June 20, 2003

Acquisition

Management of Developmental and Operational Test Waivers for Defense Systems

(D-2003-105)

This special version of the report has been revised to omit deliberative process privilege data.

Department of Defense
Office of the Inspector General

Quality *Integrity* *Accountability*

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE **20 JUN 2003**	2. REPORT TYPE	3. DATES COVERED **-**
4. TITLE AND SUBTITLE **Acquisition Management of Developmental and Operational Test Waivers for Defense Systems**		5a. CONTRACT NUMBER 5b. GRANT NUMBER 5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER 5e. TASK NUMBER 5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **DoD-IG ODIG-AUD (AFTS),Secondary Reports Distribution,400 Army Navy Drive (801),Arlington,VA,22202-4704**		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S) 11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT **Approved for public release; distribution unlimited**		
13. SUPPLEMENTARY NOTES		
14. ABSTRACT **See report.**		
15. SUBJECT TERMS		

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**		**130**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

Additional Copies

To obtain additional copies of this report, visit the Web site of the Inspector General of the Department of Defense at www.dodig.osd.mil/audit/reports or contact the Secondary Reports Distribution Unit of the Audit Followup and Technical Support Directorate at (703) 604-8937 (DSN 664-8937) or fax (703) 604-8932.

Suggestions for Future Audits

To suggest ideas for or to request future audits, contact the Audit Followup and Technical Support Directorate at (703) 604-8940 (DSN 664-8940) or fax (703) 604-8932. Ideas and requests can also be mailed to:

ODIG-AUD (ATTN: AFTS Audit Suggestions)
Inspector General of the Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-4704

Defense Hotline

To report fraud, waste, or abuse, contact the Defense Hotline by calling (800) 424-9098; by sending an electronic message to Hotline@dodig.osd.mil; or by writing to the Defense Hotline, The Pentagon, Washington, DC 20301-1900. The identity of each writer and caller is fully protected.

Acronyms

COI	Critical Operational Issue
COMOPTEVFOR	Commander, Operational Test and Evaluation Force
DOT&E	Director, Operational Test and Evaluation
LRIP	Low-Rate Initial Production
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
TEMP	Test and Evaluation Master Plan

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-4704

June 20, 2003

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)
DIRECTOR, OPERATIONAL TEST AND EVALUATION
NAVAL INSPECTOR GENERAL
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Report on the Management of Developmental and Operational Test Waivers for Defense Systems (Report No. D-2003-105)

We are providing this report for review and comment. This report discusses the overall management of waivers of developmental and operational test requirements for Defense systems. The Under Secretary of Defense for Acquisition, Technology, and Logistics did not respond to the draft report and the Director, Operational Test and Evaluation did not provide comments on Recommendation A.1. In preparing the final report, we considered comments from the Director, Operational Test and Evaluation and the Military Departments on a draft of this report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. As a result of management comments, we revised and redirected Recommendation B. to clarify our intention. Therefore, in response to the final report, we request that the Under Secretary of Defense for Acquisition, Technology, and Logistics provide comments on Recommendations A.1., A.2., and B.; that the Director, Operational Test and Evaluation provide comments on Recommendation A.1. and B; and the Military Departments provide comments on Recommendation B. by August 19, 2003.

If possible, please send management comments in electronic format (Adobe Acrobat file only) to Aud-am@dodig.osd.mil. Copies of the management comments must contain the actual signature of the authorizing official. We cannot accept the / Signed / symbol in place of the actual signature.

We appreciate the courtesies extended to the audit staff. Questions should be directed to Mr. John E. Meling at (703) 604-9091 (DSN 664-9091) or Mr. Jack D. Snider at (703) 604-9087 (DSN 664-9087). See Appendix J for the report distribution. The team members are listed inside the back cover.

For Thomas F. Gimble
David K. Steensma
Deputy Assistant Inspector General
for Auditing

Office of the Inspector General of the Department of Defense

Report No. D-2003-105 **June 20, 2003**
Project No. D2001AE-0123

Management of Developmental and Operational Test Waivers for Defense Systems

Executive Summary

Who Should Read This Report and Why? Policy makers, milestone decision makers, and testers for Defense systems should be interested in this report because it discusses the importance of addressing critical operational issues before a weapon system enters production and the need for consistent and updated waiver-and-limitation terminology and procedures.

Background. This audit was conducted based on concerns that the Director, Operational Test and Evaluation expressed in his "Operational Test and Evaluation Annual Report, FY 2000," February 2001. Specifically, the Director expressed concern about programs beginning operational test and evaluation without completing sufficient developmental test and evaluation and about the Navy's use of test waivers.

Results. The independent operational test and evaluation organizations within the Military Departments were not able to fully resolve critical operational issues for weapon systems during initial operational test and evaluation. Consequently, weapon systems that were not fully ready continued into production before critical operational issues were resolved, creating a potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat. In addition, the Military Departments applied inconsistent waiver-and-limitation terminology and procedures when referring to the deferral of testing. Although the Military Departments have policies and procedures for waivers, only the Navy processed waivers to defer testing of operational requirements. Conversely, the Army and the Air Force cited test limitations to defer testing of operational requirements. Without consistent and updated waiver-and-limitation terminology and procedures for deferral of testing, the Military Departments' use of test waivers is inconsistent with Office of the Secretary of Defense policy and affects the milestone decision makers' ability to make fully informed decisions before systems enter low-rate initial production and full-rate production. Requiring the Military Departments to assess operational performance requirements as unattained in test reports when test waivers prevent a complete evaluation of operational requirements, requiring program managers to resolve critical operational issues before approval of system full-rate production, and establishing consistent guidance for test waivers or deferrals should bring the oversight and improvements needed to those issues. See the Finding section of the report for the detailed recommendations.

Management Comments and Audit Response. We received comments from the Director, Operational Test and Evaluation; the Deputy Under Secretary of the Army (Operations Research) (the Deputy Under Secretary); the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation) (the Deputy Assistant Secretary); and the Director, Air Force Test and Evaluation; however, we did not receive comments from the Under Secretary of Defense for Acquisition, Technology, and Logistics.

The Director, Operational Test and Evaluation did not comment on the recommendation concerning the Military Departments' assessments of operational performance requirements; however, he partially concurred with having program managers resolve critical operational issues before approving systems for full-rate production. Further, he agreed with establishing consistent guidance for processing test waivers or deferrals.

The Deputy Under Secretary concurred with the recommendations concerning the Military Departments' assessments of operational performance requirements and the program managers resolving critical operational issues before approving systems for full-rate production, but he nonconcurred with establishing consistent guidance for processing test waivers or deferrals; however, he suggested a corrective action that met the intent of the recommendation.

The Deputy Assistant Secretary and the Director, Air Force Test and Evaluation nonconcurred with the recommendations concerning the Military Departments' assessments of operational performance requirements and the program managers resolving critical operational issues before approval of system for full-rate production. Further, they both nonconcurred with establishing consistent guidance for processing test waivers or deferrals. In addition, the Deputy Assistant Secretary stated that his comments contained information considered privileged in litigation, primarily under the deliberative process privilege and, therefore, was exempt from mandatory disclosure under the Freedom of Information Act. See the Finding section of the report for a discussion of the management comments and the Management Comments section of the report for the complete text of the comments.

In response to the comments by the Deputy Under Secretary of the Army (Operations Research) and to obtain succinct and attainable corrective action, we revised and redirected the recommendation to establish consistent guidance for processing test waivers or deferrals. Therefore, we request that the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Director, Operational Test and Evaluation; the Deputy Under Secretary of the Army (Operations Research); the Assistant Secretary of the Navy (Research, Development, and Acquisition); and the Director, Air Force Test and Evaluation comment on the revised recommendation. In addition, we request that the Under Secretary of Defense for Acquisition, Technology, and Logistics provide comments on the recommendations concerning the Military Departments' assessments of operational performance requirements and the program managers resolving critical operational issues before approving systems for full-rate production. We also request that the Director, Operational Test and Evaluation provide comments on the recommendation concerning the Military Departments' assessments of operational performance requirements. The comments on this report should be provided by August 19, 2003.

Table of Contents

Executive Summary i

Background 1

Objectives 2

Findings

A. Meeting Operational Requirements 3
B. Waiver Policies and Procedures 17

Appendixes

A. Scope and Methodology 24
Management Control Program Review 25
Prior Coverage 26
B. Glossary 27
C. Test and Evaluation Policy 31
D. Description of Major Defense Systems Reviewed 35
E. Critical Operational Issues not Resolved Because of Approved Test Waivers or Test Limitations 38
F. Audit Response to the Director, Operational Test and Evaluation's Comments on the Report 51
G. Audit Response to Army Comments on the Report 52
H. Audit Response to Navy Comments on the Report 58
I. Audit Response to Air Force Comments on the Report 69
J. Report Distribution 87

Management Comments

Director, Operational Test and Evaluation 89
Department of the Army 91
Department of the Navy 96
Department of the Air Force 111

Background

This report discusses the overall management of waivers of developmental and operational test requirements for Defense systems. We conducted the audit based on concerns that the Director, Operational Test and Evaluation (DOT&E) expressed in his "Operational Test and Evaluation Annual Report, FY 2000," February 2001. Specifically, the Director expressed concern about programs beginning operational test and evaluation without completing sufficient developmental test and evaluation and about the Navy's use of test waivers. DoD guidance does not specifically define what a waiver from developmental and operational testing is. DOT&E and the Military Departments have differing definitions for test waivers and use different terms when referring to the deferral of testing.

DOT&E Test Waiver. The Office of DOT&E defines a test waiver as deferral of a testing requirement, which does not eliminate the requirement for testing. The DOT&E definition does not include sections 2399 and 2366, title 10, United States Code, regarding system contractor involvement in operational test and evaluation and when live-fire test and evaluation is too expensive or impractical, respectively.

Army Test Waiver. The Army uses a test waiver to allow testers not to conduct the testing specified in the approved test and evaluation master plan (TEMP); however, for those tests for which waivers were granted for reasons other than availability of data, the program manager or other appropriate official will expand production testing or follow-on operational testing to address those operational requirements not previously tested. In addition, the Army uses the terms "limitations" and "delays" to defer specific operational test requirements. Further, Army guidance requires the approved TEMP to state the test limitations that may affect the resolution of critical operational issues; the impact of those limitations, such as the effects on COIs; and the ability to formulate conclusions regarding operational effectiveness and operational suitability.

Navy Test Waiver. The Navy uses the term "waiver" to mean either deferral of testing of an operational requirement or authorization to proceed with testing, even though the program has not met the requirements of Secretary of the Navy Instruction 5000.2B, "Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," December 6, 1996.

Air Force Test Waiver. Air Force procedures require program managers to process waivers to modify specific operational test requirements, and identify test limitations in test plans. Further, Air Force guidance requires waived items to be tested in subsequent operational test and evaluation or the operational requirements document (ORD) must be changed.

Military Departments' Position on DOT&E Waiver Definition. Although the Military Departments did not agree that test limitations and test deferrals are equivalent to test waivers, as defined by DOT&E, test limitations and test deferrals accomplish the same objective as test waivers by deferring required

testing until later in the system acquisition process, usually after the system's full-rate production decision. Further, DOT&E has indicated that test limitations and test deferrals are equivalent to test waivers in that they also result in the deferral of testing requirements. Appendix B provides a glossary of technical terms used in this report.

Objectives

The primary audit objective was to evaluate the overall management of waivers of developmental and operational test requirements. Specifically, we evaluated the process for justifying, reviewing, and approving the waiver of developmental and operational testing requirements for Defense systems. Additionally, we evaluated the management control program as it related to the audit objective. See Appendix A for a discussion of the scope and methodology, the review of the management control program, and prior coverage related to the audit objectives.

A. Meeting Operational Requirements

The independent operational test and evaluation organizations within the Military Departments were not able to fully resolve critical operational issues (COIs) for weapon systems during initial operational test and evaluation. This condition occurred because the Military Departments were approving operational test requirement waivers or waiver equivalents, such as test limitations and deferrals, so that:

- the full-rate production decisions would not be delayed and
- program tests and evaluations would be deferred into the production phase of the acquisition process.

As a result, weapon systems that were not fully ready continued into production before critical operational issues were resolved, creating a potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat.

Test and Evaluation Policy

The following provides an overview of DoD and Military Department policy concerning COIs and operational testing for acquisition programs. A COI is an issue of operational effectiveness and operational suitability, normally phrased as a question, that must be examined in operational test and evaluation to determine the system's capability to perform its mission. Appendix C provides a detailed discussion of the policy.

DoD Policy. The DoD Instruction 5000.2, "Operation of the Defense Acquisition System," May 12, 2003, requires that deficiencies encountered in testing before the low-rate initial production (LRIP) decision be resolved before the system can proceed beyond LRIP and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.[1] In addition, the DOT&E issued guidance on August 3, 2001, in a memorandum, "DOT&E Goals," that directed the Military Department testers not to issue waivers or deferrals that would prevent a complete evaluation of operational requirements. The DOT&E guidance also states that test requirements that have been waived should be considered failed unless the ORD requirement is changed.

The previous DoD 5000 series guidance stated that, before the full-rate production decision review, operational test and evaluation will:

- determine the operational effectiveness and suitability of a system under realistic conditions,
- determine whether the thresholds and objectives in the approved ORD and the COIs were satisfied, and

[1]The previous draft DoD Instruction had the same requirement. The Office of the Secretary of Defense canceled the DoD 5000 series guidance and replaced it with 120-day interim guidance in October 2002.

- assess the effects of demonstrated system performance on combat operations.

The guidance also stated that the milestone decision authority will schedule a review during the production and deployment phase to consider the results of qualification testing and initial operational test and evaluation before authorizing full-rate production and deployment.

Army Policy. The policy states that COIs are the operational effectiveness, suitability, and survivability concerns that must be examined in operational test and evaluation to determine the degree to which the system is capable of performing its mission.

Navy Policy. The policy states that operational test and evaluation is subdivided into initial operational test and evaluation and follow-on operational test and evaluation. For each program, the Commander, Operational Test and Evaluation Force (COMOPTEVFOR):

- develops the COIs to be addressed,
- publishes the COIs in the TEMP, and
- links the COIs to the Chief of Naval Operations requirements established in the ORD.

Air Force Policy. The policy states that the use of operational test and evaluation will determine the operational effectiveness and suitability of systems undergoing research and development efforts. The initial operational test and evaluation substantiates decisions for proceeding beyond LRIP, full-rate production and fielding, and declaration of initial operational capability. The results of initial operational test and evaluation are to answer completely and unambiguously all COIs as thoroughly as possible. Further, testers are not to defer testing to follow-on operational test and evaluation unless unavoidable.

Addressing Critical Operational Issues

The Military Departments' acceptance of test waivers and other test limitations impeded their independent operational test and evaluation organizations from fully resolving COIs during initial operational test and evaluation. This condition occurred because the Military Departments were approving operational test requirement waivers or waiver equivalents, such as test limitations and deferrals, so that:

- the full-rate production decisions would not be delayed and
- program tests and evaluations would be deferred into the production phase of the acquisition process.

DOT&E identified 11 DoD programs with approved operational test requirement waivers or waiver equivalents dated from October 1, 1997, through May 6, 2002. Our review of those 11 programs indicated that 8 of the respective program offices entered initial operational test and evaluation with deficiencies and postponed testing and evaluation that affected the resolution of one or more COIs for operational effectiveness or operational suitability. Appendix D describes the 11 programs reviewed.

The following table summarizes the system-specific COIs affected by test waivers or waiver equivalents for the eight systems. The COIs affected by test waivers and limitations are categorized by operational effectiveness and operational suitability. The table further separates operational suitability into the areas of reliability, availability, maintainability, interoperability, compatibility, logistics supportability, safety, human factors, and training. The table identifies the COI categories not resolved because of test waivers or waiver equivalents for the eight programs affected as indicated by the "X." The nine COI categories listed are not applicable to each of the eight programs.

Critical Operational Issues Not Fully Resolved Because of Approved Test Waivers or Test Limitations for the Eight Defense Systems Affected

	Critical Operational Issues Categories								
	Operational Effectiveness	Operational Suitability							
		Reliability	Availability	Maintainability	Interoperability	Compatibility	Logistics Supportability	Safety	Human Factors
Army									
Javelin		X							
Patriot Advanced Capability	X	X	X						
Tactical Unmanned Aerial Vehicle	X						X		
Navy									
F/A-18E/F Super Hornet*[2]									
V-22 Osprey*									
Air Force									
F-15 Tactical Electronic Warfare System		X	X						
Fighter Data Link		X							
Predator Unmanned Aerial Vehicle	X	X			X				

*Deliberative process privilege data omitted.

[2]The Navy testers considered the COIs to be resolved even though the program office had not resolved the deficiencies that caused the test waivers before the full-rate production decision.

A discussion of the nine COI categories affected by test waivers and limitations and examples of the affected COIs from the eight programs affected follow. Further details of all affected COIs are in Appendix E.

Operational Effectiveness

Of the eight programs affected by waivers, five programs deferred planned operational tests that affected the resolution of COIs associated with operational effectiveness. Examples of those programs are the Patriot Advance Capability-3, the F/A-18E/F Super Hornet, and the Predator Unmanned Aerial Vehicle.

Patriot Advance Capability-3. The COI requires the Patriot Advanced Capability-3 to enhance the effectiveness of the Patriot system. The testers were not able to resolve the operational effectiveness COI before the planned full-rate production decision because the Army deferred test requirements:

- for the missile to effectively destroy a target and counteract countermeasures,
- for the ground system to distinguish between targets, and
- for the system to operate in all required environments.

In consideration of performance problems identified during limited user testing, the Program Manager obtained the approval of the Joint Requirements Oversight Council to defer those test requirements as part of an evolutionary development program after the planned full-rate production decision. As a consequence, the Army Test and Evaluation Command determined in the limited user tests preceding the LRIP decision that the Patriot Advanced Capability-3 had limited operational effectiveness. To subsequently demonstrate those deferred test requirements, the Program Office stated that the Army increased funding for system development by approximately $90 million to demonstrate those ORD requirements. During the initial operational test and evaluation conducted in 2002, the Army Test and Evaluation Command and the Director, Operational Test and Evaluation determined that the Patriot Advanced Capability-3 was operationally effective with limitations.

F/A-18E/F Super Hornet.

*

*Deliberative process privilege data omitted.

*

The issue of the F/A-18E/F waivers, limitations, and deficiencies that affected the resolution of operational effectiveness and suitability COIs before the planned full-rate production decision has also been addressed in reports by the Inspector General of the Department of Defense (IG DoD) and the Defense Science Board.

Inspector General of the Department of Defense. The IG DoD Report No. 99-205, "Operational Testing and Evaluation of the F/A-18E/F Super Hornet," July 7, 1999, states that, in March 1999, the COMOPTEVFOR submitted the test plan for the F/A-18E/F. The test plan listed one limitation that precluded it from assessing the COI for reconnaissance because the tactical reconnaissance sensor suite was not cleared for employment during the operational evaluation. In addition, the report states that, before the operational evaluation began in May 1999, the Navy approved a temporary waiver for uncorrected technical deficiencies identified during developmental testing before beginning initial operational test and evaluation.

Defense Science Board. Report of the Defense Science Board Task Force on Test and Evaluation Capabilities, December 2000, states that the Navy did not assess the effect of waived test requirements on the resolution of the system's COIs during the evaluation of F/A-18E/F aircraft operational effectiveness and suitability. The Navy waived several of the test requirements because certain aircraft components exhibited poor reliability during developmental testing. Accordingly, the Navy did not assess the effect of those aircraft components and the associated repair times in the evaluation of the key F/A-18E/F aircraft suitability requirements of reliability, maintainability, and availability. Several of the waived aircraft components, which the Navy did not include in the operational assessment, caused failures and required a significant amount of time for inspections and repairs during the operational evaluation.

Predator Unmanned Aerial Vehicle. Although the Predator System Program Office certified that the Predator was ready to enter operational testing, it identified operational effectiveness limitations related to the system's ability to recognize tactical-sized targets. Those limitations were identified during informal developmental testing. An operational effectiveness COI for the Predator requires it to perform reconnaissance, surveillance, and target acquisition tasks to support battle management, execution, and operations other than war. Based on operational testing conducted before the full-rate production decision, DOT&E stated that the Predator was not operationally effective, which included the inability to recognize tactical-sized targets.

Reliability, Availability, and Maintainability

Because reliability, availability, and maintainability are interrelated, we combined them for discussion purposes. Of the eight programs affected by waivers, seven programs deferred planned operational tests that affected the resolution of COIs associated with suitability in the areas of system reliability, availability,

*Deliberative process privilege data omitted.

maintainability, or a combination thereof. Examples of those programs are the Javelin, the V-22 Osprey, and the F-15 Tactical Electronic Warfare System.

Javelin. A COI for the Javelin requires that it be designed so that it is sufficiently reliable and maintainable to employ on the projected battlefield. However, the Javelin entered initial operational test and evaluation with limitations associated with reliability. Engineering and manufacturing development testers estimated that the field tactical trainer (range) would achieve 25 hours, rather than the 100 hours required. The system completed initial operational test and evaluation in December 1993, the results of which indicated that the system had unresolved operational suitability issues related to the reliability parameters prescribed for system maturity; specifically, the training devices were unreliable. According to the Deputy Under Secretary of the Army (Operations Research), the U.S. Army Infantry reevaluated the requirements in 1994 and reduced the 100-hour requirement to 50 hours that should be attained at the time of system maturity, 3 years after the full-rate production decision. The Deputy also stated that the requirement for the full-rate production decision was 32 hours as shown in the System Evaluation Report, March 27, 1997. The Army operational testers resolved the operational suitability issues after the full-rate production decision.

V-22 Osprey. A COI for the V-22 requires that it be reliable and maintainable in its intended operating environment and available to support its mission. Developmental test results indicated that the V-22 mean time between failure and false alarm rate did not achieve technical thresholds, thereby affecting the complete resolution of reliability, availability, maintainability, and diagnostic issues with the V-22 during operational test and evaluation. Consequently, the program manager requested a waiver of the V-22 mean time between failure and false alarm rate requirement. The Program Executive Officer for Air Anti-Submarine Warfare, Assault, and Special Mission Programs stated that the waived requirement would be ready for operation testing after the full-rate production decision. On November 17, 2000, DOT&E stated in its beyond LRIP report for the V-22 that the V-22 was not operationally suitable, primarily because of reliability, maintainability, availability, human factors, and interoperability issues. DOT&E based its conclusion on the failure rate of aircraft components exhibited during testing.

F-15 Tactical Electronic Warfare System. A COI for the F-15 Tactical Electronic Warfare System (the System) requires that the Band 1.5 system be operationally ready to support F-15E mission requirements. The Air Force will depend on the capability of the built-in-test of the System to identify faults and take corrective action in a timely manner. The May 2000 TEMP did not show any test limitations associated with the built-in-test; however, it did show that the System had an open deficiency for an excessive built-in-test false alarm rate. Although the deficiency existed, the Air Force conducted initial operational test and evaluation in FY 2000 and determined that the built-in-test false alarm rate was 65 percent, compared to the required built-in-test false alarm rate of less than 20 percent. The excessive false alarm rate caused numerous unwarranted maintenance actions and distracted the air crew's attention from primary mission functions. Even with the excessive false alarm rate, the Air Force approved the

system for production because the System provided a greater capability than was previously available, according to DOT&E representatives. In addition, DOT&E approved the TEMP and operational test and evaluation plan for the Band 1.5 system, both of which addressed the false alarm rate and required future testing, according to Air Force Test and Evaluation Directorate representatives. The representatives also stated that the Air Force submitted plans to DOT&E to correct the false alarm rate problems in the next increment, Band 5.0.

Interoperability

The Predator Unmanned Aerial Vehicle exempted planned operational tests of interoperability data links and file formats because the Joint Interoperability Test Command had not certified the system for interoperability. This exemption affected the resolution of the COI requiring the Predator to be interoperable with other command, control, communication, and computers and intelligence systems. Accordingly, the System Program Office certified that the Predator Unmanned Aerial Vehicle was ready for operational testing with a stipulation that, if the Joint Interoperability Test Command did not certify the system for interoperability during initial operational test and evaluation, the System Program Office would complete the certification process after the completion of operational testing. According to the DOT&E FY 2001 Annual Report, the Joint Interoperability Test Command had not yet certified the Predator for interoperability because of the untested requirements affecting the resolution of the COI. Further, the Joint Interoperability Test Command had certified only three of the seven critical system interfaces because the remaining interfaces were not available for evaluation. The System Program Office deferred further interoperability testing of the Predator until the Military Departments field ground stations that are equipped with tactical control stations.

Compatibility

Of the eight programs affected by waivers, the program offices for the F/A-18E/F Super Hornet, and the V-22 Osprey deferred planned operational tests that affected the resolution of COIs associated with suitability in the area of system compatibility.

F/A-18E/F Super Hornet. On the F/A-18E/F Program, the Director of Navy Test and Evaluation and Technology Requirements, Office of the Chief of Naval Operations approved four test waiver requests that affected the resolution of the COI requiring the F/A-18E/F to be compatible with its operating environment. The Program Executive Officer for Tactical Aircraft requested the waivers because developmental test results evidenced poor communication between aircraft, inadequate radio reception while transmitting, ineffective concurrent transmission, and incompatibility with the combat training system. In the request, the Program Executive Officer for Tactical Aircraft stated that the waived requirements would be subjected to operational testing after the planned full-rate

production decision. *

V-22 Osprey. On the V-22 Osprey Program, the Director of Navy Test and Evaluation and Technology Requirements approved three test waivers that the program manager requested for the COI requiring the V-22 to be compatible with its operating environment. The program manager requested the waivers because:

- developmental test results identified inadequate cockpit and cabin nuclear, biological and chemical overpressure protection; an inability to align the lightweight inertial navigation system without the global positioning system signal; and
- the aircraft could not be cleared to operate in icing conditions.

The Program Executive Officer for Air Anti-Submarine Warfare, Assault, and Special Mission Programs stated that the waived requirement would be ready for operational testing after the full-rate production decision.

