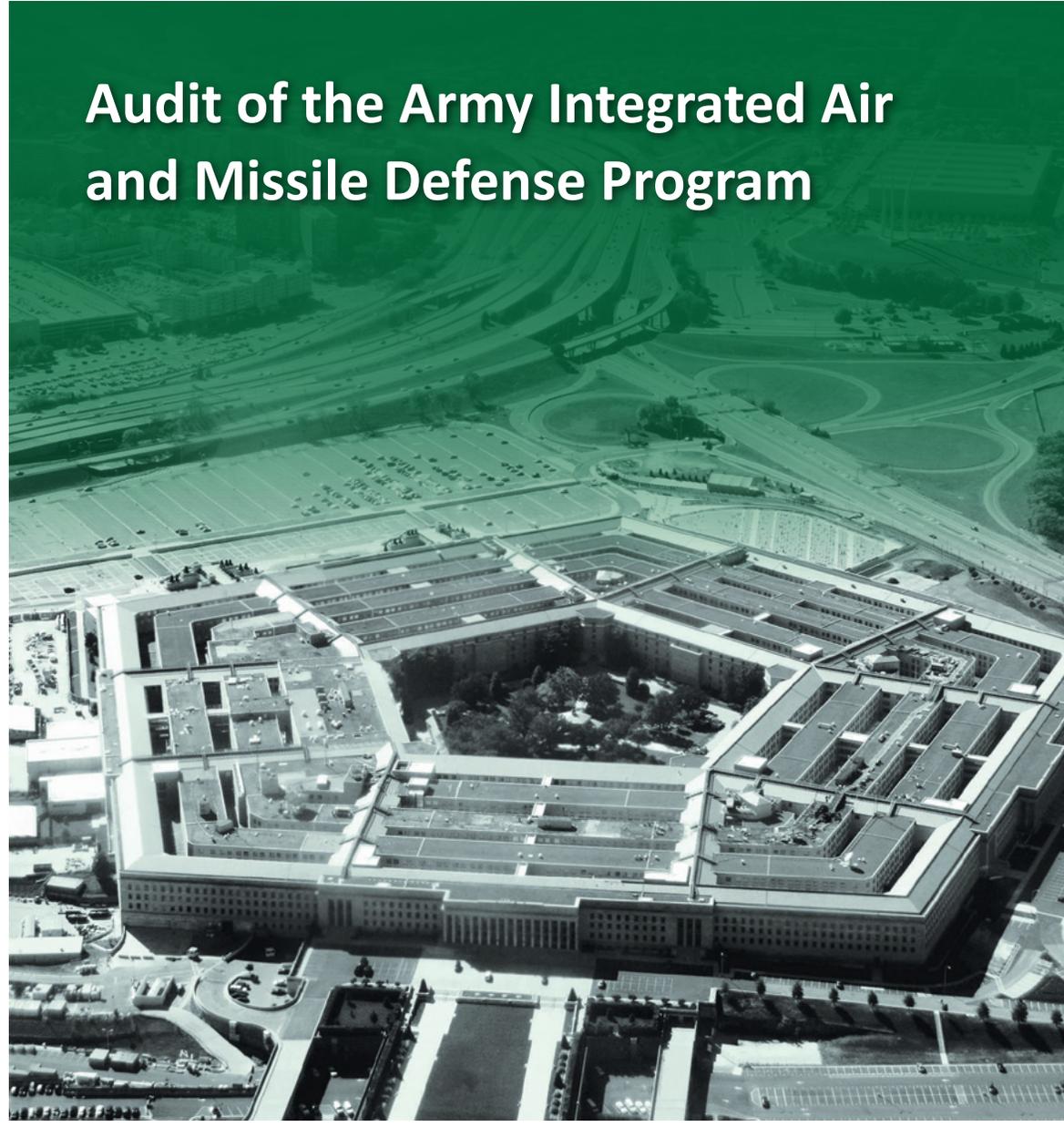


~~FOR OFFICIAL USE ONLY~~

INSPECTOR GENERAL

U.S. Department of Defense

AUGUST 19, 2019



Audit of the Army Integrated Air and Missile Defense Program

INTEGRITY ★ INDEPENDENCE ★ EXCELLENCE

The document contains information that may be exempt from mandatory disclosure under the Freedom of Information Act.

~~FOR OFFICIAL USE ONLY~~





Results in Brief

Audit of the Army Integrated Air and Missile Defense Program

August 19, 2019

Objective

We determined whether the Army is developing an affordable Integrated Air and Missile Defense (IAMD) program that can meet all capability requirements and whether these requirements remain valid and meet current and future warfighter needs. A capability requirement is a capability that an organization needs to fulfill its roles, functions, and missions in current or future operations.

Background

The Army IAMD program is a major defense acquisition program with an estimated \$3.2 billion in research, development, test, and evaluation costs and \$4.5 billion in procurement costs. The Army IAMD system includes a common mission command center, integrated fire control network, and common interface kits that connect Army air and missile defense sensors and weapons.¹ The IAMD system combines data from sensors and weapons using common software that creates a single, integrated display of air and missile threats within a particular airspace. The warfighter can then determine the most appropriate weapon to defeat air and missile threats, including ballistic missiles, cruise missiles, manned aircraft, unmanned aerial systems, and air-to-surface missiles.

In December 2009, the IAMD program milestone decision authority, the final decision maker for program reviews, approved the program to enter the

¹ The integrated fire control network communicates air and missile threat data and fire control solutions between IAMD sensors and weapons.

Background (cont'd)

engineering and manufacturing development phase to develop, build, and test IAMD systems to verify that it meets all operational requirements.

In May 2016, the Army completed a limited user test to assess whether the IAMD met operational requirements and to support a planned August 2017 Milestone C decision to begin production. A limited user test is an operational test during which warfighters operate IAMD systems in a realistic operational environment. The limited user test showed that the IAMD system software was not fully developed and functioning as intended. For example, the IAMD system could not correctly identify air and missile threats. In April 2017, the IAMD project manager notified the milestone decision authority that the August 2017 Milestone C date could not be met because the results of the limited user test showed that the system was not operationally effective, suitable, or survivable for current and future operations.²

In December 2017, the milestone decision authority approved the IAMD project office's plan to delay the Milestone C review until September 2020, because the system did not pass the 2016 limited user test. The purpose of the Milestone C review is to carefully assess a program's readiness and to make a sound investment decision before committing DoD financial resources to begin production.

Finding

(FOUO) We determined that the Army IAMD capability requirements, developed to address current and future warfighter needs, remained valid. However, IAMD project officials will not have a full analysis of the next limited user test data until [REDACTED] after the Milestone C review, scheduled for September 2020. To meet the scheduled Milestone C review, IAMD project officials plan to rely on a quick look of IAMD system performance that includes developmental tests and the limited user test. A quick look is a limited review and will not fully measure all IAMD

² Effectiveness is a measure of the overall ability of a system to accomplish a mission. Suitability is the degree to which a system can be placed and sustained satisfactorily in the field. Survivability is the system's ability to survive threats in its operating environment.



Results in Brief

Audit of the Army Integrated Air and Missile Defense Program

Finding (cont'd)

(FOUO) capability requirements or fully evaluate system effectiveness, suitability, and survivability. IAMD project officials' plan to rely on a quick look to support the Milestone C decision does not meet the requirements of DoD Instruction 5000.02, which requires project officials to verify all operational requirements have been met (through testing) before a Milestone C review.³

(FOUO) IAMD project officials will not have a full analysis of the limited user test because officials delayed the completion of the limited user test event from [REDACTED] due to the late delivery of IAMD hardware components. However, IAMD project officials have not adjusted the Milestone C review to account for the delay so that the test schedule would continue to be event-driven, as required by DoD Instruction 5000.02.⁴

Furthermore, the Army may not be able to afford production and sustainment of the IAMD program through 2049 as planned because Army G-8 officials have not established total life-cycle affordability constraints through an affordability analysis for unit production and sustainment costs of the IAMD system. The purpose of a total life-cycle affordability analysis is to set realistic program baselines to control life-cycle costs and help instill more cost-conscious management in the development of the IAMD program.

As a result, the milestone decision authority may approve procurement of six initial IAMD systems, at a total cost of about \$29.6 million, based on an incomplete analysis of the limited user test. With an incomplete analysis of the limited user test, IAMD project officials may discover system deficiencies after the Milestone C decision that require additional time and funds to correct. The time needed to correct system deficiencies may delay the fielding of the

IAMD system. Furthermore, without the total life-cycle affordability analysis and affordability constraints, Army G-8 officials have limited assurance that the IAMD program is affordable within the air and missile defense portfolio, the project manager cannot ensure program costs are within affordability constraints, and the milestone decision authority cannot enforce affordability constraints throughout the program life cycle. Assessing life-cycle affordability of systems with affordability constraints is essential for establishing the financial achievability of the program and setting realistic program baselines to control life-cycle costs and help instill more cost-conscious management in the development of the IAMD program.

Recommendations

We recommend that the IAMD project manager modify the Milestone C review date to allow sufficient time to fully analyze and report on the limited user test data.

We recommend that the Deputy Chief of Staff of the Army, G-8, immediately conduct an affordability analysis to establish total life-cycle affordability constraints and determine whether the Army can afford the IAMD program through 2049, in accordance with DoD Instruction 5000.02.

Management Comments and Our Response

The IAMD project manager agreed with the recommendation. However, the project manager stated that a decision to delay the Milestone C review date is premature because the milestone decision authority has stated that the Milestone C decision will not occur until enough relevant information is presented to properly

³ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," Section (9) EMD Phase (a) Purpose, Change 4 Incorporated, August 31, 2018.

⁴ DoD Instruction 5000.02, Enclosure 4, Section 5.a and Enclosure 5, Section 10.e.



Results in Brief

Audit of the Army Integrated Air and Missile Defense Program

Management Comments (cont'd)

inform the decision. Although the project manager agreed with the recommendation, his comments were not responsive to the intent of the recommendation; therefore, the recommendation is unresolved. The quick look will not provide the milestone decision authority with complete information to verify the IAMD system meets all operational requirements at the Milestone C review. We request that the IAMD project manager describe the specific actions that would ensure the milestone decision authority will have complete information on the IAMD system performance at the Milestone C review so that the milestone decision authority can verify whether all IAMD operational requirements have been met through testing as required by DoD Instruction 5000.02.

