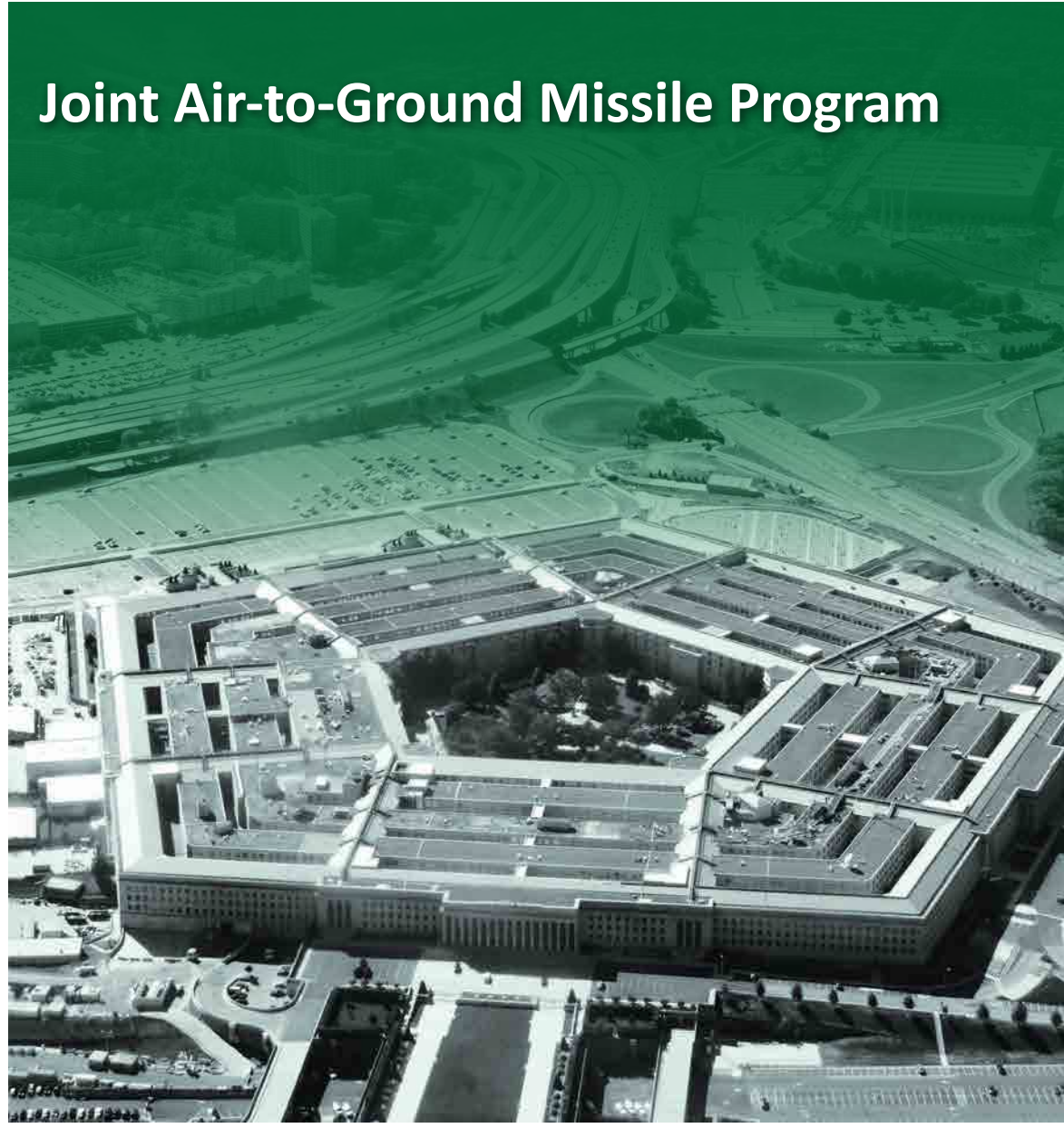


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# INSPECTOR GENERAL

*U.S. Department of Defense*

DECEMBER 7, 2017



## Joint Air-to-Ground Missile Program

INTEGRITY ★ EFFICIENCY ★ ACCOUNTABILITY ★ EXCELLENCE

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# Results in Brief

## *Joint Air-to-Ground Missile Program*

December 7, 2017

### Objective

We determined whether the Joint Attack Munition Systems (JAMS) project office adequately assessed the affordability of the Joint Air-to-Ground Missile (JAGM) increment one.

### Background

The JAGM is an Army-led program with joint requirements from the Navy and Marine Corps. The Army implemented an incremental strategy to fulfill the JAGM requirements. The JAGM is the next generation of aviation-launched, air-to-ground, self-guided missiles that will replace the Hellfire family of missiles. Joint service manned and unmanned aircraft will use the JAGM to destroy enemy targets from a greater distance than current missiles.

### Findings

We determined that the JAMS project office adequately assessed the affordability of the JAGM increment one. Army and Navy officials concluded that the JAGM program was unaffordable as originally designed because funding was not available to meet program requirements. Therefore, JAMS project office officials restructured the program. Specifically, JAMS project office officials lowered the performance of two primary requirements, substituted proven technology for technology still being developed, and deferred the delivery of certain capabilities to future increments to reduce program costs.

### Findings (cont'd)

However, although Army and Navy officials initiated actions to ensure the JAGM program was affordable, JAGM increment one will not provide critical capabilities needed by the warfighter. As a result, JAGM increment one will not provide the warfighter with the capability to launch missiles from fixed-wing aircraft; strike targets from longer distances; and increase the accuracy, lethality, and interoperability over existing air-to-ground missiles.

### Recommendations

We recommend that at the Joint Air-to Ground Missile increment one initial production decision, the Commander, U.S. Army Training and Doctrine Command; the Assistant Secretary of the Army (Acquisition, Logistics, and Technology); and the Assistant Secretary of the Navy (Research, Development, and Acquisition):

- evaluate the costs to achieve full JAGM capability; and
- determine whether the JAGM incremental strategy provides the most affordable alternative to meet the self-guided missile capability gap.

### Management Comments and Our Response

The U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack responding for the Commander, U.S. Army Training and Doctrine Command, agreed with the findings and recommendations, stating that the recommendations are in line with the U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack Strategic Portfolio Analysis and Review strategy. The Capability Manager stated that the U.S. Army Training and Doctrine Command will continuously evaluate the cost to achieve full JAGM capability, and continually assess whether the JAGM incremental strategy provides the most affordable alternative to close the self-guided missile capability gap. Therefore, the recommendation is resolved but will remain



# Results in Brief

## *Joint Air-to-Ground Missile Program*

### **Management Comments (cont'd)**

open. We will close this recommendation once we verify that the U.S. Army Training and Doctrine Command evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program.

The Project Manager, Joint Attack Munition Systems, responding for the Assistant Secretary of the Army (Acquisition, Logistics, and Technology), agreed with our findings and recommendations. The Project Manager stated that as funding becomes available for increased performance, the JAGM Product Office will manage the development, testing, and qualification of each new increment. The Project Manager stated that the program office will complete a cost estimate that will be certified by the Deputy Assistant Secretary of the Army for Cost and Economics at the Milestone C planned in May 2018 and the Army will assess the JAGM program as an affordable alternative at that time. Therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Army evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program at the Milestone C.

The Deputy Assistant Secretary of the Navy for Aviation Programs, responding for the Assistant Secretary of the Navy (Research, Development, and Acquisition), agreed with our findings and recommendations. The Deputy Assistant Secretary stated that as resources become available, the Department of the Navy will collaborate with the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) and Department of the Army Cost and Economics personnel to evaluate the current acquisition strategy to determine if an incremental approach is the most affordable alternative to address the capability gaps and the overall program costs to achieve full JAGM capabilities. Therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Department of the Navy evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program.

