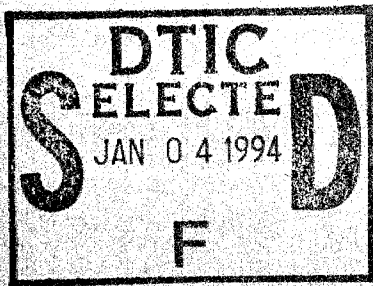


November 1994

# WEAPONS ACQUISITION

## Low-Rate Initial Production Used to Buy Weapon Systems Prematurely



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

National Security and  
International Affairs Division

B-257304

November 21, 1994

The Honorable William V. Roth, Jr.  
The Honorable David Pryor  
United States Senate

This report, which was prepared at your request, addresses the Department of Defense's policies and practices on the use of low-rate initial production in relation to operational test and evaluation. It also examines the impact of the current legislative requirements in each area. We make recommendations to the Secretary of Defense and present matters for congressional consideration, both of which are intended to minimize the risk of prematurely committing to production and later encountering costly technical problems.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Chairmen and Ranking Minority Members of the House Committee on Government Operations, Senate Committee on Governmental Affairs, House and Senate Committees on Armed Services, and House and Senate Committees on Appropriations; the Secretaries of Defense, the Army, the Air Force, and the Navy; and the Director of the Office of Management and Budget. We will also make copies available to others upon request.

This report was prepared under the direction of Louis J. Rodrigues, Director of Systems Development and Production Issues, who may be reached on (202) 512-4841 if you or your staff have any questions. Other major contributors are listed in appendix II.

Henry L. Hinton, Jr.  
Assistant Comptroller General

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# Executive Summary

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## Purpose

The Department of Defense (DOD) plans to spend over \$79 billion in fiscal year 1995 for the acquisition of weapon systems. DOD has acquired some of the most technologically advanced and effective weapon systems in the world. However, DOD has often been criticized for not acquiring the systems in the most efficient manner.

Because of concern over how DOD initiates the production of weapon systems, Senators David Pryor and William V. Roth, Jr., requested that GAO review DOD's use of a practice called low-rate initial production (LRIP) in system acquisition programs. Specifically, GAO was requested to determine whether LRIP practices were resulting in production of systems with adequate performance and whether the legislation underlying LRIP policies was adequate.

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## Background

The Congress has been concerned about the sometimes significant quantity of systems produced during LRIP and before system performance is operationally demonstrated. As a result, in 1989, the Congress enacted legislation intended to limit LRIP quantities for major systems. The law, 10 U.S.C. 2400, provides that, except for ships and satellites, LRIP is production in the minimum quantity necessary to (1) provide production-configured or representative articles for operational test and evaluation (OT&E), (2) establish an initial production base for the system, and (3) permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of OT&E.

OT&E is the primary means of assessing weapon system performance in a combat-representative environment. It is defined as (1) the field test, conducted under realistic conditions, to determine an item's effectiveness and suitability for use in combat by typical military users and (2) the evaluation of the results of such a test. If used effectively, OT&E can be a key internal control to ensure that decisionmakers have objective information available on a weapon system's performance, thereby minimizing risks of procuring costly and ineffective systems.

As weapon system programs move through the phases of the acquisition process, they are subject to review at major decision points called milestones. The milestone review process is predicated on the principle that systems advance to higher acquisition phases by demonstrating that they have met prescribed technical specifications and performance thresholds. Before systems advance to the milestone that authorizes

full-rate production, DOD is statutorily required to conduct OT&E for all major systems.

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## Results in Brief

Current legislation and DOD's acquisition policies permit LRIP to start before any OT&E is conducted. The consequences have included procurement of substantial inventories of unsatisfactory weapons requiring costly modifications to achieve satisfactory performance and, in some cases, deployment of substandard systems to combat forces. Once started, LRIP significantly limits the options available to DOD decisionmakers and the Congress when a system is found to be deficient. In GAO's view, the key decision as to whether to proceed with production should be made at the start of LRIP because, in many cases, it is also the de-facto full-rate production decision. Therefore, decisionmakers need good, independent information on the system's performance and suitability at that point. In today's national security environment, there should be very few cases in which an urgent need dictates that DOD start LRIP without a demonstrated level of confidence that the system will work as intended.

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## Principal Findings

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### Current Legislation and DOD Acquisition Policies Permit LRIP to Begin Without Any OT&E

There are no specific principles or guidelines—in legislation or DOD policy—on when and how programs should begin LRIP, on the type and amount of testing to be done before LRIP, on how much LRIP can or should be done, or under what type of circumstances LRIP should be curtailed or stopped. As a result, programs are often permitted to begin LRIP with little or no scrutiny and before any OT&E has been conducted. Although programs are sometimes delayed in getting approval for full-rate production, LRIP is not usually stopped or slowed down significantly.

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### Controls Needed Over LRIP

Over the years, GAO has found numerous instances in which production of both major and nonmajor systems from all of the services was optimistically permitted to begin under LRIP and continue based on factors other than the systems' technical maturity. Many of the weapon systems that start production prematurely later experience significant effectiveness and/or suitability problems. For example, the reliability of the Air Force's C-17 aircraft has shown to be significantly less than expected, and it cannot meet its minimum payload and range

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specifications. Major design changes are often needed to correct the problems and additional testing is needed to verify that the corrective action was effective. For example, major design changes to correct deficiencies in the Navy's T-45A aircraft included a new engine and new wings. When problems are uncovered after production starts, costly retrofits are often needed for any delivered units. Also, problems have sometimes not been fixed, and substandard systems have been deployed to field units. For example, although considered an effective weapon system, the Army's Apache helicopter has proven to be a difficult and costly system to support. Although the thrust of the LRIP legislation is to authorize only minimum necessary quantities, the continuance of LRIP on an indefinite basis has resulted in major production commitments. For example, while the original plans called for the production of 810 Advanced Medium Range Air-to-Air Missiles during 2 years of LRIP, over 4,100 were eventually produced during its 6 years of LRIP.

In a 1993 report, the DOD Inspector General stated that major acquisition programs were entering LRIP without meeting development, testing, and production readiness prerequisites.<sup>1</sup> The Inspector General recommended that DOD (1) provide guidance for all programs on the specific minimum required program accomplishments for entry into and continuation of LRIP and (2) require that program-specific exit criteria be established for entry into and continuation of LRIP. To reduce the risk of finding major operational effectiveness and suitability problems after production starts, GAO has often recommended as much OT&E as possible before production starts. GAO recognizes that, in addition to ship and satellite programs, it may be very costly and disruptive to suspend certain unique programs while OT&E is underway. These programs would typically involve inherent fabrication complexity, small procurement quantities, high unit cost, and long unit production periods. However, one means to reduce technical risks on these programs would be to conduct OT&E of key subsystems on surrogate platforms before production starts.

