

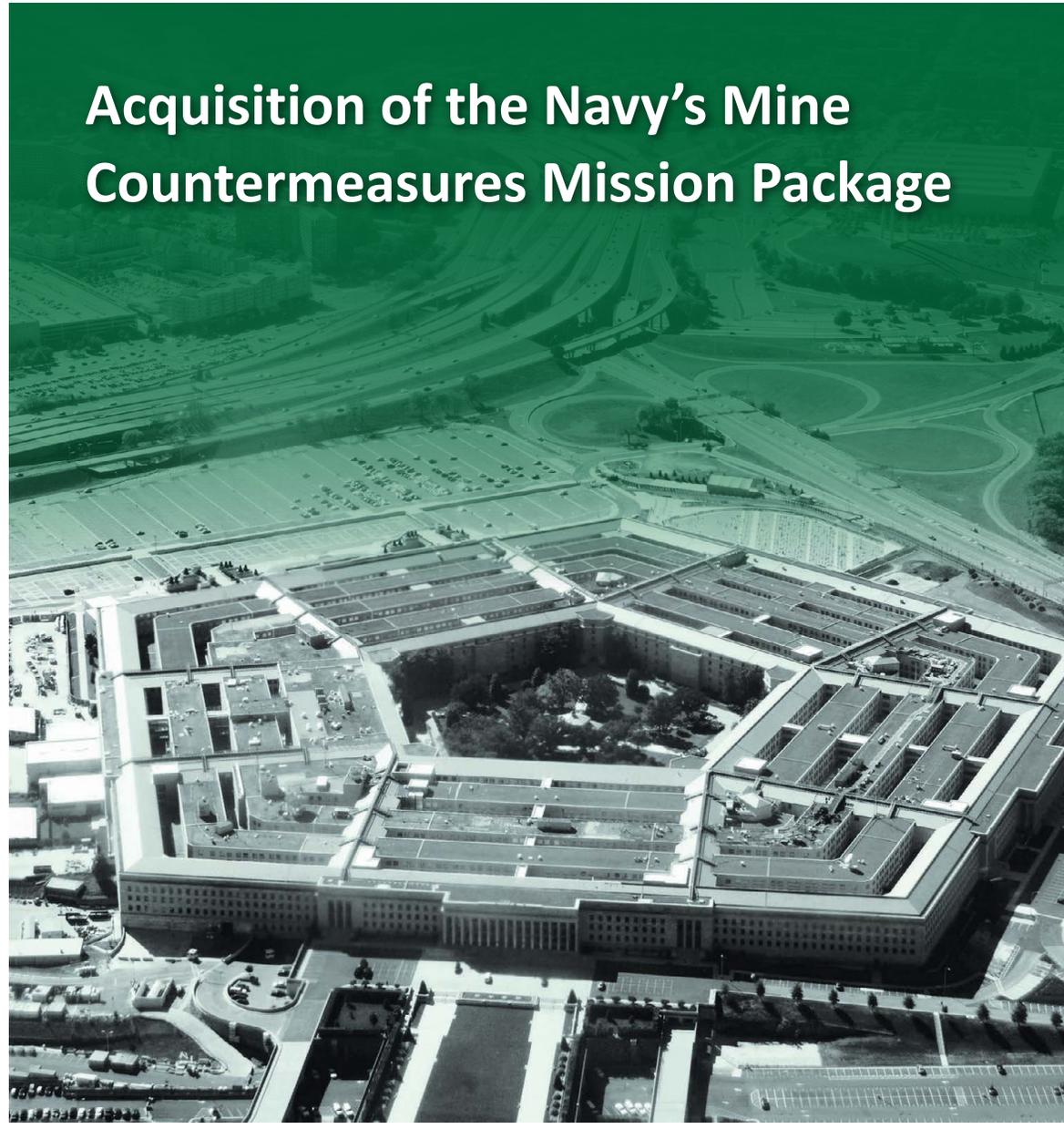
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INSPECTOR GENERAL

U.S. Department of Defense

JULY 25, 2018



Acquisition of the Navy's Mine Countermeasures Mission Package

INTEGRITY ★ INDEPENDENCE ★ EXCELLENCE

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Results in Brief

Acquisition of the Navy's Mine Countermeasures Mission Package

July 25, 2018

Objective

We determined whether the Navy is effectively managing the development of a mine countermeasures (MCM) mission package that will allow the Littoral Combat Ship to detect and neutralize or avoid mines in support of fleet operations. For this audit, we focused on the MCM mission package systems that the Navy declared had met their initial operational capability (IOC) requirements. According to DoD Instruction 5000.02, IOC is achieved when the selected user has been equipped and trained and is determined to be capable of conducting mission operations.¹

Background

The Littoral Combat Ship MCM mission package supports MCM operations through the employment of aviation assets and unmanned surface and submersible vehicles. These assets and vehicles are equipped with an array of sensors and systems to detect, localize, and neutralize surface, near-surface, in-volume, and bottom mines. The MCM mission package includes seven systems. Our review focused on three systems that the Navy had declared met IOC. Specifically, we reviewed the AN/ASQ-235 Airborne Mine Neutralization System (AMNS), Airborne Laser Mine Detection System (ALMDS), and Coastal Battlefield Reconnaissance and Analysis (COBRA) Block I systems.²

¹ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

² The Navy is using separate programs [blocks], to incrementally deliver the full COBRA capability, with Block I being the initial system.

Finding

We determined that the Navy declared IOC for the three MCM mission package systems reviewed prior to demonstrating that the systems were effective and suitable for their intended operational uses.

This occurred because the Director, Expeditionary Warfare Division (N95) declared IOC for the ALMDS and AMNS after Chief of Naval Operations and Assistant Secretary of the Navy (Research, Development, and Acquisition) officials approved a plan to pursue IOC to gather data and lessons learned. To deliver the systems to the fleet, N95 used the results of a technical evaluation and previous test events to justify its IOC decisions without demonstrating that it had corrected known performance problems. Additionally, N95 relied on data gathered during the first of five test periods to justify the COBRA Block I IOC decision, even though the program did not fully meet a key performance parameter (primary requirement). We determined that N95 declared IOC for the COBRA Block I to avoid requesting a sixth change to the IOC date that would further delay the delivery of the system's capabilities to the fleet.

~~(FOUO)~~ As a result, the Navy delivered units that have known performance problems to the fleet for use aboard the Littoral Combat Ship and other platforms. The MCM mission package operates as an integrated family of systems. Each of the seven systems needs to provide full capability and operate in conjunction with each other in order to accomplish the MCM mission. Consequently, if the Navy proceeds as planned it will spend \$ [REDACTED] million for [REDACTED] ALMDS, [REDACTED] AMNS, and [REDACTED] COBRA Block I production units that cannot fully perform their mine detection and neutralization missions. This in turn could lead to degraded mission performance, delayed delivery of needed capabilities, and the need to pull those units off-line and spend additional money to correct shortcomings in the fielded units.



Results in Brief

Acquisition of the Navy's Mine Countermeasures Mission Package

Recommendation

We recommend that the Director, Expeditionary Warfare Division, delay future procurement of Airborne Laser Mine Detection System, Airborne Mine Neutralization System, and Coastal Battlefield Reconnaissance and Analysis Block I until the Assistant Secretary of the Navy (Research, Development, and Acquisition) and Chief of Naval Operations require the Program Manager, Mine Warfare Office, to complete operational test and evaluations demonstrating the systems are effective and suitable to support full-rate production.

Management Comments and Our Response

The Assistant Secretary of the Navy (Research, Development, and Acquisition), responding for the Navy, disagreed with the report's finding and recommendation. The Assistant Secretary stated that test results during 2015 and 2017 had demonstrated the systems either met or exceeded their primary requirements. The Assistant Secretary further stated that the testing balanced comprehensiveness with speed of delivery to the fleet and is aligned with the national defense strategy tenet of "delivering performance at the speed of relevance."

The Assistant Secretary stated that the incremental approach to fielding each of the seven system in the LCS MCM mission package facilitates a more rapid and seamless transition from legacy MCM to the future modular MCM force. The Assistant Secretary also stated that the procurement must continue to ensure that a capability exists to replace the decommissioning MCM 1 Avenger Class ships and MH-53E Sea Dragon helicopter, thereby saving the Navy operating and production costs.

We disagree that the systems met the requirements for declaring IOC. In the memoranda issued declaring IOC for ALMDS and AMNS, N95 stated that the ALMDS and AMNS programs had not executed a complete initial operational test and evaluation according to the IOC definition. Therefore, the ALMDS and AMNS programs have not demonstrated that the systems are operationally effective and have met the requirements for declaring IOC. For the COBRA Block I program, the production document defines IOC as delivery of one system, new equipment training, initial spares, and support equipment to the unit. While the COBRA Block I program met that limited definition, the COBRA Block I system does not meet DoD Instruction's 5000.02 definition for declaring IOC. Specifically, the Navy has not yet demonstrated that the COBRA Block I system is able to conduct its full portfolio of mission operations.

After receiving the Navy's comments to the draft report, we met with senior Navy officials to discuss the Navy's position and received an update on the systems' development. The officials contend that having the training squadrons use the systems was the best way to identify and correct performance gaps, enhance lethality, and more rapidly change the paradigm in the MCM force. The officials stated the systems provide relevant advantage over our adversaries and the Navy had taken actions to address the performance shortcomings identified during the aforementioned test events. The officials stated that the MCM training squadrons currently working with ALMDS and AMNS systems have not reported any problems. The officials also stated that preliminary analysis of additional testing conducted on the COBRA Block I system supported that many of its performance shortcomings had been corrected.



Results in Brief

Acquisition of the Navy's Mine Countermeasures Mission Package

Comments (cont'd)

While this approach may allow for a more rapid transition to the future modular MCM force, the Navy still needs to mitigate the impact of its approach. Entering full-rate production without demonstrating a system can perform as required may require costly retrofits to fix undiscovered system deficiencies. In addition, the approach could also result in having to delay the planned decommissioning of legacy ships, helicopters, and associated equipment if deficiencies also render the new system unable to perform the full MCM mission set.