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

## Recommendations Table

| Management   | Recommendations Unresolved | Recommendations Resolved | Recommendations Closed |
|--|----------------------------|--------------------------|------------------------|
| Commander, U.S. Army Training and Doctrine Command                       | None                       | 1.a and 1.b              | None                   |
| Assistant Secretary of the Army (Acquisition, Logistics, and Technology) | None                       | 1.a and 1.b              | None                   |
| Assistant Secretary of the Navy (Research, Development, and Acquisition) | None                       | 1.a and 1.b              | None                   |

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**

December 7, 2017

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION,  
TECHNOLOGY, AND LOGISTICS  
AUDITOR GENERAL, DEPARTMENT OF THE ARMY  
NAVAL INSPECTOR GENERAL

SUBJECT: Joint Air-to-Ground Missile Program (Report No. DODIG-2018-038)

We are providing this report for your information and use. We determined the Joint Attack Munition Systems project office officials restructured the program, lowered the performance of two primary requirements, substituted proven technology for technology still being developed, and deferred the delivery of certain capabilities to future increments to reduce program costs. However, Joint Air-to-Ground Missile increment one will not provide the warfighter with the capability to launch missiles from fixed-wing aircraft, strike targets from longer distances, increase accuracy, lethality, and interoperability over existing air-to-ground missiles. We conducted this audit in accordance with generally accepted government auditing standards.

We considered management comments on a draft of this report when preparing the final report. DoD Instruction 7650.03 requires that recommendations be resolved promptly. Comments from the U.S. Army Training and Doctrine Command; the Assistant Secretary of the Army (Acquisition, Logistics, and Technology); and the Assistant Secretary of the Navy (Research, Development, and Acquisition) addressed all specifics of the recommendations and conformed to the requirements of DoD Instruction 7650.03.

We appreciate the courtesies extended to the staff. Please direct questions to Ms. Susan Lippolis at (703) 604-9081 (DSN 664-9081).

A handwritten signature in black ink, reading "Troy M. Meyer", is positioned above the typed name.

Troy M. Meyer  
Principal Assistant Inspector  
General for Audit

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# Introduction

## Objective

We determined whether the Joint Attack Munition Systems (JAMS) project office adequately assessed the affordability of the Joint Air-to-Ground Missile (JAGM) increment one. See Appendix A for a discussion of the scope and methodology and prior audit coverage related to the audit objective.

## Background

The JAGM is the next generation of aviation-launched, air-to-ground, self-guided missiles that will replace the Hellfire family of missiles, including the Hellfire Longbow and Hellfire Romeo. The Hellfire II missile is the primary air-to-ground missile for rotary-wing and unmanned aerial vehicles for all U.S. armed services and 16 other countries. Figure 1 depicts the multiple Hellfire variants. Since the 1970s, the Army has developed multiple variants of the Hellfire air-to-ground missile, each with varying capabilities, as an equalizer against enemy tanks. The Hellfire missile has been used in several wars and has numerous operators, including France, Greece, India, and Iraq.

| System Description  | Production            |
|---|-----------------------|
| <b>AGM-114A, B, C, F, FA – HELLFIRE</b><br>Weight = 45 kg Length = 163 cm<br>                    | 1982 – 1992           |
| <b>AGM-114K/K2/K2A – HELLFIRE II</b><br>Weight = 45 kg Length = 163 cm<br>                       | 1993 – Until Complete |
| <b>AGM-114L – HELLFIRE LONGBOW</b><br>Weight = 49 kg Length = 180 cm<br>                         | 1995 – 2005           |
| <b>AGM-114M – HELLFIRE II (Blast Frag)</b><br>Weight = 49 kg Length = 180 cm<br>                 | 1998 – 2010           |
| <b>AGM-114N – HELLFIRE II (MAC)</b><br>Weight = 49 kg Length = 180 cm<br>                        | 2003 – Until Complete |
| <b>AGM-114R – HELLFIRE II</b><br>(Bridge to JAGM – RW/UAS)<br>Weight = 49 kg Length = 180 cm<br> | 2010 – Until Complete |

Figure 1. Hellfire Missile Variants

Source: JAMS project office

Note: AGM-114R is a Romeo Missile

The Hellfire Longbow is the only air-to-ground missile in the Army inventory with self-guided capability. It uses radar to track targets by transmitting pulses of low-frequency electromagnetic waves that are reflected off the target and returned to the source. The Army began producing the Longbow in 1995, stopped production in 2005, and estimates that the inventory will be used up by 2025. In 2010, the Army began producing the Hellfire Romeo. The Hellfire Romeo uses a laser to identify and maintain the target until impact and provides precision point targeting.

The Army is developing the JAGM as a multipurpose missile to replace all Hellfire missile configurations (12 variants). The JAGM is designed to have a multipurpose warhead and targeting capabilities to exceed that of individual variants of the Hellfire.<sup>1</sup> The Army needed an air-to-ground missile with self-guided capability to replace the Hellfire Longbow.

The JAGM is an Army-led program with joint requirements from the Navy and the Marine Corps. The JAGM program (formerly the Joint Common Missile) started development in 1999. The Joint Common Missile and original JAGM program was developing a three-mode guidance section (third seeker mode, laser, and radar), multi-mode warhead, and a new, longer-range rocket and launchers for fixed-wing and rotary-wing aircraft. In addition, the JAGM is intended to allow the user to strike targets day or night in adverse weather and blurred battlefield conditions from a safer distance (farther away) than current missiles. See Appendix B for a table comparing the major traits of the JAGM, Hellfire Romeo, and Hellfire Longbow. Figure 2 illustrates JAGM program development, and Figure 3 depicts an aircraft firing the Hellfire missile.

---

<sup>1</sup> The warhead is the forward section of the missile that contains the explosives. A multipurpose warhead provides lethal effects against a range of target types, from armored vehicles and maritime patrol craft to urban structures.

Figure 2. JAGM Increment One Overview



Source: JAMS project office.



Figure 3. Helicopter Firing Hellfire Missile  
Source: JAMS project office.

## ***JAGM Program Incremental Acquisition Strategy***

The Army restructured the JAGM program in 2012 to reduce cost and risk. The Army implemented an incremental strategy to deliver JAGM warfighting capabilities over at least three increments.<sup>2</sup>

- **Increment one.** The Army plans to develop a dual-mode (laser and radar) guidance section for rotary-wing aircraft. The lethality of JAGM increment one will match that of existing air-to-ground missiles. The new guidance section will be integrated onto the backend of the Hellfire Romeo missile that has an 8-kilometer range. The Hellfire Romeo backend consists of the warhead, propulsion (rocket motor), and control sections. See Figure 4 for a pictorial location of the sections.

*Figure 4. Hellfire Sections*



Source: Army.

- **Increment two.** The Army plans to extend the range beyond 8 kilometers and add improved targeting capability. Increment two plans to provide increased operator survivability and improved targeting accuracy over existing air-to-ground missiles.
- **Increment three.** The Army plans to achieve full capability of the JAGM original requirements, improving the missile's accuracy, lethality, and interoperability over existing air-to-ground missiles. Increment three plans will:
  - add third seeker mode capability to the guidance section, giving the missile three different modes that allow the warfighter to operate in multiple environments;
  - extend the maximum range beyond 8 kilometers, allowing the warfighter to strike targets from a safer distance (farther away) and increasing the operator survivability; and

<sup>2</sup> Each increment of capability will have its own set of threshold and objective values set by the user.

