Report No. DODIG-2021-046

~~CUI~~

INSPECTOR GENERAL

U.S. Department of Defense

JANUARY 22, 2021

(U) Evaluation of the Aircraft Monitor and Control System's Nuclear Certification

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INSPECTOR GENERAL
INTEGRITY
EFFICIENCY
DEPARTMENT OF DEFENSE

(U) Results in Brief

(U) Evaluation of the Aircraft Monitor and Control System's Nuclear Certification

January 22, 2021

(U) Objective

(U) Our objective was to determine whether testing conducted on the Aircraft Monitor and Control (AMAC) system for DoD nuclear weapon capable delivery aircraft met the DoD and the Department of Energy (DOE) AMAC nuclear certification requirements.

(U) This evaluation was a coordinated effort between the DoD and DOE Offices of Inspector General (OIG). The DOE OIG objective was to determine the extent to which the DOE provided oversight of the AMAC system testing requirements for nuclear weapons delivery. The DOE OIG issued its report to the DOE on December 9, 2020.

(U) Background

(U) The AMAC system is equipment installed in DoD aircraft to perform inflight monitoring and control of nuclear weapons, such as nuclear weapons safing, arming, enabling, disabling, and fuzing functions. These functions ensure that the nuclear weapon is safe in both ground and air environments, is delivered to its intended target, and is detonated at the correct point in space and time to achieve the desired goal.

(U) The DoD and the DOE agreed on the division of responsibilities for AMAC compatibility testing through memorandums of understanding dating back to 1962, when the DOE was the Atomic Energy Commission. The current memorandum of understanding, signed

Background (cont'd)

(U) in 2001, delineates the responsibilities of the stakeholders regarding the design requirements, test requirements, and documentation of aircraft monitor and control systems used with aircraft-delivered nuclear weapons.

~~(CUI)~~ According to Titles 10 and 50 of the United States Code, nuclear weapon development and modification is governed by the DOE, whereas aircraft development and modification is governed by the DoD. Testing the compatibility of the nuclear weapon with the aircraft is a joint DoD and DOE activity. The DoD conducts its nuclear weapon testing and certification mission primarily through the Air Force Nuclear Weapon Center and the aircraft system program offices for the aircraft. The DOE conducts its nuclear weapon testing and certification mission primarily through the National Nuclear Security Administration (NNSA) and its national laboratories, such as Sandia National Laboratories. [redacted]

(U) Findings

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

Results in Brief

(U) Evaluation of the Aircraft Monitor and Control System's Nuclear Certification

Findings (cont'd)

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Recommendations

(U) We recommend that the Air Force Nuclear Weapons Center Commander establish a procedure for the AMAC POG Chair to:

a. (U) Establish an annual AMAC testing schedule that complies with the joint DoD and DOE testing requirements.

b. (U) Report any conflicts that would prevent future AMAC tests from being accomplished without the required number of aircraft, types of tests, or frequency of tests, in accordance with joint DoD and DOE nuclear certification and test requirements, to the Nuclear Weapons Council Standing and Safety Committee through Headquarters Air Force.

c. (U) Report the results of each AMAC test to Air Combat Command or Air Force Global Strike Command, as applicable.

d. (U) Provide an annual report to the Nuclear Weapons Council Standing and Safety Committee through Headquarters Air Force that includes the number of required and completed AMAC system tests and the results of those tests.

(U) We recommend that the Air Force Nuclear Weapons Center Commander, in coordination with the NNSA, update the AMAC POG's Charter to include all responsibilities identified in DoD Manual 5030.55, supplemented with Air Force Manual 63-103, and to document that AMAC system certification is a joint DoD and DOE responsibility.

(U) We recommend that the Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, in coordination with the NNSA:

a. (U) Update the current memorandum of understanding to clarify AMAC system test and certification roles and responsibilities.

b. (U) Direct a joint DoD and DOE review to determine if the correct number of tests and test aircraft have been performed to date to ensure the safety and surety of the AMAC systems currently deployed.

c. (U) Direct a joint DoD and DOE review to determine the minimum number of test aircraft required during future AMAC tests to provide enough data to determine nuclear weapon compatibility or functionality when loaded on a nuclear-capable aircraft.

Results in Brief

(U) Evaluation of the Aircraft Monitor and Control System's Nuclear Certification

(U) Management Comments and Our Response

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, in coordination with Headquarters Air Force Material Command, the Air Force Nuclear Weapon Center, and Headquarters Air Force Global Strike Command, agreed with the recommendations; therefore, the recommendations are resolved but will remain open. We will close the recommendations when the Air Force provides us an updated Memorandum of Understanding, the revised Aircraft Monitor and Control System Project Officers Group Charter, the annual DoD-DOE Aircraft Monitor and Control testing schedule, and study results showing that all agreed-upon actions to implement the recommendations are completed. Please see the Recommendations Table on the next page for the status of the recommendations.