Logistics Supportability

The Program Office for the Tactical Unmanned Aerial Vehicle deferred planned operational tests that affected the resolution of the COI requiring the system to meet the ground maneuver brigade commander's sustained combat requirements. Specifically, the test and evaluation was limited because testers could not verify the supportability of the system when using heavy fuel. The ORD objective requires the system to use only heavy fuel; however, the system available for testing used motor gasoline, which meets the operational requirement threshold, the minimal acceptable value necessary to satisfy the need. According to DOT&E, even though the system used motor gasoline, the system met the fuel requirement by meeting the threshold; however, the Army is addressing supportability issues about the system being able to support a motor gasoline in the future. After the planned full-rate production decision, the Army will conduct a follow-on operational test and evaluation to test for the heavy fuel requirement.

Safety

Of the eight programs affected by waivers, the Program Offices for the F/A-18E/F Super Hornet and the V-22 Osprey deferred planned operational tests that affected the resolution of COIs associated with suitability in the area of system safety.

F/A-18E/F Super Hornet. On the F/A-18E/F Program, the Director of Navy Test and Evaluation and Technology Requirements approved three waiver requests, which the Program Manager submitted, that affected the resolution of a COI

* Deliberative process privilege data omitted.

related to safety. The COI requires that the F/A-18E/F be safe to operate and maintain. Based on developmental testing results, the program manager requested that operational tests addressing the hydraulic fluid level indicator and erroneous velocity vector performance be waived. The Program Executive Officer for Tactical Aircraft stated that the waived requirement would be subject to operational testing after the full-rate production decision.

*

V-22 Osprey. On the V-22 Osprey Program, the Director of Navy Test and Evaluation and Technology Requirements approved four test waivers, which the Program Manager requested, that affected the resolution of the COI requiring the V-22 to be safe to operate and maintain. The program manager requested the waivers because, during developmental testing, excessive force was required to disconnect the intercommunication system, the pilot and copilot seats had nonqualified inertial reels, the autorotative descent could not be maintained while attempting engine air start, and the ground collision avoidance and warning system was not available for test.

*

Human Factors

For the eight programs affected by waivers, the Program Office for the F/A-18E/F Super Hornet deferred planned operational tests that affected the resolution of the COI requiring that the human factors aspects of the F/A-18E/F support completion of the aircraft's mission. The Program Executive Officer for Tactical Aircraft requested and the Director of Navy Test and Evaluation and Technology Requirements approved a waiver of the test for the ALR-67 power switch on the center pedestal because it was not within reach of the pilot when he was strapped in the seat. The Program Executive Officer for Tactical Aircraft stated that the waived requirement would be subject to operational testing after the full-rate production decision.

*

* Deliberative process privilege data omitted.

Effect of Not Meeting Operational Requirements

Without the Military Departments fully resolving COIs for weapon systems during initial operational test and evaluation, weapon systems that were not fully ready continued into production, thereby creating a potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat.

Management Comments on the Finding and Audit Responses

Summaries of management comments on the finding and audit responses are in Appendix F for the Director, Operational Test and Evaluation; Appendix G for the Army; Appendix H for the Navy; and Appendix I for the Air Force.

Recommendations, Management Comments, and Audit Responses

A. We recommend that the Under Secretary of Defense for Acquisition, Technology, and Logistics, in conjunction with the Director, Operational Test and Evaluation, require that:

1. The Military Departments assess operational performance requirements, including critical operational issues, as unattained in test reports when test waivers, or their equivalents, prevent a complete evaluation of operational requirements.

Under Secretary of Defense for Acquisition, Technology, and Logistics Comments. The Under Secretary did not provide comments on the draft report. We request that the Under Secretary provide comments in response to the final report.

Director, Operational Test and Evaluation Comments. The Director did not comment on the recommendation. We request that the Director provide comments in response to the final report.

Deputy Under Secretary of the Army (Operations Research) Comments. Although not required to comment, the Deputy agreed with the recommendation, stating that the Army focused its COIs and criteria on mission accomplishment. Further, he stated that a breach of a specific criterion is a reason to delay entry into full-rate production unless other evidence shows that the system is operationally effective and suitable. For the complete text of the Deputy's comments, see the Management Comments section of the report.

Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation) Comments. Although not required to comment, the Deputy disagreed with the recommendation, stating that the Military Departments and the milestone decision authorities already conduct assessments of the operational performance requirements and consider the assessments in their program decisions. Further, he stated that, if the intent of the recommendation is to prevent the Military Departments or the milestone decision authorities from fulfilling their obligations until the testers operationally test all items, then such a recommendation should be rescinded. The Deputy also stated that the Component Acquisition Executives and milestone decision authorities are fully aware of and consider test waivers and deferrals as well as test results in their decisions. The Deputy asserted that the report provides no cases where test waivers or deferrals resulted in a Component Acquisition Executive or a milestone decision authority making uninformed decisions that caused costly retrofits of capability due to inadequate tests or that resulted in a program's not meeting the expected threat. The Deputy stated that his comments contained information considered privileged in litigation, primarily under the deliberative process privilege and, therefore, was exempt from mandatory disclosure under the Freedom of Information Act. Where applicable, he marked his comments "For Official Use Only." For the complete text of the Deputy's comments, see the Management Comments section of the report.

Audit Response. The recommendation is not intended to prevent Military Departments or milestone decision authorities from fulfilling their obligations until all items are operational tested. The intent of the recommendation was to ensure that the milestone decision authorities are fully aware of any COIs that the respective program offices may have waived, deferred, or limited that could affect the operational effectiveness or operational suitability of the system and its ability to meet the users' requirements.

A milestone decision authority cannot be fully aware of and consider test waivers and deferrals as well as test results if an assessment of the waiver, deferral, or limitation is not available at the time of the milestone decision. In making a milestone decision, the milestone decision authority is relying on the respective program office to satisfactorily resolve the waived COIs based on future test results and on the resolution of those COIs that will not result in costly retrofits for the system to fully meet operational requirements and user needs.

Resolution of waived COIs can result in costly retrofits in systems produced, however. The report did not illustrate cases where test waivers or deferrals resulted in the milestone decision authority making uninformed decisions that caused costly retrofits or that resulted in a program not meeting the expected threat. However, the Defense Science Board Report, December 2000, concluded that the process of handling waivers seriously undermined the test and evaluation process and may have negatively affected weapon systems. Further, the DOT&E stated in his annual report for FY 2002 that he was concerned about the pressure to deploy new systems that the Military Departments have not adequately tested.

He stated that the desire to field new capabilities as soon as possible should be tempered with the responsibility to ensure that associated weapon systems will not put Americans at risk. He also noted that, because of concern about fielding of inadequately tested systems, Congress has enacted new legislation requiring the DOT&E annual report to identify Military Departments' waivers or deviations from testing requirements.

Director, Air Force Test and Evaluation Comments. Although not required to comment, the Director disagreed with the recommendation, stating that the terms "waivers or their equivalents" are too problematic and that the Office of the Secretary of Defense (OSD) and the Military Departments have not uniformly accepted the terms or practices associated with that terminology. Further, he stated that the DOT&E did not coordinate his August 3, 2001, memorandum with the Air Force, and that the Air Force has fundamental disagreements with the memorandum's statements on waivers and requirements. For the complete text of the Director's comments, see the Management Comments section of the report.

Audit Response. Because the terms "waivers or their equivalents" vary among the Military Departments, we have recommended in Finding B that the OSD and the Military Departments collectively establish consistent guidance for test waivers or deferrals. In addition, the DOT&E stated in his August 3, 2001, memorandum that he:

- intended to communicate the major points of the memorandum with the commanders of the operational test agencies and
- encouraged the commanders to share the guidance with their staffs.

Further, in January 2003, the DOT&E stated that the Military Departments should have already promulgated the test policy in his August 3, 2001, memorandum.

2. Milestone decision authorities require that program managers resolve critical operational issues before approving full-rate production for a weapon system.

Under Secretary of Defense for Acquisition, Technology, and Logistics Comments. The Under Secretary did not provide comments on the draft report. We request that the Under Secretary provide comments in response to the final report.

Director, Operational Test and Evaluation Comments. The Director partially concurred, stating that examples may exist where, because of an operational requirement, a capability is urgently needed. Consequently, testers may not fully evaluate all COIs during operational test and evaluation because of unanticipated problems, such as test range limitations, instrumentation limitations, or availability. In such a case, he stated that the milestone decision authorities should have the prerogative to field the current capability, which would be more beneficial to the warfighter, rather than wait to enter full-rate production until the respective program office resolves all COIs.

Audit Response. The Director's comments on the recommendation were responsive. We agree that in the excepted case where a capability is needed because of an urgent operational requirement, the milestone decision authorities should have the prerogative to field the current capability, rather than wait to enter full-rate production until the respective program office resolves all COIs. Otherwise, milestone decision authorities need to comply with the DoD Instruction 5000.2 requirement that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP, and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Deputy Under Secretary of the Army (Operations Research) Comments. Although not required to comment, the Deputy agreed with the concept of the recommendation and provided the same comments as he did for Recommendation A.1.

Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation) Comments. Although not required to comment, the Deputy disagreed with the concept of the recommendation and provided the same comments as he did for Recommendation A.1.

Audit Response. See the audit response for Recommendation A.1. In addition to the earlier response, DoD Instruction 5000.2, requires that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP, and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Director, Air Force Test and Evaluation Comments. Although not required to comment, the Director disagreed with the recommendation, stating that the recommendation was counter-productive and undermines the Under Secretary of Defense for Acquisition, Technology, and Logistics' new direction in the DoD 5000-series to make evolutionary acquisition the preferred acquisition strategy. The Director believed that the milestone decision authorities must retain sufficient management flexibility to plan wisely and must retain authority to make needed trade-offs among cost, schedule, and performance for the good of the program. Further, he believed that large cost overruns and long delays to fielding new capabilities to warfighters would become routine if DoD implemented the recommendation.

Audit Response. The key point of this report is to not just field new capabilities, but to field new capabilities that will fully meet warfighter requirements by efficiently resolving core impediments to fulfilling those requirements. A system being acquired using the evolutionary acquisition strategy still has to meet the operational requirements and COIs for that block of the evolutionary acquisition. When milestone decision authorities make trade-offs among cost, schedule, and performance, they still need to ensure that the system will meet user requirements. Therefore, system deficiencies that were identified before the system entered initial operational test and evaluation should be resolved before the system enters full-rate production for that block. The resolution of pre-initial operational test and evaluation deficiencies before full-rate production does not conflict with the DoD Instruction 5000.2, which requires that deficiencies encountered in testing

before the LRIP decision be resolved before the system proceeds beyond LRIP. Enforcement of this requirement will avoid large cost overruns to retrofit fielded systems that do not meet user requirements. Further, timely management efforts to resolve system deficiencies before production should not significantly delay fielding new capabilities to warfighters. On the other hand, it will provide the warfighters with a system that is operationally effective and suitable to defeat the expected threat.

B. Waiver Policies and Procedures

The Military Departments applied inconsistent waiver-and-limitation terminology and procedures when referring to the deferral of testing. Although the Military Departments have policies and procedures for waivers, only the Navy processed waivers to defer testing of operational requirements. Conversely, the Army and the Air Force cited test limitations to defer testing of operational requirements. This condition occurred because OSD had not issued specific guidance for approving and processing waivers and other deferrals of operational testing. Subsequently, the OSD issued guidance directing the Military Department testers not to issue waivers or deferrals that would prevent a complete evaluation of operational requirements and require deficiencies encountered in testing to be resolved before LRIP. However, the Military Departments have not incorporated the new guidance into their testing policies and procedures. Without consistent and updated waiver-and-limitation terminology and procedures for deferral of testing, the Military Departments' use of test waivers is inconsistent with OSD policy and affects the milestone decision makers' ability to make fully informed decisions before systems enter LRIP and full-rate production.

Military Departments' Application of Waiver Policy and Procedures

The Military Departments inconsistently applied waiver-and-limitation terminology and procedures when referring to deferral of testing until after the full-rate production decision review. Specifically:

- the Army procedures require waivers when testing in the approved TEMP will not be conducted and use the terms "limitations" and "delays" to defer specific operational test requirements,
- the Navy procedures require waivers to defer specific operational test requirements, and
- the Air Force procedures require waivers to defer specific operational test requirements; however, instead of using waivers, program managers used test limitations to defer specific operational test requirements.

Army Procedures. Army Regulation 73-1, "Test and Evaluation Policy," January 7, 2002, and Army Pamphlet 73-2, "Test and Evaluation Master Plan Procedures and Guidelines," October 11, 1996, address developmental and operational testing waivers and other methods for deferring testing.

Testing Waivers. Army Regulation 73-1 requires testers to conduct the testing specified in the approved TEMP unless the program manager or other appropriate official submits a written request for waiver and receives approval

from the TEMP approval authority. Further, the Regulation states that the approval of testing waivers will depend on the availability and acceptability of relevant data and information and will not negate the requirement for independent system evaluation. For those tests for which waivers were granted for reasons other than availability of data, the program manager is to expand production testing or follow-on operational testing to address those operational requirements not previously tested.

Testing Deferrals. Army guidance uses the terms "limitations" and "delays" to defer specific operational test requirements. Further, Army guidance requires the approved TEMP to state the test limitations that may affect the resolution of critical operational issues; the impact of those limitations, such as the effects on COIs; and the ability to formulate conclusions regarding operational effectiveness and operational suitability. In addition, Army Regulation 73-1 states that developmental or operational testing may be delayed when circumstances warrant. Test delays can be issued at the start of testing to address evaluation issues when the tester identifies a problem that would affect the completeness of the data being collected. Further, the Regulation states that tests will be delayed when it is apparent that the system has little chance of successfully attaining critical technical parameters or satisfying critical operational criteria, and when deficiencies cannot be resolved before the start of test.

Navy Procedures. Secretary of the Navy Instruction 5000.2B, "Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," December 6, 1996, addresses processing Navy waivers that affect the dedicated initial operational test and evaluation. Navy waivers consist of waivers from compliance with the criteria for certification of readiness for operational test and evaluation and waivers for deviations from TEMP testing requirements. The Navy processes those waivers in the following manner, with the waived requirement being tested in subsequent operational tests.

Waiver Process. The program manager or program executive officer formulates waiver requests before the operational test readiness and certification review process in an operational test and evaluation certification message. When requesting a waiver, the program manager will outline the limitations that the deferral or waiver will place upon the system under test and the potential effects on fleet use. Further, a statement will be made in the operational test and evaluation certification message noting when the approved deferrals will be available for subsequent operational testing. The Director, Navy Test and Evaluation and Technology Requirements approves waiver requests, as appropriate, in coordination with the COMOPTEVFOR; the Deputy Chief of Naval Operations (Logistics); the Deputy Chief of Naval Operations (Resources, Warfare Requirements, and Assessments); and the program sponsor; and advises DOT&E when the waiver is for a major defense acquisition program.

Subsequent Operational Tests. Approval of a test waiver request does not alter the test requirement. The program manager is still required to test the waived requirement in subsequent operational testing. A waiver may result in limitations to the scope of testing that preclude the COMOPTEVFOR from fully

resolving all COIs. The COMOPTEVFOR is not to assess waived requirements in its analysis to resolve COIs, but may comment on the waived requirements in the applicable test report.

Air Force Procedures. Air Force Instruction 99-102, "Operational Test and Evaluation," July 1, 1998; Air Force Operational Test and Evaluation Center Instruction 99-102, "Operational Test and Evaluation," January 20, 2000; and Air Force Manual 63-119, "Certification of System Readiness for Dedicated Operational Test and Evaluation," February 22, 1995, establish guidance for Air Force waivers from testing requirements. The Air Force procedures require program managers to process waivers to defer specific operational test requirements and identify test limitations in test plans.

Test and Evaluation Waivers. Air Force Instruction 99-102 and Air Force Manual 63-119 require the Air Force Operational Test and Evaluation Center to prepare a request to waive or modify fundamental provisions for operational test and evaluation. With the user and developer concurrence, the Air Force Operational Test and Evaluation Center is to submit the request to the Air Force Test and Evaluation Directorate. The system program manager and the system's program element monitor are to document any approved operational test and evaluation waivers in the TEMP and the program management directive, respectively. Air Force Manual 63-119 requires a waived requirement to be tested in subsequent operational test and evaluations or the user must change the ORD requirement. Before initial operational test and evaluation, the system program manager is to:

- list any required waivers or areas excluded from the test and evaluation, the rationale, and future plans to clear the waivers, and
- provide a summary of the list to the operational tester.

In response, the operational tester is to indicate whether to proceed with the test and is to discuss the effects of test limitations and test waivers on resolving operational test issues in the test report.

Other Deferred Testing. Air Force Instruction 99-102 states that the final operational test and evaluation report must contain descriptions of test methods and limitations; definitive test results; and system capabilities and limitations as measured against the ORD. According to Air Force Operational Test and Evaluation Center, testers should not include system limitations in the system evaluation and should not fail the system because of the limitations.

OSD Guidance for Test Deferrals. The Military Departments did not consistently apply waiver-and-limitation terminology and procedures to defer required operational testing as discussed because the Under Secretary of Defense for Acquisition, Technology, and Logistics and the DOT&E had not issued guidance that provided specific procedures for requesting approval to defer test requirements to future periods and for evaluating those deferral requests.

Further, the DOT&E issued guidance on August 3, 2001, that directed Military Department testers not to issue waivers or deferrals that would prevent a complete evaluation of operational requirements. The DOT&E guidance also states that test requirements that have been waived should be considered failed unless the ORD requirement is changed. However, the Military Departments had not incorporated the new guidance into their testing policies and procedures.

On May 12, 2003, OSD issued DoD Instruction 5000.2 that requires the operational test and evaluation testers to determine the operational effectiveness and suitability of a system under realistic operational conditions, including combat; determine whether thresholds in the approved ORDs[3] and critical operational issues have been satisfied; and assess effects on combat operations. In addition, the Instruction requires that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP, and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Consistently Applying Waiver-and-Limitation Terminology and Procedures

Without consistent and updated waiver-and-limitation terminology and procedures for deferral of testing, the Military Departments' use of waivers is inconsistent with OSD policy issued by the Under Secretary of Defense for Acquisition, Technology, and Logistics and the Director, Operational Test and Evaluation. Furthermore, the inconsistent policy affect the OSD milestone decision makers' ability to make fully informed decisions before systems enter LRIP and full-rate production.

Management Comments on the Finding and Audit Responses

Summaries of management comments on the finding and audit responses are in Appendix F for the Director, Operational Test and Evaluation; Appendix G for the Army; Appendix H for the Navy; and Appendix I for the Air Force.

[3]DoD Instruction 5000.2 states that, during system development and demonstration, the capabilities demonstration document instead of the ORD will have the detailed operational performance parameters. Further, the Instruction states that the capabilities production document instead of the ORD will have the operational requirements resulting from system development and demonstration and will detail the performance expected of the production system. However, this report uses the term ORD because the programs reviewed during the audit used ORDs.

Recommendations, Management Comments, and Audit Responses

Redirected and Revised Recommendation. In response to the recommendation, we received varied management comments; however, the general theme was the need for a coordinated corrective action plan to include input from the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the DOT&E. Therefore, to better respond to the recommendation and to obtain succinct and attainable corrective action, we are redirecting the recommendation to include the Under Secretary of Defense for Acquisition, Technology, and Logistics, the DOT&E, and the respective Military Department organizations responsible for test and evaluation guidance. Further, in response to the comments by the Deputy Under Secretary of the Army (Operations Research), we revised the recommendation so that guidance for test waivers or deferrals would be jointly promulgated and implemented among OSD and the Military Departments.

B. We recommend that the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Director, Operational Test and Evaluation; the Deputy Under Secretary of the Army (Operations Research); the Assistant Secretary of the Navy (Research, Development, and Acquisition); and the Director, Air Force Test and Evaluation collectively establish consistent guidance for test waivers or deferrals.

Deputy Under Secretary of the Army (Operations Research) Comments. The Deputy nonconcurred, stating that the DOT&E directed the guidance in his August 3, 2001, memorandum to his staff and focused on the completeness of evaluations. Further, he stated that applying consistent test waiver and deferral guidance throughout DoD requires the definition of terms. The Deputy suggested that we modify the recommendation to recommend that DoD establish a DoD-wide process action team, chaired by the Under Secretary of Defense for Acquisition, Technology, and Logistics and the DOT&E, with membership from the Military Department test and evaluation headquarters and the operational test agencies. By establishing the process action team, he concluded that the DoD would be able to establish consistent test waiver and test deferral guidance throughout DoD. For the complete text of the Deputy's comments, see the Management Comments section of the report.

Audit Response. The Deputy's comments were responsive to the intent of the recommendation. Consequently, we redirected the recommendation to include the Under Secretary of Defense for Acquisition, Technology, and Logistics, the DOT&E, and the respective Military Department organizations responsible for test and evaluation guidance. The DOT&E stated that the guidance in his August 3, 2001, memorandum was communicated to the Military Departments, and that the Military Departments should already have promulgated the test policy to Military Department operational test organizations.

Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation) Comments. The Deputy nonconcurred, stating that the Navy has formally stated and documented its policy on test waivers and deferrals and that the concerns expressed in the report are unfounded. He also stated that the Navy policy on test waivers and deferrals allows the Component Acquisition Executive and the milestone decision authorities the management flexibility needed to make programmatic decisions in a timely manner. The Deputy further stated that less management flexibility would add cost to programs without any benefit. The Deputy stated that his comments contained information considered privileged in litigation, primarily under the deliberative process privilege and, therefore, were exempt from mandatory disclosure under the Freedom of Information Act. Where applicable, he marked his comments "For Official Use Only." For the complete text of the Deputy's comments, see the Management Comments section of the report.

Audit Response. Although the Navy has formally stated and documented its policy on test waivers and deferrals in Secretary of the Navy Instruction 5000.2B, the Senate Armed Service Committee in its conference report for the FY 2003 DoD appropriation cited a need for the Navy to modify its guidance on waivers. Specifically, the Committee stated that the Defense Science Board, in its December 2000 Report, strongly recommended that the Navy modify Secretary of the Navy Instruction 5000.2B to prohibit it from issuing waivers without DOT&E review and approval. Further, as discussed in the associated conference report, Congress enacted new legislation requiring the DOT&E annual report to identify Military Departments' waivers or deviations from testing requirements and the actions that the Military Departments have taken or plan to take to address the concerns that the waivers or deviations raised.

The Navy policy on test waivers and deferrals allowing management flexibility states that, after the Director, Navy Test and Evaluation and Technology Requirements waives a COI or a portion thereof, the COMOPTEVFOR does not assess the associated requirements in its analysis of test results to determine whether the system has met the requirements of the COI. Consequently, based on the successful accomplishment of the tested portion of the unwaived COI requirements, the COMOPTEVFOR could assess and did assess the entire COI as met, even though that assessment did not include the waived requirements. Therefore, when the milestone decision authorities use the COMOPTEVFOR test analysis in their decision making process, they are informed that the system has met all of its COI requirements, to include the waived requirements, and that it is operationally effective and suitable and capable of performing its mission.

The Deputy believes that less management flexibility would add cost to a program without benefit; however, greater flexibility could result in the Navy expending significant dollars to retrofit fielded units to meet its operational requirements if the milestone decision authority allows a system to enter production when the system has not met all of it COI requirements.

Director, Air Force Test and Evaluation Comments. The Director stated that uniform policy for waivers may be good for DoD, but the Air Force nonconcurred

with making all Military Department policies, particularly Air Force policies, reflect the policies of the DOT&E. Further, he stated that DOT&E should first contact the Military Departments to seek agreement before establishing new policies. He believed that imposing a "one-size-fits-all" approach could undermine attempts by the Under Secretary of Defense for Acquisition, Technology, and Logistics to streamline acquisition using the evolutionary acquisitions and time-phased requirements in the new DoD 5000-series. However, the Director stated that the Air Force Test and Evaluation Directorate is rewriting and updating Air Force Instruction 99-101, "Developmental Test and Evaluation," and Air Force Instruction 99-102, "Operational Test and Evaluation." For the complete text of the Director's comments, see the Management Comments section of the report.

Audit Response. Without consistent and updated waiver-and-limitation terminology and procedures for deferral of testing, the Military Departments' use of test waivers will continue to be inconsistent with OSD policy and could affect the milestone decision makers' ability to make fully informed decisions before systems enter LRIP and full-rate production. The establishment of consistent terminology and procedures by the Military Departments should not affect using an evolutionary acquisition strategy. Conversely, the consistent terminology and procedures should strengthen the use of an evolutionary acquisition strategy by ensuring that systems meet the operational requirements and COIs for each block of the evolutionary acquisitions.

We redirected and revised the recommendation so that the OSD and the Military Departments would jointly develop and implement guidance for test waivers and deferrals.

Director, Operational Test and Evaluation Comments. Although not required to comment, the Director agreed with the concept of the recommendation and stated that DoD has already made progress in updating policies, practices, and procedures for managing waivers and that our administrative recommendations will help ensure proper management in that regard. For the complete text of the Director's comments, see the Management Comments section of the report.

Appendix A. Scope and Methodology

We reviewed documentation dated from June 1986 to January 2003. To accomplish the audit objective, we:

- discussed test and evaluation policies and procedures with personnel in the Office of the DOT&E, selected Military Department program offices, and operational test and evaluation organizations;
- assessed whether DOT&E and the Military Departments analyzed test and evaluation waiver in accordance with DoD and Military Department policy concerning critical operational issues and operational testing for acquisition programs;
- reviewed test reports that Military Department operational test and evaluation organizations issued for selected acquisition programs;
- reviewed approved requests for test and evaluation waivers to determine the effect on critical operational issues;
- reviewed TEMPs, including associated appendixes and attachments, Military Department developmental test reports, program budgets, and detailed program schedules for selected acquisition programs;
- identified the roles of the Office of the DOT&E and appropriate Military Department oversight groups in the DoD test and evaluation waiver process; and
- determined the role of the Institute for Defense Analyses in the test and evaluation waiver process.

To perform the audit, we contacted the Office of the DOT&E and the testing organizations of the Military Departments to obtain a list of all programs for which they maintained oversight that had waivers issued from 1998 through May 2002. The Office of the DOT&E provided a list of 11 programs that were issued waivers during the designated period. The programs were in various phases of the acquisition process and are described in Appendix D. The 11 programs reviewed were:

- the Army Javelin, the Patriot Advanced Capability-3, and the Tactical Unmanned Aerial Vehicle;
- the Navy Cooperative Engagement Capability, the F/A-18E/F Super Hornet, the Joint Stand-Off Weapon, and the V-22 Osprey; and
- the Air Force F-15 Tactical Electronic Warfare System, the Fighter Data Link; the Joint Direct Attack Munition, and the Predator Unmanned Aerial Vehicle.

