DEPARTMENT OF DEFENSE
Developmental Test and Evaluation

FY 2013 Annual Report

MARCH 2014

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Deputy Assistant Secretary of Defense
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Department of Defense Developmental Test and Evaluation FY 2013 Annual Report

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Contents

Figures

Tables

Index to Program Engagement and Assessments

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) 2013 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 2013 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 35 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 2013.

1.1 Developmental Test and Evaluation

This report provides descriptions of DASD(DT&E) activities and initiatives, assessments of the DT&E capabilities and organizations of the Military Departments, and a compilation of engagements with major programs that have reached a significant milestone or programs that have conducted considerable DT&E activity in FY 2013. In addition to the Military Department assessments, this report includes organizational and capabilities assessments of two DoD Components with acquisition responsibility: the Defense Information Systems Agency (DISA) and the Missile Defense Agency (MDA).

In FY 2013, Shift Left was a major DASD(DT&E) initiative. Shift Left focuses on earlier DT&E activities to identify and fix problems during development. The initiative is changing the paradigm and bringing critical test activities earlier in the acquisition life cycle. This shift is important because early developmental testing (DT) can find problems that can be fixed while the system is still in development. Finding problems early in development will avoid costly redesigns late in the acquisition life cycle.

For FY 2013, DoD Components with MDAPs, MAIS programs, and USD(AT&L)-designated special interest programs were required to provide self-assessment reports to the DASD(DT&E). The DoD Components provided updates to their previous reports regarding T&E involvement in early acquisition activities, T&E planning and strategic execution, T&E execution, and T&E personnel. In addition, the DoD Components were asked to provide details of the T&E workforce composition to include all categories of T&E personnel.

DASD(DT&E) requested 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 29 MDAPs being assessed as part of this report.

DASD(DT&E) continues to examine 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.

None of the 35 programs assessed in this report has requested a deviation or waiver from requirements in the TEMP.

1.2 DoD Test Resource Management Center

This report provides descriptions of TRMC activities and initiatives during FY 2013. The Central Test and Evaluation Investment Program (CTEIP) again made significant progress in the development and deployment of test infrastructure capabilities. Within CTEIP, advanced electronic warfare (EW) 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. The T&E/Science and Technology (S&T) Program made significant progress in more than 80 developments executed across eight focus areas. Also in FY 2013, the USD(AT&L) transferred responsibility for the National Cyber Range (NCR) to the TRMC.

The TRMC continues to develop required T&E infrastructure improvement solutions and to focus on cybersecurity test capability with continued development of the NCR. The TRMC is working within DoD to initiate a Common Development Environment (CDE) that addresses the need for a Government-owned, live, virtual, and constructive (LVC) test environment capable of being used throughout the acquisition life cycle. 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.

In FY 2013, the TRMC initiated a study to capture DT requirements for emerging aerial threats beyond the 2019 timeframe. The TRMC has also continued to further its national leadership role in

science, technology, engineering, and mathematics (STEM) initiatives for the T&E community, through the launching of a comprehensive internship program in collaboration with Naval Air Systems Command (NAVAIR) headquarters.

In support of the President's National Broadband Initiative to make 500 megahertz of Federal spectrum available to industry and in conjunction with Service T&E Executives and the Office of the DoD Chief Information Officer (CIO), the TRMC formed a tiger team composed of Major Range and Test Facility Base (MRTFB) spectrum experts as well as representatives from each of the Service headquarters. The TRMC objective is continued access to adequate radio frequency (RF) spectrum resources to properly conduct current and future planned test activities.

1.3 Adequacy of Resources

The Office of the DASD(DT&E) has a staffing level of 16 Government personnel (organic, detailees) with additional contractor support. Working within available resources, DASD(DT&E) focuses its activities on congressionally mandated MDAPs, with additional support to MAIS and special interest programs as directed by the USD(AT&L).

In FY 2013, DASD(DT&E) initiated a 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) requested and assessed information on the designation of Lead DT&E Organizations for the 29 MDAPs being assessed as part of this report, their T&E expertise and capabilities, and funding to support DT&E activities.

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2 DASD(DT&E) ACTIVITIES

2.1 Policy and Guidance Summary

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

2.2 Measurable Performance Criteria

Background. DASD(DT&E) continued the effort to establish measurable DT&E performance criteria and associated metrics to gain insight into DT&E performance. The effort consists of four phases:

- Phase I – Develop the framework, DT&E performance criteria, and associated metrics.
- Phase II – Pilot the framework.
- Phase III – Expand the scope of the pilot program.
- Phase IV – Integrate the performance measures into the DASD(DT&E) decision support capability.

Phases I and II were executed from FY 2010 to FY 2012. In FY 2013, DASD(DT&E) commenced and completed Phases III and IV. The framework contains DT&E performance criteria and metrics to assess individual program DT&E performance and also to assess the overall performance of DT&E functions across DoD.

As part of the framework, DASD(DT&E) developed a method for assessment. For each DT&E performance criterion, DASD(DT&E) uses the stoplight colors of green, yellow, and red to assess DT&E performance against the particular criterion. The meaning of each stoplight assessment color was developed uniquely for each criterion to reflect the proper status. A "Not Rated" assessment is also available, as appropriate.

The effort produced a framework of 15 DT&E performance criteria: 10 DT&E performance criteria for program DT&E performance and five DT&E performance criteria for overall DT&E performance; the criteria are shown in Table 2-1 and Table 2-2, respectively.

Table 2-1. Program DT&E Performance

Program DT&E Performance Criteria	Metrics
Program-specific key performance capabilities	Mission performance versus required capability
Cybersecurity plans and performance	Vulnerabilities/issues versus mission impacts
Interoperability evaluated for mission capabilities	Connectivity and information exchange evaluated for mission capabilities
Demonstrated failure modes and reliability	Demonstrated reliability versus planned
Established requirements that can be evaluated	Requirements in Concept of Operations (CONOPS), Capability Development Document (CDD), Initial Capabilities Document (ICD), and Capability Production Document (CPD) can be evaluated
TEMP adequacy and currency	TEMP adequacy and currency at acquisition milestones and decision points
Evaluation framework for decisions	Key performance parameter (KPP)/critical technical parameter (CTP)/key system attribute (KSA) exit criteria at acquisition milestones and decision points are established and can be evaluated to inform decisions
DT&E resource management	Test resource availability to support planned test activities
DT&E phase schedule performance	DT&E schedule delays, compressions, and trends
Modeling and simulation (M&S) evaluated for mission capabilities (if required)	Accreditation of M&S

Table 2-2. Overall DT&E Performance

Overall DT&E Performance Criteria	Metrics
Acceptance of DT&E recommendations	Program acceptance of DASD(DT&E) recommendations
DT&E assessment recommendations	DT&E assessment recommendations at acquisition milestones and decision points
TEMP approvals	TEMP approvals
T&E workforce certification status	Percentage of T&E acquisition workforce certified and/or within 24-month grace period
T&E KLPs filled by fully qualified personnel	Percentage of T&E KLPs filled by fully qualified personnel

DASD(DT&E) applied the framework in Table 2-1 to the 35 programs selected for reporting in this FY 2013 annual report. DASD(DT&E) used the resulting assessments to support development of the program engagement section of this report. The framework in Table 2-2 was used to assess the overall DT&E performance of programs with which DASD(DT&E) engaged during FY 2013.

