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February 1997

# WEAPONS ACQUISITION

## Better Use of Limited DOD Acquisition Funding Would Reduce Costs



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**National Security and  
International Affairs Division**

B-272633

February 13, 1997

The Honorable William S. Cohen  
The Secretary of Defense

Dear Mr. Secretary:

In response to congressional concerns about the way that the Department of Defense (DOD) buys weapons, we reviewed (1) DOD's practice of reducing the annual production of weapons below planned optimum rates during full-rate production, (2) the reasons for this practice, and (3) the effect of this practice on the costs and availability of weapons. In addition, we looked into the benefits of changing DOD's current practice.

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**Background**

The fiscal year 1997 DOD procurement appropriation is \$43.8 billion, a reduction of over 67 percent from the \$134.3 billion (in constant fiscal year 1997 dollars) appropriated in 1985. Many weapon acquisitions have been affected by this decline in the procurement budget. DOD's primary response to the reduced budget has been to reduce annual procurement quantities of weapons in full-rate production and extend their production schedules.

DOD buys new weapons in two phases: low-rate initial production (LRIP) and full-rate production. When in LRIP, according to 10 U.S.C. 2400, DOD is to buy minimum quantities of a new weapon. This legislation resulted from concern in the Congress about the large quantities of weapons units bought before adequate testing. The purpose of LRIP is to (1) provide weapons for operational test and evaluation, (2) establish an initial production base for the weapon, and (3) permit an orderly increase in production before full-rate production begins. Operational test and evaluation is key to ensuring that a weapon's capabilities operate as designed before full-rate production begins. At this time, field tests are done to demonstrate the weapon's effectiveness and suitability for military use. After the weapon's design has stabilized and the weapon's capabilities are proven, the services enter full-rate production to begin buying proven weapons in economic quantities. In practice, DOD views low-rate production as any production prior to completion of initial operational tests and full-rate production as the production that follows these tests, with the terms low rate and full rate having little or no relevance to the annual quantity bought.

We reviewed 6 weapons in LRIP and 22 weapons in full-rate production. (See app. I for a list of the weapons.) The 22 weapons in full-rate production represent those that in fiscal year 1996 had substantial ongoing production lines. The six low-rate production weapons were ones in production in fiscal year 1996 with substantial planned follow-on full-rate production quantities. For the six weapons in low-rate production, we looked for increases in production rates before operational tests were completed and decreases in the planned future full production rates. For the 22 weapons in full-rate production, we compared DOD's planned optimal production rates, costs, and schedules to that of actual full-rate production through fiscal year 1996 (see app. II).

## Results in Brief

DOD has inappropriately placed a high priority on buying large numbers of untested weapons during LRIP to ensure commitment to new programs and thus has had to cut by more than half its planned full production rates for many weapons that have already been tested. This practice is wasteful because DOD must often modify, at high cost, the large numbers of untested weapons it has bought before they are usable and must lower annual buys of tested, proven weapons; stretching out full-rate production for years due to a lack of funds. We have repeatedly reported on DOD's practice of procuring substantial inventories of unsatisfactory weapons requiring costly modifications to achieve satisfactory performance and, in some cases, deployment of substandard weapons to combat forces. As examples, the Air Force's C-17 airlift aircraft, the Navy's T45A trainer aircraft, and the Army's Family of Medium Tactical Vehicles encountered problems during test and evaluation that required major changes after significant quantities were bought during low-rate production.

We found the practice of reducing planned full production rates to be widespread. Primarily because of funding limitations, DOD has reduced the annual full-rate production for 17 of the 22 proven weapons reviewed, stretching out the completion of the weapons' production an average of 8 years longer than planned. According to DOD's records, if these weapons were produced at their originally planned rates and respective cost estimates, the quantities produced as of the end of fiscal year 1996 would have cost nearly \$10 billion less. At the same time, DOD is funding increased annual quantities of weapons in low-rate production that often are in excess of what is needed to perform operational tests and establish the production base.

If DOD bought untested weapons during LRIP at minimum rates, more funds would be available to buy other proven weapons in full-rate production at more efficient rates and at lower costs. Also, this would reduce costly modifications to fix substandard weapons bought in low-rate production and allow full-rate production of weapons with demonstrated performance to be completed and deployed to combat forces earlier.

## DOD Often Decreases Production Rates of Proven Weapons

It is not uncommon for DOD to reduce the annual production quantities of proven weapons, stretching out full-rate production schedules for years. For 17 of the 22 proven weapons we reviewed, the actual production rates were 57 percent lower than originally planned. Decreased rates vary from 10 percent for the E-2C Hawkeye to 88 percent for the Standard missile system. For 12 of these weapons with reduced rates during full-rate production, program officials cited insufficient funding as a contributing reason for lower rates, and therefore stretching out production. As a result of reduced rates, production of the 17 weapons will take an average of over 8 years, or 170 percent, longer to complete than originally planned. The number of years the 17 weapons' production schedules have been stretched out ranges from 1 year for the Avenger to 43 years for the Black Hawk helicopter based on current production rates. (See app. III for the reduced production rates on each of these weapons.) Examples of proven weapons with reduced annual production rates follow:

- At the extreme for slowed production is the Army's Black Hawk helicopter. If the Army continues to buy the Black Hawk at the current rate, full-rate production will take almost 54 years to complete, about 43 years longer than originally planned.
- The Navy's production of the Tomahawk missile was to be completed in 9 years or by 1992, but instead it will take 15 years or until 1998, a 67-percent schedule increase. Originally, the Navy's planned procurement rate was 600 Tomahawks annually; instead, it has averaged 276 missiles a year, a decrease of over 50 percent from the planned production rate.

