DEPARTMENT OF DEFENSE
Developmental Test and Evaluation

FY 2014 Annual Report

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Developmental Test and Evaluation

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Department of Defense Developmental Test and Evaluation FY 2014 Annual Report

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1 EXECUTIVE SUMMARY

The Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)) submits this Annual Report for Fiscal Year (FY) 2014 in response to section 139b of Title 10, United States Code (U.S.C.), and section 102(b) of Public Law 111-23, as amended. This report addresses activities related to the Major Defense Acquisition Programs (MDAPs) including the following:

- A discussion of the extent to which MDAPs are fulfilling the objectives of their developmental test and evaluation (DT&E) plans.
- A discussion of the waivers of and deviations from requirements in the Test and Evaluation Master Plans (TEMPs) and other testing requirements that occurred during the preceding year with respect to such programs, any concerns raised by such waivers or deviations, and the actions that have been taken or are planned to be taken to address such concerns.
- An assessment of the organization and capabilities of the Department of Defense (DoD) for DT&E with respect to such programs.
- Any comments on such report that the Secretary of Defense considers appropriate.

This report includes a separate section that covers the activities of the DoD Test Resource Management Center (TRMC) during FY 2014 and a separate section that addresses the adequacy of resources available to the DASD(DT&E) and the Lead DT&E Organizations of the Military Departments to carry out the responsibilities prescribed in law.

This report provides an assessment of the test and evaluation (T&E) workforce and also highlights the engagement activities and assessments of 40 programs (MDAPs, Major Automated Information System (MAIS) programs, and special interest programs designated by the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)). These selected programs reached significant milestones or had significant DT&E activities in FY 2014.

1.1 Developmental Test and Evaluation

In FY 2014, Shift Left continued to be a major DASD(DT&E) initiative. The initiative is changing the paradigm and bringing critical T&E activities earlier in the acquisition life cycle. Shift Left is about improving DT&E to enable programs to find and fix problems early during development when fixes are more effective, more efficient, and less costly. The DASD(DT&E) objective for Shift Left is to help find and resolve issues early to assist programs in achieving the objectives of Better Buying Power (BBP) and to ensure that a development problem does not become a production problem or a Warfighter problem. DASD(DT&E) continued to assist programs in developing and executing more robust DT&E activities that provide decision makers with the right information at the right time. These DT&E activities improve the knowledge and understanding of cybersecurity, interoperability, reliability, and system performance.

In FY 2014, DASD(DT&E) continued to mature the cybersecurity DT&E process to leverage new acquisition and cybersecurity policy and guidance. The cybersecurity DT&E process provides the Chief Developmental Tester and T&E community with a set of recommended developmental

cybersecurity T&E objectives to consider when planning and assessing a system and outlines the procedures necessary to gather test data for a DASD(DT&E) program assessment supporting a major decision. The guidance will be included in the next update of the Defense Acquisition Guidebook (DAG).

In FY 2014, DASD(DT&E) continued to assist the program offices in developing the TEMP (with special attention given to the Milestone (MS) A and MS B TEMP) and also in developing the Developmental Evaluation Framework (DEF) that is included in the TEMP. The DEF serves as a T&E road map and is used to support sound acquisition program decision making. It shows the correlation/mapping between test events, key resources, and the decision supported. DASD(DT&E) is briefing the DoD Components on the specifics of the framework, including its utility and importance, and solicited their support. To increase understanding and expedite adoption of the DEF, DASD(DT&E) formed a core team to assist the program offices in developing the DEF. Guidance on the DEF will be included in the next update of the DAG.

Of the 40 programs assessed in this report, only the Key Management Infrastructure (KMI) program requested a deviation in FY 2014 from requirements in the TEMP because the program missed an Acquisition Program Baseline software release date. The program office has a revised release date and has been aggressive in addressing deficiencies.

As in the past, this report includes self-assessment reports provided to the DASD(DT&E) by DoD Components with MDAPs, MAIS programs, and USD(AT&L)-designated special interest programs. The DoD Components provided updates to their previous reports regarding T&E involvement in early acquisition activities, T&E planning and execution, and T&E personnel.

1.2 Test and Evaluation Workforce

This report includes DoD Component-specific information on the designation of Chief Developmental Testers (T&E Key Leadership Positions (KLPs)) for MDAPs and MAIS programs, the use of Defense Acquisition Workforce Development Fund (DAWDF) Section 852 funding in support of the T&E workforce, and the adequacy of resources available to the Government organizations serving as Lead DT&E Organizations for the programs being assessed in this report.

DASD(DT&E) routinely monitors and examines the composition of the T&E workforce. As in previous years, DoD Components continue to rely on support contractors and developer T&E support. Non-acquisition-coded, and specifically non-T&E-coded, personnel are still the major contributors to T&E activities. A significant number of T&E resources remain outside this Defense Acquisition Workforce Improvement Act (DAWIA)-certified workforce. DASD(DT&E) is working with the DoD Components to ensure that all positions that should be coded acquisition (T&E acquisition career field) are properly coded.

An initiative of the USD(AT&L) BBP is to improve the professionalism of the total acquisition workforce by establishing higher standards for KLPs and stronger professional qualification requirements for all acquisition specialties. In FY 2014, the USD(AT&L) directed the T&E career field to finalize the process and materials for the initial KLP Qualification Board. The DASD(DT&E) convened the DoD's first KLP Qualification Board in December 2014 and provided

results to the candidates and USD(AT&L) leadership. The DASD(DT&E) also provided lessons learned for use by other career fields.

1.3 DoD Test Resource Management Center

The TRMC is responsible for oversight of the DoD test resources. This report provides descriptions of TRMC activities and initiatives during FY 2014. The T&E/Science and Technology (S&T) Program made significant progress executed across eight focus areas. An example is the development of the Hypersonic Aeropropulsion Clean Air Testbed (HAPCAT). HAPCAT technology advances efforts to reduce developmental and acquisition risks by enhancing the utility of ground facilities for testing hypersonic strike weapons. The Central Test and Evaluation Investment Program (CTEIP) again made significant progress in development and deployment of test infrastructure capabilities. Within CTEIP, advanced electronic warfare test capabilities were a major focus of analysis, investment, and capability upgrades. The Joint Mission Environment Test Capability (JMETC) continued to advance the infrastructure objectives of the "Testing in a Joint Environment Roadmap," expanding the DoD persistent capability for joint testing.

In FY 2014, the TRMC initiated two pilot projects, the Joint Strike Fighter Knowledge Management (KM) project and the Efficient Data Reduction for T&E project, to help develop the technologies and processes needed for a T&E enterprise approach to KM. These projects will culminate in the development of a KM investment road map that captures the concepts, requirements, technologies, methodologies, and architecture needed for such a T&E enterprise approach.

Test range sustainability has grown in importance with the emphasis on renewable energy projects on or near the ranges. The proliferation of these projects and the support they receive from other departments within the Federal Government increase the threat that these projects pose to the Nation's test infrastructure. In fact, the biennial T&E encroachment survey conducted by the TRMC revealed that energy projects and spectrum are the two leading encroachment issues for the test ranges.

The TRMC continues to develop required T&E infrastructure improvement solutions and to focus on cybersecurity test capability with continued development of the National Cyber Range (NCR). In FY 2014, the NCR supported 22 events for MDAPs, training, and operational exercises. In addition, the TRMC is coordinating with the Office of the Secretary of Defense (OSD) and Service T&E and S&T executives to develop the most effective processes for jointly reviewing proposed T&E and S&T infrastructure investments to support cybersecurity T&E.

In FY 2014, the TRMC continued to further its national leadership role in science, technology, engineering, and mathematics (STEM) initiatives for the T&E community through a comprehensive internship program. The TRMC worked with DASD(DT&E) to review draft TEMPs for nearly 40 defense acquisition programs and assess the adequacy of planned test resources.

The TRMC initiated a 20-month study of current and emerging DoD autonomous systems T&E requirements designed to inform an infrastructure investment strategy to develop adequate autonomy T&E capabilities. Results of this autonomy study will guide the 2016 Strategic Plan to align T&E infrastructure to meet future requirements for formal testing of autonomous systems. Additionally,

as required by congressional direction, the TRMC provided the House Armed Services Committee with a briefing on T&E capabilities to support identification and mitigation of electromagnetic pulse and high-power microwave vulnerabilities to the Department.

1.4 Adequacy of Resources

In FY 2014, the Office of the DASD(DT&E) has a staffing level of 18 Government personnel (organic, detailees) with additional contractor support. The senior executive service (SES) Principal Deputy position was filled. Working within available resources, DASD(DT&E) focuses its activities on congressionally mandated MDAPs, with additional support to MAIS and special interest programs as designated by the USD(AT&L). DASD(DT&E) also devotes appropriate resources to mandated support of T&E acquisition workforce development.

In FY 2014, DASD(DT&E) continued the process to assess the adequacy of resources available to the Lead DT&E Organizations to carry out the responsibilities prescribed in section 139b of Title 10, U.S.C. DASD(DT&E) assessed information on the designation of Lead DT&E Organizations for 29 programs, the T&E expertise and capabilities provided by these Lead DT&E Organizations, and funding to support DT&E activities.

2 DASD(DT&E) ACTIVITIES

2.1 Policy and Guidance Summary

DASD(DT&E) continued efforts to improve policy and guidance in support of major DoD weapon systems acquisition and to provide advocacy for, oversight of, and guidance to elements of the acquisition workforce responsible for DT&E.

2.2 T&E Acquisition Workforce Development

The DASD(DT&E) serves as the functional leader for the T&E career field. In this capacity, the DASD(DT&E) role is to establish, oversee, and maintain education, training, and experience requirements including competencies and certification standards, the T&E position category description (PCD), and the T&E content of Defense Acquisition University (DAU) courses as current, technically accurate, and consistent with DoD acquisition policy.

During FY 2014, DASD(DT&E), the DAU T&E Performance Learning Director, and T&E course managers conducted an annual review of the T&E curriculum. The review resulted in minor updates to the T&E PCD. The T&E Functional Integrated Product Team (FIPT) also reviewed and updated the T&E education standard for FY 2015.

DASD(DT&E) previously developed an FY 2013 to FY 2015 road map to assist in T&E workforce development through annual improvement blocks. Previous annual reports described achievements toward meeting the objectives of those annual improvement blocks. As part of the annual curriculum review, DASD(DT&E) generated an FY 2015 to FY 2017 road map to document improvement blocks for FY 2015 and beyond. The goal is to continuously improve the curriculum so that T&E professionals are prepared and capable of performing their critical roles throughout the acquisition life cycle. This road map will strengthen the organic T&E capability and will be reviewed annually and updated as required. Figure 2-1 depicts the FY 2015 to FY 2017 road map.

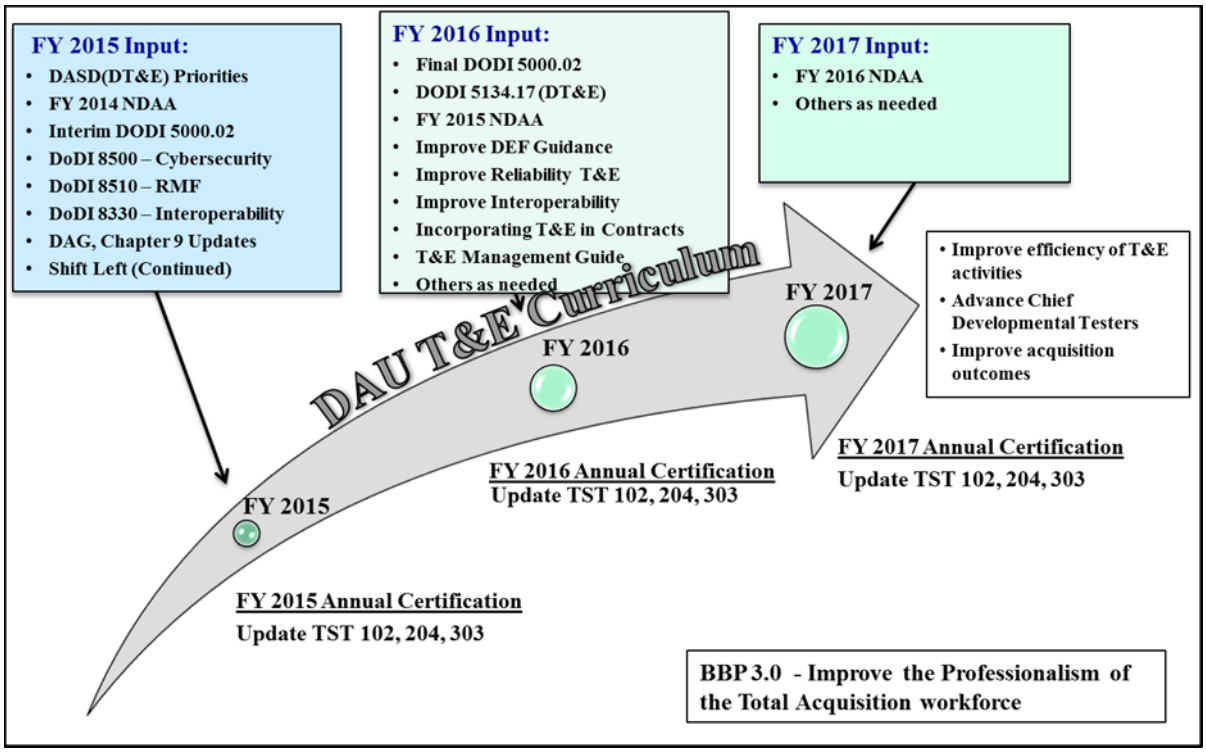


Figure 2-1. DASD(DT&E) FY 2015 to FY 2017 T&E Workforce Development Road Map

2.2.1 Core T&E Certification

Background. The DASD(DT&E) certified the FY 2015 T&E core curriculum on June 2, 2014. The review ensured that the T&E workforce development road map is moving forward, with emphasis on implementation of the updated courses (TST 102, TST 204, and TST 303) to address changes in the Interim DoD Instruction (DoDI) 5000.02, "Operation of the Defense Acquisition System"; DoDI 8500.01, "Cybersecurity"; DoDI 8510.01, "Risk Management Framework (RMF) for DoD Information Technology (IT)"; and DoDI 8330.01, "Interoperability of Information Technology (IT), Including National Security Systems (NSS)." The review also recognized the need for additional functional training courses for T&E certification to increase the breadth of knowledge for the Chief Developmental Tester. Table 2-1 shows key updates to the FY 2015 T&E career field functional training.

Table 2-1. Updates to the T&E Career Field Functional Training

Level I	Level II	Level III
Moved to Level II: CLE 035 Introduction to Probability and Statistics	Added: CLE 030 Integrated Testing CLE 035 Introduction to Probability and Statistics CLM 013 Work-Breakdown Structure CLM 016 Cost Estimating Overview	Added: CLV 016 Introduction to Earned Value Management CLB 008 Program Execution

Next Steps. DASD(DT&E) will continue to monitor and annually review the curriculum in accordance with the functional leader responsibilities assigned in DoDI 5000.66, "Operation of the Defense Acquisition, Technology, and Logistics Workforce Education, Training, and Career Development Program." DASD(DT&E) will continue to implement the DASD(DT&E) road map for the T&E workforce (see Figure 2-1).

2.2.2 T&E Curriculum Updates

Background. DASD(DT&E), the DAU T&E Performance Learning Director, and T&E course managers annually conduct a full review of the T&E curriculum. Updates are made, as appropriate, to increase rigor within the courses, increase practical application exercises, and add emphasis on critical thinking within student exercises. Table 2-2 shows key updates to the FY 2015 T&E curriculum.

Table 2-2. Updates to the FY 2015 T&E Curriculum

Course	Updates
TST 102	Expanded DT&E acquisition and data management Separated Cybersecurity and Interoperability into two lessons and expanded discussion
TST 204	Updated Cybersecurity T&E and Risk Management Framework Updated Evaluation Methodology and DEF Expanded the TEMP guidance to include a TEMP at MS A Expanded information on Test Resources
TST 303	Updated Cybersecurity T&E Updated Reliability Growth Planning Updated T&E Strategy, to include Evaluation Methodology and DEF Developed a lesson focused on T&E input to the program budget, program objective memorandum (POM), and integrated master schedule

Next Steps. DASD(DT&E) will continue to review the T&E curriculum on an annual basis in accordance with the responsibilities assigned in DoDI 5000.66. DASD(DT&E) will continue to implement the DASD(DT&E) road map (see Figure 2-1) and look for ways to improve the understanding of cybersecurity, interoperability, reliability, and associated T&E activities.

2.2.3 Support to AT&L Workforce Development

Background. The November 8, 2013, USD(AT&L) memorandum, "Key Leadership Positions and Qualification Criteria," initiated a requirement for KLP Qualification Boards to be established and convened in 2014. In FY 2014, as part of the implementation, the USD(AT&L) identified the T&E and engineering career fields to pilot the efforts. DASD(DT&E) and the Deputy Assistant Secretary of Defense for Systems Engineering initiated tiger teams and worked together to develop the process and materials for the initial KLP Qualification Boards. Subsequently, the USD(AT&L) directed the T&E career field to finalize the initial process and material as well as conduct the initial board.

This focus area is one of the initiatives of the USD(AT&L) BBP. The initiative is to improve the professionalism of the total acquisition workforce by establishing higher standards for KLPs and

stronger professional qualification requirements for all acquisition specialties. The USD(AT&L) BBP 3.0 White Paper states that the T&E field will lead the effort to develop the initial pilot of a professional qualification board and it is expected that the pilot will expand to cover a broader set of KLPs.

DASD(DT&E) convened the KLP Qualification Board in December 2014; provided results to the USD(AT&L) via the Director, Human Capital Initiatives; and presented lessons learned for use by other career fields.

Next Steps. DASD(DT&E) will continue to support the USD(AT&L) BBP initiative and will conduct follow-on boards annually to select and increase the pool of T&E professionals qualified to be assigned in a T&E KLP.

2.3 Program Engagement

DASD(DT&E) assists acquisition decision makers by providing an impartial evaluation of a program's status and risks prior to a key milestone decision. Program insight comes from early and continuous engagement with MDAPs, MAIS programs, and USD(AT&L)-designated special interest programs. In FY 2014, DASD(DT&E) advised 31 Defense Acquisition Boards (DABs), 28 Overarching Integrated Product Teams (OIPTs), and four Nunn-McCurdy reviews. DASD(DT&E) completed 12 DASD(DT&E) program assessments and engaged closely with the program offices to help develop 34 approvable TEMPs. DASD(DT&E) worked with the TRMC to assess the adequacy of resources available to the programs. In FY 2014, no TEMPs were disapproved by the DASD(DT&E).

In FY 2015, DASD(DT&E) will continue to engage with the programs to the level that available resources permit.

2.4 DASD(DT&E) Focus Areas

In FY 2014, DASD(DT&E) concentrated on the following areas:

- Shift Left Initiative
  - Cybersecurity DT&E Guidance
  - Interoperability DT&E Guidance
  - Reliability T&E Guidance
  - DEF
- Scientific Test and Analysis Techniques (STAT) in T&E
- DoDI 5000.02/DAG Update
- Acquisition Workforce Qualification Initiative (AWQI)
- Chief Developmental Tester

- Lead DT&E Organization
- Cost of DT&E
- Modeling and Simulation (M&S)
- DASD(DT&E) Program Assessments
- Tracking DT&E Recommendations

The following sections describe the findings and path ahead for each of these focus areas.

2.4.1 Shift Left Initiative

DASD(DT&E) continued to assist programs in developing and executing more robust DT&E activities that provide decision makers with the right information at the right time. These DT&E activities improve the knowledge and understanding of cybersecurity, interoperability, reliability, and system performance. The following subsections provide more details on each of these key efforts.

2.4.1.1 Cybersecurity DT&E Guidance

Background. As part of the Shift Left initiative, DASD(DT&E) updated the cybersecurity DT&E process to leverage new acquisition and cybersecurity policy and guidance. Figure 2-2 provides an overview of the cybersecurity DT&E process as mapped across the acquisition life cycle.

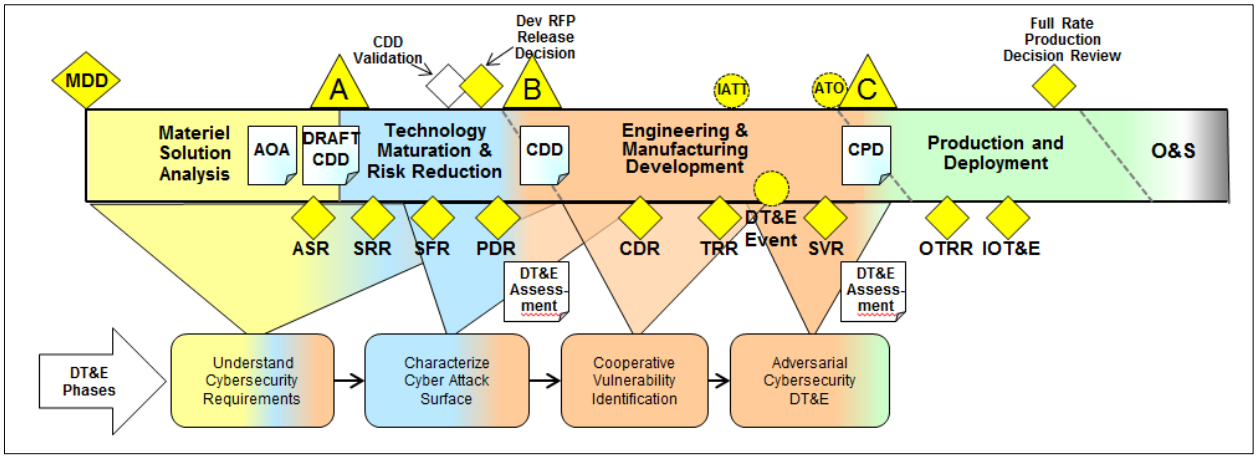


Figure 2-2. Cybersecurity DT&E Process Mapped Across the Acquisition Life Cycle

The cybersecurity DT&E process consists of four phases. This process leverages the Capability Development Document (CDD) for requirements and the Program Protection Plan to assist in identifying critical areas of vulnerability on which to focus cybersecurity DT&E. The goal is to improve the security of systems operating or exchanging data and to help programs and acquisition decision makers manage risks to operations in the cyberspace domain by identifying and resolving shortfalls early within the acquisition life cycle.

FY 2014 accomplishments include the following:

- DASD(DT&E) developed cybersecurity guidance for inclusion in the DAG (Chapter 9). The cybersecurity section provides the Chief Developmental Tester and test community with guidance regarding the planning, execution, and assessment of cybersecurity and for documenting cybersecurity DT&E activities within the program TEMP.
- DASD(DT&E), in collaboration with the Office of the DoD Chief Information Officer (CIO) and DAU, developed cybersecurity content for T&E courses. TST 204 was updated in FY 2014 and TST 102 and TST 303 were updated in the 1st quarter FY 2015 to include cybersecurity T&E lessons.
- DASD(DT&E) led an effort to exercise the first three phases of the cybersecurity testing process to analyze, assess, and validate their efficacy. The three phases were applied to the Triton program and resulted in a number of recommendations for changes to the process.

Next Steps. DASD(DT&E) will continue efforts to refine and implement a strategy for cybersecurity DT&E and to increase engagement in and guidance of early cybersecurity T&E activities. DASD(DT&E) will continue to partner with the TRMC to ensure that cybersecurity test capability is adequate and that cybersecurity T&E personnel are skilled and knowledgeable.

2.4.1.2 Interoperability DT&E Guidance

Background. In FY 2014, DASD(DT&E) worked with the DoD CIO to insert DT&E-related language into DoDI 8330.01, which was issued on May 21, 2014.

This new language outlines the DASD(DT&E) role and responsibilities related to interoperability certification. The DASD(DT&E) role, as part of TEMP approval, is to verify that adequate and executable levels of DT&E are planned and resourced in such a way that interoperability certification can be achieved in a timely manner. Furthermore, the language specifies that the DT&E program assessment at MS C will include an interoperability component. This interoperability assessment will verify that all interoperability-related developmental testing (DT) has been completed and no unresolved interoperability problems exist that can cause death or injury, or loss or damage to weapons systems, or decrease the combat readiness of the using organization.

Next Steps. As part of the Shift Left initiative, DASD(DT&E) has designated interoperability as a focus area for FY 2015. DASD(DT&E) will work with program offices to ensure that interoperability is addressed earlier in the development process. DASD(DT&E), leveraging the new DoDI 8330.01 language, will approve TEMPs only if adequate interoperability testing is planned and described.

2.4.1.3 Reliability T&E Guidance

Background. The TEMP specifies how reliability will be tested and evaluated during the acquisition phases. DoDI 5000.02 stresses the importance of including a reliability evaluation methodology within the TEMP to inform system design decisions, provide insight into sustainment costs, and inform estimates of operating and support costs for the system.

In FY 2014, to assist Chief Developmental Testers, DASD(DT&E), in coordination with the Director of Operational Test and Evaluation (DOT&E), updated the guidance on reliability T&E within the DAG. This guidance provides considerations for including reliability growth planning within the T&E planning, execution, and assessment phases and for documenting reliability within the TEMP. DASD(DT&E), through the annual T&E curriculum review, identified updates to DAU courses to impart an increased emphasis on reliability T&E planning, execution, and assessment. Reliability growth is monitored and reported throughout the acquisition process, and reliability growth progress is reported at acquisition reviews.

Next Steps. DASD(DT&E) will continue to conduct the annual T&E curriculum review and refine guidance on reliability T&E as required.

2.4.1.4 Developmental Evaluation Framework (DEF)

Background. The DEF is a key part of the Shift Left initiative. DoDI 5000.02 instructs program managers (PMs) to describe a developmental evaluation methodology in the TEMP starting at MS A that will provide essential information on programmatic and technical risks as well as information for major programmatic decisions. Starting at MS B, the TEMP will include a DEF that identifies key data that will contribute to assessing system performance, interoperability, cybersecurity, reliability, and maintainability. This DEF shows the correlation between decisions, information/data requirements, test events, and key resources.

In FY 2014, DASD(DT&E) developed implementation guidance for the DEF and briefed the DoD Components on the specifics of the framework, including its utility and importance, as well as solicited their support. To increase understanding and expedite adoption of the DEF, DASD(DT&E) formed a team to work directly with acquisition program offices. This team guides program T&E personnel as they link decision points, information requirements, and test events. The team's goal is to assist the acquisition program office in creating a test program's DEF that will provide decision makers with the right information at the right time.

Next Steps. DASD(DT&E) will continue to assist the Military Departments to enhance their understanding of the utility and importance of the DEF and increase its implementation.

2.4.2 Scientific Test and Analysis Techniques (STAT) in T&E

Background. DASD(DT&E) continues to support execution of the STAT in T&E Implementation Plan. The STAT in T&E Center of Excellence (COE), a key component of the implementation plan, continues to assist acquisition programs in the use of STAT to generate T&E efficiencies; provide rigorous, defensible T&E strategies and results; and improve the level of knowledge for the DT planning, execution, and analysis process.

In FY 2014, the STAT in T&E COE provided dedicated support to 27 programs, identified and submitted by the T&E Executives of the Military Departments:

- **Army (8)**
  - Armored Multi-Purpose Vehicle (AMPV)
  - Common Infrared Countermeasures (CIRCM)
  - Indirect Fire Protection Capability (IFPC) Increment 2 – Intercept
  - Integrated Air and Missile Defense (IAMD)
  - Next Generation Diagnostic System (NGDS)
  - Logistics Modernization Program (LMP) Increment 2
  - Stryker Engineering Change Proposal
  - Joint Light Tactical Vehicle (JLTV)
- **Department of the Navy (8)**
  - DDG-51 Flight III Guided Missile Destroyer
  - Distributed Common Ground System–Navy (DCGS-N) Increment 2
  - LHA(R) Amphibious Assault Ship (Flights 0 and 1)
  - Next Generation Enterprise Network (NGEN)
  - Ship-to-Shore Connector (SSC)
  - Next Generation Jammer (NGJ)
  - GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)
  - Multi-Mission Maritime Aircraft (P-8A Poseidon)
- **Air Force (11)**
  - Air and Space Operations Center–Weapon System (AOC-WS) Initiative 10.2
  - Air Force Integrated Personnel and Pay System (AF-IPPS)
  - B61 Mod 12 Life Extension
  - Combat Rescue Helicopter (CRH)
  - KC-46A Tanker Replacement
  - Space Fence
  - Space-Based Infrared System High Component (SBIRS High)
  - Intercontinental Ballistic Missile (ICBM) Fuze – W78/W88-1
  - Military Global Positioning System (GPS) User Equipment (MGUE)
  - GPS Generation III (GPS III)
  - Next Generation Operational Control System (OCX)

In FY 2014, STAT in T&E COE key contributions include the following near-term benefits:

- For the SSC, SBIRS High, and NGDS programs, the COE helped to clarify test strategies by adding more analytical rigor and improving the planning and analysis process.
- For the MGUE program, the COE developed an efficient test design, requiring a reduced number of tests, for phase zero testing.
- For the NGDS program, the COE also developed early operational test (OT) plans that reduced testing by 14 percent.

Next Steps. DASD(DT&E) will continue to support implementation of STAT in T&E. Because of uncertainties associated with future budgets, DASD(DT&E) is seeking alternate methods to fund the STAT in T&E COE. The STAT in T&E COE is an important resource for Chief Developmental Testers and Lead DT&E Organizations to use when developing more cost-efficient and effective DT&E programs. DASD(DT&E) views the STAT in T&E COE as a key contributor over the long term in improving acquisition outcomes. Without sufficient funding in future budgets, it will be necessary to disestablish the STAT in T&E COE.

2.4.3 DoDI 5000.02/Defense Acquisition Guidebook (DAG) Update

Background. In FY 2014, DASD(DT&E) updated Enclosure 4 (Developmental Test and Evaluation) in support of efforts to develop the interim DoDI 5000.02 (issued November 26, 2013) and the final DoDI 5000.02 (issued January 7, 2015). DASD(DT&E) also drafted updates and restructured Chapter 9 of the DAG to align with the interim DoDI 5000.02. DASD(DT&E) made significant updates to the sections on cybersecurity DT&E, interoperability DT&E, reliability T&E, the DEF, STAT in T&E, and the TEMP.

Next Steps. With the release of the new DoDI 5000.02 in January 2015, DASD(DT&E) will formalize the updates to Chapter 9 of the DAG in 2015.

2.4.4 Acquisition Workforce Qualification Initiative (AWQI)

Background. The goal of AWQI is to develop a set of measurable standards or tasks for each level of certification that is directly linked to an individual's T&E qualifications. This effort is intended to go beyond the requirements of DAWIA certification and links demonstrated proficiencies to appropriate experience. In FY 2013, the DASD(DT&E), as the T&E functional leader, was assigned the mission within AWQI to develop the professional qualification standards for T&E.

In FY 2014, DASD(DT&E), in coordination with the T&E FIPT and DAU, developed a draft set of T&E qualification standards that are mapped to the T&E competencies.

Next Steps. DASD(DT&E), in coordination with DAU, will continue to develop and refine the T&E qualification standards. In FY 2015, DASD(DT&E) will provide the DoD Components with the initial draft set of T&E qualification standards. The DoD Components will then be responsible for implementation. These on-the-job tools and processes are intended to assist in the development of individual qualification plans for all members of the T&E workforce.

2.4.5 Chief Developmental Tester

Background. Section 1706 of Title 10, U.S.C., establishes a goal to have a properly qualified Chief Developmental Tester for each MDAP and MAIS program. The November 8, 2013, USD(AT&L) memorandum, "Key Leadership Positions and Qualification Criteria," designated the Chief Developmental Tester as a mandatory KLP for each MDAP and MAIS program.

Section 3.3.2 of this report describes FY 2014 activities related to implementation of the Chief Developmental Tester.

Next Steps. DASD(DT&E) will continue to work on behalf of the USD(AT&L) to assist Component Acquisition Executives with implementation of the Chief Developmental Tester and report progress in future reports.

2.4.6 Lead DT&E Organization

Background. Section 139b(c) of Title 10, U.S.C., states that the Secretary of Defense shall require that each MDAP be supported by a governmental test agency, serving as the Lead DT&E Organization for the program.

Section 4.2 of this report describes FY 2014 activities related to implementation of the Lead DT&E Organization.

Next Steps. DASD(DT&E) will continue to report on Lead DT&E Organizations in future reports.

2.4.7 Cost of DT&E

Background. In FY 2014, DASD(DT&E) reviewed the FY 2015 POM and FY 2015 President's Budget submissions and provided the results to the Office of Cost Assessment and Program Evaluation (CAPE) and to the Services. Additionally, DASD(DT&E) and the TRMC coordinated with the Office of the Under Secretary of Defense (Comptroller) to update DoD 7000.14-R, "Department of Defense Financial Management Regulation (DoD FMR)," based on current requirements of the two organizations.

DASD(DT&E) reviewed budget submissions for T&E funding to ensure that the T&E resources, as identified in each TEMP, are adequately funded; programs are properly identifying funds for DT&E; DoD is not maintaining unwarranted test capabilities at private industry facilities, and unwarranted duplication does not exist among DoD Component assets; test facilities and capabilities required are adequately funded and supported; and new major test facilities are warranted and meet the needs of the DoD Components.

Next Steps. DASD(DT&E) will continue to review future budget submissions for adequacy of T&E funding. Future annual reports will document updates, as needed.

2.4.8 Modeling and Simulation (M&S)

Background. In FY 2014, DASD(DT&E), in coordination with the T&E Modeling and Simulation Working Group, conducted a major revision to the DAU continuous learning module (CLM) on M&S for T&E. DASD(DT&E) submitted the final draft of the CLM to DAU in December 2014.

Next Steps. DASD(DT&E) will continue to work with DAU to have the new CLM on the DAU portal by the 3rd quarter FY 2015. Future annual reports will document updates, as needed.

2.4.9 DASD(DT&E) Program Assessments

Background. In accordance with DoDI 5000.02, the DASD(DT&E) will provide the Milestone Decision Authority with a DASD(DT&E) program assessment at each milestone review or decision point. The DASD(DT&E) program assessment will be based on the DT&E to date and will address the adequacy of the program planning, the implications of DT results to date, and the risks to successfully meeting the goals of the remaining DT&E events in the program.

DASD(DT&E) published 12 DASD(DT&E) program assessments in FY 2014. Table 2-3 lists the one DASD(DT&E) program assessment that supported a request for proposal (RFP) authority to proceed (ATP) decision, Table 2-4 lists the eight DASD(DT&E) program assessments that supported production/procurement decisions, Table 2-5 lists the two DASD(DT&E) program assessments that supported Service operational test readiness reviews (OTRRs), and Table 2-6 lists the one DASD(DT&E) program assessment that supported a decision to continue DT&E.

Table 2-3. DASD(DT&E) Program Assessment Supporting an RFP ATP Decision (FY 2014)

Program	DT&E Recommendation
Defense Healthcare Management System Modernization (DHMSM) (August 2014)	Support RFP ATP Decision

Table 2-4. DASD(DT&E) Program Assessments Supporting Production/Procurement Decisions (FY 2014)

Program	DT&E Recommendation
Multi-Mission Maritime Aircraft (P-8A Poseidon) Baseline System (October 2013)	Support Full-Rate Production (FRP) Decision
Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155) (December 2013)	Support Increase Low-Rate Initial Production (LRIP) Quantities Decision
Ground/Air Task-Oriented Radar (G/ATOR) Block 1 (January 2014)	Support MS C Decision
Phased Array Tracking Radar to Intercept of Target (PATRIOT) (January 2014)	Support MS C Decision
Integrated Personnel and Pay System–Army (IPPS-A) Increment I (February 2014)	Support MS C Decision
Defense Agencies Initiative (DAI) Increment 2 (March 2014)	Support MS B Decision
Consolidated Afloat Networks and Enterprise Services (CANES) (June 2014)	Support Incremental Procurement Decision
Three-Dimensional Expeditionary Long-Range Radar (3DELRR) (June 2014)	Support MS B Decision

Table 2-5. DASD(DT&E) Program Assessments Supporting Service OTRRs (FY 2014)

Program	DT&E Recommendation
Excalibur lb Projectile (January 2014)	Proceed to Initial Operational Test and Evaluation (IOT&E)
Mobile Landing Platform (MLP) with Core Capability Set (CCS) (August 2014)	Proceed to IOT&E

Table 2-6. DASD(DT&E) Program Assessment Supporting a Decision to Continue DT&E (FY 2014)

Program	DT&E Recommendation
ZUMWALT-Class Destroyer (DDG 1000) (June 2014)	Continue DT&E, as planned

Next Steps. DASD(DT&E) will continue to provide DASD(DT&E) program assessments to improve the information provided to decision makers. Future annual reports will document updates, as needed.

2.4.10 Tracking DT&E Recommendations

Background. Tracking the extent to which program offices are adopting DT&E recommendations is one of the recommendations for executive action listed in the Government Accountability Office (GAO) Report GAO-10-774, "DEFENSE ACQUISITIONS: DOD Needs to Develop Performance Criteria to Gauge Impact of Reform Act Changes and Address Workforce Issues." In the DoD response to the GAO, DoD concurred in the recommendation.

In FY 2014, DASD(DT&E) continued to track acceptance of DT&E recommendations documented in Acquisition Decision Memorandums (ADMs), the minutes of Defense Acquisition Executive Summary (DAES) and OIPT meetings, DT&E annual reports, DASD(DT&E) program assessments, and TEMP approval and DASD(DT&E) memorandums.

In FY 2014, there were 14 DT&E recommendations and all were accepted by the program offices for action. Five recommendations are complete and nine are ongoing as of the end of FY 2014.

Next Steps. DASD(DT&E) will continue to track the extent to which program offices are adopting DT&E recommendations. No additional updates are needed in future reports.

3 DOD COMPONENT ASSESSMENTS

The following DoD Components provided self-assessments in support of the DASD(DT&E) annual report: Department of the Army (Army), Department of the Navy (DON), Department of the Air Force (Air Force), Defense Information Systems Agency (DISA), and Missile Defense Agency (MDA). For FY 2014, the DoD Components provided updates regarding T&E involvement in early acquisition activities, T&E planning and execution, and T&E personnel. In addition, the DoD Components provided details of the T&E workforce composition including all categories of T&E personnel and addressed the following specific areas of concerns from previous DASD(DT&E) annual reports:

- MDA – Since the FY 2011 annual report, DASD(DT&E) reported a concern regarding the realignment of the analysis and evaluation functions in the systems engineering organization. DASD(DT&E) recommended reviewing these positions for T&E coding. The alignment with the Engineering Directorate does not preclude the coding of the positions as T&E.
- Air Force – The DASD(DT&E) has previously recommended that the Air Force review the number of Level II coded positions and take actions to increase the certification level of a majority of those positions. DASD(DT&E) requested that the Air Force provide an update in FY 2014 on any efforts to increase the Level III workforce and toward implementation of T&E KLPs.

Summaries and assessments of the DoD Component responses are provided in the following sections.

The DoD Components continued to actively participate in DASD(DT&E)-led working groups, such as the T&E Working Group (TEWG), the T&E FIPT, the STAT in T&E Implementation Panel, and groups updating T&E policy and guidance. During FY 2014, these groups supported efforts to develop and implement the T&E KLP Joint Qualification Board, draft the DT&E section of DoDI 5000.02 and the DAG, and develop new and revised CLMs for T&E certification. Although the DoD Components actively participate in these groups, DASD(DT&E) would like to have more consistent attendance from MDA representatives.

3.1 Updates from DoD Component Assessments

The DoD Components reported on progress and improvements in T&E acquisition workforce certification rates across the T&E acquisition workforce. The DASD(DT&E) overall goal for certification is for 90 percent of the T&E acquisition workforce to be either certified or within the 24-month grace period for certification. Currently, the overall T&E acquisition workforce is exceeding this goal with 94 percent either certified or within the grace period. Certification rates for the T&E acquisition workforce increased for all DoD Components in FY 2014. The rates shown in Figure 3-1 are taken from the AT&L Workforce Data Mart as of the end of FY 2014.

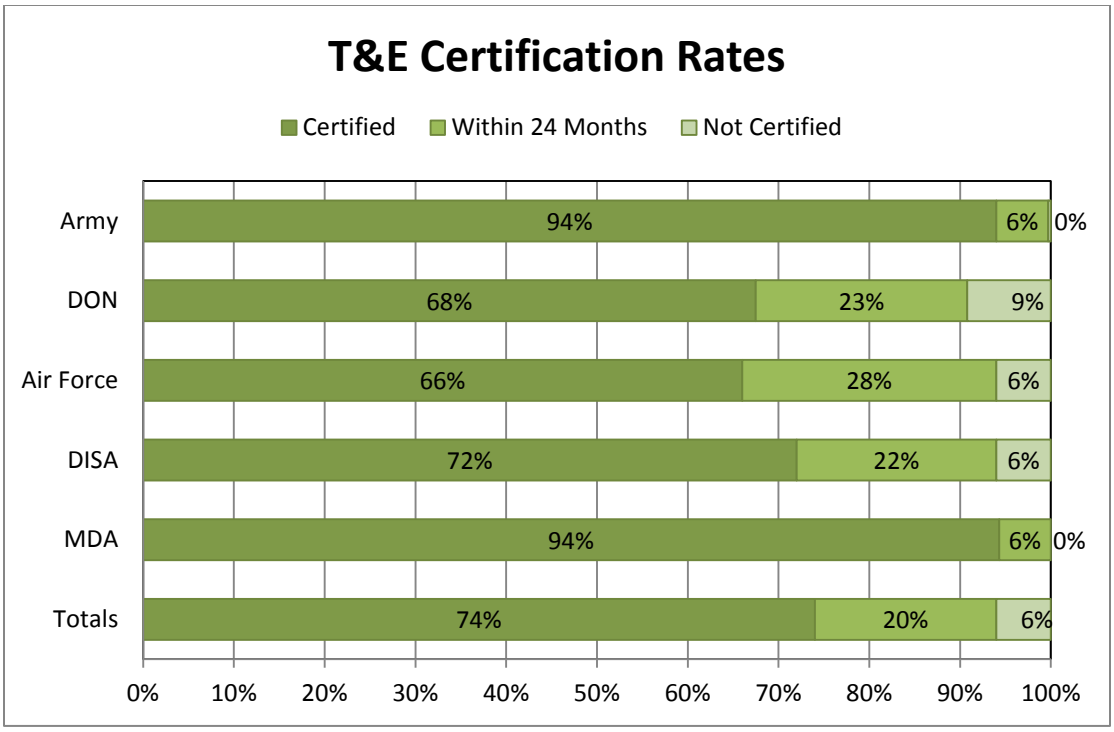


Figure 3-1. FY 2014 T&E Certification Rates

During FY 2014, the DASD(DT&E), as the functional leader for the T&E career field, revised the education requirements for certification in the T&E career field to address the DoD Components' concern regarding the requirement for a scientific or technical degree. The revised education requirement for each level of certification, which took effect on October 1, 2014, is as follows:

- Level I: Associate's degree in any discipline.
- Level II: Baccalaureate degree or higher (any field of study). A total of 24 semester hours or equivalent in technical or scientific courses such as mathematics (e.g., calculus, probability, statistics), physical sciences (e.g., chemistry, biology, physics), psychology, operations research/systems analysis, engineering, computer science, and information technology (IT).
- Level III: Baccalaureate or graduate degree in a technical or scientific field such as engineering, physics, chemistry, biology, mathematics, operations research, engineering management, or computer science.

This revised education requirement is expected to increase the number of T&E personnel entering the workforce at Level I while maintaining the higher standards for Level III T&E members.

Table 3-1 shows the composition of the T&E acquisition workforce by certification level. The table is based on data from the AT&L Workforce Data Mart and includes only the T&E-coded positions at the Military Departments, MDA, and DISA. With the exception of the Air Force, the majority of T&E positions are coded at Level III. In previous annual reports, the DASD(DT&E) stated the position that achieving Level III training and certification should be a goal for the DoD Components in the management of their T&E acquisition workforce positions.

The Air Force reported that the Air Force-wide T&E-coded position review, conducted in FY 2013, resulted in the recoding of 133 (4%) Air Force positions. These coding discrepancies were addressed throughout FY 2014 and corrective actions started. The resultant mixture of Level I, II, and III positions within the Air Force T&E portfolio coincides with the observed duty responsibilities required. The FY 2013 review ensured that the positions' coding meets DoD and Air Force guidance. Air Force guidance allows for the organizations themselves to ascertain the proper T&E duty level required for each position and only in specific cases (Development Positions, Critical Acquisition Positions (CAPs), KLPs) does the Air Force determine the level that should be assigned to a particular position. The Air Force will continue to review its positions and ensure that all positions primarily doing DT&E are T&E coded and are at an appropriate certification level that recognizes the value of the experience required, education and training requirements, organizational and program needs, and the complexity of the systems under test. Additionally, the Air Force will continue to encourage the T&E workforce to pursue the highest level of qualification possible regardless of position coding.

DASD(DT&E) remains concerned about the limited number of Level III positions in Air Force T&E, as DASD(DT&E) believes there are more positions requiring that level of training and experience than the number currently reflected in the Air Force unit manpower documents. In addition, this limited number could impact the ability to prepare Chief Developmental Testers for Air Force MDAPs and MAIS programs.

Table 3-1. T&E Acquisition Workforce Certification Levels

Level	Army	DON	Air Force	4th Estate*	Total
Level I	2%	11%	10%	2%	8%
Level II	38%	32%	75%	36%	48%
Level III	60%	57%	15%	62%	44%

*4th Estate refers to DoD organizations, other than the Military Services, having DoD manpower resources. Military personnel assigned to the 4th Estate organizations are tracked by the Services.

The DoD Components reported on their use of DAWDF Section 852 funding. Section 852 funds permit the DoD Components to hire new T&E personnel, provide training for new and existing personnel, develop training courses, provide incentives and awards for T&E, and facilitate outreach programs. DASD(DT&E) will work with the DoD Components to identify training gaps and develop proposals for Section 852 funding.

During FY 2014, all DoD Components provided detailed accounts of DAWDF funding used to advance the T&E workforce. The Army used Section 852 funds to support intern and journeyman hiring, career broadening and academic programs, and outreach programs. The DON used Section 852 funds to develop continuous learning and career certification classes for the T&E workforce,

strengthen educational partnerships, and establish recruitment incentives for CAPs. The Air Force used the funding to extend the reach of T&E hiring efforts through recruiting events and to update requisite training opportunities, including the T&E certificate program. DISA used Section 852 funds to deliver the T&E Methodology course and to bring several training courses on-site to enhance the skills of the T&E and overall acquisition workforce. MDA used Section 852 funds to support salaries and career-broadening initiatives. DASD(DT&E) will continue to encourage the DoD Components to use Section 852 funds to recruit and hire, develop and train, and recognize and retain their T&E workforce.

3.2 DASD(DT&E) Assessment of the DoD Component Reports

DASD(DT&E) assesses that the DoD Components have adequate T&E organization and capabilities to support DT&E activities.

3.2.1 Army Report

The Army report indicates that the overall state of personnel to conduct DT&E within the Army is adequate to support the needs of its acquisition community.