(U) Recommendations Table

Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Headquarters Air Force Deputy Chief of Staff, Strategic Deterrence and Nuclear Integration	None	3.a., 3.b., 3.c.	None
Air Force Nuclear Weapons Center Commander	None	1.a., 1.b., 1.c., 1.d., 2	None

(U) Table is unclassified

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

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

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

January 22, 2021

MEMORANDUM FOR DEPUTY CHIEF OF STAFF, STRATEGIC DETERRENCE AND NUCLEAR INTEGRATION
COMMANDER, AIR FORCE NUCLEAR WEAPONS CENTER

SUBJECT: (U) Evaluation of the Aircraft Monitor and Control System's Nuclear Certification (Report No. DoDIG-2021-046)

(U) This final report provides the results of the DoD Office of Inspector General's evaluation. 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.

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, in coordination with Headquarters Air Force Material Command, the Air Force Nuclear Weapon Center, and Headquarters Air Force Global Strike Command, with the recommendations presented in the report; therefore, the recommendations are resolved but will remain open.

(U) As described in the Recommendations, Management Comments, and Our Response section of this report, we will close the recommendations when you provide us documentation showing that all agreed-upon actions to implement the recommendations are completed. Therefore, please provide us within 90 days your response concerning specific actions in process or completed on the recommendations. Send your response to [redacted] if classified SECRET.

(U) If you have any questions, please contact [redacted]

Randolph R. Stone
Assistant Inspector General for Evaluations
Space, Intelligence, Engineering, and Oversight

(U) Contents

(U) Introduction

(U) Objective

Our objective was to determine whether testing conducted on the Aircraft Monitor and Control (AMAC) system for DoD nuclear weapon capable delivery aircraft met the DoD and the Department of Energy (DOE) nuclear certification requirements.

(U) This evaluation was a coordinated effort between the DoD and the DOE Offices of Inspector General (OIG). The DOE OIG's objective was to determine the extent to which the DOE provided oversight of the AMAC system testing requirements for nuclear weapons delivery. The DOE OIG issued its report to the DOE report on December 9, 2020.

(U) Background

Aircraft-delivered nuclear weapons must be compatible with the AMAC system of the aircraft because the AMAC system directly affects nuclear weapon reliability and safety. The DoD and the DOE work together to evaluate the AMAC system functionality.

(U) AMAC System

(~~CUI~~) AMAC systems are installed on nuclear-capable aircraft and are comprised of displays, controls, hardware, and software to monitor and control nuclear weapon functions required for proper compatibility between DoD aircraft and DOE-provided nuclear weapons. As of June 2020, there are two different types of AMAC systems.

[redacted][1]

(U) AMAC System Memorandum of Understanding

(U) The DoD has formally partnered with the DOE through a memorandum of understanding (MOU) dating back to 1962. The MOU delineates the responsibilities of the DoD and the DOE regarding the design requirements, test requirements, and documentation of AMAC systems used with aircraft-delivered nuclear weapons. The DoD and the DOE updated the MOU in 1986 and again in 2001.

[1] (~~CUI~~) [redacted]

(U) The MOU directs that test requirements be established by the AMAC Project Officers Group (POG). The MOU also directs that anticipated requirements for new aircraft-delivered nuclear weapons and the delivery aircraft "shall be based on agreements reached by the AMAC POG."

(U) AMAC Project Officers Group

(U) The DoD and the DOE formed the AMAC POG in 1972 to standardize, coordinate, publish, and maintain interface and test criteria for assuring compatibility between the National Nuclear Security Administration (NNSA)-developed nuclear weapons and DoD-developed aircraft. According to DoD Manual 5030.55, POGs are working-level bodies that coordinate activities associated with a particular nuclear weapon or nuclear weapon system.

(U) Roles and Responsibilities

(U) The primary stakeholders for AMAC nuclear certification are the DoD and the DOE, and both have individual and joint responsibilities. The DOE conducts its nuclear weapon testing and certification mission primarily through the NNSA and its national laboratories, such as Sandia National Laboratories (SNL). The DoD conducts its nuclear weapon testing and certification mission primarily through the Air Force Nuclear Weapons Center (AFNWC) and the aircraft system program offices for the aircraft.[2]

(U) The NNSA was established by Congress in 2000. The NNSA is an agency within the DOE responsible for maintaining and enhancing the safety, security, and effectiveness of the U.S. nuclear weapons stockpile. According to NNSA's core mission statement, part of keeping the U.S. nuclear weapons stockpile safe and effective includes working with the DoD, through the Nuclear Weapons Council, to maintain the quantity and quality of weapons necessary for U.S. national security needs.

(U) The AFNWC was established in 2006 within Air Force Materiel Command and is responsible for synchronizing all aspects of nuclear materiel management. The AFNWC consists of four directorates: Air Delivered Capabilities; Intercontinental Ballistic Missile Systems; Nuclear Command, Control, and Communications Integration; and Nuclear Technology and Integration. The Commander of the AFNWC is dual-hatted as the Air Force Program Executive Officer for Strategic Systems.