## Extended Schedules Result in Higher Acquisition Costs

Because of their reduced annual production rates and stretched out schedules, the acquisition of the 17 weapons we reviewed in full-rate production has cost nearly \$10 billion more, through fiscal year 1996, than the program offices estimated based on their original planned production rates. Since 14 of the 17 weapons will still be in production beyond fiscal year 1996, the total increased cost at completion of these weapons could be significantly more than \$10 billion. When the annual production

quantity of a weapon is reduced, its unit cost generally increases because fixed costs are spread over a smaller quantity. This was the case for 14 of the 17 weapons we reviewed that had reduced production rates (see app. II).<sup>1</sup> For example, the Navy planned to produce 48 T45 training aircraft annually at a unit cost of \$8.7 million. Instead, an average of 12 T45s has been produced annually since full-rate production began in 1994, at a unit cost of \$18.2 million. For the quantity produced in full-rate production through fiscal year 1996, T45 costs have increased from the original estimate by \$345 million.

When weapon systems are funded at their planned full production rates or higher, the unit cost of the weapon generally decreases, as illustrated in the following examples:

- The Army's program office increased the quantities of its Global Positioning System (with an original planned annual rate of 14,000) from 11,000 to 18,500 during 4 years of full-rate production. As a result, the unit cost of the system decreased from \$1,400 to \$1,076.
- If annual production were increased, the Army could save up to an estimated \$491 million on the remaining 109 Kiowa Warrior helicopters it needs to finish full-rate production. For each of the last 3 years, the program office has procured an average of 16 units a year at a unit cost of \$10.22 million.<sup>2</sup> According to Kiowa program officials, the most efficient annual production rate of 72 helicopters would reduce unit cost to \$5.72 million.

## Making Large Investments in Untested Weapons Increases Cost and Performance Risks

The practice of allocating funds during low-rate production to increase annual production quantities before successful completion of initial operational test and evaluation has frequently been wasteful. As we reported in November 1994, the consequences of buying large quantities of untested weapons are increased acquisition costs, the accumulation of unsatisfactory weapons that require costly modifications to meet performance requirements and, in some cases, the deployment of substandard weapons to combat forces.<sup>3</sup> That report contained 12 illustrative examples describing the problems experienced when the

<sup>1</sup>The three remaining weapons had lower unit costs for reasons not tied directly to the production rate. If these weapons were procured at their planned rates, additional acquisition cost savings could be realized.

<sup>2</sup>This is the unit cost for fiscal year 1995, the last year actual cost data were available on the helicopter. This figure applies only to remanufactured vehicles.

<sup>3</sup>Weapons Acquisition: Low-Rate Initial Production Used to Buy Weapon Systems Prematurely (GAO/NSIAD-95-18, Nov. 21, 1994).

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weapons were tested, the major fixes required after significant quantities were bought and, in many cases, the deployment of substandard weapons to combat forces. (Those 12 examples are included in appendix IV of this report.) In one case, before the Army did any operational test and evaluation, a multiyear production contract was awarded for up to 10,843 trucks. Operational testing was suspended 2 months after it began because the trucks were found to be unreliable and therefore not operationally effective. Production continued while the contractor modified the truck design to correct deficiencies. By the time the trucks passed operational testing, over 2,000 trucks were produced, the majority of which required extensive remanufacturing to correct the deficiencies.

Most program offices developed an acquisition strategy for both low-rate and full-rate production based on optimistic projections of available funding. As a result, the offices tended to over program the number of weapons that can be bought with the dollars available in DOD's spending plan. As we have previously reported, the use of optimistic planning assumptions has led to program instability, costly program stretch-outs, and program terminations.<sup>4</sup> Current DOD acquisition guidelines permit increasingly higher quantities of weapons in low-rate production to provide for the orderly transition to full-rate production. In addition, DOD's acquisition culture encourages this practice to solidify organizational commitment to keep weapon acquisition programs moving and to protect them from interruption.<sup>5</sup> In this regard, within DOD's acquisition culture, a weapon's acquisition manager's success depends on getting results, and in acquisitions, results mean getting the weapon into production and into the field.

The trend to reduce the full production rates from the original plans because of limited funds and to produce more quantities than are needed for testing during low-rate production increases procurement costs. For example, DOD increased the annual low-rate production of the Army's untested Longbow Hellfire Missile in fiscal years 1995, 1996, and 1997 from 0 to 352, and 1,040, respectively; while the Navy reduced full-rate production of the Standard missile system for those fiscal years from 202, to 64, and 127, respectively. Between fiscal years 1995 and 1997, low-rate production funding for the Longbow was increased from \$41.2 million to \$249.5 million while the full-rate funding for the Standard missile was reduced from \$240.4 million to \$197.5 million. The Navy originally planned

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<sup>4</sup>Future Years Defense Program: Optimistic Estimates Lead to Billions in Overprogramming (GAO/NSIAD-94-210, July 29, 1994).