DT&E is critical to ensuring that the Army continues to reduce program life cycle cost, as well as demonstrate, refine, and modernize system performance within the test-fix-test philosophy of the developmental environment. A constant challenge in many Engineering and Manufacturing Development (EMD) phase efforts is keeping test time and costs at an affordable level. The acquisition community must continue to focus on effective and efficient testing during declining budgets. This effort requires synchronization with the requirements, acquisition, and testing communities early in program development planning efforts.

As the Army's primary developmental tester, the Army Test and Evaluation Command (ATEC) utilizes a forward-thinking approach to ensure that its workforce is prepared to meet the challenges of Army acquisition in the out-years. ATEC uses targeted recruitment, multidimensional development programs, and relevant retention programs while continuing to adjust its civilian and contractor workforce because of fiscal and resource challenges and projected workload. Additionally, ATEC continues to posture itself during these budgetary times by constantly reviewing and adjusting its structure, internal policies, and procedures to ensure that the structure and framework of the organization are aligned to accomplish mission needs. Efforts in FY 2014 include the following:

- Implementing the new ATEC Army Evaluation Center (AEC) organizational structure.
- Developing new internal policies to meet the changing needs of the Army and OSD requirements.
- Continuing to develop the AEC/Army Materiel Systems Analysis Activity Center for Reliability Growth (CRG). The CRG is funded by the Deputy Under Secretary of the Army for Test and Evaluation to develop and share lessons learned from reliability T&E, develop reliability tools and methodology, and contribute to reliability policy development.

- Reviewing ATEC's T&E infrastructure capabilities to ensure that only needed capabilities are retained and, where feasible, mothball low-usage capabilities.
- In support of interoperability, continuing to lead the Army standardization effort for DT within the Army and lead the DoD effort to develop tri-Service and North Atlantic Treaty Organization test procedures.

The Army utilizes its program executive offices (PEOs) in support of the DT&E mission. The Army provided details about PEO Soldier; Joint PEO Chemical and Biological Defense; PEO Combat Support and Combat Service Support; PEO Command, Control, and Communications–Tactical; PEO Missiles and Space; PEO Ammunition; PEO Ground Combat Systems; and PEO Intelligence, Electronic Warfare, and Sensors. These PEOs have T&E personnel to adequately support their programs. The T&E personnel are available either from organic T&E-coded positions or via matrixed personnel from the Research, Development, and Engineering Command's Research, Development, and Engineering Centers, as well as support contractors to meet the DT&E mission.

The Army also supports the Ronald Reagan Ballistic Missile Defense Test Site (Reagan Test Site) that provides defensive and offensive DT&E for the MDA integrated family of systems, ICBMs, boost-glide systems, and space T&E. The Army's military, civilian, and contractor workforce is sufficient to sustain moderate risk to the T&E mission.

The Army stated that sequestration and the resulting budget reductions have significantly impacted the T&E civilian workforce. The civilian hiring process is subjected to additional constraints that have resulted in a diminished candidate pool. ATEC is currently facing a turnover rate of 7.8 percent and anticipates this percentage to continue to increase as hiring pauses and freezes are in place in the out-years. Additionally, recognizing that retirements are a fact of life with an aging workforce, ATEC is developing a plan to "build the bench" and shape the workforce of the future. To accomplish this plan, ATEC will continue to utilize all flexibilities available, including work/life programs such as telework and compressed work schedule.

Contractor personnel supporting ATEC have also been severely impacted by recent budget cuts and overall reduction in workload. From FY 2012 through FY 2014, these cuts have equated to an overall 20 percent reduction in the supporting contractor workforce. With respect to future workload, the Army will continuously assess the contractor support required and adjust as necessary.

The continuing resolutions and the sequestration have had impacts on the testing of Army programs of record. These programs experienced delays and/or prolonged testing resulting in programmatic impacts on cost, schedule, performance, and integration.

The Army reported that future years' budget and manpower guidance reflects a significant decrease in resources available to support the ATEC mission; however, FY 2016–FY 2020 projected workload remains constant. ATEC is posturing itself to function within these resource constraints through plans to reduce testing capacities and, where feasible, mothball low-usage capabilities. Part of this planning effort requires investing today to meet the challenges of the future. Therefore, modernization efforts were funded in FY 2014 to help reduce future sustainability requirements and offset some potential capacity reductions, with the overall goal of reducing risks to future test programs.

3.2.1.1 DASD(DT&E) Assessment of the Army Report

Based upon the report submitted by the Army and subsequent discussions, the DASD(DT&E) assesses that the Army has adequate T&E organizations and capabilities to support the Army T&E mission.

The Army has identified Chief Developmental Testers for MDAPs and MAIS programs with some vacancies. The Army has coded only certain positions as KLPs and has aligned the KLPs to the programs in the project management offices rather than the product management offices. Overall, most of the people assigned have the required level of certification and are expected to meet the requirements described in the November 8, 2013, USD(AT&L) memorandum, "Key Leadership Positions and Qualification Criteria" (hereafter referred to as "the USD(AT&L) KLP memorandum").

DASD(DT&E) recommends that the Army continue its efforts to identify T&E KLPs to achieve the goal of having a Chief Developmental Tester assigned to each of its MDAPs and MAIS programs.

The Army Lead DT&E Organizations are all within ATEC AEC, whose mission includes both DT&E and operational test and evaluation (OT&E) activities. DASD(DT&E) continues to monitor the DT&E capabilities needed by AEC to perform the activities of a Lead DT&E Organization.

3.2.2 DON Report

The DON report indicates that its T&E workforce, facilities, processes, and practices are adequate to support DT&E activities for acquisition programs.

The DON T&E organizational structure outlined in the FY 2013 report has not changed significantly. Naval systems commands (SYSCOMs), PEOs, and Naval Warfare and System Centers (W/SCs) utilize a Competency Aligned Organization/Integrated Product Team (IPT) business model. SYSCOM commanders structure and staff their organizations to meet workload demands and provide required technical expertise.

In 2014, important organizational enhancements to the local T&E workforce occurred at various SYSCOMs. The Naval Sea Systems Command (NAVSEA) realigned and renamed its Research and Systems Engineering Competency as the Engineering and T&E Competency to more accurately describe its workforce. The Naval Air Systems Command (NAVAIR) established a Systems-of-Systems (SoS) Test Environment Architecture (STEA) Office to provide mission area experts to critical initiatives and support programs focused on operationally relevant live, virtual, and constructive (LVC) test environments. NAVAIR also continued to mature its Integrated Warfare Division that was established to support capabilities-based T&E, cybersecurity T&E, unmanned air systems common control systems T&E, and improved electronic warfare (EW) and mission-planning T&E. The Marine Corps Systems Command (MCSC) continued to mature its DT&E Division established in 2013 under the Deputy Commander, Systems Engineering, Interoperability, Architectures, and Technology providing support to both MCSC and PEO Land Systems programs.

In 2014, the Space and Naval Warfare Systems Command (SPAWAR) supported DoD/DON cybersecurity workforce T&E efforts to define key roles, tasks, duties, and responsibilities.

SPAWAR has defined the knowledge, skills, and abilities needed for T&E workforce improvements in response to the issuance of DoDI 8510.01. SPAWAR provided technical leads to participate in the DoD/DON CIO efforts to define the cyberspace/cybersecurity battlespace. These efforts directly impact the life cycle engineering, testing, certifying, and monitoring of cyberspace systems.

The DON T&E Enterprise Improvement Process (TEIP) continues to be used for strategic planning and continuous process improvement in the DON. The Deputy DON T&E Executive serves as the national lead for the T&E career field in the Office of the Assistant Secretary of the Navy for Research, Development, and Acquisition and is the designated TEIP lead. The TEIP lead is supported by a planning team from the DON T&E office (composed of Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation (DASN(RDT&E)) and Office of the Chief of Naval Operations (OPNAV) N842/N843 senior T&E personnel). Each TEIP thrust area is supported by an IPT (composed of DASN(RDT&E), N842/N843, SYSCOM, and field activity T&E leads and subject matter experts (SMEs)) that develops T&E improvement goals, objectives, plans, and projects. The TEIP provides a forum to improve T&E policy, process, workforce, and acquisition program support in the DON.

In 2014, the DON T&E Workforce Competency IPT continued efforts on a number of strategic goals and objectives related to the workforce for the following continuous improvement initiatives:

- DON T&E Training Course (Strategies for Effective and Efficient T&E)
- DON T&E Total Training Catalog
- DON T&E Awards Program
- DON T&E Workforce Metrics

The DON T&E works closely with the DASD(DT&E) to address T&E workforce competency improvement and DT&E performance initiatives for acquisition programs. DASN(RDT&E) and N842 senior T&E staff regularly participate in the OSD T&E FIPT and TEWG meetings to provide working-level support for T&E workforce and DT&E policy initiatives.

The DON reported that because of sequestration and resulting furloughs in 2013, NAVAIR and NAVSEA reported an overall minor impact to T&E support efforts for acquisition programs in 2014. Some residual impacts to programs occurred; however, critical test events for programs were rarely impacted. In mid-2014, T&E operations resumed at the required rate to meet program demands. MCSC noted some negative impacts because of budget reductions. The demand for T&E professionals as indicated on the Integrated Master Schedules showed a need for more than 60 personnel; however, fewer than 30 were assigned. The current budget climate has made it challenging for MCSC to hire and assign the appropriate number of personnel to conduct all the needed and planned work. Workload demand is being met, in some cases, by T&E workforce members working multiple programs.

In FY 2014, the DON reported that the following efforts were initiated at NAVSEA, NAVAIR, MCSC, and SPAWAR to address critical gaps and future T&E capability needs:

- NAVSEA added cybersecurity as an additional mission priority in its Strategic Business Plan. This mission priority will focus on specifications, standards, and interfaces through certification,

accreditation, and authorization. An integral component supporting this mission priority is establishing policies, processes, and standards to test and evaluate cybersecurity to reduce technical and acquisition risk. To support execution of this mission priority, NAVSEA is designing and developing a Naval Engineering Cybersecurity Training program.

- NAVSEA began working with the DoD Autonomy Community of Interest as a member of the Autonomy T&E and Verification and Validation (V&V) Working Group. The working group is examining needed T&E and V&V standards, best practices, and resources (including technical competencies and test ranges) required to enable testing of future autonomous and self-governing defense systems. NAVSEA's specific interest is in understanding the training and skills required to design test scenarios sufficient to demonstrate autonomous system capabilities.
- NAVAIR continues to experience shortages in EW and mission systems engineers at the journeyman level. Increased demand for threat/target testing support has resulted in an increased need for employees with operational experience. Identification and development of skills to support cyber and integrated warfighting capabilities T&E is a key focus across the entire organization. The NAVAIR College of T&E continues to be the primary source for providing training in these critical skill areas. Requirements for workforce cybersecurity T&E skills are addressed within NAVAIR through multiple approaches. NAVAIR is also actively engaged in targeted recruiting and obtaining journeyman-level experience for emerging expertise areas. Recruiting and hiring challenges include competition from other DoD Components as well as private industry. NAVAIR will be hosting a Cyber Warfare Detachment Technical Exchange Meeting in early 2015 as a multiday event to provide opportunities for multi-systems command, Service, and OSD discussions regarding challenges and approaches to integrated warfare capabilities, cybersecurity testing, cyber risk, and cyber workforce development.
- NAVAIR cybersecurity testers needed an environment in which to develop and hone their skills with cybersecurity testing tools. An environment named Cybersecurity T&E Enclave was established in the Point Mugu, California, Interoperability Test and Experimentation Complex facility and achieved information assurance (IA) approval for qualified users to install and operate cybersecurity testing tools for use against simulated target computer systems. This environment supports training on a wide variety of tools that are representative of threat capabilities.
- MCSC is working to enhance T&E capabilities in the areas of design of experiments, cybersecurity, reliability and maintainability, and live-fire T&E. Initiatives to enhance MCSC in these areas include training Chief Developmental Testers and Lead DT&E Organizations, funding W/SC SMEs in the support of programs, and contracting for industry SME support.
- SPAWAR Systems Center Atlantic (SSC LANT) is standing up a Consolidated Information Warfare Lab. The intent of the lab is to colocate several cyber engineering and test competencies to investigate the techniques and technologies that will be the basis of integrated IT and cybersecurity solutions of the future.
- SSC LANT initiated development of the Cyberspace Range Operations Center/Laboratory, which will enable a revolution in the Navy's ability to conduct cyber operations by providing a persistent cyber range with virtual and physical assets.

3.2.2.1 DASD(DT&E) Assessment of the DON Report

Based upon the report submitted by the DON and subsequent discussions, the DASD(DT&E) assesses that the DON has adequate T&E organizations and capabilities to support the DON T&E mission.

The DON has identified Chief Developmental Testers for MDAPs and MAIS programs with some vacancies. The DON identified which positions are coded T&E and the level of T&E certification. The few vacant positions have personnel under consideration for fill. Overall, positions are filled with personnel expected to be qualified and meet the requirements described in the USD(AT&L) KLP memorandum.

DASD(DT&E) recommends that the DON continue its efforts to identify T&E KLPs to achieve the goal of having a Chief Developmental Tester assigned to each of its MDAPs and MAIS programs.

The Navy Lead DT&E Organizations include program offices, warfare centers, and PEOs. DASD(DT&E) continues to monitor and review the ability of an organization that is part of a program office to perform the statutory responsibilities of a Lead DT&E Organization.

3.2.3 Air Force Report

The Air Force report indicates that overall, the Air Force T&E workforce and T&E infrastructure are adapting to support the needs and requirements of Air Force acquisition programs.

Sequestration and reduced budgets are having impacts with short- and long-term ramifications. The Air Force continues to refine its internal processes and organization with regard to revitalizing the T&E workforce and streamlining DT&E infrastructure.

The Air Force report described the activities, processes, changes, and initiatives that the Air Force has implemented or will implement to ensure greater efficiency and effectiveness in the Air Force T&E enterprise.

The Air Force report also described ongoing Air Force efforts to implement congressional direction to designate Chief Developmental Testers and Lead DT&E Organizations for MDAPs. The report also covered the implementation of KLP qualifications for the Chief Developmental Testers.

The Air Force Directorate of Test and Evaluation (AF/TE) continues its active participation in OSD-led working groups such as the TEWG, T&E FIPT, and DAG rewrite team. AF/TE made significant contributions to DAU by helping to write new courses on integrated testing and by teaching in local-area T&E sessions. Additionally, AF/TE participated in revamping the DAWIA T&E certification requirements by updating the list of needed experience and coursework.

In FY 2014, no major changes occurred for test execution, data analysis, evaluation, and reporting activities. T&E execution is aided by ensuring that all T&E assets (e.g., funding, personnel, test ranges and facilities, test articles) are available at the proper time and place as the test program unfolds. Air Force testers, both DT&E and OT&E, are integrating their test efforts. Integrated testing is the best strategy for increasing test efficiency and effectiveness.

In FY 2014, the focus on cybersecurity and interoperability in acquisition programs has increased as most Air Force and joint programs rely on access to network enterprises and must operate in a cyber warfare environment. Air Force test capabilities are adequate for most programs and key areas; however, cyber test capabilities need to expand as the demand for cyber testing has increased dramatically over recent years because of this focus.

The Air Force also increased focus on future programs such as the Long-Range Strike Bomber and technologies such as hypersonics and cyber systems. The demand for trained personnel to support these efforts will likewise increase. To support these efforts, the Air Force Research Laboratory (AFRL) recently established a new High-Speed Experimentation Branch at the Arnold Engineering Development Complex (AEDC), Tennessee. The merging of AEDC's skills and resources with those of AFRL in one centralized location will be advantageous and will bring about significant advances in hypersonic technology.

The Air Force expressed several concerns in its report, including the following concerns directly related to the T&E workforce:

- The availability of cyber and IT T&E certified practitioners.
- DoDI 5000.02, which separated DT&E and operational and live-fire T&E into separate enclosures.
- The OSD T&E Oversight List, which has been separated into three lists (USD(AT&L) list, DOT&E list, DASD(DT&E) list) that are incompatible with each other.
- Full population of the Chief Developmental Tester (KLP) positions may not be completed by the end of the FY 2015 OSD waiver timeframe because of availability of qualified candidates.
- The certification requirement for a STEM degree continues to impact the ability to attain T&E certified personnel in support of acquisition areas that are not specifically STEM focused.
- The sequestration and congressional debt ceilings and their potential impact on future research, development, test, and evaluation (RDT&E) resources and appropriations.

3.2.3.1 DASD(DT&E) Assessment of the Air Force Report

Based upon the report submitted by the Air Force, the DASD(DT&E) assesses that the Air Force has adequate T&E organizations and capabilities to support the Air Force T&E mission.

The Air Force has identified personnel assigned as the Chief Developmental Tester for its MDAPs and MAIS programs with a few vacancies. The Air Force noted the category and level of T&E certification required for each position. The DASD(DT&E) is concerned that the Air Force still has no Chief Developmental Tester positions coded as KLPs. In addition, several positions were noted to be coded in a career field other than T&E (i.e., engineering and program management), and assigned personnel do not have adequate T&E certification (Level III required). The Air Force has indicated in discussions that it is coding 20 T&E KLP positions. This coding will be a great step forward but will not cover all of the Air Force MDAPs and MAIS programs. DASD(DT&E) will continue to monitor the Air Force as it implements the USD(AT&L) KLP memorandum.

DASD(DT&E) recommends that the Air Force continue its efforts to identify T&E KLPs to achieve the goal of having a Chief Developmental Tester assigned to each of its MDAPs and MAIS programs.

DASD(T&E) will continue to work with the Air Force to address its concerns. For example, to address the concern about the requirement for T&E certification that requires a scientific or technical degree, DASD(DT&E) revised the education requirements for certification in the T&E career field. The revised education requirement has a different requirement for each level of certification. DoDI 5000.02, dated January 7, 2015, has separate enclosures for DT&E (Enclosure 4) and for operational and live-fire T&E (Enclosure 5), and the requirements for a Chief Developmental Tester and Lead DT&E Organization for each MDAP are per law.

The Air Force uses test wings, the Air Force Life Cycle Management Center (AFLCMC), and the Space and Missile Systems Center (SMC) to perform the Lead DT&E Organization duties. DASD(DT&E) continues to monitor the ability of these organizations to perform the statutory responsibilities of a Lead DT&E Organization.

3.2.4 DISA Report

The DISA report indicates that the overall state of personnel to conduct DT&E within DISA is adequate to support the needs of its acquisition community.

DISA provides, operates, and ensures command and control (C2), information sharing capabilities, and a globally accessible information infrastructure in direct support of joint Warfighters, national-level leaders, and other mission and coalition partners across the full spectrum of operations. DISA has a combined military, Federal civilian, and support contractor workforce of nearly 18,000 people.

The DISA T&E workforce is composed of engineers, computer scientists, IT specialists, and operations research professionals. For the DT&E workforce, the personnel are primarily spread across DISA program management offices (PMOs) with a portion of them assigned under the Agency's Office of the Test and Evaluation Executive (TEO).

The Joint Interoperability Test Command (JITC) reports directly to the DISA Test and Evaluation Directorate and is the DoD responsible agent for certifying interoperability of IT with joint, multinational, and/or interagency interoperability requirements. JITC performs OT&E and cybersecurity testing for DISA and other external customers. JITC also provides DT&E services to DISA programs when required; however, most DISA programs have test managers within their PMOs who are responsible for DT. DISA MAIS programs establish dedicated DT&E teams, allowing JITC to focus on being the independent test agent for conducting interoperability evaluations/certifications, OT&E, and cybersecurity assessments.

Within DISA, a broad range of IT exists that T&E must support. Cloud services, whether Government or public, are being integrated onto a single converged IT infrastructure. This integration necessitates more stringent interoperability evaluations. Likewise, mobility and unified capabilities as service programs are adding new services/capabilities to the distant end user, and cyber defense initiatives have resulted in a new DoD cyber C2 framework. These new concepts have

required DISA T&E to evolve its methods for conducting T&E without increasing resources or time to test.

DISA T&E continues to build out the DoD enterprise test environment, ensuring that test tools, reference implementations, and test infrastructure are in place to support rigorous T&E of applications and services. DISA T&E is evolving this environment to serve as a federated infrastructure that aids development and ensures that DISA rigorously tests, evaluates, and certifies enterprise solutions before they are fielded.

In FY 2014, DISA did not make organizational changes with respect to the T&E workforce, although TEO and JITC senior leaders did meet to consider ways to realign JITC to better support DoD T&E needs. The DoD budget reductions did not have a significant impact on the DISA T&E workforce.

DISA reported that the T&E workforce is adequate to support the mission. DISA currently has an appropriately sized workforce and personnel are sufficiently trained.

3.2.4.1 DASD(DT&E) Assessment of the DISA Report

Based upon the report submitted by DISA and subsequent discussions, the DASD(DT&E) assesses that DISA has adequate T&E organizations and capabilities to support the DISA T&E mission.

DISA has identified Chief Developmental Testers for its two MAIS programs and reported on the KLPs in its organization. The Chief Developmental Testers are occupying properly coded KLPs and have Level III certification. DASD(DT&E) will continue to work with DISA to ensure that by June 30, 2015, all current incumbents and workforce members filling future KLPs meet the requirements described in the USD(AT&L) KLP memorandum.

DISA did not provide information on the Lead DT&E Organization because DISA does not have any MDAPs. For MAIS programs, DISA PMOs are structured to effectively support DT&E efforts surrounding the program test activities.

3.2.5 MDA Report

MDA reported an optimum balance of T&E expertise in the workforce. During FY 2014, MDA maintained this balance through implementation of contracts and by taking full advantage of its career development program. Vacated MDA civilian T&E positions were reengineered and realigned to address high-priority requirements.

The MDA T&E program functionally aligns a highly technical and qualified workforce composed of employees from multiple sensor, shooter, and C2 program offices and various support functions across MDA to execute an increasingly complex ground test, flight test, war games, and exercises program. The MDA Director for Test serves as the Test Functional Manager (TFM) to coordinate all activities within the Ballistic Missile Defense System (BMDS) Test Functional Area (TFA). The MDA T&E workforce consists of civilian and military acquisition-coded T&E personnel, other career field civilian personnel that support T&E activities, MDA Engineering and Support Services

(MiDAESS) contractor support personnel, Federally Funded Research and Development Center (FFRDC) personnel, and University Affiliated Research Center (UARC) personnel.

All civilian, military, and contractor positions in the TFA are documented in the MDA manpower tool. The TFM determines Government manpower and support contractor requirements, approves all hiring action, executes a standardized Government civilian hiring process to recruit quality personnel in a timely manner, and ensures that support personnel matrixed to the TFA are meeting expectations.

In FY 2014, the MDA T&E workforce was impacted in three primary areas by budget reductions:

- MiDAESS: As a result of efficiencies gained through new contract awards, the TFA reduced MiDAESS support contractor costs by $16.2 million across active task orders, amounting to a 20 percent reduction in funding. Additionally, contractor staffing was reduced or eliminated through efficiencies and reallocation of work within the MiDAESS task order recompetes.
- Government Hiring Restrictions: Because of sequestration constraints during FY 2013, DoD imposed a civilian hiring freeze subject to mission-critical exemptions. Although sequestration did not directly impact FY 2014 operations, MDA extended civilian hiring limitations into FY 2014. MDA closely monitored and reviewed its civilian vacancies to ensure that the highest priority missions were appropriately staffed.
- Funding for Operations and Maintenance (O&M): The funding for O&M of MDA test resources and infrastructure is currently at a minimum sustainment level. The funds allocated to O&M are sufficient to perform the minimum maintenance to keep these assets available. Some preventive maintenance has been deferred, and no funding is available for unscheduled maintenance (unexpected failures) or technical refresh activities. This situation increases risk to test execution because of the greater potential of a required or mandatory asset being unavailable for a test event.

MDA has designated the Deputy Director for Test position as the T&E KLP and Chief Developmental Tester for the BMDS program. This senior executive service (SES) position is currently vacant and a hiring action is under way. This position should be filled in the 2nd quarter FY 2015. MDA reported that it will work closely with DASD(DT&E) to ensure that MDA workforce policies are fully consistent with USD(AT&L) requirements. DASD(DT&E) will follow up on this action during FY 2015.

As noted by DASD(DT&E) in previous reports, MDA's test analysis and evaluation functions continue to reside within the Directorate for Engineering rather than in the Directorate for Test. MDA plans to conduct an assessment in FY 2015 to determine the best alignment of these functions.

3.2.5.1 DASD(DT&E) Assessment of the MDA Report

Based upon the report submitted by MDA and subsequent discussions, the DASD(DT&E) assesses that MDA has adequate T&E organizations and capabilities to support the MDA T&E mission.

MDA still maintains test analysis and evaluation functions within the Directorate for Engineering. The Directorate for Engineering works collaboratively with the Directorate for Test to leverage

expertise in defining technical objectives and analyzing test results. DASD(DT&E) continues to recommend that these positions be coded T&E. MDA is working to complete the KLP assignment and DASD(DT&E) will monitor this action to ensure that the KLP meets the requirements described in the USD(AT&L) KLP memorandum by June 30, 2015.

The evaluation functions (planning, analysis, and results) are inherently part of the T&E process and identified in the acquisition T&E career field competency model. There are successful organizational models that place the evaluation function in Systems Engineering; however, those positions should be coded and aligned to the T&E career field. It is DASD(DT&E)'s opinion that the evaluation function is best suited separate from Systems Engineering where it can have broader value to inform multiple program processes. Wherever the evaluation positions are organizationally aligned, the function needs to be correctly coded as T&E.

MDA is the Lead DT&E Organization for the BMDS program. DASD(DT&E) plans to continue to monitor and review the ability of an organization that is part of a program office to perform the statutory responsibilities of a Lead DT&E Organization.

3.3 T&E Acquisition Workforce

3.3.1 T&E Workforce

In accordance with DoDI 5000.66, the DASD(DT&E) is the functional leader for the T&E career field in the acquisition workforce. This section provides a global perspective of the entire DoD T&E workforce, including DT, OT, Government, contractor, acquisition, and non-acquisition. The entire T&E workforce includes personnel supporting all aspects of the T&E mission beyond the acquisition-specific matter. These personnel provide critical expertise in support of the DT&E mission and the success of T&E across DoD but are not part of the acquisition workforce.

Over the last 6 years, the DASD(DT&E) has requested data on the entire T&E workforce. As noted in previous reports, limitations to the data exist because the DoD Components used manual methods rather than automated systems to collect the data and the data were not all-inclusive. Over the years, the DoD Components have improved their manual processes to provide DASD(DT&E) with the T&E workforce data necessary to conduct assessment.

The T&E workforce data categories are as follows:

- Military and Civilians
  - T&E Coded
  - Acquisition Coded Non-T&E
  - Non-Acquisition Coded

- Additional T&E Support
  - Support Contractors
  - FFRDC/UARC
  - Developer T&E Support

A subset of the entire T&E workforce is the acquisition T&E workforce. Minimal changes occurred in the acquisition T&E workforce over the past 3 years. Table 3-2 shows the acquisition T&E workforce comparison between FY 2013 and FY 2014. During FY 2014, the acquisition T&E workforce had an overall decrease of 11 T&E positions. The DON showed an increase in T&E-coded positions, whereas the Army, the Air Force, and the Fourth Estate showed a small decrease. T&E workforce data, extracted from the AT&L Workforce Data Mart system, are consistent with data provided in the DoD Component reports; however, some minor differences exist between the DoD Component data and the data in the AT&L Workforce Data Mart system. The average age of the T&E workforce has increased from 41.2 years old in FY 2013 to 42.3 in FY 2014.

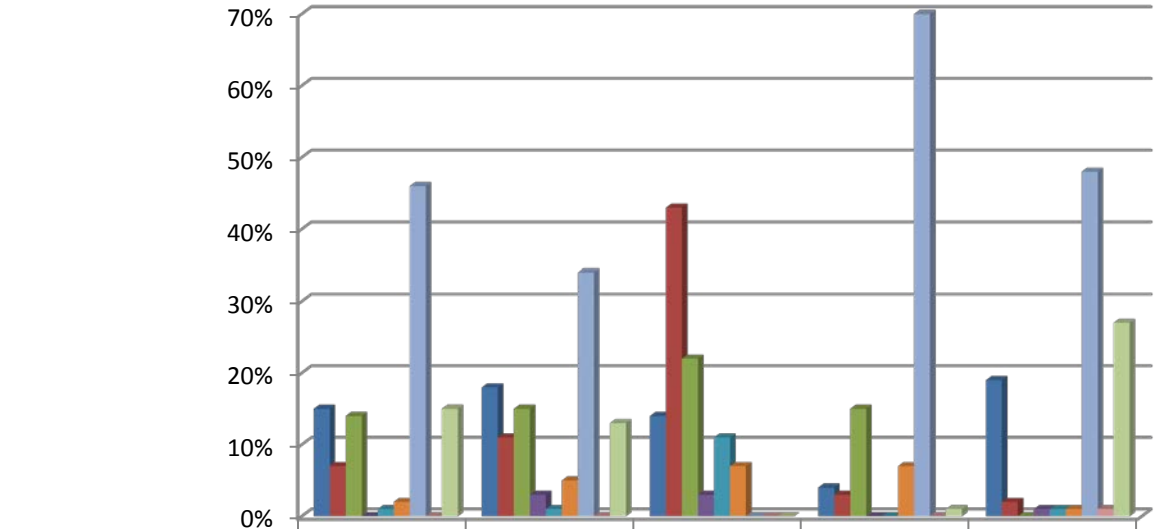
Table 3-2. Acquisition T&E Workforce Comparison, FY 2013 vs. FY 2014

DoD Component	FY 2013			FY 2014			Difference
	Civilian	Military	Total	Civilian	Military	Total	
Army	2,059	21	2,080	2,009	28	2,037	-43
DON	2,644	470	3,114	2,700	479	3,179	+65
Air Force	1,753	1,248	3,001	1,746	1,229	2,975	-26
Fourth Estate*	385		385	378		378	-7
TOTAL	6,841	1,739	8,580	6,833	1,736	8,569	-11

*Fourth Estate refers to DoD organizations, other than the Military Services, having DoD manpower resources. Military personnel assigned to the Fourth Estate organizations are tracked by the Services.

Figure 3-2 shows the composition of the T&E workforce based on the data provided in the FY 2014 DoD Component reports. Although the acquisition T&E workforce count has remained stable since FY 2012, it has increased by 15 percent since FY 2008.

DISA, MDA, and the Army have a high percentage of contractor support, with 70 percent, 48 percent, and 46 percent, respectively. Although DISA has a high percentage of contractor support, it manages its workforce effectively based on workload and enterprise T&E services. MDA has the highest percentage of developer T&E support at 27 percent. The Army highlighted its rigorous processes of determining inherently governmental responsibilities. The DON shows a relatively balanced workforce, which is attributed to the variation in SYSCOM organizations. The Air Force report did not provide data for support contractors, FFRDC/UARC, or developer T&E support. The Air Force report did not indicate a drastic change in organization from previous years in which the Air Force showed support contractors at 20 percent and developer T&E support at 12 percent. Although the workforce mix is different among the DoD Components, each reported that the overall state of personnel is adequate to support the needs of its T&E mission.



	Army	DON	Air Force	DISA	MDA
Civ T&E Coded	15%	18%	14%	4%	19%
Civ Acq Coded Non-T&E	7%	11%	43%	3%	2%
Civ Non Acq T&E	14%	15%	22%	15%	0%
Mil T&E Coded	0%	3%	3%	0%	1%
Mil Non T&E	1%	1%	11%	0%	1%
Mil Non Acq Coded	2%	5%	7%	7%	1%
Support Contr	46%	34%	0%	70%	48%
FFRDC/ UARC	0%	0%	0%	0%	1%
Developer T&E Support	15%	13%	0%	1%	27%

(0% indicates a number less than 1%)

Figure 3-2. FY 2014 T&E Personnel Breakdown

3.3.2 Key Leadership Positions (Chief Developmental Testers)

Background. In accordance with sections 139b and 1706 of Title 10, U.S.C., the Secretary of Defense shall require that each MDAP and MAIS program be supported by a Chief Developmental Tester. The Chief Developmental Tester is responsible for the following:

- Coordinating the planning, management, and oversight of all DT&E activities for the program.
- Maintaining insight into contractor activities under the program and overseeing the T&E activities of other participating Government activities under the program.
- Helping PMs make technically informed, objective judgments about contractor DT&E results under the program.

USD(AT&L) policy designates the Chief Developmental Tester as a mandatory KLP for each MDAP and MAIS program. The DoD Components continue to ensure that positions are being coded for a KLP/Chief Developmental Tester for each MDAP and MAIS program and that qualified individuals are assigned to Chief Developmental Tester positions.

Table 3-3 shows the total number of KLPs. In FY 2014, the primary focus was to support implementation of the USD(AT&L) KLP memorandum. The Services are working to identify their incumbent KLPs and ensure that those personnel will meet the requirements of the memorandum by the June 30, 2015, deadline.

In addition, the Services are implementing their overall strategy for designating T&E KLPs to comply with the USD(AT&L) KLP memorandum.

- The DON has identified and coded the majority of positions on its MDAPs and MAIS programs. The DON has indicated that the personnel assigned either are already qualified or will be qualified by the June 30, 2015, deadline.
- The Army has identified Chief Developmental Testers for MDAPs and MAIS programs with some vacancies but is only coding KLP positions on those at the project versus product level as determined by the Army Acquisition Executive. Therefore, not all Chief Developmental Testers of MDAPs and MAIS programs will be in KLP-designated positions. DASD(DT&E) will track progress and include any concerns in next year's report.
- The Air Force identified by name the Chief Developmental Testers for its MDAPs and MAIS programs. Noted vacancies exist and several individuals do not have T&E certification at any level. Many Chief Developmental Testers do not meet the KLP requirements or will not meet them by the June 30, 2015, deadline. The Air Force has not yet coded any of its Chief Developmental Tester positions as KLPs; however, the Air Force is working to code Chief Developmental Tester positions as KLPs. As stated in previous DT&E annual reports, in accordance with Air Force policy, the current Air Force KLPs are at the general officer and SES level and are not specifically assigned to MDAPs and MAIS programs as intended by the USD(AT&L) KLP memorandum. DASD(DT&E) will track progress and include any concerns in next year's report.
- MDA stated that it is in the process of filling the Deputy for Test position, which will be the T&E KLP for the BMDS program.
- DISA provided the names of its Chief Developmental Testers for its MAIS programs. Both individuals are qualified and in properly coded KLP positions.

Table 3-3 data are taken from the AT&L Workforce Data Mart as of the end of FY 2014. The DON continues to report a much higher number of KLPs than those reported by the Army and by the Air Force because of the proactive management approach and importance placed on filling these positions with highly qualified and experienced personnel. In many instances, although the Chief Developmental Testers have been identified, the positions are still not properly coded as T&E or designated as KLPs. The DoD Component reports identified more than 100 unique names for Chief Developmental Testers, but the AT&L Workforce Data Mart shows a significantly lower number of coded positions.

Table 3-3. T&E KLPs in FY 2014

	Fourth Estate	Army		DON		Air Force		Total
	Civilian	Civilian	Military	Civilian	Military	Civilian	Military	
T&E KLPs (All Positions)	3	9	0	43	0	6	4	65

Next Steps. DASD(DT&E) will continue to work with the DoD Components as they progress in designating Chief Developmental Testers as T&E KLPs for MDAPs and MAIS programs and tracking qualification of incumbent KLPs. DASD(DT&E) will update requirements and training curriculum to ensure that Chief Developmental Testers are properly qualified. Future annual reports will document progress, as needed.

4 ADDITIONAL REPORTING REQUIREMENTS

The FY 2013 National Defense Authorization Act (NDAA), signed on January 2, 2013, includes additional requirements for the DT&E annual report to Congress. The FY 2013 NDAA requires a separate section that addresses the adequacy of resources available to the DASD(DT&E) and the Lead DT&E Organizations of the Military Departments to carry out their responsibilities.

4.1 Adequacy of Resources for DASD(DT&E)

DASD(DT&E) resources addressed are the FY 2014 budget and associated staff allocated to carry out assigned responsibilities.

The FY 2014 budget, shown in Table 4-1, provides funding for the responsibilities prescribed by law and assigned in DoDI 5134.17, "Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E))."

Table 4-1. DASD(DT&E) FY 2014 Budget ($K)

Program Element	FY 2014 President's Budget	FY 2014 Appropriation
0605804D8Z	$15,451	$19,394

DASD(DT&E) executes its statutory responsibilities with a professional staff of 18 Government personnel. Table 4-2 provides the DASD(DT&E) Government workforce and contractor support. Organic staff of the DASD(DT&E) office consists of the DASD(DT&E), one SES Principal Deputy, one Military Staff director, six senior civilian (GS-15 level) Deputy Directors, and two civilian staff specialists. The DASD(DT&E) augments its Government staff with personnel detailed from the TRMC. These personnel include three Military Service members and four civilians to provide additional Government representation in program engagements. At the current staffing levels, DASD(DT&E) remains selective in its level of engagement with MDAPs, MAIS programs, and USD(AT&L)-designated special interest programs.

Table 4-2. DASD(DT&E) Workforce and Contractor Support

DASD(DT&E) Workforce Staffing (Government and Contractor)	Organic	TRMC Detailee	Total
Government Civilian	10	4	14
Military	1	3	4
Contractor/FFRDC Support	53	0	53
Total			71

4.2 Adequacy of Resources for DoD Component Lead DT&E Organizations

In accordance with section 139b of Title 10, U.S.C., Lead DT&E Organizations are responsible for the following:

- Providing technical expertise on T&E issues to the Chief Developmental Tester for the program.
- Conducting DT&E activities for the program, as directed by the Chief Developmental Tester.
- Assisting the Chief Developmental Tester in providing oversight of contractors under the program and in reaching technically informed, objective judgments about contractor DT&E results under the program.

Also in accordance with section 139b of Title 10, U.S.C., DASD(DT&E) monitors and reviews the DT&E activities of the MDAPs (including the activities of the Chief Developmental Testers and Lead DT&E Organizations).

4.2.1 Process to Assess the Adequacy of Resources for DoD Component Lead DT&E Organizations

Table 4-3 lists the Lead DT&E Organizations for 29 programs. To assess the adequacy of resources available to the Lead DT&E Organizations, DASD(DT&E) requested that the program offices address the following items:

- Provide the name of the Government agency serving as the Lead DT&E Organization.
- Describe the T&E expertise and capabilities (ranges, instrumentation, etc.) needed to support the program.
- Describe any gaps in the Lead DT&E Organization and any other participating test organizations supporting the Lead DT&E Organization.
- Provide any feedback regarding the Lead DT&E Organization and its future ability to support the program office.

DASD(DT&E) also requested that the Lead DT&E Organizations address the following items:

- Describe any DT&E activities that have been directed by the Chief Developmental Tester and how the Lead DT&E Organization conveys T&E issues to the Chief Developmental Tester.
- Describe the Lead DT&E Organization’s role in assisting the Chief Developmental Tester in providing oversight of contractors under the program and in reaching technically informed, objective judgments about contractor DT&E results.
- Provide details of any high-demand skills and expertise that the Lead DT&E Organization provides to programs and how the Lead DT&E Organization will meet future demands for these skills and expertise.

Table 4-3. List of Lead DT&E Organizations and Programs

Lead DT&E Organization	Program Name
ARMY	
ATEC AFED	Excalibur M982E1 Precision Engagement Projectiles
	Guided Multiple Launch Rocket System–Alternative Warhead (GMLRS-AW)
	M109 Family of Vehicles (FoV), Paladin Integrated Management (PIM) Self-Propelled Howitzer (SPH) and Carrier, Ammunition, Tracked (CAT) Vehicle
ATEC C4ISRED	Distributed Common Ground System–Army (DCGS-A) Increment 1
	Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155)
	Integrated Personnel and Pay System–Army (IPPS-A) Increment I
	Warfighter Information Network–Tactical (WIN-T) Increment 2
ATEC MSED	Armored Multi-Purpose Vehicle (AMPV)
NAVY	
NAWCAD HX-21	CH-53K Heavy-Lift Replacement Helicopter
NAWCAD VX-20	MQ-4C Triton Unmanned Aircraft System (UAS)
	Multi-Mission Maritime Aircraft (P-8A Poseidon)
NAWCAD VX-23	F-35 Lightning
NAWCWD VX-31	Air Intercept Missile-9X (AIM-9X) Block II
NSWC PHD	Common Aviation Command and Control System (CAC2S) Increment 1
	Littoral Combat Ship (LCS) and Mission Packages (MPs)
PEO IWS 7	Naval Integrated Fire Control–Counter Air (NIFC-CA)* (From-the-Sea (FTS) Capability)
PMA-298	NIFC-CA* (From-the-Air (FTA) Capability)
SSC PAC	Consolidated Afloat Networks and Enterprise Services (CANES)
	Mobile User Objective System (MUOS)
AIR FORCE	
96th Test Wing	Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)
	Joint Space Operations Center (JSpOC) Mission System (JMS)
	Small Diameter Bomb Increment II (SDB II)
412th Test Wing	F-22 Increment 3.2A Modernization
	F-35 Lightning
	KC-46A Tanker Modernization
	RQ-4B Global Hawk
AFLCMC/HNIZ	Defense Enterprise Accounting and Management System (DEAMS)
AFLCMC/WI	MQ-9 Reaper
SMC/GPEV	Global Positioning System (GPS) Enterprise
SMC/ISET	Space-Based Infrared System High Component (SBIRS High)
MDA	
MDA Director for Test	Ballistic Missile Defense System (BMDS)

*Technically, NIFC-CA is a project and not an MDAP.

4.2.2 Assessment of Adequacy of Resources for DoD Component Lead DT&E Organizations

The DoD Components reported that the resources for the Lead DT&E Organizations are adequate to support near-term priorities and identified some concerns. The DoD Components are implementing different constructs to meet the statutory requirement that each MDAP be supported by a governmental test agency, serving as Lead DT&E Organization for the program. The Army Lead DT&E Organizations are all within ATEC AEC, whose mission includes both DT&E and OT&E activities. The Navy Lead DT&E Organizations include program offices, warfare centers, and PEOs. The Air Force uses test wings, the Air Force Life Cycle Management Center (AFLCMC), and the Space and Missile Systems Center (SMC) to perform the Lead DT&E Organization duties. MDA is the Lead DT&E Organization for the BMDS program, and DISA did not provide information on the Lead DT&E Organization because DISA does not have any MDAPs.

Since the statutory requirement began in FY 2012, DASD(DT&E) has been reviewing the constructs annually and will report out in future reports as these models evolve and acquisition outcomes are realized. DASD(DT&E) continues to engage with the Lead DT&E Organizations, address their concerns, and monitor the DT&E capabilities needed by AEC and the ability of an organization that is part of a program office to perform the statutory responsibilities of a Lead DT&E Organization.

Tables 4-4 through 4-7 provide the assessments of the adequacy of resources for the Lead DT&E Organizations to carry out their responsibilities.

4.2.2.1 Army Lead DT&E Organizations

The Army Lead DT&E Organizations are all within ATEC AEC and include the Aviation-Fires Evaluation Directorate (AFED), the C4ISR Evaluation Directorate (C4ISRED), and the Mounted Systems Evaluation Directorate (MSED). The primary focus of AEC is to plan, support, conduct, and provide independent evaluations, assessments, and experiments in order to provide essential information to decision makers. The AEC mission includes both DT&E and OT&E activities. DASD(DT&E) continues to monitor the DT&E capabilities needed by AEC to perform the activities of a Lead DT&E Organization and will report out in future reports, if needed.

Table 4-4. Assessment of Adequacy of Resources for Army Lead DT&E Organizations

Lead DT&E Organization	Supported Programs	Assessment
ATEC AFED	Excalibur M982E1 Precision Engagement Projectiles	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC AFED are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: ATEC AFED identified no gaps. *PMO*: The PMO identified no gaps.
ATEC AFED	GMLRS-AW	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC AFED are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: ATEC AFED identified no gaps. *PMO*: The PMO identified no gaps.

Lead DT&E Organization	Supported Programs	Assessment
ATEC AFED	M109 FoV, PIM SPH and CAT Vehicle	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC AFED are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) will monitor the concerns of the PMO listed below. *Lead DT&E Organization*: ATEC AFED identified no gaps. *PMO*: The PM has the following concerns: • Losing qualified test site personnel when needed because of budget cuts. • The requirement to provide funding to ATEC for AEC contractor support. • The potential for systems to compete for the same test dates, test assets, and test sites, leading to potential schedule impacts.
ATEC C4ISRED	DCGS-A Increment 1	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC C4ISRED are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns listed below. *Lead DT&E Organization*: ATEC C4ISRED noted accreditation issues with instrumentation for DCGS-A and also issues related to security and access privileges of test personnel at some test locations. *PMO*: The PM has the following concerns: • Expertise in system-of-systems engineering specific to intelligence systems. • Expertise to write operationally flavored test cases and the Master Event List.
ATEC C4ISRED	HMS MP Radio (AN/PRC-155)	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC C4ISRED are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns noted below. *Lead DT&E Organization*: ATEC C4ISRED noted that the program office and ATEC HQ are located at Aberdeen Proving Ground (APG), Maryland, with some of the OSD stakeholders in the Washington, DC area. Maintaining a test capability at APG would enhance test oversight and reduce travel costs. *PMO*: The PM noted that the Electronic Proving Ground (EPG) is not colocated with the program office, making coordination for testing difficult.
ATEC C4ISRED	IPPS-A Increment I	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC C4ISRED are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns noted below. *Lead DT&E Organization*: ATEC C4ISRED noted that survivability resources are tasked heavily in support of the semiannual Network Integration Evaluation (NIE), which limits the availability of these resources for programs such as IPPS-A Increment I. *PMO*: The PM has a future concern that ATEC resources to support DT will not be sufficient because of concurrency in the IPPS-A release schedule.
ATEC C4ISRED	WIN-T Increment 2	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC C4ISRED are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns noted below. *Lead DT&E Organization*: ATEC C4ISRED noted that although ATEC provides cybersecurity evaluation expertise to the PMO, it does not have an internal test capability. This testing is normally conducted by the U.S. Army Research Laboratory Survivability/Lethality Analysis Directorate (ARL/SLAD).

Lead DT&E Organization	Supported Programs	Assessment
		PMO: The PM noted that ATEC provides adequate safety testing support; however, performance and reliability testing is a challenge because the program requires a brigade-sized test for DT.
ATEC MSED	AMPV	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for ATEC MSED are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) will monitor the concerns of the PMO listed below. *Lead DT&E Organization*: ATEC MSED identified no gaps. *PMO*: The PM has the following concerns: • Losing qualified test site personnel when needed because of budget cuts. • The requirement to provide funding to ATEC for AEC contractor support. • The potential for significant program impacts related to cost, schedule, and performance as a result of ATEC Policy Bulletin 13-13, "Guidance of Testing and Infrastructure Investments," November 22, 2013. The main concern is that the test projects that encompass a range of subtests will be assigned based on the commodity. When support requires expertise outside the assigned test center, SMEs from other ATEC test centers may be brought in, as needed, in lieu of sending the equipment to the other test center. • The potential for systems to compete for the same test dates, test assets, and test sites, leading to potential schedule impacts.