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## Recommendations

GAO recommends that the Secretary of Defense revise DOD system acquisition policies in the following ways:

- Require that, before entry into LRIP, programs (with the exception of ships, satellites, and programs that involve inherent fabrication complexity, small procurement quantities, high unit costs, and long unit production periods)

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<sup>1</sup>Low-Rate Initial Production in Major Defense Acquisition Programs (DOD Inspector General Report No. 94-014, Nov. 9, 1993).

plan, buy prototypes for, and conduct enough realistic testing for the services' independent testing agencies and/or the Director, Operational Test and Evaluation (DOT&E), to be able to certify to the decision authority that (1) the system's developmental testing is essentially complete and the basic results have been validated in an operational environment; (2) the system has clearly shown that it can meet the key parameters among its minimum acceptable performance requirements;<sup>2</sup> (3) the system has clearly demonstrated the potential to fully meet all of its minimum acceptable requirements for performance and suitability without major or costly design changes; and (4) the system should be able to readily complete its remaining OT&E in time to support the planned full-rate production decision.<sup>3</sup>

- Require that those programs excluded from the requirement to test prototypes instead test all key subsystems in an operational environment before entry into LRIP.
- Adopt the recommendations made by the DOD Inspector General regarding controls over the start and continuation of LRIP.

GAO also recommends that the Secretary of Defense work with the service secretaries to ensure that these policies are implemented for the acquisition of both major and nonmajor programs.

## Matters for Congressional Consideration

GAO recommends that the Congress legislatively mandate (1) that certain OT&E requirements be met before LRIP may start and (2) specific limits on the number of units allowed to be produced during LRIP. Specifically, the Congress may wish to require that all defense acquisition programs (major and nonmajor) conduct enough realistic testing on the entire system or key subsystems to ensure that key performance parameters are met before LRIP is permitted to start.

## Agency Comments and GAO Evaluation

In commenting on a draft of this report, DOD stated that while much of the information reported by GAO is factual, some of the implications to be drawn from the information are misleading. DOD questions the magnitude of the problem and believes that the current legislation provides sufficient guidance to limit the production of LRIP units without potentially causing

<sup>2</sup>Minimum acceptable requirements are the values for the particular parameters that are required to provide a system capability that will satisfy the validated mission need. These requirements are also known as thresholds and are established in the Operational Requirements Document at each milestone. Key parameters are those for which the decision authority would require a reevaluation of alternative concepts or design approaches if the thresholds are not met.

<sup>3</sup>This certification should be made by DOT&E for all major defense acquisition programs and by the services' independent testing agencies for all other systems.

costly and disruptive gaps in production. DOD opposes the mandating of OT&E requirements that must be met before the start of production and fixed limits on the number of units to be produced in LRIP because they could cause production stretchouts and production stoppages.

On numerous occasions, GAO has reported on the problems with premature commitments to production, the inherent risks in highly concurrent acquisition strategies, and the benefits of early operational testing. However, DOD continues to downplay or deny the value of testing as a means of ensuring that weapons will work as expected. Such a position contradicts the commonsense notion that quantities of products should be bought only after a clear demonstration that the product actually works. In this report, GAO is suggesting additional legislation because DOD, on its own, has been unwilling or unable to appropriately control the start and continuation of production, despite the clear evidence that such control is needed. The objective of GAO's recommendations is to avoid the premature commitment to production and thereby avoid fielding systems that do not meet requirements and need costly and time-consuming retrofits.





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## Abbreviations

DOD	Department of Defense
DOD-IG	DOD Inspector General
DOT&E	Director, Operational Test and Evaluation
GAO	General Accounting Office
LRIP	low-rate initial production
OT&E	operational test and evaluation



# Introduction

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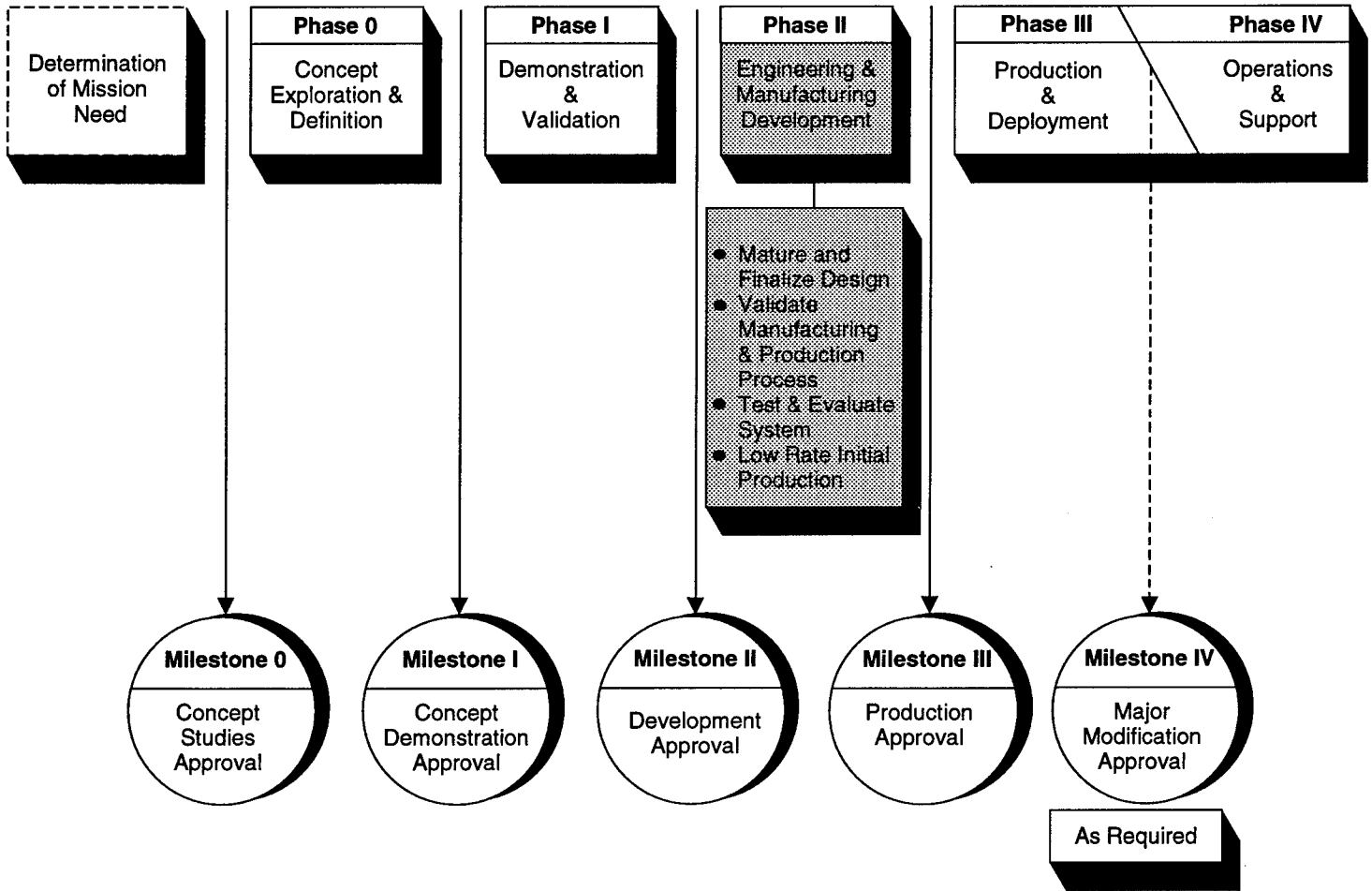
In fiscal year 1995, the Department of Defense (DOD) plans to spend over \$79 billion for research, development, test, evaluation, and production of weapon systems. While DOD has acquired some of the most technologically advanced and effective weapon systems, DOD has often been criticized for not acquiring the systems in the most efficient manner.

