

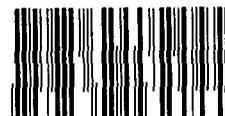
GAO

Briefing Report to the Chairman,
Subcommittee on Defense, Committee on
Appropriations, United States Senate

September 1986

PROCUREMENT

Assessment of DOD's Current Multiyear Candidates



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United States
General Accounting Office
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National Security and
International Affairs Division

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The Honorable Ted Stevens
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

Dear Mr. Chairman:

In response to your request, we analyzed the seven multiyear procurement candidates proposed in the Department of Defense's (DOD's) fiscal year 1987 budget request and the two candidates proposed in October 1985 by the Under Secretary of the Army¹ to determine if they meet the criteria established by the Congress. We presented our preliminary views on May 23, 1986, in a briefing to your staff and the staff of the Subcommittee on Defense, House Committee on Appropriations.

DOD estimates that the nine candidates will require about \$20.5 billion in then-year dollars² to complete the planned procurements on a multiyear contract basis. DOD data show that the use of multiyear contracts instead of conventional annual contracts for these candidates will require about \$217.5 million more in obligational authority and \$121.8 million more in outlays for fiscal year 1987. However, DOD estimates that using multiyear contracts instead of annual contracts will save about \$2.3 billion in then-year dollars, or about 10 percent.

We continue to support multiyear procurement as a method to achieve cost savings, reduce administrative cost, improve contractor performance, and increase competition. However, we believe a case-by-case assessment should be made of the potential benefits and risks in awarding a multiyear contract instead of a series of annual contracts. In Public Law 97-86, the Congress established the conditions that must be met by multiyear candidates to ensure a reasonable balance of benefits and risks. The law requires that the

¹The Army plans to submit to the Congress, along with a request for supplemental fiscal year 1986 appropriations, formal justification packages for these two candidates after completing negotiations on the multiyear contracts.

²Then-year dollars include inflation, constant dollars do not.

government benefit from a multiyear contract by saving money and improving contractors' productivity, and that estimated contract costs and projected savings be realistic. The law also stipulates that the system's design, requirement, and funding be stable.

In our review of the candidates proposed for multiyear procurement, we found that the Defense Support Program (DSP), the Mark 45 Gun Mount and Mark 6 Ammunition Hoist (hereinafter referred to as the Mark 45), and the Patriot Missile System generally meet the multiyear criteria of Public Law 97-86.

The UH-60A Black Hawk helicopter, Stinger missile, and F/A-18 airframe, in our opinion, do not clearly meet the funding stability criterion to justify entering a multiyear contract.

- The Army has not demonstrated a strong commitment to protect the projected funding profiles of the UH-60A Black Hawk helicopter and Stinger missile programs.
- There is a lack of consensus on the procurement and funding profiles of the F/A-18 airframe, particularly at the production and funding levels proposed in the Navy's justification package.

We believe the potential benefits versus the loss of flexibility concerning the multiyear procurement of the AH-64A Apache helicopter, Target Acquisition Designation Sight and Pilot Night Vision Sensor (TADS/PNVS), and the High-Speed Antiradiation Missile (HARM) rests on the judgement of the Subcommittee. As such, we are simply setting out the facts as they exist at this time.

- The Army may not have enough funding available in fiscal year 1986 to support the multiyear procurement of the AH-64A Apache and the TADS/PNVS. Moreover, the projected cost savings from these multiyear procurements is relatively small.
- In order to produce the required annual quantities during the proposed multiyear procurement of the HARM, monthly production must be increased over the level currently funded by the Navy and Air Force. However, the services' fiscal year 1987 budgets do not contain any funding for such an increase. Moreover, the projected cost savings from the multiyear procurement of HARM is relatively small.

DOD's initial projections of annual and multiyear contract costs are normally budgetary quality estimates. If multiyear authority is granted, the cost will have to be confirmed by firm contractor proposals. In preparing the cost estimates for several of this year's candidates, however, the program offices involved merely assumed a desirable level of cost savings from multiyear contracting (usually 10 percent) and deducted that from the program's baseline cost estimate.

That approach was taken in preparing the Apache, TADS/PNVS, F/A-18, and HARM multiyear justification materials. Because little or no attempt was made to determine, based on the specifics of the candidate systems, how and to what extent multiyear contracting may reduce costs, we are concerned that these estimates could be seriously inaccurate. The estimates for the Apache and TADS/PNVS were inaccurate. The contractor proposals, recently received by the Army, showed a level of savings from multiyear contracting that is less than half of that projected in the justification packages. Consequently, we continue to believe that strict adherence to the two-step congressional approval process, whereby authorizations and appropriations are tentative and contract approval reserved until negotiated prices are analyzed and proposed savings validated, is an appropriate way to assure the integrity of the process.

We found all of the current multiyear candidates to be relatively mature production programs with stable requirements and high military priorities. With the exception of the Stinger, most of the planned test and evaluation has been completed for all of the candidates and no significant testing issues are outstanding. The testing of the reprogrammable microprocessor (RMP) version of the Stinger will not be completed until after the proposed multiyear contract has been awarded. However, the RMP version is basically a software upgrade to the version of Stinger currently in production. Although product improvements are planned for several candidates, none are expected to have a significant impact on their hardware production efforts. Therefore, from a hardware design standpoint, the risk in procuring all of the candidates on a multiyear basis does not appear to be significant. As noted above, however, the area of risk for three of the candidates is funding stability.

While only a relatively small amount (\$217.5 million) in additional obligational authority would be required in fiscal year 1987 to contract on a multiyear basis over that required to contract on an annual basis, the total obligational authority requested in fiscal year 1987 for these candidates is about \$7.5 billion. That represents an increase of about \$1.5 billion over the amounts appropriated for the same programs in fiscal year 1986 and is due primarily to planned increases in production rates. The F/A-18 program makes up the bulk of that increase--its budget request for fiscal year 1987 is \$3,406.7 million in then-year dollars, compared to \$2,267.9 million in fiscal year 1986, as the procurement quantity increases from the 84 units authorized in fiscal year 1986 to 120 proposed for fiscal year 1987. The rate of procurement for the Stinger, Patriot, and HARM programs are also scheduled to increase. In the current budget situation, the affordability of such increases in procurement and funding has to be a concern.