The Fire Division Chief, responding for the Deputy Chief of Staff of the Army, G-8, neither agreed nor disagreed with the recommendation, but he stated that Army G-8 officials would conduct an affordability analysis, as part of providing an updated cost estimate, planned to begin in the first quarter of FY 2020, before the Milestone C decision. Comments from the Fire Division Chief did not address the specifics of the recommendation; therefore, the recommendation is unresolved. Although the Fire Division Chief

acknowledged the recommendation, Army G-8 officials will not immediately conduct an affordability analysis to establish affordability constraints. The IAMD program entered the engineering and manufacturing development phase almost 10 years ago and still has no required affordability constraints established through an affordability analysis. Affordability constraints are fixed cost requirements, equivalent to capability requirements, to be managed by the IAMD project manager. Without affordability constraints, the Army cannot prioritize IAMD capability requirements and cost tradeoffs within the Army air and missile defense portfolio, and the IAMD project manager cannot effectively manage the program. We request that the Deputy Chief of Staff of the Army, G-8, reconsider his position and immediately conduct an affordability analysis to establish affordability constraints for the IAMD program in accordance with DoD Instruction 5000.02.

Please see the Recommendations Table on the next page for status of recommendations.

Recommendations Table

Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Deputy Chief of Staff of the Army, G-8	2	None	None
Project Manager, Army Integrated Air and Missile Defense Program	1	None	None

Please provide Management Comments by September 17, 2019.

Note: The following categories are used to describe agency management’s comments to individual recommendations.

- **Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **Closed** – OIG verified that the agreed upon corrective actions were implemented.



**INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500**

August 19, 2019

MEMORANDUM FOR AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit of the Army Integrated Air and Missile Defense Program
(Report No. DODIG-2019-114)

This final report provides the results of the DoD Office of Inspector General's audit. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

This report contains recommendations that are considered unresolved because the Fire Division Chief, Office of the Deputy Chief of Staff of the Army, G-8, and the Project Manager, Army Integrated Air and Missile Defense Program, did not agree with or did not fully address the recommendations presented in the report.

Therefore, as discussed in the Recommendations, Management Comments, and Our Response section of this report, the recommendations remain open. We will track these recommendations until an agreement is reached on the actions to be taken to address the recommendations, and adequate documentation has been submitted showing that the agreed-upon action has been completed.

DoD Instruction 7650.03 requires that recommendations be resolved promptly. Therefore, please provide us your response concerning specific actions in process or alternative corrective actions proposed on the recommendations by September 17, 2019. Comments provided to the final report must be marked and portion-marked, as appropriate, in accordance with DoD Manual 5200.01. Your response should be sent to either audacs@dodig.mil or [REDACTED] if classified SECRET.

Please direct questions to me at (703) 604-9312 (DSN 664-9312). We appreciate the cooperation and assistance received during the audit.

A handwritten signature in black ink that reads "Theresa S. Hull".

Theresa S. Hull
Assistant Inspector General for Audit
Acquisition, Contracting, and Sustainment

Contents

Introduction

Objective.....	1
Background.....	1
Acquisition Guidelines for Testing and Affordability Analysis.....	4
Review of Internal Controls.....	4

Finding. IAMD Requirements Remain Valid, but Test Analysis Will Be Incomplete at the Milestone C Review and the Program May Be Unaffordable..... 5

Capability Requirements Remain Valid and Meet Warfighter Needs.....	6
IAMD Project Officials Plan to Rely on an Incomplete Test Analysis at the Milestone C Review.....	8
IAMD Project Officials Have Not Allowed Sufficient Time to Analyze Limited User Test Data.....	11
The Milestone Decision Authority May Approve Production of IAMD Systems That May Not Meet All Capability Requirements.....	12
The IAMD Program May Be Unaffordable.....	13
Army G-8 Officials Have Not Established Total Life-Cycle Affordability Constraints for the IAMD Program.....	13
Army G-8 Officials Have Limited Assurance That the IAMD Program Is Affordable.....	16
Conclusion.....	16
Management Comments on the Finding and Our Response.....	17
Recommendations, Management Comments, and Our Response.....	19

Appendixes

Appendix A. Scope and Methodology.....	22
Use of Computer-Processed Data.....	24
Prior Coverage.....	24
Appendix B. IAMD Schedule History and Significant Program Events.....	28
Appendix C. Original and Revised KSAs and APAs for the IAMD Program.....	29

Contents (cont'd)

Management Comments

Deputy Chief of Staff of the Army, G-8.....	32
Program Executive Office, Missiles and Space.....	34
U.S. Army Fires Center of Excellence.....	35
U.S. Army Test and Evaluation Command.....	37

Acronyms and Abbreviations.....	41
--	-----------



Introduction

Objective

We determined whether the Army is developing an affordable Integrated Air and Missile Defense (IAMD) program that can meet all capability requirements and whether these requirements remain valid and meet current and future warfighter needs. A capability requirement is a capability that an organization needs to fulfill its roles, functions, and missions in current or future operations. See Appendix A for a discussion of the audit scope and methodology.

Background

The Army IAMD program is an acquisition category ID major defense acquisition program with an estimated \$3.2 billion in research, development, test, and evaluation costs and \$4.5 billion in procurement costs. To be considered an acquisition category ID, a program must have research, development, test, and evaluation costs of more than \$480 million or procurement costs of more than \$2.79 billion. The Army plans to acquire 25 IAMD systems for testing and 454 systems for fielding and plans to sustain these systems until 2049.

The Army IAMD system includes a common mission command center, integrated fire control network, and common plug and fight interface kits that connect Army air and missile defense sensors and weapons.⁵ The Army currently delivers air and missile defense capabilities through independently developed and operated mission commands, sensors, and weapons.

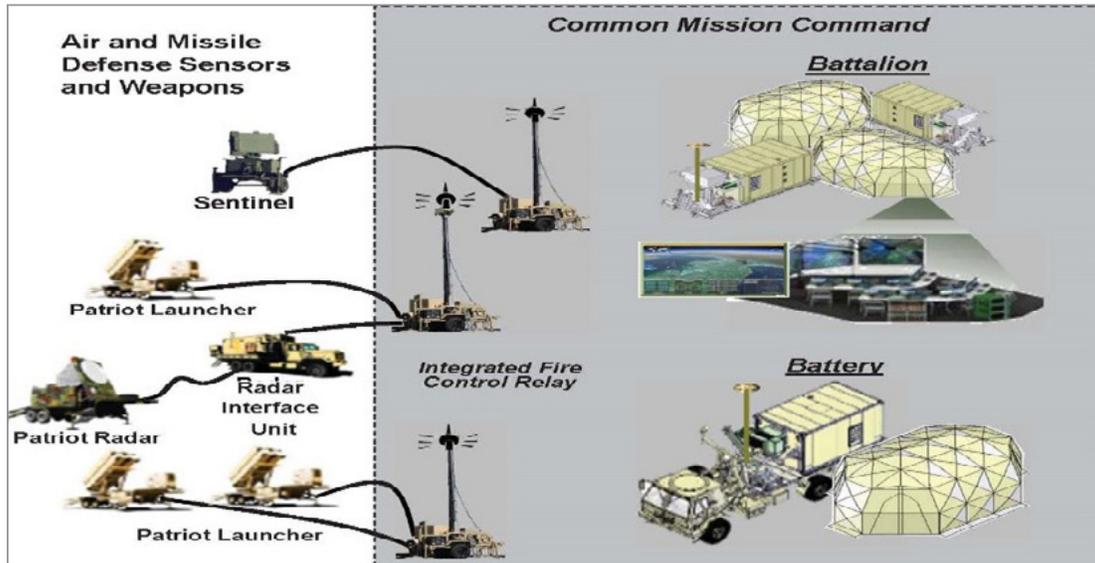
The IAMD system combines data from sensors and weapons using common software that creates a single, integrated display of air and missile threats within a particular airspace. The warfighter can then determine the most appropriate weapon to defeat air and missile threats, including ballistic missiles, cruise missiles, manned aircraft, unmanned aerial systems, and air-to-surface missiles.

The Army will field integrated Patriot sensors and weapons and Sentinel sensors with IAMD system components.⁶ The Patriot mobile Army surface-to-air missile system uses a radar, launchers, missiles, and a communication station to counter air threats. The Sentinel sensor provides data through command and control systems to defeat enemy air threats. Figure 1 shows IAMD system components with integrated Patriot sensors and weapons and Sentinel sensors.

⁵ The integrated fire control network communicates air and missile threat data and fire control solutions between IAMD sensors and weapons. Plug and fight interface kits enable IAMD systems to automatically recognize and configure various sensors and weapons without interrupting operations when the warfighter adds, removes, or rearranges sensors and weapons to respond to threats and defense strategy changes.

⁶ The IAMD program will integrate additional sensors and weapons once the initial capability is fielded.

Figure 1. IAMD System With Integrated Patriot Sensors and Weapons and Sentinel Sensors



Source: Program Executive Office for Missiles and Space and the DoD OIG.

The IAMD common mission command center consists of a family of medium tactical vehicles with mounted shelters housing computing and communications equipment. The shelters will provide an environmentally conditioned work area for warfighters to execute their mission command and fire control tasks.

IAMD Program Stakeholders and Timeline

The IAMD project office, part of the Army Program Executive Office for Missiles and Space, is located at Redstone Arsenal, Alabama. The IAMD project office develops, acquires, fields, and sustains the Army IAMD system and supports the integration of current and future sensors and weapons. The Army Fires Center of Excellence (FCoE), located at Fort Sill, Oklahoma, developed the IAMD program capability requirements.

The Under Secretary of Defense for Acquisition and Sustainment is the milestone decision authority for the IAMD, and as such, is the final decision maker for program reviews.⁷ In December 2009, the IAMD program milestone decision authority approved the program to enter the engineering and manufacturing development phase. The purpose of the engineering and manufacturing development phase is to develop, build, and test a product to verify that all operational requirements have been met.

In May 2010, the Vice Chairman of the Joint Chiefs of Staff, Joint Requirements Oversight Council (JROC), approved and validated IAMD capability requirements. JROC manages and prioritizes warfighter needs within and across the capability

⁷ In December 2009, the milestone decision authority for the IAMD program was the Under Secretary of Defense for Acquisition, Technology, and Logistics.

requirement portfolios. Capability requirement portfolios are organized within similar DoD capabilities and grouped to support capability analysis, strategy development, investment decisions, portfolio management, and capability-based force development and operational planning. Table 1 lists key organizations and officials responsible for managing, testing, or overseeing the IAMD program.

Table 1. Key Organizations and Officials Responsible for Managing, Testing, or Overseeing the IAMD Program

Organization or Official	Responsibilities for the Army IAMD Program
Joint Requirements Oversight Council	Validates whether IAMD capability requirements meet joint warfighter needs
Under Secretary of Defense for Acquisition and Sustainment	Approves the entry of the IAMD program into the next phase of the acquisition process (milestone decision authority)
Deputy Chief of Staff of the Army, G-8	Recommends funding resources for Army programs
Project Manager, Army IAMD	Provides day-to-day IAMD program management
Army Fires Center of Excellence	Develops IAMD system capability requirements
Army Test and Evaluation Command	Independently tests and evaluates the IAMD system effectiveness, suitability, and survivability

Source: The DoD OIG.