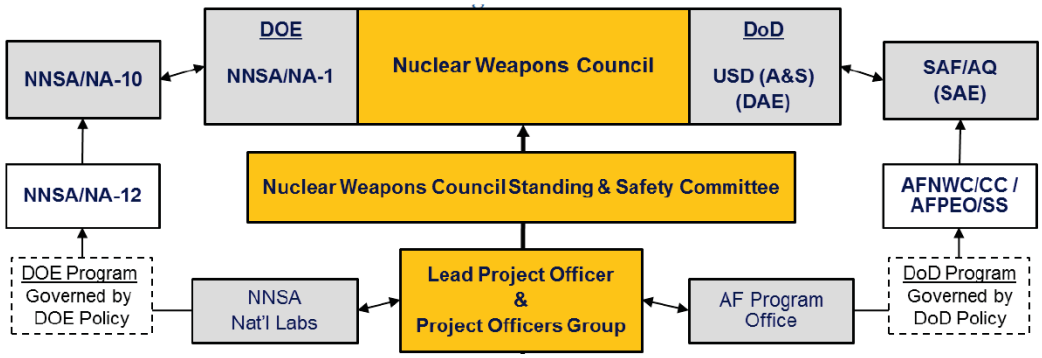
(U) DoD Policy

(U) DoD Manual 5030.55, supplemented by Air Force Manual 63-103, specifies that nuclear weapon development and modification is governed by DOE policy (left side of Figure 1). Aircraft development and modification is governed by DoD

[2] (U) DoD Manual 5030.55_AFMAN 63-103, "DoD Procedures for Joint DoD-Department of Energy/National Nuclear Security Administration (DOE/NNSA) Nuclear Weapon Life-Cycle Activities," August 10, 2018.

(U) policy (right side of Figure 1). Testing the compatibility of the nuclear weapon with the aircraft is a joint DoD and DOE activity, as reflected in the center portion of Figure 1.[3]

Figure 1. (U) Nuclear Weapon Certification Stakeholders



(U) Legend

AFNWC/CC	Air Force Nuclear Weapons Center Commander	SAF/AQ (SAE)	Secretary of the Air Force for Acquisition, Service Acquisition Executive
AFPEO/SS	Air Force Program Executive Officer for Strategic Systems	USD (A&S) (DAE)	Under Secretary of Defense for Acquisition & Sustainment, Defense Acquisition Executive

(U) Figure 1 and the legend are Unclassified.
(U) Source: DoD Manual 5030.55_AFMAN 63-103, "DoD Procedures for Joint DoD-Department of Energy/National Nuclear Security Administration (DOE/NNSA) Nuclear Weapon Life-Cycle Activities," August 10, 2018.

(U) DoD Manual 5030.55 implements policy, assigns responsibilities, and prescribes procedures for joint DoD and DOE nuclear weapon life-cycle activities.[4] The DoD Manual assigns the Deputy Chief of Staff of the Air Force for Strategic Deterrence and Nuclear Integration (AF/A10) as the Headquarters Air Force accountable officer to the Secretary of the Air Force and the Chief of Staff of the Air Force for the Air Force nuclear mission. The Deputy Chief of Staff is required to provide guidance and oversight to organizations with nuclear weapons or responsibilities and authorities for systems supporting nuclear deterrence operations.

(U) DoD Manual 5030.55 also requires program managers of nuclear weapon delivery systems and sub-systems to collaborate with the applicable nuclear weapon lead project officer and the POG to ensure integration and alignment with associated nuclear weapon system programs and integration with relevant

[3] (U) DoD Manual 5030.55_AFMAN 63-103, "DoD Procedures for Joint DoD-Department of Energy/National Nuclear Security Administration (DOE/NNSA) Nuclear Weapon Life-Cycle Activities," August 10, 2018.

[4] (U) DoD Manual 5030.55, "DoD Procedures for Joint DoD-Department of Energy/National Nuclear Security Administration (DOE/NNSA) Nuclear Weapon Life-Cycle Activities," January 25, 2001.

(U) delivery platforms. Additionally, DoD Manual 5030.55 requires that POGs, in coordination with the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics and AF/A10, brief the Nuclear Weapons Council or its subordinate committees on program status as requested.

(U) Military Standard (MIL-STD) 1822B defines nuclear weapon system compatibility as two or more nuclear weapon system components functioning in one system or environment without mutual interference.[5] The MIL-STD mandates requirements that are necessary to ensure this compatibility between NNSA-developed nuclear weapons and DoD nuclear weapon delivery systems and associated support equipment. Finally, the MIL-STD states that nuclear compatibility certification is a joint DoD and DOE effort.

(U) Air Force Instruction (AFI) 63-125 directs the AFNWC to coordinate required tests and analysis with the NNSA during compatibility certification.[6] AFI 63-125 directs the AFNWC to ensure that the NNSA is aware of system modifications or acquisitions that may affect the extent of compatibility between a nuclear weapon and an aircraft. This testing determines compliance and functionality of the aircraft AMAC system with required AMAC specifications and establishes aircraft electrical compatibility with the required set of nuclear weapons.