We reviewed the 11 programs that the Office of DOT&E identified and obtained information for the F/A-18E/F Super Hornet and the V-22 Osprey from prior General Accounting Office and Inspector General of the Department of Defense reports. The Navy was the only Military Department that reported having processed waivers; however, it was unable to provide a list of those waivers. The Army and Air Force indicated that the programs for which they provided oversight had not issued waivers for the period reviewed. Our review of those 11 programs indicated that 8 of the respective program offices entered initial operational test and evaluation with deficiencies and postponed testing and evaluation that affected the resolution of one or more COIs for operational effectiveness or operational suitability. The following are the eight programs:

- the Army Javelin, the Patriot Advanced Capability-3, and the Tactical Unmanned Aerial Vehicle;
- the Navy F/A-18E/F Super Hornet and the V-22 Osprey; and
- the Air Force F-15 Tactical Electronic Warfare System, the Fighter Data Link, and the Predator Unmanned Aerial Vehicle.

We performed this audit from June 2001 through February 2003 in accordance with generally accepted government auditing standards.

Use of Computer-Processed Data. We did not rely on computer-processed data to perform this audit.

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in the DoD. This report provides coverage of the DoD Weapon Systems Acquisition high-risk area.

Management Control Program Review

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, and DoD Instruction 5010.40, "Management Control (MC) Program Procedures," August 28, 1996, require DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of the Review of the Management Control Program. In accordance with DoD Directive 5000.1, "The Defense Acquisition System," May 12, 2003, acquisition managers are to use program cost, schedule, and performance parameters as control objectives to implement the requirements of DoD Directive 5010.38. Accordingly, we limited our review to management controls directly related to the waivers of test and evaluation requirements. We did not assess management's self-evaluation of those controls.

Adequacy of Management Controls. The management controls were in place for review and approval of waivers; however, the Military Departments and the milestone decision authorities were not using the controls to ensure that DoD

testers addressed COIs that had waived tests, or other limitations, before the milestone decision authorities approved a weapon system for full-rate production. Implementation of Recommendations A.1. and A.2. will ensure that DoD testers address COIs that have waived tests, or other limitations, before a weapon system is approved for full-rate production.

Prior Coverage

During the last 5 years, the General Accounting Office and the Inspector General of the Department of Defense have issued reports that reference DoD test waivers and limitations. Unrestricted General Accounting Office and Inspector General of the Department of Defense reports can be accessed at http://www.gao.gov and http://www.dodig.osd.mil/audit/reports, respectively.

General Accounting Office (GAO)

GAO Report No. NSIAD-98-13, "Navy Aviation: V-22 Cost and Capability to Meet Requirements are yet to be Determined," October 1997

GAO Report No. NSIAD-00-199, "Best Practices: A More Constructive Test Approach is Key to Better Weapon System Outcomes," July 2000

GAO Report No. NSIAD-98-61, "Navy Aviation: F/A-18E/F Development and Production Issues," March 1998

Inspector General of the Department of Defense (IG DoD)

IG DoD Report No. D-2000-174, "V-22 Osprey Joint Advanced Vertical Aircraft," August 15, 2000

IG DoD Report No. 99-205, "Operational Testing and Evaluation of the F/A-18E/F Super Hornet," July 7, 1999

Appendix B. Glossary

Acquisition Category. An acquisition category is an attribute of an acquisition program that determines the program's level of review, decision authority, and applicable procedures. The acquisition categories consist of I, major Defense acquisition programs; IA, major automated information systems; II, major systems; and III, all other acquisition programs. Acquisition Category I programs have two subcategories: ID and IC. Acquisition IA programs also have two subcategories: IAM and IAC.

Availability. Availability is a measure of the degree to which an item is in an operable state and can be committed at the start of a mission when the mission is called for at an unknown (random) point in time.

Compatibility. Compatibility is the capability of two or more items or components of equipment or material to exist or function in the same system or environment without mutual interference.

Critical Operational Issue. A critical operational issue is an issue of operational effectiveness or operational suitability (not parameters, objectives, or thresholds), or both, that must be examined in operational test and evaluation to determine the system's capability to perform its mission. A critical operational issue is normally phrased as a question that must be answered to properly evaluate operational effectiveness or operational suitability.

Follow-On Operational Test and Evaluation. Follow-on operational test and evaluation is test and evaluation that is necessary during and after the production period to refine the estimates made during operational test and evaluation, to evaluate changes, and to reevaluate the system to ensure that it continues to meet operational needs and retains its effectiveness in a new environment or against a new threat.

Human Factor. A human factor is the systematic application of relevant information about human abilities, characteristics, behavior, motivation, and performance. It includes principles and applications in the areas of human engineering, personnel selection, training, life support, job performance aids, and human performance evaluation.

Initial Operational Capability. Initial operational capability is the first attainment of the capability to effectively employ a weapon, item of equipment, or system of approved specific characteristics with the appropriate number, type, and mix of trained and equipped personnel necessary to operate, maintain, and support the system. Initial operational capability is normally defined in the operational requirements document.

Initial Operational Test and Evaluation. Initial operational test and evaluation is an operational test and evaluation conducted on production, or production

representative articles, to determine whether systems are operationally effective and suitable, and which supports the decision to proceed beyond LRIP.

Interoperability. Interoperability is the ability of systems, units, or forces to provide services to or accept services from other systems, units, or forces and to use the services so exchanged to operate effectively together.

Key Performance Parameters. Key performance parameters are capabilities or characteristics so significant that failure to meet the threshold or minimum acceptable value can be cause for the concept or system selected to be reevaluated or the program to be reassessed or terminated.

Limited User Test. A limited user test is any type of research, development, test and evaluation funded user test conducted that does not address all of the effectiveness, suitability, and survivability issues and is therefore limited in comparison to an initial operational test that must address all effectiveness, suitability, and survivability issues.

Logistics Supportability. Logistics supportability is the degree of ease to which system design characteristics and planned logistics resources (including the logistics support elements) allow for meeting system availability and wartime usage requirements.

Low-Rate Initial Production. Low-rate initial production (LRIP) establishes an initial production base for the system, permits an orderly production-rate increase sufficient to lead to a smooth transition to full-rate production, and provides production representative articles for initial operational test and evaluation and full-up live fire testing. This work effort concludes with a full-rate production decision review to authorize full-rate production and deployment.

Maintainability. Maintainability is the ability of an item to be retained in, or restored to, a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair.

Major System. A major system is a combination of elements that function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. A system will be considered a major system if it is estimated by the DoD Component Head to require an eventual total expenditure for research, development, test, and evaluation of more than $140 million in FY 2000 constant dollars, or for procurement of more than $660 million in FY 2000 constant dollars, or is designated as major by the DoD Component Head. Major systems are synonymous with Acquisition Category II programs.

Operational Effectiveness. Operational effectiveness is the overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected, such as natural, electronic, or threat, for operational employment of the system considering organization; doctrine; tactics;

survivability; vulnerability; and threat, including countermeasures, initial nuclear weapons effects, nuclear, biological, and chemical contamination threats.

Operational Requirements Document. An operational requirements document (ORD) is a formatted statement, prepared by the user or user's representative, containing performance and related operational performance parameters for the proposed concept or system.

Operational Suitability. Operational suitability is the degree to which a system can be placed satisfactorily in field use with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistic supportability, natural environmental effects and impacts, documentation, and training requirements.

Program. A program is an acquisition effort funded by research, development, test and evaluation or procurement appropriations, or both, with the express objective of providing a new or improved capability in response to a stated mission need or deficiency.

Program Management Directive. The program management directive is an Air Force document, required for all Air Force acquisition programs, that directs acquisition responsibilities to the appropriate Air Force major commands, agencies, program executive offices, or designated acquisition commander.

Reliability. Reliability is the ability of a system and its parts to perform its mission without failure, degradation, or demand on the support system.

Safety. Safety is the freedom from conditions that can cause death, injury, occupational illness, damage/loss of equipment or property, or damage to the environment.

Test and Evaluation Master Plan. The test and evaluation master plan (TEMP) documents the overall structure and objectives of the test and evaluation program. It provides a framework within which to generate detailed test and evaluation plans and it documents schedule and resource implications associated with the test and evaluation program. The TEMP identifies the necessary developmental test and evaluation, operational test and evaluation, and live fire test and evaluation activities. Further, the TEMP relates program schedule, test management strategy and structure, and required resources to critical operational issues; critical technical parameters; objectives and thresholds documented in the ORD; evaluation criteria; and milestone decision points.

Third-Party Targeting. According to DOT&E representatives, third-party targeting allows a DoD asset other than the asset dropping the bomb (a third party) to control the coordinates for the target. Third-party targeting allows targeting while the aircraft is in the middle of its operations, unlike preplanned targeting, which requires setting the targeting coordinates before the mission. Third-party targeting provides for shorter update and quicker ability to change the target.

Waiver. According to DOT&E, a waiver is a deferral of an operational testing requirement and does not eliminate the requirement for subsequent testing.

Appendix C. Test and Evaluation Policy

Deputy Secretary of Defense Memorandum, "Defense Acquisition," October 30, 2002; Army Regulation 73-1, "Test and Evaluation Policy," January 7, 2002; Army Pamphlet 73-2, "Test and Evaluation Master Plan Procedures and Guidelines," October 11, 1996, Secretary of the Navy Instruction 5000.2B, "Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," December 6, 1996; Air Force Instruction 99-102, "Operational Test and Evaluation," July 1, 1998; Air Force Operational Test and Evaluation Center Instruction 99-102, "Operational Test and Evaluation," January 20, 2000; and Air Force Manual 63-119, "Certification of System Readiness for Dedicated Operational Test and Evaluation," February 22, 1995, provide policy concerning operational testing and critical operational issues for acquisition programs.

DoD Policy. On October 30, 2002, the Deputy Secretary of Defense issued a memorandum, "Defense Acquisition," that canceled DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," April 5, 2002, and replaced it with interim guidance in the form of attachments to the memorandum. The interim guidance requires Military Departments to complete operational testing and evaluation before the system can proceed beyond the LRIP decision. Operational testing and evaluation is to determine the operational effectiveness and suitability of a system; determine whether the thresholds and objectives in the approved operational requirements document and the critical operational issues have been satisfied; and assess the effects of demonstrated system performance on combat operations. In addition, the independent operational test agencies are required to use production or production-representative articles for the dedicated phase of operational test and evaluation that support the full-rate production decision. The interim guidance also states that all developmental test and evaluation will identify technical capabilities and limitations. In addition to identifying test limitations, the developing agency must formally certify the system as ready for the dedicated phase of operational test and evaluation.

Further, the interim guidance states that major Defense acquisition programs may not proceed beyond LRIP without approval by the milestone decision authority. The decision to continue beyond LRIP to full-rate production requires completion of initial operational test and evaluation and the submission of the beyond LRIP and live-fire test and evaluation reports, as applicable, to Congress, the Secretary of Defense, and the Under Secretary of Defense for Acquisition, Technology, and Logistics.

The DOT&E issued guidance on August 3, 2001, that directed Military Department testers not to issue waivers or deferrals that would prevent a complete

evaluation of operational requirements. The DOT&E guidance also states that test requirements that have been waived should be considered failed unless the ORD requirement is changed.

Army Policy. Army Regulation 73-1 defines critical operational issues and criteria as the operational effectiveness, suitability, and survivability concerns that must be examined in operational test and evaluation to determine the degree to which the system is capable of performing its mission. COIs are the key decision maker operational concerns or issues with standards of performance that must be answered by the system evaluation to determine if the system is ready to enter full-rate production. Further, COIs are associated with scope, criteria, and rationale. A breach of a criterion is reason for the milestone decision authority to delay entry of the system into full-rate production unless other evidence of acceptable system operational effectiveness and suitability is provided. Further, the Regulation states that testing specified in the approved TEMP must be conducted unless the program manager or other appropriate official submits a written request for waiver and the TEMP approval authority approves the waiver request.

The Regulation also states that the approval of testing waivers will depend on the availability and acceptability of relevant data and information and will not negate the requirement for independent system evaluation. For those tests for which waivers were granted for reasons other than availability of data, the program manager is to expand production testing or follow-on operational testing to address those operational requirements not previously tested.

The Regulation further states that testing may be delayed when circumstances warrant. Test delays can be issued at the start of testing to address evaluation issues when the tester identifies a problem that would affect the completeness of the data being collected. Further, the Regulation states that tests will be delayed when it is apparent that the system has little chance of successfully attaining critical technical parameters, satisfying critical operational criteria, or resolving deficiencies before the start of test.

Army Pamphlet 73-2 requires the approved TEMP to state the test limitations that may affect the resolution of critical operational issues; the impact of those limitations, such as the effects on COIs; and the ability to formulate conclusions regarding operational effectiveness and operational suitability.

Navy Policy. Secretary of the Navy Instruction 5000.2B states that operational test and evaluation is subdivided into initial operational test and evaluation and follow-on operational test and evaluation. Initial operational test and evaluation is all operational test and evaluation up to and including the completion of operational evaluation. For each program, the COMOPTEVFOR is to develop critical operational issues and publish them in the TEMP. The critical operational issues are to be linked to the Chief of Naval Operations requirements established in the operational requirements document. For programs requiring joint interoperability, joint interoperability critical operational issues must be established to address effectiveness during operational testing. Further, the Instruction provides guidance for processing waivers to defer testing of the operational requirements.

Navy waivers consist of waivers from compliance with the criteria for certification of readiness for operational test and evaluation and waivers for deviations from TEMP testing requirements. The program manager requests a test waiver in an operational test and evaluation certification message. If a waiver request is anticipated, the program manager is to coordinate the waiver with the program sponsor; the Test and Evaluation Division, Office of the Director of Navy Test and Evaluation and Technology Requirements; and the COMOPTEVFOR before an operational test and readiness review. The Director, Navy Test and Evaluation and Technology Requirements approves waiver requests, as appropriate, in coordination with the COMOPTEVFOR; the Deputy Chief of Naval Operations (Logistics); the Deputy Chief of Naval Operations (Resources, Warfare Requirements, and Assessments); and the program sponsor.

The Navy Instruction further states that approval of a test waiver request does not alter the test requirement. The program manager is still required to test the waived requirement in subsequent operational testing. A waiver may result in limitations to the scope of testing that preclude the COMOPTEVFOR from fully resolving all COIs. The Office of the COMOPTEVFOR is not to assess waived requirements in its analysis to resolve COIs, but may comment on the waived requirements in the applicable test report.

Air Force Policy. Air Force Instruction 99-102 requires initial operational test and evaluation to determine the operational effectiveness and suitability of systems undergoing research and development efforts. Initial operational test and evaluation supports decisions of the milestone decision authorities to authorize low-rate initial production and full-rate production, and declaration of initial operational capability. Further, the Instruction requires a dedicated phase of initial operational test and evaluation for Acquisition Category I and II programs, and is strongly recommended for all others. The Instruction also requires the initial operational test and evaluation to completely and unambiguously answer all critical operational issues as thoroughly as possible, and not defer testing into follow-on operational test and evaluation unless unavoidable. Additionally, the Instruction requires that all approved operational test and evaluation waivers be documented in the TEMP.

To waive or modify fundamental provisions in operational test and evaluation plans, the Instruction requires the system program manager to prepare a request. With the user and developer concurrence, the system program manager is to submit the request through the Air Force Operational Test and Evaluation Center to the Air Force Test and Evaluation Directorate. The system program manager and the system's program element monitor are to document any approved operational test and evaluation waivers in the TEMP and the program management directive, respectively.

Air Force Manual 63-119 requires a waived requirement to be tested in subsequent operational test and evaluations or the user must change the ORD requirement. Before initial operational test and evaluation, the system program manager is to list any required waivers or areas excluded from the test and evaluation, the rationale, and future plans to clear the waivers, and provide a summary of the list to the operational tester. In response, the operational tester is

to indicate whether to proceed with the test and is to discuss the effects of test limitations and test waivers on resolving operational test issues in the test report.

Air Force Instruction 99-102 states that the final operational test and evaluation report must contain descriptions of test methods and limitations, definitive test results, and system capabilities and limitations as measured against the ORD.

Appendix D. Description of Major Defense Systems Reviewed

Department of the Army

Javelin. The Javelin, an Acquisition Category IC program, is a man-portable, fire-and-forget, medium anti-tank missile employed by dismounted troops to defeat current and future threat armored combat vehicles out to 2,500 meters. The Javelin attacks most targets from the top to defeat explosive reactive armor; it also has the capability, in the direct fire mode, to attack targets under cover or those that would be unreachable by top attack. The Javelin consists of a missile in a disposable launch tube and a reusable Command Launch Unit, with a trigger mechanism and day/night sighting device for surveillance, target acquisition, and built-in-test capabilities. The missile locks onto the target before launch using an infrared focal plane array and on-board processing, which also tracks the target and guides the missile to the target after launch. A full-up system weighs less than 50 pounds.

The Javelin includes a training system consisting of three devices: the Missile Simulation Round, the Basic Skills Trainer, and the Field Tactical Trainer. The Missile Simulation Round is a form, fit, and weight, but not functional, representation of the missile in its launch tube and is used to familiarize the gunner with the physical characteristics of the Javelin. The Basic Skills Trainer is used in classrooms to develop the basic tactical and technical gunnery skills to operate the Javelin. The Field Tactical Trainer refines the gunner's abilities and enables the gunner to participate in range training and force-on-force exercises.

Patriot Advanced Capability-3. The Patriot, an Acquisition Category ID program, is an air-defense that uses guided missiles to engage and destroy air-breathing targets and tactical ballistic missiles. The Patriot Advanced Capability-3 is the latest version. The latest version will include a multi-function radar, an engagement control station, and communications relay groups for communicating with remote launchers and the battalion headquarters.

Tactical Unmanned Aerial Vehicle. The Tactical Unmanned Aerial Vehicle system, an Acquisition Category II program, will provide the ground maneuver brigade commander with a day and night reconnaissance, surveillance, target acquisition, and battle damage assessment system. The Tactical Unmanned Aerial Vehicle provides the commander with enhanced situational awareness, a target acquisition capability, the ability to conduct battle damage assessment, and enhanced battle management capabilities. Those capabilities will provide the commander with dominant situational awareness and allow him to maneuver to points of positional advantage with speed and precision to conduct decisive operations. The Tactical Unmanned Aerial Vehicle, in conjunction with other systems, will provide the tactical commander with information superiority contributing to the full-dimensional protection of his force and precision engagement of the enemy.

Department of the Navy

Cooperative Engagement Capability. The Cooperative Engagement Capability, an Acquisition Category ID program, is a system of hardware and software that allows the sharing of radar data on air targets among ships. Radar data from individual ships of a Battle Group is transmitted to other ships in the group through a line of sight data distribution system. Each ship uses identical data processing algorithms resident in its Cooperative Engagement Processor, resulting in each ship having essentially the same display of track information on aircraft and missiles. Accordingly, an individual ship can launch an anti-air missile at a threat aircraft or anti-ship cruise missile within its engagement envelope, based on radar data relayed to it by another ship.

F/A-18E/F Super Hornet. The FA-18E/F Super Hornet, an Acquisition Category IC program, is a multi-mission, day/night strike fighter aircraft designed to add to the capability and tactical flexibility of the Carrier Air Wing through improvements in the FA-18C/D's range, endurance, and carrier bring-back payload and weapons payload. The FA-18E/F features a larger airframe with more fuel capacity, two additional store stations and increased survivability with additional capacity for capability upgrades and growth. This aircraft will also serve as an airborne tanker, further improving Battle Group flexibility and mobility.

Joint Stand-Off Weapon. The Joint Stand-Off Weapon, an Acquisition Category ID program, is a family of efficient 1,000-pound class, air-to-surface glide weapons that provide for low observability, multiple kills per pass, preplanned missions, standoff precision engagement, and launch and leave capability against a wide range of targets during day/night, all weather conditions. The system is employed as a force multiplier in a joint warfare environment for interdiction of fixed, relocatable and mobile, light and heavy armored targets, massed mobile armored targets, anti-personnel, and air-to-surface threats. The system primarily functions in a preplanned mission mode where the system can store up to eight targets; however, the system is to allow pilot manual inputs as well as third-party targeting. The weapon will be land and carrier based.

V-22 Osprey. The V-22 Osprey, an Acquisition Category ID program, is a tilt-rotor, vertical take-off and landing, multi-mission aircraft developed to fill multi-Service combat operational requirements. The MV-22 will replace the Marine Corps assault helicopters in the medium lift category (CH-46E and CH-53D), contributing to the dominant maneuver of the Marine landing force, as well as supporting focused logistics in the days following commencement of an amphibious operation. The Air Force requires the CV-22 to provide a long-range vertical take-off and landing insertion and extraction capability and to supplement the Special Operations Forces MC-130 aircraft in precision engagement. The tilt-rotor design combines the vertical flight capabilities of a helicopter with the speed and range of a turboprop airplane and permits aerial refueling and worldwide self-deployment.

Department of the Air Force

F-15 Tactical Electronic Warfare System. The F-15 Tactical Electronic Warfare System Band 1.5 is an Acquisition Category III program. The acquisition program contributes to full-dimensional protection by improving individual F-15 aircraft probability of survival through improved air crew situation awareness of the radar-guided threat environment, cueing both active and passive countermeasures in the Band 1.5 frequency spectrum, and adding a feature for jamming optimization against specific threats. The Tactical Electronic Warfare System provides electronic detection and identification of surface and airborne threats. In addition, it allows for activation of appropriate countermeasures, including electronic jamming and dispensing of expendables such as chaff and flares.

Fighter Data Link. The Fighter Data Link, an Acquisition Category ID program, provides Link 16 data link networking with other Link 16 capable fighter aircraft, command, and control systems to support synchronized operations. Link 16 is a data link with a common message standard and robust jam-resistant communications waveform providing Joint and Multinational interoperability to enable forces to operate effectively together.

Joint Direct Attack Munition. The Joint Direct Attack Munition, an Acquisition Category ID program, is a low cost, autonomously controlled guidance kit for the Air Force and Navy 2,000-pound general-purpose bombs and the 1,000-pound bomb. The Air Force inventory of bombs will be configured with Joint Direct Attack Munition guidance kits and accessories. Actual weapon launch occurs when the aircrew has flown the aircraft into the weapon launch acceptability region. The launch acceptability region is the three-dimensional area in space in which the weapon may be released to fly directly to a selected target on a pre-determined bearing. The Joint Direct Attack Munition is designed to be employed by a variety of fighter/attack and bomber aircraft, allowing precision engagement from all altitudes under adverse environmental conditions.

Predator Unmanned Aerial Vehicle. The Predator Unmanned Aerial Vehicle System, an Acquisition Category II program, is a theater asset that is to provide cued and non-cued reconnaissance, surveillance, and targeting capability. The Predator system comprises both air and ground segments. The Predator began as an advanced concept technology demonstration program that transitioned to an Acquisition Category II program.

Appendix E. Critical Operational Issues not Resolved Because of Approved Test Waivers or Test Limitations

This appendix shows operational effectiveness or operational suitability categories and the associated critical operational issues that could not be resolved during operational testing before system full-rate production decisions because of waivers and other test deferrals for the eight DoD weapon systems affected by waivers.

Department of the Army

Javelin

Operational Suitability Issues

Critical Operational Issue (Reliability). Is the Javelin operationally suitable when employing existing doctrine: manpower and personnel integration, reliability, availability, and maintainability, and logistic supportability concepts? The Javelin entered initial operational test and evaluation with limitations associated with reliability. Engineering and manufacturing development testers estimated that the field tactical trainer (range) would achieve 25 hours, rather than the 100 hours required. The system completed initial operational test and evaluation in December 1993, the results of which indicated that the system had unresolved operational suitability issues related to the reliability parameters prescribed for system maturity; specifically, the training devices were unreliable. According to the Deputy Under Secretary of the Army (Operations Research), the U.S. Army Infantry reevaluated the requirements in 1994 and reduced the 100-hour requirement to 50 hours that should be attained at the time of system maturity, 3 years after the full-rate production decision. The Deputy also stated that the requirement for the full-rate production decision was 32 hours as shown in the System Evaluation Report, March 27, 1997. The Army operational testers resolved the operational suitability issues after the full-rate production decision.

Patriot Advanced Capabilities (PAC-3) Program Office

Operational Effectiveness Issues

Critical Operational Issue. Does the Patriot Advanced Capability-3 enhance the effectiveness of the Patriot system? The testers were not able to resolve the operational effectiveness COI because the Army deferred test requirements:

- for the missile to effectively destroy a target and counteract countermeasures,
- for the ground system to distinguish between targets, and

- for the system to operate in all required environments.

In consideration of performance problems identified during limited user testing, the Program Manager obtained the approval of the Joint Requirements Oversight Council to defer those test requirements as part of an evolutionary development program after the planned full-rate production decision. As a consequence, the Army Test and Evaluation Command determined in the limited user tests conducted before the LRIP decision that the Patriot Advanced Capability-3 had limited operational effectiveness. Because the Joint Requirements Oversight Council deferred those test requirements, the operational effectiveness COI will not be fully resolved before the program proceeds beyond LRIP. To resolve the deferred test requirements, the Program Office stated that the Army increased funding for system development by approximately $90 million to demonstrate those ORD requirements. During initial operational test and evaluation conducted in 2002, the Army Test and Evaluation Command and the Director, Operational Test and Evaluation, determined that the Patriot Advanced Capability-3 was operationally effective with limitations.

Operational Suitability Issues

Critical Operational Issue. Can the PAC-3 be sustained in an operational environment? During initial operational test and evaluation conducted in 2002, the Army Test and Evaluation Command and DOT&E, determined that the Patriot Advanced Capability-3 was operationally suitable with limitations, including reliability and availability.

