for the negotiated fiscal year 1988 contracts. The Army took into account the impact of inflation for each year from fiscal years 1990 through 1993 and applied this

upgrade includes increased armor protection, a laser rangefinder, a commander's independent thermal viewer, a new electronics system, and a few other components.

A total of 5,722 tanks have been delivered through March 1989. Production peaked at about a 70 per month rate during fiscal year 1983 and continued at this rate through fiscal year 1985, when the rate was decreased to an average 60 per month for a 5-year multiyear contract. The current multiyear contract proposal assumes a rate of 43 tanks per month with only one tank plant in operation, instead of the two plants currently in use.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1990-93.)

Type: Firm fixed-price or fixed-price with EPA ceiling for Block II improvements; sole source to General Dynamics.

Estimated cost: \$2,846.9 million.

Estimated savings: \$317.1 million (10 percent), compared to estimated annual contract costs.

Quantity: 2,368 M1A1/M1A2 Tanks.

Unfunded cancellation ceiling:

\$36.9 million (fiscal years 1992-94)

\$46.2 million (fiscal years 1993-94)

\$33.7 million (fiscal year 1994)

Review Results

Savings Realism

- The M1 Tank annual contract estimate was based on a June 1988 contractor estimate for an annual buy of 720 (60 per month, 2-plant operation) tanks. Based on contractor input, the Army applied a production rate penalty to reflect the impact of the lower production volume of 516 tanks per year for a one plant operation. In addition, the Army applied (1) an overhead savings factor to reflect the reduced operating costs accompanying closure of one tank plant and (2) an inflation factor.

to go from development to full production without first completing testing increases program risks.

The basic estimating methodology used by the Army to derive its multiyear and annual contract estimates appears reasonable given the fundamental assumption of one tank plant. However, the recent House Armed Services Committee proposal to retain the second tank plant, if enacted, would make the Army's current multiyear contract proposal and justification obsolete.

M1 Tank Engine

The M1 Tank turbine engine consists of four major components: the forward module, the accessory gear box, the reduction gear box, and the rear module subassembly, which includes a recuperator, a device to increase the efficiency of the engine. The engine is produced by Textron Lycoming Division, formerly AVCO's Lycoming Division. The engine was originally acquired under a subcontract to the prime contractor, but in fiscal year 1981 the Army began to procure the engines itself and provide them to the prime contractor as government-furnished material. For fiscal years 1986 through 1990, the Army awarded a 5-year multiyear contract for 3,299 engines. A second 5-year multiyear contract is planned, which corresponds to the planned multiyear procurement period for the tank chassis.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1990-93.)

Type: Firm fixed-price or fixed-price with EPA; sole source to Textron Lycoming.

Estimated cost: \$859.2 million.

Estimated savings: \$134.5 million (13.5 percent), compared to estimated annual contract costs.

Quantity: 2,368 turbine engines.

Unfunded cancellation ceiling:

\$22.4 million (fiscal years 1992-94)

\$12.2 million (fiscal years 1993-94)

\$ 2.2 million (fiscal year 1994)

The modification of a critical component of the engine, the recuperator, will be ongoing during the proposed multiyear contract period. However, the Army does not intend to introduce the new recuperator as government-furnished material until fiscal year 1994, the last year of the proposed multiyear contract. The recuperator represents a known design deficiency which the Army plans to incorporate into the engines during the first 4 years of the multiyear contract period.

M1 Tank Fire Control System Thermal Imaging System

The Thermal Imaging System (TIS) is one of several components of the M1 Tank fire control system. TIS is a passive device that receives heat waves and develops an image of a target based on the heat radiated by the target as compared to the heat in the background. This device gives the M1 Tank full day/night target acquisition capability. TIS consists of four units: the thermal receiving, thermal electronic, image control, and common power control units.

The Hughes Aircraft Company is the sole source for TIS. TIS has been procured under two multiyear contracts — the first covered fiscal years 1983-85 and the second fiscal years 1986-90.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1990-93.)

Type: Firm fixed-price; sole source to Hughes Aircraft Company.

Estimated cost: \$277.5 million.

Estimated savings: \$37.9 million (12 percent), compared to estimated annual contract costs.

Quantity: 2,368 TIS units.

Unfunded cancellation ceiling: \$0

Review Results

Savings Realism

- The Army computed the multiyear contract costs based on historical (fiscal years 1986-90) unit prices, and adjusted them upward to reflect

7,934 to 8,811 vehicles. The proposed multiyear contract integration effort includes the chassis, turret, automotive electronics, and the labor to integrate these components into the vehicle.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1990-93.)

Type: Fixed-price with EPA and variation in quantity clauses that provide DOD with flexibility in the quantities to be obtained; sole source to FMC.

Estimated cost: \$1,487 million.

Estimated savings: \$193.6 million (11.5 percent), compared to estimated annual contract costs.

Quantity: 3,000 (600 per year for fiscal years 1990-94).

Unfunded cancellation ceiling:

\$89.1 million (fiscal years 1991-94)

\$69.1 million (fiscal years 1992-94)

\$49.6 million (fiscal years 1993-94)

\$27.1 million (fiscal year 1994)

Review Results

Savings Realism

- The contractor provided a rough order of magnitude cost estimates for both multiyear and annual procurement scenarios at 500 vehicles a year for 4 years. These estimates were based on historical Bradley costs. The Army used these data along with the 1988 negotiated contract costs to generate its in-house annual and multiyear contract estimates for a 5-year, 600 vehicles per year program.
- The program office intends to negotiate both annual and multiyear contract proposals and select the most cost-effective strategy.