If the Navy continues its procurement of additional ALMDS, AMNS, and COBRA Block I systems to enable the timely decommissioning of the MCM 1 Avenger Class ships and MH-53E, it should continually improve those systems based on feedback identified by Fleet users.

Based on management's comments to the draft report and our follow on meetings with senior Navy officials regarding their comments, we consider the recommendation resolved. The recommendation can be closed once the Navy: (1) provides documentation that the performance deficiencies identified in prior testing of the ALMDS, AMNS, and COBRA Block I systems have been corrected; and (2) demonstrates progress towards achieving its full portfolio of mission operations, while mitigating the risk of costly retrofits.

Recommendation Table

Management	Recommendation Unresolved	Recommendation Resolved	Recommendation Closed
Chief of Naval Operations	None	Yes	None
Assistant Secretary of the Navy (Research, Development, and Acquisition)	None	Yes	None
Director, Expeditionary Warfare Division	None	Yes	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**

July 25, 2018

MEMORANDUM FOR DIRECTOR, OPERATIONAL TEST AND EVALUATION
NAVAL INSPECTOR GENERAL

SUBJECT: Acquisition of the Navy's Mine Countermeasures Mission Package
(Report No. DODIG-2018-140)

We are providing this report for your information and use. 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. Comments from the Assistant Secretary of the Navy (Research, Development, and Acquisition), and follow-on meetings with senior Navy officials, conformed to the requirements of DoD Instruction 7650.03; therefore we do not require additional comments.

We appreciate the cooperation and assistance received during the audit. Please direct questions to Mr. Patrick Nix at (703) 604-9332 (DSN 664-9332).

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

Troy M. Meyer
Principal Assistant Inspector General
for Audit

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Introduction

Objective

We determined whether the Navy was effectively managing the development of a mine countermeasures (MCM) mission package that will allow the Littoral Combat Ship (LCS) to detect and neutralize or avoid mines in support of fleet operations. For this audit, we focused on the MCM mission package systems that the Navy declared had reached initial operational capability (IOC). DoD Instruction 5000.02, states IOC is declared when the selected user has been equipped and trained and is determined to be capable of conducting mission operations.³ See Appendix A for scope and methodology and prior audit coverage.

Background

According to the Navy Fact Sheet, the LCS is a fast, agile, ship designed for operation in near-shore environments, yet capable of open-ocean operation. The primary missions for the LCS include countering diesel submarine threats, littoral mine threats, and surface threats, such as small surface craft attacks, to assure maritime access for joint forces.⁴ According to the Navy Fact Sheet, the underlying strength of the LCS lies in its innovative design approach, applying modularity for operational flexibility. Fundamental to this approach is the capability to rapidly install interchangeable mission packages onto the seaframe to fulfill a specific mission, and then be uninstalled, maintained, and upgraded at the Mission Package Support Facility for future use aboard any LCS seaframe. The LCS Mission Modules program is an Acquisition Category IC program, with an estimated program cost of \$6.4 billion.⁵ It includes three mission packages that provide unique warfighting capabilities for the following mission areas.

- Mine Countermeasure (MCM) – detection, localization, classification, and neutralization of mine threats.
- Surface Warfare – maritime security and prosecution of small boat threats.
- Anti-Submarine Warfare – detect, classify, localize, and prosecute enemy submarines.

³ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

⁴ Littoral comprises two segments of operational environment: (1) Seaward: the area from the open ocean to the shore, and (2) Landward: the area inland from the shore that can be supported and defended directly from the sea.

⁵ Acquisition Category IC is a major defense acquisition program for which the Under Secretary of Defense for Acquisition, Technology, and Logistics estimates eventual total expenditure for research, development, test, and evaluation of more than \$480 million in FY 2014 constant dollars or, for procurement, of more than \$2.79 billion in FY 2014 constant dollars.

The LCS MCM mission package supports MCM operations through the employment of aviation assets and unmanned surface and submersible vehicles. These assets and vehicles are equipped with an array of sensors and systems to detect, localize, and neutralize surface, near-surface, in-volume, and bottom mines. The MCM mission package systems allow the LCS to remain outside the mine threat area during detection and neutralization efforts. The MCM mission package also provides the capability to sweep mines and detect beach zone and buried mines. The MCM mission package includes the following seven systems.

- The AN/AQS-20A Sonar Mine Detecting System is a surface towed mine reconnaissance sensor designed to provide the Mine Counter-Measure Commander or other operational commanders with detection, classification, identification, and localization of bottom and moored mines in shallow and deep water. This program completed Milestone C on May 10, 2005, and the Navy is developing pre-planned product improvements.⁶
- The AN/ASQ-235 Airborne Mine Neutralization System (AMNS) is a mine neutralization system, deployed from the MH-60S helicopters using an expendable mine neutralization device. This program completed Milestone C on January 28, 2008.
- The Airborne Laser Mine Detection System (ALMDS) is mounted onto the MH-60S helicopter and detects, classifies, and localizes near-surface mine threats using laser imaging. This program completed Milestone C on June 14, 2005.
- The Coastal Battlefield Reconnaissance and Analysis (COBRA) Block I system, along with the MQ-8B Fire Scout Vertical Takeoff and Landing Unmanned Aerial Vehicle (VTUAV), provides capabilities for daytime surface-laid minefield and obstacle detection in the beach zone. COBRA Block II is intended to add night operations and surf zone detection capability. COBRA Block III is intended to add buried mine line detection and near-real time onboard processing capability. The COBRA Block I program completed Milestone C on March 30, 2009.⁷

⁶ Milestone C decision approves entry into the production and deployment phase, during which the contractor produces system units for fielding.

⁷ The Navy is using separate programs [blocks], to incrementally deliver the full COBRA capability, with Block I being the initial system.

- The Unmanned Influence Sweep System (UISS) uses an Unmanned Surface Vehicle integrated with an Unmanned Surface Sweep System, a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the LCS or a ship of opportunity. This program completed Milestone B on August 27, 2014.⁸ According to Program Management Office, Unmanned Maritime System personnel, this program is on track to have the Milestone C decision in FY 2018.
- Knifefish (Surface Mine Countermeasure Unmanned Undersea Vehicle) provides detection of volume and bottom mines with Low Frequency Broadband Synthetic Aperture Sonar, including a buried mine detection capability. According to a Program Management Office, Unmanned Maritime System personnel, the Milestone C decision for this program will occur in third quarter FY 2018. However, Report No. DODIG-2017-014 stated that the Navy did not effectively establish capability requirements and plan and execute testing to procure the Knifefish.⁹
- Barracuda is intended to conduct sea mine acquisition, identification, and neutralization operations when previous operations locate a mine-like contact. This program is scheduled to have a Milestone B decision in the second quarter of FY 2018.

Our review focused on the ALMDS, AMNS, and COBRA Block I systems because the Navy had declared IOC for these systems. See Appendix B for a more detailed description of the individual systems.

Program Management

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

The Assistant Secretary of the Navy (Research, Development, and Acquisition) (ASN[RD&A]) serves as the Navy Acquisition Executive. The ASN(RD&A) establishes policies and procedures and manages the Navy's research, development, and acquisition activities in accordance with DoD 5000 Series Directives. The ASN(RD&A) is the milestone decision authority (MDA) for the LCS Mission Modules, AN/AQS-20A Sonar Mine Detecting System, AMNS, and ALMDS. As the MDA, the ASN(RD&A) has overall program responsibility and is accountable for cost, schedule, and performance reporting to higher

⁸ Milestone B decision approves entry into the engineering and manufacturing development phase, which commits acquisition managers to developing a specific system for production and fielding.

⁹ Report No. DODIG-2017-014, "Acquisition of the Navy Surface Mine Countermeasures Unmanned Undersea Vehicle (Knifefish) Needs Improvement," November 8, 2016.

authorities, including Congress. The MDA can tailor acquisition procedures to more effectively and efficiently achieve program objectives, unless a statute requires the procedure. Tailoring procedures includes eliminating phases and combining or eliminating milestones and decision points.

Office of the Chief of Naval Operations

The Office of the Chief of Naval Operations (CNO) is responsible for the command and operations of Navy forces and for shore activities assigned by the Secretary of the Navy.¹⁰ The Expeditionary Warfare Division (N95) is responsible for establishing requirements, setting priorities, and directing overall planning and programming for expeditionary warfare systems and related labor, training, and readiness. The Commander, Operational Test and Evaluation Force (COMOPTEVFOR), is the Navy's sole independent agency for operational test and evaluation. COMOPTEVFOR is responsible for providing objective assessments of the effectiveness and suitability of systems being tested in support of Navy and DoD acquisition programs. COMOPTEVFOR also assesses how those systems affect mission accomplishment by sailors, marines, airmen, and soldiers.

Program Executive Officer Littoral Combat Ships

The Program Executive Office (PEO) for the LCS provides a single program executive responsible for acquiring and maintaining the littoral mission capabilities of the LCS class, beginning with procurement and ending with fleet employment and sustainment.¹¹ The programs PEO LCS supports include Mine Warfare, LCS Mission Modules, Unmanned Maritime Systems, LCS, and Fleet Introduction, Test and Evaluation, and In-Service Support. The PEO LCS is the MDA for the COBRA, UISS, Knifefish, and Barracuda.

Program Management Office Littoral Combat Ship Mission Modules

The Program Management Office LCS Mission Modules (PMS 420) is responsible for all aspects of the LCS Mission Modules program and vested with the authority, accountability, and resources necessary to manage all aspects of the LCS Mission Modules program from concept development to demilitarization and disposal. PMS 420 acts through the Fleet Introduction and Sustainment Program Office (PMS 505) with respect to management of Mission Modules and their

¹⁰ Shore activities include facilities for the repair of machinery and electronics; communications centers; training areas and simulators; ship and aircraft repair; intelligence and meteorological support; storage areas for repair parts, fuel, and munitions; medical and dental facilities; and air bases.

¹¹ The Navy announced March 22, 2018, that it renamed PEO LCS as PEO Unmanned and Small Combatants (USC) to better align the course and scope of responsibilities for both manned and unmanned systems to meet combatant commander needs.

associated equipment throughout their life cycle. PMS 420 will exercise management authority, including selection and application, over core capabilities that support the development, testing, and procurement of the LCS mission modules. PMS 505 assumes responsibility for fleet introduction, in-service support, demilitarization, and disposal of assigned systems.