<sup>5</sup>Weapons Acquisition: A Rare Opportunity for Lasting Change (GAO/NSIAD-93-15, Dec. 1992).

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to produce 2,160 Standard missiles a year during full-rate production over a period of 4 years. Instead, the Navy has averaged only 266 missiles a year and at that rate it will take 21 years to complete production, 17 years longer than planned, and at a cost of \$286 million more than estimated at the originally planned rate.

Many times, the services steadily increased the annual LRIP quantities, exceeding the number ultimately needed to complete operational tests and prove out the production line. The increase in annual quantities of weapons produced during low-rate production resulted in a substantial reduction of funds available for the production of proven weapons at planned rates. By minimizing the quantities of weapons procured during LRIP, DOD can reduce the risk associated with producing untested weapons and increase the funding available to produce other proven systems in full-rate production at planned rates, lowering their unit cost.

For eight of the weapons we reviewed, the services' procurement rates during LRIP were equal to or more than they were during full-rate production. For example, the program office for the advanced medium range air-to-air missile increased the quantities produced during low-rate production to 900 units annually. However, since 1992, when it completed operational tests and entered full-rate production, the missile has been produced at an annual rate of 900 or more only twice. In fact, from fiscal years 1997 to 2007, the program office plans to procure an average of only 338 units a year. Table 1 shows the remaining seven weapons with low-rate production quantities equal to or higher than full-rate quantities.



**Table 1: Systems With Low-Rate Production Equal to or Higher Than Full-Rate Quantities**

System	Quantity in last 2 low-rate years		Quantity in first 2 full-rate years		Full-rate production quantity in fiscal year 1996
Black Hawk	92	94	80	96	60
Commander's tactical terminal	33	58	51	51	0 <sup>a</sup>
Improved recovery vehicle	15	24	12	12	0 <sup>a</sup>
JSTARS ground station	16	20	20	19	0 <sup>a</sup>
Multiple launch rocket system launcher	68	72	76	44	0 <sup>b</sup>
Rolling airframe missile	250	250	180	240	200
T45 trainer aircraft	12	12	12	12	12

<sup>a</sup>System is still currently in low-rate production. Full-rate quantities shown are current planned rates occurring beyond fiscal year 1996.

<sup>b</sup>Fiscal year 1995 was the last year with production quantities for this system.

DOD continues to generate optimistic full-rate production plans that are rarely achieved. One example where this situation could occur and where planned increases in low-rate production quantities may be unnecessary is the Navy's F/A-18E/F system. The Navy plans to procure 72 F/A-18E/F aircraft over 3 years during LRIP—12 in 1997, 24 in 1998, and 36 in 1999 and then procure 72 each year during peak full-rate production years. However, the Congress has questioned the affordability of this full production rate and has directed DOD to calculate costs based on estimates of 18, 24, and 36 aircraft a year.<sup>6</sup> In addition, the conferees on the Omnibus Consolidated Appropriations Act for Fiscal Year 1997 asked for calculations based on 48 aircraft a year.<sup>7</sup> The increased quantities procured during low-rate production are not necessary to transition to full-rate production, especially if the number of aircraft procured during full-rate production drops significantly. Even if the Navy buys the aircraft at the rate originally planned, production rate increases to reach peak full rates could occur after the system has been operationally tested, rather than before. The same optimistic planning is reflected in the Air Force's F-22 program. The Air Force plans to contract for F-22 aircraft under four low-rate buys of 4, 12, 24, and 36 aircraft for a total of 76 aircraft at an

<sup>6</sup>National Defense Authorization Act for Fiscal Year 1997, Public Law 104-201, Section 219.

<sup>7</sup>H.R. Report (Conference) No. 104-863, 104th Congress, 2nd Session (1996) at 897, on Making Omnibus Consolidated Appropriations for Fiscal Year 1997.

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estimated cost of nearly \$11 billion prior to completing initial operational test and evaluation and entering full-rate production at 48 aircraft a year.

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## Conclusions

During LRIP, DOD is supposed to restrict the number of weapons produced to the minimum quantity necessary to conduct operational testing, establish the initial production base, and allow for an orderly increase into full-rate production. However, because DOD often budgets available funding for unnecessary increases in low-rate production quantities of unproven weapons, it rarely is able to buy proven weapons at originally planned full-rates. When funding is insufficient to produce proven weapons in full-rate production at optimum levels and therefore to complete programs in a timely manner, it is not cost-effective to use limited funds to unnecessarily increase production of untested weapons whose designs are not yet stabilized. This wasteful practice could be minimized by shifting increases in annual production rates from the low-rate production phase to the beginning of full-rate production.

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## Recommendations

We recommend that the Secretary of Defense revise DOD's weapon acquisition policies to require that (1) annual quantities of weapons bought during LRIP be limited to the minimum necessary to complete initial operational test and evaluation and prove the production line and (2) rates and quantities not be increased during low-rate production to ease the transition into full-rate production unless DOD clearly establishes that the increase is critical to achieving efficient, realistic, and affordable full production rates and can be accomplished without affecting the efficient production of proven systems.

We also recommend that the Secretary of Defense direct the Under Secretary of Defense for Acquisition and Technology and the Under Secretary of Defense (Comptroller and Chief Financial Officer) to submit future budgets that place priority on funding the efficient production of weapons in full-rate production.