Requirement and Funding Stability

- Since 1982, the Army has received funding and procurement approval for approximately 600 vehicles a year. Army officials said the Bradley is an integral part of the Army's armored fighting capability and a high priority Army system.

Proposed Multiyear
Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1990-93.)

Type: Fixed-price with EPA and variation in quantity clauses that provide DOD with flexibility in the quantities to be obtained; competitive—winner-take-all for fiscal years 1990-94.

Estimated cost: \$400.6 million.

Estimated savings: \$77 million (16.1 percent), as compared to estimated annual contract costs.

Quantity: 3,000 (600 per year for fiscal years 1990-94).

Unfunded cancellation ceiling:

\$24 million (fiscal years 1991-94)

\$18 million (fiscal years 1992-94)

\$12 million (fiscal years 1993-94)

\$6 million (fiscal year 1994)

Review Results

Savings Realism

- Due to the competitive nature of the acquisition, no contractor input was received. Instead, the Army hired independent research firms to assist it in preparing the annual and multiyear contract cost estimates.

Requirement and Funding
Stability

- The current Bradley vehicle procurement objective is 8,811 units. The TOW-2 subsystem is an integral part of the Bradley vehicle and receives its funding and procurement requirements in concert with the Bradley.

Design Stability

- The TOW-2 subsystem has been in production since 1985. It is compatible with the TOW-2A missile and planned to be compatible with the TOW-2B missile. The TOW-2B is expected to be integrated on the vehicles procured in the fiscal year 1990 buy. According to the Army, integration of the TOW-2B will entail a minor software change. No significant changes are anticipated for the TOW-2 subsystem during the fiscal years 1990-94 period.

Review Results

Savings Realism

- The PLS multiyear contract estimate was based on the historical unit cost of the multiyear contract for a similar truck, the Heavy Expanded Mobility Tactical Truck (HEMTT). The Army adjusted its estimate to reflect the physical differences between the two vehicles. From this, the Army calculated a baseline unit cost. Estimated trailer and flatrack costs were added to arrive at the estimated multiyear contract cost.
- The annual cost estimate was based on the estimated PLS multiyear contract unit prices, contract cost elements such as material, labor, and overhead obtained from a previous HEMTT multiyear contract, and a contractor market survey regarding cost element savings associated with multiyear procurements. In addition, although there are only three interested bidders, the Army assumed that a new contractor would be selected to build the vehicle in each of the 5 years. To account for production line start-up costs for these five contractors, the Army added an average of \$20.4 million each year to its estimate of annual contract costs.

Requirement and Funding Stability

- The Army's total procurement objective for PLS is 4,333 vehicles, 1,915 trailers, and 103,000 flatracks. These quantities are to be procured from fiscal years 1990 through 1996. The program is still in research and development; as a result, no production funding has been received to date.

Design Stability

- Although PLS has no production history, Army officials believe that the PLS development is low risk due to the use of mature NDI components. However, existing components need to be modified, integrated into the vehicle configuration, and tested. Recent legislation requires a contract award in December 1989; however, the latest test schedule will not be completed until March 1990. The Army intends to seek congressional approval to delay the multiyear contract award until April 1990, after testing has been completed.

Conclusions

The PLS vehicle design stability will remain uncertain until the prototypes are delivered and tested, the source selected, and production begun. Although the Army believes that NDI components ensure a low risk, integrating these components into a workable configuration may entail further changes to the winning design.

Review Results

Savings Realism

- The Navy developed both the annual and multiyear contract cost estimates through regression analysis of actual labor hours and material costs, which were provided by the prime and principal subcontractor for the last nine annual contracts. Program cost analysts told us that vendor quotes were used to check selected elements of the estimates.
- The Navy plans to request both the multiyear contract proposal and an annual contract proposal for fiscal year 1990 from the contractor. Annual contract proposals for the remaining years of the multiyear contract period will not be requested, unless the multiyear contract is not awarded.

Requirements and Funding Stability

- The current procurement objective of 1,157 aircraft was established in the fiscal years 1988-92 Five Year Defense Plan, which reflects a reduction from 1,366 aircraft. A June 1989 Congressional Research Service study projects a surplus of F/A-18s by the mid-1990s, but a Navy program official stated that the Navy may need more F/A-18 aircraft to replace the Marine Corps' A-6 aircraft.
- The total procurement objective did not change in the current budget submission. However, due to budget constraints, DOD has reduced the F/A-18's annual procurement rate from the previous level of 84 aircraft per year to 72 aircraft per year in the initial fiscal years 1990-91 budget request to 66 aircraft per year in the updated budget request.
- Based on its analysis, OSD stated that the minimum economic production rate for the F/A-18 is 66 aircraft a year, consistent with the multiyear contract. According to the Navy, the procurement rate for fiscal years 1983-89 of 84 F/A-18 aircraft a year is the minimum economic production rate. The proposed multiyear contract at 66 aircraft a year is 21 percent below that rate. The Navy expects foreign military sales to keep production at or above the minimum economic production rate for the first 3 years of the multiyear contract period, but the last 2 years are uncertain.
- The July 1989 House Armed Services Committee report expressed concern about the possible surplus of F/A-18 aircraft and recommended cutting the advance procurement funding and denying multiyear contracting authority. The House Appropriations Committee subsequently made the same recommendations, citing low anticipated savings from the proposed multiyear contract.