Next Steps. DASD(DT&E) will continue to assess programs using the framework. No additional updates are needed in future reports.

2.3 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 2013, DASD(DT&E) personnel, the DAU T&E Performance Learning Director, and T&E course managers conducted a full review of the T&E curriculum. The T&E Functional Integrated Product Team (FIPT), led by the DASD(DT&E) Deputy Director for T&E Competency and Development and composed of DoD Component functional representatives, directors of acquisition career management (DACMs), and DAU representatives, reviewed the T&E Workforce Competency Model, T&E PCD, and T&E training standards. As a result of the review, minor updates were made to the T&E PCD and T&E Workforce Competency Model. The T&E education standard was reviewed by the T&E FIPT and a recommendation is forthcoming.

DASD(DT&E) previously developed an FY 2013 to FY 2015 road map to assist in T&E workforce development through annual improvement blocks. This road map was part of the annual curriculum review and will continue to be reviewed and updated annually. The goal is to develop T&E professionals capable of performing their critical roles throughout the acquisition life cycle. Figure 2-1 depicts the DASD(DT&E) road map.

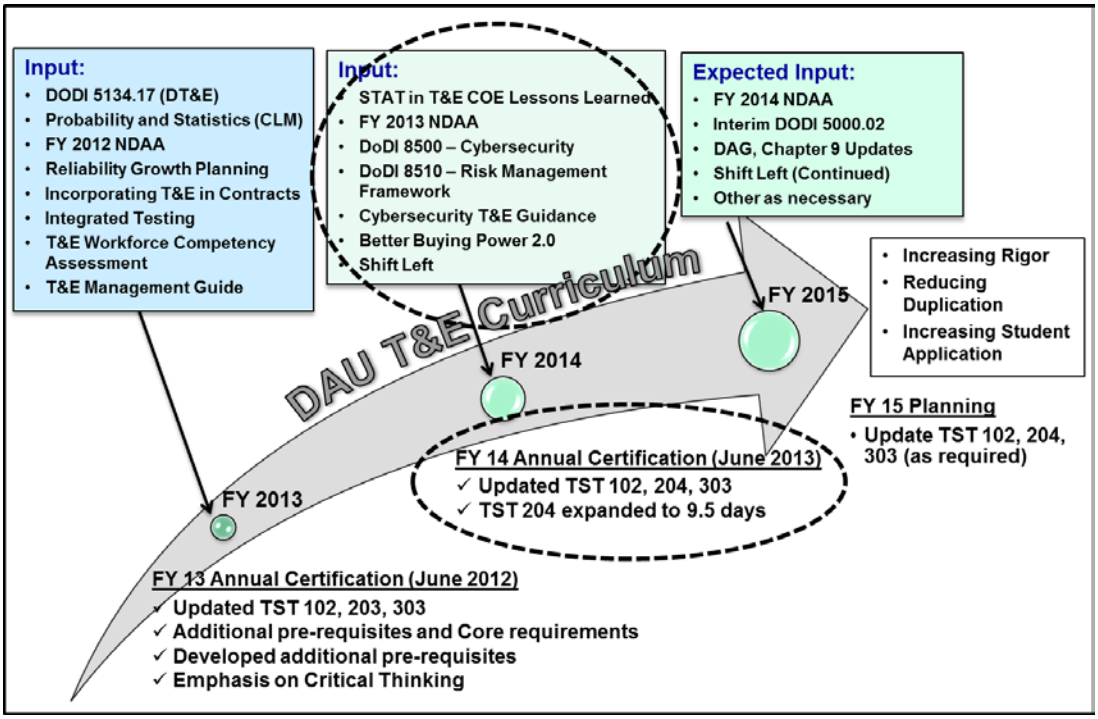


Figure 2-1. DASD(DT&E) FY 2013 to FY 2015 T&E Workforce Development Road Map

2.3.1 Core T&E Certification

Background. The DASD(DT&E) certified the FY 2014 T&E core curriculum on June 7, 2013. The FY 2013 review focused on ensuring that the T&E workforce development road map is moving

forward, with emphasis on implementation of the TST 204 course. No additional functional training courses were added for T&E certification.

Next Steps. DASD(DT&E) will continue to monitor the curriculum in accordance with the functional leader responsibilities assigned in DoD Instruction (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 (see Figure 2-1).

2.3.2 T&E Curriculum

Background. The DASD(DT&E) FY 2013 to FY 2015 T&E workforce development road map includes updates to the DAU T&E curriculum. Table 2-3 shows key changes to the FY 2014 T&E curriculum. Updates were made to increase rigor within the courses, increase practical application exercises, and add emphasis on critical thinking within student exercises.

Table 2-3. FY 2014 DAU Curriculum Updates

Course	FY 2014 Updates
TST 102	Expanded discussion of DT&E assessments Updated Cybersecurity and Interoperability T&E
TST 204	Expanded course curriculum from 5 days to 9.5 days Updated Cybersecurity and Risk Management Framework Included Cybersecurity T&E process Expanded discussion on CTPs Expanded discussion on DT&E assessments Expanded discussion on Test Readiness Reviews (TRRs) Increased practical application during T&E exercises
TST 303	Updated Interoperability T&E Expanded discussion on the statement of objectives (SOO) and statement of work (SOW) as included within the request for proposal (RFP)

Next Steps. DASD(DT&E) will continue to review the 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 reliability and associated T&E activities.