(U) The Nuclear Weapons Council Required Joint DoD and DOE Nuclear Weapon Coordination

(U) Section 179, title 10, United States Code, established the Nuclear Weapons Council in 1986. The Nuclear Weapons Council is a joint DoD and DOE activity composed of senior level officials from the two departments and serves as the focal point for interagency activities to maintain the U.S. nuclear weapons stockpile. The Council facilitates cooperation and coordination between the DoD and the DOE, normally through the NNSA, on nuclear weapons stockpile issues, reaches consensus on those issues, and establishes priorities between the DoD and the NNSA to align their efforts as they carry out their responsibilities for managing the U.S. nuclear weapons stockpile.

(U) The Council has two subordinate support committees: the Action Officers Group and the Nuclear Weapon Council Standing and Safety Committee. The Action Officers Group performs detailed analyses of issues and provides those analyses to the Standing and Safety Committee, which reviews them and formulates decision packages for final Council review and decision.[7]

[5] (U) Military Standard 1822B, "Nuclear Compatibility Certification of Nuclear Weapon Systems, Subsystems and Support Equipment" (MIL-STD 1822B), January 11, 2017.

[6] (U) Air Force Instruction 63-125, "Nuclear Certification Program," July 24, 2017.

[7] (U) GAO-15-446, "Nuclear Weapons Council, Enhancing Interagency Collaboration Could Help With Implementation of Expanded Responsibilities," May 2015.

(U) AMAC System Testing and Certification

(U) To evaluate the nuclear weapon interface between the aircraft and the weapon, and to ensure compatibility between the aircraft and the weapon, the following AMAC tests are required by the AMAC System 1 Test Requirements (System 1).[8]

(U) AMAC Periodic tests are conducted jointly by the AFNWC and NNSA to test electrical systems to ensure that no degradation to the AMAC system has occurred due to modification or aging and to ensure that weapon reliability numbers published by the DOE are supportable. These tests are conducted on AMAC systems that have not been modified or tested for an extended period. Periodic AMAC tests are typically conducted every 5 years. However, the AFNWC and the NNSA documented in the AMAC System 1 Test Requirements that periodic AMAC test gaps are allowed up to, but not to exceed, 10 years.

(U) Surveillance tests are conducted by the AFNWC over the life of an aircraft and after any major AMAC system change to ensure that the AMAC design continues to meet AMAC interface specifications. Surveillance tests are typically conducted once every year for each type of aircraft.

(U) AMAC Certification tests are conducted jointly by the AFNWC and NNSA to determine design compliance of new and significantly modified aircraft. These tests are typically conducted when there is a new weapon system or when there has been a major modification to the AMAC system.

(U) Together, these tests are designed to provide both the DoD and the DOE confidence that an aircraft with an AMAC system can employ nuclear weapons in a safe, secure, and reliable manner. Aircraft-delivered nuclear weapons must be compatible with the AMAC system of the aircraft because the reliability and safety of nuclear weapons are directly affected by the AMAC systems.

(U) Aircraft-delivered nuclear weapons must be compatible with the AMAC system of an aircraft because the reliability and safety of nuclear weapons are directly affected by the AMAC systems.

[8] (U) Specification Standard No. SYS 1300-02, "System 1 Aircraft Monitor and Control Test Requirements," May 20, 2005.

~~(CUI)~~ Finding

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Additionally, a previous AFNWC Commander incorporated in the 2014 AMAC POG charter, which is still current, that he had the "...ultimate authority and responsibility for the AMAC POG, POG deliverables, and acceptance for the AMAC System certifications[,]" despite the requirements in DoD Manual 5030.55 and the current joint DoD and DOE MOU that direct joint DoD and DOE coordination. However, we determined that AMAC nuclear certification is not a unilateral AFNWC decision. The DOE, through the NNSA, is responsible for certifying whether the carriage and release of a weapon on DoD aircraft will adversely impact the reliability, safety, or surety of the weapon.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