We attempted to assess the enhancement the current multiyear candidates would have on the defense industrial base. However, most program offices had little additional information concerning enhancement of the industrial base beyond that included in the justification packages.

Appendix I discusses our objective, scope, and methodology used to evaluate DOD's multiyear candidates. In appendix II, information is provided on the criteria for multiyear contracting and its potential for enhancement of the defense industrial base. The details of our review of each candidate are in appendix III.

As you requested, we did not obtain official DOD comments on this report. We did obtain the views of agency officials from individual program offices; the Army, Navy, and Air Force Headquarters; and the Office of the Secretary of Defense. Their views are included where appropriate.

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

Sincerely yours,



Frank C. Conahan
Assistant Comptroller General

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ABBREVIATIONS

DOD	Department of Defense
DSP	Defense Support Program
GAO	General Accounting Office
HARM	High-Speed Antiradiation Missile
OSD	Office of the Secretary of Defense
POST	passive optical seeker technique
RMP	reprogrammable microprocessor
TADS/PNVS	Target Acquisition Designation Sight and Pilot Night Vision Sensor

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to evaluate the justifications for the seven multiyear candidates included in DOD's fiscal year 1987 budget, plus the two candidates that may be included in a fiscal year 1986 supplemental budget request, to determine if they meet the criteria established by the Congress. We performed our work at the following locations:

- Office of the Secretary of Defense (OSD), 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.
- Naval Air Systems Command, Washington, D.C.
- Naval Sea Systems Command, Washington, D.C.
- U.S. Army Aviation Systems Command, St. Louis, Missouri
- U.S. Army Missile Command, Huntsville, Alabama
- Air Force Systems Command's Space Division, El Segundo, California
- TRW, Inc., Redondo Beach, California

We visited the OSD and military services headquarters and the program offices that prepared the justifications for each of the candidates. We reviewed the program offices'

- acquisition strategy;
- cost estimating methodologies;
- system requirements;
- funding, production, and delivery history;
- test results;
- engineering changes not yet tested or incorporated in the production item;
- schedules for implementing the multiyear program; and
- specific benefits involving enhancement to the industrial base.

Our work was performed from March through July 1986 in accordance with generally accepted government auditing standards.

THE CRITERIA FOR MULTIYEAR PROCUREMENT

Multiyear procurement is a method for acquiring up to 5 years' requirements of systems or subsystems with a single contract. In 1981 the Congress authorized DOD to use multiyear procurement for major systems and since fiscal year 1982, DOD has proposed acquiring weapon systems or subsystems in that manner.

Although multiyear procurement can benefit the government, it can also entail certain risks. Accordingly, in Public Law 97-86, the Congress established criteria that multiyear candidates must meet to limit those risks. The risk-limiting criteria require that the minimum requirement for the system be expected to remain substantially unchanged, sufficient funding be requested by DOD to carry out the contracts, the design be stable, and estimated contract costs be realistic. Some of these criteria have been further refined by DOD and the congressional committees.

BENEFIT TO THE GOVERNMENT

The cost savings to be achieved should be significant since multiyear contracting can reduce future budget flexibility and can entail some added risks, particularly if the requirement, design, and/or funding prove to be unstable or if cost estimates ultimately prove to be inaccurate. If a multiyear contract were awarded and later changed significantly or terminated, the ultimate cost could be higher than under annual contracting. Further, cost savings must offset additional government borrowing costs associated with accelerated expenditures under multiyear contracting.

Each proposed multiyear contract should be evaluated on its own merits, weighing the margin of savings against added risks and any other uncertainties. The savings should be high enough to offset any additional risks of entering a multiyear contract. For example, a candidate with no risks in terms of requirement, funding, or design stability, and in which a high degree of confidence in the cost estimate exists, may provide only a small percentage or amount of savings. If the savings are essentially ensured, they may be judged substantial enough to take advantage of multiyear contracting. In contrast, a candidate with high projected savings may be inappropriate for multiyear contracting if the design, funding, and/or requirement is unstable or if the cost estimate is not based on sound information and logic.

Accordingly, savings should be assessed in relation to the risk or absence of risk in the (1) confidence in the cost

estimate, (2) requirement stability, (3) funding stability, and (4) configuration or design stability.

DEGREE OF COST CONFIDENCE

This criterion requires that the contract cost and the anticipated cost savings be realistic. Cost savings is the difference in cost estimates, proposals, or negotiated prices for the multiyear contract and the cost of procuring the same quantities in the same time frames with successive annual contracts.

Initially, the military services produce budgetary estimates of the potential savings available from multiyear contracting. These estimates are usually based on prior history, informal information from contractors, and/or in-house estimates. They are usually the basis for the original multiyear justifications submitted to the Congress. Confidence in the cost estimates may be increased by receiving firm proposals from the applicable contractor on an annual and multiyear basis and then comparing and analyzing those proposals. Negotiating both the annual and multiyear prices with the contractor provides the best method of defining the savings. However, this is not always practical, and DOD officials stated that the additional administrative effort and the cost to negotiate both must be considered.

The fiscal year 1986 Defense Appropriations Act states that funds for multiyear contracts for major systems will not be available until the House and Senate Committees on Armed Services and Appropriations are notified at least 30 days in advance of contract award. This allows the Committees to compare the estimates presented in the justification packages with the actual proposed contract amounts.

STABILITY OF REQUIREMENT

The need for the system or subsystem must be stable and remain relatively stable throughout the multiyear procurement period. A stable requirement means the total quantity or procurement rate will not vary significantly over the term of the multiyear contract, particularly downward. Decreases in the quantities to be procured can require termination of the multiyear contract and create unit cost increases, which could adversely affect savings.