In May 2016, the Army completed a limited user test to assess whether the IAMD system met operational requirements and to support a planned August 2017 Milestone C review. A limited user test is an operational test during which warfighters operate IAMD systems in a realistic operational environment. The purpose of the Milestone C review is to carefully assess a program's readiness and to make a sound investment decision before committing DoD financial resources to begin initial production.

The May 2016 limited user test showed that the IAMD system software was not fully developed and functioning as intended. For example, the IAMD system could not correctly identify air and missile threats. In April 2017, the IAMD project manager notified the milestone decision authority that the August 2017 Milestone C date could not be met because the results of the limited user test showed that the IAMD system was not operationally effective, suitable, or survivable for current and future operations.⁸ In December 2017, the milestone decision authority approved the IAMD project office's plan to delay the Milestone C review to September 2020 because the system did not pass the 2016 limited user test.

⁸ Effectiveness is a measure of the overall ability of a system to accomplish a mission. Suitability is the degree to which a system can be placed and sustained satisfactorily in the field. Survivability is the system's ability to survive threats in its operating environment.

Following the Milestone C decision, the Army plans to initially procure six IAMD systems, at a total cost of about \$29.6 million, in FY 2020. Appendix B summarizes IAMD schedule history and significant program events.

Acquisition Guidelines for Testing and Affordability Analysis

DoD Instruction 5000.02 states that program managers will use the test and evaluation master plan as the primary test planning and management document.⁹ The test and evaluation master plan is required to include a test schedule that is event-driven to allow sufficient time to support test analysis and reporting. Army Regulation 73-1 also emphasizes that the test schedule should be event-driven and allow sufficient time to support the test analysis.¹⁰

Army leadership is responsible for an affordability analysis, which should involve programming, resource planning, requirements, intelligence, and acquisition communities. The purpose of an affordability analysis is to avoid starting or continuing systems that cannot be produced and supported. DoD Instruction 5000.02 requires an affordability analysis that addresses the total program life cycle and covers 30 to 40 years into the future.¹¹

Review of Internal Controls

DoD Instruction 5010.40 requires DoD organizations to implement a comprehensive system of internal controls that provides reasonable assurance that programs are operating as intended and to evaluate the effectiveness of the controls.¹² We identified internal control weaknesses related to the IAMD schedule and affordability. Specifically, IAMD project officials have not adjusted the schedule for the Milestone C review to allow sufficient time to analyze the limited user test data. Furthermore, Army G-8 officials have not established total life-cycle affordability constraints through an affordability analysis for IAMD production and sustainment. We will provide a copy of the report to the senior official responsible for internal controls in the Army.

⁹ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," Enclosure 4, Section 5.a, and Enclosure 5, Section 10.e, Change 4 Incorporated, August 31, 2018.

¹⁰ Army Regulation 73-1, "Test and Evaluation Policy," Chapter 10, Section 10-2.a, June 8, 2018.

¹¹ DoD Instruction 5000.02, Enclosure 8, Section 3.a.

¹² DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013.

Finding

IAMD Requirements Remain Valid, but Test Analysis Will Be Incomplete at the Milestone C Review and the Program May Be Unaffordable

(FOUO) We determined that the Army IAMD capability requirements, developed to address warfighter needs, remained valid. However, IAMD project officials will not have a full analysis of the limited user test data until [REDACTED] after the Milestone C review, scheduled for September 2020. To meet the scheduled Milestone C review, IAMD project officials plan to rely on a quick look of IAMD system performance that includes developmental tests and the limited user test. A quick look is a limited review and will not fully measure all IAMD capability requirements or fully evaluate system effectiveness, suitability, and survivability. IAMD project officials' plan to rely on a quick look to support the Milestone C decision does not meet the requirements of DoD Instruction 5000.02, which requires project officials to verify all operational requirements have been met (through testing) before a Milestone C review.

(FOUO) IAMD project officials will not have a full analysis of the limited user test because officials delayed the completion of the limited user test event from [REDACTED] due to late delivery of IAMD hardware components. However, IAMD project officials have not adjusted the Milestone C review to account for the delay so that the test schedule would continue to be event-driven, as required by DoD Instruction 5000.02.

Furthermore, the Army may not be able to afford production and sustainment of the IAMD program through 2049 because Army G-8 officials have not established total life-cycle affordability constraints through an affordability analysis for unit production and sustainment costs of the IAMD system.

As a result, the milestone decision authority may approve procurement of six initial IAMD systems, at a total cost of about \$29.6 million, based on an incomplete analysis of the limited user test. With an incomplete analysis of the limited user test, IAMD project officials may discover system deficiencies after the Milestone C decision that require additional time and funds to correct. The time needed to correct system deficiencies may delay the fielding of the IAMD system. Furthermore, without the total life-cycle affordability analysis and affordability constraints, Army G-8 officials have limited assurance that the IAMD program is affordable within the air and missile defense portfolio, the project manager cannot ensure program costs are within affordability constraints, and the milestone

decision authority cannot enforce affordability constraints throughout the program life cycle. Assessing life-cycle affordability of systems is essential for establishing the financial achievability of the program and setting realistic program baselines to control life-cycle costs and help instill more cost-conscious management in the development of the IAMD program.

Capability Requirements Remain Valid and Meet Warfighter Needs

As of February 2019, Army IAMD capability requirements, developed to address current and future warfighter needs, remained valid. A capability requirement is a capability that an organization needs to fulfill its roles, functions, and missions in current or future operations. Capability requirements include the following.

- Key performance parameters (KPPs): performance attributes of a system considered critical or essential.
- Key system attributes (KSAs): performance attributes considered important to achieving a balanced solution, but not critical enough to be designated a KPP.
- Additional performance attributes (APAs): performance attributes not important enough to be considered KPPs or KSAs, but still appropriate to be included as a capability requirement.

(FOUO) [REDACTED]

(FOUO) To address air and missile defense capability gaps, FCoE officials developed capability requirements for the IAMD program. For example, [REDACTED]

In May 2010, Vice Chairman of the Joint Chiefs of Staff, JROC, validated the Army IAMD capability requirements. In the December 2013 Joint IAMD Vision for 2020, the Chairman, Joint Chiefs of Staff, identified the DoD's need for IAMD capabilities to effectively deter and defeat air and missile threats. The Chairman stated that joint IAMD capabilities will help prevent attacks on the U.S. Homeland.

(FOUO) After the JROC validated Army IAMD capability requirements, FCoE officials revised the requirements to comply with the updated Manual for the Operation of the Joint Capabilities Integration and Development System (JCIDS manual), February 12, 2015.¹³ For example, [REDACTED]

[REDACTED] Although FCoE officials revised IAMD capability requirements, the officials did not change the intent of the requirements. Table 2 lists original and revised KPPs for the IAMD program. Appendix C lists original and revised KSAs and APAs for the IAMD program.

Table 2. Original and Revised KPPs for the IAMD Program

(FOUO) Original KPPs	Revised KPPs	Explanation of FCoE Revisions
[REDACTED]	[REDACTED]	[REDACTED]
N/A	[REDACTED]	[REDACTED] (FOUO)

* [REDACTED]

Source: The DoD OIG.

In October 2018, FCoE officials stated that the warfighter needed IAMD capabilities to address air and missile defense capability gaps. FCoE officials provided a biannual capabilities needs analysis that identified air and missile defense capability gaps. Furthermore, in November 2018, a Joint Staff official, overseeing

¹³ The JCIDS manual, August 31, 2018, is the current procedural guidance for JCIDS that includes a list of mandatory KPP requirements. The manual provides detailed guidelines and procedures to facilitate capability requirements, portfolio management, and development of capability solutions for the warfighter.

the IAMD program, told us that the capability requirements remain valid indicating that, once met, should address the identified capability gaps. The Joint Staff official also stated that JROC will revalidate IAMD capability requirements before the Milestone C review. As of February 2019, the IAMD capability document was in the approval process as part of the effort to prepare for the September 2020, Milestone C decision.

IAMD Project Officials Plan to Rely on an Incomplete Test Analysis at the Milestone C Review

IAMD project officials plan to rely on a quick look of IAMD system performance that . . . is a limited review and will not fully measure all IAMD capability requirements . . .

(FOUO) IAMD project officials will not have a full analysis of the next limited user test data until [REDACTED] after the Milestone C review, scheduled for September 2020. To achieve the scheduled Milestone C review, IAMD project officials plan to rely on a quick look of IAMD

system performance that includes developmental tests and the limited user test.¹⁴ A quick look is a limited review and will not fully measure all IAMD capability requirements and will not fully evaluate the system effectiveness, suitability, and survivability.

In December 2017, the milestone decision authority approved IAMD project officials' proposed plan for additional developmental tests and a second limited user test to support the Milestone C review, scheduled for September 2020. In January 2018, the Army submitted the plan to Congress. The plan outlined activities that IAMD project officials must complete to successfully field an effective, suitable, and survivable IAMD system. The plan included additional developmental tests between 2017 and 2019 and a second limited user test in 2020 to support the revised Milestone C review.

Additionally, IAMD project officials planned to provide an operational test agency milestone assessment report, issued by the Army Test and Evaluation Command, to the milestone decision authority at the Milestone C review. Army Test and Evaluation Command, the Army's independent operational test agency, plans and conducts operational tests, such as the limited user test, and analyzes and reports test results of the operational effectiveness, suitability, and survivability of systems. For the IAMD program, Army Test and Evaluation Command officials plan and conduct the limited user test, analyze the test data, and issue an operational test agency milestone assessment report, including complete test results. In an

¹⁴ Appendix B outlines the developmental testing and the limited user test schedule.

operational test agency milestone assessment report, Army Test and Evaluation Command officials document whether the system is effective, suitable, and survivable. Army Test and Evaluation Command officials consider test results that occur throughout the engineering and manufacturing development phase when they evaluate IAMD system performance and develop an operational test agency milestone assessment report.

However, in November 2018, IAMD project officials decided to rely on a quick look of IAMD system performance instead of relying on an operational test agency milestone assessment report for the Milestone C review. IAMD project officials requested a quick look of developmental tests and the limited user test to cover three areas—situational awareness, fire control, and fire direction. Situational awareness is the perception of events with respect to time or space, the comprehension of their meaning, and the projection of their future status. Fire control is the control of all operations in connection with firing on a target. Fire direction provides timely and effective fire control in support of current operations, including locating, analyzing, and delivering the weapon to the target. We asked IAMD project officials why they selected these three areas for a quick look. The officials could not explain their reasons for selecting the three areas and did not document the reasons for their selection.