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## Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD agreed with the principle that premature commitment to LRIP is unwise and that LRIP should not be used to buy equipment that is known not to work. DOD believes the existing policy as set forth in the requirements of 10 U.S.C. 2400 (enacted in 1995) and DOD Directive 5000.2-R (issued in 1996) adequately provides an acquisition structure that allows DOD to focus on minimizing LRIP

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quantities, while providing the flexibility to maintain an adequate industrial base capability (e.g. ramp-up) to meet the interest of national security. DOD also stated that it makes every effort to fund full-rate production programs to the maximum extent possible within funding availability, changing priorities, and program realities.

Concerning our recommendations, DOD commented that (1) its current acquisition policies fully comply with the intent of the policy proposal to minimize the quantities produced under LRIP, (2) increasing production rates (ramping-up) during LRIP allows the contractor to hire and train his production team and maintain a production workforce while operational testing is being conducted, and (3) it makes every effort to fund full-rate production programs but fiscal realities driven by a fluid environment is a serious challenge that will continue to impact the stability of major defense acquisition program production rates and quantities.

Although efforts have been made in the last year to reduce the quantities bought under LRIP, our review indicates that DOD is still buying more than the minimum quantities needed. By allowing the ramp-up of quantities under LRIP to hire, train, and maintain a workforce to produce a still unproven product, funding is diverted from contractors producing proven products and their workforce by reducing their production rates and quantities.

DOD's comments have not addressed (1) the negative effect of the current approach on the industrial base, (2) the cost implications, and (3) the delayed deployment of proven weapons. Cost implications include the added funding that will be needed to correct the problems in products produced before operational testing is completed and the increased costs from stretching out the production run of proven products. Stretched production schedules can also undermine national security interests by delaying deployment of needed proven systems to field units.

If the LRIP rate "ramp-up" was delayed until after the completion of operational test, initial quantities of unproven systems would be reduced and additional funding would become available to buy the proven systems at more efficient rates. Although there are many reasons why weapon quantities and funding for full-rate production should be changed (such as changes in threats and technology), as long as the existing requirement remains valid, we believe priority should be given to funding the already tested, less risky full-rate systems at the most efficient rate possible.

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DOD's comments are presented in their entirety in appendix V.

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## Scope and Methodology

To quantify the number of weapons being bought below their planned full production rates, we screened the line items contained in the February 1995 Procurement Programs document. We determined that 88 percent of the budget for fiscal year 1996 was concentrated into 300 line items. We then reviewed the 300 line items, primarily using budget back-up books' documentation, to determine which of those items were being bought on an annual repetitive production basis, which is more conducive to increased rate production. We narrowed our universe to 83 line items, or 80 weapons, by excluding line items that were multiple procurement items such as spares, modification programs if the work was being done at a depot, advance procurements, commercial products, and items that did not have a repetitive annual production profile, such as a single one-time procurement.

As we obtained additional program-specific data on the 80 weapons, we determined that an additional 52 weapons should be excluded based on the original criteria. Thus, our final universe was 22 weapons in full-rate production and 6 weapons in LRIP with a total cost of about \$6.5 billion in fiscal year 1996 procurement funds. We collected cost and schedule data for all 28 weapons through interviews and documents from program officials for each weapon, service- and DOD-level acquisition officials, a DOD Comptroller office official, and a defense contractor. We did our review primarily at the individual program offices responsible for procuring the weapons.

We performed our review from August 1995 through November 1996 in accordance with generally accepted government auditing standards.

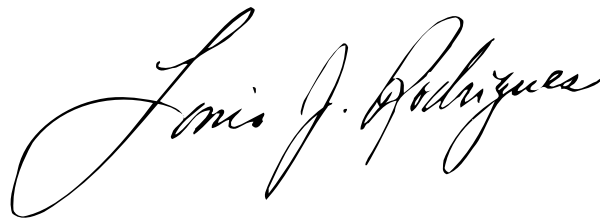
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This report contains recommendations to you. The head of a federal agency is required under 31 U.S.C. 720 to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Reform and Oversight no later than 60 days after the date of the report. A written statement must also be submitted to the Senate and House Committees on Appropriations with an agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to appropriate congressional committees and the Secretaries of the Army, the Navy, and the Air Force. We will also make copies available to others on request.

Please contact me at (202) 512-4841 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix VI.

Sincerely yours,

A handwritten signature in black ink that reads "Louis J. Rodrigues". The signature is written in a cursive, flowing style with large, elegant loops.