STABILITY OF FUNDING

The services and DOD must be committed to ensure that sufficient funds will be requested to complete a multiyear

contract at planned production rates. A turbulent funding history for a weapon system may suggest an unstable requirement, a relatively low funding priority, or wavering support, making it inappropriate for multiyear contracting. Disagreements among the military services, OSD, and the Congress concerning the appropriate production rate for a system are often signals that the basis for funding stability has not been firmly established.

Pressures to reduce budgets increase the discipline necessary for using multiyear contracts for major weapon systems. In other words, DOD must ensure that the funding required to sustain the production schedule over the life of the multiyear contract, as reflected in its Five-year Defense Program, be requested as originally anticipated.

STABILITY OF DESIGN

The design of a system or subsystem should be stable before multiyear procurement is initiated. Test and evaluation should be complete and demonstrate that the system or subsystem is operationally effective. We believe a program should be judged mature and stable only after research and development and one or two production runs have been successfully completed. The Senate Committee on Appropriations, in previous reports on the DOD appropriations bills, indicated a similar view that the multiyear approach must be reserved for established production operations and state-of-the-art technology.

Plans for future modifications to a system or component, which is proposed for multiyear procurement, may indicate a lack of design stability. However, adding equipment in future production, which is properly planned and managed and which does not affect the design of the main production item, may not necessarily be an indication of design instability.

INDUSTRIAL BASE ENHANCEMENT

The multiyear justification packages include statements about industrial base enhancements related to each of the candidates. The categories discussed in multiyear justifications include:

- improved competition,
- enhanced investment,
- improved vendor skill levels,
- training programs,
- progress payment changes,
- use of multiyear contracting for vendors, and
- increased production capacity.

The stability in contractor/subcontractor operations associated with multiyear contracts can create a level of business certainty more conducive to enhancing the industrial base than annual procurements which are more likely to fluctuate. Nevertheless, in most instances, it is difficult if not impossible, to identify in advance the industrial base enhancement that will occur as a result of a multiyear contract that would not occur if procurement were by annual contract.

ESTIMATED SAVINGS FOR THE
NINE MULTIYEAR CANDIDATES

In its fiscal year 1987 budget request, DOD submitted seven candidates for approval of multiyear procurement authority. DOD estimated a total potential savings of \$2,070.2 million in then-year dollars or about 10.3 percent less than the cost of procurement on an annual contracting basis. For the two multiyear candidates that may be requested in a fiscal year 1986 supplemental appropriation request, the Army originally estimated multiyear savings of \$268.4 million in then-year dollars or 10.3 percent less than the cost of procurement using annual contracts. For all nine candidates, DOD has projected total savings of \$2,338.6 million in then-year dollars or 10.3 percent, as indicated in table II.1.

Table II.1: Cost Savings Estimates for Current Multiyear Candidates in then-year dollars

<u>System</u>	<u>Estimated total contract cost</u>			
	<u>Annual</u>	<u>Multiyear</u>	<u>Savings</u>	<u>Percenta</u>
	------(millions)-----			
Army:				
Stinger	\$ 1,558.5	\$ 1,396.9	\$ 161.6	10.4
Patriot	3,144.4	2,829.6	314.8	10.0
Black Hawk ^b	1,047.3	931.6	115.7	11.0
Apachec	2,093.5	1,876.4	217.1	10.4
TADS/PNVSc	510.9	459.6	51.3	10.0
Navy:				
F/A-18	10,402.5	9,362.2	1,040.3	10.0
Mark 45	221.9	173.2	48.7	21.9
HARM	2,158.2	2,098.5	59.7	2.8
Air Force:				
DSP	<u>1,653.1</u>	<u>1,323.7</u>	<u>329.4</u>	19.9
Total	<u>\$22,790.3</u>	<u>\$20,451.7</u>	<u>\$2,338.6</u>	10.3

^aPercent of savings compared to annual contract cost.

^bIncludes only costs and savings for UH-60A Black Hawk and not for EH-60A Quick Fix.

^cCandidates have been proposed and multiyear authority may be requested in a fiscal year 1986 supplemental appropriation request.

Present-value analysis can be used to measure the real costs of a multiyear procurement and compare those to the costs of an annual procurement. In such an analysis, a standard discount rate is used to adjust for the time value of money. Selecting an appropriate discount rate, however, has been a subject of controversy. Since most government funding requirements are met by the Department of the Treasury, we believe their estimated cost of borrowing is a reasonable basis for establishing the discount rate to be used in present-value analyses. Accordingly, we computed the average yield on outstanding marketable Treasury obligations that have remaining maturities similar to the period involved in our analysis, and applied that rate to the projected then-year dollars. However,

DOD applied the Office of Management and Budget Circular A-94's prescribed present-value method, which uses a flat 10-percent discount rate applied to constant dollars; that is, future years' estimates that do not include estimated inflation.

Our present-value analysis of the current candidates, as shown in table II.2, indicates total projected savings of about 9.2 percent. DOD's present-value analysis shows savings of about 8.6 percent.

Table II.2: Comparison of DOD and GAO Present-Value Savings for Current Multiyear Candidates

System	DOD		GAO	
	<u>Amount</u>	<u>Percent</u> ^a	<u>Amount</u>	<u>Percent</u> ^b
	(millions)		(millions)	
Army:				
Stinger	\$ 79.2	8.0	\$ 106.1	8.8
Patriot	183.9	9.7	218.8	9.8
Black Hawk ^c	50.9	7.9	70.4	9.1
Apache	118.0	9.2	145.1	9.7
TADS/PNVS	26.9	8.4	33.6	9.0
Navy:				
F/A-18	496.2	8.4	606.7	8.9
Mark 45	15.4	9.4	23.4	12.4
HARM	41.3	2.8	45.6	2.8
Air Force:				
DSP	<u>158.8</u>	16.3	<u>211.3</u>	17.7
Total	<u>\$1,170.6</u>	8.6	<u>\$1,460.9</u>	9.2

^aPercent of savings compared to DOD's present value annual contract cost.

