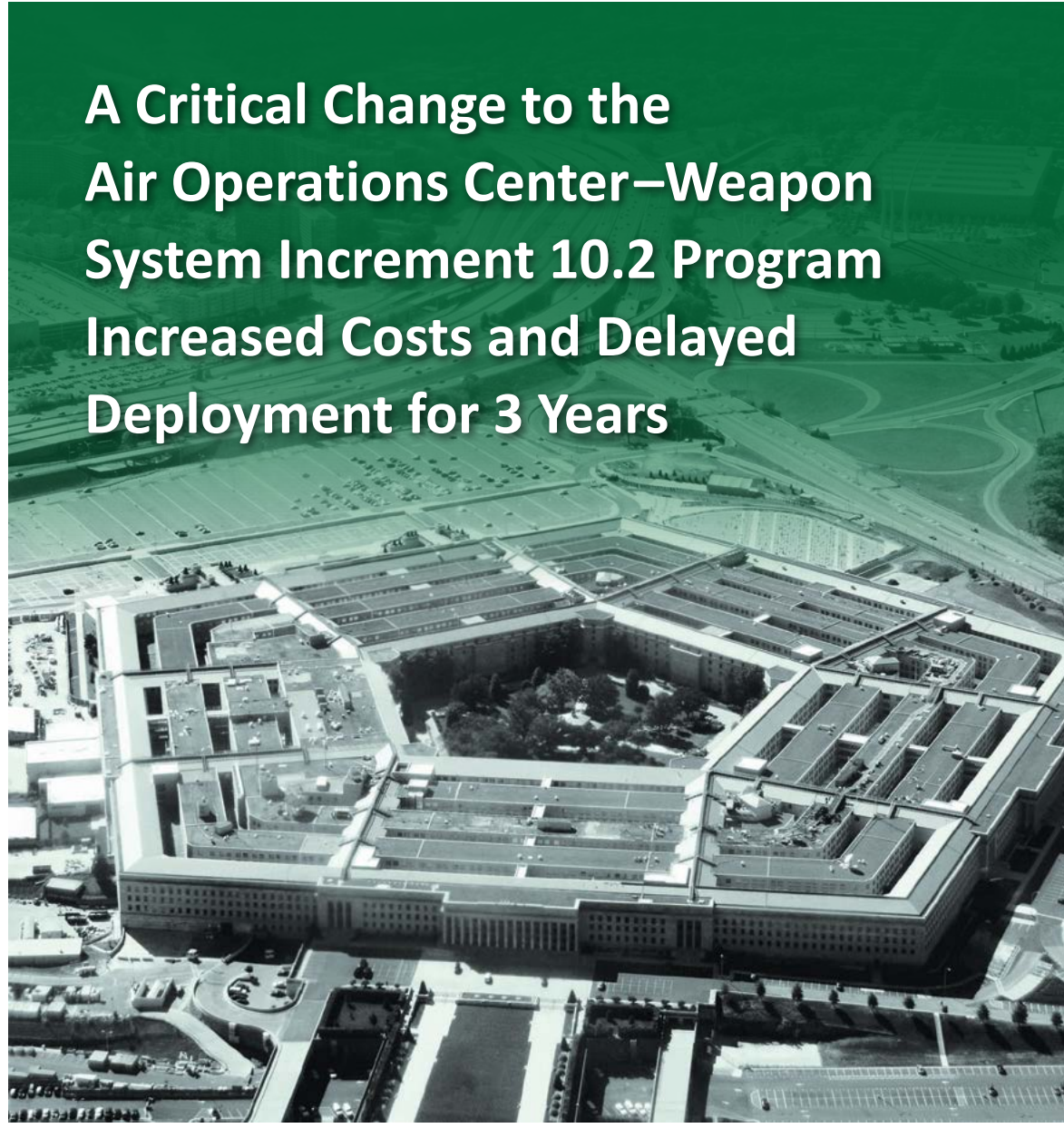


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INSPECTOR GENERAL

U.S. Department of Defense

MAY 4, 2017



A Critical Change to the Air Operations Center–Weapon System Increment 10.2 Program Increased Costs and Delayed Deployment for 3 Years

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Results in Brief

A Critical Change to the Air Operations Center–Weapon System Increment 10.2 Program Increased Costs and Delayed Deployment for 3 Years

May 4, 2017

Objective

We determined the impact of schedule delays on the initial production decision of the Air Operations Center–Weapon System (AOC) Increment 10.2 program.