2.3.3 Support to AT&L Workforce Development

Background. In February 2012, USD(AT&L) initiated an effort to address "Elevating the Status, Prestige, and Professional Standards of Acquisition Personnel – Focusing on Key Leaders." DASD(DT&E) continues to support many aspects of this effort, which focuses on competency and accountability. This effort sets standards and selection criteria for KLPs and creates an aura of prestige, status, and recognition for acquisition workforce members.

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. As part of the implementation, 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 (DASD(SE)) are working on a process to pilot the KLP Qualification Board.

Next Steps. DASD(DT&E) will continue to participate in efforts to improve the acquisition workforce.

2.4 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 2013, DASD(DT&E) advised 39 Defense Acquisition Boards (DABs) and 43 Overarching Integrated Product Teams (OIPTs). The DASD(DT&E) completed 10 DT&E assessments, and engaged closely with the program offices to help develop 30 DT&E plans and 30 approvable TEMPs. DASD(DT&E) worked with the TRMC to assess the adequacy of resources available to the programs. No TEMPs were disapproved by the DASD(DT&E).

In FY 2014, DASD(DT&E) will continue to engage with the programs to the level that available resources permit.

2.5 DASD(DT&E) Focus Areas

In FY 2013, DASD(DT&E) concentrated on the following areas:

- Shift Left Initiative
- Chief Developmental Tester
- Lead DT&E Organization
- Cost of DT&E
- T&E Policy Initiatives
- Scientific Test and Analysis Techniques (STAT) in T&E
- Developmental Evaluation Framework
- Interoperability DT&E Guidance
- Cybersecurity DT&E Guidance
- Cyber T&E Event
- Cyber Acquisition Pilot Plan
- Acquisition Workforce Qualification Initiative (AWQI)
- Defense Acquisition Guidebook (DAG) Update
- DT&E Assessments

- M&S
- Tracking DT&E Recommendations
- Use of Government Test Capabilities

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

2.5.1 Shift Left Initiative

Background. The current DoD acquisition process has some significant T&E activities occurring late in the acquisition life cycle. The DASD(DT&E) Shift Left initiative is about improving DT&E to enable programs to find and fix problems during development when fixes are more effective, more efficient, and less costly.

The Shift Left initiative has three key focus areas: earlier mission context, earlier interoperability testing, and earlier cybersecurity testing. Bringing mission context into DT&E means getting the new system out of the laboratory early to see how it will actually be used, which is an important part of DT&E. Interoperability has proven to be a major challenge throughout the past decade of combat operations; the Shift Left initiative is helping to find interoperability issues early enough to correct them during development. Cybersecurity DT&E activities are helping to discover vulnerabilities before deployment.

DASD(DT&E) is working to assist programs in developing and executing more robust DT&E with the right resources to provide decision makers with the right information. The Shift Left initiative focuses on improving the conduct and content of DT&E to improve DASD(DT&E) knowledge and understanding of system performance, reliability, interoperability, and cybersecurity before the system begins production. The DASD(DT&E) objective is to help find and resolve issues early to help programs achieve the objectives of Better Buying Power and to ensure that a development problem does not become a production problem or a Warfighter problem.

Next Steps. DASD(DT&E) is continuing to further develop the Shift Left initiative so that issues can be identified and resolved even earlier in the acquisition life cycle. This follow-on effort is focused on DT activities to identify and resolve issues during the Technology Maturation and Risk Reduction phase. Early DT&E activities are needed to inform decisions on technology, early design, and programmatic risks.

2.5.2 Chief Developmental Tester

Background. Section 1706 of title 10, U.S.C., establishes a goal that for each MDAP and MAIS program there be a properly qualified Chief Developmental Tester.

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. DASD(DT&E) continues to work with the acquisition workforce community and the DoD Components on the implementation of the Chief Developmental Tester for each MDAP and

MAIS program. Section 3.3.2 of this report provides information on DoD Component implementation.

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

2.5.3 Lead DT&E Organization

Background. Section 139b(c) of title 10, U.S.C., requires 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. DASD(DT&E) continues to work with the DoD Components on implementation of the Lead DT&E Organization for each MDAP. Section 4.2.2 of this report provides information on DoD Component implementation of the Lead DT&E Organization for those MDAPs included in this report.

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

2.5.4 Cost of DT&E

Background. DoD 7000.14-R, "Department of Defense Financial Management Regulations (FMRs)," instructs formulation of the T&E Exhibit "dash one" (T&E-1) needed for review and analysis of DoD Component T&E funding requirements. In FY 2012, the DASD(DT&E) and Director of Operational Test and Evaluation (DOT&E) coordinated with the TRMC and DoD Components to modify the T&E-1 to include additional information on prior year funding as well as an estimate for completion, beginning in FY 2013. In FY 2103, DASD(DT&E) revised the T&E-1 to make it more straightforward and informative. DASD(DT&E) will review future 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 Lead DT&E Organizations; and DoD is not maintaining unwarranted test capabilities at private industry facilities.

In FY 2013, multiple revisions were made to the T&E-1 including the following:

- Separated the DT&E and operational test and evaluation (OT&E) list of required programs. OT&E programs use the DOT&E oversight list to identify programs for submission, whereas DT&E uses the MDAP/MAIS list to identify DT&E programs for submission.
- Used a new format for Cost Assessment and Program Evaluation (CAPE) instructions to provide an easier-to-read section for the narrative instructions.
- Changed the narrative input requirements to reflect more specific definitions of requested data.
- Added a table to the narrative to identify what test facilities and ranges are required to support programs.
- Added a table to the narrative to identify each program's Lead DT&E Organization and programmed funding for the Lead DT&E Organization by fiscal year.

- Added a request at the end of the narrative for the program manager (PM) to sign the exhibit, certifying that the program's T&E-1 inputs (data and narrative) are correct as of the date of the program's report.

DASD(DT&E) worked closely with the Service and Defense Agency points of contact (POCs) to implement the modifications. DASD(DT&E) also trained its staff specialists on the modifications and how they could utilize the information to better support the TEMP development and review effort. Modified submissions by the Services and Defense Agencies now provide actual data for the current budget years. These data help DT&E staff specialists better understand a program's resource requirements, as described in TEMPs.

Next Steps. DASD(DT&E) will review future budget submissions for T&E funding to ensure the following:

- T&E resources, as identified in each TEMP, are adequately funded.
- Programs are properly identifying funds for Lead DT&E Organizations.
- DoD is not maintaining unwarranted test capabilities at private industry facilities.
- Unwarranted duplication does not exist among DoD Component assets.
- Test facilities and capabilities required are adequately funded and supported.
- New major test facilities are warranted and meet the needs of the DoD Components.