Program Management Office Mine Warfare

The Navy established the Program Management Office Mine Warfare (PMS 495) on June 1, 2004, with the consolidation of the Surface Mine Warfare and Airborne Mine Warfare program offices. The mission of PMS 495 is to deliver mine warfare capabilities to the warfighter. PMS 495 systems provide mining and mine countermeasure capability from the beach zone out to deep water. PMS 495 is responsible for managing the AMNS, ALMDS, COBRA, and Barracuda.

Program Management Office Unmanned Maritime Systems

Program Management Office Unmanned Maritime Systems (PMS 406) is chartered to develop, acquire, deliver, and support operational effective, integrated unmanned maritime systems for warfighters and to direct unmanned maritime systems experimentation and technology maturation efforts to meet the fleet's capability needs. Unmanned maritime systems comprises unmanned maritime vehicles, which includes unmanned undersea vehicles and unmanned surface vehicles, and fully integrated sensors and payloads as necessary to accomplish the required missions. PMS 406 is responsible for managing the AN/AQS-20A, Knifefish, and UISS. Table 1 shows how the Navy aligned the mine countermeasures programs under the program office and the MDAs.

Table 1. Alignment of the Programs Under the Program Office and the MDAs

Program Office	Program	Milestone Decision Authority
PMS 420	LCS Mission Modules	ASN(RD&A)
PMS 495	AMNS	
	ALMDS	
	COBRA	
PMS 406	Barracuda	PEO LCS
	Knifefish	
	UISS	
	AN/AQS-20A	ASN(RD&A)

Source: The DoD OIG.

Director, Operational Test and Evaluation

The Director, Operational Test & Evaluation (DOT&E) is the primary staff assistant and senior advisor to the Secretary of Defense on operational test and evaluation in the DoD. The DOT&E is responsible for issuing DoD operational test and evaluation policy and procedures; reviewing and analyzing the results of operational tests and evaluations conducted for each major DoD acquisition program; and providing independent assessments to the Secretary of Defense; the Under Secretary of Defense for Acquisition, Technology, and Logistics; and Congress. Additionally, the DOT&E makes budgetary and financial recommendations to the Secretary of Defense regarding operational test and evaluation and oversees major DoD acquisition programs to make sure operational tests and evaluations are adequate to confirm the operational effectiveness and suitability of defense systems in combat use.

DoD Acquisition Milestones

According to DoD Instruction 5000.02, the defense acquisition system uses three milestones to oversee and manage major defense acquisition programs.¹²

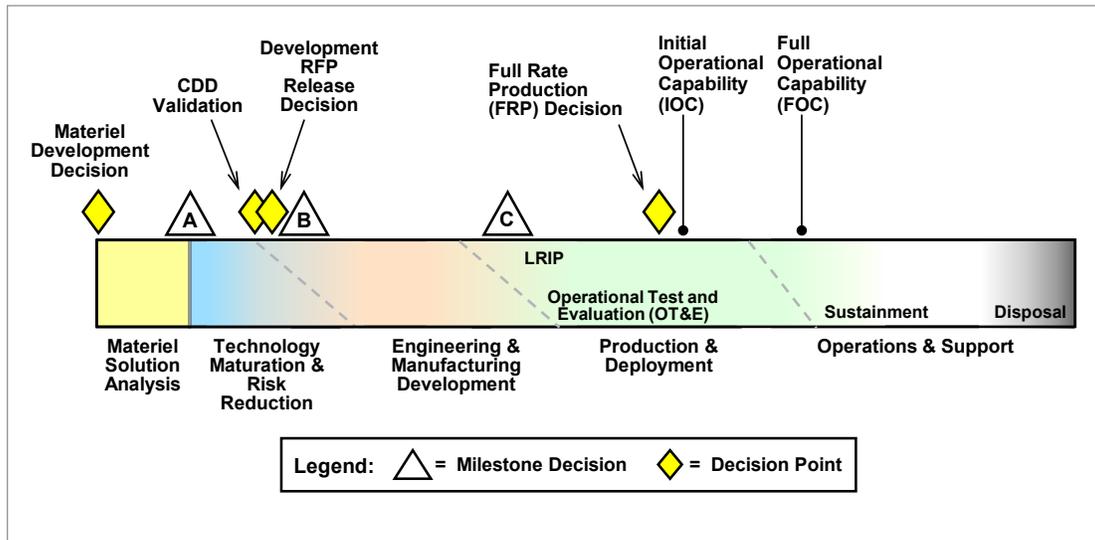
- Milestone A decision approves program entry into the technology maturation and risk reduction phase, which involves developing technologies and reducing risks before committing the resources needed for complete system development;
- Milestone B decision approves entry into the engineering and manufacturing development phase, which commits acquisition managers to developing a specific system for production and fielding; and
- Milestone C decision approves entry into the production and deployment phase, during which the contractor produces system units for fielding.¹³

As a prerequisite to each milestone, the project manager must develop a test plan that documents the overall structure and objectives for system testing necessary to evaluate system capabilities. The following figure shows the typical sequence of events and activities that occur during the acquisition process.

¹² DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

¹³ Fielding means placing a weapon system into operational use with units in the fleet.

Figure 1. Acquisition Process

**ACRONYMS:**

RFP Request for Proposal

CDD Capability Development Document

LRIP Low-Rate Initial Production

Source: DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

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.¹⁴

We identified an internal control weakness with the Navy not effectively managing the development of the MCM mission package. Specifically, the Navy prematurely declared IOC for systems before completing testing, which would have demonstrated systems were effective and suitable for operations. We will provide a copy of the report to the senior official responsible for internal controls in the Department of the Navy.

¹⁴ DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013.

Finding

The Navy Declared Initial Operational Capability Without Demonstrating MCM Systems were Effective and Suitable

The Navy declared IOC for the three MCM mission package systems reviewed prior to demonstrating that the systems were effective and suitable for their intended operational uses.

This occurred because N95 declared IOC for the ALMDS and AMNS after the CNO and ASN(RD&A) officials approved a plan to pursue IOC to gather data and lessons learned. Specifically, to deliver the systems to the fleet, N95 used the results of a technical evaluation and previous test events to justify its IOC decisions without demonstrating that known performance problems were corrected. Additionally, N95 declared that the COBRA Block I program reached IOC based on data gathered during the first of five test periods, even though the program did not fully meet a key performance parameter (primary requirement). N95 declared IOC for the COBRA Block I program to avoid requesting a sixth change to the IOC date that would further delay the delivery of the system capabilities to the fleet.

~~(FOUO)~~ As a result, the Navy has delivered units that have known performance problems to the fleet for use aboard the LCS and other platforms. The MCM mission package operates as an integrated family of systems. Each of the seven systems needs to provide full capability and operate in conjunction with each other in order to accomplish MCM missions. Consequently, if the Navy proceeds as planned, it will spend \$ [REDACTED] million for [REDACTED] ALMDS, [REDACTED] AMNS, and [REDACTED] COBRA Block I production units that cannot fully perform their mine detection and neutralization missions. This in turn could lead to degraded mission performance, delayed delivery of needed capability to the warfighter, and the need to pull those units off-line and spend additional money to correct the shortcomings in the fielded units.

Navy Declared Initial Operational Capability Before Completing Operational Testing and Evaluation

The Navy declared IOC for the three MCM mission package systems reviewed prior to demonstrating that the systems were effective and suitable for their intended operational uses.

DoD Instruction 5000.02 states that an operational authority declares IOC when the operational organization is equipped and trained and is determined capable to conduct mission operations.¹⁵ A system's capability development document and capability production document define IOC requirements. In weapons acquisition programs, such as the ALMDS, AMNS, and COBRA Block I, IOC generally occurs during the production and deployment phase. The production and deployment phase produces and delivers products for use by operational units, after operational test and evaluation and the full-rate production decision (final production decision).

Initial operational tests occur in a realistic threat environment and can help the program office determine whether the ALMDS, AMNS, and COBRA Block I are operationally effective and suitable for the intended use before spending funds to procure additional units. Without a robust, rigorous test and evaluation program, and the successful demonstration that the system is operationally effective and suitable, programs are more susceptible to cost overrun, being behind schedule, and not performing program missions.¹⁶ Therefore, to minimize the risk of incurring cost overruns, falling behind schedule, or poor system performance, we believe it is a best practice to conduct initial operational tests before declaring IOC and procuring additional units. In addition, according to the Defense Acquisition University website, IOC should not occur before initial operational test and evaluation because of the risk to the program.

Declaring Initial Operational Capability for Airborne Laser Mine Detection System and Airborne Mine Neutralization System

On November 18, 2016, N95 declared that the ALMDS and AMNS had achieved IOC. However, the Navy had not fully demonstrated that the systems were effective and suitable for their intended operational uses. The ALMDS and AMNS requirements documents define IOC as the successful completion of initial operational test and

¹⁵ DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015.

¹⁶ Operational suitability is the degree to which a system can be placed and sustained satisfactorily in an operational environment.

evaluation. Additionally, the ALMDS requirement document states that IOC includes the delivery of at least two ALMDS units to the fleet with logistic support.¹⁷ The AMNS requirement document states that IOC occurs when one squadron is outfitted and trained with one production representative AMNS unit.¹⁸

In July 2011, the Navy modified the developmental and initial operational test and evaluation strategy for demonstrating that the ALMDS and AMNS successfully integrate into the LCS MCM mission module. The revised strategy called for individual MCM systems' full capability to be assessed when working together on the LCS as opposed to testing each individual systems' ability to perform its respective missions in an operational environment. However, because of the strategy's limited focus, the Navy will not collect sufficient information to fully demonstrate that the ALMDS and AMNS are operationally effective and suitable for all their intended uses.

From September through October 2014, COMOPTEVFOR conducted an assessment to determine whether there were any significant operational problems that could affect successful completion of the initial operational test and evaluation for the ALMDS and AMNS. The COMOPTEVFOR operational assessment report concluded that the MH-60S helicopter with the ALMDS and AMNS installed was high risk for not being able to effectively conduct mine warfare missions because of reliability problems with the ALMDS and AMNS.¹⁹ According to a PEO LCS official, the ALMDS and AMNS program teams reviewed the problems identified in COMOPTEVFOR's operational assessment report and fixed the problem before the technical evaluation.²⁰ The remaining low-priority problems did not require immediate action. However, according to the PEO official the ALMDS and AMNS program teams did not directly address some of the problems that were specific to the MH-60S helicopter or the Naval Air Systems Command Airborne MCM mission kit.