^bPercent of savings compared to GAO's present value annual contract cost.

^cIncludes only savings for UH-60A Black Hawk and not for EH-60A Quick Fix.

SOURCE OF SAVINGS

Just as the savings for each candidate varies so does the source of the savings. The largest category of savings for the current candidates is associated with vendor or subcontractor procurement. The total estimated savings and breakout by source of savings for eight of the nine current candidates are shown in table II.3. The Navy could not provide a detailed breakout by source of the savings projected from an F/A-18 multiyear contract.

Table II.3: Sources of Estimated Savings

	<u>Percent of total estimated savings</u>
Vendor procurement	54.8
Manufacturing	36.1
Inflation	7.9
Other	<u>1.2</u>
Total	<u><u>100.0</u></u>

The majority of the savings in a typical multiyear arrangement is associated with procurement of vendor and subcontracted items on a more economical basis than is possible with a series of annual procurements. The technique is called economic order quantity procurement or expanded advance buy. Rather than procure 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 because the subcontractor can be more efficient in buying materials and in scheduling production. However, the government must make a contractual commitment to the prime contractor to either procure the larger multiyear total quantity or pay termination costs if quantities are later reduced. The commitment to larger advance procurements usually requires additional funding in the early years of a multiyear contract.

GAO ASSESSMENTS OF THE
CURRENT MULTIYEAR CANDIDATES

We reviewed the justification materials submitted to the Congress for the seven multiyear procurement candidates proposed in the DOD's fiscal year 1987 budget request and the two candidates proposed in October 1985 by the Under Secretary of the Army to assess their conformance to the multiyear procurement criteria outlined in Public Law 97-86. Our assessment of each candidate follows.

STINGER MISSILE SYSTEM

The Stinger, being purchased by the Army, Marine Corps, Navy, and Air Force, is a shoulder-launched, air-defense missile system used to counter the low-altitude aircraft threat in forward areas. The original Stinger has been upgraded with the passive optical seeker technique (POST) and will be upgraded with the reprogrammable microprocessor (RMP).

The Army's total requirement is for 50,664 Stinger missiles, the Marine Corps' is for 13,924 missiles, the Navy's is for 685 missiles, and the Air Force's is for 216 missiles. All of these requirements appear to be relatively stable. In 1985 an Army-sponsored study of the feasibility of second sourcing the Stinger-RMP production recommended that such a strategy not be pursued at this time from a cost-effectiveness standpoint. Instead, the Army decided to request multiyear procurement authority for the Stinger program.

From fiscal years 1978 to 1984, the Army contracted with the General Dynamics Corporation to purchase 12,272 basic Stingers. Since low rate initial production began in fiscal year 1983, the Army has awarded contracts for 3,777 Stinger-POST missiles. Production flight testing of those missiles is scheduled to start in September 1986. The Army has subsequently decided to convert 3,218 of those Stinger-POST missiles to the Stinger-RMP version. The RMP version of Stinger has been in development since September 1984 and is expected to improve the performance of the Stinger-POST through relatively low cost hardware changes and additional software. However, Stinger-RMP engineering and design is not yet complete and operational testing has not yet been performed. As a consequence, the effectiveness of the Stinger-RMP will not be demonstrated at least until the software is ready and that is not expected before August 1987. Nevertheless, the Army's multiyear proposal involves the procurement of only Stinger-RMP missiles.

The Army's multiyear proposal calls for the procurement of 37,622 Stinger missiles, 17,438 gripstocks, and 508 tracking head trainers at a cost of \$1,396.8 million in then-year dollars over a 5-year period starting in fiscal year 1987. According to the Army, multiyear contracting would provide cost savings of \$161.6 million in then-year dollars or 10.4 percent of the projected cost for the same quantities procured on an annual contracting basis. The annual cost estimate was based on a July 1985 Stinger project office study, whereas the multiyear estimate was calculated by modifying the prime contractor's unsolicited proposal to reflect quantity and other changes. The multiyear cost estimate may be high and the savings underestimated, because the Army did not consider its historical success rate--which range from 8 to 15 percent--in negotiating Stinger production contracts with General Dynamics.

The reasonableness of the projected savings will be better known when the Army receives and analyzes firm contractor proposals for both annual and multiyear contracts. The Army plans to complete negotiations on a multiyear or annual contract by February 1987.

Project office officials told us that the funding for the Stinger program in the Army's fiscal year 1988 budget may be considerably less than that shown in the multiyear justification package. With the expected funding decrease, as many as 1,000 missiles would have to be deleted from each year's procurement. However, an OSD official involved with multiyear procurement told us that the fiscal year 1988 budget has not yet been approved by OSD but that OSD is committed to protecting the funding profiles of its multiyear procurement programs. Nonetheless, until the Army demonstrates a strong commitment to protect the Stinger's funding profile for fiscal year 1988 and beyond, the Subcommittee may wish to consider not approving the procurement of the Stinger system on a multiyear basis.

PATRIOT MISSILE SYSTEM

The Patriot is an advanced surface-to-air guided missile system designed to engage multiple targets simultaneously in a mass attack by high performance aircraft. Since production was approved in 1980, there have been seven production contracts awarded to the prime contractor, the Raytheon Company. Through the seventh contract, the Army will have purchased 67 fire units and 2,175 missiles. Patriot missile requirements increased by over 30 percent in fiscal year 1982, but have been relatively stable since then and are expected to remain unchanged during the contemplated contract period. As of December 1985, a total of 100 fire units and 6,037 missiles are needed by the Army.