- increase the number of aircraft that can fire the missile from 2 to 15 (see Appendix C for a list of aircraft). This will allow the Army, Air Force, Navy, and Marine Corps to use the JAGM on unmanned aerial vehicles, fixed-wing, and rotary-wing aircraft.

As of February 25, 2017, JAGM increment one is the only DoD acquisition program of record.<sup>3</sup> Increments two and three are needed capabilities that the Army has not funded in the FY 2016 through FY 2020 budget (unfunded requirements). According to Army officials, increments two and three may become separate programs with their own funding if the Army and Navy decide to later make these programs of record.

### ***DoD Acquisition Milestones and JAGM Program Milestones***

The Defense Acquisition System uses three milestones, each with a distinct phase, to oversee and manage major defense acquisition programs.

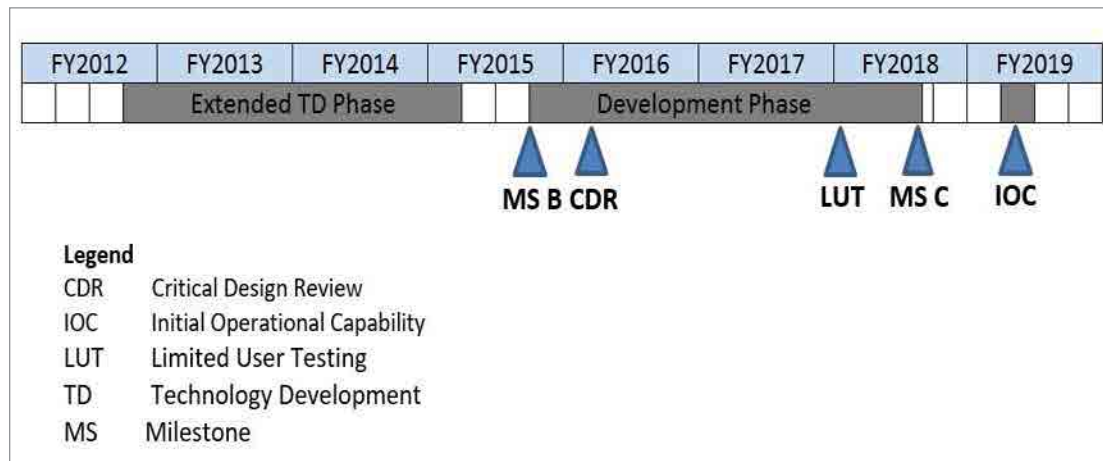
- Milestone A initiates technology maturation and risk reduction.
- Milestone B initiates engineering and manufacturing development.
- Milestone C initiates low rate initial production and deployment.

The JAGM program entered the technology development phase in 2008 (Technology Maturation and Risk Reduction phase). In 2012, the Army requested an extension to the technology development phase to address affordability, development, and maturation of the new JAGM guidance section. JAGM increment one entered the engineering and manufacturing development (development) phase in July 2015. As of February 2017, the JAGM is preparing for the initial production decision, Milestone C.

The program encountered a schedule delay that exceeded the date established in the Acquisition Program Baseline. During February 2017, Milestone C was rescheduled from July 2017 to May 2018 because of delayed missile deliveries. During the development phase, the JAGM is planned to complete full system integration, develop affordable and executable manufacturing processes, and test and evaluate the system before proceeding into the production and deployment phase. Figure 5 shows the schedule and milestones for the JAGM program.

<sup>3</sup> Program as recorded in the current future years defense program or as updated from the last future years defense program by approved program documentation (acquisition program baseline, acquisition strategy, or selected acquisition report).

Figure 5. JAGM schedule and milestones as of February 2017



Source: JAMS project office.

## Acquisition Oversight of the JAGM Program

The following describes the management and oversight responsibilities for the JAGM.

- **Under Secretary of Defense for Acquisition, Technology, and Logistics:**
  - was the milestone decision authority (MDA), and
  - designated JAGM increment one as an acquisition category 1D major defense acquisition program in July 2015.<sup>4</sup>
- **Secretary of the Army**
  - is delegated the MDA, and
  - designated JAGM increment one as an acquisition category 1C major defense acquisition program in March 2017.<sup>5</sup>
- **Program Executive Office Missiles and Space:**
  - is a component of the Assistant Secretary of the Army (Acquisition, Logistics, and Technology), and
  - provides overall direction and guidance for development, acquisition, and fielding of the JAGM program.

<sup>4</sup> An Acquisition Category 1D is a major defense acquisition program that has an estimated eventual total spending for research, development, test, and evaluation of more than \$480 million in FY 2014 constant dollars or, for procurement, more than \$2.79 billion in FY 2014 constant dollars and the Decision Authority is the Defense Acquisition Executive.

<sup>5</sup> An Acquisition Category 1C is a major defense acquisition program that has an estimated eventual total spending for research, development, test, and evaluation of more than \$480 million in FY 2014 constant dollars or, for procurement, more than \$2.79 billion in FY 2014 constant dollars and the Decision Authority is the Head of the DoD Component.



- **JAMS project office:**
  - is a component of the Program Executive Office Missiles and Space, and
  - manages the Hellfire Missile, the JAGM, and other munitions, and their associated test and support equipment.
- **JAGM Product Manager:**
  - is a component of the JAMS project office, and
  - leads the design and development of the JAGM program.
- **Assistant Secretary of the Navy (Research, Development, and Acquisition):**
  - serves as the Navy Acquisition Executive, and
  - oversees all Navy acquisition functions, including Naval Air Systems Command.
- **Direct and Time Sensitive Strike Program Office:**
  - is the Naval Air Systems Command office that oversees the JAGM program for the Navy, and
  - is responsible for the acquisition, development, and sustainment of direct and time-sensitive strike weapons.<sup>6</sup>
- **Capability Manager for Reconnaissance and Attack of the U.S. Army Training and Doctrine Command:**
  - is the user representative to the JAMS project office,
  - ensures all applicable capability development efforts are completed, and
  - assesses mature technologies to mitigate capability gaps.
- **Joint Requirements Oversight Council:**
  - helps identify and assess the priority of requirements, including existing systems and equipment to meet military and defense strategies.

### ***JAGM Program Funding and Procurement***

(FOUO) The Army and Navy funded JAGM increment one and will assess the funding resources available for future increments at the initial production decision (May 2018). In July 2015, the Army awarded a fixed-price-incentive-fee contract, valued at \$80.7 million, for the JAGM increment one development phase. In 2015, JAMS project office officials estimated the total cost throughout the life

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<sup>6</sup> Navy officials stated that Department of Navy maintains a position in the JAMS project office to manage day-to-day operations for the Navy-specific portion of JAGM increment one.

(FOUO) of the program will be about \$8 billion for increment one. The JAGM program manager reported in the Defense Acquisition Executive Summary report (February 25, 2017) that Army and Navy funding for JAGM increment one includes \$966.7 million in research, development, test, and evaluation and \$600.5 million in procurement funds from FY 2008 through FY 2019. [REDACTED]

[REDACTED]

### ***Affordability Criteria***

Section 2366b, title 10, United States Code, states that a major defense acquisition program may not receive Milestone B approval until the MDA has received a business case analysis and certifies based upon that analysis that:

- the program is affordable;
- appropriate tradeoffs between cost, schedule, and performance have been made;
- reasonable cost and schedule estimates have been developed; and
- funding is available to execute the product development and production plan.