Background

The AOC is a major automated information system used by the Joint Forces Air Component Commander to plan, execute, monitor, and assess air, space, and cyberspace operations. The fielded version of the AOC, 10.1, combines 43 applications maintained by DoD organizations, including multiple Air Force program offices, Army program offices, and other joint organizations. An application is a software program located on an information system.

The AOC 10.2 is being developed to replace the AOC 10.1 because increasing application integration problems and cybersecurity vulnerabilities will eventually make AOC 10.1 unsustainable. The AOC 10.2 program office is addressing the shortfalls of AOC 10.1 by implementing a service oriented architecture, which is a style of software design where services are provided by applications. The service oriented architecture is intended to improve the Air Force's ability to integrate application updates and more easily improve security as threats evolve.

Finding

AOC 10.2 program officials declared a schedule delay and cost increase Critical Change in 2016, during the program's development. Program officials for a major automated information system may declare a Critical Change if one or more of the following occur:

- a schedule delay of 1 year or more past original program estimates; or
- costs increase by 25 percent or more than estimates; or
- performance negatively affects the ability of the system to meet the mission as originally intended.

(FOUO) Program officials declared the Critical Change because Air Force officials underestimated the complexity of the program and lacked the appropriate number of contractor personnel with the required skills to manage the program effectively. As a result, the program office delayed the initial production and full deployment decisions by 3 years; research, development, test, and evaluation costs increased by \$370 million; and according to program officials, the legacy system, AOC 10.1, will need to be maintained until [REDACTED] at an additional cost of [REDACTED].

Recommendation

As part of the Critical Change reporting process, the Air Force has taken corrective actions to address the cause of the Critical Change. Therefore, we are not making recommendations in this report. However, we will continue to monitor the progress of the AOC 10.2 program as it approaches the initial production and full deployment decisions. We considered management comments on a discussion draft of this report in preparing the final report and revised the report as appropriate. Therefore, no written response to this report is required.





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

May 4, 2017

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY,
AND LOGISTICS
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT
AND COMPTROLLER)

SUBJECT: A Critical Change to the Air Operations Center-Weapon System Increment 10.2
Program Increased Costs and Delayed Deployment for 3 Years
(Report No. DODIG-2017-079)

We are providing this report for your information and use. Program officials for the Air Operations Center-Weapon System Increment 10.2 declared a schedule delay and cost increase Critical Change in 2016 during the program's development. We are not making recommendations in this report. However, we will continue to monitor the progress of the AOC 10.2 program as it approaches the initial production and full deployment decisions. We considered management comments on a discussion draft of this report in preparing the final report and revised the report as appropriate. Therefore, no written response to this report is required.

We appreciate the courtesies extended to the staff. Please direct questions to me at (703) 604-8905 (DSN 664-8905). If you desire, we will provide a formal briefing on the results.

A handwritten signature in black ink that reads "Troy M. Meyer".

Troy Meyer
Principal Assistant Inspector General
for Audit

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Introduction

Objective

We determined the impact of schedule delays on the initial production decision of the Air Operations Center–Weapon System Increment 10.2 program. See Appendix for a discussion of the scope and methodology related to the audit objective.

Background

The Air Operations Center–Weapon System (AOC) is a Major Automated Information System (MAIS) that integrates a collection of systems used by the Joint Forces Air Component Commander to plan, execute, monitor, and assess air, space, and cyberspace operations. The fielded version of the AOC is the AOC 10.1, which combines 43 applications maintained by DoD organizations, including multiple Air Force program offices, Army program offices, and other joint organizations. An application is a software program located on an information system.

The AOC 10.2 is being developed as the replacement for the AOC 10.1 because increasing application integration problems and cybersecurity vulnerabilities will eventually make AOC 10.1 unsustainable. The AOC 10.2 program office is addressing the shortfalls of the legacy system, AOC 10.1, by implementing a service oriented architecture, which is a style of software design where services are provided by applications. Services are a software functionality or set of software functionalities that produce data, validate customers, or provide simple analytical functions. The service oriented architecture is intended to improve the Air Force's ability to integrate application updates and more easily improve system security as threats evolve. When completed, the AOC 10.2 is supposed to integrate 48 applications into a single system. Figure 1 shows an active AOC.



Figure 1. Air Operations Center–Weapon System at U.S. Air Forces Central Command
Source: U.S. Air Force.