Under a multiyear contract, the Army plans to procure the remaining 3,862 Patriot missiles and 33 fire units at a projected cost of \$2,829.6 million in then-year dollars--a savings of \$314.8 million or 10 percent less than the Army's cost estimate of \$3,144.4 million for five successive annual contracts for the same total number of missiles and fire units. However, the difference between the Army's in-house estimate of annual contract costs and the contractor's original estimate of multiyear contracting costs (after certain adjustments by the Army) was actually about 6 percent. Army officials believe that, based on previous experience, additional savings could be achieved through contract negotiations. Therefore, the Army adjusted the multiyear costs to reflect a 10-percent savings. The reasonableness of the projected savings will be better known when the Army receives and analyzes firm contractor proposals from Raytheon for both annual and multiyear contracts. Proposals for a multiyear contract covering fiscal year 1987 through 1991 and an annual contract for fiscal year 1987 were submitted to the Army in July 1986 but have not yet been fully analyzed.

The Army plans to award a Patriot multiyear contract or another annual contract to Raytheon on a firm fixed-price basis without competition. The Army does not believe that competition at the system level is desirable at this stage of the program. During full-scale engineering development, economic production rates were analyzed and the Army decided not to seek second sources at the major item level but rather to strive for economic missile production rates and second sources for components. In addition to second sourcing, many components of the Patriot missile system have been broken out as government-furnished equipment since the initial production contract. In October 1985, the Army evaluated the potential savings that would be achieved through further break-outs of components from the prime contract and concluded that greater savings would result from multiyear procurement.

The Patriot's design appears to be stable. All engineering change proposals other than preplanned product improvements have been designed and tested. Of the six preplanned improvements that have not been designed, five will be designed prior to a multiyear contract award and one will not be incorporated into the Patriot design until after the multiyear contract period.

According to the project manager, deliveries of both missiles and fire units are behind schedule, but the the problem is considered to be minor and the contractor is expected to recover by the end of fiscal year 1986. As of March 1986, Patriot missile deliveries lagged behind the contract schedule

by 159 missiles because of radome bonding problems. Those problems have apparently been resolved and radomes are currently being produced at a faster than scheduled rate in order to catch up. Patriot fire unit deliveries are 1 month behind schedule because of the unavailability of lower level assemblies and longer than planned system test time. Corrective actions are under way to alleviate these problems and fire unit deliveries are expected to be on schedule by the end of fiscal year 1986.

The latest operational test of the Patriot missile system was conducted from July to September 1984. Generally, the test reports indicate that the system hardware exceeded reliability expectations. Although one analysis indicated that the effectiveness of Patriot hardware and operators should have been tested at temperatures as low as -45 degrees fahrenheit, the risk of having to redesign Patriot hardware to meet cold weather extremes is considered to be low. Project officials told us that, although there are no current plans to deploy the system in an arctic climate, Patriot performed successfully in Europe during the winter of 1986. In addition, although some electromagnetic pulse testing of Patriot has been performed, one test group did not consider the testing to be sufficient. Project officials concurred that the testing was limited and have scheduled system level electromagnetic pulse testing during fiscal year 1987.

As long as the final level of negotiated contract savings is close to or above that originally projected, the Patriot appears to meet the criteria for multiyear procurement.

UH-60A BLACK HAWK AIRFRAME

The UH-60A utility helicopter--commonly called the Black Hawk--was designed and developed by the Sikorsky Aircraft Division of the United Technologies Corporation in the early 1970s. The same airframe is also used for the Army's EH-60A Quick Fix--a special electronics mission aircraft. Modified versions of the UH-60A airframe are also used for the Navy's SH-60B, SH-60F, and VH-60 aircraft. Since fiscal year 1977, the Army has awarded two annual (fixed-priced incentive) and two multiyear (firm fixed-price) production contracts for a total of 921 UH-60A and EH-60A airframes for the Army and 11 UH-60A airframes for the Air Force. One of the annual production contracts included option prices for three additional fiscal years which were exercised by the Army. Through May 1986, 752 airframes have been delivered.

In its fiscal year 1987 budget, the Army proposed to complete its procurement program by acquiring 252 UH-60As and

additional EH-60As³ in a third multiyear contract covering fiscal years 1988 through 1990. The Army projected a savings of \$115.7 million in then-year dollars on the procurement of the 252 UH-60As on a multiyear contract basis compared to an annual contract basis. However, the cost estimates and projected savings submitted to the Congress for that proposed multiyear contract may now be invalid. Project officials have informed us that, in formulating its fiscal year 1988 budget, the Army changed the UH-60A's funding profile so that the third multiyear contract would cover a 4-year period--fiscal years 1988 through 1991. In doing so, the Army apparently decided to reduce the production rate of the UH-60A from 8 to 6 a month.

If this change is approved by OSD, the Army will have to revise its multiyear justification package for the UH-60A/EH-60A and submit it with the President's fiscal year 1988 budget request. However, an OSD official involved in multiyear procurement issues has stated that final decisions have not yet been made on DOD's overall fiscal year 1988 budget. He added that funding changes made at the service level can and probably will be reversed, since the Black Hawk multiyear procurement program has been previously approved by OSD. Nonetheless, the questions within DOD on the funding for the UH-60A Black Hawk raises questions on the funding stability of the program.

The UH-60A airframe is a stable helicopter system. The requirements for the UH-60A and EH-60A have been stable since the program's inception. Since 1982 the contractor has met its production requirements. Although some engineering change proposals are planned for introduction during the proposed multiyear contract, the aircraft design appears to be stable.

According to the Army, no product improvement programs are contemplated for the proposed multiyear contract period. However, the Army has tentative plans to develop an enhanced version of the UH-60A. If a decision is made to develop this version, the Army plans to procure 668 units after the proposed multiyear contract is completed.

³This multiyear proposal also includes the procurement of EH-60As, the specific number and projected cost of which are classified. In order to keep this report unclassified, we have deleted all reference to such information. However, that information does not have an effect on the results of our assessment of this multiyear proposal.

With the exception of the funding stability criteria, the UH-60A appears to meet the criteria for multiyear procurement. Until a consensus is reached on the program's funding profile, however, the Subcommittee may wish to consider not approving the UH-60A for multiyear procurement at this time. A delay would not appear to be a major problem in that the proposed multiyear contract was not planned to be awarded until fiscal year 1988.