Design Stability

- The current models of the aircraft, the F/A-18C and F/A-18D, have been in production since fiscal year 1986, and an upgrade to incorporate

be retired, and it is estimated this will result in an inventory of 143 E-2C aircraft. If approved, the multiyear contract will procure the remainder of the E-2C requirement, according to an E-2C program official.

Proposed Multiyear Contract

Term: Fiscal years 1991-94. (Advance procurement in fiscal years 1990-93.)

Type: Firm fixed-price; sole source to Grumman Corporation.

Estimated cost: \$1,292.4 million.

Estimated savings: \$204.2 million (13.6 percent), compared to estimated annual contract costs.

Quantity: 36 aircraft.

Unfunded cancellation ceiling: \$0

Review Results

Savings Realism

- The multiyear contract cost estimate was based on the multiyear contract history for the C-2A, "Greyhound," which is a similar aircraft; actual labor and material costs from previous E-2C annual contracts; and contractor inputs from the prime and all principal subcontractors.
- According to program officials, the annual contracts cost estimate was based on actual contract data and contractor inputs.
- Costs of planned aircraft enhancements (Group II upgrades) were independently reviewed by the Naval Center for Cost Analysis and found to be reasonable.

Requirement and Funding Stability

- Since the mid-1970s, the E-2C has been procured at a steady rate of at least six aircraft per year. The proposed multiyear contract would increase this quantity to nine per year, and, according to an E-2C program official, permit the Navy to procure the remainder of its E-2C requirement by 1994.
- According to a June 1989 Congressional Research Service study, there may be a surplus of E-2C aircraft by the mid-1990s. Navy officials have also projected a surplus during 1992-94. However, Navy officials said

Appendix II
Our Assessments of the Fiscal Years 1990-91
Multiyear Contract Candidates

The House Committees' concerns with the potential E-2C surplus and their recommendations to cut advance procurement funding and to deny multiyear contracting authority also call the requirement stability into question.

Appendix III
Objective, Scope, and Methodology

We performed our work at the following locations:

- Office 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 Tank-Automotive Command, Warren, Michigan.
- U.S. Army Armament, Munitions, and Chemical Command, Rock Island, Illinois.
- Naval Air Systems Command, Washington, D.C.
- Air Force Systems Command's Aeronautical Systems Division, Dayton, Ohio.
- Air Force Logistics Command's Air Logistics Center, Tinker Air Force Base, Oklahoma City, Oklahoma.

We discussed our findings with officials at OSD, the military service headquarters, and the program offices. Our work was performed from April through July 1989 in accordance with generally accepted government auditing standards.

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Objective, Scope, and Methodology

The Chairman, Senate Appropriations Committee, asked us to review 8 of the 27 systems proposed for multiyear procurement in DOD's amended fiscal years 1990-91 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 annual 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 eight candidates in the January 1989 multiyear contract justification package submitted to the Congress by President Reagan and the amended budget subsequently submitted by President Bush. 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 each candidate met the criteria outlined in Public Law 97-86, we made the basic analyses described below for each candidate. 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, 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 military 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 contract 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.

that, beginning in 1992, the Navy will start to retire aircraft at an accelerated rate, thus resulting in a projected shortfall of E-2Cs by 1998. The Advanced Tactical Surveillance aircraft is planned to replace the E-2C.

- Because of its concern about possible surplus aircraft, the July 1989 House Armed Services Committee report recommended reducing the E-2C advance procurement funding and denying multiyear contracting authority for the E-2C. Likewise, the House Appropriations Committee recommended procurement of six E-2Cs in fiscal year 1991 on an annual rather than multiyear contract basis, due to concerns about an excess inventory of E-2Cs at the end of 1996. The E-2C program manager said the Navy acknowledges the surplus of aircraft and evaluates it as a good business risk compared with the uncertainty of the Advance Tactical Surveillance aircraft and the retirement of older, less capable aircraft.

Design Stability

- The Navy has not fully tested the Group I or II upgrades. Both must undergo operational evaluation, the final test phase required for a full-production decision. Operational evaluation is scheduled for November 1989 for Group I and February 1992 for Group II. The E-2C program manager said the Navy is confident of the E-2C's design stability because of recent highly successful test results.
- Because the aircraft has a full complement of avionics equipment, Navy program officials have recognized the complexity of the systems integration process as well as problems relating to space, power, cooling, and weight limitations.
- According to program officials, potential wing fatigue problems identified in 1983 are now being corrected by modifying older aircraft. Grumman redesigned the wing and all procurements beginning with the fiscal year 1983 contract to incorporate a new, "heavy" wing. Fatigue test verification of the newly designed wing continues, according to the Navy.

Conclusions

There are uncertainties concerning the design stability of the aircraft due to the upgrades currently planned for the aircraft. According to program officials, the multiyear contract award is planned for March 1991. However, the Group II operational evaluation testing is not scheduled to begin until February 1992.

Given this schedule and the recognized complexity of the systems integration process as well as the structural limitations of the aircraft, the modifications may increase the risk for a stable multiyear contract.

night attack and austere all-weather attack capabilities is scheduled to be completed and tested before awarding the multiyear contract.