2.5.5 T&E Policy Initiatives

Background. DASD(DT&E) provided recommendations for future policy considerations.

The November 26, 2013, Deputy Secretary of Defense memorandum, "Defense Acquisition," canceled the current DoDI 5000.02, "Operation of the Defense Acquisition System" (dated December 8, 2008), with the exception of Enclosure 9, Acquisition of Services, and replaced it with an interim policy effective immediately. The interim policy includes the following additions/updates with respect to DT&E:

- Roles and responsibilities of the Chief Developmental Tester.
- Requirement for identification or designation of a Lead DT&E Organization.
- Replacement of the Test and Evaluation Strategy (TES) with the TEMP at Milestone (MS) A.
- A DT&E assessment at each milestone review or decision point.
- Identification, within the TEMP, of all contractor and Government system-level reliability testing needed to support initial reliability planning estimates.
- Use of Government T&E capabilities unless an exception can be justified as cost-effective to the Government.
- Requirement to report on program progress to plan for reliability growth and to assess reliability and maintainability performance for use during key reviews.

- Use of STAT to design an effective and efficient test program that will produce the required data to characterize system behavior across an appropriately selected set of factors and conditions.
- Guidance on DT&E in support of accelerated acquisition and urgent programs.
- Requirement for the evaluation methodology in the TEMP, starting at MS B, to include a Developmental Evaluation Framework to identify key data that will contribute to assessing progress toward achieving interoperability requirements.
- Guidance on DT&E cybersecurity.

Next Steps. DASD(DT&E) will support the DoD staffing and coordination process for future updates to T&E policies and adjudicate any comments, if necessary.

2.5.6 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 provide advice and assistance in the application of STAT. The COE, consisting of an interdisciplinary group of DoD T&E professionals with knowledge and experience in DoD T&E and statistical expertise, provides dedicated support to selected programs. The COE works in partnership with PMs and Chief Developmental Testers to improve effectiveness and the efficient use of scarce resources during development of the TEMP. Using a combination of rigorous scientific methods and lessons learned, the COE identifies areas in which test designs can be improved and efficiencies gained, and then provides recommendations and assistance in the development of an efficient T&E strategy.

In FY 2013, the STAT in T&E COE expanded the number of supported programs from 20 to 25 using existing resources to better support PMs and Chief Developmental Testers.

- STAT in T&E COE Support to Programs. Currently, the STAT in T&E COE provides assistance to the following 25 acquisition programs, identified and submitted by the DoD Components:
  - **Army (8)**
    - Armored Multi-Purpose Vehicle (AMPV)
    - Common Infrared Countermeasures (CIRCM)
    - Indirect Fire Protection Capability Increment 2 – Intercept
    - Integrated Air and Missile Defense (IAMD)
    - Next Generation Diagnostic System (NGDS)
    - Logistics Modernization Program
    - 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 Increment 2
- LHA-R Amphibious Assault Ship (Flights 0 and 1)
- Next Generation Enterprise Network
- Ship-to-Shore Connector
- Next Generation Jammer (NGJ)
- GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)
- Multi-Mission Maritime Aircraft (P-8A Poseidon)

o **Air Force (9)**

- Air and Space Operations Center – Weapon System Initiative 10.2
- Air Force Integrated Personnel and Pay System
- B61 Mod 12 Life Extension
- Combat Rescue Helicopter
- KC-46A Tanker Replacement
- Space Fence
- Space-Based Infrared System High Component (SBIRS High)
- Intercontinental Ballistic Missile (ICBM) Fuze – W78/W88-1 (support began 1st quarter FY 2014)
- Military Global Positioning System (GPS) User Equipment (MGUE) (support began 1st quarter FY 2014)

- STAT in T&E COE Key Contributions
  - Developed design matrices for laser infrared countermeasures (IRCM) T&E laboratory testing that reduced the number of runs required to properly characterize the CIRCM system.
  - Developed operational characteristics curves for pilot lot assay testing across test parameters. These curves were used to develop an effective and efficient test plan for NGDS that balanced cost with risk.
  - Developed a comprehensive list of opportunities to inject STAT into the T&E Strategy and incorporated a phased STAT strategy into the CVN 78 TEMP Revision C. This effort was undertaken to support the contract award of the second carrier in the new Ford-class, JOHN F KENNEDY (CVN 79).
  - Supported SIBRS High on a proposed contract modification that would incorporate experimental design as part of the contractor's test program.

Next Steps. DASD(DT&E) will continue to support implementation of STAT in T&E and is working on a sustainable business model to continue to support and expand the STAT in T&E COE.

2.5.7 Developmental Evaluation Framework

Background. The Interim DoDI 5000.02 stresses the importance of using evaluation methodology in the TEMP to provide essential information on programmatic and technical risks as well as information for major programmatic decisions. To assist Chief Developmental Testers, DASD(DT&E) is developing guidance on the use of a Developmental Evaluation Framework for acquisition programs as they develop testing strategies and plans. This guidance on the Developmental Evaluation Framework, to be included in the DAG, will aid programs in determining where to apply limited resources, particularly during Engineering and Manufacturing Development (EMD), and how to structure tests to answer critical technical questions. Knowledge gained from the testing program will provide information for technical, programmatic, and acquisition decisions at decision points and major milestones.

The Developmental Evaluation Framework will identify key data that will contribute to assessing progress toward achieving KPPs, CTPs, KSAs, interoperability requirements, cybersecurity requirements, reliability growth, maintainability attributes, and other items as needed. The Developmental Evaluation Framework will show the correlation between test events, key resources, and the decisions to be supported.

Next Steps. DASD(DT&E) is in the process of refining the Developmental Evaluation Framework and guidance that will be included in the next DAG update. Future inititiaves will include application of the Developmental Evaluation Framework to the Technology Maturation and Risk Reduction phase and addition of a mission context.

2.5.8 Interoperability DT&E Guidance

Background. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6212.01F provides new roles and responsibilities for the DASD(DT&E). The instruction states that the DASD(DT&E) shall approve DT&E plans in support of joint interoperability test certification as documented in the TEMP. The Joint Interoperability Test Command (JITC) role is to advise DASD(DT&E) regarding the adequacy of test planning in support of joint interoperability test certification.