4.2.2.2 Navy Lead DT&E Organizations

The Navy Lead DT&E Organizations include program offices, warfare centers, and PEOs. For the programs reviewed this year, the Navy Lead DT&E Organizations include Naval Air Warfare Center, Aircraft Division (NAWCAD), Naval Rotary-Wing Aircraft Test and Evaluation Squadron Two One (HX-21); NAWCAD, Air Test and Evaluation Squadron Twenty (VX-20); NAWCAD, Air Test and Evaluation Squadron Twenty-Three (VX-23); Naval Air Warfare Center, Weapons Division (NAWCWD), Naval Air Test and Evaluation Squadron Three One (VX-31); Naval Surface Warfare Center (NSWC), Port Hueneme Division (PHD); PEO for Integrated Warfare Systems (IWS) 7; Air Warfare Mission Area/FTA Program Office (PMA-298); and Space and Naval Warfare Systems Command (SPAWAR) Systems Center Pacific (SSC PAC).

Table 4-5. Assessment of Adequacy of Resources for Navy Lead DT&E Organizations

Lead DT&E Organization	Supported Programs	Assessment
NAWCAD HX-21	CH-53K Heavy-Lift Replacement Helicopter	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NAWCAD HX-21 are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NAWCAD HX-21 identified no gaps. *PMO*: The PMO identified no gaps.
NAWCAD VX-20	MQ-4C Triton UAS	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NAWCAD VX-20 are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NAWCAD VX-20 identified no gaps. *PMO*: The PMO identified no gaps.

Lead DT&E Organization	Supported Programs	Assessment
NAWCAD VX-20	P-8A Poseidon	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NAWCAD VX-20 are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NAWCAD VX-20 identified no gaps. *PMO*: The PMO identified no gaps.
NAWCAD VX-23	F-35 Lightning	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NAWCAD VX-23 are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NAWCAD VX-23 identified no gaps. *PMO*: The PMO identified no gaps.
NAWCWD VX-31	AIM-9X Block II	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NAWCWD VX-31 are adequate to support near-term priorities. No gaps have been identified for the current programs. DASD(DT&E) will monitor the concerns of the PMO noted below. *Lead DT&E Organization*: NAWCWD VX-31 identified no gaps. *PMO*: The PMO noted that no gaps have been identified for the current test program. For the next major AIM-9X increment (AIM-9X Block III), concern exists with range space for the extended range testing requirements, as well as the possible related need in an updated telemetry for flight termination system capability. Concerns also include some signature and vulnerability data to support M&S updates for advanced threats and small targets of the future.
NSWC PHD	CAC2S Increment 1	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NSWC PHD are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NSWC PHD identified no gaps. *PMO*: The PMO identified no gaps.
NSWC PHD	LCS and MPs	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for NSWC PHD are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: NSWC PHD identified no gaps. *PMO*: The PMO identified no gaps.
PEO IWS 7*	NIFC-CA (FTS Capability)	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for PEO IWS 7 are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) plans to continue to monitor and review the ability of the organization in the program office to perform the necessary level of DT&E for this demonstration project. *Lead DT&E Organization*: PEO IWS 7 is the Test Lead and has identified no gaps. *PMO*: The PMO identified no gaps. *NIFC-CA is a project and not an MDAP. There is not a Lead DT&E Organization assigned for the NIFC-CA project. PEO IWS 7 is the systems engineering and test lead for NIFC-CA FTS capability.
PMA-298**	NIFC-CA (FTA Capability)	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for PMA-298 are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) plans to continue to monitor and review the ability of the organization in the program office to perform the necessary level of DT&E for this demonstration project. *Lead DT&E Organization*: PMA-298 is the Test Lead and has identified no

Lead DT&E Organization	Supported Programs	Assessment
		gaps. *PMO*: The PMO identified no gaps. **NIFC-CA is a project and not an MDAP. There is not a Lead DT&E Organization assigned for the NIFC-CA project. PMA-298 is the systems engineering and test lead for NIFC-CA FTA capability.
SSC PAC	CANES	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for SSC PAC are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: SSC PAC identified no gaps. *PMO*: The PMO identified no gaps.
SSC PAC	MUOS	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for SSC PAC are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: SSC PAC identified no gaps. *PMO*: The PMO identified no gaps.

4.2.2.3 Air Force Lead DT&E Organizations

The Air Force uses test wings, the Air Force Life Cycle Management Center (AFLCMC), and the Space and Missile Systems Center (SMC) to perform the Lead DT&E Organization duties. The Air Force Lead DT&E Organizations include the 96th Test Wing; 412th Test Wing; Enterprise Integration, AFLCMC (AFLCMC/HNIZ); Intelligence, Surveillance, and Reconnaissance and Special Operations Forces, AFLCMC (AFLCMC/WI); GPS Directorate's Systems Engineering Division, SMC (SMC/GPEV); and SBIRS Integration and Test Branch, SMC (SMC/ISET).

Table 4-6. Assessment of Adequacy of Resources for Air Force Lead DT&E Organizations

Lead DT&E Organization	Supported Programs	Assessment
96th Test Wing	FAB-T	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 96th Test Wing are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: The 96th Test Wing identified no gaps. *PMO*: The PMO identified no gaps.
96th Test Wing	JMS	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 96th Test Wing are adequate to support near-term priorities. Some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns of the PMO noted below. *Lead DT&E Organization*: The 96th Test Wing identified no gaps. *PMO*: The PMO identified gaps in resource availability at SPAWAR, the prime integrator, on the System Integration Test and Evaluation (SITE) team. An unfunded requirement has been submitted as part of the get-well plan. In the interim, FFRDC is currently utilized to fill the gap.
96th Test Wing	SDB II	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 96th Test Wing are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: The 96th Test Wing identified no gaps.

Lead DT&E Organization	Supported Programs	Assessment
		PMO: The PMO identified no gaps.
412th Test Wing	F-22 Increment 3.2A Modernization	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 412th Test Wing are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the concerns of the PMO noted below. *Lead DT&E Organization*: The 412th Test Wing identified no gaps. *PMO*: The PMO noted that the availability of high-density operational environments and the size of the F-22 DT fleet limit the ability at times to accommodate program slips and multiple projects requesting instrumented F-22 aircraft. Because of the multiple configurations of the F-22, the test program faces many challenges in trying to complete the testing of multiple configurations simultaneously. The size of the F-22 test fleet will continue to limit the number of test projects supported in 2015 and into early 2016.
412th Test Wing	F-35 Lightning	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 412th Test Wing are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: The 412th Test Wing identified no gaps. *PMO*: The PMO identified no gaps.
412th Test Wing	KC-46A Tanker Modernization	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 412th Test Wing are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: The 412th Test Wing identified no gaps. *PMO*: The PMO identified no gaps.
412th Test Wing	RQ-4B Global Hawk	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for the 412th Test Wing are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. DASD(DT&E) will monitor the PMO concerns below. *Lead DT&E Organization*: The 412th Test Wing identified no gaps. *PMO*: The PMO noted that the expertise needed for testing the Global Hawk is adequate; however, T&E costs remain a concern.
AFLCMC/ HNIZ	DEAMS	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for AFLCMC/ HNIZ are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: AFLCMC/HNIZ identified no gaps. *PMO*: The PMO identified no gaps.
AFLCMC/WI	MQ-9 Reaper	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for AFLCMC/WI are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: AFLCMC/WI identified no gaps. *PMO*: The PMO identified no gaps.
SMC/GPEV	GPS Enterprise	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for SMC/GPEV are adequate to support near-term priorities. No gaps have been identified. *Lead DT&E Organization*: SMC/GPEV identified no gaps. *PMO*: The PMO identified no gaps.
SMC/ISET	SBIRS High	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for SMC/ISET are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) will monitor the concerns of the PMO noted below.

Lead DT&E Organization	Supported Programs	Assessment
		Lead DT&E Organization: SMC/ISET identified no gaps. *PMO*: The PMO noted that not all personnel in the Lead DT&E Organization have the appropriate certifications or experience for their current positions. These personnel are taking training to obtain the required certifications or are acquiring waivers as necessary. Appropriate actions have been taken.

4.2.2.4 MDA Lead DT&E Organization

MDA is the Lead DT&E Organization for the BMDS program. MDA has assigned an organization, MDA/Director for Test, within the agency to act as the Lead DT&E Organization.

Table 4-7. Assessment of Adequacy of Resources for MDA Lead DT&E Organization

Lead DT&E Organization	Supported Program	Assessment
MDA/ Director for Test	BMDS	*DASD(DT&E)*: DASD(DT&E) assesses that the resources for MDA are adequate to support near-term priorities. No gaps have been identified. DASD(DT&E) plans to continue to monitor and review the ability of an organization that is part of a program office to perform the statutory responsibilities of a Lead DT&E Organization. *Lead DT&E Organization*: The MDA/Director for Test identified no gaps. *PMO*: The PMO identified no gaps.

5 DoD Test Resource Management Center

In FY 2014, the TRMC provided advocacy, oversight, and guidance for all matters pertaining to assessment of and strategic planning for DoD T&E resources. These responsibilities included annual certification of the Service and Defense Agency T&E budgets and development of the congressionally directed biennial Strategic Plan for DoD T&E Resources, hereafter referred to as "Strategic Plan." In addition, the TRMC oversees management of the Central Test and Evaluation Investment Program (CTEIP), the Test and Evaluation/Science and Technology (T&E/S&T) Program, the Joint Mission Environment Test Capability (JMETC) program, and the National Cyber Range (NCR).

5.1 Test and Evaluation Master Plan Review

The TRMC provided acquisition program TEMP assessments of the test resources required to complete T&E for nearly 40 defense acquisition programs in 2014. Reviews assessed the adequacy of test resources documented in the TEMP, including test infrastructure, distributed testing, interoperability, and cyberspace. Feedback through DASD(DT&E) to programs assisted in overcoming some test limitations and improving program awareness of all DoD test capabilities. In addition, information gleaned from TEMPs informs the overall knowledge of test infrastructure, capability shortfalls, and potential investments in test infrastructure by programs.

The TRMC identified several issues for further investigation including the following: the ability to support full-power jamming of GPS; test targets and threat systems' cost, availability, and fidelity in threat representations; and environmental factors limiting full-scope testing of some active acoustic systems. The TRMC has responded by initiating the 5th Generation Aerial Target joint service tiger team, continuing investments in threat-representative target technologies via S&T programs, and continued engagement with range sustainability stakeholders to monitor and help mitigate encroachment and environmental regulation impacts.

5.2 Near-Term Gaps

5.2.1 Strategic Plan

In FY 2014, the TRMC continued to execute the 2012 Strategic Plan and to monitor and reassess gaps to address emerging capability issues. The plan is produced biennially in response to section 196 of Title 10, U.S.C., enacted by section 231 of the Bob Stump NDAA for FY 2003, Public Law 107-314, and the TRMC's chartered mission to plan for and assess DoD T&E infrastructure. The plan provides a comprehensive review, analyzing test infrastructure for 16 key test capabilities/focus areas across the air, land, maritime, space, and cyberspace warfighting domains. This review also includes assessment of the investments and workforce necessary to sustain the infrastructure.

DoD T&E infrastructure is currently assessed as adequate to meet known immediate test requirements, with increasing risk in the out-years. Budget turmoil is a significant issue that strains the management and modernization of the Major Range and Test Facility Base (MRTFB). Similar to

FY 2013, the following list highlights the most pressing issues in the areas of infrastructure, workforce, and funding:

- Equipment obsolescence and deterioration.
- Proliferation of complex, emerging enemy threat systems.
- Increasing need for new test technologies and methodologies.
- Development of realistic and threat-representative distributed operational environments.
- A sustainable process for common, authoritative threat models and simulations for T&E.
- Issues surrounding spectrum reallocation.
- Encroachment, which remains a serious concern to frequency spectrum, air-, ground-, and sea-based testing.
- Recruiting, developing, and retaining a skilled workforce.
- Increasing demand for cyber and nuclear weapons effects T&E capabilities.
- Adequate funding, which is essential to operate, sustain, invest, and modernize T&E capabilities to be able to respond to the changing needs of the Department.

In addition to continuing execution of the 2012 Strategic Plan, the TRMC began drafting the 2014 Strategic Plan to provide a comprehensive review of the Department's T&E infrastructure and a future assessment of the T&E requirements for the Department beyond the 5-year budget horizon to at least the 10-year objectives. With the 2014 Strategic Plan, the TRMC has developed performance measures, providing a consistent methodology for measuring progress in resolving specific T&E objectives over time.

5.2.2 Common Development Environment (CDE)

Developing, testing, and fielding acquisition systems have become exponentially more complex and more expensive with the shift to joint Warfighter operations in a kinetic and cyber-contested environment. Acquisition systems must also support rapidly advancing capabilities, technology, and standards that drive ever-changing system interfaces and interoperability requirements. In December 2012, the TRMC completed a comprehensive review of the T&E infrastructure needed to support current and emerging acquisition requirements. As part of this review, interviews and survey responses from 26 Service PEOs and PMs led to the conclusion that a need exists for a Government-owned, interoperable, live, virtual, and constructive (LVC) environment for RDT&E that promotes standards and reuse to reduce overall costs across the acquisition life cycle. To address this need, the TRMC initiated in FY 2014, in conjunction with the Services, development of an initial CDE prototype capability that, once realized, acquisition programs can utilize to more efficiently deliver capabilities to the Warfighter. This LVC environment will be achieved through an enterprise approach that leverages and integrates existing investments.

5.2.3 T&E Enterprise Knowledge Management (KM)

The current KM capabilities and processes used to gain, collect, and analyze the information necessary to conduct acquisition assessments and evaluations are deficient. Embracing an enterprise approach to T&E KM and leveraging commercially proven big data analytic technologies can efficiently and continuously improve the knowledge base throughout the life cycle of a system. Improved analytical tools are needed to reduce the data and to analyze performance within these environments. T&E data must be shared and leveraged across programs to allow learning from the knowledge attained by others. In FY 2014, the TRMC initiated two pilot projects to help develop the technologies and processes needed for a T&E enterprise approach to KM. The Joint Strike Fighter KM project will ascertain how recent advancements in data mining, big data analytics, and cloud computing technologies can be applied to T&E datasets and data centers in support of complex DT and OT missions. The Efficient Data Reduction for T&E project will leverage historical data collected during in-theater operations to support continuous system improvement and provide valuable knowledge to a next-generation system's engineering requirements design phase. These efforts will culminate in the development of a KM investment road map that will capture the detailed concepts, requirements, technologies, methodologies, and architecture necessary for a T&E enterprise approach.

5.2.4 T&E of Autonomous Systems

Capabilities to formally test autonomous systems across all Services and domains need to be developed to support the integration of autonomy into warfighting systems. The TRMC provided language covering testing of autonomous systems for the S&T priorities portion of the FY 2016–FY 2020 Defense Planning Guidance. In collaboration with the Assistant Secretary of Defense for Research and Engineering, the TRMC is studying T&E standards, metrics, and methodologies for autonomous systems to create a consistent T&E framework for future testing of autonomous systems. The TRMC has also initiated a study to determine the T&E requirements of current and emerging autonomous systems and develop an investment strategy for the necessary test infrastructure. Results of this study will guide the 2016 Strategic Plan to align T&E infrastructure to meet future requirements for formal testing of autonomous systems.

5.2.5 Range Sustainability

Test range sustainability issues have evolved from environmental conservation matters such as endangered species protection to impacts from large renewable energy projects such as wind farm developments, electric transmission line placement, and massive solar farms or towers. In FY 2014, a growing group of projects required a detailed review and analyses by more than one Service and the oversight organizations within DoD, including the TRMC. The threat to test range capability has increased because of the proliferation of these developments and the support they receive from other departments within the Federal Government. The TRMC is an advocate for the Services in matters related to range sustainability and ensures that impacts to test capability because of sustainability issues are examined from not just a singular Service perspective, but from that of the DoD test community as a whole. For example, in FY 2014, the TRMC spent a tremendous amount of time in high-level negotiations on the SunZia project that proposes to place high-power electrical transmission lines across the Northern Extension Area of White Sands Missile Range (WSMR), New

Mexico, to transfer renewable energy from north-central New Mexico to load center in southern Arizona. The Director, TRMC funded the Massachusetts Institute of Technology Lincoln Laboratory (MIT-LL) to perform independent assessment of DoD's mission-related concerns. MIT-LL validated DoD's concerns and concluded that the transmission lines could present an obstruction to some low-altitude flight tests; in particular, tests involving threat-representative cruise missile target drones. The TRMC worked closely with the Army (and Navy programs that test at WSMR) to preserve some low-flight testing capability that is in danger of being obstructed by the proposed transmission lines.

The TRMC continues to protect test range capability by not only being an advocate for the test ranges but also by funding technology efforts to provide mitigation options and technological solutions. Great Bay Wind I Energy Project was found to result in an unacceptable risk to the national security of the United States. This project's proposed wind turbines, without effective mitigation, would significantly impair and degrade the Advanced Dynamic Aircraft Measurement System (ADAMS) located at Naval Air Station Patuxent River, Maryland. The TRMC is funding an MIT-LL study evaluating the most promising mitigation options to help preserve the capability while supporting the national initiative to expand the use of renewable energy.

In response to issues raised during the SunZia negotiations, the TRMC continues to conduct a Range Review study started in August 2014 that will be used to highlight critical capabilities that may be impacted by encroachment factors in the future. Since March 2013, the TRMC also completed 82 informal reviews of proposed energy infrastructure projects and served as the Department's functional expert on several teams working with developers to mitigate effects of developing energy infrastructure that is incompatible with testing infrastructure

In FY 2014, the TRMC, in conjunction with the Services and DISA, repeated a biennial T&E encroachment survey. The survey identifies issues that may impact T&E infrastructure. The survey revealed that energy and spectrum encroachment are the two issues with the greatest impact on T&E infrastructure. It should be noted that the TRMC has had an ongoing spectrum stewardship initiative to address this area of encroachment, which is described in section 5.7.1 of this report. The TRMC uses the results from the survey to ensure that the test ranges are adequately sustained, remaining viable for critical weapons systems testing despite the growing pressures of numerous and diverse encroachment factors. The TRMC worked with T&E Service representatives to update the survey and more accurately capture new issues, especially within the energy arena.

The TRMC participates heavily within the sustainability community and is a member of the Siting Clearinghouse and the Sustainable Ranges Initiative Organization. In addition, the TRMC continues its participation in two sustainability forums in which tribal, federal, regional, state, and local stakeholders collaborate on specific sustainability issues: the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) and the Western Regional Partnership (WRP). Both SERPPAS and WRP are composed of local government and civilian officials partnered with the DoD and other federal and tribal agencies to address regional issues of common concern, including encroachment affecting military controlled lands. These forums provide early insight into issues and interface with the Services, developers, and local and state governance to mitigate or avoid issues before they may impact a range.

Range encroachment is a growing problem that extends well beyond DoD installation boundaries. To face this challenge, the TRMC will continue to place more emphasis and resources on range sustainability.

5.3 Studies

5.3.1 Fifth-Generation Threat Requirements Study

Broad agreement exists within the weapon system community on the need for a representative threat capability to test against fifth-generation threat aircraft. The Department has had considerable difficulty in shaping the emulation capability requirements because of incomplete threat attribute data and inadequate trade-off analyses of required threat emulation fidelity, offensive system requirements, and cost considerations. The intelligence community has completed detailed engineering assessments on many aspects of fifth-generation fighter aircraft performance, signatures, and other capabilities. Using these assessments, the TRMC developed an analytical framework for identifying performance gaps in current threat emulation capabilities relevant to emerging fifth-generation aerial threats and completed a preliminary comparison of open-air range target assets and foreign aircraft threats.

The TRMC is leading an expedited effort to expand this analysis, in collaboration with the Services and DOT&E, and establish specific threat emulation requirements. This effort will also include an analysis of alternatives to provide the Department with an affordable investment strategy for both DT&E and OT&E.

5.3.2 Hypersonic Study

The FY 2013 NDAA called for a study on the ability of the national T&E infrastructure to effectively and efficiently mature hypersonic technologies for defense systems development in the short term and long term. It also called for a report (together with a plan) to the appropriate congressional committees on the requirements and proposed investments to meet DoD needs through 2030. These activities are ongoing and scheduled to be completed by March 2015. Based on initial findings, the TRMC and Assistant Secretary of Defense for Research and Engineering are collaborating on the submission of purposed investments for consideration in the FY 2016 Budget to address shortfalls in test capability for hypersonic system development.

5.3.3 High-Power Microwave (HPM)/Electromagnetic Interference Infrastructure Study

As required by House Report 1960 of the NDAA for FY 2014, the TRMC provided the House Armed Services Committee with a briefing on T&E capabilities to support identification and mitigation of electromagnetic pulse (EMP) and HPM vulnerabilities to the Department. The briefing identified existing capabilities to address EMP and HPM vulnerabilities, assessed the adequacy of the capabilities, and identified shortfalls in those capabilities. The TRMC found the test capability area to be robust, with the Services studying and developing an understanding of the threat and the associated test needs. With few exceptions, the needed capabilities exist and the Services are addressing those areas in which the test capability is inadequate or unavailable.

5.4 T&E/S&T Program

The T&E/S&T Program develops test technologies to keep pace with evolving weapons technologies. Funded within the Advanced Technology Development Budget Activity, the T&E/S&T Program is critical to ensuring that DoD has the ability to adequately test advanced systems that will be fielded in the future. T&E/S&T Program technology development projects typically begin at Technology Readiness Level (TRL) 3 and mature to TRL 6; deliverables include test technology prototypes and demonstrations in relevant test environments. Although the T&E/S&T Program primarily addresses long-term gaps in the T&E infrastructure, it also performs risk reduction for the development of test capabilities by CTEIP and DoD Component Improvement and Modernization (I&M) efforts.

The TRMC centrally manages the T&E/S&T Program. The program employs a decentralized execution process through eight Test Technology Areas, each of which is led by an Executing Agent from one of the Services and based at a test organization in the field. Moreover, each Executing Agent leads a working group composed of representatives from the DoD T&E and S&T communities, with expertise related to the respective test technology. The eight Test Technology Areas are Electronic Warfare (EW) Testing, Cyberspace Testing, Net-Centric Systems Testing, High-Speed Systems Testing, Directed Energy Testing, Unmanned Autonomous System (UAS) Testing, Advanced Instrumentation Systems Technology, and Spectrum-Efficient Technology.

The T&E/S&T Program also advances OSD science, technology, engineering, and mathematics (STEM) initiatives for the T&E community by involving academic institutions in projects initiated by response to broad agency announcements and by supporting intern activities within the TRMC and at DoD test ranges and facilities.

Significant Ongoing Technology Developments

- **Improving Infrared Countermeasures (IRCM) Systems Testing**. The EW Test Technology Area is developing a realistic, high-resolution, infrared two-color scene projector capable of emulating hot objects rapidly traversing a realistic background. This technology will provide the ability to project an infrared scene of an incoming target into an aircraft sensor and enable realistic dynamic testing of two-color missile warning systems and directed IRCM systems.
- **Improving Hypersonic Propulsion Systems Testing**. The Hypersonic Aeropropulsion Clean Air Testbed (HAPCAT) development better replicates a realistic flight profile in a wind tunnel with clean air at the required temperatures and with the ability to vary Mach number from 5 to 8 to adequately test scramjet engine performance and operability. The HAPCAT technology will advance DoD efforts to reduce developmental and acquisition risks by enhancing the utility of ground facilities for testing high-speed strike weapons.
- **Expanding the Test Opportunities for High-Energy Lasers (HELs)**. The Directed Energy Test Technology Area is developing an integrated system— including three prototype light detection and ranging (LIDAR) systems to characterize the atmosphere on slant propagation paths—to provide range-resolved refractive turbulence profiles, water vapor density, and extinction due to aerosols. This technology will provide the ability to understand how atmospheric effects distort HEL beam propagation along a slant path. The system will be integrated onto USS PAUL F. FOSTER Self-Defense Test Ship at Port Hueneme, California, and

will allow characterization of the beam path of the Navy Solid-State Laser Test Program during upcoming sea trials.

- **Improving Large-Footprint Weapons Testing**. The Spectrum Efficient Test Technology Area is prototyping a multiband (L/S/C-bands), beam-forming phased array antenna system suitable for mounting on an aircraft to support over-the-horizon test operations. Designed to support long-range missile defense tests, this prototype will reduce the risk for a CTEIP-developed next-generation range support aircraft at Naval Air Warfare Center Weapons Division, Point Mugu, California.
- **Improving Behavior Prediction for Autonomous System Testing**. The UAS Test Technology Area is developing a stress-testing tool for UAS software that reveals behavior performance failures within the system. Identifying weaknesses and improving resiliency of autonomy software, an early version of the software test tool supported the testing of autonomous system technology demonstrators, and the tool will ultimately be transitioned into Government system integration test laboratories to support the testing of next-generation autonomous systems.
- **Improving Sanitization of Networked Environments**. The Cyberspace Test Technology Area effort is developing an automated sanitization framework of cyber-range components. This trusted, consistent sanitization approach will enable specialized assets to be shared among user communities that require access at varying levels of security without risk of compromise of classified data or artifacts at the NCR.

5.5 Central Test and Evaluation Investment Program (CTEIP)

CTEIP provides an enterprise approach for DoD investments in T&E capabilities that meet the multi-Service test requirements. CTEIP projects, because of project timeline constraints, primarily address near-term gaps in the T&E infrastructure. The major portion of CTEIP funding is devoted to joint I&M projects, which support major T&E investments nominated by the T&E Executive Agent on behalf of the Services and Defense Agencies. CTEIP funds the Resource Enhancement Project (REP), which addresses high-priority, near-term OT needs nominated by the Service or Defense Agency operational test commands and approved by the DOT&E. CTEIP also funds threat simulator development efforts through the Threat Systems Program (TSP). The total program funds 40 to 50 projects a year ranging from studies of test technologies to full-scale developments.

During FY 2014, 10 projects were successfully completed and 35 projects continued in execution. A complete review of all 2014 CTEIP projects will be published in the 2014 CTEIP Annual Report. The following is a summary of ongoing and new projects in the major enterprise investment areas.

- Electronic Warfare (EW) Testing. A number of high-priority studies have identified gaps in DoD ability to test aircraft performance against advanced radar threats. In response, CTEIP established the EW Test REP as a portfolio of projects that develop advanced installed systems test facility (ISTF) and open-air range EW threat simulation capabilities. The major components are the OSD-led Radar Signal Emulator project that develops high-power, reprogrammable, relocatable radio frequency (RF) emitters emulating specific Pacific Rim threat systems and the Navy-led Advanced Anti-air Threat Simulator, Block B that fields relocatable, closed-loop surface-to-air missile (SAM) simulators. The Next-Generation EW Environment Generator

project develops high-fidelity EW environment generation capability that upgrades Navy and Air Force ISTFs and establishes commonality among DoD RF stimulators. Other key investments include the REP-funded Radar Missile Gun System and Wideband Configurable Control Jammer Enhancement projects, the TSP-funded Advanced Threat Signal Injection Jammer, and the Modular RF Threat System projects.

- Net-Centric and Cyber Warfare Testing. Cyber/net-centric operations are a critical enabler for operations in the air, land, maritime, and space domains. During FY 2014, CTEIP initiated the Network-Centric Weapons T&E Environment project that develops a distributed capability to assess net-centric weapons system-of-systems performance (e.g., Small Diameter Bomb II), and the Cyber Test Analysis and Simulation Environment project that expands cybersecurity testing analysis capabilities and M&S tools. The ongoing Multi-Level Secure – Joint/Coalition Network Environment project will provide an interoperable, multi-level secure data management network architecture for the DoD T&E environment.
- Space Flight and Strategic Warfare Testing. CTEIP continues to modernize DoD T&E capabilities to protect its strategic warfare systems from the damaging effects of EMP and HPM threats. During FY 2014, CTEIP initiated the Vertical EMP Simulator project that develops a vertical EMP test capability at two test facilities and a narrowband HPM test capability for conducting aircraft intersystem electromagnetic vulnerability testing.
- Safe, Realistic Testing of Large-Footprint Weapons. Safe flight test operations for increasingly smaller, longer-range (large footprint) weapons combined with limited internal instrumentation space requires development of subminiature flight termination systems and range control services for target and weapon tracking, telemetry, and communications at long ranges. The ongoing Subminiature Flight Termination System project provides that miniaturized flight termination capability. CTEIP also initiated the Commercial Aircraft-Based Instrumentation Telemetry System project that will provide long-range autonomous range control, range safety and flight termination services, and improved airborne telemetry for open-ocean testing worldwide.
- Spectrum-Efficient Telemetry. CTEIP is improving DoD telemetry systems to add flexibility for real-time management of test data and instrumentation during missions as well as to use the newly available C-band frequencies. The ongoing integrated Network Enhanced Telemetry project will enhance current one-way serial streaming telemetry with a two-way C-band network radio capability that provides real-time management of aircraft test data and instrumentation. CTEIP completed a Tri-Service C-Band Roadmap Study to help Service resource managers plan C-band investments necessary to use newly available C-band frequencies.
- High-Accuracy Time-Space-Position Information (TSPI). CTEIP is improving DoD ability to more accurately measure a test item's location and phenomenology while in flight. The ongoing Common Range Integrated Instrumentation System project will replace the aging Advanced Range Data System and provide ranges with the capability to collect highly accurate TSPI (i.e., less than 1 meter). The Advanced Range Tracking and Imaging System project will improve optical tracking capability to observe and record performance (including TSPI) of aircraft or surface-launched missiles and munitions.
- Aircraft Survivability. The sophistication and technology of SAMs and air defense weapons, as well as ground fire systems, continue to be a significant threat to aircraft. The CTEIP Joint Distributed IRCM Ground Test System project enables high-fidelity, low-cost ground testing of

installed missile warning systems and IRCM systems. The CTEIP Multi-Spectral Sea and Land Target Simulator project provides portable, mobile open-air missile plume simulators to test IRCM systems against land- and sea-based threats. The ongoing REP-funded Joint Standard Instrumentation Suite project measures and collects signature, TSPI, and related data of threat missile and hostile fire munitions firings; and the Hostile Fire Indicator Site project provides additional shooter sites, Doppler radar, and rotary-wing control. TSP continued implementation of the Ascot Wren and Ascot Falcon projects.

- Unmanned Autonomous System (UAS) Testing. CTEIP is improving DoD ability to test the performance and safety of modern UAS flying in both battlespace and national airspace environments. The CTEIP ongoing Joint Unmanned Aircraft Systems Mission Environment project provides test capability for testing and evaluating unmanned aircraft systems for all three Military Departments.
- Urban Test Environments. Military operations over the past decade highlight the challenges of operating in complex urban environments. The ongoing Joint Urban Test Capability project is developing a realistic, reconfigurable "slice" of an urban environment to enable more realistic communications testing. The ongoing REP Command and Control (C2) and Urban Background Environment Simulator project develops high-density, open-loop urban background signals for aircraft ISTF testing.

5.6 Joint Mission Environment Test Capability (JMETC) Program

The JMETC program continues to be a cost-effective, time-saving, DoD-wide infrastructure for linking distributed facilities and enabling customers to test and evaluate warfighting capabilities in a joint context. Having completed its eighth year, the program has provided the T&E community with an infrastructure that supports testing across the full spectrum of the acquisition process. JMETC has supported DT, OT, interoperability certification, and Joint Mission Capability Portfolio testing. The JMETC program has increased its focus on the support of T&E of interoperability requirements at the mission-effectiveness level and positions itself as a forward-leaning contributor for the emerging cyber T&E infrastructure requirements. The recently approved DoDI 8330.01 requires interoperability testing in a cyber-contested environment, and the JMETC program has started the upgrades required to accommodate the higher classifications.

In FY 2014, the JMETC program continued to make progress in accomplishing the objectives of the Testing in a Joint Environment Roadmap to build and sustain the infrastructure to support current and future interoperability and cyberspace T&E requirements. Summarized below are some of the FY 2014 highlights:

- Supported 70 distinct customer distributed LVC test activities.
- Continued participation in four major thrust areas of cyber: T&E policy, T&E methodologies, T&E infrastructure, and workforce qualifications.
- Sponsored the Cyber Range Interoperability Standards effort.
- Continued development and deployment of the second-production Regional Service Delivery Points (RSDPs), which will provide increased capacity for cyber test and training.

- Continued development of significant distributed test infrastructure enhancements that will support multiple, concurrent testing for interoperability at classification up to and including Top Secret (TS)/Sensitive Compartmented Information (SCI).
- Leveraged the RSDP capabilities and incorporated both kinetic and non-kinetic assets to address growing interoperability and cyber T&E requirements and started exploring EW-cyber convergence requirements.

The JMETC program has generated a persistent infrastructure to 77 sites, with an additional 18 sites planned to support interoperability T&E in a cyber-contested environment. These sites are distributed across the country.

5.7 Other Significant Activities

5.7.1 Spectrum Encroachment

In 2014, the TRMC, through its ongoing spectrum stewardship initiative, contributed substantially to the goal of ensuring access to the RF spectrum for use in T&E at DoD test ranges.

- **DoD Electromagnetic Spectrum (EMS) Strategy Action Plan**. The TRMC, in conjunction with the Services, ensured that the DoD test range community's interests were represented in development of the EMS Strategy Action Plan.
  - In February 2014, the DoD CIO released the DoD EMS Strategy. The vision of the strategy is to ensure "spectrum access when and where needed to achieve mission success" by expediting the development of spectrum-dependent system capabilities with increased spectrum efficiency, flexibility, and adaptability; increasing the agility of DoD spectrum operations; and sharpening the responsiveness to ongoing spectrum regulatory and policy changes.
  - The EMS Strategy Action Plan is the blueprint for implementing the strategy. The 88 Action Plan tasks for which the TRMC holds primary or joint responsibility will substantially enhance the ability of the ranges to manage and operate in the RF spectrum and to protect their radio systems against interference in an increasingly crowded and contentious spectrum environment. As an example, the TRMC holds joint responsibility with the Office of the Under Secretary of Defense for Personnel and Readiness/Joint Training and Ranges and DoD CIO for Action 3.1.5, which states, "By 2020, DoD will regularly collect spectrum usage data from over 50% of CONUS-based test and training ranges."
- **Range Access to 5925–6700 Megahertz**. The TRMC was instrumental in securing approval for the ranges to use 5925–6700 megahertz, which will help to relieve RF spectrum congestion at large ranges.
  - International Telecommunications Union document 8B/143-E is a 2005 CTEIP-sponsored report to the U.S. Department of State to officially document the amount of additional spectrum required for aeronautical mobile telemetry within the United States. The report stated that, in addition to the then-existing allocation of 215 megahertz plus sharing of the

1755–1850 megahertz band, an additional 650 megahertz of spectrum would be required to sustain U.S. telemetry operations by 2020.

- Since the report's publication, the 2007 World Radiocommunication Conference (WRC-07) granted the United States shared access to three bands in the 4 to 7 gigahertz range of the C-band. Although these bands make up a total of 1.374 gigahertz of bandwidth, the amount of spectrum usable for telemetry (because of the requirement to share with other users) is only about 460 megahertz.
- When the Federal Communications Commission (FCC) issued the public notice changing U.S. regulations to include these changes, it withheld the 5925–6700 megahertz band on the basis of overcrowding. This withholding effectively decreased the net gain of usable spectrum to about 260 megahertz, which is 390 megahertz short of the projected 2020 telemetry spectrum requirement. In light of the already insufficient spectrum allocation, and coupled with the President's initiative to give more spectrum from the Federal inventory (including telemetry spectrum) to the broadband industry, this withholding constitutes a serious shortfall in the T&E spectrum inventory and places future operations at risk.
- In response to the FCC withholding, the TRMC requested that DoD CIO ask the FCC to reconsider its denial of the ranges' access to 5925–6700 megahertz for telemetering, as had been approved at WRC-07. The FCC agreed with the data provided supporting the requirement and is preparing an official notice of proposed rulemaking that will lead to approval for the ranges to use 5925–6700 megahertz, thereby providing substantial relief to the RF spectrum congestion occurring at large ranges.

- **Medical Body Area Networks (MBANs)**. The TRMC spearheaded the effort that resulted in the successful remediation of a spectrum encroachment issue, demonstrating that the T&E community can share its spectrum if the right technical and policy protections are in place.
  - In 2007, a commercial medical device manufacturer petitioned the FCC to allow its new wireless medical telemetry device to operate in the 2360–2390 megahertz telemetry band as an MBAN service, a new type of spectrum service defined by the FCC. Analysis showed that the very low power devices (1 milliwatt) constituted a substantial risk to both DoD and commercial flight testing. Working with the medical device manufacturers and the commercial flight test community, the TRMC sponsored a series of tests, including a flight test, to produce the data needed to develop a means of sharing the spectrum between the two types of spectrum services.
  - The long, multiyear negotiations between DoD and industry under FCC oversight concluded in 2014 with the signing of an agreement that will provide substantial protection to hundreds of DoD telemetry receiving systems from interference from wireless medical telemetry devices operating in the critical 2360–2390 megahertz band. These devices will operate at medical facilities throughout the United States, an estimated 15 percent of which are within sight of test range antennas. Absent this agreement, flight tests being tracked by telemetry stations near medical facilities using the devices would have been at great risk of interference, thereby causing loss of data and culminating in the need to re-fly the tests.

5.7.2 Workforce Development

In 2013, the TRMC launched its first-ever comprehensive internship program. In 2014, the TRMC-sponsored STEM initiative made strategic improvements and refined initiative objectives. The STEM initiative was established to support undergraduate and graduate students pursuing STEM-related degrees at historically black colleges and universities (HBCUs) and minority-serving institutions (MSIs) and provide the students with exposure to the career opportunities in T&E. Ensuring that the future T&E workforce is mission ready is a core tenet of the effort, and in FY 2014, the TRMC took a regional approach to intern placement to support better intern-to-employee conversion rates upon graduation. The 2014 effort sponsored 25 interns who spent the summer learning about T&E through hands-on projects with TRMC partners nationwide, including DoD test ranges, industry, and academia. The TRMC initiative serves as a springboard for careers, as two graduating seniors have been extended invitations to join organization-specific workforce development programs that will provide employment and education reimbursement benefits. Successful internships will help promote employment in T&E and shore up the gaps resulting from attrition of key talent across the MRTFB ranges. Concurrently, the TRMC continued focused investments at several HBCUs and MSIs to support their growth in test technology development for DoD.

5.7.3 National Cyber Range (NCR)

In FY 2014, the NCR supported 22 events for MDAPs, training, and operational exercises, as shown in Figure 5-1. The NCR is unique in that it can simultaneously execute up to four multiple independent tests of differing security levels from unclassified to TS/SCI on its securely partitioned test beds. The NCR also has the ability to represent the scale and diversity at fidelity detailed enough to realistically portray current and anticipated attack strategies (e.g., malware, distributed denial-of-service attacks, and cross-site scripting). Throughout 2014, the NCR consistently provided the highest quality of customized support that successfully fulfilled a wide range of customer requirements.

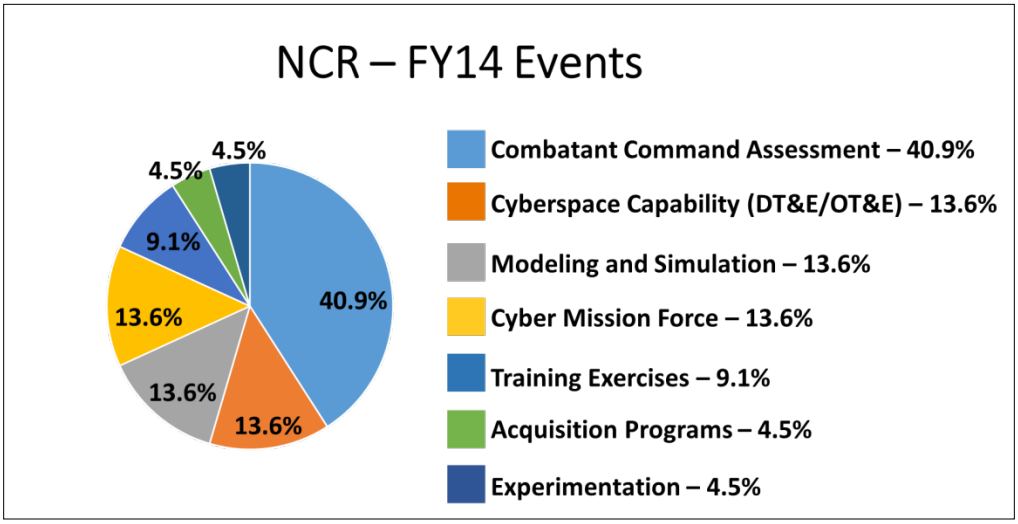


Figure 5-1. NCR FY 2014 Events

During training exercises, the NCR demonstrated capability to rapidly configure complex network topologies varying in scale from hundreds to 15,000 high-fidelity nodes. The NCR provided realistic emulations of Secret Internet Protocol Router Network (SIPRNET) enclaves with highly detailed and realistic supporting Web and e-mail servers and clients. It also provided high-fidelity representations of public internet infrastructure with thousands of websites. The NCR was used by an MDAP for a security architecture evaluation. The NCR provides a world-class cyber test team to assist customers in planning and executing cybersecurity T&E and training events. The NCR is fully accredited to operate at the TS/SCI level based upon Intelligence Community Directive 503 certification and accreditation requirements.

Highlights of NCR accomplishments in FY 2014 include the following:

- The NCR successfully supported distributed cyber training events sponsored by DOT&E and U.S. Cyber Command as a component of the DoD Enterprise Cyber Range Environment using the Joint Information Operations Range (JIOR) for external connectivity.
- In FY 2014, the NCR Team integrated additional capabilities including the following:
  - A Faraday cage to enable testing of RF-emanating devices.
  - An upgraded JIOR Service Delivery Point and Defense Research and Engineering Network connection that will increase range communication bandwidth capacity to 300 megabits per second.
  - Enhanced simulated internet services and traffic generation tools.
  - Additional commercial software applications and reusable models to enhance future tests.

5.7.4 Budget Certification

The TRMC produced a Budget Certification Report (BCR) containing the Director's analysis of the major FY 2015 T&E budget submissions as well as the Director's determination as to whether these proposed budgets are adequate and provide balanced support for the Strategic Plan. For FY 2014, the total institutional (operation and investment) funding assessed by the TRMC was approximately $2.9 billion, and the total customer funding received by the activities/capabilities assessed was approximately $1.8 billion. The BCR satisfied the reporting requirements of section 196(e)(2) of Title 10, U.S.C., for assessment of the MRTFB and non-MRTFB T&E capabilities, finding them to be adequate and providing balanced support with respect to the Strategic Plan.

The Budget Control Act of 2011 impacted all of the DoD Components during FY 2013 and the impact is expected to be felt in FY 2014 and beyond. However, the TRMC is not aware of any significant sequestration impacts on test instrumentation or services required to assist major acquisition programs in meeting their test objectives. Although the BCR, by law, reports on only one budget year, general trends are observed from FY 2006 to FY 2015. The composite DoD Component trends observed during this period include the following:

- Total cost of operating the MRTFB, measured in constant FY 2015 dollars, was relatively stable through FY 2011. It has been declining since FY 2012. This decline occurred initially in the

institutional component of operations funding, with direct (customer) funding starting to decline in FY 2013, with significant variations among the Services.

- The majority of the work done at any individual MRTFB activity is for programs belonging to its parent Service (e.g., Army-managed programs testing at Army-managed MRTFB activities). For context, in FY 2013, approximately 70 percent of the workload was from programs managed by the owning DoD Component, and work for other DoD Components was approximately 21 percent. The remaining 9 percent of the total workload was from non-DoD sources.
- Total work years spent operating the MRTFB activities declined by about 12 percent from FY 2006 to FY 2015. Although all Services evidence a decline, the decline is sharpest for the Army. The manpower mix has significantly changed, with military and contractor work years dropping by about 23 percent each over this period, while civilian work years have increased by 11 percent. This significant change reflects the impact of the Department's civilian in-sourcing efforts and the continuation of a long-term trend of moving military manpower out of the test infrastructure.
- Investment in the MRTFB, other than Military Construction projects, was approximately $500 million per year through FY 2009 but declined to a projected $400 million per year in FY 2013. Total investment funding held at or above $500 million per year until FY 2010 but has declined to $400 million from FY 2010 to FY 2014. FY 2015 is forecast to recover to the $500 million level. Military Construction, which tends to be project specific and more variable than I&M, has dropped significantly over the period.

The TRMC continues to successfully work closely with the Under Secretary of Defense (Comptroller) and Director of Cost Assessment and Program Evaluation to address critical emergent Department T&E capability needs.

6 PROGRAM ENGAGEMENT AND ASSESSMENTS

The FY 2014 Annual Report highlights the engagement activities and assessments of 40 programs (MDAPs, MAIS programs, USD(AT&L)-designated special interest programs) that have reached a significant milestone or had significant DT&E activities. Significant activities include DASD(DT&E) program assessments, first test flight, completed system integration lab testing, completed ground testing, and dedicated Government DT&E. For those programs that received a DASD(DT&E) program assessment during the fiscal year, a separate paragraph highlighting the findings and recommendations of that assessment is included. Of the 40 programs assessed in this report, only the Key Management Infrastructure (KMI) program requested a deviation from requirements in the TEMP because the program missed an Acquisition Program Baseline software release date. The program office has a revised release date and has been aggressive in addressing deficiencies.

Assessments are as of the end of FY 2014 (September 30, 2014); however, some assessments may include information on program status beyond that date.

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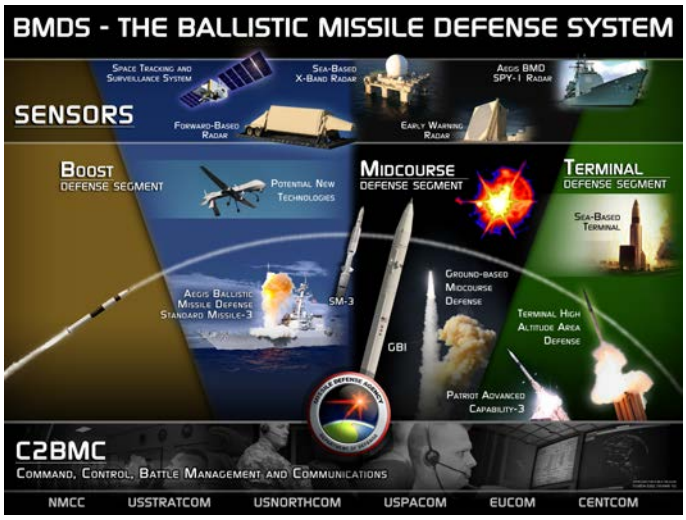
6.1 DoD Programs

This section includes summaries of the following 8 programs:

- Ballistic Missile Defense System (BMDS)
- Defense Agencies Initiative (DAI) Increment 2
- DoD Healthcare Management System Modernization (DHMSM)
- Defense Medical Information Exchange (DMIX)
- F-35 Lightning
- Joint Light Tactical Vehicle (JLTV)
- Key Management Infrastructure (KMI) Increment 2
- Theater Medical Information Program–Joint (TMIP-J) Increment 2

Ballistic Missile Defense System (BMDS)



Executive Summary: The BMDS is intended to counter ballistic missiles of all ranges—short, medium, intermediate, and intercontinental. The BMDS is an integrated, layered architecture that provides multiple opportunities to destroy missiles and their warheads before they can reach their targets. The system includes networked overhead persistent infrared sensors and ground- and sea-based radars for target detection and tracking, and ground- and sea-based interceptor missiles for destroying ballistic missiles. These elements are coupled via a command and control, battle management, and communications system that networks, integrates, and synchronizes missile defense systems operations, providing the Warfighter with the needed links between the sensors and weapon systems.