The MDA must also certify that the:

- DoD has completed an analysis of alternatives on the program,
- Joint Requirements Oversight Council has analyzed the operational requirements of the program, and
- Assistant Secretary of Defense for Research and Engineering has completed an independent review and assessment that the technology in the program was demonstrated in a relevant environment.

DoD Instruction 5000.02 establishes the fundamental concepts and approaches for developing and applying affordability constraints to an acquisition program.<sup>7</sup> An affordability analysis is required at Milestones B and C. Affordability analysis is a DoD Component leadership responsibility that involves the Component's programming, resource planning, requirements, intelligence, and acquisition communities.

<sup>7</sup> DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

DoD Instruction 5000.02 further establishes that affordability constraints for procurement and sustainment will be derived early in the program planning processes and will be used to ensure capability requirements prioritization and cost tradeoffs occur as early as possible and throughout the program's life cycle. Affordability analysis addresses the long-range planning and decision making that determines the resources a Component can allocate for each new capability

## 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.<sup>8</sup> The Army JAMS project office's internal controls over the JAGM program were effective as they applied to the audit objectives; however, the development testing and procurement costs for future JAGM increments to achieve full capability to improve missile capabilities were not determined. We will provide a copy of the report to the senior official responsible for internal controls in the Department of the Army.

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<sup>8</sup> DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013.

## Finding

### JAMS Project Officials Restructured the JAGM Program to Make it Affordable

We determined that the JAMS project office adequately assessed the affordability of the JAGM increment one. In 2011, Army and Navy officials concluded that the JAGM program was unaffordable as originally designed because funding was not available to meet program requirements. Therefore, JAMS project office officials restructured the program. Specifically, JAMS project office officials lowered the performance of two primary requirements, substituted proven technology for technology still being developed, and deferred the delivery of certain capabilities to future increments to reduce program costs.

However, although Army and Navy officials initiated actions to ensure the JAGM program was affordable, JAGM increment one will not provide critical capabilities needed by the warfighter. As a result, JAGM increment one will not provide the warfighter with the capability to launch missiles from fixed-wing aircraft, strike targets from longer distances, and increase accuracy, lethality, and interoperability over existing air-to-ground missiles.

### JAGM Unaffordable as Originally Designed

Army and Navy acquisition officials determined the JAGM program as originally designed was unaffordable because there was not enough funding to develop all the JAGM requirements.<sup>9</sup> DoD Instruction 5000.02 states that the DoD has a long history of programs that are unaffordable, so the purpose of affordability analysis is to avoid starting or continuing programs that cannot be produced within a reasonable budget. Affordability analysis promotes responsible investment decisions by examining capabilities.

The 2008 capability development document for JAGM increment one, prepared for the Milestone B decision review, validated by the Joint Requirements Oversight Council contains the specifics for full system capability.<sup>10</sup> According to the capability development document, JAGM full capability requirements include:

- three different modes in the guidance section (third seeker mode, laser, and radar);

<sup>9</sup> JAGM increment one Test and Evaluation Master Plan dated April 15, 2015, and JAGM Cost Analysis Requirements Description dated June 18, 2015.

<sup>10</sup> The Defense Acquisition University Glossary defines the Capability Development Document as a document that captures the information necessary to develop a proposed program capability.

- launching the missile from multiple platforms, including rotary-wing and fixed-wing aircraft, and unmanned aerial vehicles;
- striking targets at extended ranges to increase operator survivability;
- accommodating technology upgrades that address changing threats; and
- operating in multiple environments.

During our audit, Army and Navy officials stated that the requirements were extensive and not prioritized and that increased program costs that would delay delivery of the new capability to the warfighter.

## **Lack of Funding Forced JAGM Program Restructure**

In 2012, Army and Navy officials determined that they needed to restructure the JAGM program to stay within their available funding. The Budget Control Act of 2011 reduced spending across many functions of Government and implemented automatic defense spending cuts if Congress did not reduce the budget.<sup>11</sup> Army officials removed all funds (\$136 million) from the FY 2013 JAGM program and decided to develop the JAGM in increments in response to the budget constraints. Navy officials stated that they also removed their funds (\$106 million) from the FY 2013 JAGM program budget. In January 2013, Army officials returned \$10 million to the FY 2013 JAGM budget to allow JAMS project office officials to continue the technology development phase using the newly developed incremental approach.

## **JAMS Program Office Restructured, Reduced Primary Requirements, and Used Proven Technology to Reduce Program Costs**

Army and Navy officials considered the JAGM increment one program affordable after the restructure and program costs have remained at or below the established affordability limits (see Table 2).

### ***JAGM Restructure***

The JAGM's revised strategy was to deliver increased capability in phases. JAGM increment one is designed to combine the Hellfire Longbow radar and Hellfire Romeo laser in the guidance section with lethality matching existing Hellfire missiles. JAGM increment one is intended to be launched (fired) from 2 of the 15 planned rotary-wing and fixed-wing aircraft. See Appendix C for a list of aircraft that will receive the JAGM. In November 2012, the Joint Requirements

<sup>11</sup> Public Law 112-25, Section 365, 125 Statute 240, "Budget Control Act of 2011," August 2, 2011, is a Federal statute in the United States that was signed into law by President Barack Obama. The Act brought conclusion to the United States debt ceiling crisis of 2011.

Oversight Council endorsed the incremental strategy to achieve the full JAGM capability.

### ***Primary Requirements Reduced***

JAMS project office officials reduced the primary requirements for the JAGM program because the JAGM program could not meet the originally desired range and interoperability requirements with the Hellfire Romeo backend. Hellfire air-to-ground missiles have insufficient range to strike targets at the extended ranges needed to improve survivability and to provide mutual support to widely dispersed, friendly air and ground elements. On November 7, 2012, the Joint Requirements Oversight Council approved the reduction of the range and interoperability primary requirements for increment one. JAMS project office officials:

- reduced the range performance requirement to 8 kilometers, deferring the increased maximum-range (beyond 8 kilometers) requirement to a future increment; and
- reduced the number of aircraft that can launch the JAGM from six to two and planned to integrate the JAGM onto an additional 13 aircraft in a future increment.

### ***Reduced Performance and Priority of the Inflight Reliability Requirement***

After restructuring the program, JAMS project office officials also reduced the minimum performance and the priority of the inflight reliability requirement for increment one to maintain program affordability. Inflight reliability is the probability (measured in a percentage) that the missile will operate successfully without experiencing a failure while operating. The Army planned to purchase 48 missiles for testing. However, according to a U.S. Army Training and Doctrine Command official, the Army did not believe it could meet the inflight requirement. In 2012, the primary requirement for inflight reliability was 0.92 percent for initial fielding and 0.94 percent for system maturity.<sup>12</sup> In August 2016, the Joint Requirements Oversight Council approved the Army's request to reduce:

- the JAGM inflight reliability primary requirement to 0.85 percent for initial fielding and 0.92 percent for system maturity to reduce costs and schedule risk during operational testing, and
- the JAGM primary requirement for inflight reliability to a key system attribute (secondary requirement).<sup>13</sup>

<sup>12</sup> Capability Development Document for Joint Air-To-Ground Missile (JAGM) Increment One, October 1, 2012.

<sup>13</sup> A secondary requirement is an important performance attribute of a system but is not considered critical.



The reductions to performance and priority of the inflight reliability requirement should decrease the JAGM increment one program costs and avoid delays to the operational testing schedule.