Army Test and Evaluation Command officials stated that for an operational test agency milestone assessment report, they fully analyze whether the IAMD system meets all KPPs, which are essential capability requirements. In addition, they fully analyze all KSAs and APAs, which are also capability requirements for the IAMD system. However, Army Test and Evaluation Command officials stated that for a quick look, they do not fully analyze the KPPs and will partially analyze some of the KSAs or APAs because some KPPs are interdependent upon the KSAs and APAs. Army Test and Evaluation Command officials also stated that they do not fully analyze system effectiveness, suitability, and survivability for a quick look. Table 3 shows the differences between the quick look and operational test agency milestone assessment report assessments.

Table 3. Differences Between Quick Look and Operational Test Agency Milestone Assessment Report

IAMD Requirements Analyzed	Quick Look	Operational Test Agency Milestone Assessment Report
KPPs	Not fully analyzed	Fully analyzed
KSAs	Not fully analyzed	Fully analyzed
APAs	Not fully analyzed	Fully analyzed
Operational Effectiveness, Suitability, and Survivability	Not fully analyzed	Fully analyzed

Note: Responding to a draft of this report, Army Test and Evaluation Command officials provided a table, showing specific KPPs, KSAs, and APAs that the officials will analyze, partially analyze, and not analyze for the quick look. See the Army Test and Evaluation Command table in the Management Comments section of this report.

Source: The DoD OIG.

The IAMD project manager stated that quick look results of a limited user test may be sufficient to brief the milestone decision authority at the Milestone C review if the results demonstrate that the system meets expected performance. If the IAMD system does not meet expected performance during the limited user test, the project manager stated that quick look results will inform the milestone decision authority to delay the Milestone C review until the operational test agency milestone assessment report is complete.

However, Army Test and Evaluation Command officials stated that quick look results consist of a few summary-level briefing slides on IAMD performance while an operational test agency milestone assessment report is about a 300-page report with full analysis of all IAMD requirements areas. In an operational test agency milestone assessment report, Army Test and Evaluation Command officials thoroughly document whether the system is effective, suitable, and survivable in support of a Milestone C decision. Furthermore, the test and evaluation master plan states that Army Test and Evaluation Command officials will provide an operational test agency milestone assessment report to the milestone decision authority at the Milestone C review, not quick look results. DoD Instruction 5000.02 requires project officials to verify that all operational requirements have been met (through testing) prior to a Milestone C decision.¹⁵ Therefore, IAMD project officials' use of a quick look to support the Milestone C decision does not meet the requirements of DoD Instruction 5000.02.

¹⁵ DoD Instruction 5000.02, Section (9) EMD Phase (a) Purpose.

IAMD Project Officials Have Not Allowed Sufficient Time to Analyze Limited User Test Data

IAMD project officials will not have a full analysis of the next limited user test because officials have not adjusted the schedule for the Milestone C review to allow sufficient time to analyze the limited user test data. DoD Instruction 5000.02 and Army Regulation 73-1 emphasize the need for sufficient time to analyze test data.

(FOUO) In November 2018, IAMD project officials delayed the completion of the limited user test by [REDACTED] but did not revise the Milestone C review, scheduled for September 2020, to account for the delay. Specifically, IAMD project officials revised the test schedule due to late delivery of IAMD hardware components such as the common mission command center and the integrated fire control network relay. Because the hardware delivery was delayed, IAMD project officials revised the test schedule by delaying tests by about [REDACTED] and shifting the limited user

test completion from [REDACTED]. However, IAMD project officials have not adjusted the Milestone C review to account for the delay so that the test schedule would continue to be event-driven, as required by DoD Instruction 5000.02.¹⁶

IAMD project officials have not adjusted the Milestone C review to account for the delay so that the test schedule would continue to be event-driven, as required by DoD Instruction 5000.02.

(FOUO) According to an Army Test and Evaluation Command official, the schedule revision does not allow sufficient time to analyze the test data since the revision allows Army Test and Evaluation Command officials only [REDACTED] to analyze and report on IAMD system performance during the limited user test before the Milestone C review, planned for September 2020. The official stated that after the limited user test, the contractor and IAMD project officials would require approximately [REDACTED] to convert the unanalyzed test data to a readable form and provide the readable test data to Army Test and Evaluation Command personnel. The official stated that Army Test and Evaluation Command personnel would then require approximately [REDACTED] to analyze test data, write results based on the analysis, conduct internal briefings to inform their leadership of test results, and send the report through the approval process before distributing it to external organizations. The official's statements are consistent with the [REDACTED] timeline in the test and evaluation master plan for completing the operational test agency milestone assessment report. Army Test and Evaluation Command officials stated that IAMD testing produces large volumes of data,

¹⁶ (FOUO) Responding to a discussion draft of this report, Army Test and Evaluation Command officials stated that the limited user test is a major test event supporting the Milestone C decision; however, its success depends on several events preceding it. Army Test and Evaluation Command officials stated that the compressed test schedule may negatively impact the success of the limited user test. For example, the revised test schedule has reduced the amount of time for one event preceding the limited user test from [REDACTED].

~~(FOUO)~~ around 20 to 30 terabytes of compressed data that takes longer to reduce and analyze than other air and missile defense systems.¹⁷ Additionally, the IAMD project manager stated that there is insufficient time to fully analyze and report on IAMD system performance for the Milestone C review. Therefore, a complete analysis of the limited user test data will not be available to support the milestone decision authority's decision to begin production of IAMD systems in September 2020.

IAMD project officials stated that the limited user test is not a statutory requirement so they do not need a complete analysis of the limited user test for the Milestone C review. Although the limited user test is not a statutory requirement, in December 2017, IAMD project officials, with milestone decision authority approval, delayed the Milestone C review by about 3 years and added more tests, including a second limited user test. We believe the additional time and tests are to make sure the IAMD system is fully developed and functioning as intended before committing financial resources to begin production. Furthermore, in January 2018, the Army informed Congress of its plan to successfully field an effective, suitable, and survivable IAMD system and to perform a second limited user test before the Milestone C review. IAMD project officials are responsible for developing, acquiring, fielding, and sustaining IAMD systems; however, their plan did not include sufficient time for Army Test and Evaluation Command officials to fully analyze limited user test data and report results to the milestone decision

IAMD project officials did not include sufficient time for Army Test and Evaluation Command officials to fully analyze limited user test data and report results to the milestone decision authority before the planned Milestone C review.

authority before the planned Milestone C review. Therefore, IAMD project officials should modify the Milestone C review date to allow Army Test and Evaluation Command officials sufficient time to fully analyze and report on the limited user test data (in the operational test agency milestone assessment report).

The Milestone Decision Authority May Approve Production of IAMD Systems That May Not Meet All Capability Requirements

~~(FOUO)~~ As a result of the incomplete analysis of the limited user test data, the milestone decision authority may approve the procurement of six initial IAMD systems, at a total cost of about \$29.6 million. The decision to begin production is costly and difficult to reverse. With an incomplete limited user test analysis,

¹⁷ Terabyte is a measure of computer data storage capacity. One terabyte equals one trillion bytes.

(FOUO) IAMD project officials may discover system deficiencies after the Milestone C decision that require additional time and funds to correct. The time needed to correct system deficiencies may delay the fielding of the IAMD system. Furthermore, these six initial IAMD systems may not fully address the capability requirement for [REDACTED]

The IAMD Program May Be Unaffordable

The Army may not be able to afford production and sustainment of the IAMD program through 2049. Army officials stated the IAMD program was funded through the end of the engineering and manufacturing development phase, planned for September 2020. DoD Instruction 5000.02 states that the DoD has a long history of starting programs that proved to be unaffordable and resulted in costly program cancellations and significant inventory reductions. The Instruction requires an affordability analysis that addresses the total program life cycle and covers 30 to 40 years in the future. The purpose of an affordability analysis is to avoid starting or continuing systems that cannot be produced and supported.¹⁸

Life-cycle affordability of Army programs is determined based on the portfolio the program belongs to. The Army will normally make funding tradeoffs within that portfolio, but if necessary it can make tradeoffs across different portfolios to provide adequate resources for high-priority programs such as the IAMD program.

Army G-8 Officials Have Not Established Total Life-Cycle Affordability Constraints for the IAMD Program

Army G-8 officials have not established total life-cycle affordability constraints through an affordability analysis for unit production and sustainment costs of the IAMD system. DoD Instruction 5000.02 states that affordability constraints are equivalent to KPPs, which are capability requirements essential to a program. DoD Components prioritize capability requirements and cost tradeoffs throughout a program’s life cycle based on established affordability constraints.

Army G-8 officials have not established total life-cycle affordability constraints through an affordability analysis . . . affordability constraints are equivalent to KPPs, which are capability requirements essential to a program.

¹⁸ DoD Instruction 5000.02, Enclosure 8, Sections 2.a and 3.a.(2).

During our audit site visit, Army G-8 officials stated that they analyzed the program affordability in 2012. Based on the 2012 documentation, the IAMD program was fully funded and affordable for the next 5 years. However, Army G-8 officials did not establish affordability constraints for the IAMD program. IAMD project officials stated that an affordability constraint policy did not exist when the IAMD program entered the engineering and manufacturing development phase. However, Army officials are not only responsible for fully funding the program for 5 years, they are also responsible for conducting an affordability analysis to establish life-cycle affordability constraints for unit production and sustainment costs. These affordability constraints are fixed cost requirements, equivalent to KPPs, to be managed by the IAMD project manager. Without affordability constraints, the Army cannot prioritize IAMD capability requirements and cost tradeoffs within the Army air and missile defense portfolio, and the IAMD project manager cannot effectively manage the program.

DoD Instruction 5000.02, December 8, 2008, did not require an affordability analysis to enter the engineering and manufacturing development phase; rather the Instruction required full funding to enter in the engineering and manufacturing development phase.¹⁹ However, in November 2013, the Deputy Secretary of Defense canceled DoD Instruction 5000.02, December 8, 2008, and issued Interim DoD Instruction 5000.02, November 25, 2013.²⁰ The updated interim Instruction stated that the Deputy Secretary of Defense determined that the DoD needed an acquisition policy environment that achieved greater efficiency and productivity in defense spending including affordable programs as a requirement.