The January 2, 2002, Secretary of Defense memorandum, "Missile Defense Program Direction," directed that BMDS elements will enter the formal DoD acquisition cycle at MS C, concurrent with procurement responsibility transfer to a Service. The memorandum also directed the following:

- The BMDS program will not be subject to the traditional requirements generation process of Chairman of the Joint Chiefs of Staff Instruction 3170.
- The Director, MDA will establish a process that sets initial capability standards.
- MDA will baseline capabilities and configurations during the transition phase.
- The Services will develop capability-based operational requirements documentation that becomes operative upon transfer.

Since release of the Secretary of Defense memorandum, only Terminal High-Altitude Area Defense and Aegis Ballistic Missile Defense (BMD) components have transitioned to a Service for procurement. The DASD(DT&E) focus is on ensuring that the DT&E planned and conducted will fully inform MS C decisions for future systems.

Lead DT&E Organization: MDA, Director for Test

Summary of FY 2014 DT&E Activities

- October 3, 2013, Aegis BMD conducted an intercept flight test using Aegis BMD 4.0 and a Standard Missile-3 (SM-3) Block IB guided missile to support follow-on production decisions.
- January 14, 2014, Aegis BMD conducted simulated engagements of three Aegis Readiness Assessment Vehicle-A targets using Aegis BMD 4.0.2 and simulated SM-3 Block IB missiles.
- March 27–April 18 and April 28–May 23, 2014, MDA completed hardware-in-the-loop testing involving ground-based midcourse defense (GMD) fire control, Aegis BMD, and the sea-based X-band radar.

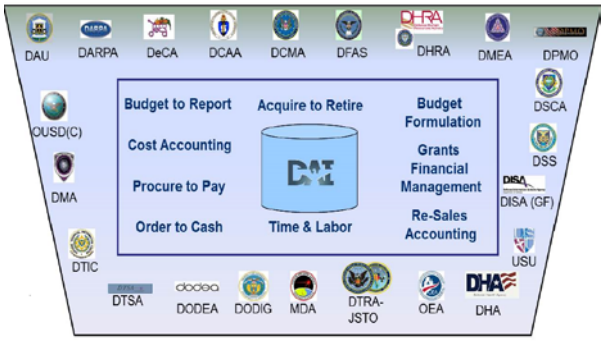
- May 20, 2014, Aegis BMD conducted an SM-3 launch to assess the functionality of the shore-based Aegis weapons system and verify the system's ability to launch, capture, and provide uplink and downlink guidance.
- June 22, 2014, MDA conducted a GMD lethal intercept of an intermediate-range ballistic missile class target, exercising a long interceptor time-of-flight, medium closing velocity engagement and exoatmospheric kill vehicle functions to discriminate the lethal object from a representative target scene with additional non-target objects to collect relevant data.

Summary of FY 2014 DT&E Engagement and Assessments

- In the FY 2011, FY 2012, and FY 2013 DT&E annual reports to Congress, DASD(DT&E) identified issues concerning linkage between ground-based interceptor (GBI) flight tests and Failure Review Board (FRB) processes. DASD(DT&E) still has concerns; for example, the FRB for the July 5, 2013, GBI battery failure was not duplicated during ground test and evaluation causing DASD(DT&E) to question this as a definitive cause of failure. DASD(DT&E) recommends more relevant ground test and evaluation prior to and after flight test events to provide the needed information to better assess design strengths and weaknesses.
- MDA has agreed to collaborate in development of a Developmental Evaluation Framework (DEF) for the redesigned kill vehicle (RKV). DASD(DT&E) recommends that MDA apply a built-in test to the maximum extent possible and use DT&E to evaluate system and element design margins and that GBI electromagnetic interference/electromagnetic compatibility, vibration, and environmental stress T&E be integral to the RKV program.
- Integrated ground test and evaluation provided data to support capability assessment for theater and regional BMDS for U.S. Pacific Command (USPACOM) and homeland defense for U.S. Northern Command and USPACOM. Ground test and evaluation to support technical capability delivery originally scheduled for June 2014 was delayed until December 2014 and is now complete.
- MDA commissioned an independent GMD fleet audit to assess GBI testing, design, and manufacturing changes; prime and supply chain pedigree; GBI configurations; confidence in reliable GBI operation; and adequacy of the GBI reliability program. DASD(DT&E) recommends that the observations, themes, and findings be applied to the RKV program.
- As tasked, DASD(DT&E) provided CAPE with an analysis of current and achievable GBI reliability. Achievable GBI reliability estimates are based on the planned GBI flight test events contained in Integrated Master Test Plan (IMTP) version 14.2.
- MDA is not required to have a TEMP at the BMDS level and therefore did not request any waivers or deviations.

Conclusion: Based on the GBI fleet audit results, rescheduling/cancellation of T&E events, and lack of stability in the evaluation schedule, the IMTP DT&E structure would benefit from additional engineering discipline. MDA has made noticeable progress to develop evaluation practices that articulate the required information for system-level ground testing. MDA should further develop evaluation practices that articulate the required information from DT&E. All new work or redesign activities should use a DEF and TEMP-like document to ensure good knowledge development during development.

Defense Agencies Initiative (DAI) Increment 2



Executive Summary: The DAI program modernizes the Defense Agencies' financial management processes by streamlining financial management capabilities, addressing financial reporting material weaknesses, and supporting financial statement auditability for the majority of agencies and field activities across DoD.

In September 2013, DAI Increment 1 transitioned to operations and sustainment and DAI Increment 2 became an Acquisition Category (ACAT) IAM program reaching its MS B in April 2014. The Defense Logistics Agency is deploying Increment 2 in four releases. Release 1 is a technical upgrade from Oracle Release 11i to Oracle Release 12.3 and incorporates procure-to-pay efficiency and time and labor process automation planned for fielding in the 3rd quarter FY 2015. The requirements for Increment 2, Release 1 comprise nearly 95 percent of total system functionality. Releases 2 through 4 will provide the remaining capability while transitioning additional Defense Agencies to DAI. The program plans full deployment for 4th quarter FY 2018, followed by Increment 2 entering sustainment.

Lead DT&E Organization: Joint Interoperability Test Command (JITC)

Summary of FY 2014 DT&E Activities

- August 1, 2013–January 15, 2014, the PMO developed the Business Case, Systems Engineering Plan, TEMP, and Program Protection Plan to support the Increment 2 MS B decision.
- January 2, 2014–October 5, 2014, the PMO conducted contractor/Government Release 1 development integration test (DIT) over a series of five additive capability mock-up data deliveries. DIT validates that the configuration done by the business process areas yields the desired outcomes and that the reports, interfaces, conversions, extensions, forms, and workflow developed for the release work as an integrated part of the solution and perform as expected in a production-like environment. DIT will be followed by system integration test (SIT) and user acceptance test, led by the Lead DT&E Organization, prior to fielding Release 1.
- SIT began as scheduled on October 6, 2014. The test was suspended on October 8, 2014 due to a protest filed with GAO regarding the purchase of Oracle Contract Lifecycle Management licenses and a resulting stop-work order. The program reinstated the needed licenses and resumed SIT on February 9, 2015.

Summary of FY 2014 DT&E Engagement and Assessments

- The program successfully developed and revised the acquisition and test strategy for DAI Increment 2.
- The program carried out planned FY 2014 DT&E activities according to its approved TEMP.
- The DAI program did not request a waiver or deviation from the requirements in the TEMP.

DASD(DT&E) Program Assessment

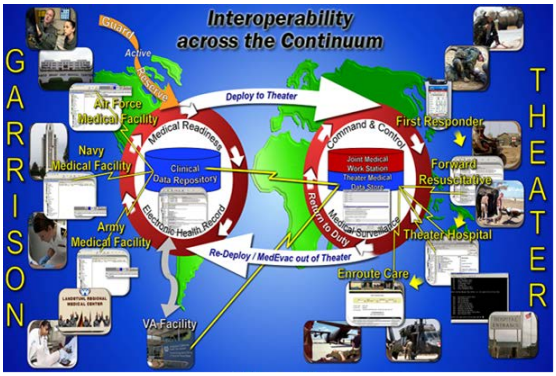
- DASD(DT&E) conducted a DASD(DT&E) program assessment of DAI Increment 2 in March 2014 to support the Increment 2 MS B decision. The summary of the evaluation follows:

- Planning. The TEMP provided an adequate DT&E plan to support the program described in the Business Case, Systems Engineering Plan, and Program Protection Plan. The PMO plans TEMP updates for each subsequent release.
- Schedule. The T&E schedule adequately supports contractor and Government DT events prior to the FY 2015 Release 1 limited fielding decision.
- Resources. The program allocated sufficient resources to execute the Increment 2, Release 1 T&E plan.
- Recommendation. Based on the adequacy of DT&E planning at the time of the assessment, DASD(DT&E) recommended that the program enter into the Development and Fielding phase.

Conclusion: The program successfully completed Increment 2 T&E planning and began execution of Release 1 DT activities. Significant delay of DT SIT because of the stop-work order will cause delay in completion of DT and to fielding Release 1 as originally scheduled and may impact Release 2 DT if the delay is longer than several months.

DoD Healthcare Management System Modernization (DHMSM)

Executive Summary: DHMSM is a highly tailored MAIS program focused on replacing DoD legacy healthcare systems. DoD will procure an off-the-shelf (OTS), best-of-suite (BoS) commercial electronic health record (EHR) system, augmented by best-of-breed products for requirements unmet by the BoS and, as necessary, minimal customization for critical DoD unique requirements. DHMSM will replace legacy systems in both fixed-facility medical treatment facilities and the EHR component of the Theater Medical Information Program–Joint (TMIP-J), thereby providing EHR support spanning the full range of military medical operations. The Government released a solicitation for a single-award, indefinite-delivery/indefinite-quantity contract for a single service provider/integrator for purchase of an OTS solution, integration activities, and deployment support across the DoD enterprise to satisfy the full set of requirements. The program will produce six foundational documents appropriately tailored to satisfy statutory and regulatory requirements: Acquisition Strategy (AS); Business Case; Engineering Master Plan; Cost and Benefit Analysis; Test Strategy (TS); and Deployment, Training, and Change Management Plan, all signed by the USD(AT&L). Each document will be appropriately tailored to satisfy information requirements across the acquisition life cycle and will support authority-to-proceed (ATP) decisions. The USD(AT&L)-directed program will have only four ATP acquisition milestones: RFP release, contract award, initial operational capability (IOC), and full deployment decision.



In August 2014, DASD(DT&E) conducted a DASD(DT&E) program assessment of DHMSM to support the RFP ATP decision. The assessment concluded that the program's DT&E planning adequately supported the RFP release.

Lead DT&E Organization: Space and Naval Warfare Systems Command Test and Evaluation

Summary of FY 2014 DT&E Activities

- October 1, 2013–January 23, 2014, the PMO developed the program's initial draft TS to supplement the first draft RFP released to industry.
- January 21–March 5, 2014, the PMO updated the draft TS to support the second draft RFP released to industry.
- March 6–April 30, 2014, the PMO revised the draft TS for release with the third draft RFP released to industry.
- May 1–August 20, 2014, the PMO finalized the TS and obtained approval of the final TS to augment the RFP release.

Summary of FY 2014 DT&E Engagement and Assessments

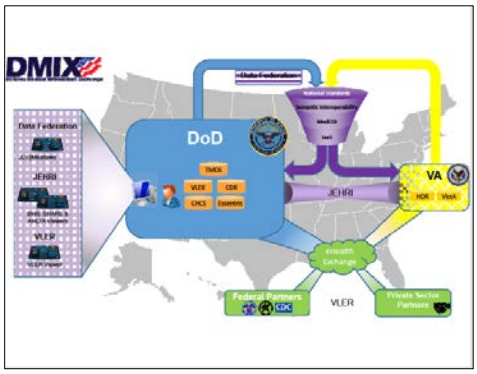
- The program successfully developed a TS to support the program's AS; the TS was released with the RFP on August 25, 2014.
- The TS adequately supports the program schedule to meet the FY 2017 IOC.
- The TS satisfactorily addresses known key T&E resource requirements.

DASD(DT&E) Program Assessment

- DASD(DT&E) conducted a DASD(DT&E) program assessment of DHMSM in August 2014 to support the RFP ATP decision. The assessment concluded that the program's DT&E planning adequately supported the RFP release. The summary of the evaluation follows:
  - Planning. The TS provided an adequate DT plan to support the RFP release; the PM plans to update the TS prior to contract award to support succeeding ATPs.
  - Schedule. The T&E schedule adequately supports contractor and Government DT events prior to the FY 2017 fixed facilities limited fielding IOC ATP.
  - Resources. The program adequately identified known key T&E resource requirements. Successfully establishing Government-approved labs to support contractor testing in the 1st quarter FY 2016 is critical to the DT&E plan.
  - Recommendation. Based on the adequacy of DT&E planning at the time of the assessment, DASD(DT&E) recommended that the USD(AT&L) authorize the program to release its RFP.

Conclusion: The program successfully developed a comprehensive TS to support the program's AS. The program included the TS with the release of the RFP to ensure that responding vendors consider the strategy within their proposals.

Defense Medical Information Exchange (DMIX)



Executive Summary: DMIX provides data exchange and interoperability between legacy system health data and external partners. With the DMIX data exchange/ interoperability capability in place, the program will assist in the transition to the modernized electronic health record platform being acquired by DoD Healthcare Management System Modernization (DHMSM). DMIX consists of a family of capability initiatives supporting the seamless exchange of standardized health data among DoD, the Department of Veterans Affairs (VA), other Federal agencies, and private providers as well as benefits administrators. The program provides the capability for health care providers to access and view complete and accurate patient health records from a variety of data sources, thereby allowing healthcare providers to make faster and higher quality care decisions. The program's two major focus areas are to expose all Health Executive Committee approved data domains via the Joint Legacy Viewer (JLV) and to provide DHMSM access to standard data domains no later than the 3rd quarter FY 2015.

The PMO fielded two DMIX products during FY 2014: Data Federation Releases (DF Rel) 0 and 1. The program developed DF Rel 0 to provide DoD and VA clinicians with access to standardized, integrated clinical record data. The PMO conducted a limited DF Rel 0 deployment in FY 2014. The PMO focused DF Rel 1 on compliance with NDAA FY 2014 by providing DoD and VA with standardized and computable health data. The PEO authorized a limited fielding of DF Rel 1 in the 4th quarter FY 2014.

Lead DT&E Organization: PEO DoD Healthcare Management Systems

Summary of FY 2014 DT&E Activities

- November 11–December 6, 2013, the PMO conducted system integration testing (SIT) for DF Rel 0 using JLV version 2.1.0.2 to verify that retrieved patient data records are complete and accurate and that clinical terms are mapped for the seven most critical clinical data domains.
  - The PMO conducted testing in the JLV test environment located in the Hines test facility in North Chicago, Illinois, connected to the Defense Health Clinical Systems DTE1 test environment in Vienna, Virginia, and the North Hampton Veterans Health Information Systems and Technology Architecture (VistA) test instance located in Martinsburg, West Virginia.
- July 23–August 28, 2014, PMO testers conducted a SIT of DF Rel 1 software components, JLV version 2.2.0.0, and Bidirectional Health Information Exchange (BHIE) DoD Adaptor (BDA) version 1.0.1.7 to prove the technical software capability to extract and aggregate patient data from legacy clinical systems within DoD and VA.
  - The PM conducted testing in the functional test dot-mil environment of the Development Test Center (DTC) located in Richmond, Virginia, with external connections to the VA VistA located in the Austin Information Technology Center, Austin, Texas.

- August 13–September 8, 2014, the PMO conducted capacity testing of JLV version 2.2.0.2 and BDA version 1.0.1.7.2 to determine user capacity of the JLV application and BDA in support of DF Rel 1 NDAA requirements.
  - The PM conducted testing in the DTC performance dot-mil environment.
- September 17–November 17, 2014, the PMO conducted a Virtual Lifetime Electronic Record Health Exchange version 2.0.2.0 SIT, Joint Partner Testing and capacity testing to verify functional performance and capacity of the exchange upgrade prior to fielding.

Summary of FY 2014 DT&E Engagement and Assessments

- DF Rel 0 SIT provided standardized terminology mappings for the seven most critical clinical data domains.
  - DF Rel 0 SIT used a very limited test patient population; the PMO created 20 DoD and VA correlated patient medical records with critical clinical domains terminology mappings.
  - Patient data included a sampling of terms expected to match standardized terminology that would exercise JLV ability to display a complete and accurate record; the scope of testing did not include validating the accuracy of mapped data provided to the two departments.
  - The PMO successfully applied four software patches to JLV during SIT to fix high-severity defects.
  - The PM attributed several test case failures to BDA defects during SIT and applied two patches to the BDA to correct defects.
  - Testing results met the SIT exit criteria with no Severity 1, Severity 2, or clusters of Severity 3 software defects that remained open and 99 percent of the terms in the test data that mapped correctly.
  - Based on SIT results, DASD(DT&E) supported the PEO authorizing a limited fielding of DF Rel 0 and JLV upgrades to the nine VA and DoD sites currently deployed with JLV; the PMO completed fielding on July 31, 2014.
- DF Rel 1 SIT validated software updates to the JLV and BDA to meet NDAA requirements.
  - Test patient population improved from DF Rel 0 SIT; the PMO created 280 DoD and VA correlated patient medical records with terminology mappings within 15 clinical domains.
  - The developer successfully applied two software patches to the JLV and BDA to fix environment issues discovered early in the test.
  - The PMO met the SIT exit criteria of no open Severity 1, Severity 2, or clusters of Severity 3 software defects, plus the defects were documented, verified, and resolved or designated as a future change.
- JLV and BDA capacity testing successfully demonstrated that the system exceeded DF Rel 1 NDAA system requirements.
  - The system successfully supported 300 JLV concurrent users, exceeding the requirement of 250; surpassed the transaction size requirement of 56 kilobytes by supporting transaction sizes of 1.5 megabytes; and demonstrated a capacity to handle 400,000 requests per hour as opposed to a requirement to process 3,000 requests per day.
  - DASD(DT&E) considered these position results along with the SIT results in supporting the PEO decision to authorize the DF Rel 1 limited fielding.
- As a result of DF Rel 1 and JLV and BDA capacity testing, DASD(DT&E) supported the PEO authorizing a DF Rel 1 limited fielding on September 12, 2014.
  - The PEO limited users to 1,000 until the Functional Advisory Council or the Health Executive Council approves expanded use.

- Fielded sites include the DISA Defense Enterprise Computing Center in Montgomery, Alabama, and the Military Health Service Enterprise Support Operations Center in San Antonio, Texas.

Conclusion: The program successfully executed its FY 2014 DT&E plan to support the limited fielding of two products. The products provided DoD and VA clinicians with access to standardized, integrated clinical record data and provided DoD and VA with standardized and computable health data in compliance with NDAA FY 2014.

F-35 Lightning

Executive Summary: The F-35 is the next fifth-generation Air Force, Navy, and Marine Corps fighter providing stealth capability with unprecedented sensor fusion. The F-35 is in the fifth year of a 7-year DT program. Eighteen test aircraft are conducting DTs at two test sites: six F-35A conventional takeoff and landing (CTOL) variants, two F-35B short takeoff and vertical landing (STOVL) variants, and one carrier variant (CV) at the Air Force Test Center located at Edwards Air Force Base, California, and five F-35B STOVL variants and four F-35C CVs at Naval Air Warfare Center, Patuxent River, Maryland.

The program is approaching two-thirds of system development and demonstration execution with roughly 60 percent of the nearly 60,000 planned flight test points flown mainly in the Block 2 envelope and Block 2B mission systems testing. Overall, Block 2B flight test, test point closure, and verification are behind that planned for 2014. Flight sciences test point execution is nearly at the planned schedule, but mission systems test point execution is notably behind due primarily to late software delivery to flight test, exceeding the projected test point regression and growth rates, and groundings due to engine issues. Two engine-related groundings have resulted in about a 2-month delay to flight testing. The majority of Block 2B functionality was delivered in April and June 2014; software issues discovered in flight test required two additional software releases. Although nearly all of the major technical issues examined in separate Department assessments have an identified way ahead, all remain behind in their originally projected verification through test.

Lead DT&E Organization: 412th Test Wing; NAWCAD VX-23

Summary of FY 2014 DT&E Activities

- During FY 2014, the test program accomplished the following:
  - Completed helmet-mounted display system Generation (Gen) II testing and initiated Gen III testing with Technology Refresh #2 hardware and Block 3i software.
  - Completed carrier suitability structural survey testing and initial F-35C carrier shipboard test period.
  - Completed engine "rub-in" third-stage testing to assess the way ahead for the engine failure; completed 11 of 18 DT aircraft "Pre-Trench" engine stator modifications.
  - Initiated climatic chamber testing with a STOVL aircraft (BF-5).
  - Initiated Block 3i testing with estimated completion in June/July 2015.
  - Completed 50 percent of CTOL second-lifetime durability testing and 67.5 percent of CV second-lifetime durability testing; STOVL test article testing was suspended at 13 percent of second lifetime durability testing – completing bulkhead repairs for a January 2015 restart.
  - Completed 11 of 15 Block 2B live weapon delivery accuracy (WDA) tests; the test program expects to complete 13 of 15 tests by the end of February 2015 with 2 WDAs deferred to Block 3F.

  - Completed Autonomic Logistics Information System (ALIS) 2.0 logistics test and evaluation testing.
- A total of 818 flight science and 284 mission systems planned test points have been eliminated based on review of DT&E to date, which was vetted through a stakeholder review.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) has been thoroughly engaged with the F-35 Program Office, the Services, and OSD staff in increasing insight into system maturity, test progress, and ensuring that adequate test resources are planned to test F-35 Lightning against current and planned threats. Specific DASD(DT&E) engagement in FY 2014 included the following:
  - Engaged and involved in the STOVL durability test article bulkhead failure analysis, test article repair, and setting conditions for the restart of testing.
  - Continued the development and execution with DOT&E of a plan for urgently needed investments to Air Force and Navy test chambers and open-air ranges to support adequate testing of the F-35 Lightning as well as all future fighters and electronic warfare systems.
- The program is meeting mission systems projected fly rates, but mission systems testing incrementally leading to the final Block 3F configuration is notably behind at this stage of test execution. Overall, roughly 60 percent of the nearly 60,000 planned flight test points have been flown; 2014 test points were mainly in the Block 2 envelope and Block 2B mission systems functionality.
- Although flight test execution at the two primary test sites is meeting or exceeding mission systems planned fly rates, flight science fly rates continue to lag behind the plan established at the program re-baselining. Mission systems baseline test point execution, test point closure, and capability verification are behind the planned schedule. The key factors are discovery, test point growth, regression testing, two aircraft groundings, and late software delivery to flight test. For example, Block 2BR5 software was delivered more than 2 months late to flight test resulting in a commensurate slip in test.
- Block 2B mission systems flight test and test point closure are behind the 2014 plan. Although flight sciences test point execution is nearly at the planned schedule, mission systems execution is about 19 percent below the 2014 plan compounded by greatly exceeding regression and test point growth. Risk to Block 3F DT execution is expected to rise in 2015 as the complexity of mission system testing increases and because of late lab integration of the initial Block 3F releases.
- Nearly all of the major technical issues examined in separate Department assessments have an identified way ahead, though all remain behind in their originally projected verification through test.
- Full-scale ground durability testing is in various stages of completion with F-35A at 12,000 hours (75 percent complete); F-35B suspended at 9,056 hours (57 percent complete) due to major bulkhead cracks; and F-35C at 10,000 hours (62.5 percent complete) with structural deficiencies being uncovered; discovery rates to date are as follows:
  - CTOL – 9 realized of 17 projected; 4 major versus 6 projected.
  - STOVL – 23 realized of 17 projected; 11 major versus 6 projected.
  - CV – 19 realized of 17 projected; 10 major versus 5 projected.
- The root cause of the F-35B test article's major bulkhead failure was determined, with fixes under development.
- Reliability: Performance across all variants is below the planned reliability growth curves established and expected for this phase of testing. Reliability has been a manageable factor for

flight test execution, although continued below-growth-curve performance will affect testing as the program moves into more complex mission system events.

- Two engine-related groundings delayed developmental flight testing about 2 months overall with the engine's third-stage rotor failure grounding resulting in about a 1.5-month delay.
- The test program completed the "rub-in" engine tests to assess the conditions leading to the original engine failure; the "Pre-Trench" engine stator modification is ongoing on DT aircraft. Estimating the final DT aircraft will be modified by the beginning of March 2015.
- ALIS is currently behind in development; the contractor is to present a new re-plan to the program office at the F-35 January 2015 Block Review Board. Meeting a July/August 2015 ALIS 2.0.1.0 initial operational capability (IOC) is medium to high risk. Stable ALIS operability with commensurate spare parts availability is a significant factor in maintaining efficient flight test execution.
- The F-35 program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted 2014 DT&E activities in accordance with the approved TEMP. DT&E aircraft groundings and late mission systems software delivery to flight test will delay Block 2B completion until late January/February 2015 vice late October 2014. Although the delay will have some impact on the Marine Corps IOC, it will negatively impact the Block 3i and Block 3F development, DT flight test schedules, and start of IOT&E.

Joint Light Tactical Vehicle (JLTV)

Executive Summary: The JLTV family of vehicles is expected to modernize the light tactical vehicle fleet and provide the joint Warfighter with a mobile, lightweight tactical vehicle capable of being transported by rotary-wing aircraft and other lift assets. The JLTV should provide increased force protection over the current up-armored high-mobility multipurpose wheeled vehicle (HMMWV). It will consist of a two-seat combat support variant (CSV) and a four-seat combat tactical variant (CTV), each expected to possess maximum commonality and a set of mission-specific components to meet the requirements of all mission packages. The CTV includes a general purpose vehicle, heavy guns carrier, and close combat weapons carrier. The CSV includes a utility/prime mover/shelter carrier.

The JLTV is intended to support deployment and operations across the full spectrum of Army and Marine Corps missions. The JLTV should interoperate in units with other tactical vehicles and weapon systems to provide maneuver, combat power, support, and sustainment. It is expected to provide increased force protection, reliability, maintainability, availability, payload, and fuel efficiency compared with current light tactical wheeled vehicles, while providing similar mobility, net-centricity, transportability, and a reduced logistical footprint.

Following the Technology Demonstration phase, the program entered the EMD phase in August 2012 and the Army awarded three contracts to AM General, Lockheed Martin, and Oshkosh. Before DT&E, each vendor delivered armor coupons and cab and chassis structures to support testing of force protection. In September 2013, each vendor delivered 22 vehicles (16 CSVs and 6 CTVs) to undergo DT&E.

The JLTV has eight key performance parameters (KPPs) (mobility, sustainment, transportability, net-ready (including information assurance), force protection, vehicle survivability, payload, and training) and four key system attributes (KSAs) (reliability, fuel efficiency, unit cost, and ownership cost).

By October 2014, the program completed the majority of EMD DT&E. Testing focused on validating KPPs and KSAs. Remaining testing, including corrosion, low-velocity airdrop (LVAD), sand slope mobility on CSV, and roof-crush on CSV, extended into FY 2015. Following source selection and MS C, one vendor will begin LRIP. LRIP vehicles will undergo production qualification testing (PQT), reliability qualification testing, full-up system-level live-fire testing, and multi-Service operational test and evaluation (MOT&E).

Lead DT&E Organization: ATEC MSED

Summary of FY 2014 DT&E Activities

- During FY 2014, the program executed all major elements of DT&E in accordance with the approved TEMP: soft soil and sand slope mobility; reliability; transportability; payload; command, control, communications, computers, intelligence, surveillance, and reconnaissance

(C4ISR) integration and interoperability; information assurance; live-fire; roof-crush; and fuel consumption.
- September–December 2013 and February–March 2014, the program conducted mobility soft soil testing.
- January 2014, the program completed the first phase of reliability growth testing (RGT) and Corrective Action Period (CAP) 1.
- February–April and November 2014, the program conducted automotive performance and corrosion testing.
- February–November 2014, the program conducted mobility sand slope testing.
- April 2014, the program conducted transportability testing during the combined DT/OT.
- April 2014, the program completed the second phase of RGT and CAP 2.
- May–November 2014, the program conducted vehicle roof-crush testing.
- July 2014, the program completed the third phase of RGT.
- October 2014, the program completed ballistic hull and system-level live-fire testing (completing all 50 tests).
- December 2014, the program conducted LVAD testing.

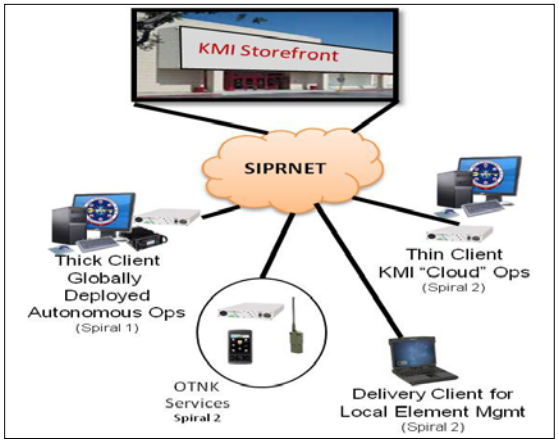
Summary of FY 2014 DT&E Engagement and Assessments
- DASD(DT&E) engaged with the Army in a series of working-level and integrated product team meetings to refine the Production and Deployment (P&D) test strategy of the JLTV LRIP configuration so that it minimizes discovery in MOT&E.
- DASD(DT&E) participated as a member of the OSD phase 1 peer review team to ensure that the P&D phase RFP accurately reflected vendor test support requirements consistent with the P&D test strategy.
- DASD(DT&E) is developing a DASD(DT&E) program assessment to support the MS C decision currently scheduled for the 4th quarter FY 2015. Emerging results show that almost all of the system KPPs and KSAs were met by at least one of the vendors, but no single vendor meets all KPPs and KSAs.
  - Mobility. The mobility KPP evaluates the ability of the JLTV to traverse fine-grained soils and ascend/descend sand slopes. The Army completed soft soil and sand slope testing on the CTV and CSV vehicles for all vendors.
  - Sustainment. The sustainment KPP evaluates JLTV operational availability (Ao) and materiel availability (Am), taking into account reliability, maintainability, and logistics delay time. The Army completed RGT on the CTV and CSV vehicles for all vendors.
  - Transportability. The transportability KPP evaluates the capability of the JLTV to be transportable by the CH-47F (a single sling-loaded vehicle) for 50 nautical miles and the CH-53K (two sling-loaded vehicles for 40 nautical miles) and by sealift to support strategic deployment and operational maneuver in accordance with Service concepts and programs.
    - The Army completed CH-47F transportability on the CTV vehicles for all vendors, but spreader bar failures precluded completion of CH-47F transport testing for the CSVs.
    - The CH-53K is still in development and not available to demonstrate JLTV dual sling-load capability. However, the CH-53K is expected to be able to lift two sling-loaded JLTV vehicles and transit 40 nautical miles. The Army did conduct dual-vehicle static lift testing.
    - The Army completed combined DT/OT to evaluate vehicle ability to load, traverse the deck spaces, and unload from prepositioning and amphibious vessels.
  - Payload. The payload KPP evaluates the capability of the JLTV to transport payloads, including essential mission role equipment, weapons and mounts, and vehicle occupants and

their associated sustainment loads.
    - The Army completed CTV and CSV payload testing to evaluate payload capacity.
  - Net Ready and Information Assurance. The Net Ready KPP evaluates the capability of the JLTV to continuously provide survivable, interoperable, secure, and operationally effective information exchanges to enable a net-centric military capability.
    - The Army completed interoperability and information assurance testing.
  - Survivability. The survivability KPP evaluates the ability of the JLTV to maintain structural integrity during a rollover event.
    - The Army completed CTV and CSV roof-crush testing for all vendors; however, the correlation between roof-crush testing and the survivability during a rollover event has not been established for any JLTV.
  - Fuel Efficiency. The fuel efficiency KPP evaluates JLTV fuel efficiency over representative terrain and fuel consumption while providing power to onboard systems during idle periods.
    - The Army completed CTV and CSV fuel consumption and idle fuel consumption testing for all vendors.
- The JLTV program conducted DT&E necessary to support the source selection process and adequately inform the MS C decision. Based on testing conducted to date, DASD(DT&E) provides the following recommendations to the Army and Marine Corps:
  - Ensure that PQT is scoped to verify design changes resulting from EMD.
  - Complete full-up JLTV cybersecurity testing during PQT prior to MOT&E.
  - Perform mission-based performance and reliability testing during the PQT prior to MOT&E.
  - Perform roof-crush testing with appropriate structures mounted on the roof and establish an initial link between these test results and survivability in a rollover event through analysis.
  - Conduct CH-53K sling-load transport of two JLTVs as soon as the CH-53K is certified for external airlift.
- The JLTV program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. Emerging results show that no single vendor meets all KPPs/KSAs, but the requirements are achievable with moderate risk. EMD DT&E data are sufficient to support source selection, and the program is on track for MS C in FY 2015 with low risk.

Key Management Infrastructure (KMI) Increment 2

Executive Summary: The KMI program is a vital element of the DoD defense-in-depth strategy, adopted to ensure the security posture for the Department of Defense Information Network (DODIN) by providing transparent cryptographic capabilities consistent with operational imperatives and mission environments. As a critical enabler to the DODIN information assurance (IA) strategy, KMI is characterized by the steady rollout of capability increments toward end-state IA objectives consistent with the overarching DODIN and cryptographic modernization capability requirements.



The program completed Spiral 1 in 2012, after emerging from a cost- and schedule-driven critical change review in May 2012. Spiral 2 is in development and is employing agile software development methods to expand KMI capabilities and services to all clients of the legacy Electronic Key Management System over the course of four 1-year spins. DASD(DT&E) approved an addendum to the Increment 2 TEMP covering Spiral 2 activities through the full deployment decision, currently scheduled for April 2017. The TEMP addendum allows for reduced testing for Spins 3 and 4 if Spin 2's DT&E 2 and the limited user test identify few problems.

Spin 1, DT&E 1 was delayed by approximately 45 days because of software defects. The retest for DT&E 1 also delayed DT&E 2, and the next retest and additional deficiencies discovered after the retest delayed the operational assessment (OA) by 60 days. The National Security Agency Service Acquisition Executive declared a KMI program deviation on August 29, 2014, because the program missed the Acquisition Program Baseline's Spiral 2, Spin 1 software release date in July 2014. The PMO's revised release date is January 31, 2015. Delays in Spin 1 completion impacted release testing for Spin 2, as significant manpower was required to fix deficiencies identified in DT&E 1 and 2 for Spin 1. The program office has been aggressive in addressing deficiencies, but the continued emergence of new errors warranted assessment of the contractor regression testing procedures.

Token reliability was identified as an issue during Spiral 1, and the program office implemented numerous fixes to address the issue. The program office is also revisiting the 10,000-hour (approximately 6 months mean time between failures) token reliability requirement with the Services. An independent contractor is investigating what token reliability is possible with the current technology. The PMO is also looking at a model to meet reliability requirements with two tokens.

Lead DT&E Organization: Joint Interoperability Test Command (JITC)

Summary of FY 2014 DT&E Activities

- March 3–14, 2014, the development contractor conducted DT&E 1, testing of Spin 1 capabilities.
- April 7–10, 2014, the development contractor retested Spin 1 capabilities to verify fixes of discrepancies noted in DT&E 1.
- April 9, 2014, DASD(DT&E) signed the TEMP Addendum for Spiral 2.

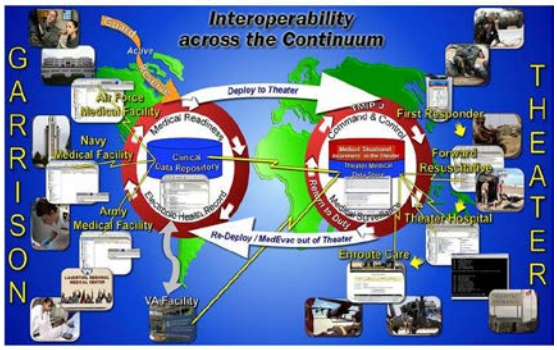
- April 30–May 15, 2014, JITC conducted DT&E 2.
- June 23–July 7, 2014, JITC retested Spin 1 capabilities to verify additional fixes and demonstrate readiness for OA.

Summary of FY 2014 DT&E Engagement and Assessments

- Spin 1, DT&E 1 identified 21 Priority 2 Discrepancy Reports (DRs).
- The DT&E 1 retest demonstrated fixes for the DRs, but also found six new Priority 2 DRs, which were corrected and verified before the DT&E 2 event.
- Spin 1, DT&E 2 identified 22 Priority 2 DRs, which necessitated the retest in June 2014.
- The DT&E 2 retest identified 11 additional high-priority DRs; therefore, the KMI PM delayed the OA by 60 days so that the KMI system engineers and developers could resolve the database problem and the software deficiencies.

Conclusion: The program successfully demonstrated Spiral 2, Spin 1 capabilities over the course of multiple rounds of DT. The required additional testing delayed fielding of the new capabilities by more than 6 months. Spin 1 delays have also impacted progress on Spin 2 development as resources were dedicated to fixing discrepancies noted in testing.

Theater Medical Information Program–Joint (TMIP-J)
Increment 2



Executive Summary: The TMIP-J suite of automated medical information applications integrates medical information systems to ensure seamless, interoperable support for rapid mobilization events, operational deployments, and sustainment of all tactical/fleet medical services. The system enhances clinical care and information capture at all levels of care in theater, transmits critical information to the theater commander, tracks the evacuation chain for combat and noncombat casualties, and forges the theater links of the longitudinal health record to the sustaining base and the Department of Veterans Affairs. The system design uses an open system architecture approach to integrate commercial off-the-shelf, Government off-the-shelf, commercial, and non-developmental items, thus accommodating changes and facilitating the integration of future systems and technology.

The TMIP-J Acquisition Strategy encompasses evolutionary acquisition with incremental integration of functionality and time-phased delivery of capabilities in defined increments with scheduled full releases to the Services for TMIP-J deployment in accordance with Service-approved concept of employment. The program is developing Increment 2 in three releases. Release 1 is fully deployed and Release 2 is now being deployed; the program is currently developing Release 3, the last TMIP-J release.

Release 2 provides approximately 90 percent of TMIP-J capability and functionality. Release 2 software successfully underwent a multi-Service operational test and evaluation in May–June 2013; all five KPPs were verified and validated. Testing results supported the Defense Acquisition Executive decision to approve a full deployment decision in December 2013. The program is projecting a Release 3 fielding decision in the 4th quarter FY 2015, followed by declaring full deployment in the 1st quarter FY 2016. The program will then enter into sustainment.

Lead DT&E Organization: Defense Health Clinical Systems, PEO DT&E Services

Summary of FY 2014 DT&E Activities

- December 2, 2013–April 21, 2014, the program conducted a series of five Release 2 Armed Forces Health Longitudinal Technology Application–Theater (AHLTA-T) medication administration record (MAR) system integration tests (SITs) to verify that the new features were functioning properly and to ensure that all previous functionality was not compromised.
- May 12–28, 2014, the PMO and the TMIP-J Air Force PMO jointly conducted AHLTA-T MAR functional system acceptance testing to ensure correction of software deficiencies identified in the SITs, assess the new functionality based on critical mission functions, and provide final verification of operating system reliability and proper functioning of the TMIP-J software on Air Force hardware platforms.
- August 5–December 19, 2014, the PMO conducted a series of Release 3 SITs in a lab setting using production-representative hardware and software to ensure that end-to-end functionality

meets the users' need and is sufficiently mature and stable to test its functional system characteristics.

Summary of FY 2014 DT&E Engagement and Assessments

- The PMO and the multi-Service system test team successfully developed the Release 3 T&E strategy; DASD(DT&E) approved the DT&E plan within the Release 3 TEMP on July 7, 2014.
- The program successfully completed planned T&E activities.
- The PMO resolved defects found during all Release 2 MAR events, leaving no unresolved Priority 1 or 2 or cluster 3-level defects.
- The PMO released the MAR to the Services in June 2014; the Services plan to begin using it in January 2015.
- Release 3 DT&E is currently on schedule; the program is on track and making favorable progress toward full deployment.
- The TMIP-J program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program successfully conducted FY 2014 Release 3 DT&E according to its approved DT&E plan. The program is on track and making favorable progress toward full deployment.

6.2 Army Programs

This section includes summaries of the following 9 programs:

- Armored Multi-Purpose Vehicle (AMPV)
- Distributed Common Ground System–Army (DCGS-A) Increment 1
- Excalibur M982E1 Precision Engagement Projectiles
- Guided Multiple Launch Rocket System–Alternative Warhead (GMLRS-AW)
- Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155)
- Integrated Personnel and Pay System–Army (IPPS-A) Increment I
- M109 Family of Vehicles (FoV), Paladin Integrated Management (PIM) Self-Propelled Howitzer (SPH) and Carrier, Ammunition, Tracked (CAT) Vehicle
- Precision Guidance Kit (PGK)
- Warfighter Information Network–Tactical (WIN-T) Increment 2

Armored Multi-Purpose Vehicle (AMPV)

Executive Summary: The AMPV is intended to replace the M113 Family of Vehicles (FoV), a set of vehicle platforms performing various support missions in the armored brigade combat team (ABCT). The AMPV should provide improved force protection, survivability, mobility, situational awareness, sustainment, and capability for future growth. The combined protection and automotive performance capabilities of the AMPV should enable all ABCT elements to maintain the same tactical momentum.

Five variants will constitute AMPV: general purpose, mission command, medical treatment, medical evacuation (ambulance), and mortar carrier.

The Army terminated M113 production in June 2007. In 2008, the Army conducted a combat and tactical vehicle study to identify implications of replacing the M113 FoV in the ABCT. This study resulted in an Initial Capabilities Document (ICD), approved in February 2010. In March 2012, the Defense Acquisition Executive authorized the Army to enter into the Materiel Solution Analysis phase and further approved commencement of the analysis of alternatives (AoA) to assess potential materiel solutions that could affordably satisfy the capability need documented in the ICD. The AMPV AoA assessed a number of alternatives to replace the existing M113 FoV, taking into account mobility, force protection, electrical power performance, sustainment, technical and schedule risk, and life cycle cost estimates. The results of the AoA informed formulation of the AMPV CDD across the five mission roles and shaped development of the RFP. The Joint Requirements Oversight Council validated the CDD in March 2013; the CDD identifies core AMPV capabilities. In November 2013, the USD(AT&L) provided authorization to the Army to release the EMD RFP. The Army plans to begin EMD in December 2014.

Lead DT&E Organization: ATEC MSED

Summary of FY 2014 DT&E Activities

- October 2013–September 2014, DASD(DT&E) engaged with the Army in a series of working-level and integrated product team meetings to refine a test strategy that supports development of an EMD phase TEMP and delivers the data needed to support a MS C LRIP decision.
- August 2014, DASD(DT&E) approved the DT&E Strategy in the AMPV TEMP in preparation for the MS B decision scheduled for December 2014.
- September 2014, DASD(DT&E) participated as a member of the OSD phase II peer review team to ensure that the Army complied with the source selection plan.

Summary of FY 2014 DT&E Program Engagement and Assessments

- During development of the EMD test strategy, DASD(DT&E) made the following recommendations:
  - Include cybersecurity testing during EMD.

  - Conduct testing in natural environments during EMD and P&D.
  - Include a Developmental Evaluation Framework as part of the TEMP to ensure that data requirements are clearly understood for critical technical and programmatic decisions.
- In response to these recommendations, the Army adopted a cybersecurity test strategy during EMD and P&D phases. The Army also planned to conduct climatic chamber testing to characterize performance in natural environments but has deferred the decision to conduct system-level testing in a tropical environment until test capabilities are better understood. DASD(DT&E) believes that climatic chamber testing is a necessary risk reduction event but not sufficient to evaluate performance in tropical environments.
- In June 2013, DASD(DT&E) assessed the EMD test strategy to support the MS B DAB, which was held in December 2013. Based on the test strategy and test planning completed by the time of the assessment, DASD(DT&E) assessed the AMPV DT&E program as medium risk for three reasons: the use of a platform-level rather than system-level reliability requirement, an aggressive test schedule, and a reliability growth program that called for about 40 percent of planned reliability growth prior to MS C. The test schedule assumed that the platform would be based on a military vehicle derivative with a high degree of commonality among variants. If this assumption is not realized, the program may have to revise the DT&E strategy. DASD(DT&E) also noted that the allocation of test assets prioritizes logistics support tasks over reliability test data collection.
- DASD(DT&E) recommended that the Army consider use of a system-level rather than platform-level reliability requirement to guide development and ensure that the developer delivers an overall system that meets the Army's needs. DASD(DT&E) also recommended that the program pursue more reliability growth before MS C to ensure that the system is mature before beginning LRIP.
- In response to these concerns, the Army developed system-level goals for each AMPV variant to support a system-level evaluation, but the developer will not be responsible for system-level reliability. The Army adjusted the reliability growth plan to pursue about 50 percent of planned reliability growth prior to MS C and increased the reliability incentive target in the EMD contract to incentivize the contractor to achieve more growth. The approved AMPV Reliability Growth Curve reflects that 50 percent of the growth is prior to MS C. The Army also added an in-process review before Government reliability testing to ensure that the program is ready to begin the formal Government reliability growth program.
- The AMPV program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program developed a comprehensive DT&E strategy for EMD that should support MS C with moderate risk. The Army awarded an EMD contract in December 2014.

Distributed Common Ground System–Army (DCGS-A) Increment 1

Executive Summary: DCGS-A is the Army's primary system for intelligence, surveillance, and reconnaissance (ISR) sensor tasking, data posting, information processing, and consolidating threat intelligence, weather, and terrain. The system synthesizes data from joint, interagency, and multinational sources, which provides for a current and detailed view of the operational environment. The program's agile acquisition structure provides for early operational release of new capabilities and accommodates changes driven by battlefield missions.

DCGS-A Increment 1 consists of three software releases. Release 1 (Secret) is fielded and includes the ISR Fusion Server, Geospatial Intelligence Workstation, Tactical Ground Station, and Intelligence Processing Center. Release 2 adds the Top Secret (TS) and Sensitive Compartmented Information (SCI) software and the Cross-Domain Solution to move data between Secret and TS/SCI enclaves. Release 3 begins to integrate the capabilities offered by cloud computing. The December 5, 2014, USD(AT&L) memorandum authorized deferral of Release 3 capabilities to DCGS-A Increment 2. Cloud functionality is expected to be delivered to test during FY 2016.