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## System Acquisition Process and DOD's Policy

As weapon system programs progress through the phases of the acquisition process, they are subject to review at major decision points called milestones. The milestone review process is predicated on the principle that systems advance to higher acquisition phases by demonstrating that they meet prescribed technical specifications and performance thresholds. Figure 1.1 illustrates the DOD's weapon system acquisition process.

Figure 1.1: DOD's Weapon System Acquisition Process



At milestone 0, a determination is made about whether an identified mission need warrants a study of alternative concepts to satisfy the need. If warranted, the program is approved to begin the concept exploration and definition phase. At milestone I, a determination is made about whether a new acquisition program is warranted. If warranted, initial cost, schedule, and performance goals are established for the program, and authorization is given to start the demonstration and validation phase. At milestone II, a determination is made about whether continuation of development, testing, and preparation for production is warranted. If

warranted, authorization is given to start the engineering and manufacturing development phase. Also, approval of this phase will often involve a commitment to low-rate initial production (LRIP). At milestone III, a determination is made about whether the program warrants a commitment to build, deploy, and support the system.

DOD acquisition policy states that program risks shall be assessed at each milestone decision point before approval is granted for the next phase. The policy adds that test and evaluation shall be used to determine system maturity and identify areas of technical risk. Operational test and evaluation (OT&E) is a key internal control to ensure that decisionmakers have objective information available on a weapon system's performance, to minimize risks of procuring costly and ineffective systems. OT&E has been defined as (1) the field test, under realistic conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining its effectiveness and suitability for use in combat by typical military users and (2) the evaluation of the results of such a test.

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## Legislative Requirements on LRIP and OT&E of Weapon Systems

Over a period of many years, the Congress has been concerned about the performance of weapon systems being acquired by DOD. As early as 1972, the Congress required DOD to provide it with information on the OT&E results of major weapon systems before committing them to production. However, the Congress continued to receive reports from the DOD Inspector General (DOD-IG), us, and others that (1) weapon systems were not being adequately tested before beginning production, (2) fielded systems were failing to meet their performance requirements, and (3) OT&E being conducted on weapon systems was of poor quality.

In the late 1970s and early 1980s, the Congress enacted a series of laws to ensure that U.S. military personnel receive the best weapon systems possible and that the U.S. government receives best value for the defense procurement dollar. Among other things, these laws

- specified that independent OT&E be conducted;
- established the Office of the Director, Operational Test and Evaluation (DOT&E), and assigned it specific oversight duties and responsibilities;
- specified that OT&E of a major defense acquisition program may not be conducted until DOT&E approves the adequacy of the plans for that OT&E;<sup>1</sup>

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<sup>1</sup>A "major defense acquisition program" is defined as a system whose research and development cost is expected to exceed \$300 million in fiscal year 1990 dollars or whose procurement cost is expected to exceed \$1.8 billion in fiscal year 1990 dollars.

- required that a major system may not proceed beyond LRIP until its initial OT&E is completed;<sup>2</sup> and
- required that DOT&E analyze the results of OT&E conducted for each major defense acquisition program and, prior to a final decision to proceed beyond LRIP, report on the adequacy of the testing and whether the results confirm that the items tested are operationally effective<sup>3</sup> and suitable<sup>4</sup> for combat.

In the late 1980s, the Congress found that DOD was acquiring a large portion of the total program quantities, using the LRIP concept, without successfully completing OT&E. In the National Defense Authorization Act for Fiscal Years 1990 and 1991 (P.L. 101-189), the Congress addressed this situation by including a definition of LRIP and a requirement that the determination of the LRIP quantities to be procured be made when a decision is made to enter engineering and manufacturing development. According to the act, LRIP was defined as the minimum quantity needed to (a) provide production-representative articles for OT&E, (b) establish an initial production base, and (c) permit orderly ramp-up to full-rate production upon completion of OT&E.

In the conference report for the act, the conferees indicated that they did not condone the continuous reapproval of LRIP quantities that eventually total a significant percentage of the total planned procurement. Also, the conferees granted an exception to the LRIP legislation for ship and satellite programs because of their inherent production complexity, small number, high unit cost, and long unit production periods. However, they directed the Secretary of Defense to develop regulations that capture the spirit of the LRIP legislation as it applies to these programs. This special consideration for ships and satellites carries with it additional reporting requirements to improve the oversight of these programs.

Finally, in the National Defense Authorization Act for Fiscal Year 1994, the Congress required that the Secretary of Defense ensure that appropriate,

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<sup>2</sup>According to DOD regulation, a "major system" is defined as a system whose research, development, test, and evaluation cost is estimated to exceed \$115 million in fiscal year 1990 dollars or whose procurement cost is estimated to exceed \$540 million in fiscal year 1990 dollars.

<sup>3</sup>DOD defines "operational effectiveness" as the overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, survivability, vulnerability, and threat.

<sup>4</sup>DOD defines "operational suitability" as the degree to which a system can be placed satisfactorily in field use with consideration given to such factors as availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, and supportability.

rigorous, and structured testing be completed prior to LRIP of any electronic combat or command, control, and communications countermeasure system.

## Objectives, Scope, and Methodology

Senators David Pryor and William V. Roth, Jr., requested that we review DOD's use of LRIP in the acquisition of major defense programs. Specifically, the Senators asked that we determine whether

- LRIP policies were resulting in the production of systems with adequate performance capabilities and
- the legislation underlying the LRIP policies was adequate.

We analyzed the legislation and DOD policies governing the production and testing of weapon systems, particularly those dealing with (1) the purposes of LRIP, (2) the criteria or requirements for entering LRIP and full-rate production, and (3) the testing requirements related to this process. We used the results of our extensive body of work from the past decade or so on defense acquisition programs and the acquisition process<sup>5</sup> to determine whether the LRIP concept, as currently authorized and practiced by DOD, has resulted in a premature commitment to production of both major and nonmajor systems. We reviewed the 1993 report of the DOD-IG on LRIP and held discussions with the DOD-IG staff. We gathered and summarized data on numerous ongoing system acquisition programs (both major and nonmajor programs) and supplemented that information with discussions with officials from the Office of the Secretary of Defense and the military services.

In addition, we gathered and analyzed information on the advantages and disadvantages of conducting OT&E before LRIP (for both major and nonmajor systems). We also held discussions with those officials on DOD's current acquisition strategies and OT&E policies and practices.

This review was conducted from April 1993 to May 1994 in accordance with generally accepted government auditing standards.