This new language strengthens the role of DT&E in interoperability certification. DASD(DT&E) will ensure Net Ready KPP review and concurrence from a DT&E perspective and will also provide guidance and oversight to the T&E processes that lead to certification. To support this effort, DASD(DT&E) is partnering with JITC to ensure that the test events in the TEMP are leveraged as much as possible to support joint interoperability test certification. JITC will be able to coordinate with the Chief Developmental Tester and Lead DT&E Organization to ensure that the data collected can be used for interoperability certification. This partnership allows JITC to assist in shaping DT events, as necessary, to eliminate the need to conduct separate interoperability tests.

Next Steps. DASD(DT&E) will continue to partner with JITC to ensure that the use of DT&E is maximized, efficiencies are gained, and capabilities are fielded according to Warfighter needs.

2.5.9 Cybersecurity DT&E Guidance

Background. As part of the Shift Left initiative, DASD(DT&E) developed a cybersecurity T&E process that provides suggested developmental cybersecurity issues to consider when assessing a system and details the procedural steps necessary to properly gather data for an assessment.

- Step 1. Understand cybersecurity requirements.
- Step 2. Characterize the cyber attack surface.
- Step 3. Understand the cybersecurity kill chain.
- Step 4. Conduct cybersecurity DT&E.

This process will include using existing documents such as the CDD for requirements and the Program Protection Plan to assist in identifying critical areas of vulnerability on which to focus cybersecurity DT&E. The first step is to understand the cybersecurity requirements; thus, the process begins very early in the acquisition life cycle, at MS A or B, to begin to develop an approach for cybersecurity DT&E. Step 2 takes into consideration the integrated environment in which the system interoperates to characterize the *attack surface*; that is, to understand the avenues by which a potential adversary may gain access to the system, escalate privileges, monitor data exchanges, or embed malicious software. The third step, once the potential attack surface is defined, is to understand the cybersecurity *kill chain*. The kill chain is a construct that describes potential adversary actions, thereby allowing system developers and network defenders to plan response measures to improve resilience. Finally, as Step 4 indicates, cybersecurity testing should include testing with a capable cyber threat representation, in a range intended for that purpose, during DT&E.

The goal is to improve the security of systems operating or exchanging data in cyberspace 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 2013 accomplishments include the following:

- DASD(DT&E) and the TRMC are collaborating to improve the conduct of and resources supporting cybersecurity DT&E. The cybersecurity DT&E methodology will help the PM in developing a robust cybersecurity DT&E design, with the objective of improving and understanding the resilience of network-enabled military capabilities. The goal of cybersecurity DT&E is to improve the resilience of military capabilities in the presence of cyber attacks.
- DASD(DT&E) provided key input to the forthcoming DoD policy to reinforce the need to include cybersecurity during T&E planning, execution, and assessment and to document cybersecurity DT&E activities within the program TEMP.
- DASD(DT&E) was a collaborating partner with USD(AT&L) and DoD CIO representatives in the development of a PM cybersecurity implementation guidebook. This guidebook will help PMs navigate through cybersecurity policy and guidance as programs progress through the acquisition life cycle.

Next Steps. DASD(DT&E) is continuing efforts to fully develop and implement a strategy for cyber DT&E. DASD(DT&E) is continuing to promulgate the need to complete cybersecurity testing

beyond the standard information assurance (IA) controls and initiate T&E planning, execution, and assessment early within the acquisition life cycle. As visibility and critical concerns increase with respect to cybersecurity of mission critical systems in the next year, DASD(DT&E) will continue to employ measures such as increased oversight and guidance of early cybersecurity testing activities. DASD(DT&E) will partner with the TRMC to ensure adequate cybersecurity test capability and skilled and knowledgeable cybersecurity T&E personnel. The next DAG update will reflect cybersecurity DT&E guidance.

2.5.10 Cyber T&E Event

Background. Interoperability Test and Evaluation Capability (InterTEC) Cyber Event (ICE) 2011, completed in December 2011, simulated cyber attacks on a command and control (C2) system involved in a joint close air support mission. This initial cyber pilot event was a valuable first step in understanding the conduct of T&E activities in the defensive cyber domain.

In FY 2012, DASD(DT&E) initiated the planning for ICE 2013, which included a representation of a Computer Network Defense Service Provider. In FY 2013, DASD(DT&E) led the execution of ICE 2013.

Lessons learned during ICE 2013 are serving as the basis for implementing the cybersecurity DT&E process for acquisition programs.

Next Steps. Future events are being explored to further refine the methodology.

2.5.11 Cyber Acquisition Pilot Plan

Background. Section 933 of the FY 2011 National Defense Authorization Act (NDAA) tasked DoD with developing a strategy for the rapid acquisition of tools, applications, and other capabilities for cyber warfare. The ensuing Report to Congress identified the need for early engagement by the T&E community in cyber acquisition. Because speed is critical in the rapid process, DT and operational test (OT) will take advantage of using integrated testing to the greatest extent possible instead of using a serial testing schedule. Testing will be based on a risk assessment, take place in realistic ranges, and be overseen by cyber T&E subject matter experts (SMEs). DoD created a cyber acquisition framework to establish repeatable, transparent, and disciplined processes for developing cyber capabilities.

In FY 2013, DoD prepared a pilot plan for the cyber acquisition effort to validate or refine framework processes, roles, and policies before implementation of the framework. DASD(DT&E) assisted in the development of this pilot plan to ensure that adequate T&E is performed during cyber acquisition.

Next Steps. DoD plans to conduct a pilot event in FY 2014. DASD(DT&E) and the T&E community will participate and use the pilot events to identify gaps in test infrastructure, testing methods, and qualified personnel. Test policies and practices will be updated, as appropriate, based on lessons learned during the pilot event.

2.5.12 Acquisition Workforce Qualification Initiative (AWQI)

Background. USD(AT&L) Better Buying Power 2.0 identified a need to improve the professionalism of the total acquisition workforce. This need resulted in the establishment of AWQI, which is intended to develop workforce qualification standards based upon hands-on experience in roles of increasing responsibility. This initiative is a collaborative effort between the acquisition functional areas and DAU. 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, DASD(DT&E), as the T&E functional leader, was assigned the mission within AWQI to develop the professional qualification standards for T&E. DASD(DT&E), in coordination with DAU, is developing T&E qualification standards for all certification levels and the means to document an individual's demonstrated T&E knowledge, skills, and experience. T&E supervisors, mentors, and SMEs will also play a key role in this effort. DoD Components will have the flexibility to add or tailor specific qualification tasks and requirements germane to their T&E areas of interest.