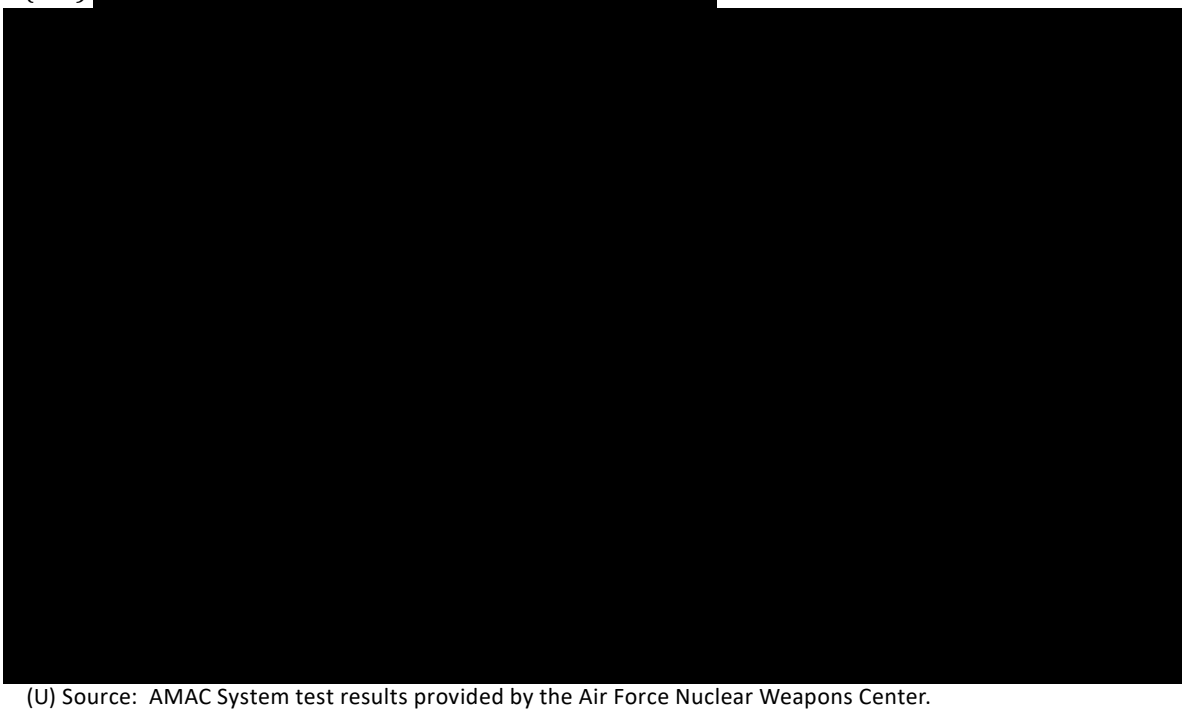
~~(CUI)~~ [redacted]

[9] (U) Specification Standard No. SYS 1300-02, "System 1 Aircraft Monitor and Control Test Requirements," May 20, 2005.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]



(U) Source: AMAC System test results provided by the Air Force Nuclear Weapons Center.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Periodic AMAC tests verify that no degradation to the AMAC system that would jeopardize the aircraft's capability to properly function with a nuclear weapon has occurred due to modification or aging. Table 2 summarizes the types of AMAC system tests that require a minimum number of aircraft to test.

~~(CUI)~~ [redacted]

[redacted]

(U) Source: Specification Standard No. SYS 1300-02, "System 1 Aircraft Monitor and Control Test Requirements," May 20, 2005.

[10] (U) Specification Standard No. SYS 1300-02, "System 1 Aircraft Monitor and Control Test Requirements," May 20, 2005.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~*(CUI)*~~ [redacted]

(U) Source: AMAC System test results provided by the Air Force Nuclear Weapon Center.

(CUI) [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(CUI) [redacted]

(U) Source: AMAC system test results provided by the Air Force Nuclear Weapons Center.

[redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

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~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

> (U) The authority for establishment and clarification of responsibilities of the AMAC POG is derived from:
>
> (U) DODI 5030.55, DOD Procedures for joint DOD-NNSA Nuclear Weapons Life-Cycle Activities, 25 January 2001, Enclosure 6, Project Officers Group Procedures.
>
> (U) The DOD instruction specifies the POG and Subgroups be established for the purpose of resolving issues between the DOD and DOE (NNSA).
>
> (U) Enclosure 6 provides detailed procedures and responsibilities for forming POGs and conducting POG business.

(U) DoD Manual 5030.55, supplemented with Air Force Manual 63-103, states that the POG is the primary means of communication between the DOE and the DoD on nuclear matters. Enclosure 6 of DoD Manual 5030.55, mandates that POGs " submit DoD-DOE conflicts to the Nuclear Weapons Council if the conflicts cannot be resolved at lower levels."

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

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~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

[11] (U) Sandia National Laboratories, "Nuclear Certification Quantities: System 1 Assessment," April 2, 2018.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Interviews with both DoD and DOE officials revealed that personnel from both agencies believed the 2001 MOU was outdated. DoD and DOE officials stated that neither roles and responsibilities nor an updated charter was possible without updating the MOU. The DoD and DOE OIG teams agree with this assessment.

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Additionally, SNL officials stated that there are opportunities for SNL to use additional Air Force AMAC tests for DOE certification purposes. Air Force officials agreed that a need exists to re-assess AMAC system tests in a manner that might support and enforce reliability confidence. SNL and Air Force officials believe this consolidation of test data could improve the integrity of test data.