AH-64A APACHE AIRFRAME

On October 25, 1985, the Under Secretary of the Army submitted justification packages to the Congress in support of proposed fiscal years 1986 to 1988 multiyear procurements of the AH-64A Apache airframe and spares and the Target Acquisition Designation Sight and Pilot Night Vision Sensor (TADS/PNVS). In December 1985 the Congressional Conferees on the Continuing Resolution for Fiscal Year 1986 Appropriations acknowledged receipt of the proposals but did not approve them because of their concerns about "the continuing difficulties in achieving rate production and uncertainties about the total AH-64A program and its stability." Nonetheless, the Conferees agreed that "a proposal to enter one or both of the proposed multiyear contracts may be considered as part of a 1986 supplemental or may be proposed as a new start in fiscal year 1987. Any such proposal should be substantiated by comparable negotiated contract data."

The Army intends to acquire 366 AH-64A Apache helicopters on a multiyear contract for fiscal years 1986-1988. The contract will call for the prime contractor (McDonnell Douglas Helicopter Company) to manufacture or acquire the basic airframe and related components and assemble them with the TADS/PNVS, government-furnished engines, and other miscellaneous components into a completed aircraft system. The engines are procured under separate multiyear contracts and the TADS/PNVS has been proposed as a multiyear candidate.

Since 1982 the Army has awarded four annual production contracts for a total of 309 aircraft. The first two contracts for 59 aircraft were awarded on a fixed-price incentive basis. The remaining 250 aircraft are being produced under two firm fixed-price contracts. Through March 1986, 93 aircraft had been delivered. During the past year, however, delivery of the Apaches had been held up (precluded from acceptance flight testing) due to two safety of flight groundings. Those groundings have been lifted and the Army is again accepting Apaches for delivery. The contractor has produced as many as 11 aircraft a month and is currently producing at a rate of 10 a

month. The contractor is expected to begin producing at a maximum rate of 12 units per month by October 1986.

Program requirements have remained firm since entering production, with the only major deviation being an increase in quantities. Since the baseline design configuration was established in 1983, some engineering change proposals have been adopted. However, none appears to have had any significant impact on the aircraft's basic design and its production stability.

The Apache justification package reflects estimated savings of about \$217 million in then-year dollars by using multiyear contracting--a 10-percent savings over the projected costs of annual procurements. The 10-percent estimated savings was based on the multiyear contract experience of other programs, such as the UH-60A Black Hawk, and applied to the Apache's estimated annual contracting costs to derive the multiyear cost estimate. Without a thorough analysis of the specifics of an Apache multiyear production effort, there can be little confidence in the Army's multiyear cost estimate for the Apache.

The Army plans to negotiate with the contractor on both an annual and multiyear basis and expects to have a negotiated firm fixed-price contract by August 1986, with Congressional notification to be accomplished shortly thereafter. The contractor's proposals for an annual contract with two options and one 3-year multiyear contract, which were received by the Army in March 1986, reflect savings of about 4.6 percent by using multiyear procurement--less than one-half the amount originally projected.

The prices in the contractor's multiyear proposal reflect savings generated through economic order quantity purchases. Over \$100 million may be required in both fiscal years 1986 and 1987 to support the fiscal years 1987 and 1988 multiyear effort--amounts substantially greater than the advanced procurement funding for those years reflected in the justification package (\$45.9 and \$32.6 million respectively). More importantly, advance funds in the amount proposed would bring total funding requirements for fiscal years 1986 and 1987 above presently budgeted levels. The Army's original budget request for fiscal year 1986 has been reduced by about \$147 million through congressional action and by DOD actions to implement the funding reductions imposed by the Balanced Budget and Emergency Deficit Control Act of 1985. Army program and procurement officials note that if negotiations on the multiyear contract and the advanced procurement requirements do not bring

the total funding requirement down to the amounts available, consideration of multiyear contracting would be seriously impaired.

TARGET ACQUISITION DESIGNATION SIGHT
AND PILOT NIGHT VISION SENSOR (TADS/PNVS)

The TADS/PNVS is a major item of government-furnished equipment to the AH-64A Apache helicopter. An integrated sensor system, the TADS/PNVS enables the crew to fly, locate, and destroy targets day and night and in adverse weather. It includes high-power direct view optics, a forward looking infrared sensor, a laser designator/range finder, and a laser spot tracker.

The Army plans to procure 681 units, with deliveries extending into 1990. Except for the fiscal year 1986 budget shortfall (discussed in Apache section), both the requirements and funding appear to be firm for the Apache helicopter and the TADS/PNVS. Since 1982 the Army has entered into four annual production contracts for 318 TADS/PNVS units. The first three contracts (fiscal years 1982, 1983, and 1984) for 177 units were fixed-price incentive contracts with an estimated ceiling cost of \$655 million. The fourth production contract called for 141 units at a firm fixed price of \$197 million. As of May 31, 1986, 157 of the 318 units on contract have been delivered by the prime contractor, Martin-Marietta, which is 6 units behind the current delivery schedule. Martin-Marietta is currently producing 12 units a month. The proposed multiyear contract for fiscal years 1986, 1987, and 1988 will call for 363 units at a firm fixed price.

Since the baseline design configuration for the TADS/PNVS was stabilized in July 1985, there have been 41 engineering change proposals, but none are considered significant in either dollars or design. In fiscal year 1986, the Army plans to award a research and development contract to Martin-Marietta for an improved optical system. This development, estimated for completion in fiscal year 1988, is expected to have a minimal impact on the multiyear contract. One Army official estimated that if the development proceeds without problems, only the last 100 units would be fitted with the improved optics during production--all other units would be retrofitted.