### ***JAMS Project Office Officials Substituted Proven Technology for Technology Still Under Development to Reduce Costs***

In August 2010, a team of subject matter experts from the Army, Navy, and Air Force, that specialized in missiles, performed a technology readiness assessment. The team found that the JAGM system technology could not be demonstrated in an operational environment and was not ready to enter the development phase. The Army and Navy decided in 2012 to remove the third seeker mode and increased range requirements from JAGM increment one because the third seeker mode technology was too expensive and technology in the rocket motor for increased range was not fully developed. JAMS project office officials stated that the third seeker mode and the rocket motor for aircraft increased range were the two most expensive requirements of the missile.

During the restructure, JAMS project office officials decided to use the Hellfire Romeo backend technology (rocket motor and control section) already in use by the warfighter. More than 14,000 Hellfire Romeo missiles have been procured on DoD production contracts, according to the JAGM acquisition strategy from September 2014. By using Hellfire Romeo backend technology, the JAGM program costs will decrease while lowering risks and providing dual-mode guidance section capability to the warfighter faster. JAMS project office officials are developing a larger Hellfire missile rocket motor with increased propulsion that would allow the warfighter to launch the missile from a safer distance (further away) to increase aircrew safety. Initial operational capability for the JAGM is scheduled for FY 2019. JAMS project office officials will decide in FY 2019 whether to incorporate the newly developed larger rocket motor on JAGM increment one.

### **JAGM Increment One Affordable**

We reviewed the Army and Navy affordability assessments and determined that the Army and Navy followed DoD policies and procedures in conducting the assessments before entering the engineering and manufacturing development phase with increment one. Specifically, we determined that the JAMS project office adequately assessed the affordability of JAGM increment one. In June 2015, Army and Navy officials conducted an affordability assessment of the JAGM program and considered the increment one program affordable for entry into the engineering and manufacturing development phase. DoD Instruction 5000.02 requires each Military Department to conduct an affordability assessment of the program before entering the engineering and manufacturing development phase (Milestone B) and

the production and deployment phase (Milestone C). An affordability assessment is a comparison between the cost of the program and the available funding at a point in time. The MDA is responsible for setting and enforcing affordability limits to make sure the program remains within the budget.

### ***JAGM Increment One Affordability Assessment to Enter Engineering and Manufacturing Development***

In June 2015, Army and Navy program officials developed individual cost estimates for their portion of the JAGM increment one program, compared those estimates to their future funding levels for FYs 2016 through 2040, and determined that the JAGM increment one program was affordable. The Army and Navy then developed the joint cost estimate for the JAGM increment one program and budgeted for it in the Presidents' Budget FYs 2016 through 2020.

### ***OSD CAPE Independent Cost Estimate for JAGM Increment One***

In July 2015, the Office of the Secretary of Defense, Cost Assessment and Program Evaluation (OSD CAPE) independent cost estimate for JAGM increment one was \$1.1 billion higher than the joint cost estimate the Army and Navy prepared (see Table 1).

*Table 1. Difference Between the Joint Cost Estimate and the Independent Cost Estimate for the JAGM Increment One Program (in millions)*

|   | Joint Cost Estimate | Independent Cost Estimate | Difference |
|---|---------------------|---------------------------|------------|
| Total Estimated Acquisition Cost          | \$5,012             | \$6,082                   | \$1,070    |
| Average Procurement Unit Cost per missile | \$.138              | \$.179                    | \$.041     |

Source: OSD CAPE.

The OSD CAPE independent cost estimate for the JAGM increment one Milestone B review report shows that:

- the joint cost estimate did not include future Air Force procurements or foreign military sales and did not accurately reflect the procurement profile detailed in the cost analysis requirements description for JAGM increment one.<sup>14</sup> The CAPE independent cost estimate included forecasts for the Air Force future procurements and foreign military sales based upon the 5-year average of the Air Force's budget for

<sup>14</sup> The cost analysis requirements description (card) is the common description of the technical and programmatic features of the program that is used by the teams preparing the program office estimate, component cost analysis, and the independent life cycle cost estimate.

Hellfire procurements during FYs 2010 through 2014 and annual foreign military sales.

- contractor reporting of historical cost data for the Hellfire program was limited, and an OSD CAPE official stated that the development of the JAGM guidance section was also limited. The Army intends to include contractor reporting of actual costs on future missile contracts, which will enable cost collection during the production of JAGM increment one and reduce reporting deficiencies.
- procurement of the same missile variant for 23 years is not historically supported because of technology changes, obsolescence, and operational planning threat scenarios that evolve over time. The JAGM increment one program plan calls for the Army and Navy to procure the JAGM increment one over 23 years, with no procurement plans for any other JAGM variant. OSD CAPE officials reported that historically, the Hellfire Longbow procurement lasted 8 years and estimated that the Hellfire Romeo procurement would last 11 years.

### ***MDA Established JAGM Affordability Limits***

The MDA established affordability limits in October 2014 for the JAGM program before the program entered the engineering and manufacturing development phase. The MDA directed the Army and Navy to fund to the CAPE independent cost estimate on July 29, 2015. As of June 2017, the JAGM increment one program was below its affordability limits (see Table 2).

*Table 2. JAGM Increment One Affordability Limits and Estimates as of June 2017*

|                               | Affordability Limits | Estimates as of June 2017 |
|-------------------------------|----------------------|---------------------------|
| Average Procurement Unit Cost | \$200,000            | \$177,150                 |
| Sustainment Unit Cost         | \$700.00             | \$588.09                  |

Source: Defense Acquisition Management Information Retrieval.

### **Costs for Future Unfunded Increments Have Not Been Determined**

The Army and the Navy deferred delivery of critical capabilities to future unfunded increments. However, the Army and Navy have not determined the developmental testing and procurement costs for increments two and three. The Army has not prepared cost estimates or funded the future JAGM increments. We requested the total costs associated with achieving the full JAGM, but the Army program officials did not have the requested documentation. The Army officials stated that they will identify the developmental and procurement costs associated with

future increments needed to achieve full capability if the Army decides to fund the additional increments. The JAGM acquisition strategy states that the Army will assess the funding resources available for future increments at the JAGM increment one initial production decision scheduled for May 2018.

According to a JAMS project official, stakeholders would re-evaluate the threat situation for the initial production decision and determine whether to continue into production with increment one and begin concurrent development of a future increment. DoD Instruction 5000.02 allows the program office to tailor requirements with user approval and use incentives to reduce cost to stay within affordability limits. The Army and Navy must evaluate the costs to achieve full JAGM capability and determine whether the JAGM provides the most affordable alternative to meet the self-guided (fire-and-forget) missile capability.

## **JAGM Increment One Will Not Provide Critical Capabilities Needed by the Warfighter**

Army and Navy officials took action to make and maintain the affordability of JAGM increment one. Specifically, they delayed two primary requirements to future unfunded increments, used proven technology, and lowered the minimum performance and priority of another primary requirement to reduce program costs. As a result, JAGM increment one average procurement unit and sustainment unit costs have remained below the established limits. However, JAGM increment one will not provide the capabilities to:

- launch the missile from fixed-wing aircraft;
- increase the maximum range for striking targets; and
- increase accuracy, lethality, and interoperability over existing air-to-ground missiles.

The Joint Requirements Oversight Council approved delaying the primary capabilities to future JAGM increments. However, future JAGM increments are unfunded, and developmental testing and procurement costs to achieve full capability have not been determined.