Reliability – Limited user test revealed a number of PAC-3 system reliability problems. The communications relay group mean time between critical mission failure rate was seven times greater than allocated, and the engagement control station mean time between critical mission failure rate was twice as large as allocated. The routing logic radio interface units problems were the primary reasons that the fire unit mean time between critical mission failure rate was 1.7 times greater than the requirement. The routing logic radio interface units and data link terminals were major contributors to poor system reliability. The "System Evaluation Report of the Patriot Advanced Capability-3 Initial Operational Test and Evaluation," indicated improvements for those issues, however, the overall fire unit mean time between critical mission failure of 19.8 hours was less than threshold requirement of 21 hours.

Availability - Specifics concerning limitations to availability are classified and are not detailed in this report.

Tactical Unmanned Aerial Vehicle Program Office

The Tactical Unmanned Aerial Vehicle is a commercial off-the-shelf program that did not undergo developmental testing. The Project Office certified the system as ready for operational testing, given the following limitations.

Operational Effectiveness Issues

Critical Operational Issues. The Tactical Unmanned Aerial Vehicle limitations to testing included two COIs concerning operational effectiveness.

- Does the Tactical Unmanned Aerial Vehicle system provide the commander timely and accurate reconnaissance, surveillance, and target acquisition information?

- Does the Tactical Unmanned Aerial Vehicle system provide adequate coverage of the ground maneuver brigade commander's area of interest?

The Tactical Unmanned Aerial Vehicle program entered initial operational test and evaluation with known limitations affecting the resolution of the operational effectiveness COIs. For example, the ground control station was not compatible with the tactical control system architecture because the tactical control system was still in development. As a result, Army testers were not able to determine whether interoperability characteristics of the vehicle met the ORD requirements. The program manager and the users listed the test limitations in memorandums to the Army testers instead of requesting waivers to testing the ORD requirement. The Army plans to conduct the deferred test requirements during future operational test and evaluation.

Operational Suitability Issues

Critical Operational Issue (Logistics Supportability). Does the Tactical Unmanned Aerial Vehicle system meet the ground maneuver brigade commander's sustained combat requirements? The Tactical Unmanned Aerial Vehicle Program Office deferred planned operational tests that affected the resolution of the COI requiring the system to meet the ground maneuver brigade commander's sustained combat requirements. Specifically, the Tactical Unmanned Aerial Vehicle Program Manager in a memorandum, "Initial Tactical Unmanned Aerial Vehicle System Limitations for Initial Operational Test and Evaluation (IOTE)," undated, limited the test and evaluation because testers could not verify the supportability of the system when using heavy fuel. The ORD objective requires the system to use only heavy fuel; however, the system available for testing used motor gasoline, which meets the operational requirement threshold, the minimal acceptable value necessary to satisfy the need.

According to DOT&E, even though the system used motor gasoline, the system met the fuel requirement by meeting the threshold; however, the Army is addressing supportability issues about being able to support a motor gasoline after 2005. After the planned full-rate production decision, the Army will conduct a follow-on operational test and evaluation to test for the heavy fuel requirement.

Department of the Navy

F/A-18E/F Super Hornet

Operational Effectiveness Issues

Critical Operational Issues. The F/A-18E/F Super Hornet waivers included five COIs concerning operational effectiveness.

- **Airborne Tanker Platform.** Will the F/A-18E/F function adequately as an airborne tanker platform?
- **Air-To-Ground Sensors.** Will the F/A-18E/F air-to-ground sensors be effective in all mission areas including navigation, target detection, target acquisition, target identification, target designation, target track, and target surveillance against the current and projected threat in its intended operating environment?
- **Air-To-Ground Weapons.** Will the F/A-18E/F effectively employ and support the full capability of all air-to-ground weapons it is intended to carry against the current and projected threat in its intended operating environment?
- **Air-To-Air Sensors.** Will the F/A-18E/F effectively employ and support the full capability of all air-to-air weapons it is intended to carry against the current and projected threat aircraft in its intended operating environment?
- **Mobility.** Will the F/A-18E/F demonstrate adequate mobility to conduct wartime operations from ashore or from an aircraft carrier?

In consideration of performance problems identified during developmental testing, the program manager requested the following operational test waivers:

- Lack of provisions for tanker lighting recognition.[4]
- Excessive time to rebuild and expand mode image after aim-point redesignation.
- Inadequate targeting, forward-looking, infrared resolution and magnification.
- Targeting, forward-looking, infrared loss of autotrack and scene track during maneuvering.

[4]Resolved after the full-rate production decision.

- Insufficient air-to-ground radar, expand mode resolution.
- Inadequate targeting, forward-looking, infrared autotrack range.
- Scaling of radar presentation in "expand 2/3" does not permit precise target designation.
- No laser blanking to outboard weapons stations.
- Insufficient duration of AIM-9 cooling capacity.[4]
- Unsatisfactory automatic carrier-landing system.[4]

*

Operational Suitability Issues

Critical Operational Issue (Reliability). Will the reliability of the F/A-18E/F support completion of the aircraft's mission? Based on reliability performance problems identified during developmental tests, the Program Executive Officer for Tactical Aircraft requested the following operational test waivers:

- Unacceptable reliability of the fuel and air heat exchanger leak detection system.[2]
- Premature failure of the environmental bellows due to misalignment during door installation.
- ALE-50 system requires preflight power-up with weight-on-wheels.[4]
- Inadequate secondary power system engine start fault isolation.[2]
- AIM-9M sidewinder captive air training missile roller on assembly in-flight failures.
- Uncommanded map display format changes in one cockpit based on map displays selected in other cockpit.
- Undesirable inter-cockpit display format coupling.

[4]Resolved after the full-rate production decision.

[*]Deliberative process privilege data omitted.

- Axle vertical loads encountered during catapult testing exceed F/A-18E/F nose landing gear tire and wheel loads qualification limits.[4]
- Inadequate reliability of the hydraulic drive unit.[2]
- Delamination within composite surface layers of the horizontal stabilator.
- Engine stalls in maximum afterburner power while aircraft is positioned in front of the jet blast deflector.[4]
- Engine stalls during catapult stroke.[4]
- Engine stator vane retainer rail failures.[4]
- Unacceptable high failure rate of fuel cells.[4]
- Poor reliability characteristics of the fuel/no air valve.[4]
- High failure rate of the wing fuel cell channel injection plugs.[4]
- AIM-7 forward lug failure in flight on station two.[4]
- Pylon loads exceed design limit during maneuvering flight.[4]
- Failure of memory unit data to automatically download.[4]
- In-flight failure of LAU-127A/A while carrying captive air training missile.[4]
- Failure of the nose landing gear door forward hinge.
- Failure of the main landing gear outboard door forward hinge.[4]
- Broken fin retainer springs on the LAU-127A/A launcher.
- Damage and loss of AAR-50 forward looking, infrared coolant access door during flight.
- Receiver saturation in engagements within-band forward quarter.

Critical Operational Issue (Maintainability). Will the F/A-18E/F be maintainable by fleet personnel? Based on maintainability problems identified during developmental tests, the Program Executive Officer for Tactical Aircraft requested the following operational test waivers:

[4]Resolved after the full-rate production decision.

- Configuration of the hydraulic bay 53 L/R does not provide sufficient accessibility to hydraulic tube assemblies, which inhibits proper torquing.[4]

- Inadequate limits for engine high pressure compressor bladed disk repair.

- Wing tip LAU-127A/A damage caused during downloading of AIM-9 stores after flight.[4]

- Inadequate environmental control system diagnostic capability.[4]

- Excessive inspection requirements for AIM-120C on stations 2 and 10.[4]

- LAU-127A/A loose screws.

- Inadequate procedures for repeatable release holdback bar release load calibration.[4]

Critical Operational Issue (Compatibility). Will the F/A-18E/F be compatible with its operating environment? Based on compatibility problems identified during developmental testing, the Program Executive Officer for Tactical Aircraft requested the following operational test waivers:

- Poor F/A-18F intercommunication system mechanization.[4]

- No provision for reception on one radio while transmitting on the other.[4]

- No provision for concurrent transmission (pilot and weapon system operator).[4]

- ALR-67 V(3) is incompatible with the tactical aircrew combat training system.[4]

Critical Operational Issue (Safety). Will the F/A-18E/F be safe to operate and maintain? Based on safety problems identified during developmental tests, the Program Executive Officer for Tactical Aircraft requested the following operational test waivers:

- Potential for personnel injury due to location of hydraulic fluid level indicator.

- Erroneous velocity vector performance without aid from the global positioning system.

- Inadequate attitude reference indication during night carrier vessel approach.[4]

[4]Resolved after the full-rate production decision.

Critical Operational Issue (Human Factors). Will the human factors aspects of the F/A-18E/F support completion of the aircraft's mission? The Program Executive Officer for Tactical Aircraft requested and the Director of Navy Test and Evaluation and Technology Requirements approved a test waiver for the ALR-67 power switch on the center pedestal because it was not within reach of the pilot while he was strapped in the seat.

*

V-22 Osprey

Operational Effectiveness Issues

Critical Operational Issue (Assault Support). Will the V-22 demonstrate the operational performance necessary to effectively execute assault support operations in its intended environment? Because of deficiencies identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved the following operational test waivers:

- Inadequate cargo handling system.
- Avionics navigation system does not provide data other than World Geodetic System.
- Exterior lighting for formation flight is inadequate.
- External load interferes with radar altimeter.
- Lower cabin door operation during hover operations.
- Unable to fastrope out of cabin door.

Further, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for maximum short take off (shipboard) 48,500 pounds, rather than mission profile specific weight because the capability

[4]Resolved after the full-rate production decision.

[*]Deliberative process privilege data omitted.

had not been tested developmentally before operational evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

The Director of Navy Test and Evaluation and Technology Requirements also approved an operational test waiver for the defensive weapon system because the system was still under development and had not been fielded before the operational test and evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

Critical Operational Issue (Self-Deployment). Will the V-22 demonstrate the operational performance necessary to effectively self-deploy in its intended operating environment? Because of performance problems identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved the following operational test waivers:

- Aircraft was not cleared to refuel from a KC-135 tanker.
- Aircraft was not cleared for aerial refueling.

In addition, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for crashworthy auxiliary fuel tanks because the system was still under development and had not been fielded before the operational test and evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

Critical Operational Issue (Survivability). Will the susceptibility and vulnerability characteristics of the V-22 allow the successful completion of its mission in its intended operating environment? Because of performance problems identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved the following operational test waivers.

- AN/APR-39A(V)2 degraded Band 2 analysis of alternatives.
- Defensive weapon system not available for test.

Further, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for the Aircraft being cleared for air combat maneuveringbecause the capability had not been tested developmentally before operational evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

In addition, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for crashworthy auxiliary fuel tanks because the system was still under development and had not been fielded before the operational test and evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

*

Operational Suitability Issues

Critical Operational Issue (Reliability, Availability, and Maintainability). Will the V-22 be reliable in its intended operating environment? Will the availability of the V-22 support its mission? Will the V-22 be maintainable in its intended operating environment? Because of performance problems identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver of the V-22 mean time between failure and false alarm rate technical thresholds.

Critical Operational Issue (Compatibility). Will the V-22 be compatible with its operating environment? Because of performance problems identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved the following operational test waivers.

- Inadequate cockpit/cabin nuclear biological and chemical overpressure protection.
- Unable to align Light Weight Inertial Navigation System without Global Positioning System signal.

In addition, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for the aircraft to operate in icing conditions because the system was still under development and had not been fielded before the operational test and evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

Critical Operational Issue (Safety). Will the V-22 be safe to operate and maintain? Because of performance problems identified during developmental testing, the Director of Navy Test and Evaluation and Technology Requirements approved the following operational test waivers.

- Excessive force required to disconnect the intercommunication system.
- Pilot and copilot seats incorporate nonqualified inertial reels.
- Autorotative descent cannot be maintained while attempting engine air start.

In addition, the Director of Navy Test and Evaluation and Technology Requirements approved an operational test waiver for the ground collision avoidance and warning system because the system was still under development

*Deliberative process privilege data omitted.

and had not been fielded before the operational test and evaluation, according to the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation).

*

Department of the Air Force

F-15 Tactical Electronic Warfare System

Operational Suitability Issues

Critical Operational Issue (Reliability and Availability). Does the operational readiness of the Band 1.5 system support F-15E mission requirements? The Air Force will depend on the capability of the built-in-test of the F-15 Tactical Electronic Warfare System (the System) to identify faults and take corrective action in a timely manner. The May 2000 TEMP did not show any test limitations associated with the built-in-test; however, it did show that the System had an open deficiency for an excessive built-in-test false alarm rate. Although the deficiency existed, the Air Force conducted initial operational test and evaluation in FY 2000 and determined that the built-in-test false alarm rate was 65 percent, compared to the required built-in-test false alarm rate of less than 20 percent. The excessive false alarm rate caused numerous unwarranted maintenance actions and distracted the air crew's attention from primary mission functions. Even with the excessive false alarm rate, the Air Force approved the system for production because the System provided a greater capability, according to DOT&E representatives. In addition, DOT&E approved the TEMP and operational test and evaluation plan for the Band 1.5 system, both of which addressed the false alarm rate and required future testing, according to Air Force Test and Evaluation Directorate representatives. The representatives also stated that the Air Force submitted plans to DOT&E to correct the false alarm rate problems in the next increment, Band 5.0.

Fighter Data Link

Operational Suitability Issues

Critical Operational Issue (Reliability). Is the Fighter Data Link terminal suitable when integrated in an F-15? The operational test report included a test limitation related to the built-in-test functionality. During initial operational test and evaluation, inadequate flight hours were available to evaluate the Fighter Data Link built-in-test and logistics supportability. Accordingly, Air Force operational

*Deliberative process privilege data omitted.

testers did not fully test mean time between critical failures, the integrated diagnostics, and logistics support. As a result, Air Force operational testers were not able to resolve whether the Fighter Data Link terminal was suitable when integrated into the F-15. Consequently, Air Force testers deferred further evaluation of built-in-test functionality until follow-on operational test and evaluation. According to DOT&E, during follow-on operational test and evaluation, the Fighter Data Link was able to demonstrate 963 hours even though the ORD requires 1,000 hours.

Predator Unmanned Aerial Vehicle

Operational Effectiveness Issues

Critical Operational Issue (Mission Utility). Can the Predator system perform reconnaissance, surveillance, and target acquisition tasks to support battle management, execution, and operations other than war? Although the Predator System Program Office certified that the Predator was ready to enter operational testing, it identified operational effectiveness limitations related to the system's ability to recognize tactical-sized targets that were identified during informal developmental testing. Based on operational testing conducted before the full-rate production decision, DOT&E stated that the Predator was not operationally effective, which included the inability to recognize tactical-sized targets

Operational Suitability Issues

Critical Operational Issue (Reliability). Does the Predator system meet the warfighter's sustained combat requirements? The System Program Office certified the Predator as ready to enter operational test and evaluation with test limitations concerning the aircraft's effective time on station that were identified during informal developmental testing. One limitation was the use of pre-production wing sets instead of production units during operational testing to determine the aircraft's effective time on station. The ORD requirement for effective time on station was 75 percent, but the actual effective time on station recorded during testing was about 70 percent. Correcting for the use of pre-production wing sets, the Air Force Operational Test and Evaluation Center stated that it was 68 percent confident that the system would meet the ORD requirement. However, the Air Force Operational Test and Evaluation Center stated that, under sustained operations, it was highly probable that air vehicle failures would have a negative effect on the aircraft's effective time on station.

Critical Operational Issue (Interoperability). Can the Predator system successfully accomplish the mission planning, launch and recovery, in-flight operations, and interoperability with other command, control, communication, and computers and intelligence systems necessary to perform its missions? The System Program Office exempted planned operational tests of interoperability data links and file formats because the Joint Interoperability Test Command had not certified the system for interoperability, thereby affecting the resolution of the COI. Accordingly, the System Program Office certified that the Predator Unmanned Aerial Vehicle was ready for operational testing with a stipulation that, if the Joint Interoperability Test Command did not certify the system for

interoperability during initial operational test and evaluation, the System Program Office would complete the certification process after the completion of operational testing. According to DOT&E FY 2001 Annual Report, the Joint Interoperability Test Command had not yet certified the Predator for interoperability because of the untested critical requirements. Further, the Joint Interoperability Test Command had certified only three of the seven critical system interfaces because the remaining interfaces were not available for evaluation. The System Program Office deferred further interoperability testing of the Predator until the Military Departments field ground stations that are equipped with tactical control stations.

Appendix F. Audit Response to the Director, Operational Test and Evaluation Comments on the Report

The detailed responses to the comments from the Director, Operational Test and Evaluation on statements in the draft report follow. The DOT&E commented on limiting the use of waivers, live-fire test and evaluation, and the Fighter Data Link. The complete text of those comments is in the Management Comments section of this report.

Limiting the Use of Waivers. The Director stated that his office seeks to limit the issuance of waivers and eliminate their interference with evaluations of operational effectiveness and suitability.

Live-Fire Test and Evaluation. The Director stated that the Background section of the report states that, "…evaluation and when live-five test and evaluation…," and that it should be revised to state "…evaluation and when live-fire test and evaluation…."

Audit Response. We revised the report as suggested.

Fighter Data Link. The Director stated that, during initial operational test and evaluation, inadequate flight hours were available to evaluate the Fighter Data Link built-in-test and logistics supportability. Further, he stated that although the ORD requires 1,000 hours, during follow-on operational test and evaluation, the Fighter Data Link was able to demonstrate 963 hours.

Audit Response. We revised the report as suggested.

Appendix G. Audit Response to Army Comments on the Report

The detailed responses to the comments from the Deputy Under Secretary of the Army (Operations Research) on statements in the draft report follow. The complete text of those comments is in the Management Comments section of this report.

Management Comments on the Background and Appendix C and Audit Response

The Deputy commented on the Background section and Appendix C, "Test and Evaluation Policy," of the report.

Background. The Deputy stated that the report states that we initiated the audit to address the DOT&E concern about programs beginning operational test and evaluation without completing sufficient developmental test and evaluation. However, the Deputy further stated that we limited the scope of the audit to the test waiver and deferral process, which he believed was not sufficiently broad enough to yield findings or recommendations that could improve the robustness of developmental testing or the likelihood of conducting a successful operational test.

Audit Response. We limited the scope of the audit to the test waiver and deferral process based on concerns DOT&E expressed in his FY 2000 annual report. Specifically, the Director expressed concern about programs beginning operational testing without completing sufficient developmental test and evaluation and about the Navy's use of test waivers. The primary focus of the audit was not developmental testing or the likelihood of conducting a successful operational test because, as the Director stated, the reason that developmental testing was not robust was that program managers have reduced developmental testing to save time and money, thereby postponing the problems to operational testing. Therefore, we focused the audit on the Director's concern about the Military Departments' use of test waivers.

Appendix C. The Deputy recommended that the report mention the COI approval authority for each of the Military Departments. The Deputy rationalized that, because COIs are important to the decision makers, mentioning the approval authority would reveal how the decision makers are considering COIs and COI criteria as tester or decision maker products. He also stated that, in accordance with Army Regulation 73-1, "Test and Evaluation Policy," COI criterion approval authority is based on the type of program. For example, the approval authority for material and tactical programs with command, control, communications, computers, and intelligence and information technology requirements would be the Deputy Chief of Staff for Programs (G-8) and for nontactical programs with similar requirements, it would be the Army Chief Information Officer. Further, the Deputy stated that Army test and evaluation policy addresses a mandatory

attachment, "Requirements/Test Crosswalk Matrix," which identifies the source of each operational requirement agreed upon with the TEMP approval.

Audit Response. The primary focus of the audit was not on how the decision makers consider COIs and COI criteria for approval, but rather on the waiver of the testing for the COIs and the need for subsequent testing of those COIs to ensure that the system is operationally effective and suitable.

Management Comments on Finding A and Audit Response

The Deputy discussed operational effectiveness and operational suitability issues associated with the Javelin, the Patriot Advanced Capability-3, and the Tactical Unmanned Aerial Vehicle programs.

Javelin. For the Javelin Program, the Deputy commented on unresolved issues, the table of COIs, operational requirements, suitability issues, training category, and the description of the Javelin.

Unresolved Issues. The Deputy recommended removing the discussion about the Javelin from the report because it did not support the report's overall argument that unresolved issues caused costly retrofits of fielded units or an initial operational performance that is less than expected to defeat the threat.

Audit Response. The System Evaluation Report, March 27, 1997, states that all reliability, availability, and maintainability requirements for the full-rate production decision were met with the exception of the field tactical trainer (range) mean time between operational mission failures. Therefore, the critical operational issue for reliability was not fully resolved before the full-rate production decision, thereby resulting in initial operational performance that was less than expected and the potential for fixes that will result in retrofit costs for fielded units.

Table of COIs. The Deputy disagreed with the issue, suggesting that the table, "Critical Operational Issues Not Fully Resolved Because of Approved Test Waivers or Test Limitations for the Eight Defense Systems Affected," be changed to show that the Javelin did not have unresolved issues for reliability.

Audit Response. The Javelin did have an unresolved reliability issue when the full-rate production decision was made. Specifically, the System Evaluation Report states that the field tactical trainer (range) attained a mean time between operational mission failures of 25.9 hours that did not meet the threshold requirement of 32 hours.

Operational Requirements. The Deputy disagreed with the issue, stating that the requirement for a 100-hour mean time between operational mission failures for the field tactical trainer (range) cited in the report was a requirement written in the Joint Service Operational Requirements before the tactical and training systems had a firm hardware configuration. Further, he stated that the U.S. Army Infantry reevaluated the requirements in 1994 and reduced the 100-hour requirement to 50 hours that should be attained at the time of system

maturity, 3 years after the full-rate production decision. The Deputy also stated that the requirement for the full-rate production decision was 32 hours as shown in the System Evaluation Report, March 27, 1997. In addition, he stated that, although the 25-hour mean time between operational mission failures did not meet the 32-hour requirement, the difference between 25 hours and 32 hours was closer than between 25 hours and 100 hours and would not have caused the Army to not field the Javelin. The Deputy stated that the majority of the problems with the field tactical trainer (range) and the associated fixes were simple and effective as indicated in the Army Test and Evaluation Command assessment, "System Assessment of Javelin Reliability and Availability Maturity," December 2000.

Audit Response. Based on the Army comments, we revised the report to address the 32-hour requirement for the full-rate production decision and the 50-hour requirement for system maturity. The Army comments affirm the report statement that the attained mean time between operational mission failures for the field tactical trainer (range) did not meet the threshold requirement.

Suitability Issues. The Deputy disagreed with the issues, stating that the report incorrectly states that the Army operational testers resolved the field tactical trainer (range) suitability issues after the full-rate production decision. He did not believe that the report was correct because the Army Test and Evaluation Command conducted a limited user test from March through May 1996, which resolved those suitability issues. The Deputy stated that after the limited user test, the Army Test and Evaluation Command conducted a customer confirmatory test. Further, he stated that the program successfully completed the customer confirmatory test that demonstrated the suitability of the field tactical trainer, after which the Army System Acquisition Review Council made its full-rate production decision in July 1997.

Audit Response. When asked, the Deputy's representative was unable to provide support to validate the statement that the customer confirmatory test successfully demonstrated the suitability of the field tactical trainer (range). As stated in the report, the System Evaluation Report states that all reliability, availability, and maintainability requirements for the full-rate production decision were met with the exception of the field tactical trainer (range) mean time between operational mission failures. Therefore, the COI for reliability was not fully resolved before the full-rate production decision.

Training Category. The Deputy suggested adding the training category to the table in the report addressing COIs that were not fully resolved.

Audit Response. According to the Deputy's representative, the Deputy wanted to add the training category to the table because he believed that the field tactical trainer (range) deficiencies were training rather than reliability issues. We did not add the training category to the table because the System Evaluation Report indicates that the mean time between operational mission failures requirement for the field tactical trainer (range) was a reliability issue.

Description of the Javelin. The Deputy suggested that the description of the Javelin include the description of the field tactical trainer, the only unresolved issue with the Javelin.

Audit Response. We revised the report as suggested.

Patriot Advanced Capability-3. For the Patriot Advanced Capability-3 Program, the Deputy commented on the ORD cancellation, delays in software development and missile availability, the operational effectiveness COI, and system reliability problems.

ORD Cancellation. The Deputy stated that the Secretary of Defense retroactively canceled all ORDs for missile defense systems in January 2002 and required that the replacement ORDs be capabilities based.

Audit Response. As stated, the Secretary of Defense canceled all ORDs for missile defense programs in January 2002; however, the August 2002 TEMP for the Patriot Advanced Capability-3 indicates that the testers initiated and conducted the testing described in the TEMP based on the 1998 ORD. The TEMP further stated that all future testing on the Patriot Advanced Capability-3 would adhere to a capabilities-based ORD. According to Patriot Advanced Capability-3 representatives, the Army combat developers had not yet established a capabilities-based ORD for the Patriot Advanced Capability-3.

Delays in Software Development and Missile Availability. The Deputy disagreed with the operational effectiveness issue, stating that, based on delays in software development and Patriot Advanced Capability-3 missile availability, the Army made a decision to split the system testing, evaluation, and fielding into two parts: the First Unit Equipped-Ground (the Ground) and the First Unit Equipped-Missile (the Missile). Further, he stated that the Army testers conducted a limited user test of the Ground part from March through October 2000. The Deputy stated that the test incident reports for the limited user test were subsequently resolved or deferred before the Army testers conducted the initial operational test and evaluation on the Missile part from January through May 2002. The Deputy commented that even though the Army deferred testing of some of the requirements in the canceled ORD, the user requirements were still valid and would be tested and evaluated later.

Audit Response. The primary focus of this report is the waiver of the testing for the COIs and the need for subsequent testing of those COIs to ensure that the system is operationally effective and suitable. Because the Patriot Advanced Capability-3 missile encountered the deficiencies before the initial operational testing and the Army made the decision to defer the resolution of some of those deficiencies until after the full-rate production, the program most likely will experience retrofit costs for fielded units and initial operational performance that may be less than required to defeat the expected threat.

Operational Effectiveness COI. The Deputy agreed with the statement in the draft report that, "The testers were not able to resolve the operational effectiveness COI before the planned full-rate production decision because the Army deferred test requirements…." He stated that the program had deferrals of test requirements that were driven by deferrals of system performance requirements and that the Army testers believed that deferrals of test requirements was a prudent decision with acceptable risks based on world events. The Deputy

concluded that the events in the Mid-East validated the Army tester's decision to defer the test requirements.