The AOC 10.2 program is managed by the AOC program office, under the supervision of the Program Executive Office for Battle Management. The Under Secretary of Defense for Acquisition, Technology, and Logistics is the milestone decision authority. The AOC 10.2 program is an Air Force MAIS acquisition category 1AM program.¹ According to DoD guidance, an acquisition category 1AM program:

- is designated by the milestone decision authority as a MAIS program;
- has program costs estimated to exceed \$40 million in a single fiscal year;
- has program costs estimated to exceed \$165 million from the beginning of material solution analysis, Milestone A, through development;² or
- has \$520 million in expenses from the beginning of material solution analysis, Milestone A, through sustainment of the system.³



As of September 2016, the Air Force estimated spending \$745 million in RDT&E funds, nearly double the amount of the 2013 cost estimate.

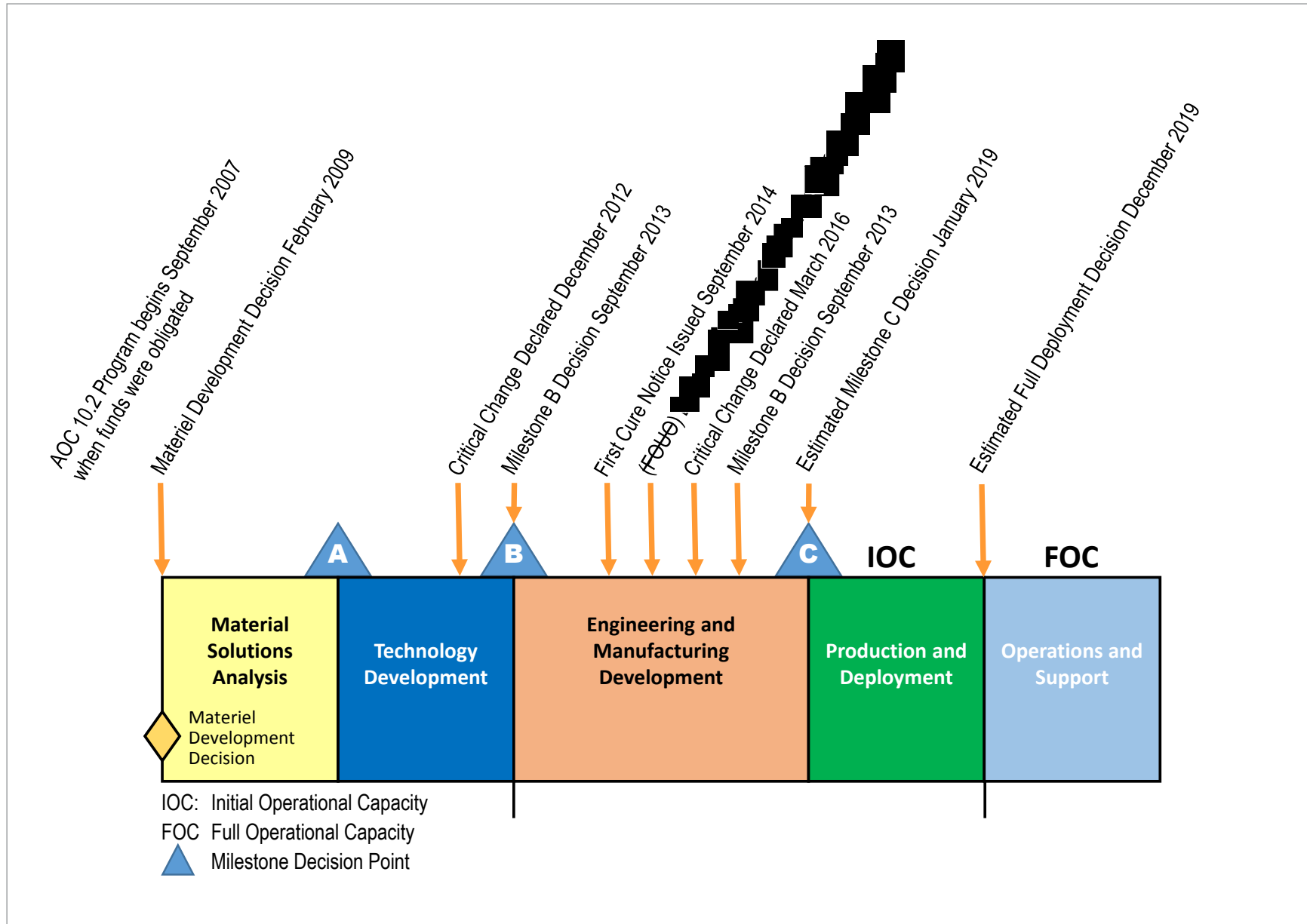
The AOC 10.2 program began in 2007 when the AOC 10.2 system was selected as the preferred alternative to replace the AOC 10.1. The AOC 10.2 program entered the engineering and manufacturing development phase (Milestone B) in 2013. According to the 2013 cost estimate for the AOC 10.2 program, the Air Force estimated spending \$375 million on research, development, test, and evaluation (RDT&E). However, as of September 2016, the Air Force estimated spending \$745 million in RDT&E funds, nearly double the amount of the 2013 cost estimate. Figure 2 shows the AOC 10.2 Program Acquisition Events and the Defense Acquisition Management System.