<sup>5</sup>See the Related GAO Products section of this report for a partial listing of GAO reports on these topics since late 1990. Well in excess of 100 GAO reports, covering a very broad range of programs, were used in preparing this report.

# DOD Lacks Controls Over LRIP

Our extensive body of work over the years has amply demonstrated that improper usage of LRIP has been widespread. Many major and nonmajor systems from each of the services have been prematurely committed to production, which often results in problems being found after a substantial number of units have been produced and a significant commitment made to the entire procurement program. In addition, contrary to the statutory emphasis on minimum LRIP quantities and conferee statements, many programs continue in LRIP for prolonged periods. DOD's continuing reluctance to employ the discipline of early OT&E is evident in each of the services and in many major and nonmajor programs. Adequate controls have not been established over the start and continuation of LRIP. A requirement to successfully complete enough independent testing in an operational environment to ensure that the item meets its key performance parameters before LRIP starts would be feasible in most cases and would be an effective management control over the premature start of production.

## Premature Commitments to Production

Over the years, we have found numerous instances from all three services in which production of major and nonmajor systems was permitted to begin and continue based not on the systems' technical maturity, but on schedule or other considerations. DOD has frequently committed programs to production without assurance that the systems would perform satisfactorily. Many of the weapon systems that start production prematurely later experience significant operational effectiveness and/or suitability problems. As a result, major design changes were often needed to correct the problems, additional testing was needed to verify that the corrective action was effective, and costly retrofits were needed for any delivered units. A few of the many examples of premature and extensive commitments to production of major and nonmajor systems are shown in the following tables. Table 2.1 shows systems that entered LRIP before any operational tests were conducted and later experienced significant problems during the tests. Table 2.2 shows systems that were subjected to early operational tests but were allowed to enter LRIP even though the performance deficiencies were not corrected.



Chapter 2  
DOD Lacks Controls Over LRIP

**Table 2.1: Examples of Systems That Entered LRIP Before Operational Tests Were Conducted and Later Experienced Problems During These Tests**

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 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.

(continued)

**Chapter 2  
DOD Lacks Controls Over LRIP**

<b>System</b>	<b>Program category</b>	<b>Inadequate system deployed to field</b>	<b>Percent procured in LRIP</b>	<b>Comments</b>
Air Force AN/ALQ-184 Jammer	Nonmajor	Yes	8 <sup>e</sup>	DOT&E recommended that jammer 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.)
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	n/a <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.

(Table notes on next page)

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**Chapter 2**  
**DOD Lacks Controls Over LRIP**

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<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.

**Table 2.2: Examples of Systems That Entered LRIP Despite Problems Identified During Early Operational Testing**

System	Program category	Inadequate system deployed to field	Percent procured in LRIP	Comments
Army AN/AVR-2, AN/AVR-2A Laser Warning System	Nonmajor	Yes	53 <sup>a</sup>	Even though over 900 units have been procured, neither the redesigned AN/AVR-2 nor the further redesigned AN/AVR-2A had completed OT&E. (GAO/NSIAD-93-14, Jan. 25, 1993.)
Army AN/APR-39A(V)1 Radar Warning Receiver	Nonmajor	Yes	43 <sup>b</sup>	In 1989, the Army's independent testers recommended curtailing production because of poor results. However, production continues.
Navy Airborne Self-Protection Jammer	Major	N/A	100 <sup>c</sup>	This \$2 billion program was terminated after procurement of 95 systems because of failure to pass required OT&E. (GAO/NSIAD-92-103, Mar. 23, 1992.)
Navy AN/SLQ-32 Shipboard Electronic Countermeasures System	Major	Yes	73	Numerous modifications have been made at a cost of over \$300 million, but the AN/SLQ-32's effectiveness remains questionable. (GAO/NSIAD-93-272, Aug. 19, 1993.)
Navy MK-50 Torpedo	Major	Yes	100 <sup>d</sup>	OT&E, conducted after LRIP began, was halted until technical problems were addressed. However, later OT&E continued to show performance problems. Due to drastic reductions in total quantities, all 1,073 torpedoes were procured in LRIP.
Navy MH-53E Helicopter	Major	Yes	38	OT&E conducted after LRIP started revealed several major mechanical deficiencies. Later, OT&E found the MH-53E to be marginally operationally effective and not operationally suitable.
Navy AN/ALR-67(V)2 Radar Warning Receiver	Nonmajor	Yes	67	OT&E conducted after the start of LRIP pointed out several serious problems. However, by that time, the Navy had bought and deployed over 700 systems at a cost of \$467 million. The Navy later spent \$96 million to correct the deficiencies and to upgrade the systems. However, production of the upgrades started before OT&E was conducted, and many units were placed in storage pending completion of testing, as discussed in a classified GAO report.

(continued)

System	Program category	Inadequate system deployed to field	Percent procured in LRIP	Comments
Air Force AN/ALQ-131 Block 1 Jammer	Nonmajor	Yes	78	The Block I jammer was produced and deployed although it failed to pass various reliability and maintainability tests. As a result, many of the jammers required major part replacements and technical adjustments, as discussed in a classified GAO report.

<sup>a</sup>Quantity includes some AN/AVR-2 full-rate production units.

<sup>b</sup>Production was not separated into LRIP and full-rate production phases. However, 2,000 units (or 43 percent of the total program quantity of 4,604 units) were on contract at the time of the independent tester's recommendation.

<sup>c</sup>Program terminated while in LRIP.

<sup>d</sup>Due to drastic reductions in total procurement quantities of the MK 50, the Navy decided not to get approval for full-rate production.

## Major Production Commitments Are Made During LRIP

Programs that enter production prematurely often require more time and resources than originally planned to correct problems and to meet the requirements for full-rate production. LRIP is often continued, despite the evidence of technical problems, well beyond that needed to provide test articles and to establish an initial production capability. As a result, major production commitments are often made during LRIP.

In the conference report for the LRIP legislation, the conferees stated that they did not intend to authorize the continuance of LRIP on an indefinite basis. Nevertheless, the existing LRIP legislation does not include any specific principles or guidelines on when and how programs should begin LRIP, on the type and amount of testing to be done before LRIP, on how much LRIP can or should be done, or under what circumstances LRIP should be curtailed or stopped. Instead, the emphasis has been placed almost entirely on the full-rate production decision, at which point the law requires, among other things, that a report be provided on the adequacy of the testing conducted and an assessment be made of the system's operational effectiveness and suitability. Although programs are delayed getting approval for full-rate production, LRIP is rarely stopped or slowed significantly. As a result, the decision to start LRIP, in many cases, is also the de-facto full-rate production decision.

## DOD Fails to Emphasize Early OT&E

DOD's written policies provide that acquisition strategies be event-driven and link major contractual commitments and milestone decisions to demonstrated accomplishments in development, test, and initial production. However, DOD policies state that a primary goal in developing an acquisition strategy shall be to minimize the time and cost of satisfying a need consistent with common sense and sound business practices.

In addition, DOD's policies state, but without detailed requirements, that OT&E should be conducted throughout the acquisition process. However, while DOD is statutorily required to conduct OT&E before full-rate production is approved, DOD's policies permit LRIP to begin before any OT&E is conducted. The point at which LRIP begins is not a required milestone under DOD policy.