Louis J. Rodrigues  
Director, Defense Acquisitions Issues

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Table

Table 1: Systems With Low-Rate Production Equal to or Higher Than Full-Rate Quantities

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**Abbreviations**

AGM	air-to-ground missile
AMRAAM	advanced medium range air-to-air missile
ATACMS	Army Tactical Missile System
DOD	Department of Defense
DOT&E	developmental operational test and evaluation
FAAD	Forward Area Air Defense
GBS	Ground Based Sensor
GPS	Global Positioning System
GMLS	Guided Missile Launch System
LRIP	low-rate initial production
MLRS	Multiple Launch Rocket System
OT&E	operational test and evaluation
RAM	rolling airframe missile

# Weapon Systems Reviewed by Location

Aviation and Troop Command, Mo.	Black Hawk Kiowa Warrior Apache Longbow
Fort Monmouth, N.J.	JSTARS ground station <sup>a</sup> Commander's Tactical Terminal <sup>a</sup> Global Positioning System (GPS) user equipment Single Channel Ground and Airborne Radio System Frequency hopping multiplexor
Redstone Arsenal, Ala.	Avenger Multiple Launch Rocket System (MLRS) launcher Army Tactical Missile System (ATACMS) Stinger modification program Forward Area Air Defense (FAAD)/Ground Based Sensor (GBS) Longbow Hellfire missile <sup>a</sup>
Eglin Air Force Base, Fla.	Advanced medium range air-to-air missile (AMRAAM) Air-to-ground missile (AGM)-130 <sup>a</sup> Sensor fuzed weapon
Warner Robins Air Force Base, Ga.	R-11 fuel truck
Tank and Automotive Command, Mich.	Improved Recovery Vehicle <sup>a</sup>
Wright-Patterson Air Force Base, Ohio	C-17 <sup>a</sup>



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**Appendix I**  
**Weapon Systems Reviewed by Location**

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Naval Sea Systems  
Command, Va.

Standard missile  
Rolling airframe missile (RAM)  
RAM Guided Missile Launch System (GMLS)

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Naval Air Systems  
Command, Va.

F/A-18C/D  
E-2C Hawkeye  
T45 training system  
Tomahawk

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Strategic Systems  
Programs, Va.

Trident II missile

<sup>a</sup>Denotes system in low-rate initial production (LRIP). All others are in full-rate production (FRP).

# Full-Rate Production Systems Procured Below Original Planned Production Rates

Dollars in millions

Army	Annual full production rate			Unit flyaway cost <sup>a</sup>			
	Planned	Current average	Percent below	Planned	Average to date	Units to date <sup>b</sup>	Increased cost to date <sup>c</sup>
ATACMS Block 1	470.0	190.0	55.2	\$0.465	\$0.642	1477.0	\$261.4
Avenger	144.0	105.2	26.9	0.674	1.140	721.0	336.0
Black Hawk	165.0	60.0	63.6	3.685	6.022	1193.0	2,788.0
FAAD GBS	31.0	17.5	43.5	2.634	2.300	24.0	0
Kiowa Warrior	120.0	36.0	70.0	3.106	5.235	366.0	779.2
MLRS launcher	76.0	47.5	37.5	7.787	8.143	570.0	202.9
Stinger modifications	2593.0	650.0	74.9	0.006	0.013	1850.0	13.0
<b>Total</b>							<b>\$4,380.5</b>
<b>Air Force</b>							
AMRAAM	3000.0	484.4	83.9	\$0.360	\$0.596	4038.0	\$953.0
Sensor fuzed weapon	2150.0	500.0	76.7	0.152	0.310	500.0	79.0
<b>Total</b>							<b>\$1,032.0</b>
<b>Navy</b>							
E-2C	4.0	3.6	10.0	\$64.318	\$65.229	7.0	\$6.4
F/A-18C/D	74.8	55.6	25.7	18.841	24.859	612.0	3,683.0
RAM	900.0	240.0	73.3	0.137	0.285	620.0	91.8
RAM GMLS	12.0	8.0	33.3	4.900	6.021	29.0	32.5
Standard missile	2160.0	266.0	87.7	0.486	0.556	4087.0	286.1
T45TS	48.0	12.0	75.0	8.652	18.233	36.0	344.9
Tomahawk	600.0	275.5	54.1	1.808	1.624	3913.0	0
Trident II missile	72.0	22.8	68.3	32.426	16.283	343.0	0
<b>Total</b>							<b>\$4,444.7</b>
Average			56.7				
<b>Total cost</b>							<b>\$9,857.2</b>

<sup>a</sup>In constant fiscal year 1996 dollars.<sup>b</sup>Does not include foreign military sales.<sup>c</sup>Despite being procured at rates lower than planned, unit costs for the FAAD GBS and Tomahawk systems decreased as a result of cost-reduction initiatives, which reduced the production cost. Likewise, the Trident II missile reduced its procurement rate for industrial base preservation and affordability reasons, yet it still had lower production costs. If these systems could be produced at their planned rates, unit costs could be even lower.

# Full-Rate Production Systems Procured Slower Than Originally Planned

	Years to complete planned schedule	Years to complete current schedule	Years over planned schedule	Percent longer
<b>Army</b>				
ATACMS Block 1	4.0	6.0	2.0	50.0
Avenger	7.0	8.0	1.0	14.3
Black Hawk	11.0	53.6	42.6	387.3
FAAD GBS	4.0	6.0	2.0	50.0
Kiowa Warrior	6.0	15.0	9.0	150.0
MLRS launcher	7.5	12.0	4.5	60.0
Stinger modifications	5.0	11.0	6.0	120.0
<b>Air Force</b>				
AMRAAM	3.0	16.0	13.0	433.3
Sensor fuzed weapon	3.0	10.0	7.0	233.3
<b>Navy</b>				
E-2C	9.0	10.0	1.0	11.1
F/A-18C/D	8.0	11.0	3.0	37.5
RAM	1.0	4.0	3.0	300.0
RAM GMLS	5.1	8.0	2.9	56.9
Standard missile	4.0	21.0	17.0	425.0
T45TS	2.4	10.0	7.6	316.7
Tomahawk	9.0	15.0	6.0	66.7
Trident II missile	7.0	19.0	12.0	171.4
<b>Average</b>			<b>8.2</b>	<b>169.6</b>