From February through August 2015, the Navy also conducted a technical evaluation that focused on MCM operations.²¹ The Navy reviewed the ALMDS and AMNS ability to determine the presence or absence of mine threats when minehunting in a designated mine danger area as a part of the review. However,

¹⁷ "Operational Requirements Document (ORD) for the AN/AES-1 Airborne Laser Mine Detection System (ALMDS) Program, Revision 1 – Update, July 13, 2004.

¹⁸ "Capability Production Document (CPD) For the Airborne Mine Neutralization System," March 16, 2007.

¹⁹ "Multimission Combat Support Helicopter with Airborne Laser Mine Detection System and Airborne Mine Neutralization System Operational Test Agency Operational Assessment (OA) Report," April 21, 2015.

²⁰ Technical evaluation is the study, investigation, or test and evaluation by a developing agency to determine the technical suitability of materiel, equipment, or a system, for use in the Military Services. The Navy uses technical evaluation as part of developmental testing.

²¹ "Littoral Combat Ship (LCS) 2 Mine Countermeasures (MCM) Mission Package (MP) Developmental Test/Integration Test (DT/IT)-C2 Technical Evaluation (TECHEVAL) Test Report," January 2016. System development agencies generally perform these types of tests to evaluate a system's design and progress during development.

the technical evaluation did not test whether the ALMDS and AMNS were operationally effective and suitable to support final production. The Navy conducts technical evaluations to demonstrate that a system is stable and technically mature, and determine whether a system is ready for initial operational testing. LCS Mission Module Program Manager concluded that both systems performed effectively to support MCM mission package requirements.

In early 2016, the CNO and ASN(RD&A) officials approved a plan developed to implement recommendations made by an Independent Review of the Remote Minehunting System. The plan provided the Navy an opportunity to re-baseline its approach to MCM and deliver an affordable MCM capability to the LCS, with IOC planned for FY 2020 or 2021 and full operation capability in FY 2024. The initial phase of the plan called for systems to be provided to the fleet (LCS) to obtain critical early lessons in training, refine tactics, and to increase operational experimentation while gathering data to support the evaluation of comparable mine hunting systems. To provide the systems to the fleet to support this effort, the Director, N95, used the MCM mission package technical evaluation and previous test events results to declare that ALMDS and AMNS had achieved IOC. However, the operational assessments identified that COMOPTEVFOR did not test the ALMDS and AMNS in all operational environments.

On June 30, 2016, the DOT&E completed an Early Fielding Report in response to the Navy's plan to deploy the LCS MCM mission package before conducting operational testing.²² The report stated that the MH-60S helicopter with the current ALMDS and AMNS units would not be operationally effective or suitable to conduct mine countermeasure operations. In addition, the report explained that the results of the Navy's technical evaluation conducted in 2015 were incorrect because the Navy excluded information from the test data collected when determining the results. The FY 2016 DOT&E Annual Report recommended that the Navy limit procurement of the ALMDS and AMNS until program officials develop and test system performance improvements in a realistic operational environment.²³ According to a PEO LCS official, PEO LCS has continued to procure these systems to comply with CNO and ASN(RD&A) direction to implement the Independent Review recommendation to support LCS MCM mission package requirements. Program officials still plan to conduct LCS MCM mission package initial operational test and evaluation in fourth quarter of FY 2020. However, the PEO LCS's continued procurement of these systems contradicts DOT&E recommendation that the Navy limit procurement of the systems.

²² Director, Operational Test and Evaluation, "Littoral Combat Ship Increment 1 Mine Countermeasures Early Fielding Report," June 30, 2016.

²³ Director, Operational Test and Evaluation, "FY 2016 Annual Report," December 2016.

Declaring Initial Operational Capability for Coastal Battlefield Reconnaissance and Analysis

On July 31, 2017, N95 declared IOC for COBRA Block I program. According to N95, the program office achieved all IOC requirements. N95 based the COBRA Block I program IOC decision on the first of five test periods, even though the program did not fully meet a key performance parameter (primary requirement). The COBRA Block I production document defines IOC as the delivery of one COBRA Block I system, new equipment training, initial spares, and support equipment to the first unit scheduled to receive the system.²⁴ However, the developmental and initial operational testing conducted showed that the system had problems, such as unstable power supply, that could affect operational effectiveness and suitability. We determined that N95 declared IOC because the COBRA Block I program was going to miss its planned IOC date, which would have required the PEO LCS to approve a change to the IOC date for the sixth time and further delay the delivery of the system capabilities to the fleet.

The COBRA Block I system became a program of record in April 2005. The Navy designed the system to operate from the Fire Scout Vertical Takeoff and Landing Unmanned Aerial Vehicle (VTUAV) and be a part of the LCS Mine Warfare Mission Module starting in FY 2007. PMS 495 has delayed the COBRA Block I IOC milestone five times, increasing the schedule 10 years beyond the original scheduled date for IOC. DoD Instruction 5000.02 allows program managers, with the approval of the MDA, to revise the program schedule when there is a program deviation. Table 2 shows the date and reason for each change.

Table 2. Changes to the IOC Milestone Date and Reason for Changes

Program Baseline Dates	Program Deviation Report Dates	IOC Date	Number of Months Added to IOC Date	Reason for Change
June 2006		December 2007		Initial Baseline
February 2007		March 2009	15	Test requirement changes/availability of Fire Scout VTUAV software for flight testing
August 2007	July 2007	March 2010	12	Technical problems with COBRA Airborne Control Processor development and delays in Fire Scout VTUAV and LCS programs

²⁴ "Capability Production Document for Assault Breaching System Coastal Battlefield Reconnaissance and Analysis (COBRA) System Block I," July 2, 2007.

Table 2. Changes to the IOC Milestone Date and Reason for Changes (cont'd)

Program Baseline Dates	Program Deviation Report Dates	IOC Date	Number of Months Added to IOC Date	Reason for Change
May 2009	March 2008	June 2012	27	Technical issues with COBRA Airborne Control Processor development; numerous technical issues identified during flight testing; and delay of the Fire Scout VTUAV software
July 2012	March 2010	February 2014	20	Non-availability of Fire Scout VTUAV because of delays in its operational evaluation
December 2014	September 2014	July 2017	41	Fire Scout VTUAV technical issues and its availability delayed required test flights (developmental test assist); and the Navy changed its information assurance requirements

Source: COBRA Acquisition Program Baseline Program Deviation Reports, and PEO LCS.

PMS 495 issued the last COBRA Block I program deviation report on September 10, 2014, and the PEO LCS approved the report on September 16, 2014, approving the COBRA Block I program to revise the program's baseline schedule dates.²⁵ Specifically, the program deviation deferred IOC an additional 41 months to July 31, 2017. The schedule was changed due to missing a developmental test assist because of Fire Scout VTUAV technical problems and schedule constraints, and changes in the Navy's Information Assurance requirements.²⁶

The DOT&E FY 2015 Annual Report states that the Navy canceled a scheduled operational assessment of COBRA Block I when a rocket exploded after liftoff, resulting in shrapnel damage to both Fire Scout VTUAVs, which were to host the COBRA Block I system during tests. In addition, the DOT&E FY 2015 Annual Report states that in December 2014, the DOT&E returned the Navy's revised COBRA Block I Test and Evaluation Master Plan for rework, noting that the schedule, test strategies, funding profile, and planned resources no longer reflected the state of the program following cancelation of the operational assessment.

The DOT&E FY 2016 Annual Report states that early developmental testing of the COBRA Block I revealed problems that, if not corrected, could adversely affect the operational effectiveness and suitability of the system. Specifically, the FY 2016 Annual Report states that the COBRA Block I test data revealed that the system's

²⁵ Program deviation reports describe acquisition program baseline deviations (also called "breaches") to the Defense Acquisition Executive and Component Acquisition Executives.

²⁶ Developmental test assist is a developmental test with the active involvement of operational test personnel. Developmental test assists are not a formal phase of operational testing. Developmental test assists may be conducted to allow the Operational Test Director to become more familiar with a system, or to supplement developmental test personnel.

probability of detection was low against small mines and mines placed in some environmental conditions.²⁷ The FY 2016 Annual Report also states that without improvements, the capability of the current COBRA Block I system would likely be limited in some operationally realistic threat scenarios. The DOT&E testified to the U.S. House of Representatives Armed Services Committee on December 8, 2016, that the COBRA Block I:

Will not provide the capability needed to satisfy LCS MCM requirements for minehunting in the surf zone and beach zone. The Navy expects the COBRA Block II system to include surf zone capability, improved beach zone detection capability against small mines, and nighttime capability. The Navy expects these improvements to provide the capability needed to meet LCS MCM requirements in the surf zone and beach zone and expects the Block II system to reach IOC in FY [20]22.

The Test and Evaluation Master Plan Revision 1, Change 3 dated May 8, 2017, states that the COBRA Block I Technical Evaluation ended on February 20, 2017, and the first phase of initial operational test and evaluation began on April 24, 2017, barely 2 months later. The program office conducted an operational test readiness review to assess whether the COBRA Block I should proceed with initial operational test and evaluation on April 5, 2017, less than 2 months after the end of the technical evaluation. Therefore, the program office did not have adequate time to support pre-test predictions, testing, post-test analysis, evaluation, and report; and execution of corrective actions in response to discovered deficiencies.

In June 2017, COMOPTEVFOR completed the first of five test periods to determine the operational effectiveness and suitability for the COBRA Block I system. Test Period I focused on the mine warfare mission from shore and with limited aspects of suitability. COMOPTEVFOR provided the PEO LCS with an initial impressions memorandum to support the COBRA Block I IOC decision scheduled for July 31, 2017.²⁸ COMOPTEVFOR memorandum stated that the initial impressions is that COBRA Block I is trending operationally effective and suitable based on initial operational test and evaluation test period one. However, the MQ-8B Fire Scout's reliability limited shore-based operational employment of the COBRA Block I

²⁷ According to PMS 496, DOT&E is referring to vegetation and grass because if vegetation or grass covers a mine, it cannot be found was DOT&E issue.