As a result, for many major defense acquisition programs, the services do not plan to conduct any OT&E prior to the start of LRIP. It has been and continues to be the exception, rather than the rule, for programs to include OT&E before LRIP starts. In some instances, the services plan to start LRIP even though they plan to use developmental or prototype units for their initial OT&E, not LRIP units. Although not required by written DOD or Navy policy, the Navy now performs a limited phase of OT&E before LRIP to prepare for later phases of OT&E on some of its programs. However, these programs are not required to meet specific testing-related criteria before entering LRIP. As shown in table 2.2, even when some OT&E was conducted prior to the start-up of production, identified problems were not verified as corrected, and significant performance problems emerged later in the program.

Over the past several years, DOD has stated that it planned to reemphasize the need for OT&E as early as possible in the acquisition process. However, we have not detected any reemphasis on early OT&E, and DOD's 1991 revision of its key acquisition directives did not address this issue. DOD acquisition and testing officials concede that there has not been any major reemphasis on early OT&E. In fact, DOD has recently supported legislative proposals that would reduce the current overall requirements to conduct OT&E.<sup>1</sup>

DOD has recognized that reducing the amount of production prior to completing development provides for greater design maturity, which increases the likelihood of meeting system requirements and avoiding

<sup>1</sup>Acquisition Reform: Role of Test and Evaluation in System Acquisition Should Not Be Weakened (GAO/T-NSIAD-94-124, Mar. 22, 1994).

retrofit costs. In commenting on our 1992 report,<sup>2</sup> DOD officials said they were lessening the amount of concurrent development and production in weapon programs due to the end of the Cold War. In 1992, the Under Secretary of Defense for Acquisition also stated that the need to replace existing weapon systems in order to maintain a significant technological advantage was no longer as urgent. However, acquisition strategies of many current programs do not reflect these positions. DOD's acquisition practices continue to stress the importance of minimizing the time to deploy new or improved weapon systems.

Highly concurrent acquisition strategies continue to be featured in many current major and nonmajor programs,<sup>3</sup> with little, if any, OT&E expected until well after the start of production and a significant commitment is made to the procurement of the system. Our analysis of the current selected acquisition reports shows that many programs continue to postpone initial OT&E until well after the start of production.

- LRIP is expected to be approved in February 1996 for the Army's Secure Mobile Anti-Jam Reliable Tactical Terminal. Initial OT&E will not be completed until July 1998, by which time a total of 125 units, or 3 years of LRIP, is planned to be approved out of a total program quantity of 367 units.
- The LRIP decision for the Air Force's F-22 aircraft program is expected in June 1998, and initial OT&E is to be conducted from March to November 2001. Thus, 1 year of preproduction verification and 4 years of LRIP—80 aircraft out of a total quantity of 442 units—are planned to be approved before completion of OT&E.
- The Navy plans to procure 106 of the 630 planned Multifunctional Information Distribution Systems before OT&E is completed in December 2000 and a full-rate production decision is made in June 2001. In addition, 42 prototype systems are to be built as part of the system development effort.

These programs feature major commitments to LRIP before development is completed and before any OT&E is completed, even though developmental prototypes are expected to be available for testing in these programs. Accordingly, a substantial and frequently irreversible commitment to production will have been made before the results of independent testing are available to decisionmakers.

<sup>2</sup>Weapons Acquisition: A Rare Opportunity for Lasting Change (GAO/NSIAD-93-15, Dec. 1992).

<sup>3</sup>A program with high levels of concurrency typically proceeds into production before a significant amount of initial OT&E is conducted.

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## Controls Recommended Over the Start and Continuation of LRIP

In its 1993 report,<sup>4</sup> the DOD-IG found that major defense acquisition programs were entering LRIP without meeting development, testing, and production readiness prerequisites. As a result, the DOD-IG concluded that DOD incurred excessive program risk of overcommitment to production of systems without obtaining assurance that the design is stable, potentially operationally acceptable, and capable of being produced efficiently. Among other things, the DOD-IG recommended that DOD (1) provide guidance on the specific minimum required program accomplishments for entry into and continuation of LRIP and (2) require that program-specific exit criteria be established for entry into and continuation of LRIP. DOD is currently considering what, if any, actions will be taken in light of the DOD-IG's recommendations.

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<sup>4</sup>Low-Rate Initial Production in Major Defense Acquisition Programs (DOD Inspector General Report No. 94-014, Nov. 9, 1993).



# Conclusions and Recommendations

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## Conclusions

The decision to begin LRIP should be given much more attention because decisionmakers find it very difficult to stop or slow down programs once they are in production. Given the cost risks involved and DOD's inability or unwillingness to curtail production after it starts, we agree with the DOD-IG that controls are urgently needed over the start and continuation of LRIP.

A key criterion for all programs beginning LRIP should be the completion of a phase of independent testing in an operational environment. During such testing, some problems should be expected. However, enough realistic testing should be conducted for the services' independent testing agencies and/or DOT&E to be able to certify to the decision authority that (1) the system's developmental testing is essentially complete and the basic results have been validated in an operational environment, (2) the system has clearly shown that it can meet the key parameters among its minimum acceptable performance requirements,<sup>1</sup> (3) the system has clearly demonstrated the potential to fully meet all of its minimum acceptable requirements for performance and suitability without major or costly design changes, and (4) the system should be able to readily complete its remaining OT&E in time to support the planned full-rate production decision.<sup>2</sup> Comprehensive testing of a system's operational suitability features, such as supportability, may not be possible during early independent testing. However, the testing should be sufficient to reveal major suitability problems.

Conducting OT&E before LRIP will not, by itself, result in a better weapon system, but it is the best means available to guard against the premature start of production. Decisionmakers need verifiable information on system design maturity and where corrective actions are needed before production start-up. Every effort should be made to correct problems in development, not in production, because early fixes are less expensive, easier to implement, and less disruptive. In today's national security environment, there should be very few cases in which an urgent need dictates that DOD start production without assurance that the system will work as intended.

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<sup>1</sup>Minimum acceptable requirements are the values for the particular parameters that are required to provide a system capability that will satisfy the validated mission need. These requirements are also known as thresholds and are established in the Operational Requirements Document at each milestone. Key parameters are those for which the decision authority would require a reevaluation of alternative concepts or design approaches if the thresholds are not met.

<sup>2</sup>This certification should be made by DOT&E for all major defense acquisition programs and by the services' independent testing agencies for all other systems.

We realize that, for some programs, a significant effort (personnel and facilities) may be needed to produce one or more prototypes for a phase of early OT&E. These programs would typically involve inherent fabrication complexity, small procurement quantities, high unit cost, and long unit production periods. To suspend that type of effort while OT&E is underway could be costly and disruptive. Alternatively, key subsystems should be independently tested on surrogate platforms before production. Once underway, production should be limited until acceptable OT&E results are obtained on the entire system.