At the full deployment decision, the Defense Acquisition Executive authorized deployment of Release 1 capabilities and directed the PM to obtain OSD approval of a Release 2 T&E strategy and to return with test results before Release 2 fielding. The Army provided a T&E strategy to DASD(DT&E), after which, during April 2014, DASD(DT&E) approved the TEMP's DT strategy. The T&E strategy is heavily reliant on automated data collection to validate performance and isolate faults for corrective action. Through the conduct of testing in FY 2014, data collection, reduction, and analysis (DCRA) has been identified as a significant area of concern. Failure to validate the required DCRA process will increase risk of assessing system requirements.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2014 DT&E Activities

- The PMO briefed DASD(DT&E) during April and June 2014 on a revised TEMP and the PMO's evolving T&E strategy. The PMO briefings resulted in the DASD(DT&E) approving the DT portion of the TEMP.
- Functional Qualification Testing (FQT): The PMO conducted and DASD(DT&E) oversaw contractor testing of the Increment 1, Release 2 architecture during the 3rd and 4th quarters FY 2013. The PM's FQT validated the KPPs and KSAs and the family-of-systems architecture that went to Government DT.
- DT1: The PM twice deferred DT1 until the 2nd quarter FY 2014 because of system readiness issues. The PMO conducted and DASD(DT&E) observed DT1 at the Systems Integration Laboratory facilities at Aberdeen Proving Ground (APG), Maryland.
- Conduct of DT in FY 2014 was delayed on three occasions. Delays were driven by schedule changes, T&E readiness issues, and system stability. As a result of these delays, critical corrective action periods (CAPs) built into the approved T&E strategy were reduced. Reduction

in CAPs has amplified the risk of readiness to enter OT. Programs that maintain a schedule-driven DT&E program increase the risk of not meeting OT&E objectives.
- The PMO conducted system regression testing throughout FY 2014 to uncover and resolve new software bugs in existing functional and nonfunctional areas of the system.

Summary of FY 2014 DT&E Engagement and Assessments
- The PMO's initial T&E schedule efforts created high risk of attaining adequate time between test events to analyze DT results. As a result, the PM worked with the Army to produce a corrective action plan, which included extending the schedule to the right and spreading out all DT events.
- The January 2013 full deployment decision ADM direction to submit the TEMP to OSD within 90 days was overshadowed by changes to the PMO schedule and test venues and an inadequate test strategy to support Release 2 operational testing. The PMO continued to work T&E strategy issues and the DASD(DT&E) signed the DT portion of the TEMP in December 2013.
- The 1st quarter 2014 FQT threshold performances indicated that KPPs were testable. However, the number of software issue reports (SIRs) and the reliability KSA shortfall created moderate to high risk for DT1 readiness. In fact, "leading indicators" pointed to the program not being able to resolve sufficient critical SIRs required for the start of Government DT.
- The Army directed the start of DT1 (laboratory testing at APG, Maryland) during the 2nd quarter 2014 without attaining all entrance criteria. Consequently, critical standards within the DT1 test scope were not demonstrated. The inability to confirm full functionality of Release 2 during DT1 hindered the PMO's ability to demonstrate readiness to enter DT and reduced critical schedule timelines needed to correct faults. As a result of not demonstrating critical requirements, the PMO was required to conduct a follow-on DT event. DT2 was conducted in September 2014 at the Electronic Proving Ground, Fort Huachuca, Arizona. The scope of DT2 included the use of trained operators in an operational-like environment (e.g., deployment of tactical network infrastructure). The test successfully introduced critical components of high-side (TS/SCI) capabilities associated with data fusion and cross-domain data dissemination.
- DT2 was delayed four times until September 2014 because of immature software and systems performance and reliability issues. Emerging results indicate that PMO analysts collected the required data for further analyses and that the system will have difficulty satisfying limited user test (LUT) entrance criteria.
  - DASD(DT&E) assesses high risk that the system will attain the reliability KSA requirement threshold before the planned LUT. The DCGS-A system reliability exit criteria were not met because the program reduced test time from 21 to 10 test days and because excessive system aborts occurred whereas none was expected. The PMO is working with its T&E leadership to discuss reliability mitigation options that must be accomplished before entering into the LUT.
  - DASD(DT&E) assesses moderate to high risk that the additional testing in the coming months and the transition from DT2, conducted at Fort Huachuca, Arizona, to LUT, conducted at Fort Bliss, Texas, will result in more systems issues that will have to be addressed before Release 2 fielding.
  - Thus far, the system has not met DT exit criteria required to demonstrate readiness for the LUT. However, the PM is developing a "get-well plan" to mitigate and demonstrate KPP and KSA requirement thresholds before entering the next phase of T&E.
- The DCGS-A program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: Conduct of DT during FY 2014 highlighted several critical issues. The Release 2 event-driven T&E schedule increases the risk of demonstrating system requirements, making it

unlikely that the PMO will be able to satisfactory demonstrate reliability and or system maturity metrics needed to meet the 3rd quarter FY 2015 LUT entrance criteria. Post-DT2 activities, the PMO developed an aggressive corrective action plan to help mitigate OT readiness risk. Secondly, ensuring readiness of evaluation tools is a critical aspect of analyzing test readiness. The test community's inability to properly collect and reduce data compromises the ability to fully assess system requirements. Lastly, DT in a robust operational-like environment (i.e., the use of trained Soldier operators in a tactical setting) reduces the risk of discovery during an OT event and allows for improvements to user interfaces and training while the system is still in development. This has not occurred since DT2 completion and increases LUT risk.

Excalibur M982E1 Precision Engagement Projectiles

Executive Summary: Excalibur is a cannon-delivered, precision engagement, extended-range family of indirect-fire artillery projectiles that are self-guided to a preprogrammed aim point. The Block I variant is a unitary projectile composed of three major subsystems: base, warhead, and guidance section. Block I, Increment la is currently in FRP and is forward deployed providing precision fires capability in operational theaters. The Increment lb makes updates to the guidance, navigation, and control section and the fuze, safe, and arm component.

Increment lb is intended to fill current and future force capability gaps for the brigade combat team while improving theater agility and munitions efficiency. Increment lb is intended to provide precision engagement at extended ranges, capable of eliminating the shortcomings of current area engagement munitions by enabling the maneuver commander to engage critical targets, including fleeting and short-dwell targets, with increased precision, range, and lethality while minimizing collateral damage in the target area. The Excalibur is fired from the joint lightweight 155-millimeter howitzer with towed artillery digitization (M777A2), Paladin (M109A6), and Paladin Integrated Management (M109A7).

Increment lb is an ACAT IC program that entered the P&D phase in December 2012. The Army completed a second phase of DT in December 2013 and executed IOT&E in January 2014. In June 2014, the Army Milestone Decision Authority provided authorization to enter FRP.

Lead DT&E Organization: ATEC AFED

Summary of FY 2014 DT&E Activities

- During FY 2014, the Army continued Increment 1b reliability growth testing to improve reliability. Testing continues post-IOT&E to address the two remaining fuze failures and one remaining inertial measurement unit (IMU) failure, all of which are considered low risk of occurrence.
- November–December 2013, the Army conducted Army Interoperability Certification testing on the Increment 1b projectile to verify, validate, and accredit system software functionality and to evaluate system interoperability.
- December 2013, the Army conducted the first article test (FAT). The FAT evaluated the Increment 1b projectile configuration and production processes prior to IOT&E.
- March, May, and August 2014, the Army conducted a series of three lot acceptance tests (LATs) for the Increment lb projectile. After the Increment 1b projectile undergoes rigorous vibration and thermal conditioning, a LAT is conducted to evaluate each production lot before the Army can accept delivery.
- April 2014, the Army completed electromagnetic environmental effects (E3) testing. This testing evaluated the Increment 1b projectile's ability to meet its operational and safety performance requirements when subjected to prescribed electromagnetic environmental and emission conditions.

- May 2014, the Army completed the final LAT for the Increment la projectile. The LAT evaluated the live-fire performance of the last la production lot (Increment la-2).
- August 2014, the Army completed durability life testing (DLT) of the Increment 1b projectile. DLT evaluated the projectile's potential to experience degradation after being stored for at least 20 years. Accelerated aging methods were used to simulate the effects of long-term storage.

Summary of FY 2014 DT&E Engagement and Assessments

- Prior to IOT&E, the Army conducted a rigorous DT&E that improved reliability and virtually eliminated discovery during IOT&E. By October 2014, the Army successfully resolved nine of 11 Increment 1b failure modes resulting in high reliability of 94 percent that exceeded the requirement of 90 percent. The remaining two failure modes (GPS and IMU accelerometer) represent a low risk of reoccurrence. The PMO is pursuing a next-generation IMU that should correct the known IMU accelerometer failure mode; this IMU is scheduled for production cut-in in the 1st quarter FY 2015. No resolution is planned for the GPS failure.
- The FAT series consisted of 30 Increment 1b projectiles. Test results showed that 28 of 30 projectiles guided accurately to the target and 27 detonated in the proper fuze mode. One projectile successfully guided to the target but failed to detonate (fuze failure). One projectile failed to guide to the target and flew to the ballistic impact point (BIP) after an IMU bias failure. One projectile failed to guide to the target and flew to the BIP after the GPS receiver lost time (no planned fix) and the IMU suffered an IMU accelerometer hard failure.
- Excalibur successfully completed the final phase of the E3 test series. Test results showed that no major issues were observed during transient testing to include the direct-strike lightning test. However, the external radio frequency electromagnetic emissions testing revealed some low-risk anomalies at certain frequency bands. These anomalies are not considered a risk to either safety or performance. The Army is implementing a software fix in future production that may further mitigate effects. The hazards of electromagnetic radiation to ordnance (HERO) tests indicate that Excalibur lb is safe, is survivable, and meets requirements following exposure to HERO environments.
- The LAT series consisted of 32 Increment 1b projectiles for production Lot 1 (10/11 rounds), Lot 2 (10/10 rounds), and Lot 3 (10/11 rounds) in March, May, and August 2014, respectively. All projectiles were subjected to environmental conditioning and fired. Test results show that 30 of 32 projectiles accurately guided to the target and detonated in the proper fuze mode. One projectile fuze failed-set on four consecutive attempts, before working as designed, and was not fired and scored as a failure. One projectile accurately guided to its target but experienced a low-level detonation. Although that target was not part of the Excalibur target set, this projectile was scored a failure. On average, the circular error probable (CEP) for 30 LAT Lots 1–3 projectiles is 1.36 meters and exceeds the CEP requirement. LAT Lots 1–3 testing demonstrated a reliability point estimate of 93.7 percent (lower confidence level of 80 percent, with 80 percent confidence), also exceeding the reliability requirement.
- The final Increment 1a LAT consisted of nine projectiles. Test results showed that nine of nine projectiles demonstrated successful hood discard, fin and canard deployment, maneuver authority, and detonation in the proper fuze mode.
- The DLT series consisted of eight Increment 1b projectiles. The Army exposed the eight projectiles to 9 months of accelerated pre-fire temperature and humidity cycling. Six projectiles were fired while two projectiles await disassembly to facilitate examination of internal components for evidence of degradation. Emerging data from the DLT show that six of six Increment 1b projectiles demonstrated successful hood discard, fin and canard deployment, maneuver authority, and detonation in the proper fuze mode.

- In total, the Army fired 100 Increment 1b LRIP projectiles as part of FAT (27/30 rounds), IOT&E (31/32 rounds), LAT Lots 1–3 (30/32 rounds), and the DLT (6/6 rounds). Ninety-four out of 100 LRIP projectiles accurately guided to the target and detonated in the proper fuze mode demonstrating a reliability point estimate of 93.6 percent (lower confidence level of 90 percent, with 80 percent confidence).
- Overall, DT&E test results showed that the Increment 1b program met five of five KPPs.
- In August 2013, DASD(DT&E) provided the Army with a DASD(DT&E) program assessment to support the Army's LRIP 2 decision. In January 2014, DASD(DT&E) published a final DASD(DT&E) program assessment to inform the Army's OTRR process and decision to enter IOT&E at the conclusion of FAT.
- DASD(DT&E) approved the DT&E strategy in the Excalibur Increment lb FRP TEMP update on January 7, 2014, to support the FRP decision.
- The Excalibur program did not request a waiver or deviation from requirements in the TEMP.

DASD(DT&E) Program Assessment

- The January 2014 assessment showed that three KPPs were met: Unjammed Accuracy (KPP 2), Reliability (KPP 4), and Maximum Range (KPP 5). Two primary critical technical parameters (CTPs) were also met: Minimum Range and Jammed Accuracy. The assessment showed that two KPPs were partially met: Net Ready (KPP 1) and Effectiveness (KPP 3) and that the program achieved an assessed reliability point estimate of 90 percent (lower confidence level of 79 percent, with 80 percent confidence). At the time of the assessment, five of 11 low-risk-of-occurrence failure modes remained under investigation.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. The Army conducted and completed a rigorous DT&E that virtually eliminated discovery during IOT&E. The program is meeting all KPPs and began FRP in June 2014.

Guided Multiple Launch Rocket System–Alternative Warhead (GMLRS-AW)

Executive Summary: The GMLRS-AW is a solid propellant artillery rocket deployed from the M270A1 Multiple Launch Rocket System (MLRS) or the lighter wheeled M142 High Mobility Artillery Rocket System mobile launch vehicle launchers as well as, potentially, the European Fire Control System-equipped MLRS launchers. GMLRS-AW uses an inertial measuring unit with GPS assistance to guide the rocket to a specific point to deliver effects on a target. GMLRS-AW is transported and fired from a launch pod container (LPC) that holds six rockets. The GMLRS-AW is intended to satisfy the same requirements as the M30 (GMLRS Dual-Purpose Improved Conventional Munitions), while significantly decreasing the probability of unexploded ordnance (UXO). The Alliant Techsystems-designed GMLRS-AW is a conventionally shaped enhanced 200-pound fragmentation assembly filled with PBXN-110 high explosive. Upon detonation, the explosive accelerates two layers of preformed tungsten fragments that are optimized to defeat required targets.

The mission of the GMLRS-AW is to attack/neutralize/suppress/destroy targets using rocket-delivered indirect precision fires, while decreasing the probability of UXO. GMLRS-AW provides field artillery units with medium- and long-range fires while supporting brigades, divisions, corps, joint/coalition forces, and Marine air-ground task forces in full, limited, or expeditionary operations.

The program entered EMD in the 2nd quarter FY 2012 and completed all contractor and Government DT in the 3rd quarter FY 2014. Because the program used production-representative test articles during EMD, the Army conducted IOT&E during EMD and modified the acquisition strategy to combine the MS C and FRP decisions. Because the Army completed EMD DT&E on schedule and completed IOT&E in advance of MS C, the Army was able to accelerate its timeline for the MS C/ FRP decision 22 months earlier than the initial acquisition strategy.

Lead DT&E Organization: ATEC AFED

Summary of FY 2014 DT&E Activities

- July 2013–June 2014, the GMLRS-AW completed software qualification tests to verify the integration of the GMLRS-AW rocket capability into the existing MLRS fire support/mission execution structure (MLRS common test equipment, rocket, launcher, and command and control (C2)).
- October 2013–January 2014, the GMLRS-AW completed payload arena tests to verify warhead fragmentation characteristics/radius/performance in accordance with Joint Munitions Effectiveness Manuals, determine effectiveness, and generate performance data.
- October 2013–March 2014, the GMLRS-AW completed stockpile-to-target sequence (STS) tests to verify LPC and flight rocket durability/functionality and that the GMLRS-AW remains safe

for firing after exposure to the climatic and dynamic (transportation and handling) environments after exposure to STS conditions.
- October 2013–June 2014, the GMLRS-AW completed developmental flight tests to evaluate AW performance, verify system technical performance to meet operational requirements and interoperability with the M142 and M270A1 launchers, and demonstrate system software (launcher, rocket, and C2).
- January–May 2014, the GMLRS-AW completed insensitive munitions (IM) assessment tests to characterize and determine the response and level of IM compliance to the various unplanned stimuli as described in the following tests: sympathetic detonation, bullet impact, fragmentation impact, fast cook off, slow cook off, and shaped charge jet.
- January–June 2014, the GMLRS-AW completed hazards assessment tests to determine possible hazards/safety response after a loaded LPC is dropped from a height of 40 feet (a Navy ship transportation requirement required for hazard classification) and completed cook-off tests.
- February 2014, the GMLRS-AW completed Government system integration tests to verify platform/rocket, simulators, and C2 system (Advanced Field Artillery Tactical Data System (AFATDS)) compatibility and interfacing to ensure that the incorporation of the GMLRS-AW does not affect/degrade existing MLRS family of munitions variants already in place.
- February–April 2014, the GMLRS-AW completed electromagnetic environmental effects (E3) tests to determine operational capability and possible hazards and characterize the GMLRS-AW rocket pod prelaunch operational performance and rocket in-flight performance in an E3 electromagnetic radiation operational situation.
- April–June 2014, the GMLRS-AW completed explosive ordnance disposal tests to verify and validate the render safe and destructive disposal/destruction procedures of a GMLRS-AW LPC.

Summary of FY 2014 DT&E Engagement and Assessments
- Prior to IOT&E and as outlined in the TEMP, the Army conducted and completed a rigorous DT&E that should serve to minimize discovery during IOT&E.
- The Army successfully completed all ground and flight testing and the system demonstrated the ability to meet four of four KPPs.
- In October 2014, DASD(DT&E) published a DASD(DT&E) program assessment to support the combined MS C/FRP decision scheduled for the 2nd quarter FY 2015. Based on the DT&E conducted at the time of the assessment, DASD(DT&E) recommended that the program continue with IOT&E and proceed to the combined MS C/FRP as planned. The results of the evaluation are summarized below.
- The GMLRS-AW program did not request a waiver or deviation from requirements in the TEMP.

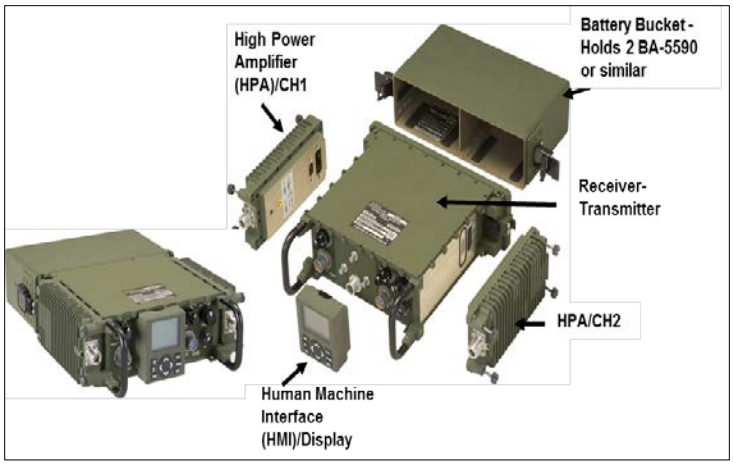
DASD(DT&E) Program Assessment
- In October 2014, DASD(DT&E) assessed system performance, reliability, interoperability, and cybersecurity and published a DASD(DT&E) program assessment to support the combined MS C/FRP decision scheduled for the 2nd quarter FY 2015. The summary of the evaluation follows:
  - Performance. DT results show that the program is meeting all four KPPs and all six CTPs. The GMLRS-AW is meeting or exceeding requirements for Range (KPP 1), Effectiveness (KPP 2), UXO Rate (KPP 3), and Reliability (KPP 4). The PMO fired 35 rockets from various distances and all impacted on target, meeting area and point target damage inflicted requirements, and with zero UXO because GMLRS-AW is a fragmentation round with zero cluster submunitions.

- Reliability. DT data show that GMLRS-AW reliability is on the reliability growth curve, with a point estimate reliability of both the warhead and rocket system of 1.0 (point estimate) throughout DT. Based on consistency of system configuration between tests, and assuming negligible effects of test conditions, it is possible to combine all DT flight tests to improve confidence in the system reliability. The combined reliability for all 35 shots during DT produces a reliability point estimate of 1.0, with a two-sided 80 percent lower confidence bound of 0.94, which surpasses the requirement of 0.92. GMLRS-AW reliability meets the requirement with statistical confidence.
- Interoperability. The Army certification was completed on July 25, 2014. Tests were conducted between January 2013 and June 2014 at the Lockheed Martin facility and at both Central Technical Support Facilities at Fort Hood, Texas, and White Sands Missile Range, New Mexico. GMLRS-AW launcher Software Suite 7.11 tri-annual interoperability testing was successfully conducted in July 2014. The AFATDS software used during this event and during the developmental/operational test event verified that there were no interoperability issues and satisfied the interoperability certification requirements.
- Cybersecurity. The GMLRS-AW does not interface with the Global Information Grid (GIG), nor does it interact, after launch, with the fire support system or the GIG other than to passively receive GPS signals. Therefore, the cybersecurity assessment is focused on the launchers.
  - All related systems and subsystems have completed their DoD Information Assurance Certification and Accreditation Process and have received their Authorization to Operate.
  - A GMLRS vulnerability assessment conducted in June 2014 identified some low-risk vulnerabilities. These vulnerabilities should be considered for reevaluation and potential exploitation during the red team testing in late 2014.

- Based upon DT conducted at the time of the assessment, DASD(DT&E) recommended that the program continue with IOT&E and proceed to the combined MS C/FRP as planned.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. The Army conducted and completed a rigorous DT&E that should serve to minimize discovery during IOT&E. DT&E shows that the program is meeting all KPPs. The program is on track for a combined MS C/FRP decision in the 2nd quarter FY 2015.

Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155)



Executive Summary: The Army PMO for Tactical Radios has responsibility for development of the MP radio. The HMS MP is an ACAT ID program; Increment 1 of the HMS MP, the AN/PRC-155, is a Type I encryption security-capable, two-channel voice and data software definable radio that operates the following threshold-required waveforms: single-channel ground and airborne radio system (SINCGARS), demand assigned multiple access (DAMA) satellite communications (SATCOM), and Soldier radio waveform (SRW). It is employed at brigade and below echelons, down to the platoon leader echelon. It is also designated as the initial ground terminal for the Navy's Mobile User Objective System (MUOS) program. The MP radio is employed in both mounted and dismounted configurations and includes a handset, batteries, antennas for each waveform, power adapters, key and configuration loading devices, and a dismounted carrier or vehicle installation kit. The MP radio provides the Warfighter with a software-programmable, networkable, multimode radio to implement simultaneous voice, data, and video/imagery communications.

The first LRIP quantity was limited to 100 radios to support development and testing. In October 2012, the USD(AT&L) authorized the Army to procure 3,726 radios for LRIP 2 to ensure orderly ramp-up of production capacity, provide test assets for further developmental and operational tests, and facilitate fielding in accordance with Army deployment schedules. The combined LRIP quantity (3,826) is 6 percent of the total planned procurement of approximately 73,000. The HMS MP program focused its FY 2014 DT activities on demonstrating fixes for performance issues from FY 2012–FY 2013 OT and DT. In the 1st quarter FY 2014, the Army requested an LRIP 2 increase of 1,500 MP radios to fill the delivery gap between the end of the current LRIP and the expected start of FRP in support of the Army's plans for Capability Set 15 deployment.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2014 DT&E Activities

- January 13–February 24, 2014, ATEC conducted Government Developmental Test (GDT) 4 before execution of the MP follow-on operational test and evaluation (FOT&E) as part of the Army's Network Integration Experiment (NIE) 14.2, which was conducted in May–June 2014. GDT 4 was designed to validate corrective actions for issues identified in previous test events. GDT 4 also assessed capabilities that had not been previously tested and allowed collection of reliability data to assess mean time between effective function failure (MTBEFF).
- In the 3rd and 4th quarters FY 2014, JITC conducted joint interoperability testing for SATCOM waveform certification. JITC conducted the testing at Fort Huachuca, Arizona, for the PM Tactical Radios.

- MP radios are designated as the initial ground terminal for MUOS. MP radios were integrated by the PM Tactical Radios into the MUOS FY 2014 end-to-end testing and integration events, including the major DT On-Orbit System Validation 2 (OSV-2).

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) provided a DASD(DT&E) program assessment to the USD(AT&L) in the 1st quarter FY 2014 in support of the Army's request for an increase of 1,500 MP radios. The DASD(DT&E) program assessment was primarily based on DT results from GDT 3 (September–October 2013) and recommended approval for procurement. The details were reported in the FY 2013 annual report.
- DASD(DT&E) provided an emerging results assessment from GDT 4 in support of the OTRR for FOT&E in NIE 14.2, conducted in the 3rd quarter FY 2014. The details are as follows:
  - Performance
    - The KPP 1 threshold requirement is to provide networked voice and data exchange (i.e., mission command information) to support tactical actions while dispersed across the battlefield. In GDT 4, all three threshold waveforms—SRW (L-band, ultrahigh frequency (UHF)), SINCGARS, and SATCOM (UHF and DAMA MIL-STD-188-182/183A compliant)—networked voice communications call completion rate exceeded 90 percent. Message completion rate for automated position location information data over SRW (UHF and L-band) exceeded 90 percent.
    - The radio successfully demonstrated threshold range for networked voice communications for dismounted (5 kilometers) and mounted (10 kilometers) in static operations for SINCGARS. A 40-node SRW and SINCGARS network was successfully demonstrated.
    - The joint enterprise network manager successfully loaded the MP radios with all three threshold waveforms (except DAMA SATCOM MIL-STD-188-182A) and network presets.
    - For KPP 3, Operational Availability (Ao), each channel of the MP must demonstrate an Ao of 0.96 (threshold) and 0.99 (objective). GDT 4 did not provide the conditions for accurate maintenance and repair time data collection, which is a core factor for calculating Ao. Therefore, no Ao threshold calculation was assessed in GDT 4, and it remains an unknown KPP 3 performance value.
    - The KPP 4, Multichannel Operations, threshold value specifies that the MP radio must have the ability to route and retransmit KPP waveforms. The radio effectively demonstrated cross-channel routing and retransmission of voice and data communications for SRW, and voice communications for SATCOM and SINCGARS (except SINCGARS-SINCGARS). Also, simultaneity of transmission of voice communications was successfully demonstrated for all three threshold waveform combinations.
    - For completeness, it should be noted that KPP 2, Net Ready, was successfully demonstrated in FY 2013.
  - Reliability. MP system reliability is still significantly below the threshold value and has not improved significantly since GDT 3. Each MP channel, independent of waveform, has at least an 86 percent probability of operating over a 72-hour period without an effective function failure, which translates to at least 477 hours MTBEFF at the 80 percent lower confidence bound (LCB). In GDT 4, the MTBEFF point estimate was 217 hours and the LCB estimate was 190.8 hours. In GDT 3, the MTBEFF point estimate was 190 hours and the LCB estimate was 146 hours.

- The HMS MP program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program office is developing a TEMP for OSD approval in support of the FRP competitive non-developmental item (NDI) procurement phase. The HMS MP program focused its FY 2014 DT activities on demonstrating fixes for performance issues from FY 2012–FY 2013 DT and OT, and in support of the transition from the LRIP to FRP competitive NDI procurement strategy. The program office continues to make progress toward correcting known test deficiencies in preparation for FOT&E activities.

Integrated Personnel and Pay System–Army (IPPS-A) Increment I

Executive Summary: IPPS-A is the implementation of a single, integrated military personnel and pay system for the Army that will provide management functionality for all three Army components. It will be a Web-based tool, available 24 hours a day, accessible to Soldiers, human resources professionals, combatant commanders, leaders, personnel and pay managers, and other authorized users throughout the Army. The program addresses major deficiencies in the delivery of military personnel and pay services and provides internal controls and audit procedures that prevent erroneous payments and loss of funds. The acquisition strategy calls for the program to deliver the system in two increments with multiple releases. Increment I provides the foundation for an authoritative database and infrastructure for Increment II.

Increment I affords the Army several capabilities not currently available: consolidation of personnel data from all components into a single trusted source; enhanced visibility of personnel across all components; and new multi-component reports, including a Soldier Record Brief (SRB) for all Soldiers. The SRB will serve as a management tool used to make decisions regarding the utilization of Soldiers. It displays a Soldier's military career personal information, qualification skills, training, assignment history, and various other Soldier attributes.

The Army is deploying Increment I in three waves: Army National Guard, Wave 1; Active Army, Wave 2; and Army Reserve, Wave 3. The Army deployed Wave 1 upon MS C approval in February 2014 and Wave 2 in August 2014 based on a release deployment decision (RDD). Following a successful system acceptance test (SAT) and RDD, the Army deployed Wave 3 during the 1st quarter FY 2015. The program plans full deployment (FD) for the 2nd quarter FY 2015, followed by Increment I entering sustainment.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2014 DT&E Activities

- September 6–November 21, 2013, the PMO conducted a contractor/Government combined unit-level Wave 1 capability acceptance test (CAT) to verify that each configuration item (CI) meets requirements and performs as expected in a production-like environment.
- November 25–December 27, 2013, the PMO performed a contractor/Government combined Wave 1 developer integration test (DIT)/system integration test (SIT) to evaluate the fully integrated system in the production environment.
- January 7–9, 2014, the PMO led a Wave 1 SAT Government test to evaluate the fully integrated system using typical end users in their operational environment.
- March 19–May 30, 2014, the PMO executed a contractor/Government combined Wave 2 product-level test (PLT)/CAT of the CIs, including integration of the dependent CIs, performed in a lab environment.
- May 30–July 2, 2014, the PMO conducted a DIT/SIT full integration event to ensure that Wave 2 satisfies the system specifications and the system's critical design.

- July 9, 2014, the PMO tested the fully integrated system in an operationally realistic environment executed by typical end users during a Wave 2 SAT.
- July 15–17, 2014, the PMO accomplished an end-to-end test of the program's infrastructure capabilities executed by end users in an operational environment.
- August 4–September 26, 2014, the PMO conducted a Wave 3 PLT/CAT to validate Army Reserve data and began testing privileged user capability.

Summary of FY 2014 DT&E Engagement and Assessments

- The program successfully completed planned FY 2014 DT&E activities according to its approved TEMP; Increment I is on track and making favorable progress toward FD.
- The PMO successfully resolved defects found during DT events for all three waves, leaving no unresolved Priority 1 or 2 defects.
- All three waves met threshold values for the Net-Ready KPP, Data Accuracy KPP, and critical technical parameter (CTP).
- The PMO validated Army Reserve data during Wave 3 PLT/CAT; Wave 3 DT events were successfully completed.
- The IPPS-A program did not request a waiver or deviation from requirements in the TEMP.

DASD(DT&E) Program Assessment

- DASD(DT&E) conducted a DASD(DT&E) program assessment of the IPPS-A Increment I, Wave 1, in February 2014 to support the MS C decision. The assessment concluded that the program met all Increment I Net-Ready and Data Accuracy KPPs threshold values during Wave 1 DT. The CTP met the objective value. DASD(DT&E) did not have sufficient data to evaluate Waves 2 and 3. Based on Wave 1 performance and emerging Wave 2 data load/ validation results, DASD(DT&E) assessed meeting Waves 2 and 3 KPP threshold values as low risk. The summary of the DASD(DT&E) evaluation based on Wave 1 DT results follows:
  - Performance/Interoperability
    - Data indicated that the system established necessary Wave 1 interfaces, successfully ingested National Guard data into the Increment I database, and was meeting responsiveness and accuracy threshold requirements.
    - Wave 1 met threshold values for the Net-Ready KPP and Data Accuracy KPP.
    - Wave 1 met the CTP objective value to produce an image of a printable SRB.
    - Selected Soldiers took a survey to record their user experience with the system and results were positive.
  - Availability/Reliability
    - DASD(DT&E) was unable to assess the Availability KPP (repair time) as there were no unscheduled downtimes during DT.
    - The program successfully completed a disaster recovery to a secondary site on December 27, 2013.
    - The program successfully completed an infrastructure test, which consisted of a continuity of operations and a demonstration of IPPS-A ability to recover from hardware failures, on July 15–17, 2014.
    - Increment I software was stable with no open Priority 1 or 2 System Problem Reports (SPRs) and Government-approved work-arounds for all Priority 3 SPRs.
    - The program met the Wave 1 DT&E event exit criteria and the Production and Deployment (P&D) phase entrance criteria.

- Cybersecurity
  - The program obtained a Designated Approving Authority-approved interim authority to operate on November 25, 2013.
  - The Army conducted vulnerability and penetration testing resulting in medium- and low-level findings; the program implemented fixes to correct the issues and conducted a verification of fixes demonstration.
- Recommendations. Based on positive Wave 1 DT results, plus ongoing efforts to implement and validate cybersecurity fixes, DASD(DT&E) recommended that IPPS-A Increment I enter the P&D phase, including immediate deployment of Wave 1 and deployments of Waves 2 and 3 following successful SAT.

Conclusion: The program successfully completed planned FY 2014 DT&E activities according to its approved TEMP. The program is on track and making favorable progress toward FD.

M109 Family of Vehicles (FoV), Paladin Integrated Management (PIM) Self-Propelled Howitzer (SPH) and Carrier, Ammunition, Tracked (CAT) Vehicle

Executive Summary: The M109A7 FoV program consists of two individual platforms: an SPH and a CAT vehicle. The SPH is an aluminum armored, full-tracked 155-millimeter vehicle, capable of carrying a minimum of 39 projectiles and a minimum of 26 modular artillery charge system canisters. The CAT supplies the SPH with ammunition as it provides tactical and operational fires during both offensive and defensive operations. The CAT will be capable of carrying a 12,000-pound (5,454 kilogram) ammunition payload and can be configured for various ammunition needs and specifications. Both the SPH and CAT incorporate a newly designed hull, a modified Bradley fighting vehicle (BFV) power train and suspension system, the future BFV track, a modernized 600-volt electrical system, and a microclimatic conditioning system intended to improve sustainability over the current Paladin/field artillery ammunition support vehicle fleet. The SPH also includes an automated fire control system.

The primary mission area for the M109A7 FoV is force application-engagement. The M109A7 FoV supports combined arms maneuver, wide-area security, and other full-spectrum operations as part of the land component of a joint task force. The M109A7 FoV is planned to be employed as part of a fires battalion in the Armored Brigade Combat Team (ABCT) and the fires brigades, but it will be fully capable of supporting any brigade combat team. Targets include the full range of materiel, personnel, and structures.

As an ACAT II program, the Army Acquisition Executive approved entry into EMD in the 4th quarter FY 2009. As a result of program restructure and cost increases, the USD(AT&L) designated M109A7 as an ACAT ID program in June 2011. DT&E started in May 2011 at Yuma Proving Ground, Arizona, and Aberdeen Proving Ground, Maryland, in accordance with the draft TEMP and ATEC detailed test plans. During FY 2011 and FY 2012, the program began the production proveout test (PPT), completing the first phase and entering into the second phase of a three-phase DT plan. The first phase of DT used four prototype SPH platforms and one prototype CAT platform to conduct the first segment of the SPH reliability growth program, SPH firing performance, automotive performance, and a 1,500-mile (of the planned 2,400 miles) reliability, availability, and maintainability (RAM) demonstration conducted on the prototype CAT. Phase 2 of DT began with refurbishment and upgrades to the vehicles to incorporate fixes to problems identified during phase 1 and earlier contractor testing. During FY 2013, the program completed PPT, software verification efforts, a logistics demonstration, the second segment of the SPH reliability growth program, SPH firing performance, automotive performance, and a 1,100-mile RAM demonstration on the CAT. Phase 2 also includes post-MS C testing to verify corrective action, producibility improvement, and obsolescence (CPO) changes; first article testing (FAT); software developmental qualification testing (DQT); component-level live-fire testing; a logistics technical manual (TM)

review; and software formal qualification test (FQT). Phase 3 DT will use LRIP vehicles for production qualification testing (PQT), involving eight SPHs and five CAT vehicles. In October 2013, the USD(AT&L) conducted a MS C review and authorized the program to enter the P&D phase and begin LRIP.

Lead DT&E Organization: ATEC AFED

Summary of FY 2014 DT&E Activities

- During FY 2014, the program executed all major elements of DT&E in accordance with the approved TEMP.
- The PMO continued testing to verify CPO changes aimed at evaluating changes to LRIP subsystems and components to meet requirements prior to system-level testing in PQT.
- The PMO completed software DQT, component-level live-fire testing, and a logistics TM review.
- The PMO completed the majority of planned line-replaceable unit (LRU)-level qualification testing (FQT) in FY 2014 with the exception of the heat exchanger. Heat exchanger qualification testing is expected to be completed in the 2nd quarter FY 2015.
- In September 2014, the PMO began LRU FAT.
- In October 2014, the PMO began software version 3.1 FQT.

Summary of FY 2014 DT&E Engagement and Assessments

- CPO testing is on track to support LRIP and PQT.
- The FAT originally scheduled to end in December 2014 is now projected to end in May 2015. The FQT originally scheduled to end in January 2015 is now projected to end in April 2015 for the SPH and in June 2015 for the CAT. The FQT and FAT schedule slips have the potential to negatively impact the start of PQT (specifically the logistics demonstration) and could adversely impact test article configuration.
- In June 2013, DASD(DT&E) approved the DT portion of the TEMP with the caveat that the Army submit and obtain approval of updated portions of the TEMP that incorporate the results of an analysis regarding DT in natural environments and recent coordination pertaining to cybersecurity testing. The PM has developed and coordinated TEMP updates regarding cybersecurity and environmental testing. The PM will submit TEMP change pages to DASD(DT&E) for final approval before the start of PQT.
- In August 2013, DASD(DT&E) assessed system performance, reliability, interoperability, and cybersecurity to support the MS C DAB held in October 2013. Based on the DT&E conducted at the time of the assessment, the DASD(DT&E) recommended that the program proceed to LRIP. DASD(DT&E) also recommended that the Army reevaluate the KPP 5 rate-of-fire performance requirement as appropriate before IOT&E, continue to explore and address ammunition-related issues, collect additional data to characterize SPH accuracy between 6 and 16 kilometers with the M795 projectile before IOT&E, and update the TEMP as needed to align remaining test plans with DoD Strategic Guidance and determine the need for testing in extreme natural environments (e.g., desert, cold, tropics).
- The program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. EMD testing supported the program beginning LRIP and MS C. DT&E conducted to date shows that the program is meeting most KPPs/KSAs with appropriate mitigation measures already

completed or being worked to address shortfalls. The program is conducting qualification testing, FAT, and software DQT to support the LRIP build and PQT with moderate risk.

Precision Guidance Kit (PGK)

Executive Summary: PGK is an artillery round guidance kit compatible with M795 and M549A1 artillery rounds (155 millimeter), employed from M777A2 lightweight artillery and the M109A6 Paladin self-propelled howitzer. It is programmed with GPS, fuze mode, reference data, and a trajectory using the currently fielded enhanced portable inductive artillery fuze setter; attached using a simple, unique fuze wrench; and then loaded and fired using normal artillery firing procedures. PGK uses GPS data and a rotating ring with fixed canards to correct the projectile's trajectory to a programmed target with improved accuracy. Program requirements include 50-meter accuracy, point detonation and height-of-burst functions, and safety features that prevent detonation if the fuze determines an unacceptable miss distance. Future improvement will add GPS anti-jam capabilities. The Army Acquisition Executive delegated Milestone Decision Authority to the PEO for Ammunition.

In prior years, PGK testing demonstrated the potential for high accuracy but lower than required reliability. In 2013, the program adopted a test strategy to continue development of accuracy and reliability, while producing and accepting early production for an Urgent Materiel Release (UMR). In March 2013, the Army approved MS C of the Full Materiel Release (FMR) version, supported by a DASD(DT&E) program assessment. Following MS C, PGK failed the acceptance criteria for First Article Acceptance Test (FAAT) and the Army rejected production deliveries. To maintain the program schedule, the Army elected to FMR the previously delivered UMR rounds (designated "PGK NA 28") and directed the developer to correct production deficiencies and deliver a new series of LRIP rounds (designated as "PGK NA 29") for FAAT. PGK NA 29 completed FAAT in December 2014. In FY 2015, the Army will conduct environmental qualification testing and IOT&E and begin production lot acceptance testing (LAT).

Lead DT&E Organization: Armament Research, Development, and Engineering Center (ARDEC)

Summary of FY 2014 DT&E Activities

- July and August 2013, the PMO completed a series of production proveout tests (PPTs). This test series was designed to assess new rounds produced at a different production facility, in preparation for LRIP.
- August and November 2013, the PMO completed a series of high quadrant elevation (QE) test shots to gather data regarding performance in high-angle firing conditions.
- October 2013, the PMO completed its final LAT for UMR of PGK rounds in support of Operation ENDURING FREEDOM.
- November 2013, the PMO completed its initial FAAT–Performance (FAAT-P). These tests were required prior to accepting LRIP rounds.
- December 2013, the PMO completed its FAAT–Safety (FAAT-S) cold test series, the remaining FAAT-P, FAAT-S (hot) test series, and additional high QE shots.

- March 2014, the PMO completed a series of vertical gun tests to verify failure modes.
- May 2014, the PMO completed airdrop certification testing of PGK NA 28 and PGK NA 29 articles.
- May 2014, the PMO completed a test series with updated guidance software to gather failure definition data.
- June and July 2014, the PMO completed a production verification series of shots.

Summary of FY 2014 DT&E Engagement and Assessments

- The July–August 2013 PPT series showed high accuracy (12.2 meters circular error probable (CEP)) and strong reliability (93.8 percent point estimate) and met the safety criteria, especially in comparison to the program requirements of 92 percent reliability and 50 meters CEP.
- The LAT 8 series demonstrated acceptable reliability (85.7 percent point estimate) and high accuracy (18.2 meters CEP) and met the acceptance criteria for the last UMR production lot.
- The October 2013 high QE shots gathered additional developmental data. PGK inconsistent accuracy and performance at high QE (greater than 900 mils) led the program to collect data that could identify firing solution changes or PGK corrections that might improve the performance at those conditions. The program also uses this information to recommend changes in tactics, training, and procedures.
- PGK performance during FAAT-P demonstrated high accuracy (11.8 meters CEP), but reliability was lower (80 percent point estimate) than that deemed acceptable for LRIP (the acceptance requirement is 85 percent reliability point estimate). The program office rejected the production deliveries.
- The program office deferred IOT&E and directed a new strategy to correct PGK production problems and re-accomplish testing (including FAAT) before resuming IOT&E and the subsequent LAT for LRIP.
- After examining the DT results to date and considering the reliability growth planning in the previous MS C TEMP, DASD(DT&E) provided the PM with a recommended strategy for returning to FAAT and IOT&E: confirm production process failures, conduct testing to verify the corrections, conduct confidence building testing, re-accomplish FAAT, and return to the previous strategy of IOT&E followed by LRIP LAT series. As of the period of this report, no updated strategy has been incorporated into the TEMP.
- The developer elected to return production to the previous facility. The PMO has developed a new strategy to return to FAAT, to IOT&E, and eventually to LRIP LAT. DASD(DT&E) is concerned that the strategy test sequence, lack of corrections between test phases, and difficulty at proving the robust requirement with confidence may lead to test results that demonstrate less than the required reliability.
- The PGK program did not request a waiver or deviation from the requirements in the TEMP.

Conclusion: The program conducted DT that demonstrated recovery from a problematic production facility change and associated reliability problems. The TEMP, describing this additional DT&E and strategy to complete IOT&E and LAT before initial operational capability, is still not complete. There is still risk that the program may not be able to meet the requirement of 92 percent reliability because of limited corrective action periods between individual test series.

Warfighter Information Network–Tactical (WIN-T) Increment 2

Executive Summary: WIN-T is the primary backbone communications system linking divisions, brigades, battalions, and companies. It provides voice, data, and video to the tactical edge of the battlefield. Increment 2 provides initial on-the-move capabilities and network planning, monitoring, and control tools. It utilizes a combination of satellite (military and commercial) and line-of-sight transmission systems using the highband networking waveform (HNW) for line of sight and the network-centric waveform for satellite. WIN-T Increment 2 consists of multiple vehicle configuration items including the Tactical Communications Node (pictured), Network Operations and Security Center, Point of Presence (PoP), Tactical Relay–Tower (TR-T), and Soldier Network Extension (SNE), among others.

WIN-T Increment 2 is an ACAT ID program in LRIP. It completed follow-on operational test and evaluation (FOT&E) as part of the Army's Network Integration Evaluation 13.2 based at White Sands Missile Range (WSMR), New Mexico, in May 2013. The DOT&E FOT&E report found the SNE, TR-T, and HNW to be not operationally effective and the PoP and SNE to be not operationally suitable. As a result, the USD(AT&L) limited additional procurement and deferred the FRP decision until the program demonstrates improved performance and reliability in FOT&E 2.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2014 DT&E Activities

- February 2014, the PM conducted DT 1 at the Aberdeen Test Center, Maryland, to demonstrate improved Soldier suitability. The test included a limited number of active duty and recently separated Soldiers to assess complexity and usability of the SNE and PoP.
- June 2014, the PM conducted DT 2 at WSMR using more than 40 active duty Soldiers as operators and commanders. This test focused on mission-based DT using typical mission scenarios to confirm suitability improvements and demonstrate fixes to failure modes identified during FOT&E and demonstrate threshold reliability of the PoP and SNE.

Summary of FY 2014 DT&E Engagement and Assessments

- October 2013–January 2014, DASD(DT&E) reviewed DT plans and provided recommended improvements to include increased Soldier participation.
- February 2014, DASD(DT&E) observed DT 1 at Aberdeen, Maryland. DT 1 demonstrated significantly improved Soldier suitability with better designed human interface and reduced complexity.
- March–May 2014, DASD(DT&E) reviewed detailed test plans for DT 2 and continued to encourage increased Soldier participation.
- June 2014, DASD(DT&E) observed DT 2 and made the following assessments:
  - The increased use of Soldiers and commanders provided a more meaningful assessment of human factors engineering (HFE).
  - There was continued positive Soldier feedback to the HFE improvements.

  - A redesign of the PoP and SNE workstations better balanced the workload of the commander and operator.
  - The TR-T met range requirements, but terrain will still limit line-of-sight communications.
  - The SNE and PoP reliability thresholds were not met at the 80 percent confidence level. The PM will continue to take corrective actions to improve reliability for FOT&E 2 in FY 2015.
- DASD(DT&E) recommends continued use of Soldiers during DT for early identification of HFE and suitability issues.
- The WIN-T program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The DT series was an important precursor to FOT&E 2. The increased use of Warfighter operators in DT potentially reduces the disparity between DT and OT results. Early results from FOT&E 2 suggest that this is true.

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6.3 Navy Programs

This section includes summaries of the following 13 programs:

- Air Intercept Missile-9X (AIM-9X) Block II
- CH-53K Heavy-Lift Replacement Helicopter
- Common Aviation Command and Control System (CAC2S) Increment 1
- Consolidated Afloat Networks and Enterprise Services (CANES)
- GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)
- Littoral Combat Ship (LCS) and Mission Packages (MPs)
- Mobile User Objective System (MUOS)
- MQ-4C Triton Unmanned Aircraft System (UAS)
- Multi-Mission Maritime Aircraft (P-8A Poseidon)
- OHIO-Class Submarine Replacement (OHIO Replacement)
- Trident II Life Extension (D5LE)
- U.S. Navy Integrated Air and Missile Defense (IAMD) and Naval Integrated Fire Control–Counter Air (NIFC-CA) Capabilities
- VIRGINIA-Class Submarine

Air Intercept Missile-9X (AIM-9X) Block II

Executive Summary: The AIM-9X is the latest generation short-range, air-to-air, heat-seeking missile employed by the U.S. Navy, the U.S. Air Force, and U.S. allies (through foreign military sales). The AIM-9X Block II program developed from a preplanned product improvement initiative designed to address AIM-9X Block I obsolescence.

The Block II missile hardware has approximately 85 percent commonality with that of the AIM-9X Block I. AIM-9X Block II completed its DT&E program in April 2012 and has resumed IOT&E following a period of deficiency correction that required additional DT&E to verify the fixes.