The Interim DoD Instruction 5000.02, November 25, 2013, along with the current DoD Instruction 5000.02, August 31, 2018, require programs to be fully funded but also require programs to have an affordability analysis and affordability constraints that addresses the total life cycle of the planned program beyond the full funding of 5 years. As stated earlier, the purpose of an affordability analysis is to avoid continuing systems that cannot be produced and supported within reasonable expectations for future budgets, covering 30 to 40 years into the future.

Responding to a draft of this report, the Fire Division Chief, Army G-8, provided the IAMD program cost estimate from 2012 to show that Army G-8 officials considered operational and maintenance cost estimates of IAMD hardware and software solutions with an assumed 40-year service life. However, DoD Instruction 5000.02 states that a cost estimate is different from an affordability analysis and affordability constraints. The Instruction states that affordability constraints are determined based on available resources a DoD Component can allocate

¹⁹ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," December 8, 2008.

²⁰ Interim DoD Instruction 5000.02, "Operation of the Defense Acquisition System," November 25, 2013.

for a system, given inventory requirements and all other fiscal demands on the Component. In contrast, cost estimates provide a forecast of what a system will cost for budgeting purposes. If affordability constraints cannot be met, the DoD Component must reevaluate technical requirements, schedule, and required quantities. After such reevaluation, if affordability constraints still cannot be met and the DoD Component cannot do tradeoffs within or outside of the portfolio, the program will be canceled.

The Chief also provided IAMD program documentation from 2009 that indicated Army officials completed the program life-cycle cost estimates, compared the cost estimates to amounts loaded in the Army funding database, and determined amounts that needed to be aligned to make the program affordable for FY 2013 through FY 2015. The 2009 IAMD program documentation did not include affordability constraints. Also, in 2012, the Army restructured the IAMD program, increasing the required inventory from 285 to 431 units. Consequently, the 2009 cost estimate was superseded by the 2012 cost estimate.

Affordability analysis and derived affordability constraints are a DoD Component leadership responsibility, specifically for Army G-8 officials.²¹ DoD Instruction 5000.02 states that an affordability analysis should be conducted as early as possible in a program’s life cycle. The Instruction also states that affordability constraints for procurement and sustainment will be derived early in the program planning process. Furthermore, the Instruction states that affordability constraints will be used to ensure that capability requirement prioritization and cost tradeoffs occur as early as possible and throughout the program’s life cycle. Additionally, the Instruction states that DoD Components maintain and update program affordability analysis to reflect significant changes such as large cost growth or changes in defense strategy.

Affordability constraints will be used to ensure that capability requirement prioritization and cost tradeoffs occur as early as possible and throughout the program’s life cycle.

In December 2009, when the IAMD program entered the engineering and manufacturing development phase, the IAMD program was the Army’s number one priority in the air and missile defense portfolio. In 2019, the IAMD program was priority number 4 of 17 programs in the air and missile defense portfolio due to changes in defense strategy. Furthermore, an Army G-8 official stated that the Army would not conduct a life-cycle affordability analysis until 30 days before the Milestone C review, scheduled for September 2020, because

²¹ Affordability analysis and affordability constraints are not equal to cost estimates and approaches for reducing costs. Affordability analysis and constraints are tools to promote responsible and sustainable investment decisions across likely, long-term weapon system acquisition choices and investment decisions before substantial resources are committed to a program.

DoD Instruction 5000.02 did not require the Army to perform one earlier. The Army G-8 official stated that as long as the program is fully funded, it is affordable.²² Since Army G-8 officials have never established total life-cycle affordability constraints for the IAMD program through an affordability analysis, they should immediately conduct an affordability analysis to establish total life-cycle affordability constraints and determine whether the Army can afford the IAMD program through 2049, in accordance to DoD Instruction 5000.02.

Army G-8 Officials Have Limited Assurance That the IAMD Program Is Affordable

Assessing total life-cycle affordability of systems with affordability constraints is essential for establishing the financial achievability of the program and setting realistic program baselines to control life-cycle costs . . .

Without the total life-cycle affordability analysis and affordability constraints, Army G-8 officials have limited assurance that the IAMD program is affordable within the air and missile defense portfolio, the project manager cannot ensure program costs are

within affordability constraints, and the milestone decision authority cannot enforce affordability constraints throughout the program life cycle. Assessing total life-cycle affordability of systems with affordability constraints is essential for establishing the financial achievability of the program and setting realistic program baselines to control life-cycle costs and help instill more cost-conscious management in the development of the IAMD program.

Conclusion

IAMD project officials have not allowed sufficient time for Army Test and Evaluation Command officials to thoroughly analyze test data from the limited user test and report complete test results to the milestone decision authority at the Milestone C decision to begin IAMD production. After the Milestone C decision, IAMD system deficiencies could be discovered. The time needed to correct system deficiencies may delay the fielding of the IAMD system. Furthermore, Army G-8 officials have limited assurance that the Army can afford the IAMD program through 2049 without a total life-cycle affordability analysis and affordability constraints. An affordability analysis and derived affordability constraints are necessary to achieve greater efficiency and productivity in defense spending and to promote responsible and sustainable investment decisions in the DoD and the Army.

²² Full funding means having the dollars and manpower needed for all current and future efforts to carry out the acquisition strategy over a 5-year period.

Management Comments on the Finding and Our Response

Deputy Chief of Staff of the Army, G-8, Comments on the IAMD Affordability Analysis and Affordability Constraints

The Fire Division Chief, responding for the Deputy Chief of Staff of the Army, G-8, disagreed with the finding statement that implied Army G-8 officials do not know, or cannot determine, the affordability of the IAMD program. Furthermore, the Chief disagreed with the report heading that stated that Army G-8 officials have not performed an IAMD life-cycle affordability analysis. The Chief stated that Army G-8 officials performed an affordability assessment in 2012 and considered the IAMD program affordable. The Chief stated that the 2012 affordability assessment included operational and maintenance costs of IAMD hardware and software solutions for a 40-year service life. The Chief stated that Army G-8 officials consider program affordability when they build the 5-year budget plan or conduct the long-term investment analysis in support of the annual Strategic Portfolio Analysis Review. The Chief provided IAMD program documentation from 2009 and 2012 that showed Army officials completed the life-cycle program cost estimates and cost/funding comparisons.

Our Response

We revised the finding statement to state that the Army may not be able to afford production and sustainment of the IAMD system through 2049. We also revised the report heading discussed in the Chief's comments. Although Army G-8 officials considered operational and maintenance cost estimates of IAMD hardware and software solutions with an assumed 40-year service life in 2012, and determined that the IAMD program was fully funded and affordable for the next 5 years, officials have not established affordability constraints for the IAMD program. As stated in the finding discussion, Army officials are not only responsible for fully funding the program for 5 years, they are also responsible for conducting an affordability analysis to establish life-cycle affordability constraints for unit production and sustainment costs. We added a new paragraph to discuss the IAMD program documentation from 2009 and 2012 that the Chief provided, and explained why we do not believe it supports the affordability of the IAMD program. Furthermore, we clarified the importance of an affordability analysis and affordability constraints.

U.S. Army Fires Center of Excellence Comments on Adequacy of Capability Requirements Description

(FOUO) [REDACTED]

Our Response

(FOUO) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

U.S. Army Test and Evaluation Command Comments on the Finding Discussion

Although not required to comment, the Commander, Army Test and Evaluation Command, provided comments on and revisions to the finding discussion. Also the Commander requested that the DoD OIG provide the resolution of the comments that Army Test and Evaluation Command officials provided on a discussion draft of this report.²³

The Commander stated that the quick look discussion and Table 3 in the finding does not provide complete information. The Commander stated that the table should provide results by individual KPP, KSA, and APA to provide appropriate information. The Commander also provided additional details regarding work that Army Test and Evaluation Command officials would perform for the quick look and the operational test agency milestone assessment report. The Commander stated

²³ The discussion draft was an unofficial draft of this report provided to IAMD program stakeholders to obtain comments on statements of facts.

that the report should separate the time needed to convert unanalyzed test data to a readable form from the time needed to complete the operational test agency milestone assessment report. Lastly, the Commander stated that a statement attributed to an Army Test and Evaluation Command official was incorrect.

Our Response

Responding to the Commander's request to resolve the Army Test and Evaluation Command comments on the discussion draft, we reviewed those comments and where needed we incorporated those comments in a draft of this report. For example, we added developmental testing to the quick look description, and a footnote on an Army Test and Evaluation statement regarding test events and compressed test schedule.

Responding to the Commander's comment on Table 3, we added a table note to refer readers to Army Test and Evaluation Command comments for specific KPPs, KSAs, and APAs that the officials will analyze, partially analyze, and not analyze for the quick look. Where needed, we added details to the work performed by Army Test and Evaluation Command personnel on the quick look and the operational test agency milestone assessment report. We added sentences to separate the time needed to convert unanalyzed test data to a readable form and the time needed to analyze test data and complete the operational test agency milestone assessment report. While we do have support for the statement attributed to the Army Test and Evaluation Command official, we agree that it was made in the past and the official provided the table, showing aspects of KPPs, KSAs, and APAs covered by the quick look. As a result, we did not include the statement in the final report.

Recommendations, Management Comments, and Our Response

Recommendation 1

We recommend that the project manager of the Army Integrated Air and Missile Defense Program modify the Milestone C review date to allow Army Test and Evaluation Command officials sufficient time to fully analyze and report on the limited user test data (in the operational test agency milestone assessment report).

Program Executive Office, Missiles and Space Comments

~~(FOUO)~~ The IAMD project manager agreed with the recommendation. However, the project manager stated that the milestone decision review will not be time-based, rather the decision will be knowledge-based; therefore, a [REDACTED] (as recommended) is premature at this time.

Our Response

Although the project manager agreed with the recommendation, his comments were not responsive to the intent of the recommendation; therefore, the recommendation is unresolved. As stated in the finding discussion, DoD Instruction 5000.02 requires project officials to verify that all operational requirements have been met (through testing) before a Milestone C decision. Army Test and Evaluation Command officials will not have sufficient time to fully analyze the next limited user test data and report on whether the IAMD system meets all KPPs, KSAs, and APAs, or whether the system is effective, suitable, and survivable for the quick look. Subsequently, the quick look will not provide the milestone decision authority with complete information to verify the IAMD system meets all operational requirements as required by DoD Instruction 5000.02.

Furthermore, the test and evaluation master plan is a contract between the Component operational test agency, the milestone decision authority, the project manager, and other senior program stakeholders according to DoD Instruction 5000.02.²⁴ The IAMD test and evaluation master plan indicated that the milestone decision authority plans to use an operational test agency milestone assessment report—not quick look results—at the Milestone C review. The operational test agency milestone assessment report will include a full analysis of the IAMD system, and the quick look results will not. Since an operational test agency milestone assessment report will not be available for the planned September 2020 Milestone C review, we request that the IAMD project manager respond to the final report with a description of the specific actions that would ensure the milestone decision authority will have an operational test agency milestone assessment report at the Milestone C review so that the milestone decision authority can verify that all IAMD operational requirements have been met through testing as required by DoD Instruction 5000.02.