²⁸ "Initial Impressions For Coastal Battlefield Reconnaissance and Analysis Block I Initial Operational Test and Evaluation Test Period One," July 6, 2017.

system, which resulted in a negative impact to the COBRA Block I system mission completion during test period one. In addition, the test plan for COBRA Block I initial operational test and evaluation states that a minor limitation to the COBRA Block I initial operational test and evaluation was that the very small mines were not tested and therefore, COBRA Block I could not demonstrate its imagery capability against smaller sizes.²⁹ The operational effectiveness and suitability of the COBRA Block I system will not be determined until the completion of LCS shipboard operation, maintenance demonstration, and cybersecurity testing.

(FOUO) [REDACTED]
[REDACTED] 30 [REDACTED]
[REDACTED]
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[REDACTED]
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[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Instead of PMS 495 issuing another program deviation report in July 2017 and changing the IOC date again to allow more time for rework and additional operational testing to demonstrate all primary requirements were met, N95 declared IOC for COBRA Block I on July 31, 2017, to meet the program’s revised IOC milestone. Consequently, the program became more schedule-driven than event-driven. DoD Instruction 5000.02 states that event-driven testing schedules will allow adequate time to support pre-test predictions, testing, post-test analysis, evaluation, and report; reconciliation of predicative models; and adequate time to support execution of corrective actions in response to discovered deficiencies. The schedule should allow sufficient time between developmental test and evaluation and initial operational test and evaluation for rework, reports, and analysis and developmental test of critical design.

²⁹ “Coastal Battlefield Reconnaissance and Analysis (COBRA) Block I Initial Operational Test and Evaluation Test Plan,” April 5, 2017.
³⁰ Operational mission failures are events in which an item or part of an item does not, or would not, perform as specified, that prevents the system from performing one or more mission-essential functions.
³¹ An uncommand shutdown is a premature shutdown of the system.

The DOT&E FY 2017 Annual Report stated that COBRA Block I did not meet the Block I capability production document threshold requirements for one class of targets but provides marginal capability that is better than any existing beach reconnaissance capability. In addition, the FY 2017 Annual Reports states that initial operational test and evaluation period one data shows that the COBRA Block I system performed reliably with relatively few operational mission failures for short durations. However, both MQ-8B Fire Scout test platforms were not operational for several days during this period. MQ-8B Fire Scout troubleshooting and repairs required significant maintenance and technical support.

N95 should delay future procurement of the ALMDS, AMNS, and COBRA Block I until the ASN(RD&A) and CNO require PMS 495 to complete operational test and evaluations demonstrating the systems are effective and suitable to support full-rate production.

Navy Has Delivered Training Units, but Has Not Determined System Capabilities

~~(FOUO)~~ Since declaring IOC, the Navy has delivered two ALMDS, one AMNS, and one COBRA Block I units to the fleet with known performance problems for use aboard the LCS and other platforms. The Navy plans to conduct a combined developmental and operational test in FY 2020 for the MCM mission package, which will include testing the ALMDS, AMNS, and COBRA Block I. MCM mission package operates as an integrated family of systems. Each of the seven systems needs to provide full capability and operate in conjunction with each other in order to accomplish mine countermeasures mission. Consequently, if the Navy proceeds as planned it will spend \$████ million for ███ ALMDS, ███ AMNS, and ███ COBRA Block I production units that cannot fully perform their mine detection and neutralization missions. This in turn could lead to degraded mission performance, delayed delivery of needed capability to the warfighter, and the need to pull those units off-line and spend additional money to correct the shortcomings in the fielded units.

Programs that declare IOC before conducting initial operational test and evaluation increase the likelihood of cost overruns, increased delivery timelines, and not meeting performance objectives. The Navy experienced these negative effects recently with its LCS program. The Government Accountability Office stated in its 2017 Assessment of Selected Weapon Programs that 49 percent of programs, including the LCS program, intend to or have declared IOC with limited

or no operational testing.³² The report stated that the Navy declared IOC for the LCS program in 2014 before some of the ship's capabilities including most mission equipment completed developmental testing. Since declaring IOC, the LCS has experienced significant performance limitations that have also negatively affected the mission package programs, resulting in the Navy delaying the LCS initial operational test and evaluation. In addition, these performance limitations caused the Navy to reduce the quantity of LCS and move to a new ship design.

Management Comments on the Finding and Our Response

The Assistant Secretary of the Navy (Research, Development, and Acquisition), responding for the Navy, provided comments on the finding. This section summarizes the comments. For the full text of the comments, see the Management Comments section of the report.

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

The Assistant Secretary of the Navy (Research, Development, and Acquisition) stated the Navy disagreed with the finding. The Assistant Secretary stated the ALMDS, AMNS, and COBRA Block I systems had met the requirements for the declaration of IOC as defined in their acquisition documentation. The Assistant Secretary stated that all three systems had successfully completed operational tests designed by COMOPTEVFOR in operationally relevant environments with fleet operators as a part of the individual test programs and all had met or exceeded their primary requirements. The Assistant Secretary stated that the ALMDS and AMNS had completed and exceeded expectations for testing required by the LCS MCM mission package acquisition decision memorandum. In addition, the Assistant Secretary stated the COBRA had successfully completed the first period of initial operational test and evaluation as designed by COMOPTEVFOR and DOT&E to meet the requirements for IOC.

Our Response

We disagree that the systems have met the requirements for declaring IOC. The ALMDS and AMNS requirements documents define IOC as the successful completion of initial operational test and evaluation and delivery of systems to the fleet. However, in the memoranda issued declaring IOC for ALMDS and AMNS, N95 states that the ALMDS and AMNS programs have not executed a complete initial operational test and evaluation per the IOC definition. Therefore, the ALMDS

³² Report No. GAO-17-333SP, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 30, 2017.

and AMNS programs have not demonstrated that the systems are operationally effective and have met the requirements for declaring IOC. As for the COBRA Block I program, the production document defines IOC as delivery of one system, new equipment training, initial spares, and support equipment to the unit. While the COBRA Block I program met that limited definition, the COBRA Block I system does not meet DoD Instruction's 5000.02 definition for declaring IOC. Specifically, the Navy has not fully demonstrated that the COBRA Block I system is able to conduct its full portfolio of mission operations. Specifically, the ALMDS does not meet Navy detection and classification requirements; AMNS cannot neutralize most of the mines in the Navy's threat scenarios; and COBRA Block I has not demonstrated its imagery capability against smaller mine sizes.

Recommendation, Management Comments, and Our Response

Recommendation

We recommend that the Director, Expeditionary Warfare Division (N95), delay future procurement of Airborne Laser Mine Detection System, Airborne Mine Neutralization System, and Coastal Battlefield Reconnaissance Analysis until the Assistant Secretary of the Navy (Research, Development, and Acquisition) and Chief of Naval Operations require the Program Manager, Mine Warfare Office, to complete operational test and evaluations demonstrating the systems are effective and suitable to support full-rate production.

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

The Assistant Secretary of the Navy (Research, Development, and Acquisition) disagreed with the recommendation. The Assistant Secretary stated that test results during 2015 and 2017 had demonstrated the systems either met or exceeded their primary requirements. The Assistant Secretary stated that the testing conducted balanced comprehensiveness with speed of delivery to the Fleet and is aligned with the National Defense Strategy tenet of "delivering performance at the speed of relevance." The Assistant Secretary further stated that delaying procurement and incremental fielding of capabilities that have been extensively tested and shown to provide a relevant advantage over our adversaries will significantly delay the Navy's transition to the future modular MCM force. The Assistant Secretary stated that the incremental approach to fielding each of the seven system in the LCS MCM mission package facilitates a more rapid and

seamless transition from legacy MCM to the future modular MCM force. Therefore, the Assistant Secretary stated the procurement must continue to ensure that a capability exists to replace the decommissioning MCM 1 Avenger Class ships and MH-53E, thereby saving the Navy operating and production costs.

Our Response

Although the Assistant Secretary did not agree with the finding or recommendation, we consider the recommendation resolved. As stated in the report, although the ALMDS, AMNS, and COBRA Block I have met primary requirements in some relevant environments, the Navy has yet to perform testing that demonstrates that the ALMDS and AMNS systems are operationally effective and suitable for all their intended uses. The FY 2016 DOT&E Annual Report states that the MH-60S airborne MCM helicopter equipped with ALMDS and AMNS would not be operationally effective or suitable if called upon to conduct MCM missions in combat. Specifically, the ALMDS does not meet the Navy's requirements for minimum probability of detection and classification in all depth bins or the average probability of detection and classification in all conditions over a region of the water column that extends from the surface to a reduced maximum depth requirement. In addition, the AMNS cannot neutralize mines that are moored above the system's prescribed operating ceiling. This will preclude neutralizing most of the mines expected in some likely threat scenarios; thus, alternative means, such as an Explosive Ordnance Disposal Team provided by another unit, must be used to complete mine clearing. Further, in its FY 2017 Annual Report, DOT&E reported that the COBRA Block I system did not meet the Block I capability production document minimum requirements for one class of targets but provided marginal capability that is better than any existing beach reconnaissance capability.

After reviewing the Assistant Secretary's comments to the draft report, we met with senior Navy officials to discuss the Navy's position and received an update on the systems' development. The officials stated that the systems provide relevant advantage over our adversaries and that the Navy had taken actions to correct the performance shortcomings identified during the aforementioned test and evaluation events. The officials further stated that the MCM training squadrons working with ALMDS and AMNS systems have not reported any problems. In addition, the officials stated that preliminary analysis of additional testing conducted on the COBRA Block I system supported that many of its performance shortcomings had been corrected. The officials further contend that having the training squadrons use the systems is the best way to identify and correct performance gaps, enhance lethality, and more rapidly change the paradigm in the MCM force.