System Reliability Problems. The Deputy disagreed with the system reliability issue, stating that the draft report stated that the limited user test revealed a number of Patriot Advanced Capability-3 reliability problems involving the mean time between critical mission failure rate for the communication relay group, the engagement control station, and the fire unit. He stated that difficulties with the routing logic radio interface unit was the primary cause of the problems involving the mean time between critical mission failure rate. The Deputy also stated that the Lower Tier Project Office[5] and Raytheon corrected the difficulties with the routing logic radio interface unit after the Ground limited user test and before the Missile initial operational test and evaluation. As a result of the correction, he stated that the mean time between critical mission failures for the fire unit went from 12.6 hours during the limited user test to 19.4 hours[6] during the initial operational test.

Audit Response. As the Deputy indicated, the "System Evaluation Report of the Patriot Advanced Capability-3 Initial Operational Test and Evaluation" did indicate that the mean time between critical mission failure rate for the communications relay group, the engagement control station, and the fire unit had improved. That improvement to 19.8 hours, however, was less than the threshold requirement of 21 hours. Accordingly, the System Evaluation Report indicated that the system was operationally suitable with limitations, including reliability and availability. We revised our report to include the System Evaluation Report results that were not available when the draft report was issued.

Tactical Unmanned Aerial Vehicle. For the Tactical Unmanned Aerial Vehicle Program, the Deputy commented on operational effectiveness and operational suitability.

Operational Effectiveness. The Deputy agreed with the operational effectiveness issues associated with the ground control station and the tactical control system compatibility discussion in the report.

Operational Suitability. The Deputy disagreed with the operational suitability issue, recommending that we delete the logistics supportability issues because the Tactical Unmanned Aerial Vehicle met the threshold fuel requirements during the May 2002 initial operational test. Although the Army approved a system limitation memorandum, he stated that it should be disregarded because it references an inconsistent program support requirement within the ORD. The Deputy also stated that the current TEMP for the Tactical Unmanned Aerial Vehicle includes a limited user test to reevaluate the system after the

[5]The Lower Tier Project Office is the project office for the Patriot Advanced Capability-3 Program.

[6]The System Evaluation Report shows that this was actually 19.8 hours

Tactical Unmanned Aerial Vehicle Program Office develops and integrates a replacement heavy fuel engine.

Audit Response. The ORD objective requires the system to use only heavy fuel; however, the system available for testing during initial operational test used motor gasoline, which meets the operational requirement threshold, the minimal acceptable value necessary to satisfy the need. The ORD also states that motor gasoline will not be available after 2005 in the Army inventory and that, although motor gasoline is generally available on the local economy, heavy fuel is the Army tactical fuel. To integrate a replacement heavy fuel engine into the Tactical Unmanned Aerial Vehicle will potentially require costly retrofit as addressed in the report finding. As a result, the Army is addressing the issue of supporting a motor gasoline system in the future.

Management Comments on Finding B and Audit Response

OSD Guidance on Test Deferrals. For the report paragraph, "OSD Guidance on Test Deferrals," the Deputy recommended that we revise the wording in the sentence that reads, "Further, the DOT&E issued guidance on August 3, 2001, that directed Military Department testers not to issue waivers or deferrals that would prevent a complete evaluation of operational requirements." The Deputy stated that Army test and evaluation policy does not authorize testers to waive documented test requirements.

Audit Response. Although the Army test and evaluation policy does not authorize testers to waive documented test requirements, the Deputy needs to revise its guidance to reference or conform to DOT&E guidance on overall waivers.

Appendix H. Audit Response to Navy Comments on the Report

The detailed responses to the comments from the Deputy Assistant Secretary of the Navy (Research, Development, Test and Evaluation) on statements in the draft report follow. The Deputy stated that his comments contained information considered privileged in litigation, primarily under the deliberative process privilege and, therefore, was exempt from mandatory disclosure under the Freedom of Information Act. Where applicable, he marked his comments "For Official Use Only." The complete text of those comments is in the Management Comments section of this report.

Management Comments on the Overall Report and Audit Response

The Deputy commented on OSD test deferral guidance; the potential effects of waivers; effects of waivers; report inaccuracies; the acronym for Chief of Naval Operations; the acronym for Commander, Operational Test and Evaluation Force; types of waivers; and Navy test waivers.

OSD Guidance on Test Deferrals. The Deputy stated that the report incorrectly states that the DOT&E memorandum, August 3, 2001, represents DoD policy on test waivers and deferrals. Further, he stated that written policy guidance at the DoD level did not exist, that the memorandum was not a directive to the Military Departments, and that OSD never implemented the memorandum in subsequent DoD directives. The Deputy also stated that each Military Department is within its authority to establish and execute their policies regarding test waivers and deferrals. Further he stated that the Navy consults with DOT&E on all major Defense acquisition programs and DOT&E oversight programs before considering test waivers or deferrals.

Audit Response. The DOT&E memorandum, August 3, 2001, does represent DoD policy on test waivers and deferrals. The DOT&E has the authority to issue guidance to the Military Departments on test policy. Section 139, title 10, United States Code states that the DOT&E is the principal DoD adviser to the Secretary of Defense and the Under Secretary of Defense for Acquisition, Technology, and Logistics on operational test and evaluation and the principal operational test and evaluation official within the DoD senior management. Section 139 further states that the DOT&E will prescribe, by authority of the Secretary of Defense, policies and procedures for the conduct of operational test and evaluation in the DoD.

Although the revised DoD Instruction 5000.2 does not use the term waivers discussed in the DOT&E memorandum, it does discuss those deficiencies encountered in testing before the LRIP decision for which program managers used test waivers, deferrals, and limitations to address. The Instruction requires that

those deficiencies be resolved before the system can proceed beyond LRIP and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Further, the DOT&E stated that the Military Departments should already have promulgated the memorandum's test policy to their operational test organizations. The Navy stated that it consults with DOT&E on all major Defense acquisition programs and DOT&E oversight programs before considering test waivers or deferrals; therefore, it should already have implemented the guidance in the DOT&E memorandum.

Potential Effects of Waivers. The Deputy stated that the report incorrectly states that test waivers or deferrals create the inability to resolve COIs needed to assess a program's ability to meet its operational requirements in effectiveness or suitability. He stated that before the Navy considers a test waiver or deferral, it considers the effect of the test waiver or deferral on the program's operational effectiveness and suitability. Further, the Deputy stated that test waivers and deferrals are seldom a factor in COI resolution or determinations of effectiveness or suitability. He also stated that, when specified by the Navy Acquisition Executive or the milestone decision authority, Navy testers conduct tests to provide information to them about a program. The Deputy stated that the Navy formally reviews approval of test waivers or deferrals and that the Navy Acquisition Executive and the milestone decision authority carefully consider any fielding decision.

Audit Response. As evidenced in the report, the Navy's consideration of the effect of the test waivers and deferrals on the program's operational effectiveness and suitability before approval of the test waiver or deferral did not ensure that Navy operational testers could resolve COIs needed to assess a program's ability to meet its operational requirements in effectiveness or suitability. Test waivers and deferrals were a factor limiting the Navy operational testers' ability to determine the operational effectiveness and suitability of Navy systems.

For example, the V-22 Program Office's request for test waivers states that the limitations will affect the complete resolution of the affected COIs for operational effectiveness and suitability. Although the F-18E/F Program Office's request for test waivers indicated that the limitations would not affect the resolution of affected COIs for operational effectiveness and suitability, the request did list the potential effects of the limitations on fleet use. The potential effects on fleet use could reasonably be considered the potential effects on operational testing and the resolution of affected COIs if those tests were conducted. In accordance with Navy policy, however, Navy operational testers were not to use those effects in their analysis to resolve COIs.

The Navy's policy states that the Office of the COMOPTEVFOR was not to assess waived requirements in its analysis to resolve COIs, but could comment on the waived requirements in the applicable test report. Without this analysis of the effects of the waivers on resolution of COIs, the Navy Acquisition Executive and other Navy milestone decision authorities were not being provided with complete

information on whether the waived or deferred test requirement would have an adverse effect on the system's operational effectiveness, suitability, or both. With incomplete information, the milestone decision authority could make a decision that would later result in costly retrofits to fielded units and an initial operational performance that may be less than required to defeat the expected threat.

Effects of Waivers. The Deputy provided comments similar to those he made concerning the discussion, "Potential Impacts of Waivers." In addition to those comments, he stated that the report provides no evidence that retrofits occurred for Navy programs as a result of test waivers or deferrals. The Deputy stated that the two Navy programs discussed in the report, the F/A-18E/F Super Hornet and the V-22 Osprey, have not been retrofitted and the Navy does not consider them deficient against the expected threat as a result of test waivers or deferrals.

Audit Response. Although the Deputy stated that the F/A-18E/F Super Hornet and the V-22 Osprey have not had any retrofits to date, the V-22 and the F/A-18E/F waiver requests indicate that the waived requirements will not be fixed and available for testing until after the full-rate production decisions. In his response, the Deputy did not indicate when fixes resulting from testing of the waived requirements would be incorporated into the full-rate production aircraft produced. Accordingly, the extent of retrofit costs will not be known until the Navy begins incorporating fixes for unresolved COIs in production aircraft already produced.

Acronyms for Chief of Naval Operations and Commander, Operational Test and Evaluation Force. The Deputy stated that throughout the report, Director, Test and Evaluation and Technology Requirements, Office of the Chief of Naval Operations, and Commander, Operational Test and Evaluation Force are unnecessarily referred to in long title and suggested that the report use the long title once early in the report and thereafter use CNO (N091) and COMOPTEVFOR, respectively.

Audit Response. Based on IG DoD policy, too many acronyms make a report difficult to read and diminish the report's effectiveness. In the report, we use the title, "Director Test and Evaluation and Technology, Office of the Chief of Naval Operational," infrequently; therefore, we did not use the acronym. Because we used the title "Commander, Operational Test and Evaluation Force" more often, we revised the report to use the acronym as suggested.

Types of Waivers. The Deputy stated that the report indiscriminately used the word "waiver" even though Navy policy defines two types of waivers with different ramifications. Specifically, the Navy policy identifies test waivers from operational test certification requirements and test waivers from TEMP requirements. He stated that the assertions and conclusions in the report could be affected by improper, indiscriminate, and inappropriate use of the word "waiver" when describing testing of Navy programs. The Deputy recommended that we review all Navy sections of the report to identify whether the approved waiver was a test waiver from operational test certification requirements (Part A) or test waiver from TEMP requirements (Part B).

Audit Response. The Office of DOT&E defines a test waiver as deferral of a testing requirement that does not eliminate the requirement for testing. Although the Navy's waiver request for the V-22 Osprey and the F/A-18E/F designate the deficiencies as either Part A or Part B waivers, the testing requirement for each type of deficiency will not be met until after the full-rate production decision. Therefore, the test waivers, whether Part A or Part B, are deferrals of testing requirements and do not eliminate the requirement for testing as presented in the report.

Navy Test Waivers. The Deputy stated that the definition of a test waiver, as stated in the Background section of the report, is vague and inaccurate and does not correspond with the definition in Secretary of the Navy Instruction 5000.2B, "Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," December 6, 1996. He stated that the report needs to properly define test-waiver terminology and recommended replacing the paragraph, "Navy Test Waiver," with text that defines the two types of waivers as follows:

- Waivers from compliance with the criteria for certification to commence operational testing, referred to as Part A waivers, and

- Waivers for deviations from the testing requirements directed by the TEMP, referred to as Part B Waivers. Those waivers are deferrals that are meant to appropriately delay planned testing from one test period to a later test period. Further, those deferrals require impact statements and a defined follow-on test period.

Audit Response. The Background section of the report states that, "The Navy uses the term 'waiver' to mean either deferral of testing of an operational requirement or authorization to proceed with testing, even though the program has not met the requirements of Secretary of the Navy Instruction 5000.2B." The statements in the Background section of the report about the Navy use of test waivers is a synopsis of the test waiver terminology in Secretary of the Navy Instruction 5000.2B. The report discusses the Navy's test waiver policy in further detail in Finding B and Appendix C, "Test and Evaluation Policy."

Management Comments on Finding A and Audit Response

The Deputy commented on the resolution of COIs, operational effectiveness COIs, operational effectiveness for the F/A-18E/F Super Hornet, Chief of Naval Operations involvement, a previous IG DoD Report, a V-22 safety COI, F/A-18E/F Super Hornet human factors COI, and the effect of not meeting operational requirements.

Resolution of COIs.

*

*Deliberative process privilege data omitted.

*

Audit Response.

*

Operational Effectiveness COIs. The Deputy stated that the table, "COIs Not Fully Resolved Because of Approved Test Waivers of Test Limitations for the Eight Defense Systems Affected," has only one column for the operational effectiveness COIs, while the operational suitability COIs are individually broken out. Further, he stated that having one column for the operational effectiveness COIs was misleading and implied that effectiveness as a whole was waived or deferred. The Deputy suggested that the report list the waived effectiveness COIs.

Audit Response. We did not break out separate categories for operational effectiveness COIs because the eight programs did not have common operational effectiveness COIs among the Military Departments. The Military Departments did have common COIs for operational suitability parameters. Also, as shown in Appendix E, the COIs for suitability parameters were more often affected by waivers or deferrals of operational testing. In Appendix E, we do provide an individual listing of the operational effectiveness COIs that could not be fully resolved during operational testing before full-rate production decisions.

Operational Effectiveness for the F/A-18E/F Super Hornet.

*

*Deliberative process privilege data omitted.

*

Audit Response.

*

Chief of Naval Operations Involvement. The Deputy stated that the report states that the Director of Navy Test and Evaluation and Technology Requirements considered three of the five COIs for operational effectiveness to be satisfactorily resolved for the F/A-18E/F Super Hornet. He further stated that this statement is technically incorrect because COMOPTEVFOR, not the Director of Navy Test and Evaluation and Technology Requirements, resolves COIs.

Audit Response. We revised the report accordingly.

Previous IG DoD Report. The Deputy stated that the report cites a previous IG DoD report that discusses a limitation to operational testing in a COMOPTEVFOR test plan because of the known nonavailability of a reconnaissance system for the F/A-18E/F. Further, he stated that the phased development of the Shared Reconnaissance Pod, a limitation to testing that precluded evaluation of the reconnaissance COI, was well understood before the F/A-18E/F operational evaluation. The Deputy also stated that DOT&E, in the beyond LRIP report on the F/A-18E/F operational evaluation, stated that "The tactical reconnaissance sensor suite intended for eventual employment on the FA-18E/F was not developed/cleared for employment during OPEVAL [operational evaluation]. The TEMP for the F/A-18E/F, as approved by DOT&E in 1992, explicitly stated this limitation with the intention of evaluating this capability during a future period of Follow-On Operational Test and Evaluation (FOT&E), OT-III." Consequently, the Deputy recommended that we remove from the report the paragraph citing a previous IG DoD report because it is not germane to test waivers and deferrals. He also stated that limitations to the scope of operational testing before the operational test and evaluation were not test waivers or deferrals.

Audit Response. We did not remove the subject paragraph from the report. The Deputy's comment confirmed that the known nonavailability of a reconnaissance system for the F/A-18E/F deferred the testing of the sub-system until after the full-rate production decision for the F/A-18E/F aircraft. Therefore, the previous IG DoD Report is germane to the discussion of Navy waivers and deferrals.

V-22 Safety COI.

*

*Deliberative process privilege data omitted.

*

Audit Response.

*

F/A-18E/F Super Hornet Human Factors COI.

*

Audit Response.

*

Effect of Not Meeting Operational Requirements. The Deputy reiterated the following statements that we made in the finding.

> Without the Military Departments fully resolving COIs for weapon systems during initial operational test and evaluation, weapon systems that were not fully ready continued into production, thereby creating a potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat.

The Deputy believed that the paragraph conflicted with the DOT&E Beyond LRIP Report conclusions regarding F/A-18E/F readiness for full-rate production. The Director provided the DOT&E Beyond LRIP Report conclusion as follows:

> The limitations of OPEVAL [operational evaluation] did not inhibit the operational evaluation of this aircraft. OPEVAL, as planned and conducted provided a test of the operational effectiveness and operational suitability of the F/A-18E/F that is adequate for resolution of the critical issues and for informing the acquisition decision authority regarding the full-rate production decision.

The Deputy stated that the report did not present any specific evidence that the V-22 or F/A-18E/F has or will require costly retrofit to defeat the expected threat. He recommended that the V-22 and F/A-18E/F be excluded from the above paragraph in the report.

Audit Response. The V-22 and F/A-18E/F were not excluded from the above paragraph because the Navy waived test requirements that did affect the resolution of operational effectiveness and suitability COIs. Although approval of the test waiver request did not alter the test requirement, Secretary of the Navy

*Deliberative process privilege data omitted.

Instruction 5000.2B precluded COMOPTEVFOR from assessing the effects of waived requirements in its analysis concerning the resolution of COIs.

For the V-22, the request for test waivers specifically stated that the limitations would affect the complete resolution of the affected COIs for operational effectiveness and suitability. As a result of Navy policy concerning the resolution of COIs, COMOPTEVFOR did not assess the potential effects to fleet use, operational testing, and the affected COIs in the analysis.

Although the F/A-18E/F request for test waivers indicated that the limitations would not affect the resolution of affected COIs for operational effectiveness and suitability, it listed potential effects on fleet use. In actuality, the potential effects on fleet use could reasonably be considered the potential effects on the completion of adequate operational testing and the resolution of affected COIs if those tests were conducted. In accordance with Navy policy, COMOPTEVFOR could not assess those effects in its analysis concerning the resolution of COIs.

Waiver requests for the V-22 and the F/A-18E/F also indicated that the waived items would not be available for testing until after the full-rate production decision.

Management Comments on Finding B and Audit Response

Management Comments. The Deputy stated that the paragraph, "Navy Procedures," and the accompanying subparagraphs, "Waiver Process," and "Subsequent Operational Tests," did not accurately define or explain the Navy test waiver and deferral policy. He further stated that the paragraph provided an inaccurate and incomplete definition of Navy waiver policy and process that affects all other Navy portions of the report. The Deputy recommended deleting the paragraph and subparagraphs and provided the following replacement text:

> **Navy Policy and Procedures.** At the time of the V-22 and F/A-18E/F OPEVALs [operational evaluations], waivers were governed by Secretary of the Navy Instruction 5000.2B, 'Implementation of Mandatory Procedures for major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs' effective 6 December 1996. Two types of waivers were defined:
>
> 1. *Part A Waivers* from compliance with the criteria for OT [operational test] certification. These waivers are meant to allow a system to enter OPEVAL or FOT&E [follow-on operational test and evaluation] even though all criteria have not been met. Waivers do not change or delay any system or testing requirements, only the data/maturity required by the Decision (DA) to allow a system to enter into an Operational Test (OT) period. Data for any waived OT certification requirement may be used in COMOPTEVFOR's final analysis to resolve COIs, determine system operational effectiveness, operational suitability, and any recommendation regarding fleet introduction.

> 2. *Part B Waivers.* These are deferrals for deviations from the testing requirements directed by the Test and Evaluation Master Plan (TEMP). These deferrals are meant to appropriately delay planned testing from one test period to a later decided-upon test period. This moves a requirement from one test period to a later period. A deferral may result in limitations to the scope of testing that may preclude COMOPTEVFOR from fully resolving all COIs. Deferred items shall not be used in COMOPTEVFOR's final analysis to resolve COIs, but maybe commented on in the appropriate sections of the test report.
>
> **Waiver Process.** The program managers (PM) or Program Executive Officers (PEOs) formulate waiver requests prior to the OT readiness and certification review (OTRR) process. When requesting a waiver or deferral, the PM shall outline the limitations that the deferral or waiver will place upon the system under test, and their potential impacts on fleet use. Further, a statement shall be made in the OT&E [operational test and evaluation] certification message noting when approved deferrals will be available for subsequent operational testing. The Director, Navy Test and Evaluation and Technology Requirements (CNO(N091)) adjudicates all waiver requests in coordination with COMOPTEVFOR, DCNOs [Deputy Chief of Naval Operations] for Logistics, DCNO (Resources, Warfare Requirements, and Assessments), and the program sponsor. N091 approves waivers as appropriate, and advises OSD (DOT&E) in the case of MDAPs [major Defense acquisition programs]."

Audit Response. The Deputy's comments on Navy policy and procedures did not accurately present information contained in the Secretary of the Navy Instruction 5000.2B. Specifically, the Instruction does not allow COMOPTEVFOR, for Part A Waivers, to use data for any waived operational test in its final analysis to resolve COIs to determine system operational effectiveness and operational suitability, and to make any recommendations regarding fleet introduction. Further, the Instruction does not state that COMOPTEVFOR, for Part B waivers, may comment on deferred items in the appropriate sections of its test report, but only in the "Operational Considerations" section of the test report.

We incorporated the Deputy's comments on the waiver process into the appropriate section of Finding B of the report.

Management Comments Addressing Appendix E, "Critical Operational Issues not Resolved Because of Approved Test Waivers or Test Limitations," and Audit Response

The Deputy commented on the F/A-18E/F operational effectiveness COIs, F/A-18E/F operational suitability COIs, reasons for waivers of test requirements, V-22 operational effectiveness COIs, and V-22 operational suitability COIs.

F/A-18E/F Operational Effectiveness COIs. The Deputy stated that the report incorrectly states that, "As a result of the waivers, the COIs for operational effectiveness were not fully resolved during initial operational testing." Further, he stated that, because of test waivers, COMOPTEVFOR could not fully resolve

the COI for air-to-ground sensors, which was 1 of the 20 operational effectiveness COIs. The Deputy stated that COMOPTEVFOR fully resolved the remaining 19 operational effectiveness COIs.

Audit Response. The COMOPTEVFOR test report did state that it was able to fully resolve 19 of the 20 operational effectiveness COIs; however, COMOPTEVFOR resolved those COIs without including an assessment of the effects of waivers on the resolution of the 19 COIs. This condition occurred because the Navy policy precludes COMOPTEVFOR from assessing the effect of waived requirements in its analysis on the resolution of COIs. In the audit report, the analysis considered the effect of the test waivers and deferrals on the resolution of the COIs.

F/A-18E/F Operational Suitability COIs.

*

Audit Response.

*

Reasons for Waivers of Test Requirements. The Deputy disagreed with the following statement in the report: "Because of performance problems identified during developmental test, the Director of Navy Test and Evaluation and Technology Requirements, Office of the Chief of Naval Operations approved the following developmental test waivers." He stated that the Director of Navy Test and Evaluation and Technology Requirements granted the following test waivers because the capability had not been tested before operational evaluation and not because of performance problems identified during developmental test:

- Maximum short take off (shipboard) 48,500 pounds, rather than mission profile specific weight.
- Aircraft not cleared for air combat maneuvering.

*Deliberative process privilege data omitted.

Further, the Director of Navy Test and Evaluation and Technology Requirements granted the following test waivers because the capability was still under development and had not been fielded before operational test and evaluation.

- Defensive weapon system not available for test.
- Crashworthy auxiliary fuel tanks not available for test.
- Aircraft not cleared to operate in icing conditions.
- Ground collision avoidance and warning system not available for test.

Audit Response. We revised the report accordingly.

V-22 Operational Effectiveness COIs.

*

Audit Response.

*

V-22 Operational Suitability COIs.

*

Audit Response.

*

*Deliberative process privilege data omitted.

Appendix I. Audit Response to Air Force Comments on the Report

The detailed responses to the comments from the Director, Air Force Test and Evaluation on statements in the draft report follow. The complete text of those comments is in the Management Comments section of this report.

Management Comments on the Overall Report and Audit Response

The Director commented on the DOT&E Memorandum; test waivers, limitations, and deferrals; evolutionary acquisition; fielding new capabilities; and input from the Military Departments.

DOT&E Memorandum. The Director stated that the August 3, 2001, DOT&E memorandum referenced in the report did not reach Headquarters, Air Force Test and Evaluation or the Air Force Operational Test and Evaluation Center. Further, he stated that the Air Force Operational Test and Evaluation Center received a different memorandum, dated August 7, 2001; however, that memorandum did not contain any guidance about test and evaluation waivers. The Director stated that his office had since obtained a copy of the August 3, 2001, memorandum that DOT&E addressed to his staff. Had the Air Force been given the opportunity to review or coordinate on the August 3, 2001, memorandum, he stated that his office would have nonconcurred with the language about waivers and requirements. Further, he stated that his office was unsure whether the DOT&E disseminated his August 3, 2001, memorandum to the entire test and evaluation community.

Audit Response. In the DOT&E memorandum, the DOT&E stated that he was communicating the major points of the memorandum to the Commanders of the Operational Test Agencies and was encouraging them to share the guidance with their staffs so that everyone involved would be on the same wavelength. Further, DOT&E stated that the Military Departments should already have promulgated the memorandum's test policy.

Even if the Director had been able to nonconcur with the DOT&E memorandum, he is required by statute to comply with DOT&E guidance. DOT&E has the authority to issue guidance to the Military Departments on operational test policy. Section 139, title 10, United States Code states that DOT&E is the principal adviser to the Secretary of Defense and the Under Secretary of Defense for Acquisition, Technology, and Logistics on operational test and evaluation in the DoD and is the principal operational test and evaluation official within the DoD senior management. Section 139 further states that DOT&E will prescribe, by authority of the Secretary of Defense, policies and procedures for the conduct of operational test and evaluation in the DoD.

Test Waivers, Limitations, and Deferrals. The Director stated that the report identifies differences in opinion, policy, and practice among the Military

Departments and DOT&E staff about what constitutes a test waiver. The Director believes that the report incorrectly considers test waivers, test limitations, and test deferrals as the same. He stated that the Air Force rarely applies directly for test waivers, but, instead, identifies test limitations and test deferrals to DOT&E through the test plan approval process. Further, the Director stated that, after DOT&E reviews and approves the test plans, no additional action is required. He also stated that his office follows DoD 5000 policy and Title 10 that do not require waivers for test limitations or test deferrals. The Director stated that, nonetheless, his office is revising all Air Force test and evaluation policy documents and plans to address the use of waivers in more detail. In addition, he stated that the other Military Departments appear to use different strategies and policies for test waivers.