We believe that LRIP should be used to focus on (1) addressing producibility and product quality issues; (2) producing just enough systems to support initial OT&E, to prove out the production process, and to sustain the production line; and (3) testing those systems and correcting any deficiencies. A limit on the quantity that can be produced under LRIP would provide an opportunity to correct problems that are identified during initial OT&E, without incurring the risk of overproducing under the LRIP phase.

## Recommendations

We recommend that the Secretary of Defense revise DOD's acquisition policies in the following ways:

- Require that, before entry into LRIP, programs (with the exception of ships, satellites, and those other programs that involve inherent fabrication complexity, small procurement quantities, high unit costs, and long unit production periods) plan, buy prototypes for, and conduct enough realistic testing for the service's independent testing agency and/or DOT&E to be able to certify to the decision authority that (1) the system's developmental testing is essentially complete and the basic results of that testing have been validated in an operational environment; (2) the system has clearly shown that it can meet the key parameters among its minimum acceptable performance requirements; (3) the system has clearly demonstrated the potential to fully meet all of its minimum acceptable requirements for performance and suitability without major or costly design changes; and (4) the system should be able to readily complete its remaining OT&E in time to support the planned full-rate production decision.
- Require that those programs excluded from the requirement to test prototypes instead test all key subsystems in an operational environment before entry into LRIP.

- Adopt the recommendations made by the DOD-IG regarding controls over the start and continuation of LRIP such as (1) providing guidance on the specific minimum required program accomplishments for entry into and continuation of LRIP and (2) requiring that program-specific exit criteria be established for entry into and continuation of LRIP.

We also recommend that the Secretary of Defense work with the service secretaries to ensure that these policies are implemented for the acquisition of both major and nonmajor systems.

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## Matters for Congressional Consideration

The legislation defining LRIP has not been effective in accomplishing its purpose, which was to limit the commitment to major production quantities pending satisfactory completion of OT&E. Therefore, we recommend that the Congress legislatively mandate (1) that certain OT&E requirements be met before LRIP may start and (2) specific limits on the number of units allowed to be produced during LRIP. Specifically, the Congress may wish to require that all defense acquisition programs (major and nonmajor) conduct enough realistic testing on the entire system or key subsystems to ensure that its key performance parameters are met before LRIP is permitted to start. In addition, the Congress may wish to (1) specify a percentage (10 percent, for example) of a system's total procurement beyond which a program may not proceed during LRIP and/or (2) amend 10 U.S.C. 2400 (by deleting subsection (b)(3)) to preclude the use of LRIP authority to ramp-up the production rate prior to the successful completion of OT&E.



# Comments From the Department of Defense

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



OFFICE OF THE UNDER SECRETARY OF DEFENSE

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WASHINGTON DC 20301-3000



11 AUG 1994

Mr. Frank C. Conahan  
Assistant Comptroller General  
National Security and International  
Affairs Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "WEAPONS ACQUISITION: Low-Rate Initial Production Used to Buy Weapon Systems Prematurely," dated June 28, 1994 (GAO Code 707065), OSD Case 9725. DoD partially concurs with the report findings, but non-concurs with all but one of the recommendations.

While much of the information reported by the GAO is factual, some of the implications to be drawn from the information are misleading. For example, Table 2-1 lists the percentage of units procured in Low-Rate Initial Production (LRIP). The C-17 is listed at 33%. That number is true based on a buy of 120 airplanes. However, the original program was for 200 plus airplanes. The number of airplanes to be procured was reduced as a result of problems encountered in testing. If the number of units procured in LRIP is compared to the total planned program, the percentage would be 16% rather than 33%. In addition, AN/ALQ-32 shows a 100% buy in LRIP. However, the supporting narrative states that only 65 systems were procured because DoD testing found problems. The GAO report fails to mention the total planned buy. This same problem exists for the AN/USM-464, AN/ALQ-131, F-14D, and the Airborne Self-Protection Jammer. Lastly, the GAO report cites the Navy Pioneer Unmanned Aerial Vehicle as a system that entered LRIP before conducting any operational testing and later experienced significant problems. The Pioneer system was procured under special circumstances, but was not an LRIP effort.

The Department also questions the validity of the report findings for three reasons. First, the GAO methodology is such that the magnitude of the problem you present is unclear. There is no indication of the number of programs with Low-Rate Initial Production (LRIP) in DoD. Therefore, objective readers of the report have no way to determine whether the 20 programs cited constitute a majority or small minority of LRIP programs. Second, the programs chosen do not appear to be randomly selected. Rather, they are programs that GAO has previously reviewed and are heavily electronic oriented. Third, the report contains several sweeping generalizations. For example, GAO asserts that "DoD's acquisition policies permit LRIP to start without doing any OT&E." GAO also asserts that, "there are no clear principles or guidance -- in legislation or DoD policy -- on when or how programs should begin LRIP...." In fact, LRIP guidance is cited in over 90 places in DoDD 5000.1, DoDI 5000.2, and DoD 5000.2-M. Specifically, DoDI 5000.2, Part 8 notes the importance of the early involvement of both developmental and operational testers in, and the program schedule chart



See comment 1.

See comment 2.

See comment 3.

See comment 4.

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in DoD 5000.2-M, Section 4-B shows operational test of engineering development models prior to the beginning of LRIP.

See comment 3.

It is the DoD position that because of the GAO lack of familiarity with the process, and the attempt to extrapolate from a very small sample, GAO report conclusions and recommendations are seriously flawed. The GAO recommendations to do more full-up testing would have the effect of adding time and cost to weapons system development without improving the identification of the majority of problems found in operational testing. DoD has been using operational assessments, rather than full-up testing, prior to LRIP to identify problems that could lead to redesign.

See comment 5.

Also, DoD strenuously objects to the matters for congressional consideration concerning additional legislation. It is the DoD position that current legislation (10 U.S.C. §2400) provides sufficient statutory guidance to limit the production of LRIP units without potentially causing costly and disruptive gaps in production. In addition, the Department opposes the mandating of OT&E requirements that must be met before the start of production and fixed percentage limits on the number of units that may be produced in LRIP. Both provisions could cause production stretch-outs and production stoppages. DoD also opposes changes to §2400 that would preclude the use of LRIP authority to efficiently ramp-up the production rate. Such changes would most certainly stretch-out production programs.

See comment 6.

In conclusion, the Department agrees that there are problems with the current statutory regime for testing, and supports constructive changes in the current testing statutes. Examples of the kinds of problems and the kinds of statutory changes that are necessary to correct the problems are contained in the testimony presented by the Deputy Under Secretary of Defense (Acquisition Reform) before the Senate Federal Services, Post Office, and Civil Service Subcommittee, on March 22, 1994.

See comment 7.

Detailed DoD comments on the GAO report recommendations and matters for congressional consideration are contained in Enclosure 1. A copy of the DoD response to the related DoDIG report is contained in Enclosure 2. A copy of the Deputy Under Secretary's testimony is contained in Enclosure 3. DoD appreciates the opportunity to comment on the draft GAO report.

See comment 8.