Next Steps. The DASD(DT&E) will continue to develop T&E qualification standards for all certification levels. These standards will be used to develop on-the-job tools and processes to assist in the development of individual qualification plans for all members of the T&E workforce and tie their performance to these plans.

2.5.13 Defense Acquisition Guidebook (DAG) Update

Background. The DAG complements DoD Directive (DoDD) 5000.01, "The Defense Acquisition System," and the Interim DoDI 5000.02 by providing the acquisition workforce with discretionary best practices that should be tailored to the needs of each program.

In FY 2013, DASD(DT&E) initiated an effort to restructure the DAG to align with the Interim DoDI 5000.02.

Next Steps. The DAG update will be completed in FY 2014 to align with the Interim DoDI 5000.02.

2.5.14 DT&E Assessments

Background. In the FY 2011 and FY 2012 annual report submissions, DASD(DT&E) provided information on DT&E assessments.

In FY 2013, as part of the Shift Left initiative to enable DT&E to identify problems early so that corrective actions can be taken during development, DASD(DT&E) conducted DT&E assessments earlier in the acquisition process, at each milestone review or decision point.

DASD(DT&E) published 10 DT&E assessments in FY 2013. Table 2-4 lists the one DT&E assessment that supported a development RFP release decision, Table 2-5 lists the six DT&E assessments that supported production decisions, and Table 2-6 lists the three DT&E assessments that supported Service operational test readiness reviews (OTRRs).

Table 2-4. DT&E Assessment Supporting a Development RFP Release Decision (FY 2013)

Program	DT&E Recommendation
AMPV (June 2013)	Support RFP Release

Table 2-5. DT&E Assessments Supporting Production Decisions (FY 2013)

Program	DT&E Recommendation
Joint Space Operations Center (JSpOC) Mission System (JMS) Increment 1 (February 2013)	Support MS C Decision
Precision Guidance Kit (PGK) (March 2013)	Support Low-Rate Initial Production (LRIP) Decision
HC/MC-130 Recapitalization (April 2013)	Support Full-Rate Production (FRP) Decision
Small Tactical Unmanned Aircraft System (STUAS) RQ-21A (April 2013)	Support LRIP Decision
Handheld, Manpack, and Small Form Fit (HMS) Rifleman Radio (RR) AN/PRC-154A (August 2013)	Support Increase LRIP Decision
M109 Family of Vehicles Paladin Integrated Management (PIM) (August 2013)	Support MS C Decision

Table 2-6. DT&E Assessments Supporting Service OTRRs (FY 2013)

Program	DT&E Recommendation
JMS Increment 1 (November 2012)	Proceed to Operational Utility Evaluation (OUE)
Joint High Speed Vessel (JHSV) (June 2013)	Proceed to Initial Operational Test and Evaluation (IOT&E)
Cobra Judy Replacement (CJR) (August 2013)	Proceed to Multi-Service Operational Test and Evaluation (MOT&E)

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

2.5.15 Modeling and Simulation (M&S)

Background. In January 2011, the USD(AT&L) designated the DASD(DT&E) as the T&E representative on the M&S Steering Committee. The T&E Modeling and Simulation Working Group (MSWG) had meetings during FY 2013 to further the organization, membership, charter, and strategic plan.

In addition, the T&E community was funded for an M&S high-level task for Cyber Operations for Research and Network Analysis (CORONA) with program management assigned to the TRMC. CORONA was completed and provides DoD with an architecture “blueprint” for rapidly integrating cyberspace LVC capabilities, and software that enables standardization. CORONA capability will directly benefit the combatant commands; the testing, training, acquisition, experimentation, and intelligence communities; the existing and emerging ranges; and the Services.

In FY 2013, the TRMC worked within DoD to initiate a Common Development Environment (CDE) that acquisition programs can utilize to more efficiently deliver capabilities to the Warfighter (see section 5.4.3 of this report for additional information). At the end state, this common environment will include standard interfaces and processes, access to technical data packages (TDPs) while protecting proprietary data, data discovery and persistence, and the infrastructure to connect it all together.

Next Steps. DASD(DT&E) will continue to provide T&E community representation to the MSWG.

2.5.16 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 2013, 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; DT&E assessments; and TEMP approval and DASD(DT&E) memorandums.

In FY 2013, there were 53 DT&E recommendations, with seven completed and 46 ongoing as of the end of FY 2013. All recommendations were accepted or partially accepted.

Next Steps. DASD(DT&E) will continue to track the extent to which program offices are adopting DT&E recommendations.

2.5.17 Use of Government Capabilities

Background. In previous reports, DASD(DT&E) supported policy to prioritize the use of Government capabilities in order to avoid the unnecessary duplication of those T&E capabilities at contractor facilities. The policy on prioritizing the use of Government capabilities was included in the Interim DoDI 5000.02, dated November 26, 2013. This policy helps to ensure that the Government is retaining core capabilities and is getting best value.

Next Steps. DASD(DT&E) will continue to assist programs in implementing the guidance during the development of the TEMP. 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), DISA, and MDA. For FY 2013, 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 to include all categories of T&E personnel and addressed the following specific recommendations from the DASD(DT&E) FY 2012 annual report:

- DoD Components – It is the DASD(DT&E) position that DoD Components should be able to target and hire interns directly into the T&E acquisition career field. Across the acquisition workforce, interns are targeted in the career fields of systems engineering (SE), program management, and contracting.
- Air Force – It is the DASD(DT&E) position that the Air Force space community should grow its DT&E workforce and training in order to provide a robust Government DT&E capability.
- Air Force – The DASD(DT&E) recommends that the Air Force review the number of Level II coded positions and take action to increase the certification level of a majority of those positions.
- MDA – In the FY 2011 annual report, DASD(DT&E) reported a concern regarding the realignment of the analysis and evaluation functions in the SE organization. MDA provided details of the personnel conducting analysis, and approximately 30 percent are T&E certified; however, none of the positions are T&E coded. DASD(DT&E) again recommended reviewing these positions for T&E coding. The alignment with the Engineering Directorate does not preclude the coding of the positions for T&E.

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 and tiger teams, the STAT in T&E Implementation Panel, and groups updating T&E policy and guidance. During FY 2013, these groups supported efforts to draft the DT&E section of DoDI 5000.02 and the T&E section of the DAG and update the continuous learning modules (CLMs) for T&E certification.