While this approach may allow for a more rapid transition to the future modular MCM force and ensure that a capability exists to replace the decommissioning MCM 1 Avenger Class ships and MH-53E, we remain concerned about procuring additional systems before demonstrating the systems can perform as required. Specifically, costly retrofits may be needed to fix yet undiscovered system deficiencies. In addition, the approach could also result in still having to delay the planned decommissioning of legacy ships, helicopters, and associated equipment if deficiencies also render the new system to be unable to perform the full MCM mission set.

If the Navy continues its procurement of additional ALMDS, AMNS, and COBRA Block I systems to enable the timely decommissioning of the MCM 1 Avenger Class ships and MH-53E, it should continually improve those systems based on feedback identified by Fleet users. Based on management's comments to the draft report and our follow on meetings with senior Navy officials regarding their comments, we consider the recommendation resolved. The recommendation can be closed once the Navy: (1) provides documentation that the performance deficiencies identified in prior testing of the ALMDS, AMNS, and COBRA Block I systems have been corrected; and (2) demonstrates progress towards achieving its full portfolio of mission operations, while mitigating the risk of costly retrofits.

Appendix A

Scope and Methodology

We conducted this performance audit from May 2017 through March 2018 in accordance with generally accepted government auditing standards. Those standards require that we 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.

- Office of the Secretary of Defense, Director, Operational Test & Evaluation, Alexandria, Virginia
- Office of the Chief of Naval Operations, Expeditionary Warfare Division, the Pentagon, Washington, D.C.
- Program Executive Office for Littoral Combat Ships (PEO LCS), Washington Navy Yard, Washington, D.C.
- Program Management Office Mine Warfare (PMS 495), Washington Navy Yard
- Program Management Office Unmanned Maritime Systems (PMS 406), Washington Navy Yard
- Program Management Office LCS Mission Modules (PMS 420), Washington Navy Yard
- Commander, Operational Test and Evaluation Force, Norfolk, Virginia
- Naval Surface Warfare Center- Panama City Division, Panama City, Florida

We collected, reviewed, and analyzed documents dated from March 1998 through August 2017. For the ALMDS, AMNS, and COBRA Block I programs, we reviewed the requirements documents, Test and Evaluation Master Plan, operational assessment reports, and system engineering plans. We did not review testing and requirements for all the systems because the Navy had not declared IOC for the AN/AQS-20A, UISS, and Barracuda as of our review. In addition, we previously reported deficiencies on the Knifefish in Report No. DODIG-2017-014, "Acquisition of the Navy Surface Mine Countermeasures Unmanned Undersea Vehicle (Knifefish) Needs Improvement," November 8, 2016.

To determine whether the Navy was effectively managing the development of an MCM mission package that will allow the LCS to detect and neutralize or avoid mines in support of fleet operations, we compared actions described in program planning and reporting documents to the policies and guidance in the following DoD and Navy issuances.

- Chairman of the Joint Chiefs of Staff Instruction, “Joint Capabilities Integration and Development System,” January 10, 2012 and January 23, 2015 (CJCS Instructions 3170.01H&I)
- “Manual for the Operation of the Joint Capabilities Integration and Development System,” January 19, 2012, and February 12, 2015
- DoD Instruction 5000.02, “Operation of the Defense Acquisition System,” December 8, 2008, and January 7, 2015
- “Defense Acquisition Guidebook,” May 5, 2017
- Secretary of the Navy Instruction 5000.2E, “Department of the Navy Implementation and Operation of the Defense Acquisition System and the Joint Capabilities Integration and Development System,” September 1, 2011

Use of Computer-Processed Data

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

Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) and the DoD Office of Inspector General (DoD OIG) issued four reports discussing the Littoral Combat Ship Mission Modules Program, relating to the Mine Countermeasure Mission Package systems. Unrestricted GAO reports can be accessed at <http://www.gao.gov>. Unrestricted DoD OIG reports can be accessed at <http://www.dodig.mil/reports.html/>.

GAO

Report No. GAO-14-749, “Littoral Combat Ship – Additional Testing and Improved Weight Management Needed Prior to Further Investments,” July 30, 2014

The Navy has continued to demonstrate and test various facets of the LCS systems and capability; however, important questions remain about how LCS will operate and what capabilities it will provide the Navy. The GAO found that the Navy’s decision to accelerate low-rate initial production of mission packages above the quantity necessary for operational testing limits the flexibility that the program will have to adjust to any problems that may arise during operational testing.

DoD OIG

Report No. DODIG-2017-014, "Acquisition of the Navy Surface Mine Countermeasures Unmanned Undersea Vehicle (Knifefish) Needs Improvement," November 8, 2016

The Navy did not effectively establish capability requirements and plan and execute testing to procure the Knifefish. Specifically, the Knifefish requirements developer (N95) did not fully define requirements to support the communication interface and launch and recovery operations between the Knifefish system and the LCS. Additionally, the Knifefish program office did not effectively plan and execute testing because of funding shortfalls, which resulted in a 14-month delay in meeting program milestones.

Report No. DODIG-2016-082, "DoD Needs to Require Performance of Software Assurance Countermeasures During Major Weapon System Acquisitions," April 29, 2016

Program officials for the Navy Littoral Combat Ship – Mission Modules did not ensure all software assurance countermeasures in the Program Protection Plan were fully performed while developing critical software.

Report No. DODIG-2012-101, "Acquisition of the Navy Organic Airborne and Surface Influence Sweep Needs Improvement," June 13, 2012

The Navy did not update capability requirements in the draft capability production document after a contractor's analysis showed the Organic Airborne and Surface Influence Sweep would not work after sustaining a shock wave of 65 percent of the shock capability requirement. Additionally, the Program Manager, Mine Warfare, planned the low-rate initial production decision review to occur before the system completed shock testing and iterative (periodically repeated) production readiness reviews.

Appendix B

Individual Mine Countermeasure Mission Package Systems

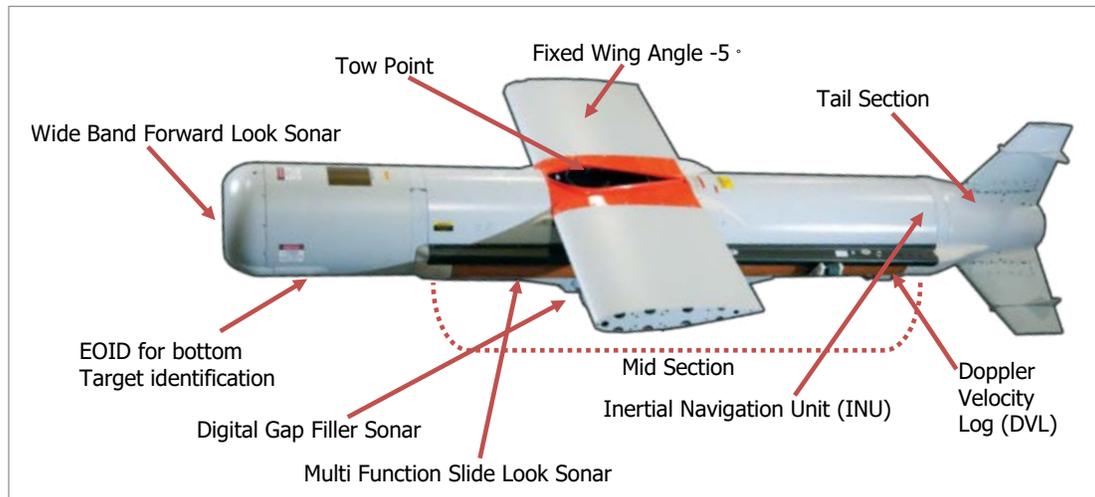
The MCM mission package includes the following seven systems.

AN/AQS-20A Sonar Mine Detecting System

The AN/AQS-20A Sonar Mine Detecting System is an Acquisition Category II program, with an estimated program acquisition cost of \$812 million.³³

The AN/AQS-20A is a mine reconnaissance sensor designed to provide the mine countermeasure commander or other operational commanders with detection, classification, identification, and localization of bottom and moored mines in shallow and deep water. The sensor is part of the LCS MCM mission package and towed by the MCM unmanned surface vehicle. The AN/AQS-20A incorporates five separate sonar/sensors (side-look sonar, forward-look sonar, volume search sonar, gap fill sonar, and electro-optical identification sensor) in a compact, lightweight, and hydro-dynamically stable towed body.

Figure 2. AN/AQS-20A Sonar Mine Detecting System



Source: PMS 420.

³³ Acquisition Category II is an acquisition program for which the DoD Component head estimates eventual total expenditure for research, development, test, and evaluation of more than \$185 million in FY 2014 constant dollars or, for procurement, of more than \$835 million in FY 2014 constant dollars.

ASQ-235 Airborne Mine Neutralization System

ASQ-235 AMNS is an Acquisition Category II program with the estimated program acquisition cost of \$227.1 million. The AMNS is a mine neutralization system, deployed from the MH-60S helicopters using an expendable mine neutralization device. The Navy plans to deploy the AMNS (Archerfish) from the MH-60S helicopter with the capability to neutralize bottom and moored mines using an expendable mine neutralization device. The Navy plans to use the AMNS and MH-60S to provide organic airborne mine neutralization capability as part of LCS Mine Warfare Mission Module. This capability will be of critical importance in littoral zones, confined straits, choke points, and the Amphibious Objective Area.

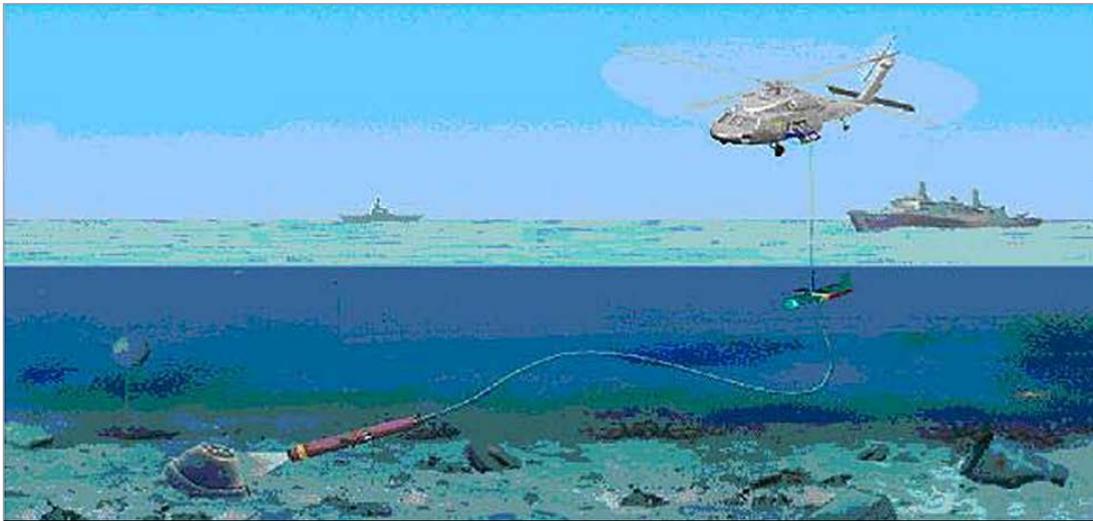


Figure 3. Airborne Mine Neutralization System towed by the MH-60S Helicopter
Source: PEO LCS.