- The aircraft is scheduled to incorporate several preplanned product improvements during the proposed multiyear contract period. However, Navy officials expect these improvements, which include adding reconnaissance capability to some aircraft, installing enhanced performance engines, and adding various electronics systems, to result in minimal modification of the airframe. According to Navy officials, the engine upgrade involves refining some internal components of the existing engine and utilizing existing aircraft fittings and computer capacity. Similarly, the package of reconnaissance equipment will be interchangeable with the F/A-18's existing 20 millimeter gun, and all provisions for installing the reconnaissance equipment will be incorporated in the aircraft before production under the multiyear contract begins.

Conclusions

The methodology used to project the multiyear contract savings is reasonable because it was based on several years of production history and prime and subcontractor inputs; however, the resulting estimate of multiyear contract savings is low, approximately 5.5 percent. The reduction from 84 to 72 to 66 aircraft as well as recent Committee actions create uncertainty about requirement and funding stability.

E-2C Aircraft

The E-2C "Hawkeye" is a U.S. Navy all-weather airborne early warning aircraft developed by Grumman Corporation for carrier-based operations. The E-2C provides area surveillance, intercept control, search and rescue, communication relay, and strike and traffic control. The E-2C has recently been scheduled for two upgrade programs. The first upgrade (Group I), which began in 1988, is intended to enhance the electronic counter-countermeasures. The second upgrade (Group II) began in 1989 and will extend the radar range and improve other avionics capabilities.

The E-2C began production in 1971. Since the mid-1970s, the Navy has consistently bought at least six aircraft per year. In fiscal year 1990, the Navy plans to procure four aircraft, followed by a multiyear contract for the airframe, which will increase the annual quantity to nine aircraft per year. As of June 1989, 109 E-2Cs have been sold to the Navy, according to program officials. An additional 21 E-2Cs had been sold to foreign countries, with 5 more foreign military sales aircraft expected to be sold during the multiyear contract term. The proposed multiyear contract is expected to buy airframes for 36 aircraft. Older aircraft would

The degree of confidence in the savings estimate is low because there is no prior price history for the vehicle and contractor price proposals are not expected to be submitted until November 1989. It is highly unlikely that a new contractor would be selected for each annual contract during the 5-year period because there are only three interested bidders for the prototype program. When the \$20.4 million start-up costs are deducted from all but the first year of production, the estimated multiyear contract savings are 7.4 percent.

Because PLS is a new program, it has no procurement history. Therefore, we did not have a good basis to assess its funding or requirement stability.

F/A-18 Aircraft

The F/A-18 Hornet is a twin engine, multirole tactical aircraft designed primarily for carrier-based missions such as fighter escort and interdiction, with fleet air defense and close air support as secondary missions. The F/A-18 is replacing the F-4 and A-7 aircraft and is being employed in Navy Strike Fighter Squadrons and Marine Corps Fighter Attack Squadrons. The current production versions are the single-seat F/A-18C and the two-seat F/A-18D.

The Navy awarded its first F/A-18 production contract in fiscal year 1979 and achieved initial operational capability in March 1983. A total of 661 aircraft have been procured on annual contracts through fiscal year 1988. The fiscal year 1989 contract for 84 aircraft is still being negotiated, and the proposed multiyear contract for fiscal years 1990-94 is for 330 F/A-18 airframes. The total procurement objective of 1,157 aircraft will not be attained until after the multiyear contract period.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (Advance procurement in fiscal years 1989-93.)

Type: Firm fixed-price; sole source to McDonnell Douglas.

Estimated cost: \$6,093.3 million.

Estimated savings: \$352.7 million (5.47 percent), as compared to estimated annual contract costs.

Quantity: 330 aircraft.

Unfunded cancellation ceiling: \$0

Conclusions

The methodology used to estimate savings appears reasonable. The Army anticipates acquiring the TOW-2 system as an integral part of the Bradley vehicle until the procurement objective is met. Funding and design appear stable.

Palletized Load System

The Army plans to acquire a new vehicle, the PLS, to improve its capability to move and distribute artillery ammunition. PLS will be procured in three different configurations. Its basic design is similar to a flatbed truck, with a 16.5-ton payload carrying capacity. It will also have the capability of on/off-loading its bed, a demountable flatrack, by means of a hydraulic load handling system operated from the cab.

A companion trailer will have the same payload capability and can be loaded/unloaded using the hydraulic system mounted on the PLS prime mover.

PLS has no prior production history. It is being competitively procured as a nondevelopmental item (NDI).³ The Army awarded three prototype contracts in January 1989; testing and source selection are expected to be completed by April 1990.

Proposed Multiyear Contract

Term: Fiscal years 1990-94. (No advance procurement.)

Type: Competitive; fixed-price, with an EPA clause.

Estimated cost: \$1,245.8 million.

Estimated savings: \$181 million (12.7 percent), compared to estimated annual contract costs.

Quantity: 3,726 PLS trucks, 1,557 trailers, and 34,160 flatracks.

³Section 907 of the Defense Acquisition Improvement Act of 1986 (P.L. 99-661) defines NDI to include items that are either available in the commercial marketplace or otherwise already developed and in use by a governmental entity in this or an allied country. The definition also includes those types of items that require only minor modification to meet DOD's needs or are currently being produced.