²⁴ DoD Instruction 5000.02, Enclosure 5, Section 5.a.

Recommendation 2

We recommend that the Deputy Chief of Staff of the Army, G-8, immediately conduct an affordability analysis to establish total life-cycle affordability constraints and determine whether the Army can afford the Integrated Air and Missile Defense Program through 2049, in accordance with DoD Instruction 5000.02.

Deputy Chief of Staff of the Army, G-8 Comments

The Fire Division Chief, responding for the Deputy Chief of Staff of the Army, G-8, neither agreed nor disagreed with the recommendation, but he stated that Army G-8 officials would conduct an affordability analysis as part of providing an updated cost estimate, planned to begin in the first quarter of FY 2020, before the Milestone C decision.

Our Response

Comments from the Fire Division Chief, responding for the Deputy Chief of Staff of the Army, G-8, did not address the specifics of the recommendation; therefore, the recommendation is unresolved. Although the Fire Division Chief acknowledged the recommendation, he did not state that Army G-8 officials will establish affordability constraints through an affordability analysis. Army G-8 officials have not established affordability constraints for the IAMD program in accordance with DoD Instruction 5000.02, Enclosure 8. The IAMD program entered the engineering and manufacturing development phase almost 10 years ago and still has no required affordability constraints established through an affordability analysis. As stated in the finding discussion, affordability constraints are fixed cost requirements, equivalent to KPPs, to be managed by the IAMD project manager. Without affordability constraints, the Army cannot prioritize IAMD capability requirements and cost tradeoffs within the Army air and missile defense portfolio, and the IAMD project manager cannot effectively manage the program. We request that the Deputy Chief of Staff of the Army, G-8, clarify and explain his position on affordability constraints and immediately establish affordability constraints through an affordability analysis for the IAMD program in accordance with DoD Instruction 5000.02.

Appendix A

Scope and Methodology

We conducted this performance audit from August 2018 through March 2019 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Review of Documentation and Interviews

To determine whether Army officials are developing an affordable IAMD program that can meet all capability requirements and whether these requirements remain valid and meet warfighter needs, we reviewed IAMD documents dated between December 2009 and February 2018. We reviewed the following program documents pertaining to capability requirements, testing, and affordability analysis.

- IAMD Developmental Testing/Operational Testing Phase Detail, February 8, 2019
- Draft Army IAMD Test and Evaluation Master Plan for Milestone C, Version 1.8.5, December 2018
- Army IAMD Program Master Schedule, Version 1.52, November 2018
- Draft Capability Production Document for the Army IAMD, October 2018
- Capabilities Needs Analysis FY 17/18 Results and Recommendations, September 2018
- Army Test and Evaluation Command Assessment of the IAMD Test Results and Schedule, June 2018
- Army IAMD Program Master Schedule, Version 1.51, December 2017
- Army IAMD Acquisition Decision Memorandum, December 2017
- Army IAMD Program Deviation Report Memorandum, April 2017
- Army Test and Evaluation Command, Operational Test Agency Milestone Assessment Report for the Army IAMD, Increment 2, November 2016
- Army IAMD Acquisition Program Baseline, Change 2, October 2014
- Joint IAMD Vision 2020, December 2013
- Acquisition Strategy for the Army IAMD, Version 1.4, April 2012
- Army IAMD Program Affordability Assessment Memorandum, April 2012

- Army IAMD, Increment 2 Capability Development Document, Version 3.9.4, May 2010
- Joint Requirements Oversight Council Memorandum 073-10, “Army Integrated Air and Missile Defense System-of-Systems Capability Development Document,” May 2010
- Army IAMD Acquisition Decision Memorandum for Entry into the EMD Phase, December 2009

To meet our objective, we reviewed the following guidance:

- CJCSI 5123.01H, “Charter of the Joint Requirements Oversight Council (JROC) and Implementation of the Joint Capabilities Integration and Development System (JCIDS),” August 31, 2018²⁵
- Manual for Operation of the Joint Capabilities Integration and Development System, August 31, 2018²⁶
- DoD Directive 5000.01, “The Defense Acquisition System,” Change 2 Incorporated, August 31, 2018
- DoD Instruction 5000.02, “Operation of the Defense Acquisition System,” Change 4 Incorporated, August 31, 2018
- Army Regulation 70—1 “Army Acquisition Policy,” August 10, 2018
- Army Regulation 73—1 “Test and Evaluation Policy,” June 8, 2018
- Army Regulation 71—9 “Warfighting Capabilities Determination,” December 28, 2009

We visited the Army IAMD project office, FCoE, Army Test and Evaluation Command, and U.S. Army Headquarters to interview officials and obtain documents to answer the audit objective. We interviewed Army officials to understand their roles in planning, managing, executing, testing, or overseeing the Army IAMD program and obtained information pertaining to capability requirements, testing, and affordability analysis.

Additionally, we interviewed DoD officials from the following offices to understand their roles and responsibilities and oversight decisions made for the IAMD program. We also obtained information pertaining to capability requirements, testing, and affordability analysis.

- Joint Chiefs of Staff, Joint Integrated Air and Missile Defense Organization, J-8
- Under Secretary of Defense for Research and Engineering
- Under Secretary of Defense for Acquisition and Sustainment

²⁵ Prior edition is CJCSI 5123.01G, February 12, 2015.

²⁶ Prior edition is Manual for Operation of the Joint Capabilities Integration and Development System, December 18, 2015.

- Director, Cost Assessment and Program Evaluation
- Director, Operational Test and Evaluation

Use of Computer-Processed Data

We did not use computer-processed data to perform this audit.

Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) issued seven reports, the DoD OIG issued one report, and the Army Audit Agency issued one report discussing the Army IAMD.

Unrestricted GAO reports can be accessed at <http://www.gao.gov>. Unrestricted DoD OIG reports can be accessed at <http://www.dodig.mil/reports.html/>. Unrestricted Army Audit Agency reports can be accessed from .mil and gao.gov domains at <https://www.army.mil/aaa>.

GAO

Report No. GAO-19-336SP, “Weapon Systems Annual Assessment: Limited Use of Knowledge-Based Practices Continues to Undercut DoD’s Investments,” May 2019

The GAO reported that the IAMD program has completed 96 percent of its revised total number of expected design drawings, which constitutes a stable design. IAMD software needs several improvements, and IAMD project officials will track software progress with additional developmental tests and a second limited user test. The Army plans to update the acquisition program baseline by the Milestone C decision in September 2020. IAMD project officials stated hardware delays may threaten the IAMD schedule leading up to the Milestone C decision.

Report No. GAO-18-360SP, “Weapon Systems Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends,” April 2018

The GAO reported that the IAMD program no longer has a stable design. The program made a number of design changes that added almost a thousand new drawings to include added functionality and new components to protect against parts obsolescence. Army Test and Evaluation Command reported that software deficiencies made the IAMD system “not suitable, not survivable, and not reliable.” The GAO reported that the program experienced development cost growth in excess of limits authorized in its acquisition program baseline due to increased time for remaining development and corrective fixes following the June 2016 limited user test. However, Army officials stated that the IAMD

design is stable and the original design was demonstrated in the limited user test. Army officials stated the original IAMD design changed at the user's request, and the data package for the new design is complete, with the exception of four engineering changes. Furthermore, officials stated that parts obsolescence is unavoidable in any program.

Report No. GAO-17-333SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2017

The GAO reported that the IAMD program took over 6 years, after the start of system development, to demonstrate that all its critical technologies were mature. Since the 2012 critical design review, the GAO reported that the total number of design drawings increased and 5 percent of these drawings need to be released before production start. IAMD software development delays persist. Army officials delayed the IAMD initial production decision to allow for more developmental testing. Furthermore, Army officials stated that the 2016 limited user test provided less than satisfactory results.

Report No. GAO-17-77, "Weapon System Requirements: Detailed Systems Engineering Prior to Product Development Positions Programs for Success," November 2016

The GAO reported that the Army made significant changes to the IAMD system during the first year of development to integrate additional systems, needing additional detailed systems engineering work after the start of development.

The GAO recommended that the DoD submit the systems engineering plans of each new proposed development program to Congress at the same time the budget requesting funds to begin development is sent to Congress. The DoD did not agree with the recommendation. The DoD agreed that early systems engineering reduces risk and establishes a solid foundation for program success. However, the DoD stated that the systems engineering plan timing and any updates are not aligned to inform a budget decision that could occur as much as 18 months prior to program initiation. The GAO stated that systems engineering plans are living documents that are updated as needed throughout the acquisition process and could be made available to inform the budget process.

Report No. GAO-16-329SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2016

The GAO reported that IAMD technologies are approaching full maturity and at least 90 percent of the design drawings have been released. However, the program has encountered software integration and synchronization challenges.

Specifically, Army officials stated that the IAMD is dependent on other acquisition programs and as systems integrator, the program must coordinate other programs' priorities and changes to ensure synchronization. Officials stated that new software integration and synchronization challenges exist with other acquisition programs that IAMD relies on for its functionality.

Report No. GAO-15-342SP, "Defense Acquisitions: Assessments of Selected Weapons Program," March 2015

The GAO reported that IAMD technologies are approaching full maturity and at least 90 percent of the design drawings have been released. However, the program has encountered software integration and synchronization challenges. Army officials stated that software challenges, coupled with FY 2015 budget reductions, led to the delay of several key events which triggered a schedule breach of the acquisition program baseline. The program's production decision is delayed by over 1 year and initial operational capability is delayed by nearly 2 years. Officials stated the delays reduce integration risk and will improve IAMD's alignment with other related air and missile defense programs.

Report No. GAO-14-340SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2014

The GAO reported that the IAMD program completed its critical design review in May 2012 with a stable design and technologies nearing full maturity, but the program does not plan to demonstrate the design can perform as expected until February 2014. Although the IAMD's mission has not changed, changes to its plans for integrating with other systems have significantly increased the size of the software effort, delayed its subsystem design reviews and increased development costs by over \$717 million.

DoD OIG

Report No. DODIG-2014-081, "Army Integrated Air and Missile Defense Program Needs to Improve Software, Test, and Requirements Planning," June 2014

The DoD OIG reported that the IAMD project manager planned the initial production decision before completing software deliveries and testing needed to demonstrate the system can meet initial capability requirements. The Army Fires Center of Excellence did not adequately define system capability requirements to support developing one of the IAMD increments. In response to two of the recommendations, the Army postponed the initial production decision until the project manager completed limited user testing.