¹ The 1AM is a subcategory of acquisition category 1A programs where the Under Secretary of Defense for Acquisition, Technology, and Logistics has retained his milestone decision authority. The “M” refers to a MAIS program.

² Milestone A is the entry point into technology maturation and risk reduction phase of the acquisition process.

³ DoD Instruction 5000.02, “Operation of the Defense Acquisition System,” February 2, 2017.

(FOUO) Figure 2. AOC 10.2 Program Events and the Defense Acquisition Management System



Critical and Significant Changes to Major Automated Information System Programs

According to section 2445c, title 10, United States Code (10 U.S.C. § 2445c [2015]), a MAIS program declares a Critical Change if one or more of the following occur:

- a schedule delay of 1 year or more past original program estimates; or
- costs increase by 25 percent or more than estimates; or
- a change in the expected performance of the system that negatively affects the system's ability to accomplish its mission as originally intended.

Additionally, a MAIS program may declare a Significant Change if one or more of the following occur:

- a schedule delay of more than 6 months but less than a year; or
- costs increase by at least 15 percent but less than 25 percent of estimates; or
- a significant, adverse change in the expected performance.

2013 Critical Change Report

The Air Force first declared a Critical Change to the AOC 10.2 program on December 31, 2012, and provided a Critical Change Report (CCR) to Congress on September 27, 2013. In 2012, 10 U.S.C. § 2445c (2012) required all MAIS programs to achieve a full deployment decision within 5 years of the date when the preferred alternative was selected for the program, or the program would declare a Critical Change.⁴ The full deployment decision allows the remaining production or deployment of the system to occur. The AOC 10.2 program, which was chosen as the preferred alternative to replace the AOC 10.1 in September 2007, failed to achieve a full deployment decision by November 3, 2012, prompting a Critical Change declaration. However, the program would no longer be considered to have experienced a Critical Change in 2013, because the Critical Change criteria was updated in November 2015 to remove the 5-year full deployment decision requirement.⁵

⁴ 10 U.S.C. § 2445c(d)(2)(A) (2012), amended 2015.

⁵ 10 U.S.C. § 2445c(d)(3).

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.⁶ We reviewed the 2016 CCR, which identified internal control weaknesses related to the Air Force's management of the AOC 10.2 program. Specifically, Air Force officials did not properly assess the complexity of the program and could not assign appropriate staffing resources to the program before experiencing a Critical Change. We are not making recommendations in this report. As part of the Critical Change reporting process, the Air Force has taken corrective actions to address the internal control weaknesses identified in the CCR. We will provide a copy of the report to the senior official responsible for internal controls in the Air Force.

⁶ DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013.

Finding

Air Operations Center–Weapon System Increment 10.2 Program Declared a Schedule Delay and Cost Increase Critical Change

(~~FOUO~~) AOC 10.2 program officials declared a schedule delay and cost increase Critical Change in 2016, during the program's development. The second Critical Change occurred because Air Force officials underestimated the complexity of the program and lacked the appropriate contractor personnel with the required skills to manage the program effectively. As a result, the program office delayed the initial production and full deployment decisions by 3 years; RDT&E costs increased by \$370 million; and according to program officials, the legacy system, AOC 10.1, will need to be maintained until [REDACTED] at an additional cost of [REDACTED].

Air Operations Center Weapon System–Increment 10.2 Experienced a Critical Change

AOC 10.2 program officials declared a schedule delay and cost increase Critical Change in March 2016, during the program's development. Specifically, the program office determined that the AOC 10.2 program would not be able to achieve an initial production decision by July 2016, 12 months after the original July 2015 estimate. Furthermore, the AOC 10.2 program development costs increased by 25 percent or more than cost estimates.