(U) Recommendations, Management Comments, and Our Response

(U) Recommendation 1

(U) We recommend that the Air Force Nuclear Weapons Center Commander establish a procedure for the Aircraft Monitor and Control Project Officers Group Chair to:

a. **(U) Establish an annual Aircraft Monitor and Control testing schedule that complies with the joint Department of Defense–Department of Energy testing requirements.**

b. **(U) Report any conflicts that would prevent future Aircraft Monitor and Control tests from being accomplished without the required number of aircraft, the types of tests, or the frequency of tests, to the Nuclear Weapons Council Standing and Safety Committee through Headquarters Air Force.**

c. **(U) Report the results of each Aircraft Monitor and Control test to Air Combat Command or Air Force Global Strike Command, as applicable.**

d. **(U) Provide an annual report to the Nuclear Weapons Council Standing and Safety Committee through Headquarters Air Force that includes the number of required and completed Aircraft Monitor and Control system tests and the results of those tests.**

(U) Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration Comments

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, in coordination with Headquarters Air Force Material Command, the Air Force Nuclear Weapon Center, and Headquarters Air Force Global Strike Command, agreed with the recommendations. The Deputy Chief of Staff stated that the Air Force Nuclear Weapon Center and the Department of Energy's National Nuclear Security Administration have initiated an interagency Nuclear Certification Study Group to evaluate and re-scope nuclear certification roles, responsibilities, and authorities, with special emphasis on compatibility certification.

(U) The Deputy Chief of Staff added that efforts are underway to scope governance or agreements and source documentation for requirements, terms of reference, definitions, and staffing considerations. An AMAC Requirements Study will be a subset of the Nuclear Certification Study and will evaluate and reestablish compatibility test frequency, test types, and quantity of aircraft required for testing.

(U) The Deputy Chief of Staff also added that the Aircraft Monitor and Control System Project Officers Group will form a Test Schedule Subgroup to meet the recommendation for establishing and publishing an annual, DoD-DOE-compliant Aircraft Monitor and Control testing schedule.

(U) The Deputy Chief of Staff further stated that the Aircraft Monitor and Control System Project Officers Group will be reviewed and revised (as needed) to be fully compliant with DoD and Air Force directives. Specifically, periodic test reporting to Major Commands and the Nuclear Weapons Council Standing and Safety Committee will be delineated responsibilities in the Aircraft Monitor and Control System Project Officers Group Charter. The charter will also specify an appropriate mechanism to elevate testing conflicts for resolution to the Nuclear Weapons Council Standing and Safety Committee, if warranted. The Deputy Chief of Staff stated that all actions would be completed by December 21, 2021.

(U) Our Response

(U) Comments from the Deputy Chief of Staff addressed the specifics of the recommendation. Therefore, the recommendation is resolved but will remain open. We will close this recommendation after we verify that the revised Aircraft Monitor and Control System Project Officers Group Charter and annual DoD-DOE Aircraft Monitor and Control testing schedule have fully addressed the recommendation.

(U) Recommendation 2

(U) We recommend that the Air Force Nuclear Weapon Center Commander, in conjunction with the National Nuclear Security Administration, develop and implement a plan for the Aircraft Monitor and Control Project Officers Group to meet all Project Officers Group requirements identified in Department of Defense Manual 5030.55, supplemented with Air Force Manual 63-103.

(U) Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration Comments

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration stated that actions captured in the response to Recommendation 1 also address Recommendation 2.

(U) Our Response

(U) We agree that the actions taken to resolve Recommendation 1 also address Recommendation 2. The Deputy Chief of Staff stated that the Aircraft Monitor and Control System Project Officers Group will be reviewed and revised (as needed) to be fully compliant with DoD and Air Force directives.

(U) Comments from the Deputy Chief of Staff addressed the specifics of the recommendation. Therefore, the recommendation is resolved but will remain open. We will close this recommendation after we verify that the revised Aircraft Monitor and Control System Project Officers Group Charter has fully addressed the recommendation.

(U) Recommendation 3

(U) We recommend that the Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, as the Headquarters Air Force accountable officer to the Secretary of the Air Force and Chief of Staff of the Air Force for the Air Force Nuclear Mission, in coordination with the National Nuclear Security Administration:

a. **(U) Update the 2001 Memorandum of Understanding to reflect Aircraft Monitor and Control system test and certification roles and responsibilities.**

b. **(U) Direct a joint Department of Defense–Department of Energy review to determine if the correct number of tests and test aircraft have been performed to date to ensure the safety and surety of the Aircraft Monitor and Control systems currently deployed.**

c. **(U) Direct a joint Department of Defense–Department of Energy study to determine the correct number of test aircraft to minimize risk.**

(U) Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration Comments

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration stated that the Air Force Nuclear Weapon Center Commander expects to provide a revised draft memorandum of understanding to Headquarter Air Force/A10 no later than July 31, 2021, for coordination with respective stakeholders. The Deputy Chief of Staff explained that the Air Force cannot direct the DoD or the Department of Energy's National Nuclear Security Administration to complete Recommendations 3.b. and 3.c. However, the Deputy Chief of Staff stated that he will engage the Office of the Deputy Assistant to the Secretary of Defense, Nuclear Matters, to explore feasible DoD and Department of Energy-level policy revisions to improve compatibility certification roles, responsibilities, and authorities.