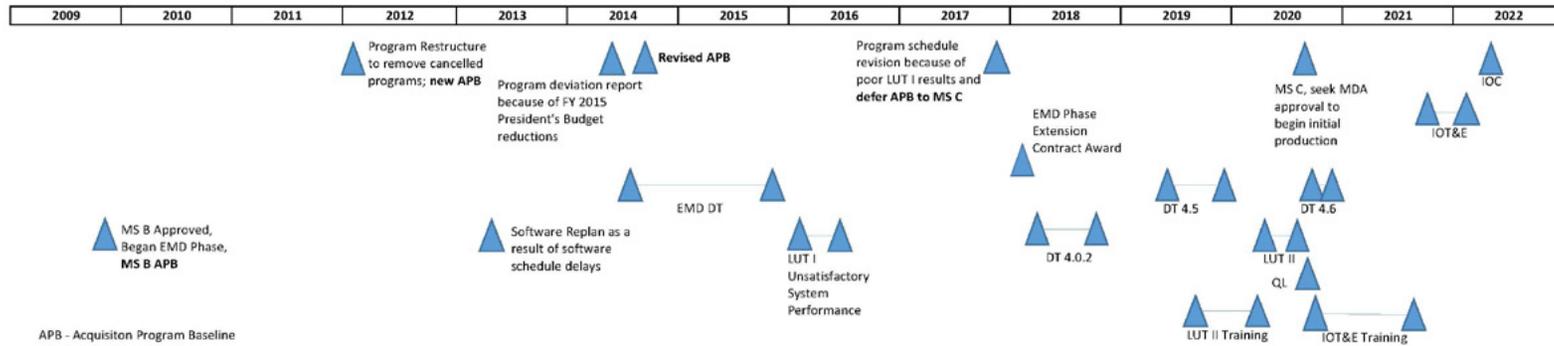
Army Audit Agency

Report No. A-2019-0059-ALA, "Cost Analyses in Support of Program Objective Memorandum Planning," April 2019

(~~FOUO~~) The Army Audit Agency reported that the Army generally had sufficient processes to develop an acquisition cost estimate for the IAMD program; however, it [REDACTED]
[REDACTED]
[REDACTED] in support of the 5 year funding plan, the IAMD project manager programmed about [REDACTED] for software costs, which [REDACTED]. The Army Audit Agency made recommendations to improve the accuracy and reliability of programmed funding amounts in the 5 year funding plans. The Army agreed with the recommendations.

Appendix B

IAMD Schedule History and Significant Program Events



APB - Acquisition Program Baseline
 DT - Developmental Testing
 EMD - Engineering and Manufacturing Development
 LUT - Limited User Test
 MDA - Milestone Decision Authority
 MS - Milestone
 IOC - Initial Operational Capability
 IOT&E - Initial Operational Test and Evaluation
 QL - Quick Look

(FOUO)	Start	End
DT 4.5		
LUT II Training		
LUT II		
QL		
MS C	September 2020	
DT 4.6		
IOT&E Training		
IOT&E		
IOC	April 2022	(FOUO)

Source: The DoD OIG.

Appendix C

Original and Revised KSAs and APAs for the IAMD Program

(FOUO) Original KSAs and APAs	Revised KSAs and APAs	Explanation of FCoE Revisions
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED] (FOUO)

Original and Revised KSAs and APAs for the IAMD Program (cont'd)

(FOUO) Original KSAs and APAs	Revised KSAs and APAs	Explanation of FCoE Revisions
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED] (FOUO)

Original and Revised KSAs and APAs for the IAMD Program (cont'd)

(FOUO) Original KSAs and APAs	Revised KSAs and APAs	Explanation of FCoE Revisions
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED] (FOUO)

Source: The DoD OIG.

Management Comments

Deputy Chief of Staff of the Army, G-8



DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF, G-8
700 ARMY PENTAGON
WASHINGTON, DC 20310-0700

DAPR-FDG

13 June 2019

Final Report
Reference

MEMORANDUM FOR Inspector General, Department of Defense, 4800 Mark Center Drive, Alexandria, Virginia 22350-1500.

SUBJECT: Response to Draft Report of Audit of the Army Integrated Air and Missile Defense Program (Project Number D2018-D000AU-0197.000).

1. The Deputy Chief of Staff, G-8 acknowledges the draft report's Recommendation 2, to "immediately conduct an affordability analysis to establish total life-cycle affordability constraints and determine whether the Army can afford the Integrated Air and Missile Defense (IAMD) program through 2049, in accordance with DoD Instruction 5000.02."

2. The Army IAMD (AIAMD) capability document is being updated in accordance with revised Joint Capability Integration Document System guidance and in support of a projected Fiscal Year 2020 (FY20) Milestone C decision. The Army will do an affordability analysis prior to Milestone C, which will include assessment of total life cycle cost. This will be done as part of providing an updated Army Cost Position in support of the required update to the Independent Cost Estimate (ICE). Currently, this effort is expected to begin first quarter FY20.

3. The Army G-8 does not agree with the statements in the report implying Army G-8 officials do not know, or cannot not determine, the affordability of AIAMD program. Moreover, the Army does not agree with the call out statement on page 16 of the draft report that "Army G-8 Officials Have Not Performed an IAMD Life-Cycle Affordability Analysis".

Revised,
Pages 13 -
16

4. As mentioned in an earlier response, an affordability assessment was conducted in 2012 which clearly indicated the Army considered the program affordable. The affordability analysis included a look at operational and maintenance cost of assuming a 40 year service life of the hardware and software solutions. The Army also looked at total life cycle program cost as part of the Army Requirements Oversight Council (AROC) approval of the AIAMD Capabilities Production Document in 2016. The cost analysis in support of the AROC assessed the cost of the entire program, considering a 20 year end of life with the then projection that the last system would be fielded in 2029.

Revised
and
Added
Text
Pages 14
- 15

5. The Army considers program affordability over the Future Years Defense Program every time it builds the Program Objective Memorandum or conducts long term investment analysis in support of the annual Strategic Portfolio Analysis Review. If it was deemed "unaffordable" the Army would have recommended the program be terminated or modified to ensure affordability. Additionally, because AIAMD capability will be incrementally integrated into the Army, affordability can only be fully assessed as each capability increment is projected for integration.

Deputy Chief of Staff of the Army, G-8 (cont'd)

DAPR-ZA

SUBJECT: Response to Draft Report of Audit of the Army Integrated Air and Missile Defense Program (Project Number D2018-D000AU-0197.000)

6. AIAMD is a Major Defense Acquisition Program (MDAP). Per Section 101 of Public Law 111-23, "Weapon Systems Acquisition Reform Act of 2009, the Director of Cost Assessment and Program Evaluation (DCAPE) provides policies and procedures for the conduct of all DoD cost estimates and reviews DoD Component cost estimates and cost analyses conducted in connection with MDAPs and major automated information systems. DCAPE conducts ICEs and cost analyses for all MDAPs for which the Under Secretary of Defense for Acquisition, Technology, and Logistics is the The Missile Defense Agency (MDA) in advance of:

- a. Any decision to enter low rate initial production (LRIP), or full rate production (FRP).
- b. Any certification pursuant to sections 2366a, 2366b, or 2433a of Title 10.
- c. At any other time considered appropriate by the DCAPE or upon request of the MDA.

7. If you have questions, the point of contact for this action is [REDACTED], [REDACTED], [REDACTED].

3 Encls

1. 2009 AIAMD ACP & Affordability Assessment
2. 2012 AIAMD ACP & Affordability Assessment
3. 2017 AIAMD Acquisition Decision Memorandum


PATRICK L. GAYDON
Colonel, U.S. Army
Chief, Fire Division

Program Executive Office, Missiles and Space

~~For Official Use Only~~



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
PROGRAM EXECUTIVE OFFICE, MISSILES AND SPACE
6260 Martin Road
Redstone Arsenal, AL 35896-8000

SFAE-MSL-IA

27 June 2019

MEMORANDUM FOR Department of Defense Office of the Inspector General (DoD
OIG), 4800 Mark Center Drive Alexandria, Virginia 22350-1500

SUBJECT: Integrated Air & Missile Defense (IAMD) Project Office Response to DoD
OIG Draft Report D2018-D000AU-0197.000

~~(FOUO)~~ 1. The IAMD Project Manager generally concurs with the DoD OIG's recommendation to allow sufficient time to analyze and report on the limited user test data. As documented in the report, the schedule currently plans for the Army Test & Evaluation Command (ATEC) to deliver a quick-look analysis to the Milestone Decision Authority [REDACTED] after test completion to support the Milestone (MS) C review, versus the typical [REDACTED] required to deliver a complete Operational Test Agency Milestone Assessment Report (OMAR). The Milestone Decision Authority has stated that a MS C decision will not occur until enough relevant information is presented to properly inform that decision. As such, the milestone decision will be knowledge based, not time based, and thus a two-month delay (as recommended) is premature at this time.

2. The point of contact for this action is [REDACTED] at [REDACTED] or [REDACTED]

ROTTENBORN.PHILIP.G Digitally signed by ROTTENBORN.PHILIP.G
REGORY [REDACTED]
PHILIP G. ROTTENBORN
COL, LG
Project Manager,
Integrated Air & Missile Defense

~~For Official Use Only~~

U.S. Army Fires Center of Excellence

UNCLASSIFIED//~~FOR OFFICIAL USE ONLY~~



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY FIRES CENTER OF EXCELLENCE AND FORT SILL
TRADOC Capability Manager – Army Air and Missile Defense Command
700 MCNAIR AVENUE
FORT SILL, OKLAHOMA 73503

ATSF-FML

20 June 2019

Final Report
Reference

MEMORANDUM FOR Headquarters, Training and Doctrine Command (TRADOC),
ATTN: Internal Review and Audit Compliance, 705 Washington Blvd, Fort Eustis, VA
23604-5704

SUBJECT: Proponent Clarification for Draft Army Integrated Air and Missile Defense
(AIAMD) Project No. D2018-D000AU-0197.000

1. Reference. Draft Report No. D2018-D000AU-0197.000, Audit of the Army Integrated Air and Missile Defense Program, May 29, 2019.
2. As the capability manager, TCM-AAMDC is not required nor has been requested to provide a response to this draft report. However, I would like to address two inaccurate statements in the report. If these inaccuracies are not adjusted, they could communicate capability that is not inherent within the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS).
3. There is an inaccurate statement on page 8.

(FOUO) [Redacted]

(FOUO) [Redacted]

Revised,
Page 6

(FOUO) [Redacted]

d. Recommended sentence remains limited to distribution authorized to Department of Defense (DoD) and U.S. DoD contractors only.