Lead DT&E Organization: NAWCWD VX-31

Summary of FY 2014 DT&E Activities

- Following the July 2013 PEO decertification of the Block II missile for IOT&E, the PM developed a software release (Operational Flight Software (OFS) 9.313) and an improved inertial measuring unit (IMU) manufacturing process to address the two unresolved deficiencies observed in IOT&E that were not apparent during the prior DT&E. An additional DT period that included five live-fire flight tests, 13 captive-carry flights, and 80 captive-carry hours was conducted in February–May 2014 to validate those software fixes and IMU manufacturing process improvements.
- AIM-9X Block II was recertified to resume IOT&E on June 5, 2014, and IOT&E (OT-C1) began June 12, 2014.
- Follow-on software development (OFS 9.4) is proceeding and will introduce new capability within the missile software and provide added survivability features. Flight test will begin in late 2014.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) reviewed the prior test results and with the Program Office (PMA 259) defined the expectations for DT necessary to support a certification to reenter OT.
- DASD(DT&E) conducted an assessment of developmental/integrated testing conducted on the software revision (OFS 9.313). The assessment concluded that issues degrading effectiveness were addressed with the software update and the improved IMU manufacturing process; however, with limited flight data, reliability remained a concern. In June 2014, DASD(DT&E) recommended recertification to resume IOT&E.
- The AIM-9X program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program completed a stressing integrated test series that supported a return to IOT&E. Resumption of IOT&E was assessed as moderate risk for reliability given the relatively few missile hours flown with the latest flight software. DASD(DT&E) assesses the likelihood of new discovery in the remaining OT to be low.

CH-53K Heavy-Lift Replacement Helicopter

Executive Summary: The CH-53K is intended to replace the CH-53E to meet the Marine Corps heavy-lift requirements beyond 2025. The CH-53K incorporates composite material construction, a new engine design, digital instrument and gauge displays (a "glass" cockpit), and fly-by-wire flight controls among other advanced technologies designed to improve performance within the same overall aircraft footprint. It is intended to provide improvements in operational capability, interoperability, reliability, and maintainability while reducing total ownership costs. The CH-53K assault transport helicopter will be a dual-piloted, multiengine helicopter designed to meet the emerging Marine air-ground task force vertical heavy-lift, warfighting requirements.

In December 2005, OSD approved MS B and authorized the CH-53K program to begin system development and demonstration. The program conducted a critical design review in July 2010. In January 2012, OSD approved Revision 1 to the CH-53K Acquisition Strategy. This revision shifted the four research, development, test, and evaluation (RDT&E) funded aircraft in the first LRIP lot to the Engineering and Manufacturing Development (EMD) phase as system demonstration test articles (SDTAs) to demonstrate manufacturing processes and support integrated T&E. This revision also increased the total procurement from 156 to 200 aircraft and aligned the program with changes to the schedule and budget that had occurred since the start of the program in 2005. In response to recent budget changes, the program submitted Revision 2 to the Acquisition Strategy (currently in coordination). This revision moves MS C from the 4th quarter FY 2015 to the 4th quarter FY 2016 and restructures the LRIP plan, reducing the number of LRIP articles from 27 to 20 but adding two more RDT&E-funded SDTA assets during EMD.

The test strategy relies on four engineering development model (EDM) aircraft to support DT&E and the SDTA aircraft that will support later DT efforts and IOT&E. The contractor completed the first of four EDM aircraft in October 2014 and it is undergoing acceptance testing, required updates to systems, and preparation for the flight test program. Currently EDM-1 is on schedule to start flight testing no earlier than March 2015.

Lead DT&E Organization: NAWCAD HX-21

Summary of FY 2014 DT&E Activities

- In FY 2014, DT&E focused on system-level testing using the CH-53K ground test vehicle (GTV). The GTV is a full-up aircraft, fixed to the ground, which allows the test team to "fly" the aircraft at high power levels while not leaving the ground. Using the GTV is a prudent risk reduction measure that will enable the program to make early discovery of major issues in advance of the flight test program, which is scheduled to start in FY 2015.
- December 2013, the Navy/Marine Corps/Sikorsky Integrated Test Team (ITT) began bare-head (no blades installed) testing on the CH-53K GTV.

- April 2014, the ITT began GTV shakedown testing (full system, blades installed), which marked the true start of GTV testing with the objective of producing the test data (system-level test results, envelope expansion, etc.) needed before the start of flight testing with the EDM aircraft.
- October 2014, EDM-1 aircraft completed production and entered acceptance testing. EDM-1 will undergo required preparation and ground testing in early FY 2015 to support first flight not earlier than March 2015.
- EDM-2, EDM-3, and EDM-4 are on schedule to be delivered in FY 2015.

Summary of FY 2014 DT&E Engagement and Assessments

- DT is significantly behind plan. The Navy is conducting testing of the GTV now to demonstrate system readiness to start flight testing. However, this testing has identified significant developmental issues with the system (nose gearbox temperature, main gearbox drive, tail rotor driveshaft vibration, etc.) that indicate the design is not yet stable and design changes may be needed. The program has identified corrective actions for some of these problems, but this has caused some slip to the test schedule, and any additional testing required because of these issues may add time to the total testing schedule.
- As of September 15, 2014, the program had completed about 22 percent of the currently required test points that need to be conducted on the GTV before first flight. The program is about 12 months behind the plan that was approved in the January 2012 Acquisition Strategy and about 3 months behind the revised plan of April 2014.
- The PMO projects that first flight will occur as early as March 2015 if current technical issues are resolved as planned but recognizes that additional technical issues could delay first flight as late as August 2015.
- Based on progress to date and the likelihood that GTV testing will continue to identify technical issues impacting first flight, DASD(DT&E) believes that May 2015 is a more likely date for first flight.
- Despite schedule pressures, the ITT is determined to fly all critical planned pre-MS C test points, which could impact the MS C date. DASD(DT&E) recommends that the Navy execute an event-based schedule that conducts all planned testing and avoid deferring critical testing or capability beyond MS C to maintain schedule.
- DASD(DT&E) and the Deputy Assistant Secretary of Defense for Tactical Warfare Systems conducted a program review in October 2014 to assess program development progress and risk. The review determined that the program has 1 to 3 months of reserve remaining in the program schedule, but any further major finding will most likely impact MS C.
- The approved TEMP was adequate to start DT but no longer reflects the current test plan, and some testing has been deferred beyond MS C. In addition, the approved TEMP does not include a plan to conduct cybersecurity testing before MS C. The PMO is submitting a letter to DASD(DT&E) and DOT&E that documents changes to the approved plan, including the plan to assess cybersecurity vulnerabilities before MS C, and identifies when deferred testing will be complete.
- DASD(DT&E) recommends that the PMO document changes to the approved plan, including the plan to assess cybersecurity vulnerabilities. DASD(DT&E) also recommends that the MS C TEMP currently in development include a comprehensive DT&E to include testing deferred from EMD before IOT&E.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. DT&E has identified significant developmental issues with the system, and DT is significantly behind plan. The program has identified corrective actions for most of these problems,

but this has caused some slip to the test schedule, and any additional testing required because of these issues may add time to the total testing schedule. The program is planning for MS C/LRIP in the 4th quarter FY 2016 with at least moderate risk.

Common Aviation Command and Control System (CAC2S) Increment 1

Executive Summary: The Marine Corps CAC2S Increment 1 provides a common suite of tactical facilities, equipment, and software to replace the legacy command and control systems that are currently used in the direct air support center, tactical air operations center, and tactical air command center throughout the Marine air command and control system. Additionally, CAC2S will provide improved automated decision aids for an enhanced aviation combat element battle command capability. CAC2S Increment 1 contains two phases. Phase 1 was fielded in 2012; consequently, this report focuses on Phase 2.

Lead DT&E Organization: NSWC PHD

Summary of FY 2014 DT&E Activities

- DT-B1: The PMO conducted and DASD(DT&E) oversaw the test between February 10 and March 21, 2014, at the Marine Corps Tactical Systems Support Activity (MCTSSA) System Test and Integration Lab (STIL), Marine Corps Base Camp Pendleton, California, using Engineering Development Model (EDM) 1.
- DT-B2: The PMO conducted and DASD(DT&E) oversaw the test between May 28 and June 21, 2014, at the MCTSSA STIL, Camp Pendleton, California. An additional DT-B2 week was added between July 14 and 18, 2014, to address the Data Fusion KPP.
  - The PMO conducted DT-B2 using three EDMs. EDM 1 link testing occurred at the MCTSSA STIL, while requirements testing occurred using EDMs 2 and 3 tests at MCTSSA and at a tactical field location on Marine Corps Base Camp Pendleton, California.
- DT-B3: The PMO conducted and DASD(DT&E) oversaw the test between September 11 and October 5, 2014, at the Yuma, Arizona, ranges prior to the Marine Corps Weapons and Tactics Instructor (WTI) exercise. The Marine Corps changed the test venue from MCTSSA and Marine Corps Air Station Miramar, California, to consolidate resources required for the test. The operational assessment (OA) was conducted immediately following DT-B3 during the live-flight phase of the WTI exercise at the same Yuma locations.
  - The PMO conducted DT-B3 at three facilities near Yuma, Arizona, using three EDMs in three different roles. The PMO used the fourth CAC2S EDM for link and additional fusion testing at the MCTSSA STIL.
- The PMO conducted system regression testing throughout FY 2014 to uncover and resolve new software bugs in existing functional and nonfunctional areas of the system.
- The PMO has scheduled two additional DT events following the MS C decision to validate fixes based on FY 2014 DT events and to ensure that the CAC2S units that will be used for IOT&E are fully functional and production representative.

Summary of FY 2014 DT&E Engagement and Assessments

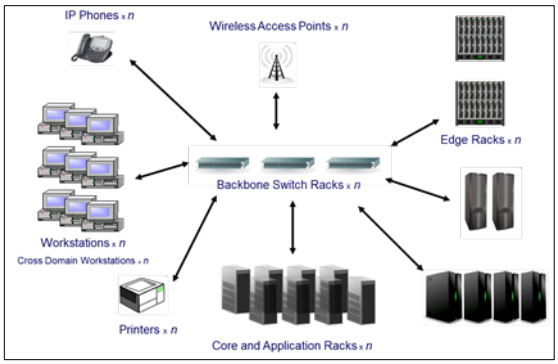
- The PMO successfully completed the scheduled FY 2014 CAC2S Phase 2 DT events, which required the PMO to verify 236 Capability Production Document (CPD) requirements across 20

functional areas. Emerging final DT results indicate that all KPPs have been demonstrated to threshold levels and other CPD requirements are on track to meet threshold levels.

- During the DT-B1 MCTSSA STIL test, the PMO was unable to demonstrate 144 requirements. Nonetheless, DASD(DT&E) found the test to be robust and that the system demonstrated considerable early system maturity.
- Some of the PMO's inability to demonstrate requirements during DT-B1 was because of functionality not being available, requirements being planned for future test events, and 10 requirements that were neither measurable nor testable. Nevertheless, the PMO verified these requirements using inspection and analysis methods. The PMO was, however, able to demonstrate 92 CPD requirements during DT-B1: 14 of these met threshold levels, 69 were partially met requiring further testing, and nine were not met; of the nine that were not met, seven were related to tactical data link processing, one was due to the system not generating a required operator alert, and one was related to insufficient system reliability.
- The PMO made considerable progress during DT-B2 to evaluate 91 CPD requirements previously not tested, and continued on track to meet CPD requirements. DASD(DT&E) found the PMO to be on track for demonstrating KPP and KSA requirements thresholds during DT.
  - During DT-B2, the PMO executed 91 of the 144 requirements not evaluated during DT-B1, which left 53 CPD requirements yet to be evaluated. Thirty-seven of the 53 remaining requirements were deferred for evaluation during future test events; two require identification, friend or foe capabilities that currently are not available; 13 are not testable or measurable and will be evaluated outside of the test periods; and one is not applicable to the Phase 2 design and will not be evaluated.
- DT-B3 executed in a different venue than originally planned because of Marine Corps 3rd quarter 2014 resourcing changes and asset reallocations. Regardless, DASD(DT&E) observed no degradation to the DT event.
  - As a result of the Marine Corps allowing the PM to move DT-B3 to Yuma, Arizona, test facilities, there was no time between DT and the OA. DASD(DT&E), however, observed no degradation during DT-B3 or the transition to the OA. The DT to OA transition was made easier because the Yuma test sites did not change.
- Emerging final DT-B3 results indicate that the PMO collected all required test data and was able to demonstrate all planned objectives for the test. Additionally, the CAC2S surpassed planned DT-B3 reliability hours, attaining nearly 460 of the 450 planned hours. The CAC2S DT-B3 reliability performance was in addition to 192 hours collected during DT-B1, 564 hours during DT-B2, and 26.5 hours during data fusion week during July 2014.
- DASD(DT&E) observed no significant issues during DT-B3 and watched the CAC2S enter the OA seamlessly.
- The CAC2S program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The PMO successfully completed the TEMP's FY 2014 CAC2S Phase 2 DT events, which required verification of 236 CPD requirements across 20 functional areas. Final FY 2014 DT results indicate that all KPPs have been demonstrated to threshold levels and other CPD requirements are on track to meet threshold levels.

Consolidated Afloat Networks and Enterprise Services (CANES)



Executive Summary: CANES is a complete scalable afloat network infrastructure (inclusive of hardware, software, processing, storage, and end-user devices) that will provide all basic network services (e-mail, Web, chat, collaboration) to a wide variety of Navy surface combatants and submarines. It will replace the Integrated Shipboard Network System, Sensitive Compartmented Information (SCI) Network, Combined Enterprise Regional Information Exchange System–Maritime, Submarine Local Area Network, and Video Information Exchange System networking systems with a single system that will support the Unclassified, Coalition, Secret, and SCI enclaves. CANES is a commercial off-the-shelf, non-developmental item systems integration effort that utilizes state-of-the-industry networking hardware and core services software.

The DASD(DT&E) reviewed and approved the DT planning within the TEMP on August 21, 2013. The program underwent a critical change when the program failed to achieve a full deployment decision by December 31, 2013, more than 5 years after the preferred alternative objective date of December 2008. The USD(AT&L) certified the critical change report on March 10, 2014, allowing the program to resume funding and development activities. The PMO conducted the first integrated test (IT-C1) event during February–April 2014 and identified 40 deficiencies. The most significant problem noted was that service-level reporting capabilities were not accurately mapped to devices to give an aggregated service-level reporting mechanism needed to assess operational availability. The shipboard IT demonstrated technical sufficiency in the installed environment. Delays to these events resulted in the installations on eight other ships being completed prior to completion of DT. OT completed in September 2014 and results are pending.

Lead DT&E Organization: SSC PAC

Summary of FY 2014 DT&E Activities

- December 2013, the program office reported a critical change in its MAIS quarterly report for having failed to achieve a full deployment decision within 5 years after selection of the preferred alternative.
- February 25–April 14, 2014, the PMO conducted IT-C1 in the Enterprise Engineering and Certification laboratory at Naval Base Point Loma, California.
- June 9–26, 2014, the PMO conducted IT-C2 onboard USS HIGGINS (DDG-76) at Naval Base San Diego, California.

Summary of FY 2014 DT&E Engagement and Assessments

- June 2014, DASD(DT&E) provided feedback to the USD(AT&L) regarding the program's system maturity assessment, as required in the MS C ADM and a subsequent ADM in February 2014.
- Testing schedule delays, due in part to delays in the availability of the IOT&E DDG, have increased program risk in several areas.
- The CANES program did not request a waiver or deviation from requirements in the TEMP.

DASD(DT&E) Program Assessments

- DASD(DT&E) conducted two DASD(DT&E) program assessments: one on June 17, 2014, and one on October 9, 2014.
  - June 17, 2014: The DASD(DT&E) assessed that the program demonstrated sufficient development progress and system maturity to justify the procurement increment in June 2014 given the operational urgency to replace the current shipboard networks. The DASD(DT&E) recommended that the program office take the following steps:
    - Complete service mapping for the unit-level configuration prior to OT-C1 in order to deliver the required system management capability and enable more accurate reliability and availability calculations.
    - Develop a plan to collect and analyze data from fielded ships to support a robust assessment of reliability for operational availability (A_o) and materiel availability (A_m).
    - Include third-party cybersecurity vulnerability assessments during force-level DT rather than waiting for OT as is the plan for unit-level testing.
    - Increase systems engineering support to the test office to improve preparation for testing through more thorough and timely dry runs of test procedures and more responsive analysis of problem reports.
  - October 9, 2014: The DASD(DT&E) assessed that the program demonstrated sufficient developmental progress and system maturity to justify the procurement increment in October 2014. The DASD(DT&E) recommended that the program office take the following steps:
    - Complete service mapping for the unit-level configuration prior to IT-D1 in order to deliver the required system management capability and enable more accurate reliability and availability calculations.
    - Develop a data collection and analysis plan for materiel availability and share the operational results for this KPP from the ships that have completed the CANES installation to allow for better assessment.
    - Include cybersecurity assessments during force-level DT rather than waiting for OT. Earlier identification of potential issues gives the program more time to address the issues prior to fielding.

Conclusion: The program office successfully completed testing and fielding of the CANES network on unit-level platforms. The network has been installed on at least 10 destroyers and is completing installation on the first three force-level ships in 2015.

GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)

Executive Summary: The future aircraft carrier GERALD R. FORD class (CVN 78) is the planned successor to the NIMITZ-class (CVN 68) aircraft carrier. It is a large-deck, nuclear-powered aircraft carrier designed to increase the sortie generation capability of embarked aircraft, improve weapon handling efficiency, and increase self-defense capabilities. This report contains an overview of mission-critical systems across the air operations; combat systems; and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) mission areas.

DASD(DT&E) has expressed concerns with electromagnetic aircraft launching system (EMALS) and advanced arresting gear (AAG) reliability growth and has been working with the Navy to characterize the operational availability of the shipboard systems, which is affected not only by reliability but also by the ability to rapidly replace/repair redundant components and rapidly reset software faults. These aspects of operational availability are getting equal attention from NAVAIR and it is important that this emphasis continues. The systems' operational availability is likely better than it appears from the current reliability data. The principal construction risk on CVN 78 is the successful execution of the shipboard test program when new design systems are energized for the first time.

Lead DT&E Organization: PMS 378T

Summary of FY 2014 DT&E Activities

- CVN 78 construction testing continued at Huntington Ingalls Industries in Newport News, Virginia. Launch occurred in November 2013 with delivery and commissioning scheduled for March and April 2016, respectively.
- January–September 2014, NAVAIR EMALS land-based performance and aircraft compatibility testing at the Lakehurst, New Jersey, test site included launches of 153 dead loads, 108 aircraft, and 1,283 no-loads. Installation and checkout of the shipboard EMALS components are in progress, with below deck equipment testing started on schedule in August 2014; and above deck equipment testing and dead-load testing planned for FY 2015.
- January–September 2014, NAVAIR AAG performance testing at the Lakehurst, New Jersey, test site included the new, strengthened design for the water twisters. A total of 119 arrestments were conducted during this timeframe. Installation of AAG components at Lakehurst, including components from CVN 78's de-scoped number 4 arresting gear engine, is in progress to enable aircraft testing to begin in late 2015.
- CVN 78 conducted land-based combat systems integration tests (CSITs) on the following dates: CSIT-3, September 16–October 11, 2013; CSIT-4, January 6–17, 2014; CSIT-5, May 5–20, 2014; and CSIT-6, August 4–20, 2014.
- September 8–19, 2014, the Dual-Band Radar (DBR) completed the first land-based DT&E (LBDT-1), tracking aircraft and aerial targets in a stand-alone radar configuration, not integrated with the remaining elements of the combat system.

Summary of FY 2014 DT&E Engagement and Assessments

Air Operations – Sortie Generation Rate (SGR)

- Modeling and simulation results from the Virtual Carrier (VCVN) model indicate that the ship has the physical capability to meet the SGR KPP if supporting systems meet their performance and operational availability requirements and the crew is proficient.
- EMALS performance: Successful completion of land-based performance and aircraft compatibility testing demonstrated that the major EMALS components can meet performance specifications and provided increasing confidence in the basic technical suitability of the shipboard system, though this must be demonstrated in the shipboard testing that begins in 2015.
- EMALS reliability and operational availability: EMALS reliability has improved with the increasing test cycles, but statistically demonstrated reliability is still well below the system's contractual technical specification and will likely remain so at the time of CVN 78 initial operational capability. Operational availability depends not only on component reliabilities but also on repair and logistics delay times. Certain EMALS electronic components appear amenable to rapid repair or rapid software fault reset, which should offset a portion of the less-than-expected component reliability. Ongoing data analysis and more detailed modeling by NAVAIR at the behest of DASD(DT&E) should provide a more definitive assessment in 2015.
- AAG: The redesigned and strengthened water twister was successfully tested at the Jet Car Track Site, addressing a major failure uncovered in previous DT. The program continues to address other developmental issues, including divergent trajectories of some off-center and skewed arrestments. Overall, AAG is less mature than EMALS. The program will face significant challenges in completing all planned DT within the current development period if any major issues arise in the aircraft testing that will begin in late 2015.
- Advanced weapons elevator systems are undergoing shipboard production testing.
- Air Traffic Control: On May 5–20, 2014, CVN 78 performed the fifth land-based CSIT (CSIT-5), integrating the air traffic control system (AN/TPX-42) using simulated volume search radar aircraft tracks. Integration with DBR was revalidated during CSIT-6 and live aircraft tracking was conducted.

Combat Systems

- September 16–October 11, 2013, CVN 78 performed the third land-based CSIT (CSIT-3), including the first connection with DBR, tracking targets of opportunity.
- January 6–17, 2014, CVN 78 performed the fourth land-based CSIT (CSIT-4), integrating additional elements and verifying software corrections since CSIT-3.
- May 5–20, 2014, CVN 78 performed the fifth land-based CSIT (CSIT-5),verifying software corrections and integrating air traffic control interfaces.
- August 4–20, 2014, the CVN 78 combat system conducted the sixth CSIT (CSIT-6), the first dedicated live aircraft tracking exercise interfaced with DBR.
- September 8–19, 2014, DBR completed the first land-based DT&E (LBDT-1), tracking aircraft and aerial targets in a stand-alone radar configuration.
- All CSITs and LBDT-1 discovered integration and performance issues were submitted to the program's deficiency reporting and correction process. According to priority and scope, many issues will be corrected and verified during land-based testing, and some may be verified during mission systems activation and post-delivery test and trials. The program will continue development and integration testing in accordance with the published T&E schedule.

C4ISR

- IA: DASD(DT&E) is a member of the IA Working Group and has been working closely with the IA manager to interpret and apply OSD cybersecurity and IA testing guidance. The most recent draft of the TEMP implements OSD guidance.

- The CVN 78 program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted its FY 2014 DT&E activities in accordance with the approved TEMP. Ship production and system-level testing supported the program progressing toward ship delivery. The program is meeting most KPPs/KSAs tested to date with appropriate mitigation measures in place to address shortfalls.

Littoral Combat Ship (LCS) and Mission Packages (MPs)

Executive Summary: LCS consists of three major programs: Seaframes (PMS 501), Mission Modules (MMs) (PMS 420), and Logistics/Sustainment (PMS 505). The Seaframes (ships) program consists of two high-speed hull variants: the USS FREEDOM (LCS-1) variants are steel mono-hulls with aluminum superstructures, and the USS INDEPENDENCE (LCS-2) variants are an all-aluminum tri-hull design. Combined diesel and gas turbine waterjets propel each ship. The MMs program is responsible for procuring, integrating, testing, and delivering three mission payloads: mine countermeasures (MCM), surface warfare (SUW), and antisubmarine warfare (ASW). Mission payloads are interchangeable with either seaframe variant as dictated by fleet requirements. When a mission payload is married with its corresponding crew and aviation detachment, it is known as an MP. The LCS Logistics/Sustainment program is a dedicated LCS organization to provide worldwide maintenance, repair parts, technical specialists, storage facilities, transportation, configuration management, contracting, software and hardware changes, or LCS-specific support for the planned 32 LCS seaframes and 64 MMs. The MCM and SUW MMs will be fielded in four increments; the ASW MM will be fielded in a single increment. Each increment will add capability to the respective MM, with total MM capability met once the final increment is fielded.

A primary component of the MCM MP is the remote minehunting system (RMS). RMS is composed of the remote multi-mission vehicle (RMMV), the AN/AQS-20 minehunting sonar, and associated support equipment. The RMMV has been recently upgraded to version 6.0 that improves vehicle performance and reliability. The AQS-20 also received upgrades to improve its search capabilities. The upgraded RMMV and AQS-20 components are being integrated as the RMS baseline, which will be tested in FY 2015. In parallel with the current upgrading of existing RMMV and AQS-20 systems, the RMS program office is competitively contracting for new RMMV and AQS-20 vehicles, based on the upgraded RMMV and AQS-20 performance specifications and design drawings. This new RMS baseline is expected to complete development and begin DT in 2018.

Lead DT&E Organizations: NSWC PHD

Summary of FY 2014 DT&E Activities

- USS FREEDOM (LCS-1) conducted early testing of an ASW MM prototype in August–September 2014. This testing provided insights into seaframe integration, performance of the towed bodies, deployment and retrieval performance and interaction with the ship's waterjets, and early system performance measurements.
- USS INDEPENDENCE (LCS-2) conducted rough-water trials, RMS launch and recovery testing, multi-vehicle communications system (MVCS) testing, and SUW tracking and firing tests in the 2nd and 3rd quarters FY 2014. Specific activities and results included the following:
  - MVCS testing provided software and antenna integration changes for the ship and systems interfacing with MVCS (unmanned vehicles, etc.).

  - Rough-water trials characterized ship performance in higher sea states.
  - Participated in Rim of the Pacific Exercise (RIMPAC) in June–July 2014, successfully executing tracking and firing events.
  - Conducted MCM embarkation and RMS launch and recovery training underway in preparation for MCM MP DT events in September–October 2014. These tests highlighted the continuing need for RMS launch and recovery training, as well as the need for integrated training with the MP and seaframe.
- USS FORT WORTH (LCS-3) conducted SUW MP DT in October 2013, followed by the MP technical evaluation (TECHEVAL) in January–February 2014. This is the first operational seaframe-MP capability delivered to the fleet. In September 2014, LCS-3 conducted total ship survivability trials. Test analysis is ongoing.
- USS CORONADO (LCS-4) successfully completed final acceptance trials in June 2014. LCS-4 conducted live-fire DT with the SUW MP and supported dynamic interface testing with the MQ-8B Fire Scout. As a result, LCS-4 received overall approval for MQ-8B operations.
- MCM MP: Major DT events included RMS testing in October–December 2013, RMMV launch and recovery testing in May 2014, and MCM MP DT in September–October 2014 onboard USS INDEPENDENCE. Integration and Government shore-based testing of an upgraded RMS baseline, which included the RMMV version 6.0 and AQS-20B began in fall 2014. This RMS baseline addressed RMMV reliability issues and AQS-20A performance shortfalls. However, unexpected performance issues encountered during initial AQS-20B testing, along with the limited number of AQS-20B test assets, led the program office to revert back to the AQS-20A sonar to maintain the MP test schedule. The Navy plans to mitigate known AQS-20A performance shortfalls through updated tactics and procedures; however, these tactics are not currently validated through testing. RMS testing was interrupted in late January 2015 to support the onload stage of the MP TECHEVAL. RMS (with AQS-20A) is scheduled to resume testing in early March 2015 to further characterize baseline performance, reliability, and updated tactics and procedures and to supplement data required by the OT community to assess MP suitability and effectiveness. Testing to date has revealed several performance and reliability issues within the MCM MP components that must be addressed before TECHEVAL. These issues are detailed below.
- SUW MP: The SUW MP Increment 2 conducted TECHEVAL in January–February 2014 onboard USS FORT WORTH (LCS-3). This test successfully demonstrated gun mission module, MH-60R, and maritime security module operations in preparation for IOT&E in the 3rd quarter FY 2014 and SUW MP initial operational capability in August 2014.
- ASW MP: The ASW MM design is being updated based on the results of early testing onboard USS FREEDOM. At-sea testing will resume in 2016. Additionally, design modifications are being made to address weight reduction and installation requirements before the MP enters Government DT.

Summary of FY 2014 DT&E Engagement and Assessments

- LCS TEMP: DASD(DT&E) reviewed and approved the current LCS Program TEMP (Revision A) in August 2013. The LCS TEMP is currently under revision, with the next update (Revision B) expected to be submitted for approval in late FY 2015. DASD(DT&E) is working closely with PEO LCS, the LCS program offices, and various Navy and OSD stakeholders to ensure that updated testing requirements are balanced with schedule and resource constraints. DASD(DT&E) focus areas include system performance and reliability, system interoperability, and cybersecurity testing.

- RMS TEMP: The current RMS TEMP, approved in 2012, is being updated to reflect programmatic changes, including the new design for the RMMV and AQS-20 systems. DASD(DT&E) is working closely with the RMS program office to ensure that both the existing and updated RMS baselines are adequately tested and can support LCS MCM operations. DASD(DT&E) focus areas include system performance and reliability, system interoperability, and cybersecurity testing.
- DASD(DT&E) continues to engage with the PEO LCS program offices to ensure that MPs are adequately tested and exhibit sufficient performance and reliability to support TECHEVAL events and fleet introduction of LCS seaframes and MPs.
  - The Navy, in accordance with planned concept of operations, rotated USS FORT WORTH crews between SUW MP DT in fall 2013 and TECHEVAL in January 2014. Because the new crew did not have any live-fire experience with the SUW MP, the crew was provided with a special live-fire training period and successfully completed SUW Increment 2 TECHEVAL.
  - MCM MP Increment 1, consisting of the RMS, the airborne mine neutralization system (AMNS), and the airborne laser mine detection system (ALMDS), conducted DT on LCS-2 through October 2014. This is the first integrated, at-sea testing of the MCM MP Increment 1 on the Independence-class LCS seaframe. The schedule between this testing and the final TECHEVAL (April 2015) is highly compressed, which does not allow adequate time to analyze the DT results, design solutions, and enact fixes. RMS completed a shore-based DT in December 2013, using a prototype RMMV and an early version of the AQS-20 minehunting sonar system. Although RMMV demonstrated sufficient reliability growth to satisfy Nunn-McCurdy requirements, overall RMS performance and reliability issues persist. These issues are expected to be addressed through upgrades to both the RMMV and the AQS-20, which have completed development and are entering system-level testing. The upgraded RMMV version 6.0 and AQS-20B are scheduled to support the MCM MP TECHEVAL and IOT&E in June 2015.
  - ALMDS and AMNS have completed initial DT and are currently undergoing shipborne operational assessments (OAs). AMNS experienced increased communications problems related to its fiber-optic cable during the shore-based OA Phase A in June 2014. Although AMNS is currently proceeding with its scheduled OA Phase B, the impact of the fiber-optic cable issues on the overall MP test schedule is unknown. Given the compressed MP DT and TECHEVAL schedule, any technical issue within the MCM MP creates a medium to high risk of schedule slip or performance degradation.
- As a result of the 2010 Nunn-McCurdy breach, RMS was required to implement a reliability growth program for the RMMV in order to obtain a minimum of 75 hours mean time between operational mission failures (MTBOMF). DASD(DT&E) conducted a formal assessment of the RMS in June 2014 to support an In-Process Review DAB. DASD(DT&E) review of RMMV contractor testing in February–June 2013 and Government testing in October–December 2013 verified that the 75-hour RMMV MTBOMF had been met (75.3 hours at 80 percent confidence). This review included validating the number of operational mission failures scored by the RMS program office.
- DASD(DT&E) continues to engage with PEO LCS to ensure that test schedules are adequately spaced to allow analysis of test results before the next test phase. Also, DASD(DT&E) is requiring the LCS programs to complete cybersecurity testing before entrance into seaframe and MM IOT&E.
- The LCS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: LCS completed FREEDOM seaframe DT&E in accordance with the approved TEMP in FY 2014 and is on track to complete INDEPENDENCE seaframe DT in FY 2015. MP testing was conducted on schedule in FY 2014; however, the compressed MCM MP test schedule and the challenges in obtaining LCS test assets make the DT program challenging going forward.

Mobile User Objective System (MUOS)

Executive Summary: MUOS provides worldwide ultrahigh frequency (UHF) beyond line-of-sight tactical satellite communications (SATCOM) services to joint, allied, and coalition forces via mobile terminals. MUOS adapts the basic architecture of a commercial third-generation (3G) wideband code division multiple access (WCDMA) cellular phone system to military UHF SATCOM by using geosynchronous satellites in place of cell towers. The constellation of four operational geosynchronous satellites and an on-orbit spare will provide MUOS users with priority-based access to voice, data, and video services.

The MUOS program now has two MUOS satellites on orbit, providing legacy UHF support. The projected ship date of the third MUOS space vehicle (SV-3) was delayed because of a component failure discovered during thermal vacuum (TVAC) testing. The SV ship sequence was adjusted by using SV-4 for the third MUOS (MUOS-3) launch to minimize the schedule breach to 5 months. The initial launch capability for MUOS-3 is now projected for January 2015. SV-5 and SV-3 are planned to fulfill the MUOS-4 and MUOS-5 launches, respectively.

On May 1, 2012, the Navy was assigned the overall responsibility to deliver a MUOS end-to-end (E2E) system capability. Basic WCDMA call functions and types have been demonstrated; however, more time is needed to mature the WCDMA capability with the Army's AN/PRC-155 Manpack terminal. The Navy isolated and is resolving the E2E performance issues related to integration of the waveform, ground system, and terminal software and configurations.

Lead DT&E Organization: SSC PAC

Summary of FY 2014 DT&E Activities

- October 2013, the Government halted contractor TVAC testing on SV-3 after a second leak was detected in the output multiplexer (OMUX) filter cans in the legacy payload. Pressure leaks would result in significant performance reduction or loss of the legacy payload. Replacement of the defective OMUX filter can clusters consequently delayed the SV-3 launch.
- November 2013, the contractor conducted on-orbit system validation of MUOS-2 (OSV-2) to check network management, satellite control, geolocation, and over-the-air (OTA) WCDMA call execution. Testing revealed immaturity of the WCDMA functionality as hosted on the Army's AN/PRC-155 Manpack terminal.
- March 2014, the U.S. Navy PEO for Space Systems, Program Manager Warfare Systems (PMW) 146 assessed that expected performance improvement was not realized during the December 2013 contractor integration tests. Additionally, the contractor DT&E schedule did not support the MUOS program schedule for multi-Service operational test and evaluation (MOT&E)-2 in September 2014.

- April 2014, PMW 146 completed an independent review of the program development schedule and confirmed the magnitude of integration work required. Issues were isolated to the integration of waveform, ground system, and terminal software and configurations. The program is reorganizing based on the extended schedule, and PMW 146 formed a Rapid Integration Integrated Product Team (RI-IPT) to simplify configurations and to reduce variables to isolate cause. DASD(DT&E) is an external member of the RI-IPT.
- May 2014, the RI-IPT and the contractor completed development of the 10-step integration and test approach to be executed during the April 2014–February 2015 timeframe. Extended integration and OTA test time to test/find/fix software delayed MOT&E, planned in June 2014, to December 2015.
- September 2014, the contractor completed step 6, stationary communications, of the 10-Step E2E Integration Plan.

Summary of FY 2014 DT&E Engagement and Assessments

- October 21–25, 2013, DASD(DT&E) observed the execution of OSV-2 from the Radio Access Facility, Wahiawa, Hawaii.
- November 8, 2013, DASD(DT&E) engaged in development of the DT&E path forward following the PMW 146 decision to suspend further testing involving OTA WCDMA voice and data transmissions (calls) during OSV-2 after unacceptable E2E call reliability was encountered and it became evident that software maturity levels between MUOS and the Handheld, Manpack, and Small Form Fit (HMS) terminal were insufficient to support planned OTA WCDMA tests.
- DASD(DT&E) assessed the MUOS schedule as high risk in the DAES Review for January 2014, with concern that the MUOS system did not have sufficient maturity to proceed to TECHEVAL and MOT&E as projected for June 2014. The program office organized the RI-IPT to fix issues with the waveform, ground system, and terminal software. DASD(DT&E) participated in the RI-IPT to monitor the phased execution of contractor integration and test of the MUOS and MUOS-capable HMS terminal. Integration started with the basic system configuration and services, and complexity was incrementally added in the integration process. DASD(DT&E) assessed late execution of WCDMA in the integration process as high risk, as this step presented the most complexity. To mitigate this risk, the program captured and prioritized failure types to isolate root causes, fix, and verify as early as feasible.
- DASD(DT&E) participated in the MUOS Operations and Integration Working Group (OIWG) to identify opportunities to assist the OIWG in its tasks involving frequency allocation, authority-to-operate certifications, security key provisioning to support contractor integration and test, and preparations for TECHEVAL-2.
- The MUOS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The MUOS program continues to follow its phased DT&E strategy outlined in the TEMP. A 12-month delay to start Government TECHEVAL-2 will allow the program to extend phased integration of the MUOS waveform with a MUOS-capable terminal. Emerging results indicate improving WCDMA service success.

MQ-4C Triton Unmanned Aircraft System (UAS)

Executive Summary: The MQ-4C Triton UAS provides persistent maritime intelligence, surveillance, and reconnaissance as part of the Navy maritime patrol and reconnaissance family of systems.

The Triton UAS consists of the high-altitude, long-endurance MQ-4C Triton aircraft; sensor payloads; line-of-sight and beyond line-of-sight communications; a mission control station; and support elements. The MQ-4C aircraft design is based on the Air Force RQ-4B Global Hawk with modifications that strengthen the structure and provide a capability for limited flight in icing conditions. The MQ-4C is equipped with the multifunction active sensor (MFAS) maritime surveillance radar to detect, identify, and track surface targets and produce high-resolution imagery. Electro-optical and infrared sensors provide full-motion video and still imagery of surface targets. Other sensors provide a capability to detect, identify, and locate threats and cooperative ships. The MQ-4C continued its radar risk reduction DT&E and UAS flight testing in 2014.

Lead DT&E Organization: NAWCAD VX-20

Summary of FY 2014 DT&E Activities

- Initial flight envelope expansion and the ferry flight were completed, with nine flights conducted for 75 flight hours in FY 2014.
- The program continued MFAS radar risk reduction flight testing on a Northrup Grumman surrogate testbed aircraft, completing 14 test flights.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) engaged with the Triton UAS program to assess DT&E and program progress and support T&E strategy updates ahead of a planned FY 2016 production decision.
- Initial safety-of-flight and flight envelope expansion testing was completed, and the results at the end of FY 2014 indicate a nominal level of aircraft maturity for this early stage of DT&E. The ferry flight of the first test aircraft to Naval Air Station Patuxent River, Maryland, was accomplished in September 2014.
- Overall systems development and flight test progress to date are slower than planned in the TEMP because of routine issues discovered in flight test and delays in software development for communications functions necessary for the ferry flight and sensor functions for sensor integration.
- Risk reduction testing of the MFAS radar on the surrogate test aircraft continues to make slow but steady progress in maturing the radar modes to detect, track, and classify maritime targets. Additional testing for accuracy, false alarms, and image quality is needed before integration onto the Triton aircraft.
- The program has established a significant development and test capability for system interoperability, using actual components and test networking capabilities.

- The Triton program completed a cybersecurity requirements and vulnerability assessment as well as a demonstration in the National Cyber Range to look at intrusion or disruption attempts against the control segment.
- The MQ-4C Triton program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted FY 2014 DT&E in accordance with the approved TEMP. The flight test effort cleared the initial flight envelope and ferried the test aircraft to the Navy facility in Patuxent River, Maryland. Progress was slower than planned because of software development delays.

Multi-Mission Maritime Aircraft (P-8A Poseidon)

Executive Summary: The P-8A is a derivative of existing Boeing aircraft with design changes to support the Navy's maritime patrol mission. The P-8A is designed to have sufficient cabin volume, load-carrying capacity, attendant electrical power, and environmental control to accommodate a minimum of six tactical aircrew and five workstations. The test program has been structured to address the balance necessary between a modified commercial aircraft variant and military mission systems. The baseline P-8A is structured to be a replacement for the aging P-3C while planned increments address expanding its role to broader-area antisubmarine warfare (ASW) and high-altitude ASW weapon capability.

The P-8A completed its first phase of DT&E to address basic P-3C replacement in August 2012 and was approved for FRP on January 3, 2014.

Lead DT&E Organization: NAWCAD VX-20

Summary of FY 2014 DT&E Activities

- DASD(DT&E) released its assessment of prior testing as well as DT&E performed subsequent to IOT&E to support the Department's FRP decision in January 2014.
- September 2014, VX-20 completed the P-8A Increment 2, Engineering Change Proposal 1 DT&E.
  - The baseline version of P-8A multi-static active coherent (MAC) ASW search capability was successfully integrated and tested during this period. Preplanned future upgrades will continuously enhance this baseline capability in accordance with the program's ongoing evolutionary acquisition strategy.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) engaged in numerous data assessments with the Navy to support increment testing with no restrictions to data access.
- DASD(DT&E) worked with the program to update the baseline program TEMP for the FRP decision and Increment 2 efforts, as well as to develop a draft Increment 3 TEMP.
- The DASD(DT&E) provided an updated assessment to support the FRP decision.
- DASD(DT&E) provided informal assessments and recommendations at key test junctures.
- The P-8A program did not request a waiver or deviation from requirements in the TEMP.

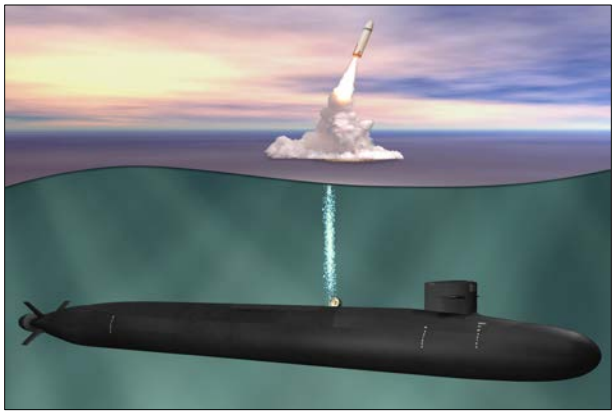
DASD(DT&E) Program Assessment

- In December 2013, the DASD(DT&E) provided risk assessments supporting the FRP decision based on favorable results in DT&E and the structure of the P-8A program.

- DT&E results, confirmed by results from the Navy's Operational Test Agency evaluations, as well as feedback from the users preparing to deploy, demonstrate that the overall P-8A baseline system performance continues to meet or exceed that of the documented P-3C capabilities except for documented limitations in the electronic support measures system.
- DT&E results confirmed that there were no critical performance or structural issues that precluded aircraft production. The most critical subsystem deficiencies identified in the baseline DT&E and confirmed in IOT&E are addressed in ongoing DT&E prior to delivery of the first FRP aircraft.
- The DASD(DT&E) based the favorable assessment for the FRP decision on the DT&E of software build 13.1.2 from October 2013. This software superseded that used for IOT&E and matched the configuration used for follow-on operational test and evaluation with the Harpoon missile, initial operational capability in November 2013, and deployment with the fleet in December 2013.
- The P-8A is one member of a specific family of systems (FoS) designated by OSD during a systems engineering review of the P-8A program in March 2004. The FoS members consist of the P-8A Poseidon, MQ-4C Triton, supporting ground stations, and legacy aircraft—all of which contribute to broad-area search ASW capability.
- The USD(AT&L) approved the P-8A program as an evolutionary acquisition program, with further capabilities being delivered in succeeding increments. The further capabilities include the broad-area search capabilities of full MAC deployment as well as high-altitude ASW.

Conclusion. The program is conducting incremental DT&E in accordance with its approved TEMP and has met its requirements for the current increment. Prior concerns over the ability to conduct wide-area ASW will be addressed in an incremental upgrade. Deficiencies in the intelligence, surveillance, reconnaissance, and communication systems have been validated as fixed in DT&E prior to the most recent FOT&E. The Navy is prioritizing fixes to the electronic warfare support system based on fleet requirements.

OHIO-Class Submarine Replacement (OHIO Replacement)



Executive Summary: The OHIO Replacement (OR) program is the follow-on fleet ballistic missile submarine (SSBN) class of submarines designed to replace the OHIO-class SSBN and deploy the existing Trident II D5 life-extended (D5LE) submarine-launched ballistic missile. The OR program is a pre-MDAP. The OHIO-class SSBN fleet of 14 submarines will retire at the rate of one per year beginning in FY 2027 and the OR-class submarine will reach initial operational capability (IOC) and conduct its first patrol in the 1st quarter FY 2031.

The mission of the OR-class SSBN force is to maintain an appropriate state of readiness to assist in deterring nuclear attack on the United States and its allies. The OR-class SSBN force of 12 submarines will provide a survivable sea-based strategic deterrent in the 2030 to 2080 timeframe. The OR-class SSBN must be capable of launching missiles against preplanned or adaptively planned targets. It does not have a requirement for other missions or capabilities unrelated to survivable strategic nuclear deterrence.

In April 2014, the PM position was changed from a Navy Captain to a civilian Senior Executive Program Director.

The OR MS B CDD will be submitted to the Joint Requirements Oversight Council (JROC) in the 3rd quarter FY 2015 for approval before MS B in August 2016. It incorporates recommendations from the OR Early Operational Assessment (EOA) OT-A1 completed in FY 2014.

The United Kingdom (UK) is replacing its SSBN force in conjunction with the OR program. The OR program is leading a collaborative program to design a common missile compartment (CMC) for United States and UK SSBNs. The 2-year delay in OR procurement resulting from the Budget Control Act of 2011 shifts the first at-sea testing of the CMC Trident II D5LE Strategic Weapons System (SWS) from the U.S. platform to the UK SUCCESSOR platform. The primary risk mitigation for this effort includes the Surface Launch Test Facility under construction at China Lake, California, and the SWS Ashore Test Facility under construction at Cape Canaveral, Florida. These test facilities are scheduled to be operational in FY 2017 and FY 2019, respectively.

The OR acquisition strategy is to leverage existing systems for the SWS and the majority of the non-propulsion and non-strategic subsystems such as sonar, fire control, radio, etc. This strategy will reduce risk and cost by using systems already in use and tested on VIRGINIA-class and OHIO-class submarines. It will also reduce operations and sustainment costs across both programs.

Lead DT&E Organization: PMS 397 for the pre-MDAP phase. DASD(DT&E) anticipates that the OR Program Director will designate PMS 397 to be the Lead DT&E Organization at MS B, when the program becomes an MDAP.