The Air Force Senior Acquisition Executive formally announced the Critical Change in April 2016, mandating that a CCR be submitted by the Critical Change Team for approval and transmittal to the Congressional Defense Committees by May 2016.⁷ In November 2016, Air Force officials provided the CCR to Congress, 6 months after the mandated May 2016 transmittal date. The 2016 CCR contained the four required certifications asserting that the new management structure was adequate, cost and schedule estimates were reasonable, the program was essential to national security, and there were no suitable alternatives. The legacy system, AOC 10.1, was considered as an alternative to the AOC 10.2; however, the CCR stated that upgrading the AOC 10.1 would cost more and take longer to complete than continuing with the AOC 10.2 program.

⁷ The team was co-led by the Deputy Assistant Secretary of the Air Force for Acquisition Integration and the Director, Information Dominance Programs and comprises representatives from the Office of the Secretary of Defense, Joint Staff, and the Air Force.

Program Complexity and Lack of Appropriate Personnel Caused the Critical Change

The AOC 10.2 program Critical Change occurred because Air Force officials underestimated the complexity of the program and the contractor lacked the appropriate number of contractor personnel with the required skills to manage the program effectively. The AOC 10.2 program will integrate 48 applications into a single system, many of which are outside AOC 10.2 program office control or management. Because the AOC 10.2 program office does not maintain those 48 applications, it cannot make direct changes to them, which leads to interface and interoperability problems within the program. An interface is a point where two independent systems or applications interact. Interoperability refers to the ability of computer systems to exchange and make use of information.

According to the CCR, the contractor added to program complexity by using a time consuming, error-prone manual software build process as opposed to an automated software build process. In the context of software development, a manual build refers to the process that converts files and other assets under the developers' responsibility into a software product in its final or usable form. The build is automated when these steps are repeatable, require no direct human intervention, and can be performed at any time with nothing other than stored information.

The integration of numerous applications and meeting cybersecurity requirements were more difficult than expected and were compounded by inadequate staffing of contractor personnel. According to the CCR, the contractor did not place sufficient priority on cybersecurity requirements and had a slow buildup of personnel starting with 9 and increasing to 40. These problems resulted in the program falling behind schedule, which led to the Critical Change. Since the Critical Change, the contractor has increased staffing to improve integration and meet cyber security requirements.

(FOUO) Testing problems were early indicators of program complexity and inadequate resourcing. The program experienced many testing problems with integrating applications that were slow to be resolved. [REDACTED]

Testing problems were early indicators of program complexity and inadequate resourcing.

[REDACTED]

[REDACTED] IATT is an authorization to perform functional testing for a specific period of time. [REDACTED]

[REDACTED]

[REDACTED]

Interim Authority to Test

(FOUO) On September 10, 2014, the contracting officer issued the first cure notice to the contractor for [REDACTED]. According to the Federal Acquisition Regulation, the contracting officer can issue a cure notice if the contractor fails to make progress or fails to perform on any condition of the contract.⁸ The cure notice informs the contractor of the specific failure and gives the contractor the opportunity to resolve the deficiency within a designated period of time. If the contractor fails to resolve the deficiency identified in the cure notice, the Government may terminate the contract.

(FOUO) The cure notice stated that the Government considered the contractor's [REDACTED] a condition that endangered the performance of the contract. The cure notice requested that the contractor develop a plan to [REDACTED]
[REDACTED]
[REDACTED]

(FOUO) On January 22, 2015, the contracting officer sent the contractor a notification for failing to comply with the first cure notice. The notification stated that the Government had conducted an assessment to determine the status of the program. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Air Operations Center–Weapon System Increment 10.2 Developmental Testing Results

(FOUO) [REDACTED]
[REDACTED]
[REDACTED] On September 17, 2015, the contracting officer issued the contractor a second cure notice for [REDACTED].
[REDACTED] According to the cure notice, the delay caused a Significant Change because the program's schedule was delayed 6 months, which resulted in

⁸ Federal Acquisition Regulation Part 52, "Solicitation Provisions and Contract Clauses," Subpart 249-6, "Termination (Cost-Reimbursement)."

(FOUO) an acquisition program baseline breach.⁹ The cure notice required the contractor to develop a plan to [REDACTED]. However, for a second time, the contractor failed to comply with the cure notice.