3.1 Updates from FY 2012 DoD Component Assessments

The DoD Components reported on progress and improvements in the T&E acquisition workforce. The DoD Components reported certification rates across the T&E workforce. The DASD(DT&E) overall goal for certification is for 90 percent of the workforce to either be certified or be within the 24-month grace period for certification. Currently, the overall workforce is exceeding this goal with 94 percent either certified or within the grace period. Certification rates for the T&E workforce increased for all DoD Components in FY 2013. The rates shown in Figure 3-1 are taken from the AT&L Workforce Data Mart as of the end of FY 2013.

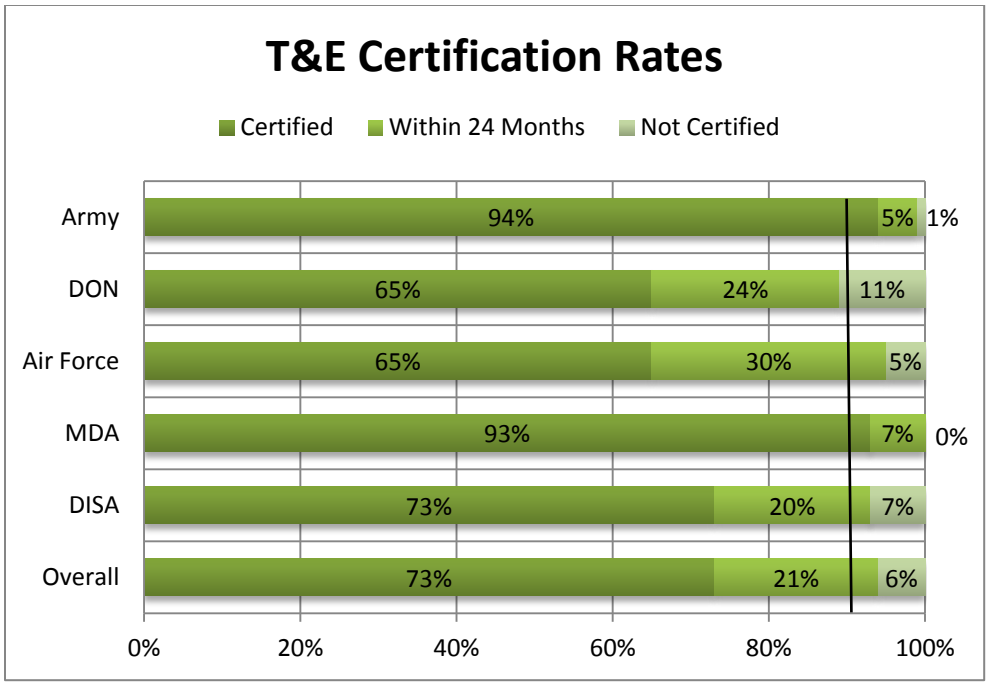


Figure 3-1. FY 2013 T&E Certification Rates

The DoD Components continue to report concern regarding the change to the T&E certification that requires a scientific or technical degree. The change applies only to members entering the T&E career field after October 1, 2012. During FY 2013, the T&E FIPT conducted a study to assess the current T&E workforce and the impact of the change. The T&E FIPT examined the occupational series of the personnel in T&E-coded positions. The majority of T&E workforce members are in occupational series associated with engineering, mathematics, operations research, and physical sciences, which all require technical or scientific degrees. The T&E FIPT received assistance from the Service DACMs to obtain the degree disciplines of members who were not in occupational series requiring scientific or technical degrees. The result of the analysis showed that more than 93 percent of the current civilian T&E workforce members and more than 64 percent of the current military T&E workforce members possess a technical or scientific degree. The number of military personnel appears low; however, more than 20 percent of the military records were incomplete. The degree disciplines for these records were "unknown."

Table 3-1 shows the composition of the T&E workforce by certification level. The chart 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 the FY 2011 and FY 2012 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 workforce positions. The Air Force reported that the Air Force Directorate of Test and Evaluation (AF/TE) directed an Air Force-wide T&E-coded position review resulting in the recoding of 133 (4%) Air Force positions. The Air Force will continue the reviews of T&E-coded positions in conjunction with the Air Force DACM office and other Air Force DAWIA functional leads to assess discrepancies in assigned DAWIA functional classifications. The Air Force also noted that it will continue to encourage the Air Force 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.

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

Level	Army	DON	Air Force	4th Estate	Total
Level I	2%	11%	13%	0%	9%
Level II	37%	31%	73%	36%	47%
Level III	61%	58%	14%	64%	44%

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 2013, all DoD Components provided detailed accounts of DAWDF funding used to advance the T&E workforce. Specifically, the Army provided opportunities for advanced acquisition and leadership training. The DON used Section 852 funds for the NAVAIR College of Test and Evaluation. The Air Force used the funding to continue several T&E-specific education and training programs, including civilian tuition assistance, and to extend the reach of T&E hiring efforts through acquisition civilian recruiting websites. DISA added additional training for its workforce with the use of DAWDF funds, and MDA used the funds to support the Missile Defense Career Development Program (MDCDP).

The DoD Components reported their efforts in FY 2013 to target and hire interns directly into the T&E acquisition career field. The Army, Air Force, and DISA continued to target and hire interns directly into the T&E workforce. The DON targets the hiring and filling of T&E positions at the journeyman level to provide personnel who are experienced and who will quickly become an effective part of the T&E workforce. As a result, there is inadequate demand in field activities to stand up a T&E intern new-hire program. MDA continued to bring interns into the MDCDP and move the interns to T&E positions at the end of the 2-year program.

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

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 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 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 community early in program development planning.

As the Army's primary developmental tester, the Army Test and Evaluation Command (ATEC) and its personnel are adequate to conduct DT&E in support of the acquisition community. ATEC continues to adjust its civilian and contractor workforce to meet fiscal and resource challenges. ATEC continues to modify its organizational structure through such efforts as the reorganization of the Army Evaluation Center (AEC) and the realignment of the Intelligence Electronic Warfare Test Directorate under the Electronic Proving Ground (EPG), Fort Huachuca, Arizona, to meet the emerging needs of the acquisition community and its customers.

The Army utilizes its program executive offices (PEOs) in support of the DT&E mission. The Army provided details about PEO Soldier; PEO Combat Support and Combat Service Support; and PEO Command, Control, and Communications–Tactical. These PEOs have T&E personnel to adequately support the programs. In addition, the PEOs have staff in T&E-coded positions at the Research, Development, and Engineering Command and at research, development, and engineering centers. The Army also supports the Ronald Reagan Ballistic Missile Defense Test Site (Reagan Test Site (RTS)) that provides defensive and offensive DT&E for the MDA integrated family of systems, ICBMs, boost-glide systems, and space operations. The Army's military, civilian, and contractor workforce is sufficient to sustain moderate risk to the T&E mission.