Summary of FY 2014 DT&E Activities

- Completed shaft and propulsor bearing large-scale testing facility construction and commenced testing at the Naval Research Laboratory Center for Corrosion Science and Engineering located at the Marine Corrosion Facility, Key West, Florida. The effort supports development of a shaft and bearing combination that will meet the OR maintenance cycle and support verification of the Material Availability and Operational Availability Sustainment KPPs.
- Completed phase I of the Ship Control System (SCS) Concept of Operations Exercise (COOPEX) at Electric Boat, Groton, Connecticut. The OR SCS COOPEX is a 3-year, three-phase effort that supports OR SCS development. A full-motion platform was constructed to model the OR SCS. OR is the first SSBN with a fly-by-wire SCS and the first U.S. submarine with an X-plane stern configuration since USS ALBACORE (SSN 569). SCS COOPEX recommendations supported down-selection to a two watchstander (Pilot/Copilot) OR SCS configuration. SCS COOPEX efforts also support verification of OR's Strategic Weapon Support System Strategic Missile Launch KPP.
- Continued free-running model testing, captive model testing, and rotating arm testing at NSWC Carderock Division to support evaluation of OR stern and fairwater control surface and hull configurations. Efforts support OR hydrodynamic characterization and generation of the OR submerged operating envelope to support verification of multiple CDD requirements.
- Continued resistance and powering tow tank testing at NSWC Carderock Division to measure OR total ship resistance and downstream wake, support revolutions per minute (RPM) and torque predictions, and provide propulsor data to enable detailed design and production of the first OR propulsor configuration (Generation One) to be tested on the Large-Scale Vehicle at the NSWC Carderock Division Acoustic Research Detachment, Bayview, Idaho, in FY 2015. Efforts support verification of multiple CDD requirements.

Summary of FY 2014 DT&E Engagement and Assessments

- USD(AT&L) conducted an OR deep dive in January 2013, focusing on technology maturation and risk reduction engineering, integration, risk, and affordability. All design and should-cost initiatives were on track and embedded in all research and development activities. All participants agreed that the program development efforts and risk mitigations are on track. The trade space in requirements versus affordability drives program execution and little trade space remains.
- DASD(DT&E) reviewed the OR EOA OT-A1, OHIO-Class Replacement Submarine EOA Report, and in 2015 will verify that the draft OR CDD incorporates EOA recommendations.
- The OR T&E Working Integrated Product Team (WIPT) met on October 23, 2013, and October 9, 2014. Both meetings provided OR program high-level reviews focused on technical maturation and risk reduction efforts and T&E planning.
- PMS 397 briefed DASD(DT&E) on OR limited distribution technology maturation and risk reduction projects in June 2014.
- DASD(DT&E) and other stakeholders are working through the TEMP focus group to guide development of the MS B TEMP. OR-class SSBN Developmental Evaluation Framework, DT Index, and Test Event Descriptions for 100 DT events for the OR-class submarine are structured into seven DT phases and six OT phases from MS A to IOC.
- DASD(DT&E) reviewed the OR-class SSBN Reliability, Availability, Maintainability, and Cost (RAM-C) Rationale Report for MS B. The RAM-C documents the rationale behind the development of OR sustainment requirements (materiel availability, operational availability, and operations and support cost) along with their underlying assumptions and an evaluation of the feasibility of achieving their threshold values. The program continues to refine the OR RAM

operational availability and materiel reliability allocations as the OR design matures, and the program will approve both a Government and a prime contractor RAM Program Plan that contains reliability growth candidates selected using OR RAM critical selection criteria in the 2nd quarter FY 2015.

- DASD(DT&E) reviewed the following OR documents to anchor the program and support MS B: Concept of Operations, Operational Mode Summary/Mission Profile, Failure Definition and Scoring Criteria, Service CDD, Design Reference Mission Profile, Non-Propulsion Electronic Systems Functional Requirements Document, and Ship Specification.
- DASD(DT&E) reviewed OR MS B information streamlining requirements recommendations.
- DASD(DT&E) reviewed OR-class SSBN acquisition, programmatic, and design decisions and requirements that were shared with the T&E WIPT.
- The annual In-Process Review (IPR) DAB was scheduled for October 2014; efforts are under way to reschedule the DAB in early CY 2015.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved T&E Strategy. The program is on schedule in developing the MS B TEMP, in accordance with the new DoDI 5000.02, and plans to submit the CDD to the JROC gatekeeper in March 2015. The IPR DAB was delayed from October 2014 to February 4, 2015, and indicated that the program continues to meet its cost and schedule goals. DASD(DT&E) assesses this pre-MDAP as low risk to gain MS B approval and become an MDAP on schedule in August 2016.

Trident II Life Extension (D5LE)

Executive Summary: The Trident II missile is a D5 ballistic missile launched from OHIO-class strategic submarines (SSBNs). The D5 missile is capable of delivering nuclear warheads in the event the Nation fails to deter nuclear war. Because D5 is a highly reliable and accurate missile, the U.S. Navy decided to use it on the OHIO Replacement submarines rather than design a new missile. In support of this decision, the guidance systems, command sequencer, and electronics of the missile inventory must be modified to extend their life.

The Strategic Systems Programs (SSP) Office is procuring 108 new U.S. D5 missiles and D5LE Strategic Programs Alteration (SPALT) kits in FY 2011–FY 2015, and deliveries will be completed by FY 2019. In addition, SPALT kits for converting the existing D5 inventory to D5LE (269 U.S. missiles and 47 United Kingdom missiles), as well as spare SPALT kits, are being procured in FY 2016–FY 2023. Pending successful completion of the D5LE SPALT Development Program, the first D5LE missiles will be deployed in FY 2017. Conversion of the entire U.S. fleet to D5LE missiles will complete in FY 2024.

Lead DT&E Organization: SSP

Summary of FY 2014 DT&E Activities

- SSP uses a comprehensive layered DT approach. Piece parts and components undergo performance and environmental testing, and manufacturing processes are validated. Subsystems undergo design and performance verification testing. Subsystems are assembled into packages and go through package qualification and package acceptance testing, while assembly processes are validated and margins and limits are measured and verified. System verification testing and integration testing are conducted in the simulation laboratory with hardware in the loop. Lastly, operationally realistic flight tests are conducted to validate that the upgraded missiles perform with the same level of reliability and accuracy as the D5 missiles.
- Reliability testing is an integral part of piece part and package acceptance testing, lab testing, and flight testing. To date, D5LE reliability indicates that D5LE missiles will meet the predicted reliability requirement.
- In 2014, the first two D5LE test missiles were successfully launched to verify that the alterations function as designed.
- In 2015 and 2016, survivability testing and two more missile shots per year are planned.

Summary of FY 2014 DT&E Engagement and Assessments

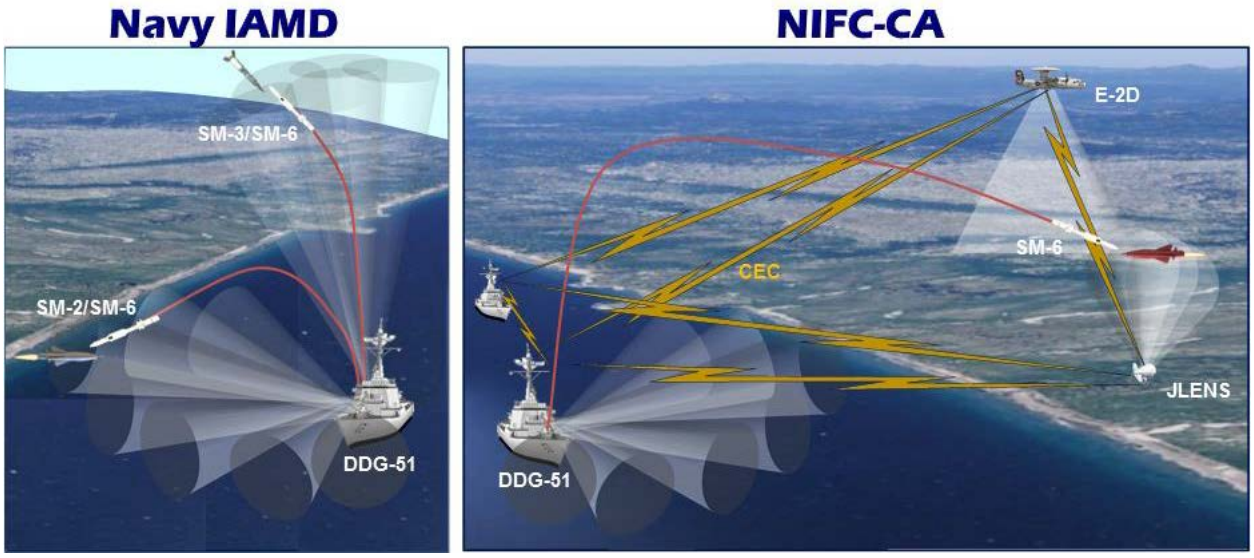
- DASD(DT&E) reviewed FY 2014 test results and determined that reliability performance met requirements.
- DASD(DT&E) will continue to work with SSP to review future test results, as they become available, to enable DASD(DT&E) to verify that missile performance and reliability are being maintained.

- The Trident II D5LE program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. The remaining test program through FY 2017 is largely operational flight tests (two per year) to gather additional data to verify that reliability and other KPPs are met. DASD(DT&E) assesses this program as low risk to completing the test program on schedule.

U.S. Navy Integrated Air and Missile Defense (IAMD) and Naval Integrated Fire Control–Counter Air (NIFC-CA) Capabilities

A system-of-systems (SoS) assessment of several Navy programs that, once integrated, provide two different synergistic sets of capabilities: IAMD and NIFC-CA. These SoS programs include Air and Missile Defense Radar (AMDR), DDG-51 Flight III Destroyer, Aegis Modernization, Cooperative Engagement Capability (CEC), and Standard Missile-6 (SM-6).



Executive Summary: The Navy's primary mission of delivering credible capability for deterrence, sea control, and power projection to prevent or contain conflict and fight and win wars is enabled by the surface Navy's IAMD and NIFC-CA capabilities. These two capabilities, made possible by a group of systems that are being developed or modernized, will be addressed both in the context of an SoS and in the context of the individual programs. IAMD is the centerpiece of the Aegis Modernization combat system program upgrade, which is a significant improvement to Aegis. With this capability, Navy DDGs upgraded to the new Aegis Baseline (BL) 9 will be able to conduct ballistic missile defense (BMD) and antiair warfare (AAW) engagements simultaneously. The NIFC-CA from-the-sea (FTS) surface-to-air capability draws upon the combined capabilities from three surface Navy programs (DDG-51 with its Aegis Advanced Capability Build (ACB), CEC, and SM-6); a joint program, Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System; and one aircraft program, E-2D Advanced Hawkeye (AHE). The current plan for the full SoS testing is integrated under a NIFC-CA enterprise, which is controlled by the PEO for Integrated Warfare Systems (IWS) 7 and supported by the individual programs. NIFC-CA from-the-air (FTA) air-to-air capability draws upon the capabilities of the F-18, advanced medium-range air-to-air missile (AMRAAM), multifunctional information distribution system (MIDS), and the E-2D. PMA-298 manages the FTA program, but the SoS testing is primarily conducted as part of the individual test programs.

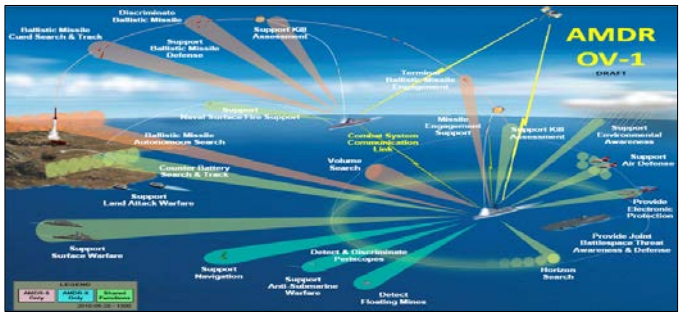
The Navy is upgrading the DDG-51 to the Flight III configuration with delivery in 2021. The new AMDR, which the Navy is developing specifically for BMD and advanced threats, will be employed on the Flight III. When integrated with other NIFC-CA systems, the introduction of the AMDR will provide the Flight III (DDG) with an increase in IAMD capability.

Each of the individual programs and their test plans/results that are integrated into the IAMD and NIFC-CA capabilities are discussed below.

DDG-51 Flight III Destroyer

The ARLEIGH BURKE (DDG-51)-class ship is a multi-mission surface combatant capable of simultaneously engaging antiair, antisurface, and antisubmarine warfare threats while performing strike operations. DDG-51–class ships operate offensively and defensively as part of a carrier strike group, surface action group, amphibious task force, and underway replenishment group. The Navy is currently building the Flight IIA configuration (DDG-79 through DDG-123) with the SPY-1D(V) radar, and starting with DDG-124 (second ship of the FY 2016 procurement), a new configuration, Flight III, will include cooling and power upgrades to support the new AMDR. DASD(DT&E) is primarily focused on development and testing of the new Flight III.

Lead DT&E Organization: NSWC PHD

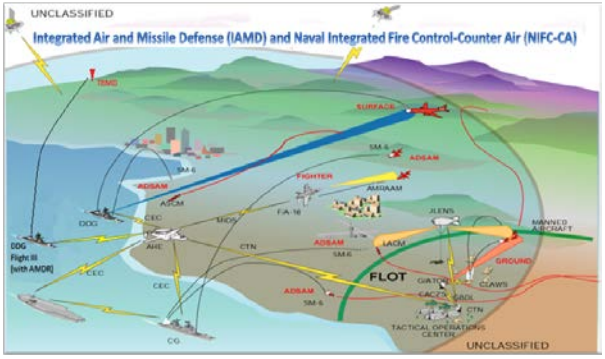


Air and Missile Defense Radar

AMDR is the Navy's next-generation radar system that will address current and future BMD and air defense (AD) challenges. The AMDR suite consists of an S-band radar (AMDR-S), an X-band radar, and a radar suite controller. AMDR-S is a new development IAMD radar providing sensitivity for long-range detection and engagement of advanced threats. The initial X-band radar is a horizon-search radar based on existing technology. For ship sets 1–12, the AMDR suite will include the AN/SPQ-9B X-band radar. AMDR will require no new development efforts for the AN/SPQ-9B and will accept the AN/SPQ-9B existing performance and logistics infrastructure. Starting with the 13th ship set, the Navy intends to develop and integrate a future X-band sensor into the AMDR suite.

Lead DT&E Organization: AMDR Cross-Product Team

NIFC-CA



The NIFC-CA program was placed on the DASD(DT&E) oversight list because it plays a unique role in integrating surface-to-air (Aegis Modernization ACB, CEC, E-2D, and SM-6) and air-to-air (F-18, MIDS, E-2D, and AMRAAM) programs into a superior integrated SoS operational concept that allows integrated engagements. The focus of the NIFC-CA test program needs to ensure that the NIFC-CA SoS test programs are adequately integrated, coordinated, and resourced for testing this

important capability. The Assistant Secretary of the Navy for Research, Development, and Acquisition has agreed to provide a combined surface/air NIFC-CA TEMP for the testing of Increment 2, which starts in 2019.

Lead DT&E Organization for FTS Capability: PEO IWS 7
Lead DT&E Organization for FTA Capability: PMA-298

Aegis Modernization

The Aegis Modernization program consists of successive ACB upgrades to the Aegis Weapon System Mk 7, which is the automated segment of the Aegis Combat System. These upgrades are developed on an approximate 4-year cycle with ACB 12 conducting testing in 2012, ACB 16 in 2016, and ACB 20 in 2020. The ACB 12 upgrade, called Aegis BL 9 when integrated aboard an Aegis ship, provides Aegis DDGs with a comprehensive AAW and BMD mission modernization of their combat system between 2013 and 2015. The Navy is installing BL 9 on some USS TICONDEROGA (CG-47)-class cruisers and Flight I USS ARLEIGH BURKE (DDG-51) destroyers. New construction DDGs, beginning with USS JOHN FINN (DDG-113), will also be delivered with BL 9.

Lead DT&E Organization: NSWC PHD

Cooperative Engagement Capability

CEC provides a sensor network that supports integrated tracking and improved situational awareness and results in a distributed and integrated AD weapon SoS among cooperating units such as Aegis CGs and DDGs, CVNs, LHAs, LHDs, and LPDs, and E-2C and E-2D aircraft. CEC provides the means to share sensor and weapons data among individual ships in a closely coordinated and cooperative manner to counter increasingly capable and less-detectable cruise missiles. CEC has multiple configurations including shipboard and airborne configurations. The shipboard version (AN/USG-2B) is being concurrently upgraded with the Aegis Modernization effort with testing on BL 9 currently ongoing. The airborne version (AN/USG-3B) is currently being upgraded and tested as part of the E-2D AHE upgrade effort.

Lead DT&E Organization: NSWC PHD

Standard Missile-6

SM-6 combines the tested legacy of the SM-2 propulsion and ordnance with a repackaged AMRAAM active seeker, allowing for enhanced performance at extended ranges. The SM-6 Block I missile will be able to increase the battlespace to its maximum effective kinematic range using its autonomous active seeker mode either with Aegis in a stand-alone configuration or beyond the horizon with a CEC configuration. When the firing ship is employed with NIFC-CA, SM-6 Block I will provide extended-range AAW defense to the full extent of the missile's kinematic limit both above and below the radar horizon. The program conducted a series of FOT&E tests in 2014, which are described below. Testing of the SM-6 Block IA configuration began in 2014 and will be followed by flight testing at White Sands Missile Range (WSMR), New Mexico, and at sea.

Lead DT&E Organization: NSWC PHD

Summary of FY 2014 DT&E Activities

SoS IAMD Capability

- June 2014, the Navy conducted the first IAMD testing with Aegis BL 9 at sea with simultaneous live BMD and AAW targets as tracking exercise TX-01 during DDG-53 combat systems ship qualification testing (CSSQT).
- An MDA-executed test using Aegis BL 9 and concurrent engagements with SM-2 and SM-3 missiles in an IAMD mode was planned for FY 2014 but was rescheduled to early FY 2015.

SoS NIFC-CA Capability

- December 2013 and January 2014, NIFC-CA FTS conducted overland tracking exercises at WSMR to demonstrate the integration of E-2D, CEC, and Aegis BL 9 against various threat-representative targets in an operationally realistic environment with tactically representative systems.
- February and June 2014, NIFC-CA FTS conducted tracking exercises at sea with DDG-53 using tactically representative targets and tactical NIFC-CA architecture.
- March 2014, NIFC-CA FTS conducted a live-fire test (LFT-1A) at WSMR to test SoS battlespace expansion in an overland environment.
- June 2014, NIFC-CA FTS conducted live-fire exercises (live-fire events 2A, 2B, and 2C) at sea with DDG-53 using tactically representative targets and tactical NIFC-CA architecture to test the SoS battlespace expansion at sea.

DDG-51 Flight III Destroyer

- DDG-51 Flight III first ship DT is scheduled to begin in 2021.
- Planning for DDG-51 integrated system testing using Aegis ACB 20 and AMDR has begun.
- The program plans to conduct early combat system integration and testing (CS I&T) as part of the AMDR DT at the Pacific Missile Range Facility (PMRF), Hawaii, in FY 2017.

Air and Missile Defense Radar

- AMDR entered into the EMD phase in early 2014 after the program resolved a protest of the contract award.
- The AMDR program had no DT scheduled during the early period of EMD in FY 2014.

- The Navy had proposed conducting an early operational assessment (EOA) in early 2015 for the AMDR program to gain some early operator feedback on the radar design to inform the critical design review. The Navy now intends to execute this EOA-like event as a DT assist.

Aegis Modernization

- The Aegis Modernization program submitted a TEMP for OSD approval in late FY 2013.
- Aegis Modernization conducted a series of DT phases (DT-B2K through DT-B2P) at sea throughout 2014 aboard CG-60, CG-62, and DDG-53 representing the various BL configurations to evaluate system performance against the requirements in the Naval Capabilities Document.
- Initial FY 2014 testing aboard USS CHANCELLORSVILLE (CG-62) was suspended before all events were conducted because of a mishap with a threat target drone. The subsequent moratorium on near-ship, low-level target use from October 2013 to June 2014 impacted the scheduled Aegis Modernization AAW testing, but the program was able to reschedule and complete most of these tests.

Cooperative Engagement Capability

- CEC continued the DT-D1 phase of testing (formally DT-IIIE-1) into 2014 to assess the integration and interoperability between CEC and Aegis BL 9 as well as across all configurations of CEC and to certify CEC readiness for OT-D1A.
- CEC started DT-D2 at land-based test sites (LBTSs) during 2014 with the AN/USG-2B (CEC BL 2.1) and CVN-78 Ship Self-Defense System Mk 2 configuration.
- June and September 2014, CEC conducted testing at sea on the West Coast in conjunction with NIFC-CA testing on an Aegis BL 9 ship and E-2D aircraft. Specific CEC testing included simulated SM-6 engagements, interoperability testing, and various composite tracking events.

Standard Missile-6

- SM-6 plans to conduct 10 follow-on operational test and evaluation (FOT&E) live-fire events (DT-D1A through DT-D1J) in 2014–2015. The Navy will conduct one live-fire event at WSMR and the remaining nine tests are planned for at-sea firing concurrent with the Aegis Modernization testing of the Aegis BL 9 combat system.
- SM-6 Block IA will commence testing with one guided test vehicle (GTV) flight test at WSMR in FY 2014 followed by additional GTV tests in FY 2015.

Summary of FY 2014 DT&E Engagement and Assessments

SoS IAMD Capability

- The Navy conducted a preliminary demonstration of IAMD capability during TX-01 onboard CG-62 during Aegis Modernization DT in June 2014.
- Aegis BL 9 supported simulated SM-2 engagements against four live AAW targets and a simulated SM-3 engagement of an Aegis Readiness Assessment Vehicle (ARAV)-A target.
- The TX-01 test event successfully achieved the overlap of simulated SM-2 and SM-3 missiles in flight and concurrent AAW/BMD engagements.

SoS NIFC-CA Capability

- NIFC-CA FTS Increment 1 tracking exercises and live-fire events in 2014 were successful and achieved all test objectives.

- During the at-sea phase of testing, DDG-53 conducted three integrated fire control (IFC) engagements employing the NIFC-CA capability and achieved the longest and lowest intercepts by an SM-6 in IFC mode to date.
- As agreed to by DASD(DT&E) and Navy leadership, the NIFC-CA FTS testing strategy, which was approved by PEO IWS in September 2012, will cover NIFC-CA Increment 1 testing through 2018. An OSD-approved TEMP will document all Increment 2 testing.

DDG-51 Flight III Destroyer

- The USD(AT&L) conducted a paper DAB In-Process Review (IPR) in June 2014 to authorize the Navy to release the RFP for the Flight III Engineering Change Proposal detailed design phase for the DDG-51 ARLEIGH BURKE-class destroyer program.
- The DDG-51 Flight III CDD JROC Memorandum was signed October 28, 2014.
- The DDG-51 Flight III program will conduct a DAB IPR in the FY 2016 timeframe to review the readiness of the program to proceed with construction of Flight III ships.
- The Navy is required to provide a Flight III TEMP with test planning and updated resource requirements before the FY 2016 DAB review. The Navy intends to update the Aegis Modernization TEMP as a starting point for the Flight III TEMP. This approach will require the DDG-51 Flight III TEMP to include hull, mechanical, and electrical systems in addition to the ACB 20 test plan.
- DDG 51 Flight III T&E has a few potentially significant issues, which need to be addressed and resolved well before actual SoS testing begins in 2021.
  - The program has not yet resolved the need for an upgraded Self-Defense Test Ship (SDTS) to conduct live engagements in the near self-defense region to verify and validate the proposed end-to-end M&S.
  - The overall impact of the compromises made to fit the AMDR into the DDG-51 seaframe cannot be fully assessed until the full SoS is tested in an end-to-end integrated test (IT) at sea. That testing, by the nature of the development timelines, is concurrent testing and will not take place until 73 percent of the AMDRs are already purchased, the ACB 20 combat system development is complete, and a large number of Flight III ships have already been approved.
- Early CS I&T conducted during AMDR DT in FY 2017, by the nature of the combat system development timeline, will not include direct ACB 20 functionality and will be primarily based on the current Aegis BL 9 combat system.

Air and Missile Defense Radar

- DASD(DT&E) had directed the AMDR program to provide justification before conducting any AMDR IAMD DT using the ARAV-M target that use of this target satisfies test objectives. Upon review of the PEO IWS 2 White Paper (ARAV-M Adequacy to Support AMDR IAMD Test Event), DASD(DT&E) accepted the ARAV–M as an acceptable target for this early DT, which is not designed for or capable of answering the entire performance requirement of the AMDR. As the AMDR program moves through its DT program into OT, however, the planned ARAV-M target may not be adequate for the testing required to assess full performance in a threat-realistic scenario.
- DOT&E has not yet approved the AMDR TEMP because of the Navy's failure to program for an upgraded SDTS for post-MS C testing. DT during the EMD phase is progressing because the DASD(DT&E) signed the TEMP for testing prior to MS C. DASD(DT&E) agrees with DOT&E that the current TEMP does not provide an adequate M&S and at-sea testing approach for testing AMDR as part of the DDG-51 Flight III SoS post-AMDR MS C.

- Because a primary focus of this new radar is improved BMD capability, and with the emphasis of BMD patrols as a fleet requirement, the Navy and MDA should exploit any opportunity for additional realistic testing. The planned testing during deployment of the Engineering Developmental Model (EDM) at PMRF was predicated on significant targets of opportunity (TOOs) related to MDA testing. DASD(DT&E) noted during TEMP development that reliance on TOOs controlled by another program was risky, and the recent MDA test plan reflects a significant decrease in number and complexity of TOOs during the EDM deployment.
- The AMDR program planned to use the MDA mobile launch platform (MLP) as a launch platform for the ARAV-Ms. Recently, MDA decided to decommission the MLP, leaving the AMDR program with a decision to either take over support for the MLP or find a suitable alternative.
- DASD(DT&E) encouraged the Navy and MDA to use the time during which the AMDR EDM is located at PMRF as an opportunity to explore integration and testing with the existing Aegis Ashore LBTS and other BMD system components. DASD(DT&E) continues to recommend keeping the EDM array at PMRF beyond MS C because significant opportunities exist to use MDA test events that provide challenging ballistic missile targets and presentations to collect data and further refine AMDR modeling.

Aegis Modernization

- In May/June 2014, OSD approved the Revision 1 TEMP that covers developmental and operational testing of the ACB 12 (BL 9) combat system upgrade. A revision to this TEMP, Revision 2, is planned for early 2015 to address ACB 16 testing, and a subsequent revision, Revision 3, will be completed before the DDG-51 Flight III DAB IPR in FY 2016 to address ACB 20 testing.
- During DT-B2K (CG-62 CSSQT/IT) in November/December 2013, the Navy successfully conducted AAW and surface warfare (SUW) tracking exercises. During an AAW tracking exercise, a threat target drone malfunctioned and physically impacted the test ship, USS CHANCELLORSVILLE (CG-62). The program suspended the remaining DT-B2K testing, which was rescheduled for other test phases and continued during the DT-B2K continuation phase, which commenced upon completion of USS CHANCELLORSVILLE repairs in fall 2014 (see below).
- During DT-B2L (DDG-53 PAU-1) in November 2013, the Navy successfully conducted AAW tracking exercises only because live-fire AAW events were postponed because of the target moratorium.
- During DT-B2N (CG-60 CSSQT/IT) in November 2013 through January 2014, the Navy successfully conducted AAW and SUW tracking exercises. Additionally, the Navy successfully conducted undersea warfare tracking exercises and live-fire events.
- During DT-B2M (DDG-53 PAU-2) in February 2014, the Navy successfully conducted live-fire events LF-04A and LF-04B using SM-2 missiles versus AQM-37 targets. During this time, the Navy also conducted NIFC-CA tracking exercises (further discussed in the NIFC-CA section). An SUW live-fire event, SUW-LF-11, was suspended because of sensor correlation issues.
- In March 2014, CG-60 successfully conducted a maintenance assessment.
- During DT-B2P (DDG-53 CSSQT/IT) in May/June 2014, an IAMD tracking exercise using simultaneous presentations of a theater BMD target, two high-flying and two low-flying targets, was successfully executed multiple times. Additionally, an AAW live-fire event, LF-08, was partially successful with one SM-2 guiding successfully to one of two low-level targets and the second SM-2 failing to leave the cell. Additionally, during DT-B2P, DDG-53 conducted

multiple NIFC-CA and SM-6 FOT&E tracking exercises culminating in successful live-fire events, which are further described in the NIFC-CA and SM-6 sections.
- In May 2014, CG-60 successfully executed live-fire event LF-01 with one SM-2 in an area defense role defending a high-value unit.
- During DT-B2K (CG-62 CSSQT/IT continuation) in August 2014, the Navy successfully completed AAW tracking exercises and live-fire events (LF-07 and -09) encompassing individual SM-2 shots against low- and high-altitude targets. Events LF-06 and -08, consisting of a single SM-2 against a single target and a multiple SM-2/Evolved Sea Sparrow Missile (ESSM) shot against a raid-sized scenario, were not successfully completed because of system, target, and missile failures. Additionally, the Navy conducted SUW live-fire events with similar issues seen in previous baselines with Aegis support against small boat attack, and SM-6 FOT&E tracking exercises and live-fire events were conducted as described in the SM-6 section.
- The program will be required to submit a TEMP revision in early 2015 to support ACB 16 development and testing. This TEMP should further evolve infrastructure, development, and resourcing of the expected high-fidelity M&S needed for ACB 20/DDG-51 Flight III testing.

Cooperative Engagement Capability
- CEC participated in numerous testing events in concert with Aegis Modernization testing: CG-60 CSSQT (November 2014), DDG-53 PAU-1 (November 2014), CG-62 CSSQT-1 (November 2014), DDG-53 PAU-2 (February 2014), CG-62 PAU-1 (May 2014), DDG-53 CSSQT-1 (May 2014), DDG-53 CSSQT-2 (June 2014), CG-62 PAU-2 (August 2014), and CG-62 CSSQT-2 (August/September 2014).
- In all testing, CEC correctly supported all engagements.
- Track file concurrence, an issue during CEC USG-3B testing on the E-2D, appears to have been resolved and will be fully assessed during upcoming testing.
- Interoperability issues with CEC and host systems still exist. These issues are planned to be addressed via the Far-Term Interoperability Improvement Project, pending funding via POM 17. Dual tracks, observed during CEC/E-2D testing in 2011–2014, are being addressed with changes to CEC and E-2D software. Implementation of the Accelerated Mid-Term Interoperability Improvement Project fixes in FY 2017 are planned to correct these dual-track issues.
- The CEC TEMP requires an update, which is in progress.

Standard Missile-6
- The SM-6 program conducted DT-D1C (SM-6 versus high-altitude target) at sea aboard DDG-53 during Aegis Modernization testing in June 2014. Final analysis on the success of this mission is pending. SM-6 DT-D1C was the first FOT&E at-sea test and the first semi-active IFC engagement for SM-6.
- The SM-6 program conducted DT-D1J (SM-6 versus minimum-altitude target over land) at WSMR in August 2014. The flight test was successful and met all test objectives. SM-6 DT-D1J was the lowest-altitude intercept over land for the SM-6.
- The SM-6 program conducted DT-D1E (SM-6 engage on remote (EOR) against a low-crossing supersonic target) and DT-D1F (SM-6 EOR against a low-crossing subsonic target) at sea aboard CG-62 during Aegis Modernization testing in September 2014. The flight tests were successful and met all test objectives. SM-6 DT-D1E was the first SM-6 IFC EOR intercept against a supersonic sea-skimming target. SM-6 DT-D1F was the first SM-6 EOR against a crossing subsonic target.
- The SM-6 Block IA program successfully conducted its first flight test with a GTV test at WSMR in August 2014.

- The full performance of SM-6 KPPs has yet to be demonstrated, but plans are in place to test, and no issues are expected. The interoperability performance requirement requires fielding of the NIFC-CA Increment I capability in FY 2015. The program expects the maximum range and launch availability KPPs to be demonstrated during SM-6 FOT&E and Aegis BL 9 testing in FY 2015.

- The AMDR, DDG-51 Flight III Destroyer, Aegis Modernization, CEC, and SM-6 programs did not request a waiver or deviation from requirements in the TEMP.

Conclusion: Aegis Modernization, CEC, and SM-6 conducted DT&E in 2014 in accordance with their individual TEMPs that culminated in SoS testing of some IAMD and NIFC-CA capabilities. AMDR is in the early EMD phase and developing its detailed test planning for component testing, which begins in 2015. The DDG-51 Flight III program is focusing test efforts on finalization of system configuration, how to test integration of the AMDR EMD with the combat system, and resolution of the need for an unmanned test asset to validate self-defense M&S. Aegis, CEC, and SM-6 testing in 2014 has been robust and has identified various issues that the programs are addressing. The Navy is conducting NIFC-CA testing in a deliberate manner with one to two tests per year. These tests are outside of the program TEMPs, with a NIFC-CA TEMP not planned until Increment 2 testing in 2018.

VIRGINIA-Class Submarine

Executive Summary: The VIRGINIA-class fast attack submarine is an ACAT ID program that previously delivered 10 submarines. In 2014, the program delivered SSN 784, the first of eight Block III submarines, on schedule and within budget. Block III submarines have the same capability as previously delivered submarines but at reduced cost and improved reliability. The major changes include replacing the large spherical-array sonar with a smaller, large-aperture bow (LAB) array sonar that uses a water-backed array of passive hydrophones and active transmitters; replacing the 12 vertical launch system tubes with two VIRGINIA payload tubes (VPTs) (six Tomahawk missiles per tube) and providing a new payload support electronics system (PSES) and common weapon launcher (CWL); and incorporating a number of other design changes to reduce the cost per unit and improve reliability.

In May 2014, NAVSEA awarded the contract to build 10 Block IV submarines (two per year). Design changes are intended to further reduce the total ownership cost of VIRGINIA platforms again with the same capability. The Block V procurement is in the planning stages and is scheduled for award in FY 2019. The VIRGINIA payload module is targeted for insertion in Block V hulls and will leverage the success of the VPT as it utilizes similar tubes developed for Block III. The CDD approved by the Joint Requirements Oversight Council in December 2013 adds KPPs for strike capacity, cost, and schedule, while it increases Tomahawk land-attack missile strike capacity from 12 to 40. This increased strike capacity is needed to replace the strike capacity that will be lost when the four SSGNs begin decommissioning in the mid-2020s. The design uses existing Multiple All-Up-Round Canisters (MACs) currently in use on SSGNs but does not preclude future capability to host other missile systems in other combinations within a different MAC interface configuration.

Lead DT&E Organization: Naval Undersea Warfare Center (NUWC) Division Newport

Summary of FY 2014 DT&E Activities

- July 2014, Commander, Operational Test and Evaluation Force (COTF) verified the correction of deficiencies on Diver's Oxygen Treatment System (DOTS) for naval special warfare capability.
- June–August 2014, PMS 450 conducted VPT hatch shock qualification testing at Aberdeen Proving Ground, Maryland.
- February–August 2014, Electric Boat found and corrected vendor material deficiencies with some Subsafe materials.
- September–October 2014, PMS 450 commenced weapon system accuracy test (WSAT) on the Pre-Commissioning Unit USS NORTH DAKOTA (SSN 784).

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) reviewed two reports on reliability analysis of the PSES and CWL for data obtained through October 2013. Both reports show that these new systems exceed expected

reliability for the time period assessed. DASD(DT&E) also reviewed an FY 2013 report on reliability analysis of the LAB array, which shows that this new system exceeded expected reliability for the time period assessed.

- On August 18, 2014, COTF issued a report verifying deficiency correction on DOTS.
- Preliminary results of VPT hatch shock qualification testing are favorable. After reviewing all data, NAVSEA 05P will issue its shock qualification in FY 2015.
- In August and September 2014, DASD(DT&E) met with program office personnel to ensure that they understood the new DT&E requirements of Interim DoDI 5000.02 and how existing program documentation could comply.
- PMS 450 completed WSAT in October 2014 and the classified report was released in December 2014. The report indicated there were eight significant material deficiencies that needed to be corrected and verified corrected before the platform could be certified materially ready to conduct all of its warfare mission areas. The platform is still within the industrial warranty period. An additional test period will be scheduled when the deficiencies have been corrected. Deficiency corrections are under way and should be tested, before or during DT, in FY 2015.
- The VIRGINIA-Class Submarine program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted its FY 2014 DT&E activities in accordance with the approved TEMP. FRP of procurement Block III is on schedule and initial at-sea testing revealed several deficiencies, which will require corrective action and regression retesting in FY 2015/FY 2016 to verify correction. Some FY 2015 planned DT events are deferred into FY 2016 because of budget cuts, but the program has revised FY 2016 DT and OT plans to complete testing without delaying submarine deployments by using the first three Block III submarines instead of just the first to complete testing. This presents a moderate risk to the test program through FY 2016.

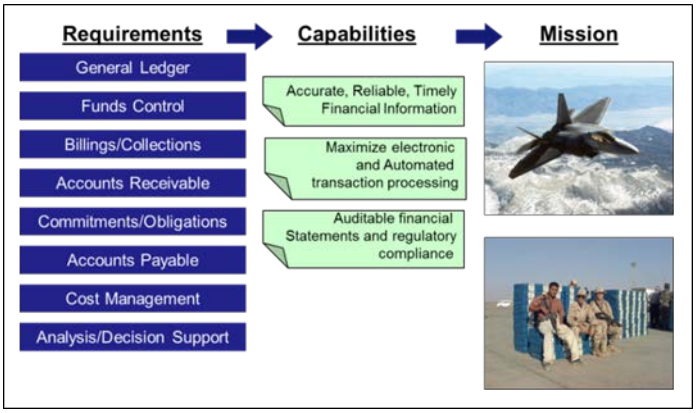
6.4 Air Force Programs

This section includes summaries of the following 10 programs:

- Defense Enterprise Accounting and Management System (DEAMS)
- F-22 Increment 3.2A Modernization
- Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)
- Global Positioning System (GPS) Enterprise
- Joint Space Operations Center (JSpOC) Mission System (JMS)
- KC-46A Tanker Modernization
- MQ-9 Reaper
- RQ-4B Global Hawk
- Small Diameter Bomb Increment II (SDB II)
- Space-Based Infrared System High Component (SBIRS High)

Defense Enterprise Accounting and Management System (DEAMS)

Executive Summary: DEAMS is a single financial system developed and implemented by the Air Force, the U.S. Transportation Command, and the Defense Finance and Accounting Service. DEAMS provides an enterprise-level view of critical financial data supporting decision making at all levels. It will replace legacy financial and accounting systems with a commercial off-the-shelf (COTS)-based funds management solution qualified by the Joint Financial Management Improvement Program.



The DEAMS program attained MS B in January 2012. Technical discovery during FY 2013 remediation activities led the program to conclude that proceeding with a COTS Oracle Enterprise Business Suite (EBS) upgrade from R11i to R12 immediately following Release 2 was not technically required, was more costly, and was greater risk to schedule and execution complexity than deferring the upgrade until DEAMS is fully deployed across the Air Force. Pending final approval by the Milestone Decision Authority in the 1st quarter FY 2015, the revised acquisition strategy outlines one increment comprising seven releases of increasing capability, an EBS technical upgrade from R11i to R12, and an eighth release to incorporate features and interfaces to support deployment to the Surface Deployment and Distribution Command. In April and June 2014, DEAMS Increment 1 Release 2 was fielded to seven locations, completing deployment to Air Mobility Command (AMC) bases.

In FY 2014, the PMO focused development and testing efforts on improving DEAMS program processes and system performance and preparing to accelerate deployments toward full fielding. The Air Force Operational Test and Evaluation Center performed a second operational assessment (OA-2) of the program in September 2013–January 2014 of Release 2. The PMO produced a series of corrective action post-production support (PPS) releases to mitigate adverse findings remaining from a 2012 OA and from OA-2 in parallel with development and test of functional enhancements in Increment 1 Release 3. Release 3 will provide approximately 85 percent of DEAMS capability and functionality, serving as the baseline for IOT&E and MS C. The Air Force deployed Release 3 to all prior operating locations and 15 Air Combat Command and Air Force Global Strike Command locations effective October 2014. As of September 30, 2014, release element 1.R3.2 features were available to DEAMS users with the exception of Defense Departmental Reporting System (DDRS) interface modifications deferred to follow fiscal year-end, with interface partner mutual concurrence. Release 3 elements 1.R3.0, 1.R3.2.1, and 1.R3.1 were deployed in November 2014.

Lead DT&E Organization: AFLCMC/HNIZ

Summary of FY 2014 DT&E Activities

- July 9–August 24, 2014, the PMO conducted contractor component validation and integration (CV&I) and Government qualification test and evaluation (QT&E) of interface and error

handling enhancements to improve detection, notification, correction, and audit trail recording of interface data anomalies; upgrades to support Standard Financial Information Structure version 10.0 and DDRS interface (1.R3.2).
- July 21–October 31, 2014, the PMO performed contractor CV&I and Government QT&E of enhancements and defect fixes related to civilian pay processing (1.R3.0, PPS 1.R3.2.1).
- July 31–December 2014, the PMO conducted contractor CV&I and Government QT&E of enhanced reporting capability by means of Oracle Business Intelligence components (1.R3.1).
- The PMO accomplished contractor CV&I and Government QT&E of defect fixes and minor enhancements resulting from prior OA events and other reported deficiencies in five PPS releases.

Summary of FY 2014 DT&E Engagement and Assessments
- The DEAMS program updated the TEMP for MS C and the revised acquisition strategy.
- The DASD(DT&E) reviewed and approved the DT planning within the TEMP on July 23, 2014.
- The PMO resolved deficiencies found during FY 2014 DT events, leaving no unresolved Severity 1 or 2 deficiencies prior to promoting the software to production.
- The DEAMS program successfully completed planned DT&E Release 2 PPS activities and continued to make progress remediating OA findings. OA-2 rated one of the nine KPPs (Net-Ready) and none of the six KSAs as significantly failing to meet threshold requirements. The PMO regularly collects operational data of deployed site usage of the production baseline. August 2014 data indicated improvement across all prior shortfalls; KPP3 (Balance of Available Funds Correct) fell significantly below threshold when assessed against the full complement of AMC bases. October 2014 data, following deployment of Release 1.R3.2, indicated significant improvement in KPP3, while KPP1 (Balance with Treasury) and KPP7 (Period End Processing) fell below threshold. The PM's get-well plan projects resolution of KPP shortfalls by November 2014.
- The program employed more integrated DT&E than in previous major releases by combining functional validation activities of CV&I and QT&E for Releases 1.R3.2, 1.R3.1, and 1.R3.0. The DEAMS Functional Management Office (FMO) observed test script execution performed by the system integrator (SI) in an SI's Government-hosted development test environment. This activity was to be followed by installation and FMO-run regression testing in the Capabilities Integration Environment (CIE) integration zone, and then installation and checkout in the DISA Defense Enterprise Computing Center Global Combat Support System–Air Force (GCSS-AF) pre-production and production areas starting with 1.R3.2. Both functional validation and regression testing by the FMO in QT&E environments has been the norm. The combined approach reduced total test time but was not as robust in emulating prospective user experience.
- Anomalies and time constraints precluded successful installation of 1.R3.2 in the QT&E CIE integration zone and GCSS-AF pre-production environments prior to production installation. Release 1.R3.2 was installed in a second development test environment and the FMO successfully performed regression testing of legacy features. The second environment did not contain new Oracle components used by 1.R3.2, preventing regression testing of 1.R3.2 unique features. Nearly 90 percent of the planned regression suite was run. The incomplete installations and regression testing led the Lead DT&E Organization to assess the deployment of DEAMS Release 1.R3.2 as a medium risk.
- The DEAMS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion. The PMO successfully completed FY 2014 planned DT and deployment of corrective patch releases improving system operational performance parameters. Full execution of Release

1.R3.2 planned DT was not completed because of differing test environment capabilities, several unforeseen technical complexities, and time constraints related to the approaching end of fiscal year. The program continues to make progress toward correcting known test deficiencies in preparation for IOT&E activities.

F-22 Increment 3.2A Modernization

Executive Summary: Increment 3.2A is a software-only upgrade providing new and improved electronic protection (EP), Link 16, and combat identification (CID) capabilities to F-22 Block 30 and Block 35 aircraft. The core warfighting capability provided by Increment 3.2A is to find, fix, track, target, engage, and assess advanced anti-access surface-to-air missiles and other non-hardened surface targets.

Planned Increment 3.2A software DT&E included a series of three developmental and one production Operational Flight Program builds. DT&E completed in November 2014.

Lead DT&E Organization: 412th Test Wing

Summary of FY 2014 DT&E Activities

- The contractor and the Lead DT&E Organization continued Increment 3.2A software development and laboratory and flight testing of EP, CID, and Link 16 performance through FY 2014.
- October–November 2013, the Lead DT&E Organization conducted flight test of the final development flight software build.
- November 2013–March 2014, the Lead DT&E Organization conducted flight test of the production flight software.
- March–November 2014, the contractor developed four additional production flight software builds to correct issues or deficiencies discovered in developmental flight testing. The Lead DT&E Organization conducted required additional flight test.
- All KPPs have been previously evaluated as part of the baseline F-22 program. No unique Increment 3.2A KPPs were evaluated.

Summary of FY 2014 DT&E Engagement and Assessments

- DT&E was extended 9 months longer than planned.
  - Analysis of flight test results of the final development flight software indicated stability issues too late to incorporate corrections in the planned production flight software build.
  - Primary evaluation objectives for additional production software builds included correction of prior stability issues and mitigation of critical deficiencies discovered during flight test.
  - The program office is evaluating more than 20 open deficiency reports for future correction.
- Performance observed in DT&E flight test did not always correlate to laboratory results but is not expected to change appreciably or prevent follow-on operational test and evaluation (FOT&E) execution.
- DASD(DT&E) provided an end of DT&E assessment to the Air Force to support the operational test readiness review.
  - Increment 3.2A DT&E showed satisfactory performance in several areas.

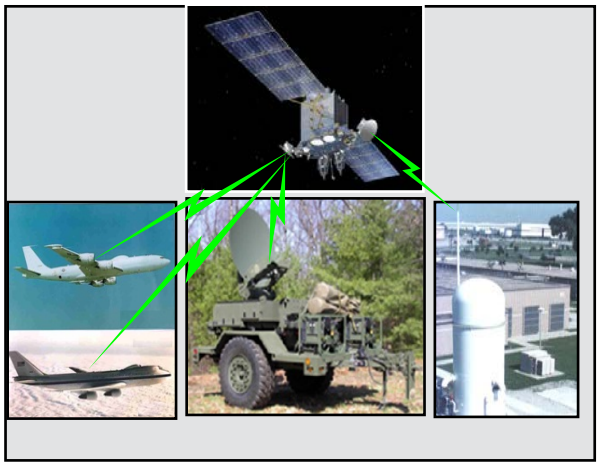
  - The overall system performance was marginal and did not fully meet all requirements in some areas.
  - Aircraft equipped with Increment 3.2A software demonstrated increased mission capability, although some fielded capabilities were degraded.
  - Software stability of the final production software build met requirements, but due to limited DT&E flight test hours of the final production software build, the reliability measure could not be assessed with meaningful confidence.
  - Based on DT&E results, the potential for major new discovery in FOT&E due to Increment 3.2A capability improvements was assessed as low.
- The F-22 program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program completed DT in FY 2014 in accordance with the approved TEMP. Increment 3.2A DT&E results indicated satisfactory performance and an overall increased mission capability in the three objective functional areas: EP, Link 16 capability, and CID.

Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)

Executive Summary: FAB-T enables strategic nuclear and nonnuclear command and control with extremely high frequency (EHF), protected and survivable communications terminals for beyond line-of-sight communications.

FAB-T provides nuclear-survivable terminals capable of communicating with Milstar (low data rate (LDR)) and advanced extremely high frequency (AEHF) (LDR/extended data rate (XDR)) satellite constellations for airborne, ground-fixed, and transportable applications for nuclear command and control.