Airborne Laser Mine Detection System



Figure 4. Airborne Laser Mine Detection System
Source: PEO LCS.

The ALMDS is an Acquisition Category II program with the estimated program acquisition cost of \$455.1 million. The ALMDS is mounted onto the MH-60S helicopter and detects, classifies, and localizes near-surface mine threats using laser imaging.

Coastal Battlefield Reconnaissance and Analysis

COBRA is an Acquisition Category III program with the estimated program acquisition cost of \$347.6 million.³⁴ The Navy designed the COBRA Block I system for use with the MQ-8B Fire Scout VTUAV aboard the LCS Ship Class. The COBRA system, along with the VTUAV squadron, may also be deployed at a shore-based facility. The mission hardware and software includes the COBRA Airborne Payload hardware and software, the COBRA Post Mission Analysis Station hardware and software, and the COBRA Tactical Control Station software segment for the VTUAV Ground Control Station. COBRA uses incremental development to meet the overall requirements. COBRA Block I provides capabilities of daytime surface-laid minefield and obstacle detection in the beach zone. COBRA Block II adds night operations and surf zone detection capability. COBRA Block III adds buried mine line detection and near-real time onboard processing capability.



³⁴ Acquisition Category III is an acquisition program for which the DoD Component head estimates eventual total expenditure for research, development, test, and evaluation of less than or equal to \$185 million in FY 2014 constant dollars or, for procurement, of less than or equal to \$835 million in FY 2014 constant dollars.

Unmanned Influence Sweep System

UISS is an Acquisition Category III program with the estimated program acquisition cost of \$1.6 billion. The UISS uses an Unmanned Surface Vehicle integrated with an Unmanned Surface Sweep System, a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the LCS or a ship of opportunity.

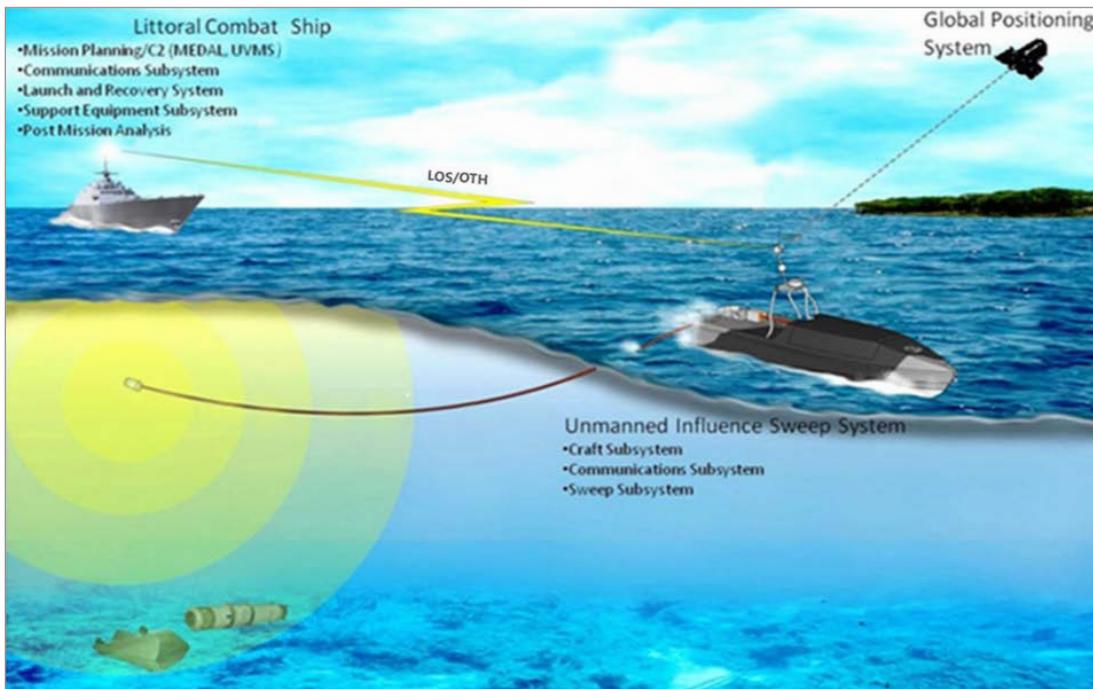
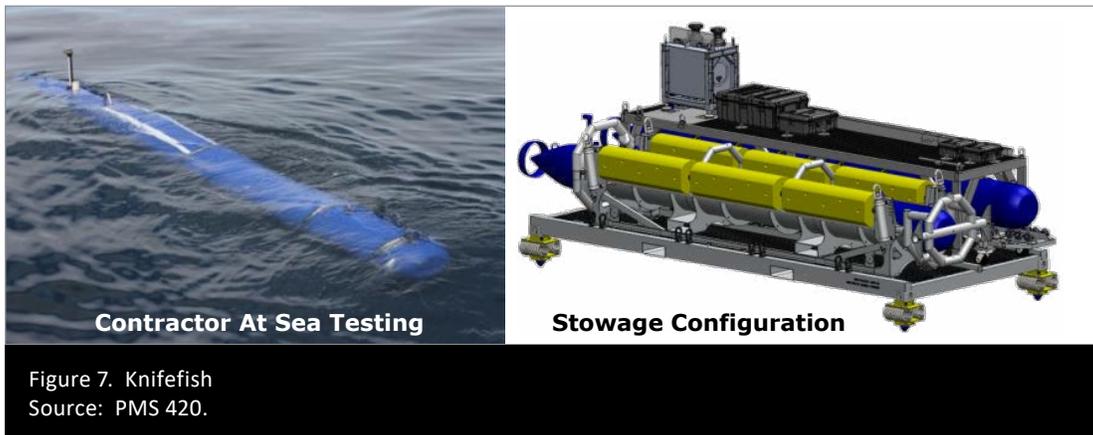


Figure 6. Unmanned Influence Sweep System Simplified Operational Concept
Source: PMS 406.

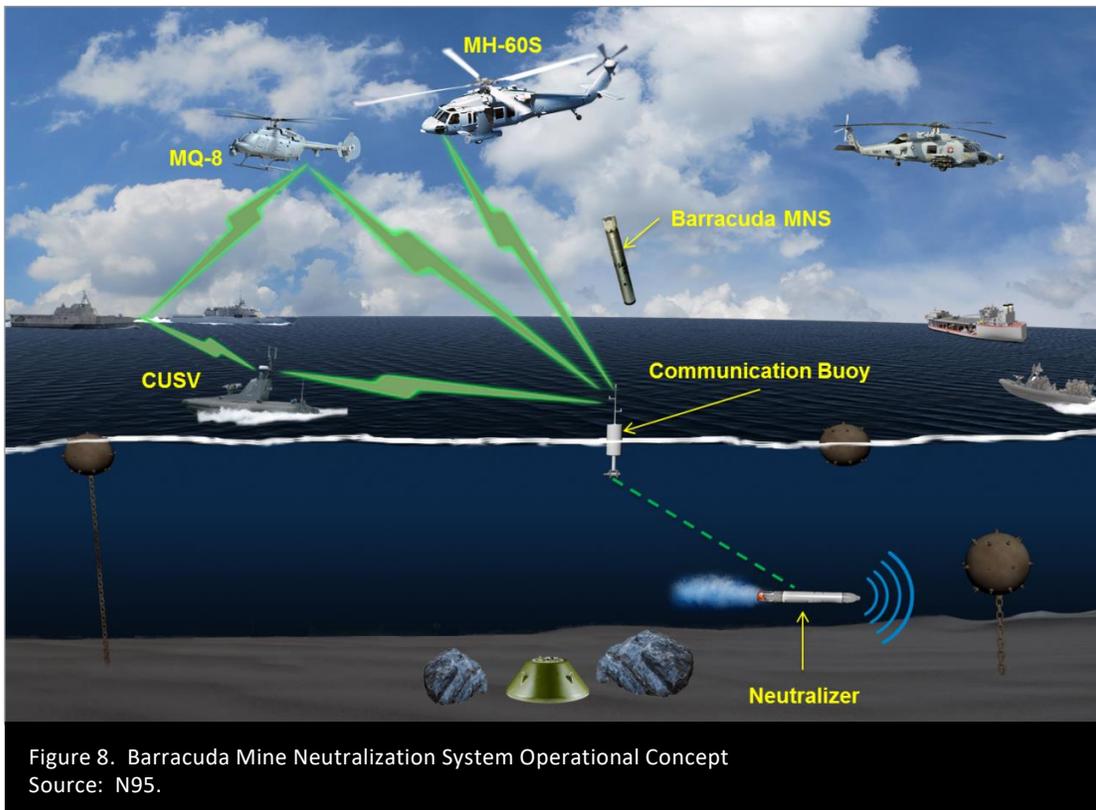
Knifefish (Surface Mine Countermeasures Unmanned Undersea Vehicle)

The Knifefish (also known as Surface Mine Countermeasures Unmanned Undersea Vehicle) is an Acquisition Category III program with the estimated program acquisition cost of \$611.4 million. The Knifefish is a fully autonomous Unmanned Undersea Vehicle employed from LCS and Craft of Opportunity. The Knifefish provides detection of volume and bottom mines with Low Frequency Broadband Synthetic Aperture Sonar, including a buried mine detection capability. Knifefish can hunt mines in high clutter and provides improved detection/classification/identification performance against stealthy mines. Knifefish also provides Intelligence Preparation of the Operational Environment (IPOE) capability.