Audit Response. Because the concept of the test waiver varies significantly among the Military Departments, we included in the Background section of the report the various definitions of test waiver used by DOT&E and the Military Departments. Because of the inconsistent procedures that the Military Departments use for test waivers and deferrals, the report recommends that the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Director, Operational Test and Evaluation; the Deputy Under Secretary of the Army (Operations Research); the Assistant Secretary of the Navy (Research, Development, and Acquisition); and the Director, Air Force Test and Evaluation collectively establish consistent guidance for processing test waivers or deferrals.

As stated in the report, DOT&E considers test limitations and deferrals as the same as test waivers although the Military Departments did not agree that test limitations and test deferrals are equivalent to test waivers. As defined by DOT&E, test limitations and test deferrals accomplish the same objective as test waivers by deferring required testing until later in the system acquisition process, usually after the system's full-rate production decision.

In reference to Air Force test waiver policy, Air Force Instruction 99-102 requires the system program manager to prepare a request to waive or modify fundamental provisions for operational test and evaluation. With user and developer concurrence, the system program manager is to submit the request through the Air Force Operational Test and Evaluation Center to the Air Force Test and Evaluation Directorate. The system program manager and the system's program element monitor are to document any approved operational test and evaluation waivers in the TEMP and the program management directive, respectively. Further, Air Force Manual 63-119 requires a waived requirement to be tested in subsequent operational test and evaluations or the user must change the ORD requirement. As stated in the Air Force comments, the Air Force rarely adheres to those requirements for processing test deferrals to operational test requirements.

We agree that DoD 5000 policy and Title 10 do not require the processing of waivers for test limitations or test deferrals. For tests requirements not resolved before the full-rate production decision, DoD Instruction 5000.2 requires that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP and that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Evolutionary Acquisition. The Director stated that the report did not recognize that the evolutionary acquisition strategy in the latest DoD 5000-series is the preferred acquisition strategy. Further, he stated that the report did not recognize the principles of time-phased requirements discussed in Chairman of the Joint Chiefs of Staff Instruction 3170.01B, "Requirements Generation System," April 15, 2001. The Director stated that his main point is that deferrals of some requirements and capabilities and the testing of the associated COIs and requirements must now be planned for so that the evolutionary acquisition strategy and the time-phased requirements will work. In addition, he stated that the materiel developers, testers, and users can no longer expect a technically perfect solution or "the perfect test" in the first increment that is deployed. In this regard, the Director stated that the Under Secretary of Defense for Acquisition, Technology, and Logistics mandated that trade-offs be made among cost, schedule, and performance so that development programs get interim capabilities delivered sooner while keeping cost and schedule under control.

Audit Response. The key point of this report is to not just field new capabilities, but to field new capabilities that will fully meet warfighter requirements by efficiently resolving core impediments to fulfilling those requirements. Even if a system is being acquired using the evolutionary acquisition strategy, the system still has to meet the operational requirements and COIs for that block of the evolutionary acquisition. DoD Instruction 5000.2 requires that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP, and that any fixes to those deficiencies be verified during follow-on operational test and evaluation. Therefore, deficiencies identified before each block of a system enters initial operational test and evaluation should be corrected before the system enters full-rate production for that block. Further, the objective of the evolutionary acquisition strategy is not to deliver a substandard system to the warfighter, but, as DoD Instruction 5000.2 states, the objective is to balance needs and available capability with resources, and to put capability into the hands of the user quickly through a block upgrade approach.

Fielding New Capabilities. The Director stated that the three Air Force programs cited in the report, the Predator, the Joint Direct Attack Munition, and the F-15 Tactical Electronic Warfare System, all used the evolutionary acquisition strategy and time-phased requirements to varying degrees to field new capabilities earlier than the traditional acquisition process. Further, he stated that the examples of test waivers, limitations, and deferrals cited in the report do not rise to a level of significance that warrant delaying any of these programs. The Director also stated that program managers are following the DoD 5000 guidance to field capabilities to warfighters sooner.

Audit Response. The Air Force, by proceeding into full-rate production before resolving test deficiencies that were identified before the start of the initial operational test and evaluation, was not following DoD 5000 guidance.

Input From the Military Departments. The Director stated that information in the draft appears to come solely from DOT&E with minimal to no input from the Military Departments. Further, he stated that no in-brief or interviews were held with Air Force testers.

Audit Response. We obtained information for the report from interviews with DOT&E; Army, Navy, and Air Force test and evaluation offices; and selected program offices. Specifically, within the Air Force, we met with representatives of the Air Force Test and Evaluation Directorate and the Air Force Test and Evaluation Center on June 8, 2001, and September 10, 2001, respectively. We also interviewed and obtained documentation from system program office personnel for the F-15 Tactical Electronic Warfare System, the Predator Unmanned Aerial Vehicle, and the Joint Direct Attack Munition Program Offices. For the Fighter Data Link, we obtained e-mail documentation from representatives of the Multifunction Information Distribution System Program Office.

Management Comments Addressing the Main Body of the Report and Audit Response

The Director commented on DoD waiver guidance, developmental test waivers, waiver equivalents, resolution of COIs, test responsibilities, missing data, DOT&E guidance, the F-15 Tactical Electronic Warfare System, the Joint Direct Attack Munition, definition of a test waiver, and Appendix A, "Scope and Methodology."

DoD Waiver Guidance. The Director stated that he agreed with the statement that "DoD guidance does not specifically define what a waiver from developmental and operational testing is." He also stated that no officially coordinated definition or policy exists. The Director further stated that the only DoD-level test and evaluation waivers he knew of were in sections 2399 and 2366, title 10, United States Code, for system contractor involvement in operational test and evaluation and when live fire test and evaluation is too expensive and impractical. He stated that the Air Force recognizes and uses these kinds of waivers when necessary. However, he disagreed with the DOT&E definition of a waiver as a "deferral of a testing requirement, which does not eliminate the requirement for testing." The Director stated that deferring the test of a system requirement to a later point in program development does not mean the need to test the requirement is waived. He also stated that the DOT&E definition of a waiver is not officially recognized DoD-wide, nor was it coordinated with the Military Department testers. The Director agreed that it is evident the concept of a test waiver varies greatly among the Military Departments. He stated that in addition to the Title 10 waivers, Air Force Instruction 99-102, "Operational Test and Evaluation," July 1, 1998, requires "waivers" in the following three other instances:

- Program managers must obtain a waiver from the Air Force Materiel Command to use non-DoD test facilities when such facilities are available;

- The Air Force Operational Test and Evaluation Center must obtain a waiver from Headquarters, Air Force Test and Evaluation Directorate

before transferring responsibility for an operational test and evaluation program to a major command; and

- The Air Force Operational Test and Evaluation Center must obtain a waiver from Headquarters, Air Force Test and Evaluation Directorate before altering, excluding areas from, or not conducting operational test and evaluation. The Air Force Operational Test and Evaluation Center needs user and developer concurrence before Headquarters, Air Force Test and Evaluation Directorate can process these kinds of waivers.

Further, the Director stated that Air Force Manual 63-119, "Certification of System Readiness for Dedicated Operational Test and Evaluation," February 22, 1995, states that, "Approval of a waiver does not eliminate or alter the requirement for operational test and evaluation." He also stated that the waived items must be tested in subsequent operational test and evaluation or the ORD must be changed.

Audit Response. Because the concept of the test waiver varies significantly among the Military Departments, we included in the Background section of the report the various definitions of test waiver by DOT&E and the Military Departments. We also stated that the DOT&E definition does not include sections 2399 and 2366, title 10, United States Code, regarding system contractor involvement in operational test and evaluation and when live-fire test and evaluation is too expensive or impractical, respectively. Further, we stated that, although the Military Departments did not agree that test limitations and test deferrals were equivalent to test waivers, as defined by DOT&E,test limitations and test deferrals accomplished the same objective as test waivers by deferring required testing until later in the system acquisition process, usually after the system's full-rate production decision.

Because of the inconsistent procedures the Military Departments used for test waivers or deferrals, we recommended that the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Director, Operational Test and Evaluation; the Deputy Under Secretary of the Army (Operations Research); the Assistant Secretary of the Navy (Research, Development, and Acquisition); and the Commander, Air Force Test and Evaluation Directorate collectively establish consistent guidance for processing test waivers or deferrals.

In its discussion of approvals of waivers, Air Force Manual 63-119 states that "Waived items must be tested in subsequent operational test and evaluation or the ORD must be changed." This statement supports the DOT&E assertion that test waivers accomplish the same objective as test deferrals by deferring required testing until later in the system acquisition process.

Developmental Test Waivers. The Director stated that he did not know of any requirement for the Military Departments to obtain waivers for developmental test and evaluation of any kind. He further stated that DOT&E is restricted by section 139, title 10, United States Code, as follows: "The Director may not be assigned any responsibility for developmental test and evaluation, other than the provision of advice to officials responsible for such testing."

Audit Response. Although the audit team's review of the regulations did not indicate a requirement to obtain waivers for developmental test and evaluation, Air Force Instruction 99-101 requires that any approved waivers to developmental testing procedures or requirements be documented in the TEMP. We neither indicated in the draft report a requirement for the Military Departments to obtain waivers from developmental test and evaluation nor did DOT&E indicate that it had responsibility for developmental test and evaluation.

Waiver Equivalents. The Director stated that the report alleges the existence of "waiver equivalents" called "test limitations" and "[test] deferrals." Further, he stated that those waiver equivalents are not the same as a waiver. The Director stated that the report's language generates confusion about what a waiver is and when it is required. He stated that the Air Force rarely applies outright for test waivers, but instead identifies test limitations and test deferrals to DOT&E through the test plan approval process. In addition, the Director stated that, once DOT&E reviews and approves the test plans to include the TEMP, additional action is not required. He stated that the Air Force follows the DoD 5000 series and Title 10, which do not require waivers for test limitations or test deferrals. Further, the Director stated that submission of a separate waiver request in addition to an approved test plan is a redundant action. He also stated that test limitations are not test waivers, but are constraints to an ideal test strategy or plan imposed by circumstances largely beyond everyone's control. The Director stated that test limitations are documented in test plans and TEMPs, along with ways to mitigate the impacts and still produce acceptable evaluations. In addition, he stated that test deferrals are not test waivers, but are agreements that certain parts of a test and evaluation program may be delayed until a later point in system development. The Director also stated that test deferrals are based on trade-off decisions mutually acceptable to developers, testers, and users, and are documented in test plans and TEMPs.

Audit Response. To establish the definition of waivers, we contacted DOT&E to determine what the Director meant when he expressed concern about programs beginning operational testing without completing sufficient developmental test and evaluation and about the Navy's use of test waivers. DOT&E defined a waiver as a deferral of a testing requirement, which does not eliminate the requirements from testing. In addition, Air Force Manual 63-119 states that "Waived items must be tested in subsequent operational test and evaluation or the ORD must be changed." Therefore, a waiver defers testing to future periods. Test deferrals and limitations caused by inadequate system capabilities also defer testing to future periods. Further, in the Director's comment, he stated that instead of applying for waivers, the Air Force identifies test limitations and test deferrals. Accordingly, the Air Force is identifying test limitations and test deferrals in TEMPs instead of processing test waivers to accomplish the same objective; that is, deferring required testing until later in the system acquisition process.

Resolution of COIs. The Director stated that no requirement exists to resolve all COIs before proceeding into full-rate production or deployment for software-intensive systems. He stated that COIs are tester-developed requirements, not operational requirements, and that some COIs such as operational suitability require a much greater amount of testing so that the

operational requirement may not be satisfied until later. The Director further stated that the reformed acquisition environment allows the milestone decision authority to use trade-off analysis to defer the closure of COIs when it makes good sense for the program.

Audit Response. Although deficiencies affecting the resolution of COIs do not need to be fixed and verified before the full-rate production decision, DoD Instruction 5000.2 requires that deficiencies encountered in testing before the LRIP decision be resolved before the system proceeds beyond LRIP at the full-rate production decision review, and that any fixes be verified during follow-on operational test and evaluation. In reference to tester developed COIs, we determined that testers use the ORD in developing the COIs. While all ORD requirements are not COIs, a correlation exists between the COIs that the testers develop and the operational requirements. To implement the testing requirement in DoD Instruction 5000.2, Air Force Operational Test and Evaluation Center Manual 99-102 states that, if every COI is resolved favorably, the system should be operationally effective and operationally suitable when employed in its intended environment by typical users. Air Force Instruction 99-102 states that initial operational test and evaluation will be planned to completely and unambiguously answer all COIs as thoroughly as possible, and will not defer testing into follow-on operational test and evaluation unless unavoidable. Air Force Instruction 99-102 also states that follow-on operational test and evaluation will not be intentionally used as a backup for incomplete or poorly planned initial operational test and evaluation.

Test Responsibilities. The Director stated that the fact that some COIs are not resolved before full-rate production or deployment is not caused solely by the testers, but is the final responsibility of the materiel developer and the milestone decision authority. He stated that the tester's job is to provide information to the developer and the milestone decision authority within the constraints of the acquisition and the test and evaluation strategies. The Director also stated that, based on the COIs that were resolved and not resolved, the milestone decision authority makes the final decision to proceed into production, and not the testers.

Audit Response. We agree, as stated in the report, that the testers' inability to resolve COIs during initial operational test and evaluation was caused, to a large extent, by the Military Departments approving waivers or waiver equivalents. The term Military Departments includes program managers, testers, milestone decision authorities, and users. We also agree that it is within the milestone decision authority's prerogative to make the decision to proceed into production when all COIs are not resolved. The milestone decision authority, however should be informed of the effects of unresolved COIs on system performance so that an objective decision can be made.

Missing Data. The Director stated that Appendix C, "Test and Evaluation Policy," was missing along with pages 15 through 27. Further, he stated that DOT&E is not qualified to speak for the Military Departments regarding their test and evaluation policies. The Director also stated that we should have come to the Military Department testers to complete this section of the report.

Audit Response. The Director's comment addressed the informal staffing of the discussion draft version of this report and not the draft report.

DOT&E is qualified to speak for the Military Departments on their implementation of DoD test and evaluation policies. The DOT&E is empowered by statute and by authority of the Secretary of Defense to prescribe policies and procedures for the conduct of operational test and evaluation in the DoD.

DOT&E Guidance. The Director expressed difficulty with the DOT&E memorandum, "DOT&E Goals," August 3, 2001, and its attachment. He stated that DOT&E did not address the memorandum to the Military Departments, but only to the "DOT&E Staff," and that DOT&E did not coordinate the memorandum with the Military Departments before publication. He stated that the memorandum included a few sentences about test waivers with which he fundamentally disagreed, such as, "There will be no waivers, or deferrals, to the completeness of evaluations. Requirements waived should be considered failed unless changed." The Director stated that, if a testing requirement is deferred because a support asset was not available during test, this does not mean the system "failed" to meet the requirement. He further stated that those statements are too extreme and run counter to the spirit of streamlined acquisition in the current DoD 5000-series and the Chairman of the Joint Chiefs of Staff Instruction 3170.01B, "Requirements Generation System," April 15, 2001.

Audit Response. In the DOT&E memorandum, the DOT&E stated that he was in the process of communicating the major points of the memorandum to the Commanders of the Operational Test Agencies and was encouraging them to share the guidance with their staffs so that everyone involved would have the same understanding of the guidance. Concerning the testing deferral, if testing for a requirement is deferred because a support asset was not available during test, that requirement cannot be fully evaluated until the support asset is available; therefore, the completeness of evaluations is affected. Further, DoD Instruction 5000.2 requires that deficiencies encountered in testing before the LRIP decision be resolved before the system proceeds beyond LRIP at the full-rate production decision review, and that any fixes be verified during follow-on operational test and evaluation.

F-15 Tactical Electronic Warfare System. Concerning the F-15 Tactical Electronic Warfare System, the Director stated that the report did not mention that DOT&E approved the Band 1.5 TEMP and operational test and evaluation plan, both of which addressed the false alarm rate and future testing. Further, he stated that the report did not mention that the Air Force submitted plans to DOT&E showing that it planned to remedy the false alarm rate problems in the next increment, which was the Band 5.0 increment.

Audit Response. We revised the report as suggested. However, the point of the report is that COIs, which need to be demonstrated to prove that the system can perform its intended mission, were not resolved before the full-rate production decision, thereby the milestone decision authority allowed the system to continue into production creating the potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat.

Joint Direct Attack Munition. The Director stated that the Joint Programmable Fuse System Program Office, not the Joint Direct Attack Munition System Program Office, is responsible for finding solutions to the interoperability problem identified in the report. Further, he stated that the follow-on operational test and evaluation is a normal followup to the initial operational test and evaluation regardless of whether the testers included the Joint Programmable Fuse in the initial operational test and evaluation. The Director also stated that the testers did not plan for the follow-on operational test and evaluation mainly because the Joint Programmable Fuse was not available.

Audit Response. The Director addressed information contained in the discussion draft version of this report and not the draft report. Based on Air Force comments to the discussion draft, we determined that the Joint Direct Attack Munition did not have deficiencies that affected the resolution of COIs before the milestone decision authority made the full-rate production decision.

Definition of a Test Waiver. The Director stated that the report contains the DOT&E definition of a test waiver. Further, he stated that the personnel from the Air Force Operational Test and Evaluation Center searched Title 10, past versions of the DoD 5000 series directives, the current OSD acquisition interim directives and guidance, and the current draft DoD 5000 series directives for the DOT&E definition of a test waiver. The Director also stated that his office cannot find the definition, policy, or guidance on waivers in those documents. In addition, he stated that personnel from the Air Force Operational Test and Evaluation Center recommend that, if DOT&E desires to establish a policy not allowing the waiver or deferral of testing operational requirements, it needs to document such policy in the current draft version of the DoD 5000 series directives.

Audit Response. See the response to the "Test Waivers, Limitations, and Deferrals" issue on page 70.

Appendix A, "Scope and Methodology." The Director stated that the report does not identify the IG DoD team's conclusion in determining the role of the Institute for Defense Analyses in the test and evaluation waiver process. Further, he stated that personnel at the Air Force Operational Test and Evaluation Center believe that the Institute for Defense Analyses has no role in the process and that it is a support contractor to DOT&E.

Audit Response. In the "Scope and Methodology" section of the report, we stated that during the audit we determined the role of the Institute for Defense Analysis in the test and evaluation waiver process. As the Director commented, the Institute for Defense Analyses does not have a role in the test and evaluation waiver process other than as a support contractor to DOT&E.

Management Comments on Finding A and Audit Response

The Director commented on management flexibility, resolution of COIs during initial operational test and evaluation, table of COIs not fully resolved, evolutionary development, test waiver decisions, Predator operational effectiveness issues, F-15 Tactical Electronic Warfare System test plans, Joint Direct Attack Munition issues, and DoD policy.

Management Flexibility. The Director stated that a key qualification overlooked in the report paragraph "Air Force Policy," and the rest of the report, was the words, "unless unavoidable." Further, he stated that those words allow for unforeseen circumstances in development programs and test and evaluation strategies that would do great harm to programs if no management flexibility were allowed. The Director stated that, in some instances, the deferral of a test requirement or the completion of a COI is better than severely penalizing the program with cost and schedule effects resulting from a less than perfect development or test and evaluation program. He also stated that this qualification allows program managers, testers, and users to make reasonable trade-offs in the best interests of warfighters, according to the DoD 5000 series' new streamlined acquisition principles.

Audit Response. See the response to the "Resolution of COIs" issue to the Air Force on page 75. We agree that the milestone decision authorities have the prerogative to allow weapon systems that were not fully ready for production to continue into production when COIs for weapon systems are not fully resolved during initial operational test and evaluation. However, this action creates a potential need for costly retrofit of fielded units later and an initial operational performance that may be less than is required to defeat the expected threat.

Resolution of COIs During Initial Operational Test and Evaluation. The Director stated that, occasionally, some COIs in initial operational test and evaluation cannot be resolved before full-rate production or deployment because of the ORD requirement or test limitations, or both. Further, he stated that a suitability requirement for a 1,000-hour mean time between failure for an aircraft system may require up to 5,000 flying hours in some instances. The Director stated that to require a system to log 5,000 flying hours before making a full-rate production or deployment decision may not be possible or good program management. He also stated that other tools, such as reliability growth curves, can reduce risk and help make good projections when those kinds of test limitations occur. The Director reiterated his statement that the draft report confuses test waivers with test limitations and test deferrals.

Audit Response. Although COIs may not be fully demonstrated before the full-rate production, DoD Instruction 5000.2 requires that deficiencies encountered in testing before the LRIP decision be resolved before proceeding into full-rate production and any fixes verified in follow-on test and evaluation. In the report, we addressed deficiencies (test waivers) that affected the resolution of COIs and that were encountered before initial operational test and evaluation that were not resolved before the milestone decision authority made the full-rate production decision. Deficiencies encountered during initial operational test and

evaluation are considered an acceptable part of the initial operational test and evaluation process and, therefore, were not addressed in this report. In reference to the definitions of test waivers, test limitations, and test deferrals, we explained the rational used by DOT&E for considering test limitations and deferrals as the equivalent to test waivers in the Background section of the report.

Table of COIs Not Fully Resolved. The Director stated that the table, "COIs Not Fully Resolved Because of Approved Test Waivers of Test Limitations for the Eight Defense Systems Affected," was not balanced because it focused almost solely on suitability COIs. He reiterated his comments on the resolution of COIs during initial operational test and evaluation. The Director also stated that evolutionary acquisition strategies recognize that test limitations for COIs may require deferral of a final answer to resolve the requirement or the COI until a later date.

Audit Response. The table addresses deficiencies that affected the resolution of COIs that were encountered before initial operational test and evaluation but were not resolved before the milestone decision authority made the full-rate production decision. With regard to the suitability COIs, the predominate COIs not resolved for the eight programs reviewed were suitability issues. Concerning evolutionary acquisition, we disagree that evolutionary acquisition strategies recognize that COIs for each block of the acquisition may require deferral of a final answer to resolve the COI until a later date. The operational testers are to establish COIs only for each block for performance capabilities that need to be demonstrated during that block development.

Evolutionary Development. The Director stated that the draft report states that the Joint Requirements Oversight Council deferred some test requirements for the Patriot Advance Capability-3 program as part of an evolutionary development program. He stated that this deferral was a good example of how evolutionary acquisition works to ensure earlier delivery of capabilities to warfighters. Further, the Deputy stated that evolutionary acquisition is the "preferred acquisition strategy" in DoD. He also stated that we were not justified in criticizing the Patriot Advance Capability-3 program for deferring a requirement after careful deliberation with the JROC and deploying much-needed capabilities to protect our warfighters.

Audit Response. The draft report does not debate the Joint Requirements Oversight Council process or how fast capabilities are delivered to the warfighters. The point of the report is that COIs, which are required for a system to perform its mission, were not resolved before full-rate production, thereby allowing the system to continue into production and creating the potential need for costly retrofit of fielded units and an initial operational performance that may be less than required to defeat the expected threat. As discussed above, the Patriot Advanced Capability-3 program is not a good example of how an evolutionary acquisition works because COIs that were established for a specific block of the acquisition strategy were not resolved before the production decision.

Test Waiver Decisions. The Director stated that the report's discussion of the nine COI categories affected by test waivers and limitations and examples of the affected COIs from the eight programs affected focused on relatively minor

problems that did not warrant delaying the full-rate production or deployment decisions. Further, he stated that perfect development programs and test and evaluation programs did not exist and that waiting for every problem to be resolved, no matter how small, before full-rate production or deployment would result in no systems being deployed, or at best would add totally unacceptable cost and delay to programs. The Director also stated that the decision to waive test requirements or defer some tests is a mutual agreement among the testers, materiel developers, and users based on program and technical risk weighed against the risk of not deploying new capabilities to our warfighters. He stated that sometimes "better" is the worst enemy of "good enough."

Audit Response. The Office of the DOT&E provided the list of programs that were issued waivers that we used for the audit. As stated in the report, we conducted the audit based on the DOT&E "Operational Test and Evaluation Annual Report, FY 2000," in which the Director expressed concern about programs beginning operational testing without completing sufficient developmental test and evaluation and about the Navy's use of test waivers. The Defense Science Board also expressed similar concerns in the "Defense Science Board Task Force on Test and Evaluation Capabilities," December 2000. Systems provided to the warfighter should be operationally effective and suitable. The report addresses test waivers that affected the resolution of COIs before the initial operational test and evaluation and that were not resolved before the milestone decision authority made the full-rate production decision. When a system enters initial operational test and evaluation with known deficiencies, those deficiencies should be resolved before entering full-rate production. If those deficiencies are not resolved before full-rate production, especially deficiencies effecting COIs required for a system to perform its mission, the system continues into production and thereby creates the potential need for costly retrofit of fielded units, and initial operational performance from the system that may be less than required to defeat the expected threat.

Predator Operational Effectiveness Issues. The Director stated that the report criticizes the Predator Unmanned Aerial Vehicle program for not achieving its full potential before full-rate production and deployment. Further, he stated that the program was intended as a fast-track program from the start and follows the evolutionary acquisition model in the new DoD 5000 series. He also stated that we were not justified in criticizing the Predator solely on technical and testing grounds because the Predator delivered new capabilities to warfighters earlier just as the new DoD 5000-series envisions. Further, the Director stated that DOT&E criticism of the Predator has little credibility because top-level combatant commanders had the highest praises for the Predator despite its drawbacks. The Director noted that latest draft DOT&E Annual Report to Congress withdrew last year's conclusion that Predator was not effective and not suitable.

Audit Response. The fact remains that the Predator did not meet its COI for effectiveness before full-rate production. The Predator experienced problems recognizing tactical-sized targets, as required as a critical mission function, and has continued into production and created the potential need for costly retrofit of fielded units to meet its critical mission requirements. However, if recognizing tactical-sized targets is not a COI, the cost for this additional requirement should be avoided.

F-15 Tactical Electronic Warfare System Test Plans. The Director stated that the report criticizes the test plans for the F-15 Tactical Electronic Warfare System for not showing test limitations for an excessive built-in-test false alarm rate. Further, he stated that DOT&E knew about the deficiency; therefore, no waivers were requested or submitted. The Director also stated that DOT&E approved the test plans as submitted without commenting on the lack of test limitations. In addition, he stated that test plan approval covered the test limitations and test deferrals. Further, the Director stated that DOT&E knew that the Air Force would attempt to correct the deficiency in the next incremental release, which is how evolutionary acquisition is supposed to work.