(FOUO) On April 27, 2016, the contracting officer sent the contractor a notification for failing to comply with the second cure notice. The notification stated that the contractor had not delivered a plan to satisfy all the requirements of the cure notice and had not [REDACTED]. The notification stated that the contractor's failure to comply with the cure notice resulted in the [REDACTED]. The notification stated that the Critical Change endangered the future of the program, and the Government reserved the right to terminate the contract.

As a consequence of failing to comply with the two cure notices, the program office gave the contractor poor ratings on its contractor performance assessment reports. Additionally, the program office did not recommend the contractor for work on other MAIS contracts or award incentives for the contract during the performance period from January 2015 to December 2015.

Schedule Delays, Cost Increases, and Maintenance of the Legacy System

As a result of the Critical Change, the program office delayed the initial production and full deployment decisions by 3 years. The initial production decision has been delayed from January 2016 to January 2019, and the full deployment decision has been delayed from January 2017 to December 2019. Additionally, RDT&E costs for the AOC 10.2 program have nearly doubled, increasing from \$375 million to \$745 million. Table 1 shows how the AOC 10.2 program costs have changed between the 2013 and 2016 CCRs.



As a result of the Critical Change, the program office delayed the initial production and full deployment decisions by 3 years.

⁹ An acquisition program baseline is an agreement between the program manager and the milestone decision authority that reflects the approved program and contains schedule, performance, and cost parameters that are the basis for satisfying an identified mission need.

Table 1. AOC 10.2 Program Cost Estimates

Funding Type	2013 CCR Cost Estimates (\$ in Millions)	2016 CCR Cost Estimates (\$ in Millions)
RDT&E	\$375	\$745
Procurement	\$439	\$434
Operational & Support	\$1,896	\$2,396
Total	\$2,710	\$3,575

(~~FOUO~~) Furthermore, according to program officials, the Air Force will need to maintain the legacy system, AOC 10.1, for an additional [REDACTED] until [REDACTED], at an additional cost of [REDACTED]. However, the Air Force recognizes that the long term operation of AOC 10.1 is not sustainable due to application integration problems and cybersecurity vulnerabilities.

The Air Force is restructuring the AOC 10.2 program to address program complexity and lack of appropriate contractor personnel, with the required skills, to keep the program on schedule for both the initial production and the full deployment decisions. As part of the restructuring for the AOC 10.2 program, the program office developed a new, realistic schedule to accomplish the program goals. This new schedule includes more frequent testing focusing on the functional performance of the AOC 10.2. Additionally, the program office is planning to perform software updates concurrent with AOC 10.2 development and has also adopted a new approach to integrate the applications into the system with the program office as the lead integrator, rather than the contractor. To address the program's resourcing problems, the contractor has increased its staff to improve integration of Government applications.

Conclusion

AOC program officials declared the Critical Change in 2016 because Air Force officials underestimated the complexity of the program and lacked the appropriate number of contractor personnel with the required skills to manage the program effectively. As part of the Critical Change reporting process, the Air Force has taken corrective actions to address these problems. The program office restructured the program with a new schedule; developed a new approach to the integration of programs; planned more frequent testing and concurrent updates; and increased contractor staff. Therefore, we are not making recommendations in this report. However, we will continue to monitor the progress of the AOC 10.2 program as it approaches the initial production and full deployment decisions.

Appendix

Scope and Methodology

We conducted this performance audit from September 2016 through April 2017 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.

We collected and reviewed documents dated from September 2007 through January 2017. We reviewed and analyzed acquisition documents to determine the impact of schedule delays on the initial production decision. In addition, we interviewed officials from:

- DoD Cost Assessment and Program Evaluation;
- Under Secretary of Defense for Acquisition, Technology, and Logistics; and
- Program Executive Office Battle Management.

We also reviewed:

- 10 U.S.C. § 2445c,
- DoD Instruction 5000.02, "Operation of the Defense Acquisition System," February 2, 2017, and
- Federal Acquisition Regulation Part 52, "Solicitation Provisions and Contract Clauses," Subpart 249-6, "Termination (Cost-Reimbursement)."

Use of Computer-Processed Data

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

Prior Coverage

No prior coverage has been conducted on Air Operations Center–Weapon System Increment 10.2 during the last 5 years.

Acronyms and Abbreviations

- AOC** Air Operations Center–Weapon System
- CCR** Critical Change Report
- IATT** Interim Authority to Test
- MAIS** Major Automated Information System
- RDT&E** Research, Development, Test, and Evaluation
- U.S.C.** United States Code

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