- The Bradley is included in the Army's Long Range Research, Development and Acquisition Plan through fiscal year 1994. This plan is used to establish priorities and provide guidance to Army headquarters and major commands. In March 1989, the total procurement objective was increased by 877 vehicles.
- The last major program change took place in fiscal year 1987. At that time, several survivability improvements were added to the vehicle: spall liners for troop protection, improved collars for swim requirements, and armor for rear armament protection. These modifications have been tested and successfully incorporated into the vehicle production line. No significant design changes are anticipated through 1994.

Design Stability

Conclusions

The Army anticipates acquiring the Bradley until the 8,811 vehicle procurement objective is met. Major modifications have been essentially completed and no significant changes are anticipated through 1994. Cost estimates for multiyear and annual contracts were based on a combination of contractor inputs, actual contract costs, and Army estimates. Updated cost data may slightly change the annual and multiyear contract cost estimates, but the Army expects the estimated 11.5 percent cost avoidance or savings to remain approximately the same.

Bradley Fighting Vehicle TOW-2 Subsystem

The TOW-2 is an antitank/assault wireguided missile that can be employed from a ground mount or a variety of military vehicles, such as the Bradley Fighting Vehicle. The TOW-2A represents the third generation of TOW missiles that has a more lethal warhead and a more powerful flight motor than its predecessors. The TOW-2 subsystem consists of a sighting unit, a guidance unit and the electrical cables connecting these units to the Bradley. It employs the TOW-2A missile and is planned to utilize the TOW-2B missile upgrade, which is still in development.

The TOW-2 subsystem has been produced by Hughes Aircraft since 1985. In 1988, the Army qualified Texas Instruments as a second source. To date, over 2,800 systems have been procured. The proposed multi-year contract will competitively downselect to one contractor.

inflation and a penalty factor for the lower procurement quantities (from 60 per month to 43 per month).

- The Army did not obtain detailed contractor input on annual contract costs, but used an overall contractor estimate of the relationship between annual and multiyear contract prices to generate a savings factor. The Army projected that a multiyear buy would cost about 12 percent less than annual buys. The Army used this factor to derive its annual contracts estimate.

Requirement and Funding Stability

- The stability of TIS is directly tied to that of the chassis and engine. The overall acquisition objective has remained stable at 10,742, but the annual buys had been reduced from 60 per month to 43 per month to correspond to the planned closure of one of the two tank plants. Since fiscal year 1983 when TIS began its first multiyear contract, its funding has been stable.

Design Stability

- According to Army officials, the TIS design is stable. It has been in production for 9 years and it will not be affected by the upcoming Block II improvements on other segments of the fire control system.

Conclusions

The basic estimating methodology the Army used to derive its multiyear contract estimate appears reasonable. However, the lack of detailed annual contract cost input from the contractor makes the annual contract and savings estimates questionable. The House Armed Services Committee's recent proposal to retain the second tank plant, if enacted, would make the Army's current multiyear contract proposal and justification obsolete.

Bradley Fighting Vehicle Integration

The Bradley Fighting Vehicle comes in two versions—the infantry fighting vehicle and the cavalry fighting vehicle. The infantry vehicle supports tanks by suppressing enemy infantry and lightly armored vehicles; the cavalry vehicle serves as a reconnaissance scout vehicle for armored cavalry units. Both versions have a 25 millimeter automatic cannon and the TOW-2 Missile System as primary armament. The cavalry vehicle can carry up to 12 TOW missiles and 5 soldiers; the infantry vehicle carries up to 7 missiles and 9 soldiers.

In 1972, the Army awarded a sole-source contract to FMC Corporation for full-scale development. The Bradley began production in 1980 and deployment in 1983 with 4,264 vehicles delivered through March 31, 1989. The Bradley procurement objective was recently increased from

Review Results

Savings Realism

- The multiyear contract estimate for the engine was based on actual experience on the current multiyear contract as adjusted for inflation and a reduction from 60 engines per month to 43 engines per month. No contractor estimates were requested.
- The annual contract estimate for the engine was based on the ratio between historical and projected multiyear contract savings for the tank chassis—not the tank engine. The Army assumed, according to a project office official, that the future engine multiyear contract savings percent ratio would mirror the projected chassis savings percent ratio. The Army applied this ratio to project the follow-on engine multiyear contract savings percentage using the currently negotiated engine multiyear contract savings estimate as the base. The resulting savings estimate was reduced (1) because the estimated savings on the current multiyear contract for the engine were believed to be partially attributable to improved contractor performance, (2) to allow for inflation, and (3) to apply a production penalty for lower quantities. Using this method, the Army estimated savings from multiyear procurement of 13.5 percent.

Requirement and Funding Stability

- The stability of the engine is similar to the chassis. The overall acquisition objective has remained stable at 10,742. The reduction from 60 tanks per month to 43 tanks per month reflects the impact of closing one tank plant.

Design Stability

- According to a project office engineer, increased vehicle weight has increased the stress in the recuperator, resulting in deterioration of recuperator reliability. Due to increasing recuperator failure rates, the Army is developing an alternate recuperator. After testing, one or more of the qualified designs are expected to be competed for a production spares award in late 1991. The Army intends to use the new component as a spare until it decides whether to introduce the component in fiscal year 1994 as government-furnished material. Until the recuperator is replaced, the failures are expected to continue.

Conclusions

The Army could not adequately explain basing its annual contract estimates for the engine primarily on data relating to multiyear contract savings for the chassis and not obtaining annual contract cost data from the engine contractor. Therefore, we believe the savings estimate is questionable.