The justification package reflects estimated savings of about \$51.3 million in then-year dollars by use of multiyear contracting--a 10-percent savings over the estimated cost of annual contracting. The project office estimated savings of 10 percent based on UH-60A Black Hawk multiyear experience and

applied this percentage to the TADS/PNVS baseline cost estimate. Without a thorough analysis of the specifics of a TADS/PNVS multiyear production effort, there can be little confidence in the Army's multiyear cost estimate for the subsystem. The Army received the contractor's proposals in May 1986, and the cost savings from multiyear procurement are about 3.8 percent--substantially below the 10-percent savings cited in the justification package. Army officials state that they perceive little or no interest on the contractor's part for multiyear procurement.

F/A-18 STRIKE FIGHTER AIRCRAFT

The Navy's multiyear proposal for the F/A-18, initiated by the Office of the Secretary of the Navy, involves the purchase of 753 aircraft during fiscal years 1988 through 1992. In fiscal year 1987, the Navy is requesting advanced procurement funds to enter into a multiyear program starting in fiscal year 1988. The fiscal year 1987 aircraft are to be procured on an annual contract.

The F/A-18 Naval Strike Fighter is a twin engine, multimission tactical aircraft. Its primary missions are fighter escort and interdiction, with fleet air defense and close air support as additional roles. In 1985 development of an austere all-weather attack capability for both single- and dual-cockpit aircraft began with the addition of a navigational forward-looking infrared sensor and night-vision goggles. These additions will allow the F/A-18 pilot to visually navigate and attack targets at night with virtually the same accuracy as in daylight. This additional capability, however, is not expected to affect the basic airframe design. The design of the F/A-18 appears to be stable with no major changes or improvements planned for the proposed multiyear period.

The proposed multiyear contract calls for the procurement of 753 aircraft at a projected firm fixed price of \$9,362.2 million in then-year dollars, including \$335.2 million in advanced procurement funds in fiscal year 1987. That represents an estimated savings of \$1,040.3 million in then-year dollars or 10 percent when compared to the projected costs of procuring the same number of aircraft on an annual basis. The annual cost estimates presented in the justification package were based on historical data. The contract cost for the most recent procurement (fiscal year 1985) was projected to fiscal year 1992 using historical production cost data and learning curve analyses and adjusted for escalation using OSD approved inflation indexes. The multiyear cost estimate was derived by adjusting the annual contracting estimates to achieve a 10

percent cost savings. Without a thorough analysis of the specifics of an F/A-18 multiyear production effort, there can be little confidence in the accuracy of the Navy's multiyear cost estimate for the F/A-18. A program office official told us that, during informal discussions, the prime contractor, the McDonnell Douglas Aircraft Corporation, stated that only a 5-percent cost savings may be realized through the proposed multiyear procurement. Despite the prime contractor's savings estimate, the project office believes that at least a 10 percent savings can be achieved during negotiations for a multiyear contract.

Effective with the fiscal year 1980 budget, the Navy increased the F/A-18 requirement from 811 to 1,377 aircraft and that continues to be the program requirement. As of December 31, 1985, the program office had awarded contracts to McDonnell Douglas for 420 F/A-18 aircraft, of which 300 have been delivered as of May 14, 1986. However, the rate at which the aircraft are to be procured is uncertain. Over the past several years, the Navy's annual procurement projections have changed almost every year. In addition, the Congress has authorized only 84 aircraft in each of the past 4 fiscal years. Nonetheless, the Navy's multiyear proposal calls for 132, 132, 163, 163, and 163 aircraft to be procured in fiscal years 1988 through 1992, respectively.

Based on past congressional actions on the F/A-18 budget requests and the current budget situation, it is questionable that funding will be approved for the levels of procurement projected in the Navy's multiyear proposal. Based on that and our concerns about the Navy's calculation of multiyear cost savings, the Subcommittee may wish to consider not approving the F/A-18 program for multiyear procurement.

MARK 45 GUN MOUNT AND MARK 6
AMMUNITION HOIST

In a multiyear procurement for fiscal year 1987 through 1990, the Navy plans to acquire 22 Mark 45 Gun Mounts and Mark 6 Ammunition Hoists--10 for installation in the CG-47 class ships and 12 for the DDG-51 class ships. The system is being acquired under a multiyear contract covering fiscal years 1984-1987. The first deliveries of the hoist and gun mount under the existing contract are scheduled for July and November 1986, respectively. Based on contractor progress reports, the Navy expects these deliveries to be made on schedule.

The planned procurement approach for the gun mount is for a sole source fixed-price incentive contract. The procurement for

the hoist will be a competitive firm fixed-price contract because it is less complex than the gun mount and various components of it have been procured from several vendors in the past. The hoist, as well as about 16 other items, will be broken out as government-furnished equipment. FMC/Northern Ordnance, the developer and current producer of the gun mount and hoist, is the only prime contractor, according to the Navy, currently capable of producing the gun mount in the timeframes required to meet dockside delivery. General Electric, the only other contractor with experience in the manufacture of the gun system, was qualified as a second source in 1971. General Electric was approached for the fiscal years 1984-1987 multiyear procurement but declined to participate due to its workload. In the past, annual procurements of small quantities (due to the limited number of new ship construction programs) have limited participation by other sources.

The requirements for the gun mount and hoist are expected to remain stable. The gun mount and ammunition hoist are included in the fiscal year 1987-1990 budgets for the CG-47 and DDG-51 at the quantities needed for the ships. An overall requirement for 189 gun mounts and hoists has been identified, with 16 units remaining to be procured beyond the proposed multiyear procurement.

The gun system design is considered to be stable, with over 100 gun mounts and hoists produced to date. A program official stated that the gun system has not undergone any major changes in its history. The most significant change occurred in 1983, prior to award of the existing multiyear contract, when the gun system's capabilities were expanded in three major areas--fire power, control, and fault isolation/maintainability. Eight engineering changes being incorporated in the existing multiyear contract are expected to be approved and made a part of the baseline before award of the proposed multiyear contract. A ninth engineering change, currently in development, is not expected to be approved before award of the multiyear contract. The program office considers these potential changes to be minor. Most are driven by the requirement to shock harden the gun mount against nuclear explosion. No new guns are being developed or planned for development.