Audit Response. We agree that DOT&E was aware of the excessive built-in-test false alarm rate, as stated in the report. However, this awareness does not alleviate the requirement for the system to meet the operational requirements and COIs for that block of the evolutionary acquisition. Because the deficiency was identified before that the system entered initial operational test and evaluation, the program office should have resolved the deficiency before the system entered full-rate production for that block. The objective of the evolutionary acquisition strategy is not to deliver a substandard system to the warfighter, but, as DoD Instruction 5000.2 states, the objective is to balance needs and available capability with resources, and to put capability into the hands of the user quickly.

Joint Direct Attack Munition Issues. The Director had multiple comments concerning the Joint Direct Attack Munition. Specifically,

- Headquarters, Air Force Test and Evaluation did not require approval of waivers or test deferrals of any kind for this program. While the Air Force recognized that some tests were deferred, Headquarters, Air Force Test and Evaluation kept close watch on those matters when reviewing operational test and evaluation plans before submission to DOT&E.

- The Air Force Operational Test and Evaluation Center decertified the Joint Programmable Fuse for operational test and evaluation, not the Joint Direct Attack Munition. This test limitation was outside the control of the Joint Direct Attack Munition Program Manager and should not have held the Joint Direct Attack Munition program hostage. Other fuses were available that afforded adequate capabilities to demonstrate the Joint Direct Attack Munition. Fuse delays were only a small part of the total weapons effects equation, so the total effect on warfighters of not having the Joint Programmable Fuse was minimal.

- The Joint Direct Attack Munition re-targeting capabilities were <u>not</u> affected by lack of Joint Programmable Fuse. Re-targeting was a capability inherent in the Joint Direct Attack Munition and not dependant on the fuse. The only problem is if the Joint Direct Attack Munition were retargeted in flight, the fuse setting may not always be <u>precisely</u> compatible with the new target. For troops in contact, who need ordnance right away, this criticism does not pass the "so what" test.

Audit Response. The Director addressed information contained in the discussion draft version of this report and not the draft report. Based on Air Force comments to the discussion draft, we determined that the Joint Direct Attack Munition did not have deficiencies that affected the resolution of COIs before the milestone decision authority made the full-rate production decision.

DoD Policy. The Director states that the report cites the DOT&E Memorandum, August 3, 2001, as the DoD-level policy for directing the operational test agencies in the Military Departments to not use waivers or deferrals that prevent a complete evaluation of operational requirements. Further, he stated that personnel at the Air Force Operational Test and Evaluation Center do not consider this memo as policy, but rather guidance to DOT&E staff to implement the goal and objective of "rigorous and robust testing that is adequate." The Deputy also stated that this same guidance was provided as a courtesy to the Commander, Air Force Operational Test and Evaluation Center in a subsequent letter, August 7, 2001. In addition, he stated that DOT&E policy is officially promulgated through DOT&E policy letters and that the Air Force Operational Test and Evaluation Center immediately implements these policy letters upon receipt through updates to Air Force Operational Test and Evaluation Center directives.

Audit Response. See the response to the "DOT&E Memorandum" issue on page 69.

Management Comments on Finding B and Audit Response

The Director commented on DOT&E guidance; Air Force test policy; test limitations in test plans; revision of Air Force instructions; Air Force Instruction 99-102; testing of waived test requirements; source of information; waivers for developmental testing; inconsistent waiver policy; changes to DoD draft policy; Air Force nonconcurrence with DOT&E policy; waiver policies and procedures; and Air Force procedures, "Test and Evaluation Waivers."

DOT&E Guidance. The Director stated that DOT&E did not issue its August 3, 2001, guidance to the Air Force, and the Air Force was not afforded a chance to coordinate on the guidance.

Audit Response. See the response to the "DOT&E Guidance" issue on page 76.

Air Force Test Policy. The Director did not agree that "Air Force procedures require the processing of waivers to defer specific operational test requirements to the future." He stated that, while Air Force test policies do address waivers, those policies are not so specific. The Director stated that the Air Force addresses test limitations and test deferrals through the test plan approval process. He also stated that, during this process, the Air Force's intention is that Air Force Manual 63-119, paragraph 4.2.7, be followed: "Approval of a waiver does not eliminate or alter the requirement for OT&E [operational test and evaluation]. Waived items must be tested in subsequent OT&E or the ORD must be changed." In addition, the Director stated that the Air Force accomplishes the same goal in the end.

Audit Response. The Director's comment addressed information in the discussion draft version of this report and not the draft report. The draft report correctly stated the Air Force waiver procedures.

Test Limitations in Test Plans. The Director stated that the Air Force has no Headquarters, Air Force-level policies addressing procedures for the program managers to use test limitations in test plans to defer specific operational test requirements to the future. Further, he stated that he did not know of any major command policies in this area either.

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. In the draft report, we revised the report as stated in our response to the "Air Force Test Policy" issue on page 82. Concerning Air Force policy, Air Force Manual 63-119 requires that the description of operational test and evaluation test limitations that may affect the full-rate production decision be placed in the TEMP. The Air Force use of test limitations to defer testing has the same effect as a test waiver.

Revision of Air Force Instructions. The Director stated that Air Force test and evaluation policies are under revision. A new Air Force Instruction 99-103, "Air Force Test and Evaluation," is already in a mature stage of development and will address this area.

Audit Response. In issuing Air Force Instruction 99-103, the Air Force needs to ensure that the new instruction is consistent and compliant with DOT&E guidance on test waivers and deferrals.

Air Force Instruction 99-102. The Director stated that the Air Force has not published or is not aware of a January 20, 2000, version of Air Force Instruction 99-102. He asked whether this instruction could be Air Force Operational Test and Evaluation Center Instruction 99-102. The Deputy stated that his office did not approve Air Force Operational Test and Evaluation Center Instruction 99-102 before publication and did not review it in conjunction with his office's review of the draft of this report.

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. The draft report cited Air Force Operational Test and Evaluation Center Instruction 99-102, "Operational Test and Evaluation," January 20, 2000.

Testing of Waived Test Requirements. The Director stated that Air Force Manual 63-119, not Air Force Instruction 99-102, requires Air Force program managers to "list any required waivers or areas excluded from OT&E [operational test and evaluation]" during the certification process and in the certification message. Further, he stated that the Manual states that "approval of a waiver does not eliminate or alter the requirement for OT&E. Waived items must be tested in subsequent OT&E or the ORD must be changed."

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. The draft report referenced Air Force Manual 63-119 concerning testing of waiver requirements.

Source of Information. The Director stated that his staff could not locate the following statement in Air Force instructions: "identify test limitations in test plans to defer the demonstration of specific operational test requirements." He asked whether this statement could be in Air Force Operational Test and Evaluation Center Instruction 99-102.

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. The draft report states that "The Air Force procedures require program managers to process waivers to defer specific operational test requirements and identify test limitations in test plans." This statement paraphrases information in Air Force Manual 63-119.

Waivers for Developmental Testing. The Director stated that, although Air Force Manual 63-119 uses the term "waiver," Headquarters, Air Force Test and Evaluation does not require the Air Force Operational Test and Evaluation Center to submit formal paperwork for "acceptance" of an operational test and evaluation with test limitations or "waivers." Further, he stated that his office does not require waivers for missing developmental test and evaluation areas. The Director stated that his office leaves that decision between the Air Force Operational Test and Evaluation Center commander and the program's certifying official, who is usually the program executive officer. He also stated that the Air Force Operational Test and Evaluation Center commander makes the final decision, but must still have his test plan coordinated through Headquarters, Air Force Test and Evaluation and approved by DOT&E before starting the operational test and evaluation.

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. The draft report states that Air Force Manual 63-119 requires a waived requirement to be tested in subsequent operational test and evaluations or the user must change the ORD requirement. The draft report also states that the Manual requires the system program manager, before initial operational test and evaluation, to:

- list any required waivers or areas excluded from the test and evaluation, the rationale, and future plans to clear the waivers, and

- provide a summary of the list to the operational tester.

In response, the operational tester is to indicate whether to proceed with the test and is to discuss the effects of test limitations and test waivers on resolving operational test issues in the test report.

Inconsistent Waiver Policy. The Director stated that he agreed with the conclusion that the Military Departments do not have consistent policies, procedures, or terminology for test waivers and limitations.

Changes to DoD Draft Policy. The Director stated that the report incorrectly states that the 120-day interim guidance requires that deficiencies encountered in testing before the LRIP decision be resolved before the system can proceed beyond LRIP, and that any fixes to those deficiencies be verified during initial

operational test and evaluation. He stated that the words "initial operational test and evaluation" should read "follow-on operational test and evaluation" as stated in the latest draft version of the DoD Instruction 5000.2, paragraph 3.7.6, which was pending signature. The Director stated that the change is very significant.

Audit Response. The Director's comments addressed information in the discussion draft version of this report and not the draft report. The draft report states that the 120-day interim guidance requires that any fixes to those deficiencies be verified during follow-on operational test and evaluation.

Air Force Nonconcurrence with DOT&E Policy. The Director stated that the Air Force did not review or coordinate on the August 3, 2001, DOT&E memorandum and would have nonconcurred with the guidance on waivers and requirements. Further, he stated that he and his office do not know what guidance the other Military Departments received from DOT&E. The Director is unsure whether DOT&E disseminated the August 3, 2001, memorandum to the test and evaluation communities in the Military Departments.

Audit Response. See the response to the "DOT&E Memorandum" issue on page 69.

Waiver Policies and Procedures. The Director stated that the Air Force Operational Test and Evaluation Center did not have a policy to waive or defer operational test requirements. Further, he stated that the Commander, Air Force Operational Test and Evaluation Center supports the DOT&E goal of rigorous, robust, and adequate testing without waivers or deferrals by implementing the policy outlined in Air Force Operational Test and Evaluation Center Instruction 99-103. The Director also stated that the Commander, Air Force Operational Test and Evaluation Center will not accept certification of system readiness for operational test and evaluation until the developer can demonstrate stabilized performance under an operational (stressed) environment with a production representative article. In addition, the Director stated that test teams at the Air Force Operational Test and Evaluation Center are aware of requirements in Air Force Manual 63-119, "Certification of System Readiness for Dedicated Operational Test and Evaluation," that are critical to ensuring, in collaboration with the applicable system program office, that the system can be certified ready for operational test and evaluation.

Audit Response. See the response to the "DOT&E Memorandum" issue on page 69.

Air Force Procedures, Test and Evaluation Waivers. The Director stated that the report refers to Air Force Instruction 99-102, "Operational Test and Evaluation," when defining the Air Force's policy on test and evaluation waivers. Further, he stated that the report quotes Air Force Instruction 99-102, paragraph 2.5, and that personnel at the Air Force Operational Test and Evaluation Center believe that the report incorrectly interprets that paragraph. The Director also stated that personnel at the Air Force Operational Test and Evaluation Center refer to this paragraph when submitting a waiver to the requirement for operational test and evaluation and not to waive or defer testing of operational requirements. In addition, he stated that the report incorrectly states

that the system program manager is the individual that submits waivers under Air Force Instruction 99-102, paragraph 2.5. Further, the Director stated that program management at the Air Force Operational Test and Evaluation Center submits the waiver request, with user and developer concurrence, to the Air Force Test and Evaluation Directorate.

Audit Response. Air Force Instruction 99-102, paragraph 2.5, "Requests to Modify the Provisions for OT&E [Operational Test and Evaluation]," states that:

> Requests to modify (waive) the fundamental provisions of this AFI [Air Force Instruction] for any OT&E must be submitted in writing, with user and developer concurrence, through AFOTEC/CV [Air Force Operational Test and Evaluation Center/CV] to HQ USAF/TE [Headquarters, Air Force Test and Evaluation]. The SM [system manager] will document any approved OT&E "waivers" in the TEMP, and the system's program element monitor (PEM) will document OT&E "waivers" in the PMD [program management directive].

Based on the Director's comments, we revised the paragraph to state that the Air Force Operational Test and Evaluation Center instead of the system program manager prepares a request to waive or modify fundamental provisions for operational test and evaluation. With user and developer concurrence, the Air Force Operational Test and Evaluation Center submits the request to the Air Force Test and Evaluation Directorate.

Appendix J. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Technology, and Logistics
    Director for Acquisition Initiatives
Under Secretary of Defense (Comptroller)/Chief Financial Officer
    Deputy Chief Financial Officer
    Deputy Comptroller (Program/Budget)
Director, Operational Test and Evaluation

Department of the Army

Assistant Secretary of the Army (Acquisition, Logistics, and Technology)
Deputy Under Secretary of the Army (Operations Research)
Auditor General, Department of the Army
Commander, Army Test and Evaluation Command

Department of the Navy

Chief of Naval Operations
    Director, Navy Test and Evaluation and Technology Requirements
Commandant of the Marine Corps
    Aviation Department
Assistant Secretary of the Navy (Manpower and Reserve Affairs)
Assistant Secretary of the Navy (Research, Development, and Acquisition)
Naval Inspector General
Auditor General, Department of the Navy
Commander, Operational Test and Evaluation Force

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force
Director, Air Force Test and Evaluation
Commander, Air Force Operational Test and Evaluation Center

Non-Defense Federal Organization

Office of Management and Budget

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on Government Efficiency and Financial Management, Committee on Government Reform
House Subcommittee on National Security, Emerging Threats, and International Relations, Committee on Government Reform
House Subcommittee on Technology, Information Policy, Intergovernmental Relations, and the Census, Committee on Government Reform

Director, Operational Test and Evaluation Comments

OFFICE OF THE SECRETARY OF DEFENSE
1700 DEFENSE PENTAGON
WASHINGTON, DC 20301-1700

OPERATIONAL TEST
AND EVALUATION

April 24, 2003

MEMORANDUM FOR INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

SUBJECT: Report on the Management of Developmental and Operational Test Waivers for Defense Systems (Project No. D2001AE-0123)

Thank you for the opportunity to review and provide comments concerning your draft report on the management of test waivers within the Department. I believe that your recommendations will be useful.

We seek to limit the issuance of waivers and eliminate their intrusion into evaluations of operational effectiveness and suitability. In your report, you recommend that the Services update their policies, practices, and procedures for managing waivers. We concur. Progress has already been made in this area, and your administrative recommendations will help ensure proper management in that regard.

Additional comments on the draft report are attached.

Thomas P. Christie
Director

Attachment:
As stated

Final Report
Reference

Comments on the DoDIG; Draft Report on the Management of Developmental and Operational Test Waivers for Defense Systems (Project No. D2001 AE-0123), February 20, 2003

Revised Page 1

1. Page 1, Background, second paragraph: Change last sentence to read "…evaluation and when live-fire test and evaluation…" from "…evaluation and when live-five test and evaluation…" Reason: Correctness.

2. Report Recommendation A.2. Milestone decision authorities require that program managers resolve critical operational issues before approving full-rate production for a weapon system.

   - PARTIALLY CONCUR. There may be examples when, due to unanticipated problems (test range limitations, instrumentation limitations and/or availability, etc.), all COIs may not be fully evaluated at OT&E, while due to an operational requirement a capability is urgently needed. In such a case, it may be more beneficial to the warfighter to field that current capability rather than waiting to enter FRP until all COIs are resolved. Milestone Decision Authorities should have that prerogative.

Revised Page 48

3. Clarification: Page 40, Fighter Data Link (FDL). During IOT&E, inadequate flight hours were available to evaluate FDL BIT and logistics supportability. While 1,000 hours were required, during Follow-on Test and Evaluation, the FDL was able to demonstrate 963 hours.

Department of the Army Comments

DEPARTMENT OF THE ARMY
DEPUTY UNDER SECRETARY OF THE ARMY
OPERATIONS RESEARCH
102 ARMY PENTAGON
WASHINGTON DC 20310-0102

APR 1 8 2003

MEMORANDUM FOR OFFICE OF THE INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE (MARY L. UGONE)

SUBJECT: Draft Report – "Management of Developmental and Operational Test Waivers for Defense Systems," dated February 20, 2003, Project No. D2001AE-0123

Per your request, I hereby provide the Army management comments to the two recommendations contained in the subject report:

Recommendation A. Concur. HQDA-approved critical operational issues and criteria are focused on mission accomplishment. Per Army T&E policy, a breach of a specific criterion is reason to delay entry into full-rate production unless other evidence of acceptable system operational effectiveness and suitability is provided.

Recommendation B. Nonconcur. Referenced DOT&E memorandum was directed to the DOT&E staff and focused on the completeness of evaluations. Applying consistent test waiver and deferral guidance throughout the Department requires definition of terms. Propose this recommendation be modified to reflect the establishment of a DoD-wide process action team, chaired by the USD(AT&L) and DOT&E, with membership from the Military Department T&E headquarters and Operational Test Agencies. Thus, consistent test waiver and test deferral guidance would exist throughout the Department.

Additional comments dealing with other areas of the report are enclosed.

Walter W Hollis

Encl
as

Walter W. Hollis
Deputy Under Secretary of the Army
(Operations Research)

Printed on Recycled Paper

Final Report Reference

Additional Comments
to
Draft Report – "Management of Developmental and Operational Test Waivers for Defense Systems," dated February 20, 2003, Project No. D2001AE-0123

1. The stated genesis of this audit was the DOT&E concern about 'programs beginning operational test and evaluation without completing sufficient developmental test and evaluation.' Scope of this audit, limited to the test waiver and test deferral process, was not sufficiently broad enough to yield findings or recommendations that could improve the robustness of developmental testing or the likelihood of conducting a successful operational test.

Revised Page 19

2. Recommend that the wording in the first paragraph, top of page 16 (OSD Guidance on Test Deferrals) be revised. Of concern is the sentence that reads - "Further, the DOT&E issued guidance on August 3, 2001, that directed Military Department testers not to issue waivers or deferrals that would prevent a complete evaluation of operational requirements." Per Army T&E policy, testers are not authorized to waive documented test requirements. Modification of Recommendation B as proposed by the DUSA(OR), will enable the DOT&E guidance to be directed by the USD(AT&L) to the Service Acquisition Executives, not the testers.

3. Appendix C. Test and Evaluation Policy. Recommend that the COI approval authority be mentioned for each of the Military Departments. Being key decision maker operational concerns, stating the approval authorities will reveal how the COI and COIC are being considered (that is, as a tester product or a decision-maker product). Per AR 73-1, the COIC approval authority is based upon the type of program – (1) Deputy Chief of Staff, G-8 (Programs) for materiel and tactical C4I/IT programs and (2) Army CIO/G-6 for non-tactical C4I/IT programs. Army T&E policy also addresses a mandatory attachment entitled 'Requirements/Test Crosswalk Matrix.' Accordingly, each source for each operational requirement is identified and agreed upon with the T&E Master Plan approval.

4. Program Specific Comments

a. Section 1 – JAVELIN.

(1) Recommend removing the JAVELIN from the draft DoD IG report, as it does not support the overall argument of unresolved issues causing costly retrofits of fielded units or an initial operational performance that is less than expected to defeat the threat.

Page 5

(2) Given that JAVELIN remains in the draft DoD IG report, propose the following:
(a) Addressing Critical Operational Issues, page 5, Table of Critical Operational Issues. Non-concur. Rationale: Of the nine COI reviewed, Javelin is incorrectly identified as failing in one, reliability.

Enclosure 1

Final Report Reference

2

(b) Reliability, Availability, and Maintainability, page 8, Javelin paragraph and Operational Suitability Issues, page 31, Critical Operational Issue (Reliability). Non-concur. Rationale: The 100 hours requirement cited, is an old JSOR requirement that was written before the hardware configurations of the tactical and training systems were firm. The FTT (range) major components include a Command Launch Unit (CLU), a simulated round (SR) and an Instructors Station (IS). The U.S. Army Infantry School reevaluated the requirements prior to the AMSAA Independent Evaluation in 1994 and reduced the 100 hours to 50 hours. This 50 hours requirement was established for System Maturity, which is MS III+3 years. The requirement at Milestone (MS) III, as established by reliability projections, is 32 as reported in the ATEC System Evaluation Report (SER) for the Javelin Anti-armor Weapon System, 27 March 1997. The 25 hours still did not quite reach the 32 hours requirement (32 vs. 50), but it is much closer than 25 vs. 100, and certainly would not have caused us to not field the Javelin weapon system. The majority of the problems with the FTT (range) were related to the CLU-to-SR connector and latch, battery cables, and battery. Most of the fixes were simple and effective. This was evidenced by the FTT (range) reliability estimate of 62 hours in the ATEC System Assessment of Javelin Reliability and Availability Maturity of December 2000.

Page 8
Page 38

(c) Reliability, Availability, and Maintainability, page 8, Javelin paragraph and Operational Suitability Issues, page 31 Critical Operational Issue (Reliability), Chronology of events. Non-concur. Rationale: The last sentence in the Javelin paragraph incorrectly states that the Army operational testers resolved those suitability issues after the full-rate production (FRP) decision. ATEC conducted a follow on limited user test (LUT) in March through May 1996, primarily to resolve the FTT suitability issues. The FTT successfully met suitability criteria. Following the Javelin LUT and an additional Customer Confirmatory Test, again conducted by ATEC, the ASARC provided a MSIII FRP decision in July 1997. The FRP was not obtained until the required additional testing was successfully completed demonstrating the FTT Suitability.

Page 8
Page 38

(d) Page 5: Add training category to table.

Page 5

(e) Page 28: Include the description of the FTT (range) in the description of Javelin as this is the only issue.

Page 35

b. Section II - PATRIOT PAC-3.

(1) Cancellation of requirements general comment: As of January 2002, all Missile Defense Systems Operational Requirements Documents (ORDs) have been cancelled retroactively by the SECDEF and all future developments would be capabilities based.

(2) Operational Effectiveness/Issues, page 6 and 32, deferred requirements and test incident reports (TIRs). Non-concur. Rationale: Based on delays in software

Page 6
Pages 38 through 39

Final Report Reference

3

development and PAC-3 missile availability, a decision was made in November 1998 to split the PATRIOT PAC-3 Configuration-3 system testing, evaluation and fielding into two parts-First Unit Equipped-Ground (FUE-G) and First Unit Equipped-Missile (FUE-M). The FUE-G Limited User Test (LUT) was conducted March through October 2000. Test Incident Reports (TIRs) noted during this test were included in the FUE-G Conditional Materiel Release (CMR), and were subsequently resolved or deferred prior to the FUE-M IOTE conducted January through May 2002. Some of the deferred TIRs will be resolved through post - IOTE events. Even though the ORD has been cancelled and some of the requirements have been deferred, they are still valid user requirements and will be tested and evaluated at a later time.

Page 6
Page 38

(3) Operational Effectiveness/Issues, pages 6 and 31, PAC-3 paragraphs. Non-concur. The draft DOD IG report states "The testers were not able to resolve the operational effectiveness COI before the planned full rate production decision because the Army deferred test requirements." It is correct that there were deferrals of test requirements driven by deferrals of system performance requirements. However, the testers believe this was a prudent decision (based on world events) with acceptable risks. Rationale: The Inspector General, DOD based this audit report on the "Operational Test and Evaluation Annual Report, FY 2000" by the Director, Operational Test and Evaluation (DOT&E) in February 2001. Therefore, the comments related to PAC-3 system were based on the data obtained during Limited User Test (LUT) and Regression Test held in March through October 2000. This LUT was conducted to assess the improvement in the PAC-3 Ground Equipment operating with PAC-2/GEM missile only. A conditional materiel release was approved following the completion of the LUT and regression testing, in order to support the Ground Equipment LRIP. Deferred requirements from the TIRs were attached as the required conditions for materiel release. ATEC understood before the LUT that the PAC-3 missile system is required to meet the operational effectiveness COI, and a full-up system IOTE was conducted in January through May 2002 to assess the increased capability of the PATRIOT system integrated with PAC-3 missile. At the completion of the IOTE and regression testing, an urgent materiel release for the PAC-3 System was approved and PAC-3 system was fielded to the Army. This was due to substantial increase in system performance in the IOTE over that demonstrated in the LUT and there was valuable benefit to the Army. Current operations in the mid-east seem to validate these decisions.

Page 39

(4) Operational Suitability Issue, page 32, Reliability paragraph. Non-concur. Rationale: The draft DOD IG report states the LUT revealed a number of PAC-3 system reliability problems: (1) The communication relay group Mean Time Between Critical Mission Failure (MTBCMF) was 14 percent of the allocated value (the allocated value is a subset of the requirement); (2) the engagement control station MTBCMF was approximately half the allocated rate; and (3) the fire unit MBCMF was 60 percent of the allocation. The Routing Logic Radio Interface Unit (RLRIU) problems were the primary reasons for these higher numbers. It should

Final Report
Reference

4

be noted that the Lower Tier Project Office (LTPO) and Raytheon resolved the RLRIU problems after the FUE-G LUT and prior to the FUE-M IOTE. This correction is indicated by the improved MTBCMF from 12.6 hours during LUT to 19.4 hours during IOT.

c. Section III - TACTICAL UNMANNED AERIAL VEHICLE (TUAV).

(1) Operational Effectiveness Issues, pages 32-33, Ground Control Station and TCS compatibility paragraph. Concur with this section as written. Revised Page 40

(2) Operational Suitability Issues, pages 10 and 33,"Logistics Supportability" paragraphs. Non-concur. Recommend deletion of both paragraphs within the document. Rationale: As defined by paragraph 4.a.(6), "Required Capabilities" of the TUAV Operational Requirements Document (ORD), threshold fuel requirements for the TUAV system were met by both the TUAV system's air vehicles and generators at the May 2002 Initial Operational Test (IOT). Although a system limitation memorandum was approved for the TUAV IOT, it references an inconsistent program support requirement within paragraph 5a of the ORD and should be disregarded as input to the subject report. Per the current TUAV Test and Evaluation Master Plan, ATEC will conduct a Limited User Test to reevaluate the system upon development and integration of a replacement heavy fuel engine. Page 10 Page 40

Department of the Navy Comments

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
RESEARCH, DEVELOPMENT AND ACQUISITION
1000 NAVY PENTAGON
WASHINGTON, DC 20350-1000

23 April 2003

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR GENERAL FOR AUDITING

Subj: DEPARTMENT OF THE NAVY COMMENTS ON DODIG DRAFT REPORT ON "MANAGEMENT OF DEVELOPMENTAL AND OPERATIONAL TEST WAIVERS FOR DEFENSE SYSTEMS", REPORT D-2001AE-0123

Ref: (a) DODIG Draft Audit Report D-2001AE-0123

Encl: (1) Navy Comments Per OPNAV N91 ltr of 15 Apr 03

ASN(RDA) appreciates the opportunity to review reference (a) and offer comments to the draft report. Upon review of the report, Navy nonconcurs with the recommendations of the draft report. Enclosure (1) summarizes the areas of discrepancies with the report and outlines our position on all recommendations.