## **Recommendation, Management Comments, and Our Response**

### ***Recommendation 1***

**We recommend that at the Joint Air-to-Ground Missile increment one initial production decision, the Commander, U.S. Army Training and Doctrine Command; the Assistant Secretary of the Army (Acquisition, Logistics, and**

**Technology); and the Assistant Secretary of the Navy (Research, Development, and Acquisition):**

- a. Evaluate the costs to achieve full Joint Air-to-Ground Missile capability.**

*U.S. Army Training and Doctrine Command Comments*

The U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack, responding for the Commander, U.S. Army Training and Doctrine Command, agreed with our findings and recommendations, stating that the recommendations are in line with the U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack Strategic Portfolio Analysis and Review strategy. The Capability Manager stated that the U.S. Army Training and Doctrine Command will continuously evaluate the cost to achieve full JAGM capability.

*Our Response*

Comments from the Capability Manager addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack assessed the affordability of the JAGM program.

*Assistant Secretary of the Army (Acquisition, Logistics, and Technology) Comments*

The Project Manager, Joint Attack Munition Systems, responding for the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) agreed with our findings and recommendations. The Project Manager stated that JAGM increment one capability does not meet the full requirement within the Capability Development Document. As funding becomes available for increased performance, the JAGM Product Office will manage the development, testing, and qualification of each new increment.

*Our Response*

Comments from the Project Manager addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Army evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program at the Milestone C.

### *Assistant Secretary of the Navy (Research, Development, and Acquisition) Comments*

The Deputy Assistant Secretary of the Navy for Aviation Programs, responding for the Assistant Secretary of the Navy (Research, Development, and Acquisition), agreed with our findings and recommendations. The Deputy Assistant Secretary stated that the Department of the Navy will collaborate with the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) and Department of the Army Cost and Economics personnel to evaluate the overall program costs to achieve full JAGM capabilities, as resources become available.

The Deputy Assistant Secretary also stated that the Department of the Navy acknowledges that JAGM increment one does not meet all warfighting requirements as described in the Joint Chiefs of Staff-approved JAGM Capability Development Document.

### *Our Response*

Comments from the Deputy Assistant Secretary of the Navy for Aviation Programs addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Navy evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program.

- b. Determine whether the Joint Air-to-Ground Missile incremental strategy provides the most affordable alternative to meet the self-guided missile capability gap.**

### *U.S. Army Training and Doctrine Command Comments*

The U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack responding for the Commander, U.S. Army Training and Doctrine Command, agreed with our findings and recommendations, stating the U.S. Army Training and Doctrine Command will continually assess whether the JAGM incremental strategy provides the most affordable alternative to close the self-guided missile capability gap. The Capability Manager further stated that a robust requirements vetting process through Army Resource Board, Army Control Board and Army Requirements Oversight Council ensures that affordability, quantity, and requirements are all optimized. The JAGM Capability Production Document for increment one is scheduled to go to the Army Resource Board on November 7, 2017, the Army Control Board on November 16, 2017, and the Army Requirements Oversight Council on December 1, 2017.



*Our Response*

Comments from the Capability Manager addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the U.S. Army Training and Doctrine Command Capability Manager-Reconnaissance and Attack assessed the affordability of the JAGM program.

*Assistant Secretary of the Army (Acquisition, Logistics, and Technology) Comments*

The Project Manager, Joint Attack Munition Systems, responding for the Assistant Secretary of the Army (Acquisition, Logistics, and Technology), agreed with our findings and recommendations. The Project Manager stated that the program office will complete a cost estimate that will be certified by the Deputy Assistant Secretary of the Army for Cost and Economics at the Milestone C planned in May 2018 and that the Army will assess the JAGM program as an affordable alternative at that time.

*Our Response*

Comments from the Project Manager addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Army evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program at the Milestone C.

*Assistant Secretary of the Navy (Research, Development, and Acquisition) Comments*

The Deputy Assistant Secretary of the Navy for Aviation Programs responding for the Assistant Secretary of the Navy (Research, Development, and Acquisition) agreed with our findings and recommendations. The Deputy Assistant Secretary stated that the Department of the Navy will collaborate with the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) and Department of the Army Cost and Economics personnel to evaluate the current acquisition strategy to determine if an incremental approach is the most affordable alternative to address the capability gaps, as resources become available.

*Our Response*

Comments from the Deputy Assistant Secretary of the Navy for Aviation Programs addressed the specifics of the recommendations; therefore, the recommendation is resolved but will remain open. We will close this recommendation once we verify that the Navy evaluated the costs to achieve full JAGM capability and assessed the affordability of the JAGM program.

## Appendix A

### Scope and Methodology

We conducted this performance audit from August 2016 through September 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 interviewed personnel and performed fieldwork at the following organizations at the Pentagon, Arlington, Virginia.

- Under Secretary of Defense for Acquisition, Technology, and Logistics
- Assistant Secretary of the Army for Acquisition, Logistics, and Technology
- Army Deputy Chief of Staff, G-8
- Army Deputy Chief of Staff, G-3
- Office of the Secretary of Defense, Cost Assessment and Program Evaluation
- Office of the Secretary of the Air Force (Acquisition) Global Power, Programs Weapons Division
- Assistant Secretary of the Navy (Research, Development, and Acquisition) Deputy Assistant Secretary of the Navy–Air
- U.S. Marine Corps Air-to-Ground Weapons Requirements Division

We also interviewed personnel and performed fieldwork at the following locations.

- JAMS project office and JAGM Product Manager, Huntsville, Alabama
- Army Training and Doctrine Command, Fort Rucker, Alabama
- Army Deputy Assistant Secretary of the Army, Cost and Economics, Fort Belvoir, Virginia

We collected, reviewed, and analyzed documents dated from May 2002 through May 2017. We reviewed the JAGM acquisition strategy, capability requirements documents, test and evaluation master plan, Defense Acquisition Executive Summary reports, and contract W31P4Q-15-C-0102, including all contract modifications.

To determine whether the JAMS project office adequately assessed the affordability of the JAGM, we compared program documents with the policies and guidance in the following DoD and Army issuances.

- Section 2366b, title 10, United States Code
- DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015
- DoD Instruction 5000.73, "Cost Analysis Guidance and Procedures," June 9, 2015
- DoD Directive 5000.01, "The Defense Acquisition System," May 12, 2003, Certified Current as of November 20, 2007
- Army Regulation 70-1, Army Acquisition Policy, July 22, 2011
- Army Regulation 71-9, "Warfighting Capabilities Determination," December 28, 2009
- Memorandum on the Army Implementation of Under Secretary of Defense Acquisition, Technology and Logistics) Affordability Initiatives
- Defense Acquisition Guidebook, September 16, 2013

## Use of Computer-Processed Data

We did not rely on computer-processed data for the finding and conclusion of this report.

## Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) issued seven reports discussing the JAGM program. Unrestricted GAO reports can be accessed at <http://www.gao.gov>.

## GAO

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

This report assessed the JAGM program. The assessment noted that the JAGM will be manufactured on an existing production line that currently manufactures Hellfire missiles. The Army was tracking several risks that could affect cost and schedule. There must be no more than 2 failures out of the of the 48 JAGM engineering and manufacturing tests flights, required funding could increase by as much as 10 percent. The GAO made no recommendations in this report.

Report No. GAO-15-466, "Weapon System Acquisitions: Opportunities Exist to Improve the Department of Defense's Portfolio Management," August 2015

The GAO found that the DoD did not effectively use portfolio management to optimize its weapon system investments. Fragmented governance, the lack of sustained leadership and policy, and the perceived lack of decision-making authority were some conditions that the GAO found within the DoD that inhibited it from implementing portfolio management.

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

This report assessed the JAGM program. The assessment noted that the JAGM program would meet the program's requirements with existing technologies. The GAO made no recommendations in this assessment.