# Excerpt From Prior GAO Report

System	Program category	Inadequate system deployed to field	Percent procured in LRIP	Comments
Air Force C-17 Aircraft	Major	To be determined	33	The C-17's reliability is significantly less than expected, and the system cannot meet current payload/range specifications. Also, while known problems with the wings, flaps, and slats are being fixed, other problems continue to emerge. (GAO/T-NSIAD-94-166, Apr. 19, 1994).
Air Force AN/ALR-56C Radar Warning Receiver	Nonmajor	Yes	8 <sup>a</sup>	Despite the poor operational, test, and evaluation (OT&E) results, the Air Force continued full-rate production and had acquired about 750 systems at a cost of over \$570 million, as discussed in a classified GAO report.
Air Force AN/ALQ-135 Quick Reaction Capability Jammer	Nonmajor	Yes	100	All 65 systems were produced under LRIP at a cost of \$256 million, before any OT&E was conducted. Because of performance problems, most of the jammers were placed in storage and only 24 were installed on aircraft. One year later, the 24 jammers were deactivated because of poor performance. (GAO/NSIAD-90-168, July 11, 1990).
Air Force AN/ALQ-135 Improved Jammer	Nonmajor	Yes	64 <sup>b</sup>	Through 1993, 331 of the 514 planned units were acquired under LRIP. However, the system has encountered significant software problems, which have delayed completion of development testing by about 2 years. OT&E has not yet started.
Air Force AN/ALQ-131 Block II Jammer	Nonmajor	Yes	100	After the Air Force bought most of the total quantity of units under LRIP, tests found serious performance problems. As a result, the system was deployed with the receiver/processor inoperative due to a lack of software. Other deficiencies were also present. (GAO/NSIAD-90-168, July 11, 1990).
Air Force AN/USM-464 Electronic Warfare Test Set	Nonmajor	Yes	100	Before the Air Force conducted OT&E, 72 test sets were procured under LRIP at a cost of \$272 million. Later testing showed that the equipment would not meet requirements, and the units were put in storage.
Air Force AN/ALQ-184 Jammer	Nonmajor	Yes	8 <sup>c</sup>	Developmental, operational, test, and evaluation (DOT&E) recommended that jammers production be stopped because of poor OT&E results. However, the system had already entered and continued full-rate production anyway. We later found that most of the 24 jammers deployed to a tactical fighter wing had been placed in storage. (GAO/NSIAD-90-168, July 11, 1990).
Navy F-14D Aircraft	Major	Yes	100	OT&E showed that the F-14D was not sufficiently developed and lacked critical hardware and software capabilities. The program was terminated after 55 units were produced. (GAO/IMTEC-92-21, Apr. 2, 1992).

(continued)

**Appendix IV  
Excerpt From Prior GAO Report**

<b>System</b>	<b>Program category</b>	<b>Inadequate system deployed to field</b>	<b>Percent procured in LRIP</b>	<b>Comments</b>
Navy T-45A Aircraft	Major	Yes	33	One year into LRIP, OT&E found that the T-45A was not effective in a carrier environment and was not operationally suitable because of safety deficiencies. Subsequent major design changes have included a new engine, new wings, and a modified rudder. (GAO/NSIAD-91-46, Dec. 14, 1990).
Navy Pioneer Unmanned Aerial Vehicle	Nonmajor	Yes	Not applicable <sup>d</sup>	The Navy procured and deployed Pioneer as a nondevelopmental item and without testing it. Numerous problems ensued, including engine failures, landing difficulties, and a cumbersome recovery system. Many modifications were required to bring Pioneer up to a minimum essential level of performance.
Army Family of Medium Tactical Vehicles	Major	To be determined	4 <sup>e</sup>	Before the Army did any OT&E, a multiyear production contract was awarded for up to 10,843 trucks. Subsequent OT&E was suspended because the vehicles were found to be unreliable and not operationally effective. However, production continues. (GAO/NSIAD-93-232, Aug. 5, 1993).
Army Palletized Load System/Family of Heavy Tactical Vehicles	Major	Yes	29	OT&E showed the system to be not operationally suitable. Despite the need for design modifications to correct reliability and maintainability problems, full-rate production was approved.

Source: Weapons Acquisition: Low-Rate Initial Production Used to Buy Weapon Systems Prematurely (GAO/NSIAD-95-18, Nov. 21, 1994).

<sup>a</sup>Proceeded beyond LRIP before OT&E was conducted.

<sup>b</sup>Because of the quantity already procured in LRIP and the lack of OT&E to date, additional units are likely to be procured in LRIP.

<sup>c</sup>Proceeded beyond LRIP beyond OT&E was conducted.

<sup>d</sup>Production was not separated into LRIP and full-rate production phases.

<sup>e</sup>At least 3,800 trucks are expected to be produced in LRIP, or about 4 percent of the more than 87,000 units planned to be procured.

# Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



ACQUISITION AND  
TECHNOLOGY

## OFFICE OF THE UNDER SECRETARY OF DEFENSE

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Mr. Louis J. Rodrigues  
Director, Defense Acquisitions Issues  
National Security and International Affairs Division  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Rodrigues:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "WEAPONS ACQUISITION: Better Use of Limited DOD Acquisition Funding Would Reduce Costs," dated November 22, 1996 (GAO Code 707126/OSD Case 1257." DoD generally concurs with the intent of the report and we further believe that the latest revision to DoD's acquisition policy documents contain appropriate emphasis on these principles. We cannot concur with the second portion of recommendation 1 (2) that solicits the Department to "... assure the funds will be available to support the planned full rate quantities." In addition, while much of the information reported by the GAO is factual, the report often shows no supporting data to substantiate the various assumptions (i.e., LRIP modifications are too costly). Other difficulties include dollar tables that are difficult to interpret in a consistent manner because they are constructed using then-year vice constant-year dollars, and the lack of consideration of current changes in the Department's acquisition policies that address many of the concerns outlined in the report. Finally, the report does not recognize that weapon quantities and funding for full-rate production change for many reasons (i.e. new threats, end of the cold war, and opportunities provided by new technology).

DoD agrees with the principle that premature commitment to Low Rate Initial Production (LRIP) is unwise and that LRIP should not be used to buy equipment that is known not to work. The Department is committed to obtain confidence in a system's adequacy in an operational environment before any significant fraction of the production is complete. In fact the latest revision of DoD's weapon acquisition policies deals very clearly with the LRIP issue. Specifically, DoD Directive 5000.2-R notes that the "...objective of LRIP is to produce the "minimum" quantity necessary to: provide production configured or representative articles for operational tests, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational testing." The paragraph further states that the Milestone Decision Authority (MDA) shall determine the LRIP quantity (10 USD §2400) for all acquisition category I and II programs as part of the Engineering and Manufacturing Development approval. If the LRIP quantity exceeds 10% of the total production as documented in the acquisition strategy, the justification for the increase must be approved by the MDA, documented in the program's Selected Acquisition Report, and forwarded to Congress. We therefore believe that the Department's current acquisition policies fully comply with the intent of the policy proposal as outlined in Recommendation 1.



See comment 1.

**Appendix V**  
**Comments From the Department of Defense**

With respect to the proposal contained in Recommendation 1 to not increase LRIP production quantities or rates unless it is proven to be critical to achieving efficient, realistic, and affordable full production rates, the Department believes that both the current legislation (10 U.S.C. §2400) and the acquisition policy contained in DoD Directive 5000.2-R provide a disciplined yet flexible management approach to effectively accomplish this requirement. Further, the Department reviews all Major Defense Acquisition Programs (MDAPs) LRIP changes and only approves changes when clearly justified.

The latter part of this recommendation dealing with the assurance that funds will be available to support the planned rate quantities of our MDAPs, is one the Department can not guarantee. Although the Department makes every effort to fund full-rate production programs, the fiscal realities driven by a fluid environment is a serious challenge and one that will continue to impact the stability of our MDAPs rates and quantities.

Finally, in response to Recommendation 2 that states that the resources derived from a reduction in LRIP quantities should be applied toward efficient production of weapons in full-rate production, the Department agrees that all effort will be made to properly fund those approved programs that support the underlying strategy outlined in the President's National Security Strategy. However, while the Department agrees in principle to this recommendation, clearly, fiscal constraints, mission requirements, and unbudgeted costs for humanitarian efforts will severely limit our ability to stretch the finite resources to all approved requirements. Each circumstance will be handled on a case-by-case basis through the acquisition management structure as outlined in DoD Directive 5000.1, Defense Acquisition, dated March 15, 1996.

More detailed DoD comments on the GAO draft report recommendations are contained in Enclosure 1. The Department appreciates the opportunity to comment on the draft GAO report.

Sincerely,



Daniel F. Czelusniak  
Director, Acquisition Program  
Integration

Enclosures  
As Stated

**Appendix V**  
**Comments From the Department of Defense**

GENERAL ACCOUNTING OFFICE DRAFT REPORT - DATED NOVEMBER 22, 1996  
(GAO CODE 707126) OSD CASE 1257

“WEAPONS ACQUISITION: BETTER USE OF LIMITED DOD ACQUISITION FUNDING  
WOULD REDUCE COSTS”

DEPARTMENT OF DEFENSE ADDITIONAL  
COMMENTS

**RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense revise DoD’s weapons acquisition policies to require that (1) annual quantities of weapons bought during low rate initial production be limited to the minimum necessary to complete initial operational test and evaluation and prove the production line, and (2) rates and quantities not be increased during low rate production to ease the transition to full rate production, unless the DoD clearly establishes that the increase is critical to achieving efficient, realistic, and affordable full production rates and can assure the funds will be available to support the planned rate quantities. (p. 7/GAO Draft Report)