Requirement and Funding
Stability

- The multiyear contract estimate was based on fiscal year 1989 pricing data from the current firm fixed-price multiyear contract. The Army adjusted the data to reflect a one plant operation, reduced procurement quantities, and DOD inflation projections. This methodology resulted in a 10-percent savings over projected annual contracts.
- The House Armed Services Committee recently proposed deleting the funding needed to close the Detroit Arsenal Tank Plant.
- The Army acquisition objective for the M1 Tank fleet has remained stable at 10,742 tanks. As of August 1989, 7,467 tanks had been placed under contract. Another 2,368 tanks would be purchased under this second multiyear contract bringing the total to 9,835 tanks. The M1 Tank procurement level has decreased from 71 per month in fiscal year 1983 to an average of 60 per month during the first multiyear contract. The Army reduced the current multiyear contract proposal to 43 per month to correspond to the minimum sustaining rate for the one tank plant.

Design Stability

- The Army plans to upgrade the current tank configuration in 1992, half way through the proposed multiyear contract. These improvements (Block II) are expected to enhance the vehicle survivability and operational capability, but will require some modification within the chassis to accommodate the new electrical system. The vulnerability of the electronics to ballistic shock and environmental conditions is unknown and will not be fully tested before the production award scheduled for August 1991. The Block II improvements will be incorporated with an engineering change proposal.
- Due to weight and cost limitations, the extent of the entire modification program is also currently uncertain. For example, the current Block II cost estimates are 77 percent over the Defense Acquisition Board's target cost. In addition, the planned developmental testing will not be completed before a full-production decision, according to a project office official. Also, advance procurement funding of about \$40 million for long lead materials and special tooling and test equipment will be required before the full-production decision is made. If the Block II modification is not approved, the Army plans to procure the current M1A1 configuration during the multiyear contract period.

Conclusions

At this point, the design stability of the Block II modification is uncertain. Although the Army believes the Block II components represent a low to moderate technological risk, the current development, test, and production schedule contains a high degree of concurrency. The decision

to the funding forecast provided by the Air Force to determine the quantities to be procured each year.

- We did not find adequate support for DOD's assumption of 10-12 percent multiyear savings estimates. Originally, OSD officials assumed a 12-percent multiyear contract savings for CEM based on general historical experience with other multiyear contract programs. Army officials stated this estimate was overly optimistic and instead assumed that savings of 10 percent would be achieved through multiyear procurement, but admitted that this may also be too optimistic. Significant savings (about 74 percent) have already been achieved through the dual-source acquisition strategy begun in 1984.
- The current procurement objective of 130,000 to 140,000 systems was established in the 1986-87 time frame. The Air Force funding plan contains sufficient funding to procure the remainder of the foreseeable requirement for CEMs.

Requirement and Funding Stability

Design Stability

- DOD officials said that CEM has undergone relatively minor engineering changes since its inception. Development and initial operational testing have been completed and identified deficiencies remedied. The system is at the end of its procurement cycle and does not have any significant modifications planned for its last 4 years.

Conclusions

When combined with the downselection to one prime contractor, some level of multiyear contract savings should be realized. However, Army officials stated that similar savings could result from a single year contract with options. The strategy expected to achieve the greatest savings will not be known until the competing proposals are received and evaluated. The design, requirement, and funding for CEM appear stable.

M1 Tank Chassis

The M1 Tank, the Army's main battle tank, was fielded in 1980. It replaced the M60 series tanks to provide increased performance in the areas of survivability, tactical mobility, night fighting capability, fire-on-the-move, and hit probability. In mid-1985, the Block I improved (M1A1) tank was put into production. The Block I improvements included a 120 millimeter cannon, a nuclear, biological and chemical protection system, armor improvements, and suspension/transmission/final drive upgrades. Additional improvements (Block II upgrades) are presently under development for incorporation into production in 1992. This

contract savings of 2.4 percent. Using this input, the Air Force extrapolated the costs and, despite the lower quantities, generated a 4.4-percent multiyear contract savings. However, the Air Force could not adequately support the assumptions on which its calculation was based.

Savings Realism - Component Breakout

- The Air Force assumed a 1-percent multiyear contract savings for the component breakout items. It used this approach because it was impractical to obtain input from the numerous contractors providing the components. In addition, most of the components were comparatively low cost items.

Requirement and Funding Stability

- The current plan to modify the entire fleet, now 636 aircraft, is the same as at program inception. The annual rate of aircraft modernization has also been relatively stable for the last 5 years at 43 in 1985, 46 in 1986, and 50 per year in 1987, 1988, and 1989. However, the multiyear contract justification package shows significantly lower rates for fiscal years 1990-94. Air Force officials stated that this significant decrease is driven by current budget constraints, not a reduction in total program requirements.
- The Air Force considered its original goal of 50 modifications per year appropriate in terms of requirements, contractor capabilities, and available funding, but budget constraints have reduced the goal to 36 per year. The first 3 years of the multiyear contract proposal are below this goal.

Design Stability

- The KC-135R is a mature, stable modification program. The combined development and operational testing was completed in 1983, and the system has been in production for 8 years.

Conclusions

Although the KC-135R modification program meets the design stability criterion for multiyear contract approval, its projected savings appear to be significantly overstated. A multiyear contract based on the quantities purchased in the past would be expected to achieve a reasonable level of savings, but the current justification package does not appear to contain realistic savings, given the reduced quantities expected to be produced.