The Navy point of contact for this audit is CDR Rick Scudder, N912, at (703) 601-1731 should you need additional information.

Michael McGrath
Deputy Assistant Secretary
of the Navy
Research, Development, Test &
Evaluation

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Deliberative process privilege data omitted.

Department of the Air Force Comments

Final Report Reference

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
Washington, DC

17 APR 2003

MEMORANDUM FOR DOD IG

FROM: HQ USAF/TE
1650 Air Force Pentagon
Washington DC 20330-1650

SUBJECT: Report and Comment on the Management of Developmental and Operational Test Waivers for Defense Systems (Project No. D2001AE-0123)

AF/TE reviewed and provided comment on an earlier version of the subject report, Attachment 1.

The current request for review and comment of the subject report has been completed with the finding that very few of our original comments have been included:

a. Pages 15 through 27, missing in the original report, have been included in the current version of the report. — Pages 24 through 34

b. Comments on page 9 of the original report referencing Joint Direct Attack Munition (JDAM) minor problems have been removed. — Deleted

c. Reference to Air force Operational Test and Evaluation Center Instruction 99-102 has been corrected.

d. Comments regarding F-15 TEWS operational suitability issues have been included on page 40.

e. Comments regarding JDAM operational suitability issues have been removed.

Since the majority of our original comments have not been addressed, not been included, and apparently not considered for inclusion in the current version of the report, our original comments (Attachment 1) still stand as a valid submission.

In regard to the report's recommendation to update guidance for waivers and test deferrals, AF/TE is in the process of rewriting its AFIs and will replace AFI 99-101 and AFI 99-102.

AF/TE concurs with AFOTEC's comments (Attachment 2) on the subject report and is provided for your review.

The point of contact in AF/TE is Mr. Frank Koval, (703) 697-0296, e-mail Frank.koval@Pentagon.af.mil.

JOHN T. MANCLARK
Director, Test and Evaluation

Attachments:
1. HQ USAF/TE Comments, 9 Jan 03
2. AFOTEC Comments, 24 Mar 03

cc:
SAF/AQX
HQ AFOTEC/XP
HQ AFMC/DOX

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

9 Jan 03

MEMORANDUM FOR Department of Defense Inspector General (DoD IG)
(ATTN: JACK SNIDER)

FROM: HQ USAF/TE
1650 Air Force Pentagon
Washington DC 20330-1650

SUBJECT: Review and Comment on Preliminary Draft Report, "Management of Developmental and Operational Test Waivers for Defense Systems"

Thank you for forwarding an early draft of the subject report. We have a number of major concerns with the document and have attached a point paper with more details.

The August 3, 2001, memo referenced in the report did not reach HQ USAF/TE or the Air Force Operational Test and Evaluation Center (AFOTEC). A different memo dated 7 August, 2001 was sent to AFOTEC; however, it did not contain any guidance about test and evaluation (T&E) waivers. We have since obtained a copy of the August 3, 2001 memo addressed only to the DOT&E Staff. Had the Air Force been given the opportunity to review or coordinate on the August 3, 2001 memo, we would have non-concurred with the language about waivers and requirements. We are unsure if the August 3, 2001 memo was fully disseminated to the entire T&E community.

The draft report reveals great differences in opinion, policy, and practice among the Services and DOT&E staff about what constitutes a "waiver." The Air Force believes the draft report incorrectly considers test waivers, test limitations, and test deferrals as the same thing. The Air Force rarely applies outright for test waivers, but identifies test limitations and test deferrals to DOT&E through the test plan approval process. Once DOT&E reviews and approves the test plans, there is no need for additional action. We are following DoD 5000 policy and Title 10 which do not require waivers for test limitations or test deferrals. Nonetheless, we are currently revising all HQ USAF T&E policy documents and plan to address the use of waivers in more detail. The other Services appear to use different strategies and policies.

The draft report fails to recognize that USD(AT&L) institutionalized evolutionary acquisition (EA) in the latest DoD 5000-series as the "preferred acquisition strategy." The draft report also fails to recognize the principles of time-phased requirements articulated in CJCSI 3170.01B, *Requirements Generation System*. The main point is that deferrals of some requirements and capabilities, and therefore testing of the associated critical operational issues and requirements, must now be planned for so that EA and time-phased requirements will work. Materiel developers, testers, and users can no longer expect a technically perfect solution or "the perfect test" in the first increment that's deployed. USD(AT&L) mandated that trade-offs be made between cost, schedule,

and performance so development programs get interim capabilities delivered sooner while keeping cost and schedule under control.

The three Air Force programs cited (Predator, Joint Direct Attack Munition, and F-15 Tactical Electronic Warfare System) all used the EA strategy and time-phased requirements to varying degrees to field new capabilities earlier than the traditional acquisition process. The examples of test waivers, limitations, and deferrals cited in the report do not rise to a level of significance that warrant delaying any of these programs. Program managers are following DoD 50000 guidance to field capabilities to warfighters sooner.

Finally, Air Force testers were not in-briefed or consulted during this audit. Since the draft report discusses Service development programs and T&E policies, the DoD IG should conduct interviews with Air Force and other Service officials in charge of these areas. To that end, we look forward to discussing the details of the draft report and the attached paper with you at your earliest convenience. The points of contact in HQ USAF/TE are Lt Col Bo Tye, (703) 697-0190, e-mail Bo.Tye@Pentagon.af.mil, and Mr. Chuck Triska, (703) 697-0299, e-mail Charles.Triska@Pentagon.af.mil.

// signed //

DAVID HAMILTON
Deputy Director, Test and Evaluation

Attachment:
Discussion Paper

cc:
SAF/AQX
HQ AFOTEC/XP
HQ AFMC/DOX
412 TW/CC

Final Report Reference

Discussion Paper
on
Draft Proposed DoD IG Report
on
"Management of Developmental and Operational Test Waivers for Defense Systems"

OVERVIEW: This paper comments on the subject draft DoD IG report. Information in the draft appears to come solely from the Director, Operational Test and Evaluation (DOT&E) with minimal to no input from the Services. There was no in-brief or interviews with Air Force testers that we know of.

DISCUSSION:

- Page 1, paragraph 1, lines 7-11: We agree that "DoD guidance does not specifically define what a waiver from developmental and operational testing is." There is no officially coordinated definition or policy. The only DoD-level test and evaluation (T&E) waivers we know of descend from Title 10 §2399 and §2366 with regards to system contractor involvement in operational test and evaluation (OT&E) and when live fire test and evaluation (LFT&E) is too expensive and impractical. The Air Force recognizes and uses these kinds of waivers when necessary. Page 1

-- However, we disagree with DOT&E's definition of a waiver as a "deferral of a testing requirement, which does not eliminate the requirement for testing." Deferring the test of a system requirement to a later point in program development does not mean the need to test it is waived. This definition is not officially recognized DoD-wide, nor was it coordinated with the Service testers. It is evident the concept of a "test waiver" varies greatly among the Services.

-- In addition to the Title 10 waivers, Air Force Instruction (AFI) 99-102, *Operational Test and Evaluation*, requires "waivers" in three other instances:

--- Program managers (PM) must obtain a waiver from Air Force Materiel Command to use non-DoD test facilities when such facilities are available (paragraph 3.10.2);

--- AFOTEC must obtain a waiver from HQ USAF/TE before AFOTEC may transfer responsibility for an OT&E program to a major command (paragraph 6.23.2); and

--- AFOTEC must obtain a waiver from HQ USAF/TE before AFOTEC can alter, exclude areas from, or not conduct an OT&E (paragraph 2.5). AFOTEC needs user and developer concurrence before HQ USAF/TE can process these kinds of waivers.

--- In addition, AFMAN 63-119, *Certification of System Readiness for Dedicated OT&E*, paragraph 4.2.7, states, "Approval of a waiver does not eliminate or alter the requirement for OT&E. Waived items must be tested in subsequent OT&E or the ORD must be changed." These are waivers that result from the process for Certification of Readiness for OT&E.

- Page 1, paragraph 2, line 3: We know of no requirement for the Services to obtain waivers for DT&E of any kind. In addition, DOT&E is restricted by Title 10 §139(d) as follows: "The Director may not be assigned any responsibility for developmental test and evaluation, other than the provision of advice to officials responsible for such testing." Page 1

- Page 2, paragraph 1, line 5-6: The report alleges there are "waiver equivalents" called "test limitations" and "[test] deferrals." These are not the same as a waiver. The report's language generates confusion about what is a waiver and when it's required. Pages 1 through 2

Final Report Reference

-- The Air Force rarely applies outright for test waivers, but instead identifies test limitations and test deferrals to DOT&E through the test plan approval process. Once DOT&E reviews and approves the test plans, to include the test and evaluation master plan (TEMP), there is no need for additional action. We follow DoD 5000 and Title 10 which do not require waivers for test limitations or test deferrals. Submission of a separate waiver request in addition to an approved test plan is a redundant action.

--- Test limitations are not test waivers. They are constraints to an ideal test strategy or plan imposed by circumstances largely beyond everyone's control. They are documented in test plans and TEMPs along with ways to mitigate the impacts and still produce acceptable evaluations.

--- Test deferrals are not test waivers. They are agreements that certain parts of a T&E program may be delayed until a later point in systems development. They are based on trade-off decisions mutually acceptable to developers, testers, and users, and are documented in test plans and TEMPs.

Revised Page 3

- Page 2, paragraph 2, line 2: Multiple comments:

-- First, there is no requirement to resolve all critical operational issues (COI) before proceeding into full-rate production (FRP) or deployment for software-intensive systems. COIs are tester-developed and not operational requirements. Some COIs such as operational suitability require a much greater amount of testing so that the operational requirement may not be satisfied until later. The new reformed acquisition environment allows the milestone decision authority (MDA) to use trade-off analysis to defer the closure of COIs when it makes good sense for the program.

-- Second, the fact that some COIs are not resolved prior to FRP or deployment is not caused solely by the testers (DT&E and OT&E), but is the final responsibility of the materiel developer and the MDA. The tester's job is to provide information to the developer and MDA within the constraints of the acquisition and T&E strategies. The MDA makes the final decision to proceed into production (not the testers) based on the COIs there were resolved, taking into account those COIs that were not resolved.

Page 3

- Page 2, paragraph 3, all: Appendix C is missing along with pages 15 through 27. DOT&E is not qualified to speak for the Services regarding Service T&E policies. DoD IG should come to the Service testers to complete this section.

Page 3

- Page 2, paragraph 4, lines 6-11: We note some problems with the August 3, 2001, DOT&E memo and its attachment. First, the memo was not addressed to the Services, but only to the "DOT&E Staff," and was not coordinated with the Services before publication. It included a few sentences about test waivers with which we fundamentally disagree such as, "There will be no waivers, or deferrals, to the completeness of evaluations. Requirements waived should be considered failed unless changed." If testing a requirement is deferred because a support asset was not available during test, this does not mean the system "failed" to meet the requirement. These statements are too extreme and run counter to the spirit of streamlined acquisition in the current DoD 5000-series and CJCSI 3170.01B, *Requirements Generation System*.

Page 4

- Page 3, paragraph 4, Air Force Policy, last line: A key caveat overlooked in this paragraph (and the rest of the report) are the last two words, "unless unavoidable." These words allow for unforeseen circumstances in development programs and T&E strategies that would do great harm to programs if no management flexibility were allowed. In some instances, it is better to defer a test requirement or completion of a COI than severely penalize the program with cost and schedule

Final Report Reference

impacts resulting from a less than perfect development or T&E program. This caveat allows PMs, testers, and users to make reasonable trade-offs in the best interests of warfighters according to DoD 5000's new streamlined acquisition principles.

- Page 3, paragraph 5, multiple comments:

-- Occasionally, some COIs are not possible to resolve in initial OT&E (IOT&E) prior to FRP or deployment due to the nature of the ORD requirement and/or test limitations. Consider a suitability requirement for 1000 hours mean time between failure for an aircraft system. Demonstrating this requirement may require up to 5,000 flying hours in some instances. It may not be possible or good program management to insist that 5,000 flying hours are logged before making a FRP or deployment decision. Other tools such as reliability growth curves can reduce risk and help make good projections when these kinds of test limitations occur. Page 4

-- The draft report again confuses test waivers with test limitations and test deferrals. This problem continues throughout the report.

- Page 4, Table of COIs Not Fully Resolved: The table is out of balance because it's focused almost solely on suitability COIs. As explained in the previous paragraph, some suitability requirements and COIs are notoriously hard to achieve in the limited time frame of a development program and an OT&E. Trying to achieve 5,000 flying hours was an example of a suitability requirement or COI that is a test limitation, and which may require deferral of a final answer that resolves the requirement or COI until a later date. EA strategies recognize this may happen. Page 5

- Page 5, paragraph 4, lines 1-4: The draft states that the Joint Requirements Oversight Council (JROC) deferred some test requirements as part of an evolutionary development program. This is a good example of how evolutionary acquisition (EA) works to ensure earlier delivery of capabilities to warfighters. Evolutionary acquisition is the "preferred acquisition strategy" in DoD. It is also not justified to criticize the Patriot program for deferring a requirement after careful deliberation with the JROC and deploying much-needed capabilities to protect our warfighters. Revised Page 6

- The next 6 pages (5 through 10) cite 11 case studies focused on relatively minor problems that did not warrant delaying the FRP or deployment decisions. There are no perfect development programs and no perfect T&E programs. Waiting for every problem to be resolved, no matter how small, before FRP or deployment would result in no systems being deployed, or at best would add totally unacceptable cost and delay to programs. The decision to "waive" test requirements or defer some tests is a mutual agreement between the testers, materiel developers, and users based on program and technical risk weighed against the risk of not deploying new capabilities to our warfighters. Sometimes "better" is the worst enemy of "good enough." Pages 6 through 11

- Page 6, paragraph 3: The draft criticizes the Predator for not achieving its full potential before FRP and deployment. It was intended as a fast-track program from the start and follows the new DoD 5000-series EA acquisition model. It is not justified to criticize Predator solely on technical and testing grounds since Predator delivered new capabilities to warfighters earlier just as the new DoD 5000-series envisions. DOT&E's criticism of Predator has little credibility because top-level combatant commanders had the highest praises for Predator despite its drawbacks. Note that DOT&E's latest draft Annual Report to Congress has withdrawn last year's conclusion that Predator was not effective and not suitable. Page 7

Final Report Reference

Page 8

- Page 7, paragraph 3: The draft criticizes the F-15 Tactical Electronic Warfare System (TEWS) test plans for not showing test limitations. The deficiency was known to DOT&E at the time, so no waivers were requested or submitted, and DOT&E approved the test plans as submitted without comment in this area. Test plan approval covered the test limitations and test deferrals. DOT&E knew that the Air Force would attempt to correct the deficiency in the next incremental release which is how EA is supposed to work.

Deleted

- Page 9, paragraph 1, multiple comments on the Joint Direct Attach Munition (JDAM):

-- First, HQ USAF/TE did not require approval of waivers or test deferrals of any kind for this program. While we recognize that some tests are deferred, HQ USAF/TE keeps close watch on these matters when reviewing OT&E plans before submission to DOT&E.

-- Second, AFOTEC decertified the Joint Programmable Fuse (JPF) for OT&E, not the JDAM. This test limitation, outside the control of the JDAM PM, should not hold the JDAM program hostage. Other fuses were available that afforded adequate capabilities to demonstrate JDAM. Fuse delays are only a small part of the total weapons effects equation, so the total impact to warfighters of not having JPF is minimal.

-- Third, JDAM's re-targeting capabilities are <u>not</u> affected by lack of JPF. Re-targeting is an capability inherent in JDAM itself and not dependant on the fuse. The only problem is if the JDAM were retargeted in flight, the fuse setting may not always be <u>precisely</u> compatible with the new target. For troops in contact who need ordnance right away, this criticism does not pass the "so what" test.

Page 12

- Page 10, paragraph A.1: <u>Non-concur</u>. The words "waivers or their equivalents" are not uniformly accepted terms or practices across DoD and the Services. Therefore, that terminology is too problematic as discussed earlier in this paper. The August 3, 2001, memo was not coordinated with the Air Force, and we have fundamental disagreements with its statements on waivers and requirements.

Page 14

- Page 10, paragraph A.2: <u>Non-concur</u>. The recommendation is counter-productive and undermines USD(AT&L)'s new direction in the DoD 5000-series to make EA the preferred acquisition strategy. MDAs must retain sufficient management flexibility to plan wisely, and must retain authority to make needed trade-offs between cost, schedule, and performance for the good of the program. If implemented, large cost overruns and long delays to fielding new capabilities to warfighters would become routine.

Page 17

- Page 11, paragraph 1, lines 9-13: We have not been issued this DOT&E direction, nor were we afforded a chance to coordinate. This matter was discussed earlier.

Page 17

Page 11, paragraph 2, 3rd bullet: Multiple comments:

-- First, we do <u>not</u> agree that "Air Force procedures require the processing of waivers to defer specific operational test requirements to the future." While Air Force test policies do address waivers, those policies are not so specific. As explained earlier, the Air Force addresses test limitations and test deferrals through the test plan approval process. During this process, our intention is that AFMAN 63-119, paragraph 4.2.7, be followed, namely, "Approval of a waiver does not eliminate or alter the requirement for OT&E. Waived items must be tested in subsequent OT&E or the ORD must be changed." We accomplish the same goal in the end.

-- Second, the Air Force has no HQ USAF-level policies addressing procedures for PMs to use test limitations in test plans to defer specific operational test requirements to the future. We know of no major command policies in this area, either.

Final Report Reference

-- Third, Air Force T&E policies are under revision. A new AFI 99-103, *Air Force Test and Evaluation*, is already in a mature stage of development and will address this area.

- Page 13, paragraph 2, Air Force Procedures: Multiple comments: — Revised Page 19

-- We have not published or heard of a January 20, 2000 version of AFI 99-102. Could this possibly be AFOTEC Instruction 99-102? We did not approve this document before publication, and have not reviewed it in conjunction with our review of your draft report.

-- AFMAN 63-119, not AFI 99-102, requires Air Force PMs to "list any required waivers or areas excluded from OT&E" during the certification process and in the certification message. It also says "approval of a waiver does not eliminate or alter the requirement for OT&E. Waived items must be tested in subsequent OT&E or the ORD must be changed."

-- We could not locate where this statement was made in HQ USAF policy instructions: "identify test limitations in test plans to defer the demonstration of specific operational test requirements . . ." Could this be in AFOTEC Instruction 99-102?

-- Although AFMAN 63-119 uses the term "waiver," HQ USAF/TE does not require AFOTEC to submit formal paperwork for "acceptance" of an OT&E with test limitations or "waivers." We do not require waivers for missing DT&E areas. We leave that between the AFOTEC commander and the program's certifying official (usually the PEO). The AFOTEC commander makes the final decision, but must still get his test plan coordinated through HQ USAF/TE and approved by DOT&E before starting the OT&E.

- Page 14, first paragraph: We agree with the conclusion that the Services do not have consistent policies, procedures, or terminology for test waivers and limitations. — Pages 19 through 20

- Page 14, paragraph 2, multiple comments:

-- In lines 7-8, the words "initial operational test and evaluation" read "FOT&E" in the latest version of DoDI 5000.2, paragraph 3.7.6, pending signature on January 13, 2003. That change is very significant. — Revised Page 20

-- In lines 8-14, The Air Force did not review or coordinate on the August 3, 2001, memo and would have non-concurred with language on waivers and requirements. We do not know what the other Services received. We are unsure if the August 3, 2001, memo was fully disseminated to the Service T&E communities. — Page 20

- Page 14, Recommendation B: Partly concur. We agree that uniform policies about waivers may possibly be good policy for the DoD, but we non-concur with making all Service polices, and particularly Air Force policies, mirror DOT&E's policies. DOT&E should first open a dialogue with the Services and seek consensus before institutionalizing new policies. Imposition of a "one-size-fits-all" approach could undermine USD(AT&L)'s attempts to streamline acquisition using EA and time-phased requirements in the new DoD 5000-series. — Revised Page 21

- Pages 15 to 27 are missing. These pages include Appendices C and D. — Pages 24 through 35

- Page 38, F-15 TEWS Operational Suitability Issues: The draft report fails to mention that DOT&E approved the Band 1.5 TEMP and OT&E plan, both of which addressed the false alarm rate and future testing that was needed. The draft report also fails to mention that the Air Force submitted plans to DOT&E to remedy the false alarm rate problems in the next increment (Band 5.0). — Page 48

Final Report Reference

Deleted

- Page 39, Joint Direct Attack Munition: Most of the issues in this paragraph were addressed previously. In addition, note that the JPF system program office (SPO), not the JDAM SPO, is responsible for finding solutions to this interoperability problem. Also note that FOT&E is a natural follow-up to IOT&E whether or not the JPF was included in the IOT&E. FOT&E was not planned solely because JPF was not available.

C. Triska, HQ USAF/TEP (SAIC), 9 Jan 03, (703) 697-0299

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER
KIRTLAND AIR FORCE BASE, NEW MEXICO

24 Mar 03

MEMORANDUM FOR USAF/TE

FROM: AFOTEC/CV
8500 Gibson Blvd SE
Kirtland AFB NM 87117-5558

SUBJECT: DoD IG Draft Report, Management of Development and-Operational Test Waivers for Defense Systems, (Project Code D2001AE-0123)

1. This is in reply to your tasker requesting AFOTEC provide comments to the subject draft report.

2. AFOTEC does not concur with all the conclusions reached in this report. Our concerns fall in to two primary areas; 1) A flawed assumption on the part of the DoD IG evaluators regarding the defintion of a "waiver" and 2) assuming a DOT&E internal memorandum is a policy directive to the OTAs. Detailed comments on the draft report are provided in the attachment.

3. My POC for this action is Lt Col Kevin Grill, XPY, DSN 246-9507 and E-mail kevin.grill@afotec.af.mil.

DOUGLAS R. LINCOLN, JR.
Colonel, USAF
Vice Commander

Attachment
AFOTEC Comments to DoD IG Draft Report

Final Report Reference

AFOTEC Comments to DoD IG Draft Report, Management of Developmental and Operational Test Waivers for Defense Systems, (Project Code D2001AE-0123)

1. General Comment: The DoD IG's assumption that test waivers, limitations, and deferrals are equivalent terms is not an acceptable assumption to AFOTEC. Each of these terms has their own specific meaning and use. This assumption creates a misinterpretation of facts and data throughout the rest of the report.

Page 3

2. Page 3, "DoD Policy", first paragraph
Comment: DoD IG cites the Director of OT&E Memorandum, dated 3 Aug 2001, as the DoD level policy for directing service OTAs to not use waivers or deferrals that prevent a complete evaluation of operational requirements. AFOTEC does not consider this memo as policy, but rather guidance to Mr. Christie's staff to ensure the goal and objective of "rigorous and robust testing that is adequate" is implemented. This same guidance was provided as a courtesy to the AFOTEC Commander in a subsequent letter, dated 7 Aug 2001. DOT&E policy is officially promulgated through DOT&E Policy Letters. AFOTEC immediately implements these policy letters upon receipt through updates to AFOTEC Directives.

Page 17

3. Page 13, "B. Waiver Policies and Procedures"
Comment: AFOTEC does not implement a policy to waive or defer operational test requirements. The AFOTEC Commander supports Mr. Christie's goal of rigorous, robust and adequate testing, without waivers or deferrals, by implementing the policy outlined in AFOTEC Instruction 99-103, "Conduct of OT&E", paragraph 4.7. The AFOTEC Commander will not accept certification of a system readiness for OT&E until the developer can demonstrate stabilized performance under an operational (stressed) environment with a production representative article. AFOTEC Test Teams are advised that AFMAN 63-119, "Certification of System Readiness for Dedicated OT&E", templates 8, 15 and 19 are critical to ensuring, in collaboration with the System Program Office, the system can be successfully certified.

Revised Page 19

4. Page 15, "Air Force Procedures, Test and Evaluation Waivers"
Comment: Air Force Instruction 99-102, "Operational Test and Evaluation", is referred to by the DoD IG when defining the Air Force's policy on test and evaluation waivers. Paragraph 2.5 is quoted, and AFOTEC believes incorrectly interpreted by DoD IG. AFOTEC refers to this paragraph when submitting a waiver to the requirement to do OT&E, <u>not</u> to waive or defer testing of operational requirements. The DoD IG report states that the <u>**system program manager**</u> is the individual that submits waivers under AFI 99-102, paragraph 2.5. This is not a correct statement. The <u>**AFOTEC program management**</u> submits the waiver request, with user and developer concurrence, through the AFOTEC/CV, who in-turn submits the request to AF/TE.

Page 30

5. Page 23, "Waiver"
Comment: The DoD IG report contains DOT&E's definition of a waiver. AFOTEC has searched Title 10, past versions of DoD 5000 series directives, the current OSD acquisition interim directives and guidance, and the current draft DoD 5000 series directives for DOT&E's waiver definition. We cannot find this definition. Nor does policy or guidance exist in any of these documents on the process to waive or defer, or not waive/defer, testing of operational requirements. AFOTEC recommends that if DOT&E desires to establish a policy not allowing the wavier or deferral of testing operational requirements, such a statement needs to be documented in the current draft version of the DoD 5000 series directives.

Final Report
Reference

Page 24

6. Page 17, Appendix A. "Scope and Methodology", 7th bullet
Comment: Nowhere does it identify what conclusion the IG team came to in determining the role of Institute for Defense Analysis (IDA) in the T&E waiver process. It is the opinion of AFOTEC that IDA has NO role in the process. They are simply a support contractor to DOT&E.

Team Members

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing of the Department of Defense prepared this report. Personnel of the Office of the Inspector General of the Department of Defense who contributed to the report are listed below.

Mary L. Ugone
John E. Meling
Jack D. Snider
Neal J. Gause
Alice F. Carey
Tracey E. Dismukes
Jacqueline N. Pugh