**DOD RESPONSE:** Concur with Recommendation 1 (1). The Department agrees with the intent of this recommendation and believes that the latest revision of DoD Directive 5000.-2-R, dated March 1996, that reflects policy language on the issue of “minimum LRIP quantities,” adequately meets this requirement. One catalyst that drove this policy change was the draft GAO report “Weapons Acquisition: Low-Rated Initial Production Used to Buy Weapons Systems Prematurely,” dated June 24, 1994 (GAO Code Case 9725) where GAO recommended that the Congress legislatively mandate specific limits on the number of units allowed to be produced during low-rated initial production (p. 5, p. 33 GAO Draft Report). The DoD Directive 5000.2-R specifies mandated policies and procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information Systems (MAIS) acquisition programs. The policy as outlined in Part 1 (Acquisition Management Processes), subparagraph 1.4.4.1 (Low Rate Initial Production) states that the “objective of LRIP is to produce the *minimum* quantity necessary to: provide production configured or representative articles for operational tests, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational testing.” This policy adequately provides an acquisition structure that allows the Department to focus on minimizing LRIP quantities, while providing the flexibility to maintain an adequate industrial base capability to meet the interests of national security.

**DOD RESPONSE:** Partially concur with Recommendation 1 (2). The Department establishes its LRIP quantities based on the number of units required for operational test and evaluation, the number needed to prove a production capability, and the number needed to achieve efficient, realistic, and affordable full-production rates. It is important to ramp-up production in order to smoothly and efficiently reach full-rate capability. Production line prove-out at a minimum rate is not sufficient. Increasing production rates during LRIP allows the contractor to efficiently hire and train his production team. A qualified vendor and production workforce must be maintained while operational testing is being conducted in order to be able to produce quality units once full-rate approval is obtained.

Enclosure 1/Page 1 of 3

See p. 8.



Further, the Department does not arbitrarily revise the LRIP rate or quantity of our MDAPs without first evaluating the circumstances behind the program's requirement. The Department would only increase the rates or quantities of LRIP if the Milestone Decision Authority (MDA) determined that the increase was critical to achieving efficient, realistic, and affordable full production rates or that mitigating circumstances required extension of LRIP. The mitigating circumstances could include a need for redesign, changes in manufacturing techniques, or problems encountered during operational testing. In addition, 10 USC §2399 states that before a MDAP can proceed beyond LRIP, the Department, will submit a report to Congress that assesses: 1) The adequacy of conducted operational test and evaluation, and 2) Whether the test and evaluation results confirm that the items or components tested are operationally effective and suitable for use in combat. Without an adequate number of LRIP articles for operational test and evaluation and for live fire test and evaluation of the system, the system can not be properly tested and evaluated, resulting in costly and disruptive gaps in production or in a worst case scenario not transitioning to full-rate production at all. Currently the Department has in place a disciplined yet flexible management approach to allow LRIP requirement changes to be evaluated and approved by the MDA (See DoD Directive 5000.2-R Part 1, Subparagraph 1.4.4.1). The Directive states that the MDA must review and approve all MDAP LRIP quantities changes exceeding 10% of the total production as documented in the acquisition strategy. If the MDA decides to approve the LRIP quantity change, the change is documented in the programs Selected Acquisition Report and forwarded to Congress. As one can clearly see, the decision to increase LRIP quantities is not taken lightly, but would be based on in-depth analysis of all the factors (i.e., programmatic, financial, national security threat etc.) surrounding the issue.

In response to the second portion of this recommendation "... to assure the funds will be available to support the planned rate quantities," the Department continues to make every effort to fund full-rate production programs to the maximum extent possible within funding availability, changing priorities, program realities, and in fact has in place a full funding policy. However, while the Department agrees in principle to the intent of this recommendation, we can not guarantee the stability of the rates and quantities of the MDAPs because of competing priorities.

**RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense direct the Under Secretary of Defense (Comptroller and Chief Financial Officer) to apply the resulting available funding toward the efficient production of weapons in full rate production. (p. 7/GAO Draft Report)

**DOD RESPONSE:** Partially concur. The Department does not intend to increase the minimum annual quantities of our systems in low-rate production unless extenuating circumstances clearly requires this course of action, e.g. problems identified during testing that must be addressed prior to a full-rate production decision. In addition, the Department can not agree to reduce LRIP quantities in order that we can financially supplement those weapons in full-rate production. Each program and circumstance must be evaluated, justified and approved by the Milestone Decision Authority (MDA) before LRIP quantities and funding are increased or decreased. The Department does agree in principle that all effort will be made to properly fund approved programs that are in full-rate production, but there are a multitude of factors that contribute to the situation in which we are forced to buy weapons at rates and quantities other than the originally planned full-rate production.

Now on p. 8.

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**Appendix V**  
**Comments From the Department of Defense**

These factors include yearly fiscal constraints that force us to make weapons decisions based on affordability not requirement, unbudgeted costs of humanitarian efforts, requirement changes especially for those weapons that are "threat" related, Congressional reductions or increases that dictate a change in rates or quantities, and retaining a specific industrial capability because it is in the best interest of national security.

Enclosure 1/Page 3 of 3

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The following is GAO's comment on the Department of Defense's letter dated December 26, 1996.

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## GAO Comment

1. Appendix IV provides examples that illustrate how buying large quantities of unproven systems during LRIP has been costly. All costs are reported in fiscal year 1996 constant dollars unless otherwise indicated. We have modified the report to recognize the fact that there may be a number of valid reasons for changing the quantities and funding for full-rate production, but if the existing requirement is still valid and everything else is equal, we believe priority should be given to buying the proven systems over the unproven.

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