Report No. GAO-15-103, "Ground Radar and Guided Munitions – Increased Oversight and Cooperation Can Help Avoid Duplication among the Services' Programs," December 2014

This report examined potential duplication exists across Military Services' ground radar and air-to-ground precision guided munitions. The section of the report regarding air-to-ground munitions found that programs were not duplicative, but potential for duplication in the future exists.

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

This report assessed the JAGM program. Upon completion of all objectives and technology development exit criteria, approval of the acquisition strategy, and completion of the source selection evaluation board, the Army was planning for a system development decision in FY 2015. The GAO made no recommendations in this assessment.

Report No. GAO-13-294SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2013

This report assessed the JAGM program. The Army restructured the JAGM program in early 2012 to extend the technology development phase by 27 months. The continuation allowed the Army to focus on affordability and risk reduction. The GAO made no recommendations in this assessment.

Report No. GAO-12-400SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2012

This report assessed the JAGM program and determined that the program faced some uncertainty because of concerns about affordability. The GAO made no recommendations in this assessment.

## Appendix B

### Major Traits of JAGM Increment One, Hellfire Romeo, and Longbow

|                           | JAGM Increment One  | Hellfire Romeo  | Hellfire Longbow   |
|---------------------------|---|---|--|
| Guidance System Operation | Dual-Mode (Laser and Radar)   | Laser <sup>1</sup>  | Radar <sup>2</sup>   |
| Users                     | Army and Navy   | Army, Navy, Air Force   | Army and Navy  |
| Platform                  | AH-1Z Viper and AH-64E Apache Guardian                                | AH-64E Apache Guardian, OH-58 Kiowa Warrior, MQ-1C Gray Eagle UAS, Special Operations Aircraft, AH-1W Super Cobra, Predator & Reaper UAS <sup>3</sup> | AH-64 Apache and Littoral Combat Systems                         |
| Acquisition Phase         | Development - 2015  | Full Rate Production - 2010   | Operations and Support -inventory expires in 2025                |
| Maximum Range             | 8 kilometers  | 8 kilometers  | 8 kilometers   |
| Mission                   | Destroy buildings, armored vehicles, and air defense systems          | Destroy buildings, non-armored vehicles, and small boats.   | Destroy small boats.   |
| Operating Condition       | Engage targets in adverse weather and blurred battlefield conditions. | Engage targets, ability to select different type of warheads.   | Engage targets in adverse weather and blurred battle conditions. |
| Advantage                 | Self-guided Capability and Precision Point Targeting                  | Precision Point Targeting   | Self-Guided Capability   |

<sup>1</sup> A laser uses a beam of light to identify and maintain the target until impact and provides precision point targeting.

<sup>2</sup> The missile uses radar to track targets by transmitting pulses of low-frequency electromagnetic waves that are reflected off the target and return to the source.

<sup>3</sup> UAS is Unmanned Aircraft System.



## Appendix C

### Planned Aircraft to Receive JAGM Missiles

|     |   |   |
|-----|---|---|
| 1.  | AH-1Z Viper Helicopter*                               | Marine Corps                            |
| 2.  | AH-64E Apache Guardian Helicopter*                    | Army                                    |
| 3.  | MQ-1C Gray Eagle Unmanned Aircraft System             | Army                                    |
| 4.  | MH-60M Defensive Air Penetrator Black Hawk Helicopter | Army                                    |
| 5.  | AH-6M Little Bird Helicopter                          | Army                                    |
| 6.  | MH-60R Seahawk Helicopter                             | Navy                                    |
| 7.  | MH-60S Knight hawk (Seahawk) Helicopter               | Navy                                    |
| 8.  | AH-1W Super Cobra                                     | Marine                                  |
| 9.  | AH-64A Apache Helicopter                              | Army                                    |
| 10. | F/A-18 C/D Hornet                                     | Navy and Marine Corps                   |
| 11. | F/A-18 E/F Super Hornet Fighter                       | Navy                                    |
| 12. | Joint Strike Fighter                                  | Navy, Air Force, and Marine Corps       |
| 13. | AV-8B Harrier II                                      | Marine Corps                            |
| 14. | Multi-Mission Maritime Aircraft                       | Navy                                    |
| 15. | Unmanned Aircraft Vehicles                            | Army, Navy, Air Force, and Marine Corps |

\* Increment one aircraft.

## Management Comments

### U.S. Army Training and Doctrine Command

REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND  
950 JEFFERSON AVENUE  
FORT EUSTIS, VIRGINIA 23804-5700

OCT 18 2017


ATIR

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

SUBJECT: Command Reply to DODIG Draft Report on the Audit of Joint Air-to-Ground Missile Program (Project D-2016-D000AE-0198.000)

1. HQ TRADOC's reply to the subject draft report is enclosed. We concur with Recommendation 1 as addressed to the Commander, United States Army Training and Doctrine Command; the Assistant Secretary of the Army (Acquisition, Logistics and Technology); and the Assistant Secretary of the Navy (Research, Development and Acquisition).
2. The enclosed response was developed by the U.S. Army Aviation Center of Excellence and staffed with representatives from the Army Capabilities Integration Center and the Assistant Secretary of the Army (Acquisition, Logistics and Technology).
3. We submitted a separate security review package to DODIG which includes the marking of specific information that if not treated as For Official Use Only should be treated as Controlled Unclassified Information.
4. Point of contact is [REDACTED]

Encl

  
KIMBERLY DAWN CYR  
Director, Internal Review  
and Audit Compliance

## U.S. Army Training and Doctrine Command (cont'd)



DEPARTMENT OF THE ARMY  
HEADQUARTERS UNITED STATES ARMY AVIATION CENTER OF EXCELLENCE  
2218 6<sup>th</sup> AVENUE  
FORT RUCKER ALABAMA 36362-5105

ATZQ-CDR

5 October 2017

MEMORANDUM FOR Headquarters, Training and Doctrine Command (TRADOC), 950 Jefferson Avenue, Fort Eustis, VA 23604

SUBJECT: TRADOC Capability Manager-Reconnaissance/Attack (TCM-R/A)  
Review/Response to DoD IG Draft Report on the Joint Air-to-Ground Missile (JAGM) Program

1. References:

a. DoD IG Report (Draft), JAGM Program, 25 September 2017, Project No. D2016-D000AE-0198.000

b. Army Requirements Oversight Council (AROC) Topic Tracking Calendar, 14 September, 2017.

2. DoD IG requested TRADOC review the subject document and provide a formal agree/disagree response to the findings and recommendations contained within the document. This memorandum constitutes the formal response from TCM-R/A.

3. The following DoD IG recommendation was contained in the report:

We [DoD IG] recommend that at the JAGM increment one initial production decision, the Commander, United States Army Training and Doctrine Command; the Assistant Secretary of the Army (Acquisition, Logistics and Technology); and the Assistant Secretary of the Navy (Research, Development and Acquisition):

- a. Evaluate the costs to achieve full JAGM capability.
- b. Determine whether the JAGM incremental strategy provides the most affordable alternative to meet the self-guided missile capability gap.

4. TCM-R/A concurs with the findings and recommendations documented in the report. We believe they are in line with our Strategic Portfolio Analysis and Review (SPAR) strategy. We agree JAGM Increment 1 will not provide all of the critical capabilities needed to close our air-to-ground missile capability gap. Our SPAR strategy dictates that we continuously evaluate the costs to achieve full JAGM capability, and continually assess whether the JAGM incremental strategy provides the most affordable alternative to close the self-guided missile capability gap. We will continue to do so.