UNCLASSIFIED//~~FOR OFFICIAL USE ONLY~~

U.S. Army Fires Center of Excellence (cont'd)

UNCLASSIFIED//~~FOR OFFICIAL USE ONLY~~

ATSF-FML
SUBJECT: Proponent Clarification for Army Integrated Air and Missile Defense
(AIAMD) Project No. D2018-D000AU-0197.000

4. There is an inaccurate statement on page 15.

~~(FOUO)~~ [Redacted]

~~(FOUO)~~ [Redacted]

Revised,
Page 13

c. Rationale: Same as paragraph 3c.

d. Recommended sentence remains limited to distribution authorized to Department of Defense (DoD) and U.S. DoD contractors only.

5. The point of contact for this action is [Redacted] at [Redacted] or [Redacted].



ANTHONY J. BEHRENS
COL, U.S. Army
Director, TRADOC Capability Manager
Army Air & Missile Defense

UNCLASSIFIED//~~FOR OFFICIAL USE ONLY~~

U.S. Army Test and Evaluation Command

~~For Official Use Only~~



TEEC-AF

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TEST AND EVALUATION COMMAND
6617 ABERDEEN BOULEVARD, BUILDING 2202-THIRD FLOOR
ABERDEEN PROVING GROUND, MD 21005-5001

JUL 16 2019

Final Report
Reference

MEMORANDUM FOR Department of Defense, Office of the Inspector General, Denver
Audit Office, 6430 S Fiddler's Green Circle, Suite 340, Greenwood Village, CO 80111

SUBJECT: U.S. Army Test and Evaluation Command Final Comments to the Draft Audit
Report on Army Integrated Air and Missile Defense (IAMD) Program (DOD IG Project
D2018-D000AU-0197.000)

1. References:

a. Email, U.S. Army Test and Evaluation Command (ATEC), 03 April 2019, subject: RE: Reminder Comments on Discussion Draft of DOD OIG Audit of Army IAMD are Due April 3.

Omitted because report revised to reflect requested changes

b. Memorandum, ATEC, 10 July 2019, subject: U.S. Army Test and Evaluation Command Comments to the Draft Audit Report on Army Integrated Air and Missile Defense Program (DOD IG Project D2018-D000AU-0197.000).

Omitted because management re-submitted Reference a

2. Background: The ATEC team provided informal comments to the Discussion Draft Audit Report on Army IAMD Program on 3 April 2019 (reference 1a). These informal comments were provided again on 10 July 2019 as the approved ATEC response to the Draft Audit Report on AIAMD (reference 1.b) since not all comments were accepted and an adjudication of comments was not provided by the DOD OIG. The ATEC team has since completed a more thorough review the Draft Audit Report.

3. I request the adjudication of the comments provided on 3 April 2019 and approve one additional comment to remove the section starting on the second paragraph, paper page 12 (electronic page 20/42) ending after the third paragraph, paper page 14 (epage 22/24) and replace with the enclosed. The additional comment corrects a false statement attributed to ATEC personnel and provides clarity on the assessment status of requirements.

4. The point of contact is [REDACTED]
or [REDACTED]

TRUTH IN TESTING!

Encl

for

JOEL K. TYLER
Major General, USA
Commanding

~~For Official Use Only~~

U.S. Army Test and Evaluation Command (cont'd)

~~For Official Use Only~~

Army Test and Evaluation Command (ATEC) officials stated that for an operational test agency milestone assessment report (OMAR), they fully analyze whether the IAMD system meets all requirements, including: KPPs, KSAs, APAs, and OV5 mission threads. However, for the planned Quick Look (Q/L) to be published prior to the OMAR given the time constraints, they will only have time to partially analyze the KPPs and a subset of KSAs & APAs, organized by ESS. ATEC provided a crosswalk of areas that will be assessed, partially assessed, or not assessed in the timeframe of the Q/L. All requirements will be fully assessed in the MS C OMAR. Table 3 shows the differences between the Q/L and OMAR assessments.

Added Text,
Page 9

Table 1. Differences between Q/L and OMAR.

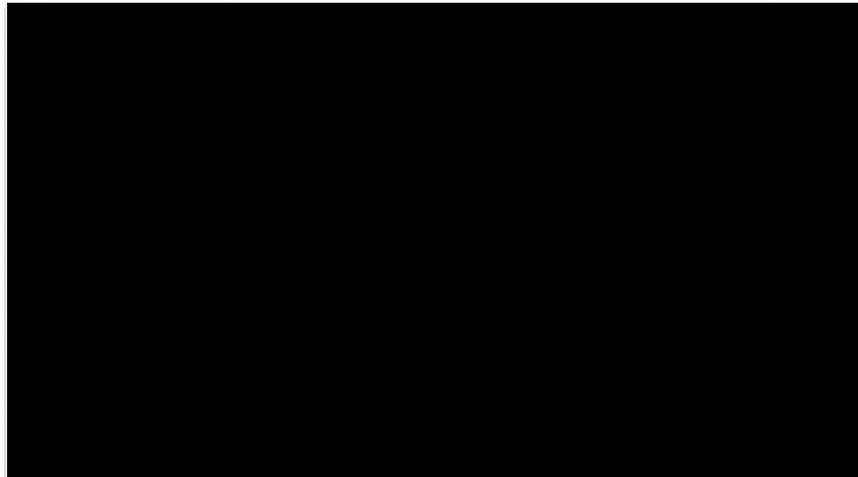
(FOUO)	Requirement	Addressed in Q/L	OMAR

Added Text,
Page 10

~~For Official Use Only~~

U.S. Army Test and Evaluation Command (cont'd)

~~For Official Use Only~~



The PO plans to utilize the Q/L to support an LRIP purchase decision, to allow for continued testing in 4.6DT and IOT&E. The LRIP will consist of refurbishment of EMD test assets and the purchase of additional production representative units.

The IAMD project manager (PM) stated that Q/L results may be sufficient to brief the milestone decision authority (MDA) at the Milestone C (MS C) review if the results demonstrate that the system meets expected performance in the key areas. If the IAMD system does not meet expected performance, then the Q/L results will inform the need to delay the MS C review until the OMAR is complete.

Q/L results are anticipated to consist of Executive Summary level briefing slides focused on key capability gaps and ESS areas, while the OMAR is estimated to be about a 300-page report with full analysis of all IAMD requirements areas; both are organized in accordance with ESS. In an OMAR, ATEC officials thoroughly document whether the system is effective, suitable, and survivable in support of a MS C decision. Furthermore, the test and evaluation master plan states that an OMAR will be provided to the MDA at the MS C review, as opposed to Q/L results. DoD Instruction 5000.02 requires project officials to verify that all operational requirements have been met (through testing) prior to a MS C decision.¹ Therefore, IAMD project officials' use of a Q/L to support the MS C decision does not meet the requirements of DoD Instruction 5000.02.

1 IAMD Project Officials Have Not Allowed Sufficient Time to Analyze Limited User Test Data

IAMD project officials will not have full limited user test (LUT) results at MS C because they have not adjusted the schedule for the MS C review to allow sufficient time to analyze the

~~For Official Use Only~~

U.S. Army Test and Evaluation Command (cont'd)

~~For Official Use Only~~

data. DoD Instruction 5000.02 and Army Regulation 73-1 emphasize the need for sufficient time to analyze test data.

~~(FOUO)~~ In November 2018, IAMD project officials delayed the T&E schedule by [REDACTED] but did not revise the MS C review, scheduled for September 2020, to account for the delay. Specifically, the T&E schedule revision was due to late delivery of IAMD hardware components, such as the IAMD Battle Command System (IBCS) and the integrated fire control network (IFCN) relay. The T&E schedule revision resulted in about a [REDACTED] delay of the LUT completion from [REDACTED]. However, IAMD project officials have not adjusted the Milestone C review so that the schedule would be event-driven, as required by DoD Instruction 5000.02.²

~~(FOUO)~~ The T&E schedule revision does not allow sufficient time to analyze the test data since only [REDACTED] are allocated to analyze and report on IAMD system performance during the LUT before the Milestone C review. ATEC personnel need approximately [REDACTED] to convert unanalyzed test data to readable form, analyze test data, write results based on the analysis, conduct the internal briefing schedule to inform ATEC Leadership of test results, and send the report through the approval process for publishing and distribution to external organizations. IAMD testing produces large volumes of data, around 20 to 30 terabytes of compressed data, that takes longer to reduce and analyze than other AMD systems.³ It has been taking about a month post event to receive the data for analysis. The AST is working to automate the data analysis to attempt to expedite the process; development and test of this automation will be ongoing throughout DT. Translating the analysis into operationally meaningful results will continue to be a human involved process. Additionally, ATEC has a limited number of support personnel. The same personnel that witness / execute the test also conduct the Data Authentication Group (DAG), analysis and reporting. ATEC will "multi-task" to the greatest extent possible, but this will be limited as the same personnel conduct all of the above. Therefore, a complete analysis of the limited user test data will not be available to support the milestone decision to begin LRIP of IAMD systems in September 2020 in support of LRIP phase T&E.

Revised and
Added Text,
Page 11

~~For Official Use Only~~

Acronyms and Abbreviations

APA	Additional Performance Attribute
FCoE	Fires Center of Excellence
IAMD	Integrated Air and Missile Defense
JCIDS	Joint Capabilities Integration and Development System
JROC	Joint Requirements Oversight Council
KPP	Key Performance Parameter
KSA	Key System Attribute



Whistleblower Protection

U.S. DEPARTMENT OF DEFENSE

Whistleblower Protection safeguards DoD employees against retaliation for protected disclosures that expose possible waste, fraud, and abuse in government programs. For more information, please visit the Whistleblower webpage at <http://www.dodig.mil/Components/Administrative-Investigations/Whistleblower-Reprisal-Investigations/Whistleblower-Reprisal/> or contact the Whistleblower Protection Coordinator at Whistleblowerprotectioncoordinator@dodig.mil

For more information about DoD OIG reports or activities, please contact us:

Congressional Liaison

703.604.8324

Media Contact

public.affairs@dodig.mil; 703.604.8324

DoD OIG Mailing Lists

www.dodig.mil/Mailing-Lists/

Twitter

www.twitter.com/DoD_IG

DoD Hotline

www.dodig.mil/hotline

~~FOR OFFICIAL USE ONLY~~



DEPARTMENT OF DEFENSE | OFFICE OF INSPECTOR GENERAL

4800 Mark Center Drive
Alexandria, Virginia 22350-1500
www.dodig.mil
Defense Hotline 1.800.424.9098

~~FOR OFFICIAL USE ONLY~~