(U) Our Response

(U) Comments from the Deputy Chief of Staff addressed the specifics of the recommendation. We recognize that the Air Force cannot direct the DoD or National Nuclear Security Administration to implement Recommendation 3.b or 3.c. However, the Deputy Chief of Staff agreed to address the recommendation and implement an action plan through the Air Force Nuclear Certification Working Group. Therefore, the recommendation is resolved but will remain open. We will close this recommendation after we receive a copy of the updated Memorandum of Understanding and the study results to verify that actions have fully addressed compatibility certification roles, responsibilities, and authorities.

(U) Appendix

(U) Scope and Methodology

(U) We conducted this evaluation from November 2019 through August 2020 in accordance with the "Quality Standards for Inspection and Evaluation," published in January 2012 by the Council of Inspectors General on Integrity and Efficiency. Those standards require that we adequately plan the evaluation to ensure that objectives are met and that we perform the evaluation to obtain sufficient, competent, and relevant evidence to support the findings, conclusions, and recommendations. We believe that the evidence obtained was sufficient, competent, and relevant to lead a reasonable person to sustain the findings, conclusions, and recommendations.

~~(CUI)~~ [redacted] The scope also included any waivers granted by either the DoD or DOE from agreed-upon test requirements. While we did not evaluate the sufficiency of the test plans, we evaluated whether the tests conducted met the documented test requirements.

(U) Interviews With Officials

(U) We met with and interviewed officials from the following organizations:

- (U) Air Force Chief of Safety
- (U) Office of the Assistant Secretary of Defense for Nuclear Matters
- (U) National Nuclear Security Agency
- (U) Deputy Chief of Staff, Strategic Deterrence and Nuclear Integration (AF/10)
- (U) Air Force Safety Center
- (U) Air Force Nuclear Weapons Center Commander
- (U) Sandia National Laboratory
- (U) Headquarters Air Combat Command Strategic Deterrence and Nuclear Integration
- (U) Headquarters Air Force Global Strike Command
- ~~(CUI)~~ [redacted]
- ~~(CUI)~~ [redacted]
- ~~(CUI)~~ [redacted]

[12] ~~(CUI)~~ [redacted]

(U) Site Visits

(U) We conducted site visits in November and December 2019 and in February 2020. We interviewed organization officials, installation officials, and maintenance and safety personnel. We also interviewed contract workers employed by Sandia National Laboratories and the Air Force Nuclear Weapons Center.

(U) Installation Selection Criteria

(U) We selected the locations and personnel to interview based on Air Force Instructions and agencies and commands actually involved in the AMAC process.

(U) AMAC Tests

~~(CUI)~~ AFNWC officials provided AMAC test reports dating from April 2004 through April 2019. [redacted] To evaluate the nuclear weapon interface between the aircraft and the weapon, and to ensure compatibility between the aircraft and the weapon, the following AMAC tests are required by [redacted]

(U) AMAC Periodic tests are conducted jointly by the AFNWC and NNSA to test electrical systems to ensure that no degradation to the AMAC system has occurred due to modification or aging and to assure weapon reliability numbers published by the DOE are supportable. These tests are conducted on AMAC systems that have not been modified or tested for an extended period. Periodic AMAC tests are typically conducted every 5 years, up to a maximum of 10 years.

(U) Surveillance tests are conducted by the AFNWC over the life of an aircraft, and after any major AMAC system change, with the purpose of ensuring that the AMAC design continues to meet AMAC interface specifications. Surveillance tests are typically conducted once every year for each type of aircraft.

~~(CUI)~~ AMAC Certification tests are conducted jointly by the AFNWC and NNSA to determine design compliance of new and significantly modified aircraft. These tests are typically conducted when there is a new weapon system or when there has been a major modification to the AMAC system. [redacted] The conclusion to the report will indicate whether the test was successful, and certification can be granted. Recommendations often prescribe further testing based upon anomalies, deviations, or analysis gaps occurring in the first test.

(U) Aircraft Test Result Analysis

~~(CUI)~~ [redacted] Specifically, we determined whether the AMAC tests conducted met the test plan requirements for the number of test aircraft, the types of tests, and the frequency of tests. We also reviewed the test reports for test deviations, test anomalies, conclusions and recommendations, and any analysis gaps.

~~(CUI)~~ [redacted]

(U) Computer Processed Data

(U) We did not use computer-processed data to perform this evaluation.

(U) Prior Coverage

(U) No prior coverage has been conducted on the AMAC System during the last 5 years.

(U) Management Comments

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration

DEPARTMENT OF THE AIR FORCE
WASHINGTON, DC

MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL

FROM: HQ USAF/A10
1120 Air Force Pentagon Suite 4E240
Washington, DC 20330

SUBJECT: Air Force Response to DoD Office of Inspector General Draft Report, "Evaluation of the Aircraft Monitor and Control System's Nuclear Certification (Project No. D2020-DEV0SN-0027.000)"

1. This is the Department of the Air Force (AF) response to the DoDIG Draft Report, "Evaluation of the Aircraft Monitor and Control System's (AMAC) Nuclear Certification (Project No. D2020-DEV0SN-0027.000)" The DCS, Strategic Deterrence and Nuclear Integration (AF/A10) concurs with the report and provides response to recommendations below.