5. In addition, a robust requirements vetting process through the Army Resource Board (ARB), Army Control Board (ACB), and Army Requirements Oversight Council (AROC)

*Encl*

## U.S. Army Training and Doctrine Command (cont'd)

ATZQ-CDR

SUBJECT: TRADOC Capability Manager-Reconnaissance/Attack (TCM-R/A)  
Review/Response to DoD IG Draft Report on the Joint Air-to-Ground Missile (JAGM)  
Program

ensures that affordability, quantity, and requirements are all optimized. The JAGM Capability Production Document (Increment 1) is scheduled for an ARB on 7 Nov 17, an ACB on 16 Nov 17, and an AROC on 1 Dec 17.

6. The point of contact for this memorandum is [REDACTED]



Paul A. Cravey  
Colonel, Aviation  
TRADOC Capability Manager for  
Reconnaissance and Attack

## Assistant Secretary of the Army (Acquisition, Logistics, and Technology)



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
PROGRAM EXECUTIVE OFFICE, MISSILES AND SPACE  
5250 MARTIN ROAD  
REDSTONE ARSENAL AL 35898-8000

SFAE-MSL-JAMS

16 October 2017

MEMORANDUM FOR Assistant Secretary of the Army, Acquisition, Logistics, and Technology

SUBJECT: Joint Attack Munition Systems (JAMS) Project Office Review/Response to Department of Defense Inspector General Draft Report on the Joint Air-to-Ground Missile (JAGM) Program

1. References:

- a. DoD IG Report (Draft), JAGM Program, 25 September 2017, Project No. D2016-D000AE-0198.000
- b. Army Requirements Oversight Council (AROC) Topic Tracking Calendar, 14 September, 2017.

2. DoD IG requested ASA (ALT) review the subject document and provide a formal agree/disagree response to the findings and recommendations contained within the document. This memorandum constitutes the formal response from JAMS Project Office.

3. The following recommendations are listed in the report:

- a. Evaluate the costs to achieve full JAGM capability.
- b. Determine whether the JAGM incremental strategy provides the most affordable alternative to meet the self-guided missile capacity gap.

4. JAMS Project Office concurs with the findings and recommendations documented in the report. The JAGM Increment 1 capability does not meet the full requirement within the Capability Development Document. As funding becomes available for increased performance, the JAGM Product Office will manage the development, testing, and qualification of each new increment. The program office will complete a cost estimate that will be certified by the Deputy Assistant Secretary of the Army for Cost and Economics at the Milestone C planned in May 2018. The Army will assess the JAGM Program as an affordable alternative at this time.

5. The JAGM Program will complete an Army Requirements Oversight Council (AROC) 1 December 2017 to ensure that affordability, quantity, and requirements are all optimized.

## Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (cont'd)

SUBJECT: Joint Attack Munition Systems (JAMS) Project Office Review/Response to Department of Defense Inspector General Draft Report on the Joint Air-to-Ground Missile (JAGM) Program

6. The point of contact for this memorandum is [REDACTED]



DAVID A. WARNICK  
COL, AV  
Project Manager, Joint Attack  
Munition Systems

## Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (cont'd)



DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY  
ACQUISITION LOGISTICS AND TECHNOLOGY  
103 ARMY PENTAGON  
WASHINGTON, DC 20310-0103

SAAL-SAF

20 October 2017

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE INSPECTOR GENERAL (DODIG),  
4800 MARK CENTER DRIVE, ALEXANDRIA, VA 22350-1500

SUBJECT: Army Response to DoDIG Draft Audit Report: Audit of Joint Air-to-Ground Missile  
(JAGM) Program (Project D-2016-D000AE-0198.000)

1. On behalf of the Assistant Secretary of the Army (Acquisition, Logistics and Technology) (ASA(ALT)), the Director of the Air Defense and Fires Directorate, under the Deputy for Acquisition and Systems Management has reviewed the recommendations from the draft DoDIG report and consolidated the official Army position. Enclosures 1 and 2 are the detailed responses from ASA(ALT) and TRADOC respectively.

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

2 Encls

1. Memo, PM JAMS, 16 OCT 17
2. Memo, TRADOC, 18 OCT 17

CHARLES M. STEIN  
COL, AC  
Director, Air Defense  
and Fires Directorate



## Assistant Secretary of the Navy (Research, Development, and Acquisition)



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

OCT 25 2017

MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL

SUBJECT: Joint Air-to-Ground Missile Program Audit (Project D-2016-D000AE-0198.000), Department of the Navy Response

In response to a Department of Defense Inspector General (DoD IG) request for views of the draft Joint Air-to-Ground Missile Program Audit Report (Project D-2016-D000AE-0198.000), the Department of the Navy (DoN) concurs with the findings and recommendations documented in the draft audit report.

The DoN acknowledges that JAGM/increment 1 does not meet all warfighting requirements as delineated in the Joint Chiefs of Staff approved JAGM Capability Development Document. As resources become available to develop additional JAGM capabilities, the DoN will collaborate with the Assistant Secretary of the Army for Acquisition, Logistics and Technology and Department of the Army Cost and Economics personnel to evaluate the current acquisition strategy to determine if an incremental approach is the most affordable alternative to address the capability gaps and the overall program costs to achieve full JAGM capabilities (Ref: DOD IG Audit Draft Report recommendations 1a and 1b).

G.A. Kessler  
Deputy Assistant Secretary of the Navy  
Aviation Programs

cc:  
HQMC (APP, APW)  
OPNAV (N9, N98)  
PEO (U&W)

## Acronyms and Abbreviations

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|             |  |
|-------------|--|
| <b>CAPE</b> | Cost Assessment and Program Evaluation |
| <b>GAO</b>  | Government Accountability Office       |
| <b>JAGM</b> | Joint Air-to-Ground Missile            |
| <b>JAMS</b> | Joint Attack Munition Systems          |
| <b>MDA</b>  | Milestone Decision Authority           |
| <b>OSD</b>  | Office of the Secretary of Defense     |

## Glossary

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**Affordability Analysis.** A comparison between the cost of the program and the available funding at a point in time.

**Backend Section (Hellfire II Missile).** The warhead, propulsion (rocket motor), and control (fins).

**Capability Development Document.** Contains the specific capability requirements to support the development of a program.

**Cost Analysis Requirements Description (Card).** A common description of the technical and programmatic features of the program that is used by the teams preparing the program office estimate, component cost estimate, and the independent life cycle cost estimate.

**Hellfire II Missile.** The primary air-to-ground missile for rotary-wing and unmanned aerial vehicles for all U.S. armed services and 16 other countries.

**Hellfire Longbow.** A variant of the Hellfire Family of Missiles that is the only air-to-ground missile in the Army inventory with self-guided capability. The Longbow uses radar to track targets by transmitting pulses of low-frequency electromagnetic waves that are reflected off the target and return to the source.

**Hellfire Romeo.** A variant of the Hellfire II that uses a laser to identify and maintain the target until impact and provides precision point targeting.

**Inflight Reliability.** The probability measured in a percentage that the missile will operate successfully without experiencing a failure while operating.

**Milestone A.** A decision to enter the technology development phase.

**Milestone B.** A decision to enter the engineering and manufacturing development phase.

**Milestone C.** A decision to enter the initial production and deployment phase.

**Primary Requirement.** A performance attribute of a system that is considered critical (key performance parameter).

**Secondary Requirement.** An important performance attribute of a system but is not considered critical.

**Warhead.** The forward section of the missile that contains the explosives. A multipurpose warhead provides lethal effects against a range of target types, from armored vehicles and maritime patrol craft to urban structures.

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