Barracuda

The Barracuda Mine Neutralization System is an Acquisition Category III program scheduled to have a Milestone B decision until second quarter of FY 2018. The Navy intends to use the Barracuda to conduct sea mine acquisition, identification, and neutralization operations when previous operations located a mine-like contact. Barracuda addresses unmet requirements in near surface neutralization created after the cancellation of the Rapid Airborne Mine Clearance System program in FY 2013.



Management Comments

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



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

MAY 09 2018

MEMORANDUM FOR INSPECTOR GENERAL DEPARTMENT OF DEFENSE

SUBJECT: Navy's Response to Department of Defense Inspector General Draft Report dated March 23, 2018, Project No. D-2017-D000AE-0147.000, "Acquisition of the Navy's Mine Countermeasures Mission Package"

The Navy submits the following comments regarding the Department of Defense Inspector General (DoDIG) Draft Report dated March 23, 2018, Project No. D-2017-D000AE-0147.000, "Acquisition of the Navy's Mine Countermeasures Mission Package (MCM MP)."

The Navy does not concur with the draft report's finding. Airborne Laser Mine Detection System (ALMDS), Airborne Mine Neutralization System (AMNS), and Coastal Battlefield and Reconnaissance System (COBRA), met the requirements for the declaration of Initial Operating Capability as defined in their acquisition documentation including individual test programs delineated in each program's Test and Evaluation Master Plan and Integrated Evaluation Framework (IEF). As part of their individual test programs, all three systems have successfully completed operational tests designed by Commander, Operational Test and Evaluation Forces (COTF) in operationally relevant environments with Fleet operators and met or exceeded their Key Performance Parameters (KPPs). ALMDS and AMNS have completed and exceeded expectations for testing required by the Littoral Combat Ship (LCS) MCM MP Acquisition Decision Memorandum (ADM) culminating with System of Systems testing on LCS 2. COBRA successfully completed the first period of Initial Operational Test and Evaluation as designed by COTF and Director, Operational Test and Evaluation in order to meet the requirements for Initial Operational Capability. This period contained all performance testing specified in the IEF.

The Navy does not concur with the draft report's recommendation. Test results during 2015 and 2017 demonstrated that ALMDS, AMNS, and COBRA Block I, either met or exceeded their KPPs as stated in their program acquisition documentation. The testing conducted for these systems balanced comprehensiveness with speed of delivery to the Fleet and is aligned with the National Defense Strategy tenet of "delivering performance at the speed of relevance". Delaying procurement and incremental fielding of capabilities that have been extensively tested and shown to provide a relevant advantage over our adversaries will significantly delay the Navy's transition to the future modular MCM force. This incremental approach to fielding each of the seven systems in the LCS MCM MP facilitates a more rapid and seamless transition from legacy MCM to the future modular MCM force. Therefore, this procurement must continue on its current

Assistant Secretary of the Navy (Research, Development, and Acquisition) (cont'd)

SUBJECT: Navy's Response to Department of Defense Inspector General Draft Report dated March 23, 2018, Project No. D-2017-D000AE-0147.000, "Acquisition of the Navy's Mine Countermeasures Mission Package"

trajectory to ensure that a capability exists to replace the decommissioning MCM 1 Avenger Class ships and MH-53E that are scheduled to go out of service starting in Fiscal Year 2022, thereby saving the Navy operating and production costs.

I thank you for the interest you have displayed over the past year in the Navy's MCM MP. My point of contact for this matter is [REDACTED], Office of DASN Ships, who can be reached at [REDACTED]


James F. Geurts

Acronyms and Abbreviations

ALMDS	Airborne Laser Mine Detection System
AMNS	Airborne Mine Neutralization System
ASN(RD&A)	Assistant Secretary of the Navy (Research, Development, and Acquisition)
CNO	Chief of Naval Operations
COBRA	Coastal Battlefield Reconnaissance Analysis
COMOPTEVFOR	Commander, Operational Test and Evaluation Force
DOT&E	Director, Operational Test and Evaluation
IOC	Initial Operational Capability
LCS	Littoral Combat Ship
MCM	Mine Countermeasures
MDA	Milestone Decision Authority
MP	Mission Package
PEO	Program Executive Office
UISS	Unmanned Influence Sweep System
VTUAV	Vertical Takeoff and Landing Unmanned Aerial Vehicle

Glossary

Acquisition Category. Acquisition categories include categories I, II, and III. Acquisition Category I programs have the highest dollar value and have the Defense acquisition executive as the milestone decision authority. Acquisition Category II and III programs have lower dollar values and the Component acquisition executive, or designee, serves as the milestone decision authority. (Source: DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015)

Acquisition Phase. Acquisition phase refers to all the tasks and activities needed to bring a program to the next major acquisition milestone. Acquisition phases provide a logical means of progressively translating broadly stated capabilities into well-defined, system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Acquisition Program Baseline. Acquisition program baseline is agreement between the Program Manager (PM) and the Milestone Decision Authority (MDA) that reflects the approved program and contains schedule, performance, and cost parameters that are the basis for satisfying an identified mission need. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Capability Development Document. A capability development specifies capability requirements in terms of developmental key performance parameters, key system attributes, additional performance attributes, and other related information necessary to support development of one or more increments of a materiel capability solution. A sponsor-approved draft capability development document is necessary for a Milestone A acquisition decision and each release in support of the technology maturation and risk reduction phase of the defense acquisition system. A validated capability development document is also necessary for each development request for proposal release decision point and Milestone B acquisition decision. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Capability Production Document. A capability production document specifies capability requirements in terms of production key performance parameters, key system attributes, additional performance attributes, and other related information necessary to support production of a single increment of a materiel capability solution. A validated capability production document is necessary for each Milestone C acquisition decision. To ensure that the production activities meet

validated requirements in cases where the milestone decision authority waives Milestone C, a capability production document must be validated, or capability development document revalidated, prior to either the low-rate initial production decision or the full-rate production decision in cases where low-rate initial production is not applicable. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Developmental Testing and Evaluation. Developmental testing and evaluation is any testing used to assist in the development and maturation of products, product elements, or manufacturing or support processes. It also includes any engineering-type testing used to verify the status of technical progress, verify that design risks are minimized, substantiate achievement of contract technical performance, and certify readiness for initial operational testing. Development tests generally require instrumentation and measurements and are accomplished by engineers, technicians, or soldier operator-maintainer test personnel in a controlled environment to enable failure analysis. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Engineering and Manufacturing Development Phase. Engineering and manufacturing development is the third phase of the defense acquisition system, usually beginning after Milestone B, as defined and established by DoD Instruction 5000.02. The purpose of this phase is to develop, build, and test a product to verify that all operational and derived requirements have been met and to support production or deployment decisions. This phase completes all needed hardware and software detailed design; systemically retires any open risks; builds and tests prototypes or first articles to verify compliance with capability requirements; and prepares for production or deployment. It includes the establishment of the initial product baseline for all configuration items. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Full-Rate Production. Full-rate production is the second part of the production and deployment phase as defined and established by DoD Instruction 5000.02 after low rate initial production and following a successful full-rate production decision review. The system is produced at rate production and deployed to the field or fleet. This phase overlaps the operations and support phase since fielded systems are operated and supported (sustained) while full-rate production is ongoing. The production level contracted for once the production process has been stabilized. Ideally, it would coincide with the economic production rate. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Initial Operational Capability. In general, IOC is attained when some units or organizations in the force structure scheduled to receive a system have received it and have the ability to employ and maintain it. The specifics for any particular system IOC are defined in that system's capability development document and capability production document. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Initial Operational Test and Evaluation. Initial operational test and evaluation is a dedicated Operational Test and Evaluation conducted on production, or production representative articles, to determine whether systems are operationally effective and suitable to support a Full-Rate Production decision. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Low-Rate Initial Production. Low-rate initial production is the first part of the production and deployment phase and is intended to result in completion of manufacturing development in order to ensure adequate and efficient manufacturing capability and to produce the minimum quantity necessary to provide production or production-representative articles for Initial Operational Test and Evaluation (IOT&E); establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to Full-Rate Production (FRP) upon successful completion of operational (and live-fire, where applicable) testing. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Operational Effectiveness. Operational effectiveness is the measure of the overall ability of a system to accomplish a mission when used by personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, supportability, survivability, vulnerability, and threat. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Operational Requirements Document. Operational requirements document was replaced by the capability development document. The operational requirements document described the overall requirements for one system, how it interacts with other systems, and systems performance goals. (Source: Defense Acquisition University ACQuipedia website [<https://www.dau.mil/acquipedia>] and AcqNotes website [<http://acqnotes.com>])

Operational Suitability. Operational suitability is the degree to which a system can be placed and sustained satisfactorily in field use with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, habitability, manpower, logistics supportability, natural environmental effects and impacts, documentation, and training requirements. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Operational Test and Evaluation. Operational test and evaluation refers to the field test, under realistic conditions, of any item (or key component) of weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of the weapons, equipment, or munitions for use in combat by typical military users; and the evaluation of the results of such tests. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Program Deviation Report. Program deviation reports describe acquisition program baseline deviations (also called “breaches”) to the Defense Acquisition Executive and Component Acquisition Executives. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Program Executive Officer (PEO). The program executive officer is a military or civilian official who has responsibility for acquisition category I and IA and sensitive classified programs, or for any other program determined by the component acquisition executive to require dedicated executive management. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Program Manager. The program manager is a designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user’s operational needs. The program manager shall be accountable for credible cost, schedule, and performance reporting to the milestone decision authority. (Source: Defense Acquisition University Glossary, 16th Edition September 2015)

Technical Evaluation. Technical evaluation is the study, investigation, or test and evaluation by a developing agency to determine the technical suitability of materiel, equipment, or a system, for use in the Military Services. The Navy uses technical evaluation as part of developmental testing. (Source: Defense Acquisition University Glossary, 16th Edition September 2015 and Secretary of the Navy Manual (SECNAV M) 5000.2, “Department of the Navy Acquisition and Capabilities Guidebook,” May 9, 2012)

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