Sincerely,



Colleen A. Preston  
Deputy Under Secretary of Defense  
(Acquisition Reform)

Enclosures:  
As Stated

GENERAL ACCOUNTING OFFICE DRAFT REPORT - DATED JUNE 28, 1994  
(GAO CODE 707065) OSD CASE 9725

"WEAPONS ACQUISITION: LOW-RATE INITIAL PRODUCTION  
USED TO BUY WEAPON SYSTEMS PREMATURELY"

DEPARTMENT OF DEFENSE COMMENTS

\* \* \* \* \*

RECOMMENDATIONS

- o **RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense revise DoD acquisition policies to require that, before entry into low-rate initial production, programs plan, buy prototypes for, and conduct enough realistic testing for the Service's independent testing agency and/or the Director, Operational Test and Evaluation (DOT&E) to be able to certify to the decision authority that (1) system's developmental testing is essentially complete and the basic results of that testing have been validated in an operational environment, (2) the system has clearly shown that it can meet the key parameters among its minimum acceptable performance requirements, (3) the system has clearly demonstrated the potential to fully meet all of its minimum acceptable requirements for performance and suitability without major or costly design changes, and (4) the system should be able to readily complete its remaining OT&E in time to support the planned full-rate production decision. (pp. 4-5, p. 32/GAO Draft Report)

**DOD RESPONSE:** Non concur. The GAO based this recommendation on two false assumptions--developmental test agencies are not independent of the system developer and the DoD only does developmental testing prior to LRIP. It is the DoD position that neither assumption is valid. First, in each of the Military Services, developmental test agencies are independent of system developers. For example, in the Army developmental test is conducted by the Test and Evaluation Command (TECOM). Development of major systems is done by Program Managers who report to Program Executive Officers (PEO). Nonmajor systems are developed by Program Managers who report to the commanders of systems commands (e.g., Tank Automotive Command (TACOM) or the Missile Command (MICOM). The TECOM is not under the command of either the systems commanders or the PEOs. Second, DoD currently uses operational assessments as a means of determining operational problems that could lead to redesign. These operational assessments occur at various times in the

See comment 9.

See comment 10.

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developmental cycle. The DoD policy supports and encourages operational assessments as early in the development of a system as is practical and as often as is necessary to assist in the design of the system.

See comment 11.

In addition, DoD policy (DoDI 5000.2, Part 8) currently requires that the developing agency formally certify that a system is ready for dedicated operational test. It is the DoD position that this recommendation does not add anything to the current policy but rather appears to be a new requirement for operational testing prior to LRIP. Such additional testing would add cost and time to weapon system. It would also most probably result in a new milestone decision review to enter LRIP. A new milestone would add administrative burden to the program manager in preparing for the new milestone decision review. This certainly is not consistent with the Administration or the Congress goal of streamlining the acquisition process and reducing the acquisition work force.

See comment 12.

Finally, it is the DoD position that expecting a non-production prototype to meet all key parameters before LRIP is unreasonable. A fundamental principle of operational testing is that production-representative articles be used as much as possible in as realistic an environment as possible. Since production-representative articles are usually obtained through LRIP, it does not follow that realistic OT&E can always be done before LRIP. The use of developmental prototypes to accomplish the OT&E objective is questionable.

See comment 13.

- o **RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense revise the DoD acquisition policies to require that, those programs excluded from the requirement to test prototypes instead test all key subsystems in an operational environment before entry into low-rate initial production. (p. 5, p. 32/GAO Draft Report)

See comment 14.

**DOD RESPONSE:** Non concur. It is the DoD position that the majority of problems found in operational test are the result of integration and interface problems among sub-systems. Using independent tests on surrogate platforms would not generally find these types of problems nor mitigate redesign in LRIP. Determining appropriate surrogates and providing the engineering required to support a "foreign" subsystem would add time and costs to the program with negligible benefits.

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- o **RECOMMENDATION 3:** The GAO recommended that the Secretary of Defense adopt the recommendations made by the DoD Inspector General regarding controls over the start and continuation of low-rate initial production such as (1) providing guidance on the specific minimum required program accomplishments for entry into and continuation of low-rate initial production and (2) requiring that program-specific exit criteria be established for entry into and continuation of low-rate initial production. (p. 5, p. 33/GAO Draft Report)

See comment 15.

**DOD RESPONSE:** Partially concur. The Office of the Under Secretary of Defense for Acquisition and Technology (USD(A&T)) has taken the position for DoD that there is benefit to supplementing current policy regarding the transition of major defense acquisition programs into LRIP. However, as discussed in our May 5, 1994 and January 12, 1994, correspondence with the DoDIG, the USD(A&T) is working closely with the OSD and Joint Staffs and the Military Departments to develop policy guidance. The DoD has established a Process Action Team (PAT) on the Defense Acquisition Board process to address this issue. It is the DoD position that a reasonable approach is to await the findings and recommendations of the PAT, before issuing policy guidance that could be subject to change through PAT recommendations. The PAT report is expected within 90 to 120 days. The DoD May 5 and January 12 responses to DoDIG Report 94-014 are enclosed.

See comment 8.

- o **RECOMMENDATION 4:** The GAO recommended that the Secretary of Defense work with the Service secretaries to ensure that these policies are implemented for the acquisition of both major and nonmajor systems of low-rate initial production. (p. 5, p. 33/GAO Draft Report)

See comment 7.

**DOD RESPONSE:** Non-concur. The Secretary of Defense and the Under Secretary of Defense (Acquisition and Technology) are working with the Service Secretaries and the Service Acquisition Executives to re-engineer the current acquisition process to maintain the U.S. technological superiority and a strong, globally competitive national industrial base, while reducing acquisition costs and protecting the public trust. Part of that reengineering effort is the identification and implementation of those DoD acquisition policies that contribute to the achievement of this goal and the cancellation of those acquisition policies that do not contribute to the achievement of this goal. Not all policies should be implemented in the reengineered systems acquisition process.

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**MATTERS FOR CONGRESSIONAL CONSIDERATION**

- o **SUGGESTION 1:** The GAO suggested that the Congress may wish to legislatively mandate (1) that certain operational test and evaluation requirements be met before low-rate initial production may start and (2) specific limits on the number of units allowed to be produced during low-rate initial production. (p. 5, p. 33/GAO Draft Report)

**DOD RESPONSE:** Non concur. It is the DoD position that current legislation (10 U.S.C. 2400) provides sufficient statutory guidance to limit the production of LRIP units without potentially causing costly and disruptive gaps in production. In addition, the Department opposes mandating OT&E requirements that must be met before the start of production and fixed percentage limits on the number of units that may be produced in LRIP. Both provisions could cause production stretch-outs and production stoppages.

- o **SUGGESTION 2:** The GAO suggested the Congress may wish to require that all defense acquisition programs (major and nonmajor) conduct enough realistic testing on the entire system or key subsystems to assure that its key performance parameters are met before low-rate initial production is permitted to start. (p. 5, p. 33/GAO Draft Report)

**DOD RESPONSE:** Non concur. As discussed in Recommendation 2, the majority of problems found in operational test are the result of integration and interface problems among subsystems. Using independent tests on surrogate platforms would not generally find these types of problems nor mitigate redesign in LRIP. Determining appropriate surrogates and providing the engineering required to support a "foreign" subsystem would add time and costs to the program with negligible benefits. The Department opposes mandating OT&E requirements that must be met before the start of production on the number of units that may be produced in LRIP. Such a provision could cause production stretch-outs and production stoppages.