2. AF/10 in coordination with HQ Air Force Material Command, the Air Force Nuclear Weapon Center (AFNWC), and HQ Air Force Global Strike Command (HQ AFGSC) will address all recommendations in the draft report and implement appropriate corrective action plans as outlined in the following recommendations:

RECOMMENDATION 1: The DoDIG recommends the AFNWC Commander establish a procedure for the Aircraft Monitor and Control Project Officer Group (POG) Chair to:

a. Establish an annual AMAC testing schedule that complies with the joint Department of Defense (DoD–Department of Energy, National Nuclear Security Administration (DOE/NNSA) testing requirements

b. Report any conflicts that would prevent future AMAC tests from being accomplished without the required number of aircraft, the types of tests, or the frequency of tests, to the Nuclear Weapons Council Standing and Safety Committee (NWCSSC) through Headquarters Air Force (HAF).

c. Report the results of each AMAC test to Air Combat Command or HQ AFGSC, as applicable.

d. Provide an annual report to the NWCSSC through HAF that includes the number of required and completed AMAC system tests and associated results.

AIR FORCE RESPONSE: Air Force stakeholders collectively attribute the DoDIG's findings to conflicting roles, responsibilities, and authorities for nuclear certification between DoD and DOE/NNSA. To effectively address recommendations a. thru d., the AFNWC and DOE/NNSA have initiated an interagency Nuclear Certification Study Group to evaluate and re-scope nuclear

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration (cont'd)

certification roles, responsibilities, and authorities with special emphasis on compatibility certification. Efforts are underway to scope governance and/or agreements, source documentation for requirements, terms of reference, definition, and staffing considerations. An AMAC Requirements Study will be a subset of the Nuclear Certification Study and will evaluate and reestablish compatibility test frequency, test types, and quantity of aircraft required for testing. The AMAC POG will form a Test Schedule Subgroup to meet recommendation 1a and publish a compliant AMAC testing schedule through the POG. The AMAC POG Charter will be reviewed/revised (as needed) to be fully compliant with DoD and AF directives. Specifically, periodic test reporting to Major Commands (MAJCOM) and the NWCSSC will be delineated responsibilities in the AMAC POG Charter. The charter will also specify an appropriate mechanism to elevate testing conflicts for resolution to the NWCSSC, if warranted. MAJCOMs will also be afforded the option to attend any AMAC Executive POG (EPOG) proceedings.

Estimated completion:

- The Test Schedule Subgroup will be established NLT 31 Jan 21
- AMAC Requirements Study completed NLT 31 Jul 21
- A revised AMAC POG Charter will be completed NLT 30 Sep 21
- Nuclear Certification Study Group expects to complete all actions NLT 31 Dec 21

RECOMMENDATION 2: The DoDIG recommends the AFNWC Commander, in conjunction with the DOE/NNSA, develop and implement a plan for the AMAC POG officials to meet all POG requirements identified in Department of Defense Manual 5030.55, supplemented with Air Force Manual 63-103.

AIR FORCE RESPONSE: Actions captured in recommendation 1 addresses this recommendation.

RECOMMENDATION 3: The DoDIG recommends that the Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, as the Headquarters Air Force accountable officer to the Secretary of the Air Force and Chief of Staff of the Air Force for the Air Force Nuclear Mission, in coordination with the National Nuclear Security Administration:

a. Update the 2001 Memorandum of Understanding (MOU) to reflect Aircraft Monitor and Control system test and certification roles and responsibilities

b. Direct a joint Department of Defense–Department of Energy review to determine if the correct number of tests and test aircraft have been performed to date to ensure the safety and surety of the Aircraft Monitor and Control systems currently deployed.

c. Direct a joint Department of Defense–Department of Energy study to determine the correct number of test aircraft to minimize risk

AIR FORCE RESPONSE: AFNWC/CC expects to provide a revised draft MOU to AF/A10 NLT 31 Jul 21 for coordination with respective stakeholders. The Air Force cannot direct DoD and DOE/NNSA to complete recommendations b. and c. However, AF/A10 will engage the Office of the Deputy Assistant to the Secretary of Defense, Nuclear Matters to explore feasible DoD- and DOE-level policy revisions to improve compatibility certification roles, responsibilities, and authorities. AF/A10 will action and ensure HAF-level oversight through the established Air Force

(U) The Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration (cont'd)

Nuclear Certification Working Group and Air Force Nuclear Certification Senior Steering Group.
3. The AF/10 point of contact is [redacted]

JAMES C. DAWKINS, JR., Lt Gen, USAF
DCS, Strategic Deterrence & Nuclear Integration

(U) Acronyms and Abbreviations

AFNWC	Air Force Nuclear Weapons Center
AMAC	Aircraft Monitor and Control System
CRP	Certificate Requirement Plan
DOE	Department of Energy
OIG	Office of Inspector General
MOU	Memorandum of Understanding
POG	Project Officers Group
NNSA	National Nuclear Security Administration
NWC	Nuclear Weapons Council
SNL	Sandia National Laboratories


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