For the proposed multiyear procurement, the justification package identified cost savings of \$48.7 million in then-year dollars or 21.9 percent compared to annual procurements. The multiyear cost estimates were based on data submitted by the contractor and negotiated prices in the existing multiyear contract with inflation factors applied. To confirm its cost

projections, the Navy plans to solicit contractor proposals for four successive annual contracts and one proposal for a 4-year multiyear contract. Provided that the projected quantities of CG-47s and DDG-51s for fiscal years 1987 to 1990 are approved, the Mark 45 appears to be an acceptable candidate for multiyear procurement.

HIGH-SPEED ANTIRADIATION MISSILE (HARM)

The HARM is an air-to-surface missile designed to suppress or destroy land- and sea-based radars which direct enemy air defense systems. HARM development began in 1972 as a Navy program. The Air Force joined the HARM program in 1975, with the Navy retaining responsibility for executive direction of the program. The HARM weapon system will be deployed on the Navy's A-7E, F/A-18A, A-6E, EA-6B and the Air Force's F-4G aircraft.

HARM is procured on a sole-source basis from Texas Instruments, which is responsible for the total system, including all missile components, associated aircraft avionics, and peculiar support equipment. Texas Instruments has completed the first three production years with on-time deliveries and is currently delivering ahead of schedule on the fourth production year--the fiscal year 1984 contract. According to the HARM program office, over 96 percent of the materials and components used to produce the HARM are obtained competitively from subcontractors. The Navy recently considered the feasibility of breaking out both the rocket motor and the target detector device as government-furnished equipment and a decision has been made to breakout the rocket motor in fiscal year 1987. Further breakout of major HARM components is not considered feasible or cost effective.

Although the Navy recommended in 1983 that a second production source for the missile system be qualified, the Secretary of Defense directed that a single-source acquisition strategy be continued, contingent upon the contractor providing cost control and reduction assurances. Congress affirmed that decision provided that the Navy accelerate the development of an alternate low cost seeker for the missile. The low cost seeker is planned to be used in a second generation HARM missile, which is expected to enter production in 1989 following competitive development.

The HARM multiyear proposal, expected to cost \$2,098.4 million in then-year dollars for fiscal years 1987 through 1989 shows projected savings of \$59.7 million (2.8 percent) on the purchase of 9,720 missiles compared to the cost of three annual

contracts for the same number of missiles. The multiyear costs were calculated by applying the assumed level of savings (2.8 percent) to the estimated annual contracting costs. The HARM program office realizes that the projected savings is small but thinks that there is potential for additional savings from increased subcontractor competition. In addition, the HARM proposal does not involve any advance procurement and, if a multiyear contract were awarded, the Navy would not be assuming any additional cancellation liabilities.

Since fiscal year 1982, the recurring flyaway unit cost of the missile has declined over 50 percent--from \$599,000 in fiscal year 1982 to \$260,000 in fiscal year 1986. The Navy attributes this reduction to the consideration given to qualifying a second production source for the missile and the credible threat of competition to Texas Instruments. The Navy estimates a further decline in the recurring flyaway unit cost to \$223,000 in fiscal year 1987. However, the Navy projects only a small additional reduction in the recurring flyaway unit cost during the multiyear contract--to \$220,000 by fiscal year 1989.

Between fiscal year 1983 and 1985, the Navy and Air Force reduced their total HARM requirements from 17,429 to 15,394. Prior to the proposed multiyear procurement of 9,720 HARMs, the Navy and Air Force will have contracted for a total of 5,193 missiles. The services plan to purchase a final 481 missiles in fiscal year 1990 to complete the total planned procurement of 15,394 missiles.

Since entering production, HARM has undergone two primarily software block configuration changes, Block I in fiscal year 1982 and Block II in fiscal year 1984. The Navy is planning to implement Block III changes, alterations to the software package, into the HARM missile. The Navy is working with the contractor to ensure that Block III changes will not result in any hardware design changes or have any impact on the recurring flyaway unit cost. Block IV is a proposed, but currently unfunded, improvement program for the missile which involves guidance section hardware changes to be developed under a firm fixed-price contract and used in the fiscal year 1989 production missiles. The Navy states that it has a commitment from Texas Instruments that the Block IV changes, if accepted, will not change the missile's unit price.

According to the Navy, HARM missiles are currently being delivered at the rate of 47 missiles a month and by October 1986, production capabilities are expected to be 110 missiles a month. In addition, Texas Instruments has received Navy funding

of about \$18 million for tooling and test equipment in order to increase its monthly production capability to 188 missiles. In order to produce 3,240 missiles annually for the proposed multiyear procurement, however, monthly production must be increased to 270 missiles. The fiscal year 1987 budgets of the Navy and Air Force do not contain any funding for tooling and test equipment to increase monthly production. Although the precise cost has not yet been determined, the HARM program office believes the necessary tooling costs can be met by reprogramming funds and the contractor incurring some of the costs. Even if the funds are obtained, we consider the proposed production increase to be ambitious and a potential problem for the proposed HARM multiyear contract.

DEFENSE SUPPORT PROGRAM

Under a multiyear contract for fiscal years 1987 through 1991, the Air Force proposes to procure five Defense Support Program (DSP) satellites. Those satellites have two major assemblies--the spacecraft, which is made by TRW, Incorporated, and the sensor, which is made by Aerojet Electro-Systems Company.

Based on preliminary estimates from the contractors and other information, the Air Force projects that a multiyear procurement of five DSP satellites would cost \$1,323.7 million in then-year dollars which is \$329.4 million or 19.9 percent less than the projected cost of annual procurement at the same production rate. Firm contractor proposals on a multiyear and annual basis have been solicited and will be negotiated in order to validate these projected savings.

The DSP was started in the mid-1960s to satisfy a highly critical national security need. A block of four satellites is now on contract and no changes are planned for the proposed block of satellites. Additional information on our assessment of the multiyear procurement of DSP satellites is classified and has been provided separately to the Subcommittee staff.

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