The FAB-T program followed a two-contractor development approach to reduce program risk and ensure the best value to produce FAB-T terminals for DoD. On June 2, 2014, the Raytheon Company of Marlborough, Massachusetts, was selected to complete development of, produce, and field the FAB-T command post terminal (CPT).

Lead DT&E Organization: 96th Test Wing

Summary of FY 2014 DT&E Activities

- September 20–November 19, 2013, Boeing and the 46th Test Squadron (46 TS) of the 96th Test Wing conducted flight tests on the advanced wideband terminal (AWT).
- October 20, 2013–June 18, 2014, Boeing completed reliability verification testing (RVT).
- October 31, 2013, Raytheon completed the 13-month prototype demonstration.
- November 2013, Raytheon participated in the Advanced EHF System Test (AEST)-7700.
- November 25–December 8, 2013, Boeing and the 46 TS completed regression flight tests on the airborne CPT with post–functional qualification test (FQT) software.
- January 2014, Raytheon participated in communication demonstrations during the AEHF Space Vehicle-3 on-orbit checkout (AEST-8000-3).
- April 14–May 1, 2014, Boeing completed satellite control risk reduction testing from Peterson Air Force Base, Colorado.
- June 16, 2014, Raytheon conducted the system verification readiness review for physical qualification tests.
- May 19–27, Boeing and the 46 TS completed regression flight tests on the airborne CPT.
- June 2, 2014, Raytheon was selected to continue development efforts with anticipation of entering into production after a successful MS C decision.
- July 21, 2014, Raytheon entered physical qualification testing and planned to conclude the testing before the MS C/first LRIP decision scheduled for March 31, 2015.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) engaged in Boeing biweekly FAB-T metric reviews on system-level testing to include RVT, which concluded in early June 2014 and was followed by a 48-hour test using FAB-T software that successfully exited FQT and flight testing. Boeing implemented multiple

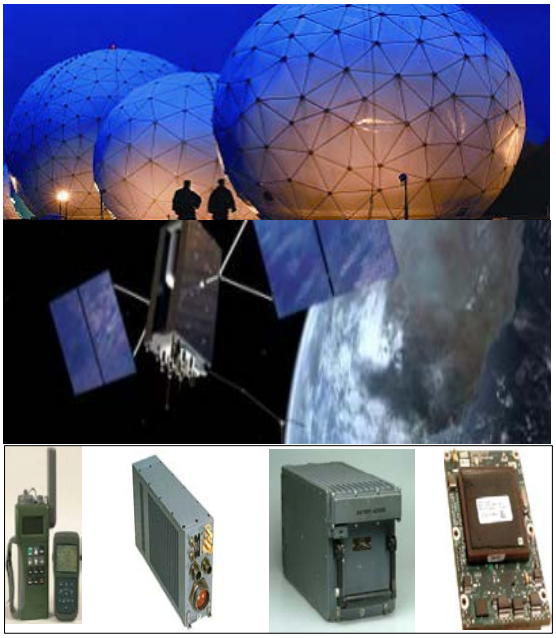
software changes to correct deficiencies and complete FQT and flight testing. RVT concluded with one critical failure.

- DASD(DT&E) participated in the Raytheon 13-month prototype demonstration, which showed that both hardware and software met prototype requirements and additional capabilities identified in the Technical Requirements Document. Raytheon successfully completed the 13-month demonstration.
- DASD(DT&E) observed 46 TS flight tests during September 2013–May 2014. The 46 TS executed a total of eight flights of the Boeing terminal on an airborne test bed. Six of these flights were flown with the airborne CPT configuration and two were flown with the AWT configuration designed for use on bombers (B-2, B-52). Issues with terminal software incorrectly handling satellite antenna beam transitions and mission image changes delayed the completion of flight test.
- DASD(DT&E) engaged in test readiness reviews for Raytheon qualification tests:
  - July 21, 2014, main environmental qualification test (EQT) for the Raytheon FAB-T terminal.
  - July 22, 2014, Raytheon high-power amplifier EQT.
  - July 26, 2014, Raytheon TEMPEST test.
- DASD(DT&E) will observe system-level flight tests using the Government-provided airborne test bed and over-the-air functional tests that will begin in early FY 2015 from the Raytheon facility in Marlborough, Massachusetts. Contractor flight tests will be followed by 46 TS-led integrated tests.
- DASD(DT&E) is engaged through the FAB-T Integrated Test Team to review contractor and 46 TS flight test planning; results will be used for the DASD(DT&E) program assessment to support the MS C/LRIP decision in the 2nd quarter FY 2015.
- DASD(DT&E) continues to monitor program office efforts to have a Chief Developmental Tester assigned to the program, as required in section 139b of Title 10, U.S.C.
- The FAB-T program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The FAB-T program has revised its DT&E strategy with its new development contractor. An update to the FAB-T TEMP is expected to support the MS C decision in FY 2015. Although there were delays in starting some DT&E activities, FAB-T development has steadily progressed since its production down-select decision in June 2014.

Global Positioning System (GPS) Enterprise

Executive Summary: GPS is a dual-use, military/civil system that provides real-time, accurate, worldwide positioning and timing services, thus enabling navigation to an unlimited number of users. GPS provides users with precise position, velocity, and time information. Each satellite transmits a radio frequency signal that contains time and ephemeris data from which user equipment determines position, velocity, and time. The system operates in all weather and specified electromagnetically challenging environments while supporting peace and wartime operations in the air, space, land, and sea domains.



The GPS modernization programs executed several GPS III payload tests; assembly, integration, and test activities; several space vehicle (SV) integration events; and a security T&E. GPS has used DT&E to demonstrate progress and reduce risk in its modernization and constellation sustainment efforts.

Lead DT&E Organization: SMC/GPEV

Summary of FY 2014 DT&E Activities

- October–December 2013, the SMC/GPEV conducted GPS nonflight satellite testbed risk reduction testing to assess GPS III internal satellite component compatibility and interoperability with other GPS satellites.
- December 2013–January 2014, SMC/GPEV tested the modernized navigation upgrade using the GPS support facility, telecommunications simulator test station (TSTS), and modernized receiver test asset (MRTA).
- December 2013–April 2014, SMC/GPEV conducted T&E of Military GPS User Equipment (MGUE) cards to assess performance in an open-air jamming environment during an open-air NAVFEST event.
- February, May, and August 2014, SMC/GPEV conducted GPS IIF on-orbit signal verification for three launches using the modernized signal test asset. The objective is to verify far-field L-band transmissions and military code (M-code) cryptography before transfer of satellite control authority to the 50th Space Wing.
- April 2014, the Lead DT&E Organization conducted a Selective Availability Anti-spoofing Module (SAASM) Mission Planning System (SMPS) version 4.0 system integration test to verify the latest version of SMPS to support a fielding decision.
- June 2014, the Lead DT&E Organization conducted a GPS III SV software integration event using the GPS III satellite simulator and MRTA as a risk reduction activity to assess GPS III internal satellite component compatibility.
- August 2014, the Lead DT&E Organization conducted a test at the GYPSY JULIET exercise to evaluate the three vendors' MGUE cards in an operationally realistic environment.

- September 2014, the Lead DT&E Organization conducted TSTS security T&E. This event was an information assurance compliance test in preparation for renewal of the authority to operate. This event tested the security posture of the TSTS, including all of the SV simulators.
- September–October 2014, the Lead DT&E Organization conducted Launch and Checkout Capability/Launch and Checkout System Exercise 4 to assess crew training and operational procedures for launch and early orbit checkout.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) provided training and expertise to the Integrated Test Teams (ITTs) to incorporate the Developmental Evaluation Framework (DEF) into the GPS Enterprise TEMP (E-TEMP) for both the enterprise and all segments. The DEF documents the technical threshold data from DT&E needed to inform key acquisition decisions.
- DASD(DT&E) initiated the Cybersecurity Working Group to define the GPS Enterprise and segment cybersecurity subportion of the DEF. This subportion of the DEF provides technical measures to use in evaluating the progress and maturity of the cybersecurity posture.
- DASD(DT&E) supported the GPS Interim Progress Review of the GPS III SV 01 development (November 12 to December 6, 2013) as the core team DT&E Lead. DASD(DT&E) identified T&E shortfalls in processes, personnel staffing, and specialized test equipment and provided recommendations to the program office to resolve these issues.
- DASD(DT&E) participated in the MGUE Analyst Meeting in Albuquerque, New Mexico, on December 17–19, 2013, and identified the way ahead for the MGUE DT&E strategy. The plan provides technical measures needed to evaluate progress in meeting KPPs and evaluate maturity of the MGUE program before the next milestone decision point.
- DASD(DT&E) led development of the MGUE DT&E strategy using rigorous design of experiments (DOE) at all four ITTs (October 2013 and January, March, and July 2014). DOE has been shown to require fewer MGUE test cases than a non-DOE T&E strategy. This effort is saving time and funds dedicated to the DT&E effort.
- DASD(DT&E) subject matter experts worked with the ITT to incorporate STAT. The SV and the Control Segments are having difficulty in implementing DOE, so an alternative STAT approach may be appropriate. DASD(DT&E) continues to provide support in implementing STAT/DOE for these segments. DOE or the alternative STAT approach will be used to assess the technical maturity of the programs using the least amount of time and funds.
- The GPS Director has established SMC/GPEV as the Lead DT&E Organization. DASD(DT&E) recommends that the Air Force designate a test agency outside of the PEO as the Lead DT&E Organization. DASD(DT&E) is concerned about the ability of the GPS program office to perform the statutory responsibilities of a Lead DT&E Organization. The Lead DT&E Organization provides T&E technical expertise, conducts DT&E activities for the program, and assists the Chief Developmental Tester in reaching technically informed, objective judgments. Program offices are typically not adequately staffed with enough specialized T&E technical expertise and may not have the objectiveness that an independent Government test agency would provide.
- DASD(DT&E) participated in the PEO-directed Interim Program Review (IPR) of the GPS Enterprise on September 14–26, 2014, as the core DT&E Lead. The IPR provided key input to the Annual GPS Enterprise Review, identifying risk drivers, unrealistic schedule pressure, and lack of synchronization resulting in unnecessary risk to constellation sustainment. The IPR recommended a contingency operations option allowing for a gated T&E program, reducing risk to the successful launch of GPS III SV 01. Additionally, in consultation with the GPS program office, U.S. Strategic Command should define whether there is an operational need for M-Code

overseas monitoring stations to facilitate DT planning and execution. The GPS programs have made critical updates to the E-TEMP, and the E-TEMP is undergoing PEO-level review.
- The GPS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted the FY 2014 DT&E of the space, control, and user segments in accordance with the approved E-TEMP. Development of the space and control segments continues to be problematic, eroding schedule margins and putting constellation sustainment at risk. The technology development of the user segment continues to make progress with the potential to accelerate security, performance, and computability certification. The GPS Enterprise program is estimated to meet all KPPs when fully deployed.

Joint Space Operations Center (JSpOC) Mission System (JMS)

Executive Summary: JMS provides space situational awareness (SSA) and command and control (C2) capability for the Commander, Joint Functional Component Command for Space. As the information hub of the space surveillance network (SSN), JMS enables an operator to process and analyze space observations from SSN sensors and other sensors to produce a comprehensive inventory/catalog of space objects. The catalog provides position and velocity information used to identify potential collisions, reentry, orbital debris, or other events of interest. JMS will also provide capabilities and applications to improve C2 of assigned space forces.

JMS is one of the first programs developed under the agile information technology (IT) acquisition requirements in section 804 of the NDAA for FY 2010. JMS is a MAIS program that will be delivered in multiple increments. Increment 1, delivered in 2013, is based on an Air Force Research Laboratory prototype and provides a foundational service-oriented architecture, a user-defined operational picture, and a basic set of operator and analyst tools. Increment 2, currently in development, is delivered in four service packs (SPs) and builds upon the Increment 1 foundation. Increment 2 will replace legacy systems and will provide capabilities to enhance catalog storage, processing, and visualization capabilities, fully enabling the SSA and space C2 missions. SP7 is the first SP in Increment 2 and is projected to be fielded in FY 2015. SP7 will provide physical hardware, communications processing system connectivity, legacy message communications, initial space catalog functions, and nuclear detonation, satellite breakup, and launch event modeling through Knowledge Assimilation and Reasoning for National Awareness of Counterspace Threats (KARNAC) services. Increment 3 requirements are being coordinated.

Lead DT&E Organization: 96th Test Wing

Summary of FY 2014 DT&E Activities

- January 6–February 28, 2014, the contractor conducted testing, the Space and Naval Warfare Systems Command (SPAWAR) conducted verification testing, and the 96th Test Wing, 46th Test Squadron (46 TS) conducted scenario injection and generation system testing and regression testing at the JSpOC Mission Integration Enclave.
- March 13–April 3, 2014, the 46 TS conducted the first SP7 DT&E event (DT&E#1). System performance and reliability were poor because of system instabilities, and the test could not be completed. In response, a second DT&E was scheduled.
- April 22–May 2, 2014, following DT&E#1, the Air Force Intelligence, Surveillance, and Reconnaissance Agency and the 46 TS performed a blue force cybersecurity risk assessment (CRA). In addition, the 46 TS conducted a validation of SP7 cybersecurity-related architecture requirements documents/software requirements specifications.
- May 19–June 6, 2014, the 46 TS conducted a second DT&E event (DT&E#2) to reevaluate the instabilities found in DT&E#1.
- August 4–September 8, 2014, the 46 TS conducted an integrated test and evaluation (IT&E) event to test the remaining open deficiencies identified in DT&E#2.

- September 9–17, 2014, the 46 TS performed a cyber penetration test to evaluate vulnerabilities in JMS software.
- October 14–17, 2014, the 46 TS conducted a regression test to evaluate the remaining open urgent issues from DT&E#2 and IT&E.

Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) recommended that additional resources be applied to the JMS program at large. JMS resources have been severely affected by funding reductions, taxes, and sequestrations. The limited team is concurrently developing, testing, and fielding multiple Increment 2 SPs as well as defining Increment 3 requirements. For this critical resource to be adequately developed for its niche mission, JMS must receive priority resources.
- Following DT&E#1 and DT&E#2, there was limited improvement in system performance and reliability, although overall system and software reliability and confidence remained low.
- Following DT&E#2, the 46 TS performed integrated testing and a regression test. Following integrated testing, JMS had more than 500 deficiencies. DASD(DT&E) recommended that the Combined Transition Force at JSpOC update training products to incorporate work-arounds of deficiencies discovered in IT. Those training products were not provided for OSD review. It should be noted that SP7 will not undergo OT&E until after SP9 completes integrated testing in FY 2015.
- A CRA confirmed that JMS boundary defenses are strong; however, similar to most IT systems, additional measures should be implemented to further strengthen JMS defenses. JMS is leaning forward in the cybersecurity area and is the first major space program to implement the Risk Management Framework. These activities include aligning the PMO cyber strategy with the DASD(DT&E) four-step cyber process as part of the Developmental Evaluation Framework (DEF) and working with the National Cyber Range to enact a solid strategy to address cyber deficiencies affecting capability.
- As a result of cyber DT&E, the PM has taken action such that JMS is rated at a medium risk. These critical SSA and C2 systems need the necessary resources now (in FY 2015).
- DASD(DT&E) recommended that additional DT&E events be added to the schedule. Historically, each SP has required at least three DT&E events to pass performance and reliability standards. A sufficient number of DT&E events will prevent an unrecoverable number of deficiencies in later SPs.
- DASD(DT&E) recommended that the PMO update the DEF. The PMO has updated the cyber portion of the DEF, to include up-to-date SPAWAR processes, but still needs to update the TEMP. If the PMO updates the DEF in the TEMP, Increment 2 T&E will be enhanced.
- DASD(DT&E) recommended that SPAWAR integration testing of technical measures be included in the DEF.
- The JMS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: This agile program conducted FY 2014 DT&E activities using the TEMP as a guide. Significant technical developmental progress toward KPPs for SP7 has been demonstrated. The likelihood of completing Increment 2 before the Acquisition Program Baseline threshold date is at risk. The PM has agreed to update the DEF and TEMP for new test requirements.

KC-46A Tanker Modernization

Executive Summary: As the initial phase of a comprehensive aerial refueling recapitalization strategy, the KC-46 program will replace approximately one-third of the capability provided by the current KC-135 fleet with 179 aircraft. The KC-46 also supports other mission areas to include airlift, aeromedical evacuation, as well as treaty compliance.

The program is currently in the later phases of DT&E planning, and the first flight of the first test aircraft is projected to be 6 months behind schedule as of the end of FY 2014. DT&E has been limited to boom and other subsystem checkouts. The contractor conducted software integration lab (SIL) and production testing.

Lead DT&E Organization: 412th Test Wing

Summary of FY 2014 DT&E Activities

- SIL testing progressed well, completing 92 percent of the total planned testing, as of October 2014. Most of the remaining software issues are in the flight management/mission control system, boom actuator control unit, and radar warning receiver. Testing generated problem reports at a higher rate than the program could close them, but additional resources have been dedicated to close problem reports faster.
- DASD(DT&E) continued to work with the Integrated Test Team (ITT) to develop a more efficient flight test schedule. DASD(DT&E) led joint Air Force and Navy test team sessions in optimizing air refueling receiver test efforts to qualify the KC-46 as a tanker in time to acquire sufficient test results to support the initial production decision as scheduled. A more efficient test plan, however, will not likely preclude an overall program schedule deviation given a 6-month (to date) production delay for the first test aircraft.

Summary of FY 2014 DT&E Engagement and Assessments

- Manufacturing issues primarily due to required electrical wiring redesign, removal, and reinstallation have slipped first flight of the first test aircraft by at least 6 months. DASD(DT&E) previously rated the military test schedule as presented in the MS B TEMP as medium to high risk. DASD(DT&E) now believes that the combination of production delays, previously identified risks, unknown unknowns, and the time required to certify 18 receiver aircraft for IOT&E will add further risk to completing DT&E on schedule.
- DASD(DT&E) continues to be actively engaged in the KC-46A and air refueling receiver certification issues. The mitigation strategy currently being considered includes a new DT&E flight test strategy that shifts the bulk of the air refueling receiver work to the Air Force and adds initial production aircraft to the OT program to allow test aircraft to support continued receiver certifications for IOT&E. Even with this additional DT&E time, there will likely be elevated risk

for finishing DT&E and certifying all required receiver aircraft in time to support the threshold FRP decision date.

- The Stage 4 test plan delivery is behind the FY 2014 schedule with some parts likely to be obsolete when the test plan is finally approved by the Air Force in early FY 2015. At the end of FY 2014, the KC-46A program had no approved current test schedule because of manufacturing delays. As a result, the KC-46A program management team is working to restructure the test program. DASD(DT&E) will assess the new test schedule when it is delivered.
- Together with the rest of the ITT, DASD(DT&E) continues to engage the issue of flight test requirements needed to fully meet the limited production performance verification entrance criteria approved by DoD at program initiation; however, nothing has been fully approved by the Air Force at this time.
- DASD(DT&E) remains concerned about the insufficient calendar time planned for correction of significant discrepancies and/or deficiencies discovered during DT before the planned start of OT based on previous experience with like programs and is working with the ITT to find efficiencies within the schedule. The current 6-month delay in starting DT&E further increases the concern.
- DASD(DT&E) remains concerned about the concurrence of activities such as aircrew and maintenance training during DT&E, which would increase the competition for limited aircraft resources. The current 6-month delay in starting DT&E further increases the concern.
- DASD(DT&E) continues to work through the Integrated Product Team process with the Lead DT&E Organization and the program office to ensure the appropriate binning, content, and DoD observation of the military-specific cybersecurity and interoperability tests to ensure that the required data will be available to support military certifications.
- The KC-46A program did not request a waiver or deviation from requirements in the TEMP.

Conclusion. DT&E in 2014 has been limited to refueling boom and other subsystem checkouts. Delays in manufacturing and parts deliveries have shifted the first flight of the test aircraft 6 months behind the schedule as of the end of 2014. The combination of all these delays has increased risk to meeting the planned date for the initial production milestone decision.

MQ-9 Reaper

Executive Summary: The MQ-9 Reaper is a multi-mission hunter-killer and intelligence, surveillance, and reconnaissance (ISR) weapon system with a timely and persistent capability to find, fix, track, target, engage, and assess time-sensitive targets.

The program is in production for Increment I, Block 1 and Block 5 aircraft. The program continues development and flight test of Increment I, Block 5 capabilities along with incorporation of new, unplanned capabilities to support overseas contingency operations. The MQ-9 Block 5 completed baseline Increment I functionality DT&E in FY 2014.

Lead DT&E Organization: AFLCMC/WI

Summary of FY 2014 DT&E Activities

- MQ-9 Block 5 hardware and software development and testing continued in 2014 at the system integration laboratory in Poway, California, and the flight test facilities in Gray Butte, California, and Naval Air Warfare Center Weapons Division, China Lake, California. The Block 5 system completed 57 test missions for 200 hours of flight testing in FY 2014.
- The MQ-9 Block 5 completed baseline Increment I functionality flights. Developmental evaluations of the final software updates for Increment I baseline capability began at the end of FY 2014.

Summary of FY 2014 DT&E Engagement and Assessment

- DASD(DT&E) was engaged in evaluating T&E options to support a revised acquisition strategy to accelerate fielding of new capability; monitoring DT&E progress; and developing performance assessment plans and criteria for Increment I capabilities and limitations.
- The Block 1 system has demonstrated operational capability in the killer role and is currently in sustainment.
- The MQ-9 Block 5 demonstrated baseline Increment I functionality with the Block 30 ground control station, providing increased alternating current (AC) power for current and future payloads; stronger landing gear to increase reliability and gross weight capability to 11,700 pounds; an encrypted data link capability; and an improved electro-optical-infrared capability.
- DT&E revealed that the integrated Block 5 configuration generates additional heat load, which limits ground operating times in hot weather environments. The integrated system evaluation test missions were not completed because temperature limits were exceeded in high outside air temperature conditions. This limitation is being partially mitigated with operating procedure changes but may require hardware modifications to fully resolve it.
- Development is complete for baseline Increment I, Block 5 capabilities, with some deficiency correction regression T&E efforts remaining. The Increment I configuration had 40 Category 1 deficiency reports pending or remaining open at the end of FY 2014.
- Additional DT&E is now being planned for integration of new capabilities originally developed to support overseas contingency operations. This and other developmental issues are causing

unplanned software changes and are expected to extend the Increment I DT&E effort into FY 2019.

- The MQ-9 system meets the "killer" requirement and partially meets the hunter and net-ready key parameters because of sensor limitations with specific target sizes and motion as well as imagery transmission issues.
- The demonstrated reliability of the Block 1 aircraft is 49 hours mean time between failure (MTBF), and the Block 5 MTBF is currently approximately 4 hours, against a revised threshold of 19 hours for the Block 5 aircraft. The Block 5 aircraft currently has approximately 240 flight hours in a DT environment. The failures experienced on the Block 5 aircraft have been similar to the Block 1 aircraft failure items.
- The Air Force deferred 12 Capability Production Document (CPD) requirements in 2011 that the system will not meet or will only partially meet. In FY 2014, DT&E identified performance shortfalls related to dissemination of ISR data to external receivers in certain situations that affect three additional CPD threshold requirements.
- The MQ-9 Reaper program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The MQ-9 Reaper Block 5 aircraft completed DT&E to validate its baseline functionality. Addressing the system overheating deficiency will require aircraft modifications and procedural changes before deployment. The program continues to conduct testing on ongoing capability improvements for overseas employment.

RQ-4B Global Hawk

Executive Summary: The Global Hawk is a high-altitude, long-endurance unmanned aircraft system providing intelligence, surveillance, and reconnaissance to Warfighters in low to medium threat environments. Global Hawks have been developed in discrete blocks of capability; Block 30 is in sustainment, and only Block 40 remains in development. Block 40 shares an airframe similar to the earlier blocks and integrates the Multi-Platform Radar Technology Insertion Program sensor, an active electronically scanned array synthetic aperture radar (SAR) that provides ground moving target indicator capability and spot and wide area search imagery.

Block 40 first flight was in November 2009 and the development effort completed in December 2014. The last production Block 40 was delivered in October 2014. The program is preparing for a program rebaseline decision following a Nunn-McCurdy breach in 2011.

Lead DT&E Organization: 412th Test Wing

Summary of FY 2014 DT&E Activities

- The program conducted 22 Block 40 developmental test flights for 293 hours.
- The program completed Block 40 interoperability and integrated system evaluation testing.
- The program began DT&E of Block 40 radar maritime modes.

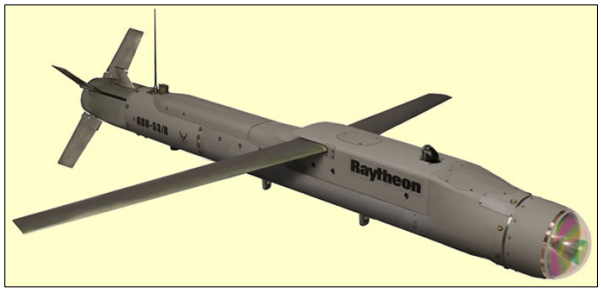
Summary of FY 2014 DT&E Engagement and Assessments

- DASD(DT&E) engaged in evaluating updated user requirements for testability, supporting development of a T&E strategy to rebaseline the acquisition program, and assessing DT&E and program progress.
- Delays in software updates for the external Air Force Distributed Common Ground Station (DCGS) system to permit the exploitation of Block 40 radar imagery delayed completion of interoperability and integrated system-level tests until July 2014. Overall interoperability between the Block 40 and DCGS analysts was marginal because of occasional problems with missing or unusable data products, timeliness of the data, and human-systems interface issues. One additional test with an operational DCGS is scheduled for FY 2015.
- Block 40 completed a risk reduction test and began DT&E of maritime moving target indicator and maritime inverse SAR modes to support the North Atlantic Treaty Organization (NATO) Alliance Ground Surveillance system. Initial results are being used to mature radar mode capability, and testing will continue into FY 2015.
- The Lead DT&E Organization conducted tests to evaluate updated communications components to replace obsolete technology and qualify new manufacturing sources.
- The existing DT&E strategy, documented in the TEMP, is outdated and does not address current DT&E for Block 40 or sustainment upgrades for Block 30. A TEMP update is in progress; however, its completion is dependent upon CPD requirement approval, and the update will not be completed in time to guide Block 40 DT&E efforts.

- The RQ-4B Global Hawk program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program completed its Block 40 DT in 2014 and continues to conduct additional testing to support sustainment of the Global Hawk fleet. A revised DT&E strategy for the combined Block 30 and 40 efforts will be required to guide future testing.

Small Diameter Bomb Increment II (SDB II)



Executive Summary: The SDB II (Guided Bomb Unit-53/B) is the second increment of the miniature munitions weapons system capability program and will provide the capability to attack moving targets through weather with standoff (outside of point defenses), using a tri-mode seeker and data link. SDB II is a 250-pound class air-to-ground glide weapon designed for employment with the F-15E, F-35B, and F-35C threshold platforms.

SDB II is a joint interest Air Force and Navy program that as of December 2014 is 53 months into EMD. Testing involves captive carry of the seeker flown from a modified UH-1 helicopter for sensor characterization, release of controlled test vehicles for flight dynamics with data link connectivity, and guided test vehicles (GTVs) for fly-out of an inert weapon and fully functioning live-fire weapons. Because of delays at the start and anomalies in the initial test flights, completion of the threshold test program will likely reset the low-rate production decision to May 2015.

Lead DT&E Organization: 96th Test Wing

Summary of FY 2014 DT&E Activities

- DT continued with Build 2 (production representative) hardware, successfully completing flight tests (GTV-6, GTV-7, GTV-9, and GTV-10), with all weapons directly impacting the intended target.
- The weapons data link issues discovered in 2013 testing were resolved.
- Captive flight testing continued with 15 events collecting more than 409 hours of sensor performance in a variety of environmental conditions including rain, snow, and high humidity.
- Reliability testing has completed 1,951 hours of laboratory testing with 10 anomalies, demonstrating a reliability growth that is projected to meet requirements at system verification review (SVR).

Summary of FY 2014 DT&E Engagement and Assessment

- DASD(DT&E) has maintained that the LRIP (MS C) decision be based upon successful execution of nine guided flight test vehicle launches as well as two live-fire (warshot) tests. All required guided flight tests have been completed, as well as one of two live-fire events. An SVR is now planned for March 2015, DASD(DT&E) anticipates supporting a MS C decision by May 2015.
- A cybersecurity assessment in the developmental/integrated test phase has been added to identify vulnerabilities and enable potential resolution via software. The SDB II design was finalized at the critical design review completed in January 2011.
- DASD(DT&E) participated in the February 2014 program management review and the program support reviews held at Raytheon.
- DASD(DT&E) supports the option to advance integration on the F/A-18E/F (objective platform) to reduce risk associated with the Navy F-35 integration schedule.
- The SDB II program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program continues testing to the approved TEMP and advances toward a final SVR before proceeding to production. Failures identified in DT&E have been mitigated in successive design changes, extending the program schedule and delaying MS C. DASD(DT&E) assesses current performance risk as demonstrated in DT&E to be moderate given multiple unrelated failures.

Space-Based Infrared System High Component (SBIRS High)

Executive Summary: The SBIRS primary mission is to provide initial warning of a ballistic missile attack on the United States, its deployed forces, and its allies. SBIRS also supports missile defense, battlespace awareness, and technical intelligence missions by providing reliable, accurate, and timely data to unified combatant commanders and other users. The system consists of geosynchronous Earth orbit (GEO) satellites, highly elliptical orbit (HEO) payloads, and a fixed and mobile ground segment. GEO-1 launched in May 2011 and was declared operational on May 17, 2013. GEO-2 launched in March 2013 and was accepted for operations on December 10, 2013. HEO-1 and HEO-2 payloads are certified for operations. Planning for installation, testing, and operational acceptance of an integrated ground system acquisition baseline was conducted in FY 2014, with planned initial operational capability in the 3rd quarter FY 2018. The mobile ground system, SBIRS Survivable Endurable Evolution, acquisition and T&E planning was conducted in FY 2014, with anticipated delivery of the first article in the 4th quarter FY 2017.

Lead DT&E Organization: SMC/ISET

Summary of FY 2014 DT&E Activities

- Throughout FY 2014, conducted capability integration of Mission Control Segment (MCS) Increment 2 (MCS-2) Block 10.3 (initial telemetry, tracking, and control and mission processing of Defense Support Program, HEO, and GEO data). Capability integration is forecasted to complete in March 2015.
- February 2014, completed delivery of MCS-2 Block 10.1 (Launch and Anomaly Resolution Center).
- April 2014, completed planned system-level prelaunch tests on GEO-3, including demonstrated system functionality and operability between the GEO-3 space vehicle and MCS-2 Block 10.1.
- June 2014, completed delivery of MCS-2 Block 10.2 (mission migration to AIX-based processing).
- June 2014, conducted a blue team DT&E cybersecurity vulnerability assessment. The information from this assessment will be used to improve SBIRS cybersecurity and guide future cyber evaluation planning.
- June 2014, DASD(DT&E) approved the DT&E portion of the SBIRS Enterprise TEMP (E-TEMP).
- September 2014, completed benchmarking of existing MCS Increment 1 (MCS-1) (Mission Control Station, Mission Control Station Backup, and Interim Test Center). The performance of Increment 1 Control Segment (CS) will be compared with CS Block 10.3 (initial Increment 2) to assess the non-degradation standard.

Summary of FY 2014 DT&E Engagement and Assessments

- The DASD(DT&E)-sponsored STAT in T&E COE participated in the SMC Remote Sensing Systems Directorate-led STAT Working Group discussions throughout FY 2014, leading the implementation of STAT for the Increment 2 T&E design.
- DASD(DT&E) initiated and provided technical leadership to the cybersecurity subsection of the Developmental Evaluation Framework (DEF) Core Team, developing an initial draft of the cyber evaluation for inclusion in the SBIRS E-TEMP. The cyber portion of the DEF frames the DT&E level of evaluation of system/software assurance, Risk Management Framework compliance, vulnerability assessment, and interoperability.
- The SBIRS program did not request a waiver or deviation from requirements in the TEMP.

Conclusion: The program conducted FY 2014 DT&E activities in accordance with the approved TEMP. The program is conducting rigorous DT&E on the CS upgrades. Because of program complexity and potential for future discovery during software development and integration, there is moderate schedule risk. The program is estimated to meet all KPPs when the CS upgrades and satellite constellation are fully deployed.

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Abbreviations and Acronyms

AAG	advanced arresting gear
AAW	antiair warfare
ABCT	Armored Brigade Combat Team
ACAT	Acquisition Category
ACB	Advanced Capability Build
AD	air defense
ADM	Acquisition Decision Memorandum
AEC	Army Evaluation Center
AEDC	Arnold Engineering Development Complex
AEHF	advanced extremely high frequency
AFATDS	Advanced Field Artillery Tactical Data System
AFED	Aviation-Fires Evaluation Directorate
AFLCMC	Air Force Life Cycle Management Center
AFRL	Air Force Research Laboratory
AF/TE	Air Force Directorate of Test and Evaluation
AHE	E-2D Advanced Hawkeye
AHLTA-T	Armed Forces Health Longitudinal Technology Application–Theater
AIM-9X	Air Intercept Missile-9X
ALIS	Autonomic Logistics Information System
ALMDS	airborne laser mine detection system
Am	materiel availability
AMC	Air Mobility Command
AMDR	Air and Missile Defense Radar
AMNS	airborne mine neutralization system
AMPV	Armored Multi-Purpose Vehicle
AMRAAM	advanced medium-range air-to-air missile
Ao	operational availability

AoA	analysis of alternatives
APG	Aberdeen Proving Ground
ARAV	Aegis Readiness Assessment Vehicle
AS	Acquisition Strategy
ASW	antisubmarine warfare
ATEC	Army Test and Evaluation Command
ATP	authority to proceed
AWQI	Acquisition Workforce Qualification Initiative
AWT	advanced wideband terminal
BBP	Better Buying Power
BCR	Budget Certification Report
BDA	Bidirectional Health Information Exchange (BHIE) DoD Adaptor
BFV	Bradley fighting vehicle
BHIE	Bidirectional Health Information Exchange
BIP	ballistic impact point
BL	Aegis Baseline
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
C2	command and control
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
C4ISRED	C4ISR Evaluation Directorate
CAC2S	Common Aviation Command and Control System
CANES	Consolidated Afloat Networks and Enterprise Services
CAP	Critical Acquisition Position; corrective action period
CAPE	Cost Assessment and Program Evaluation
CAT	Carrier, Ammunition, Tracked; capability acceptance test
CDD	Capability Development Document
CDE	Common Development Environment

CEC	Cooperative Engagement Capability
CEP	circular error probable
CI	configuration item
CID	combat identification
CIE	Capabilities Integration Environment
CIO	chief information officer
CLM	continuous learning module
CMC	common missile compartment
COE	center of excellence
COOPEX	Concept of Operations Exercise
COTF	Commander, Operational Test and Evaluation Force
COTS	commercial off-the-shelf
CPD	Capability Production Document
CPO	corrective action, producibility improvement, and obsolescence
CPT	command post terminal
CRA	cybersecurity risk assessment
CRG	Center for Reliability Growth
CS	control segment
CS I&T	combat system integration and testing
CSIT	combat systems integration test
CSSQT	combat systems ship qualification testing
CSV	combat support variant
CTEIP	Central Test and Evaluation Investment Program
CTOL	conventional takeoff and landing
CTP	critical technical parameter
CTV	combat tactical variant
CV	carrier variant
CV&I	component validation and integration
CVN 78	GERALD R. FORD Class Nuclear Aircraft Carrier

CWL	common weapon launcher
CY	calendar year
D5LE	Trident II Life Extension
DAB	Defense Acquisition Board
DAES	Defense Acquisition Executive Summary
DAG	Defense Acquisition Guidebook
DAI	Defense Agencies Initiative
DAMA	demand assigned multiple access
DASD(DT&E)	Deputy Assistant Secretary of Defense for Developmental Test and Evaluation
DASN(RDT&E)	Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation
DAU	Defense Acquisition University
DAWDF	Defense Acquisition Workforce Development Fund
DAWIA	Defense Acquisition Workforce Improvement Act
DBR	Dual-Band Radar
DCGS	Distributed Common Ground Station
DCGS-A	Distributed Common Ground System–Army
DCRA	data collection, reduction, and analysis
DDRS	Defense Departmental Reporting System
DEAMS	Defense Enterprise Accounting and Management System
DEF	Developmental Evaluation Framework
DHMSM	Defense Healthcare Management System Modernization
DISA	Defense Information Systems Agency
DIT	development integration test
DLT	durability life testing
DMIX	Defense Medical Information Exchange
DoD	Department of Defense
DoDI	DoD Instruction
DODIN	Department of Defense Information Network

DOE	design of experiments
DON	Department of the Navy
DOT&E	Director of Operational Test and Evaluation
DOTS	Diver's Oxygen Treatment System
DQT	developmental qualification testing
DR	Discrepancy Report
DT	developmental test/testing
DTC	Development Test Center
DT&E	developmental test and evaluation
E2E	end-to-end
E3	electromagnetic environmental effects
EBS	Enterprise Business Suite
EDM	Engineering Development Model
EHF	extremely high frequency
EHR	electronic health record
EMALS	electromagnetic aircraft launching system
EMD	Engineering and Manufacturing Development
EMP	electromagnetic pulse
EMS	electromagnetic spectrum
EOA	Early Operational Assessment
EOR	engage on remote
EP	electronic protection
EQT	environmental qualification test
E-TEMP	Enterprise TEMP
EW	electronic warfare
FAAT	First Article Acceptance Test
FAAT-P	FAAT–Performance
FAAT-S	FAAT–Safety
FAB-T	Family of Advanced Beyond Line-of-Sight Terminals

FAT	first article test
FCC	Federal Communications Commission
FD	full deployment
FFRDC	Federally Funded Research and Development Center
FIPT	Functional Integrated Product Team
FMO	Functional Management Office
FMR	Full Materiel Release
FoS	family of systems
FOT&E	follow-on operational test and evaluation
FoV	family of vehicles
FQT	functional qualification testing; formal qualification test
FRB	Failure Review Board
FRP	full-rate production
FTA	from-the-air
FTS	from-the-sea
FY	fiscal year
GAO	Government Accountability Office
GBI	ground-based interceptor
GCSS-AF	Global Combat Support System–Air Force
GDT	Government developmental test
GEO	geosynchronous Earth orbit
GMD	ground-based midcourse defense
GMLRS-AW	Guided Multiple Launch Rocket System–Alternative Warhead
GPS	Global Positioning System
GTV	ground test vehicle; guided test vehicle
HAPCAT	Hypersonic Aeropropulsion Clean Air Testbed
HBCUs	historically black colleges and universities
HEL	high-energy laser
HEO	highly elliptical orbit

HERO	hazards of electromagnetic radiation to ordnance
HFE	human factors engineering
HMS	Handheld, Manpack, and Small Form Fit
HNW	highband networking waveform
HPM	high-power microwave
HQ	headquarters
HX-21	Naval Rotary-Wing Aircraft Test and Evaluation Squadron Two One
I&M	Improvement and Modernization
IA	information assurance
IAMD	Integrated Air and Missile Defense
ICBM	intercontinental ballistic missile
ICD	Initial Capabilities Document
IFC	integrated fire control
IM	insensitive munitions
IMTP	Integrated Master Test Plan
IMU	inertial measurement unit
IOC	initial operational capability
IOT&E	initial operational test and evaluation
IPPS-A	Integrated Personnel and Pay System–Army
IPR	In-Process Review; Interim Program Review
IPT	Integrated Product Team
IRCM	infrared countermeasures
ISR	intelligence, surveillance, and reconnaissance
ISTF	installed systems test facility
IT	information technology; integrated test
IT&E	integrated test and evaluation
ITT	Integrated Test Team
IWS	Integrated Warfare Systems
JIOR	Joint Information Operations Range

JITC	Joint Interoperability Test Command
JLTV	Joint Light Tactical Vehicle
JLV	Joint Legacy Viewer
JMETC	Joint Mission Environment Test Capability
JMS	Joint Space Operations Center (JSpOC) Mission System
JROC	Joint Requirements Oversight Council
JSpOC	Joint Space Operations Center
KLP	Key Leadership Position
KM	Knowledge Management
KMI	Key Management Infrastructure
KPP	key performance parameter
KSA	key system attribute
LAB	large-aperture bow
LAT	lot acceptance test
LBTS	land-based test site
LCB	lower confidence bound
LCS	Littoral Combat Ship
LPC	launch pod container
LRIP	low-rate initial production
LRU	line-replaceable unit
LUT	limited user test
LVAD	low-velocity airdrop
LVC	live, virtual, and constructive
M&S	modeling and simulation
MAC	multi-static active coherent; Multiple All-Up-Round Canister
MAIS	Major Automated Information System
MAR	medication administration record
MBAN	Medical Body Area Network
MCM	mine countermeasures

MCS	Mission Control Segment
MCSC	Marine Corps Systems Command
MCTSSA	Marine Corps Tactical Systems Support Activity
MDA	Missile Defense Agency
MDAP	Major Defense Acquisition Program
MFAS	multifunction active sensor
MGUE	Military GPS User Equipment
MiDAESS	MDA Engineering and Support Services
MIDS	multifunctional information distribution system
MIT-LL	Massachusetts Institute of Technology Lincoln Laboratory
MLP	mobile launch platform
MLRS	Multiple Launch Rocket System
MM	Mission Module
MOT&E	multi-Service operational test and evaluation
MP	Manpack; Mission Package
MRTA	modernized receiver test asset
MRTFB	Major Range and Test Facility Base
MS	Milestone
MSED	Mounted Systems Evaluation Directorate
MSI	minority-serving institution
MTBEFF	mean time between effective function failures
MTBF	mean time between failures
MTBOMF	mean time between operational mission failures
MUOS	Mobile User Objective System
MVCS	multi-vehicle communications system
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAWCAD	Naval Air Warfare Center, Aircraft Division
NAWCWD	Naval Air Warfare Center, Weapons Division

NCR	National Cyber Range
NDAA	National Defense Authorization Act
NDI	non-developmental item
NGDS	Next Generation Diagnostic System
NIE	Network Integration Evaluation
NIFC-CA	Naval Integrated Fire Control–Counter Air
NSWC	Naval Surface Warfare Center
O&M	Operations and Maintenance
OA	operational assessment
OFS	Operational Flight Software
OIPT	Overarching Integrated Product Team
OIWG	Operations and Integration Working Group
OMUX	output multiplexer
OR	OHIO Replacement
OSD	Office of the Secretary of Defense
OSV	on-orbit system validation
OT	operational test
OT&E	operational test and evaluation
OTA	over-the-air
OTRR	operational test readiness review
OTS	off-the-shelf
P&D	Production and Deployment
PCD	position category description
PEO	program executive office
PGK	Precision Guidance Kit
PHD	Port Hueneme Division
PIM	Paladin Integrated Management
PLT	product-level test
PM	program manager

PMO	program management office
PMRF	Pacific Missile Range Facility
PMW	Program Manager Warfare Systems
POM	program objective memorandum
PoP	Point of Presence
PPS	post-production support
PPT	production proveout test
PQT	production qualification testing
PSES	payload support electronics system
QE	quadrant elevation
QT&E	qualification test and evaluation
RAM	reliability, availability, and maintainability
RAM-C	Reliability, Availability, Maintainability, and Cost
RDT&E	research, development, test, and evaluation
REP	Resource Enhancement Project
RF	radio frequency
RFP	request for proposal
RGT	reliability growth testing
RI-IPT	Rapid Integration Integrated Product Team
RKV	redesigned kill vehicle
RMMV	remote multi-mission vehicle
RMS	remote minehunting system
RSDP	Regional Service Delivery Point
RVT	reliability verification testing
S&T	science and technology
SAASM	Selective Availability Anti-spoofing Module
SAM	surface-to-air missile
SAR	synthetic aperture radar
SAT	system acceptance test

SATCOM	satellite communications
SBIRS	Space-Based Infrared System
SCI	Sensitive Compartmented Information
SCS	Ship Control System
SDB	Small Diameter Bomb
SDTA	system demonstration test article
SDTS	Self-Defense Test Ship
SERPPAS	Southeast Regional Partnership for Planning and Sustainability
SES	senior executive service
SGR	Sortie Generation Rate
SI	system integrator
SIL	software integration lab
SINCGARS	single-channel ground and airborne radio system
SIR	software issue report
SIT	system integration test
SM-3	Standard Missile-3
SM-6	Standard Missile-6
SMC	Space and Missile Systems Center
SME	subject matter expert
SMPS	SAASM Mission Planning System
SNE	Soldier Network Extension
SoS	system of systems
SP	service pack
SPALT	Strategic Programs Alteration
SPAWAR	Space and Naval Warfare Systems Command
SPH	self-propelled howitzer
SRB	Soldier Record Brief
SRW	Soldier radio waveform
SSA	space situational awareness

SSBN	ballistic missile submarine
SSC	Ship-to-Shore Connector
SSC LANT	SPAWAR Systems Center Atlantic
SSC PAC	SPAWAR Systems Center Pacific
SSN	space surveillance network
SSP	Strategic Systems Programs
STAT	scientific test and analysis techniques
STEM	science, technology, engineering, and mathematics
STIL	System Test and Integration Lab
STOVL	short takeoff and vertical landing
STS	stockpile-to-target sequence
SUW	surface warfare
SV	space vehicle
SVR	system verification review
SWS	Strategic Weapons System
SYSCOM	systems command
T&E	test and evaluation
TECHEVAL	technical evaluation
TEIP	T&E Enterprise Improvement Process
TEMP	Test and Evaluation Master Plan
TEO	Office of the Test and Evaluation Executive
TEWG	T&E Working Group
TFA	Test Functional Area
TFM	Test Functional Manager
TM	technical manual
TMIP-J	Theater Medical Information Program–Joint
TOO	target of opportunity
TRL	Technology Readiness Level
TRMC	Test Resource Management Center

TR-T	Tactical Relay–Tower
TS	Top Secret; Test Strategy
TSP	Threat Systems Program
TSPI	time-space-position information
TSTS	telecommunications simulator test station
TVAC	thermal vacuum
UARC	University Affiliated Research Center
UAS	unmanned aircraft system; Unmanned Autonomous System
UHF	ultrahigh frequency
UK	United Kingdom
UMR	Urgent Materiel Release
U.S.C.	United States Code
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USPACOM	U.S. Pacific Command
UXO	unexploded ordnance
V&V	verification and validation
VA	Department of Veterans Affairs
VistA	Veterans Health Information Systems and Technology Architecture
VPT	VIRGINIA payload tube
VX-20	Air Test and Evaluation Squadron Twenty
VX-23	Air Test and Evaluation Squadron Twenty-Three
VX-31	Naval Air Test and Evaluation Squadron Three One
WCDMA	wideband code division multiple access
WDA	weapon delivery accuracy
WIN-T	Warfighter Information Network–Tactical
WIPT	Working Integrated Product Team
WRC	World Radiocommunication Conference
WRP	Western Regional Partnership
WSAT	weapon system accuracy test

W/SC	Warfare and System Center
WSMR	White Sands Missile Range

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