Combined Effects Munition

The combined effects munition (CEM) is a 950-pound free fall cluster bomb designed to give tactical air forces a single weapon with multiple target attack capabilities, including personnel, armored vehicles, and other targets such as trucks and fuel depots. Each CEM system consists

- More recently, the House Appropriations Committee also denied multi-year contracting authority for the Maverick program and deleted the advance procurement funding requested to support the multiyear contract.
- The MR Maverick has been in production for 8 years; the multiyear contract would complete the planned production program. Developmental and operational testing have been accomplished and no major design changes are planned for the remaining missiles.

Design Stability

Conclusions

Since the Navy has not committed to the proposed multiyear contract quantities, overall requirements and the funding stability of this program are uncertain. Recent Senate Committee action questions the adequacy of the current program requirements as well as the proposed multiyear contract approach. If enacted, the House Armed Services Committee action to continue annual dual-source competitive buys through fiscal year 1990 could affect the Air Force funding requirements for that year, but would allow additional time for the Navy to determine its commitment to the fiscal years 1991 and 1992 buys.

KC-135R Reengine Program

The KC-135R is a modification of the KC-135A strategic tanker aircraft to provide improved refueling capabilities. The modification program replaces the four existing engines with turbofan CFM56/F108 engines, strengthens the main landing gear, and makes other system improvements. The reengineed KC-135 has a 50-percent increased fuel off-load capability and can take off with a full fuel load on a 23-percent shorter runway. The new engine is 27 percent more fuel efficient than its predecessor and is more easily and economically maintained.

In December 1977, the Boeing Military Airplane Company was selected as the prime contractor for the modification effort. In January 1980, Commercial Fan Motor International (CFMI) was selected as the replacement engine contractor. The first modified aircraft was rolled out in June 1982. As of May 30, 1989, 155 reengineed planes had been delivered to the U. S. Air Force. The modification program is divided into three major cost components—engines, airframe kits, and numerous component breakout items (items DOD will procure directly from original manufacturers rather than the prime contractor). About two-thirds of the estimated multiyear cost is attributable to the engines.

produced in three models and is acquired for the Air Force and the Navy. The Air Force is the procuring agency.

Full-scale development began in 1978 and initial operational capability was achieved in 1986. The Air Force approved full-rate production in 1986, but the Navy had not done so as of August 1989. To date, about 7,800 missiles have been delivered. As planned, the proposed multiyear contract for 11,093 missiles would buy out the program in 1992.

Proposed Multiyear Contract

Term: Fiscal years 1990-92. (Advance procurement in fiscal year 1990.)

Type: Firm fixed-price; winner-take-all competition between Hughes and Raytheon.

Estimated cost: \$990.5 million in January 1989 and \$496.6 million in June 1989.

Estimated savings: \$138.3 million (12.3 percent) in January 1989 and \$66.0 million (11.7 percent) in June 1989, compared to DOD's estimated annual contract costs.

Quantity: 11,093 (Air Force—6,263; Navy—4,830) in January 1989 and 6,823 (Air Force—6,263; Navy—560) in June 1989.

Unfunded cancellation ceiling:¹ \$0

Review Results

Savings Realism

- The IIR Maverick was originally proposed as a multiyear contract candidate in the fiscal years 1988-89 biennial budget, but the success of the earlier dual-source competitions led the Air Force to defer this proposal in favor of additional competitive procurements for fiscal years 1988 and 1989.
- The annual contract estimate in the January 1989 justification package was based on the fiscal year 1988 competitively negotiated contract prices and reduced by 10 percent to reflect the expected impact of the winner-take-all competition.

¹Unfunded cancellation ceiling is the total amount of DOD's liability for which funds have not been budgeted or appropriated in the case of multiyear contract cancellation.

Appendix I
Estimated Savings for Fiscal Years 1990-91
Multiyear Contract Candidates

multiyear contract 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.

Another significant source of savings is attributed to manufacturing savings at the prime and major subcontractor levels. These savings result from such factors as improved fabrication, assembly, inspection, and test processes; reduced labor hours and spare part and repair requirements; and improved quality and reliability of the product.

Table I.3 shows the sources of savings for the eight multiyear contract candidates, as estimated by DOD.

Table I.3: Sources of Estimated Multiyear Contract Savings for Fiscal Years 1990-91 Candidates (then-year dollars in millions)

	Total savings	Percent savings
Vendor procurement	\$920.0	44.1
Manufacturing	897.5	43.0
Inflation	209.8	10.0
Design/engineering	60.9	2.9
Total	\$2,088.2	100.0

Estimated Savings for Fiscal Years 1990-91 Multiyear Contract Candidates

We reviewed 8 of the 27 multiyear contract candidates in DOD's revised fiscal years 1990-91 biennial budget. DOD estimated that multiyear procurement of these eight candidates could save \$2,088.2 million in then-year dollars, or about 10.1 percent of the estimated cost of procurement based on annual contracts for the eight candidates. (See table I.1.)