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See comments 5 and 6.

See comment 6.

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- o **SUGGESTION 3:** The GAO suggested the Congress may wish to (1) specify a percentage (10 percent, for example) of a system's total procurement beyond which a program may not proceed during low-rate initial production and/or (2) amend 10 U.S.C. 2400 by deleting subsection (b)(3) to preclude the use of low-rate initial production authority to ramp-up the production rate prior to the successful completion of OT&E. (p. 5, p. 33/GAO Draft Report)

**DOD RESPONSE:** Non concur. The Department opposes mandating fixed percentage limits on the number of units that may be produced in LRIP. Both provisions could cause production stretch-outs and production stoppages. The DoD also oppose changes to 2400 that would preclude the use of LRIP authority to efficiently ramp-up the production rate. Such changes would most certainly stretch-out production programs.

See comments 6 and 16.

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## GAO Comments

1. The total procurement quantity of C-17s was reduced for several reasons, including affordability, but we strongly dispute the Department of Defense's (DOD) assertion here that the reduction was as a result of problems encountered in testing.

2. After careful review, we have concluded that the percentages in table 2.1 are correct as stated and that no changes are needed. Our report shows that 73 percent of the AN/SLQ-32 program quantity was bought during LRIP, not 100 percent as stated by DOD. DOD may have confused the AN/SLQ-32 with the AN/ALQ-135 Quick Reaction Capability Jammer, of which 100 percent of the total program quantity was procured during low-rate initial production (LRIP). Also, on the Pioneer system, the Navy made a major commitment to procurement—whether it was under special circumstances or LRIP—without any assurance of the system's adequacy. Nevertheless, in our view, the cited systems illustrate one of the more severe adverse impacts of beginning LRIP prematurely, that is, the unplanned termination of a program after procurement of a few costly but unsatisfactory systems. Our proposed solution is to obtain at least some confidence in the system's adequacy in an operational environment before any commitment is made to production.

3. We have clarified the description of our review methodology and have clearly pointed out that the examples used in the report are only a sampling of what we consider to be the widespread problem of premature commitment to production. Our conclusions and recommendations are based on our large body of weapon system reviews over the past decade or so plus additional analyses of the current selected acquisition report systems and recent Defense Acquisition Board decisions. The DOD Inspector General (DOD-IG) has arrived at similar conclusions based on its independent reviews. The problems discussed in this report are not new and continue to regularly occur in small and large programs and programs from all the services. The recommendations are consistent with our previous recommendations as well as those made by several "blue ribbon" panels on defense acquisition matters, including the Packard Commission. While DOD's reluctance to adequately address the problem is not new, we are very concerned that DOD now appears to question the significance of the problem.

4. The statements in our report that (a) DOD acquisition policies permit LRIP to start without doing any operational, test and evaluation (OT&E) and (b) there are no specific principles or guidelines on when or how programs should begin LRIP are accurate and are not sweeping generalizations. We

agree that the regulations do mention LRIP in many places; however, the guidance is neither clear nor specific, and implementation has not been effective in controlling the commitment to production.

5. The current legislation contains no specific controls on the start or continuation of LRIP; 10 U.S.C. 2400 defines the purposes of LRIP but does not specify when and under what circumstances it may begin or continue.

6. Our position would not cause any production stretchouts or production stoppages and, for systems that can readily demonstrate their key performance parameters, only a brief delay in starting production. In fact, production stretchouts and/or stoppages are usually the result of problems identified during operational testing performed after, rather than before, the start of production. We believe that it is reasonable to delay the start of production to obtain assurance that the system performs as intended, thereby avoiding the potential for stretchouts or delays when subsequent operational testing identifies system shortcomings.

7. Although DOD may want to deemphasize realistic operational testing during the acquisition of defense systems, it has provided no factual basis to state that test and evaluation is a cause or even a contributing factor to the continuing problems in the acquisition of defense systems. Streamlining of the acquisition process should not be used as an excuse for buying defective weapon systems.

8. Enclosures 2 and 3 are not reproduced here because they are lengthy and address many issues not addressed in this report.

9. Developmental test agencies are elements of the DOD acquisition community and, in that sense, are not independent. In fact, their lack of independence was a key factor in creating the office of the Director, Operational Test and Evaluation (DOT&E). While the independence of testers is a key point, we believe that early testing in a realistic operational environment is crucial to the identification of weaknesses in the system. Developmental testing is important in itself, but it does not expose the system to the rigors of the operational environment.

10. Operational assessments are not typically based on the results of realistic field testing and, therefore, do not provide the quantity and quality of input to decisionmakers that we believe is necessary.

11. We believe the cited DOD policy is flawed in that a system could be approved to begin LRIP and yet not be approved as ready for operational testing. In our view, if a system is not ready to do well in operational testing, it is not ready to begin LRIP. Our recommendation would require operational testing prior to LRIP, which could add some cost and time up to that point. However, we believe that additional investment would be well spent in terms of improved performance and reliability when the system is deployed and could help avoid the costly modifications and retrofits that often result from DOD committing to production of systems without any knowledge about their operational performance.

12. It is important to have a milestone review at the LRIP decision point because the decisionmakers have more flexibility to change the program at that point. As we state in this report, the decision to start LRIP, in many cases, is also the de-facto full-rate production decision.

13. We recognize that our recommendations are at odds with current acquisition practices for many programs. However, DOD should recognize that, in today's environment, highly concurrent acquisition strategies are no longer necessary and that it is technically feasible for prototypes to be sufficiently mature to be operationally tested and to meet their key parameters before LRIP. We believe that, in most cases, production representative articles can be assembled and realistic operational testing conducted before LRIP begins. If a system is not ready for operational testing, it should not be ready for production.

14. This recommendation is aimed at those very large programs for which it may not be feasible or cost-effective to produce prototypes without starting LRIP. While we recognize the potential for integration and interface problems among subsystems, we question the need to begin production of the primary system before sufficient confidence is available that the subsystems perform adequately and are reliable.

15. In response to the DOD-IG report, DOD conceded that more attention may be needed to the LRIP decision and that some sort of controls may be needed over the start and continuation of LRIP. We believe that, to be effective, such controls need to be specific rather than a generic call for more emphasis.

16. Our positions would cause the stretchout of only those production programs in which the system was not able to complete its required operational testing. In numerous cases, LRIP was continued indefinitely

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because of the inability to complete operational testing, resulting in costly retrofits of produced units and/or the fielding of unsatisfactory systems.

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# Major Contributors to This Report

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# Related GAO Products

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Military Airlift: The C-17 Program Update and Proposed Settlement  
(GAO/T-NSIAD-94-166, Apr. 19, 1994).

Acquisition Reform: Role of Test and Evaluation in System Acquisition  
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