Table I.1: DOD Cost and Savings Estimates for Fiscal Years 1990-91 Multiyear Contract Candidates (then-year dollars in millions)

System	Estimated contract costs and savings			
	Annual	Multiyear	Savings	Percent ^a
Air Force				
Maverick	\$1,128.8	\$990.5	\$138.3	12.3
KC-135R	3,003.2	2,614.6	388.6	13.0
CEM ^b	618.9	555.6	63.3	10.0
Army:				
M1 Tank ^c	4,473.1	3,983.6	489.5	10.9
Bradley ^c	2,158.2	1,887.6	270.6	12.5
PLS ^d	1,426.8	1,245.8	181.0	12.7
Navy:				
F/A-18	6,446.0	6,093.3	352.7	5.5
E-2C	1,496.6	1,292.4	204.2	13.6
Total	\$20,751.6	\$18,663.4	\$2,088.2	10.1

^aSavings divided by annual contract costs.

^bCombined Effects Munition

^cThese are composite numbers of the three M1 Tank systems and two Bradley systems proposed for multiyear contracting.

^dPalletized Load System.

Present Value Analysis

Because the rates of government expenditures differ under annual and multiyear procurement methods, present value analysis is used to put the annual and multiyear procurement 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 analysis.

Accordingly, for our analysis, 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

Contents

Letter		1
Appendix I		6
Estimated Savings for Fiscal Years 1990-91	Present Value Analysis	6
Multiyear Contract Candidates	DOD's Estimated Source of Savings	7
Appendix II		9
Our Assessments of the Fiscal Years 1990-91 Multiyear Contract Candidates	Imaging Infrared Maverick Missile	9
	KC-135R Reengine Program	12
	Combined Effects Munition	14
	M1 Tank Chassis	16
	M1 Tank Engine	19
	M1 Tank Fire Control System Thermal Imaging System	21
	Bradley Fighting Vehicle Integration	22
	Bradley Fighting Vehicle TOW-2 Subsystem	24
	Palletized Load System	26
	F/A-18 Aircraft	28
	E-2C Aircraft	30
Appendix III		34
Objective, Scope, and Methodology		
Appendix IV		36
Major Contributors to This Report	National Security and International Affairs Division, Washington, D.C.	36
	Chicago Regional Office	36
	Cincinnati Regional Office	36
	Detroit Regional Office	36
	Kansas City Regional Office	36
Tables		
	Table I.1: DOD Cost and Savings Estimates for Fiscal Years 1990-91 Multiyear Contract Candidates	6
	Table I.2: Our Estimated Present Value Savings as Compared To DOD's for Fiscal Years 1990-91 Multiyear Contract Candidates	7

estimated costs of the same procurement through a series of annual contracts. For the eight systems we reviewed, DOD estimated that it would require about \$18.7 billion in then-year dollars¹ to complete the planned multiyear procurements. DOD estimated that multiyear procurement of these eight systems would save \$2.1 billion, or about 10 percent, compared to annual contract estimates.

To achieve savings through the use of a multiyear contract, more funding is usually required in the early years of the contract term than would be needed for a series of annual contracts. For fiscal years 1990 and 1991, DOD requested \$957.1 million more in advance procurement funding for the eight multiyear contract candidates than it estimates would have been required for advance procurement under annual contracts. This additional funding should be offset by reduced funding requirements in later years.

In our evaluation of the eight weapon systems proposed for multiyear contracting authority, we found that seven systems did not clearly meet one or more of the legislative criteria. This does not mean that these systems are inappropriate candidates. Instead, it indicates an area of increased risk that must be weighed against the potential savings to determine whether multiyear procurement approval should be granted. Four of the systems' savings projections were unrealistic because of questionable assumptions. We found limited support for the savings projected for the Combined Effects Munition and questionable estimating techniques for the KC-135R, Palletized Load System, and M1 Tank.

In addition, we identified uncertainties regarding the requirements and/or funding stability of four systems. Specifically, due to budgetary constraints, the F/A-18 aircraft program has significantly reduced the quantities to be procured over the next 5 years. The Air Force recently cut the Maverick missile program requirement by about 37,000 missiles (61 percent), 5 years, and \$4.42 billion, and the Navy has not yet committed to the quantities in the multiyear contract justification package. The uncertainty surrounding the Navy's carrier air wing composition has called into question the requirements for both the E-2C and the F/A-18 aircraft programs. Because the Palletized Load System is a new program, it has no procurement history. Therefore, we did not have a good basis to assess its funding or requirement stability. To clearly meet the legislative criteria, the systems proposed for multiyear procurement

¹Then-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.

United States General Accounting Office

GAO

Briefing Report to the Chairman,
Committee on Appropriations, U. S.
Senate

September 1989

PROCUREMENT

Assessment of DOD's Multiyear Contract Candidates





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

**National Security and
International Affairs Division**

B-215825

September 5, 1989

The Honorable Robert C. Byrd
Chairman, Committee on Appropriations
United States Senate

Dear Mr. Chairman:

As requested, we analyzed eight multiyear contract candidates in the Department of Defense's (DOD) fiscal years 1990-91 biennial budget to determine whether they satisfied the legislative criteria for multiyear contract approval. We discussed the preliminary results of our review with your Office on July 27, 1989. As agreed, we are providing this report, which summarizes the final results of our review. Appendix I presents our analysis of DOD's multiyear contract savings projections. Appendix II provides details on each of the eight candidates we reviewed. Appendix III discusses our objective, scope, and methodology.

Multiyear procurement is a method of 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 weapon systems. Since that time, DOD has annually proposed various weapon systems as multiyear contract candidates for congressional 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 DOD Authorization Act of 1982 (P.L. 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