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 personnel assigned as the Chief Developmental Tester for each of its MDAPs and MAIS programs. The Army identified which positions are coded T&E and the level of T&E certification. Not all of the positions are coded as KLPs and a few are not coded T&E. DASD(DT&E) will work with the Army to ensure that by June 30, 2015, all workforce members including current incumbents of KLPs 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) memorandum").

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 2012 report has not changed significantly. Naval systems commands (SYSCOMs), PEOs, and naval warfare and systems centers 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 2013, a number of organizational improvements were implemented within Naval Sea Systems Command (NAVSEA) and Marine Corps Systems Command (MCSC) to enhance the ability to meet T&E workload demands and provide the proper focus on T&E workforce competency. NAVSEA established a T&E technical advisor position in its Research and Systems Engineering Directorate, SEA 05, and assigned T&E competency leads at each of its warfare center divisions. MCSC formally established an expanded DT&E Division with staffed positions under the Deputy Commander, Systems Engineering, Interoperability, Architectures, and Technology.

The DON T&E Improvement Process (TEIP) continues to be used for strategic planning and continuous process improvement for the DON T&E enterprise. 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 (ASN(RD&A)) 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 SMEs) that develops T&E improvement goals, objectives, plans, and projects. The TEIP provides a forum to improve T&E policy, process, workforce, and program support in the DON.

In 2013, 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. On behalf of the DON T&E national lead, 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 continues to have the highest number of Chief Developmental Testers among the DoD Components. The DON provided a list of its Chief Developmental Testers assigned to MDAPs and MAIS programs. In addition, DON positions are properly coded as KLPs. The DON showed an increase in the number of KLPs from 39 to 47 during FY 2013 (per AT&L Workforce Data Mart).

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 personnel assigned as the Chief Developmental Tester for each of its MDAPs and MAIS programs. The DON identified which positions are coded T&E and the level of T&E certification. With the exception of two Marine Corps programs, the DON has properly coded its KLP programs. DASD(DT&E) will work with the DON to ensure that by June 30, 2015, all workforce members including current incumbents of KLPs meet the requirements described in the USD(AT&L) memorandum.

3.2.3 Air Force Report

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

The Air Force DT&E workforce and DT&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 DT&E workforce and streamlining DT&E infrastructure. For example, the DT&E workforce at the Space and Missile Systems Center (SMC) is currently being optimized for improved performance.

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 addressed the reorganization of Air Force Materiel Command (AFMC), completed October 1, 2012, which consolidated 12 centers into five. It also addressed the DT&E workforce revitalization as envisioned by Congress and DASD(DT&E). The methodology of tabulating workforce data that was introduced in FY 2011 remains unchanged, but minor variation from last year's data should be attributed to attrition, additions, and slight variations in the Air Force personnel/manpower systems caused by the AFMC organizational restructure.

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. This and other congressional directions and changes from OSD were incorporated in a complete revision of Air Force Instruction 99-103, "Capabilities-Based 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 on STAT and design of experiments (DOE). The Air Force provided timely inputs to the draft versions of DoDI 5000.02.

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

- A shortage of T&E resources for cyber and information technology (IT) systems.
- A lack of policy to address IT acquisition.
- The new requirement for T&E certification that requires a scientific or technical degree.
- The Interim DoDI 5000.02, which separated DT&E and operational and live-fire T&E into separate enclosures.
- The requirements for a Chief Developmental Tester and Lead DT&E Organization for each MDAP.
- The sequestration and congressional debt ceilings and their potential impact on future research, development, test, and evaluation (RDT&E) resources and appropriations.
- The introduction of new reporting requirements in the Interim DoDI 5000.02 (primarily Operational Test Agency (OTA) reporting requirements).

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

Based upon the report submitted by the Air Force and subsequent discussions, 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 each of its MDAPs and MAIS programs. 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 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). DASD(DT&E) will continue to monitor the Air Force as it implements the USD(AT&L) memorandum.

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. They are assigned primarily under the DISA Office of the Test and Evaluation Executive (TEO), with a subset of the T&E workforce assigned to DISA portfolios responsible for the acquisition and fielding of enterprise services and IT capabilities.

JITC reports directly to the DISA TEO, is responsible for conducting interoperability certifications for all of DoD, and performs OT&E test execution and IA for DISA and other external customers. JITC provides DT&E services to DISA programs when required; however, most DISA programs have test managers within their program management offices (PMOs) who are responsible for testing. DISA MAIS programs establish dedicated DT&E teams, allowing JITC to focus on being the independent test agent for conducting interoperability evaluations, OT&E, and IA.

Within DISA, a broad range of IT exists that T&E must support. Emerging concepts such as cloud and enterprise services are driving the IT community toward modular services that are integrated onto a single converged IT infrastructure; therefore, more stringent interoperability evaluations are necessary. Likewise, mobility programs are adding a new dimension to distant end users, and cyber defense initiatives have resulted in a new DoD cyber C2 framework. These concepts have required DISA T&E to evolve its methods for conducting T&E without increasing resources or time.

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.

DISA-authorized billets for its T&E workforce are adequate to support the T&E mission. DISA currently has an appropriately sized workforce, and the personnel onboard are sufficiently trained to support the T&E mission; however, DISA must continue to fill vacant positions in continued support of the T&E mission.

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

3.2.5 MDA Report

MDA reported that the composition of the Test Functional Area (TFA) T&E workforce is optimal. All manpower initiatives directed by the Secretary of Defense have been implemented. MDA will continue to adjust the balance of the T&E workforce in accordance with future manpower and fiscal guidance.

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) TFA. The MDA T&E program continues to support all DT&E activities with a highly trained T&E workforce. 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 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.

MDA reported on efforts pertaining to KLPs. As reported in FY 2012, MDA still does not have its test functional lead positions coded as T&E KLPs. The positions remain in synch with the roles, responsibility levels, and qualifications of the Chief Developmental Tester, but MDA has not properly coded them through its DACM. 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 2014.

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 has not completed the alignment of the analysis and evaluation function to T&E-coded positions. MDA is working to complete assignments of KLPs as required by the USD(AT&L) memorandum. DASD(DT&E) will work with MDA to ensure that all workforce members including current incumbents of KLPs meet the requirements described in the USD(AT&L) memorandum by June 30, 2015.

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 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.

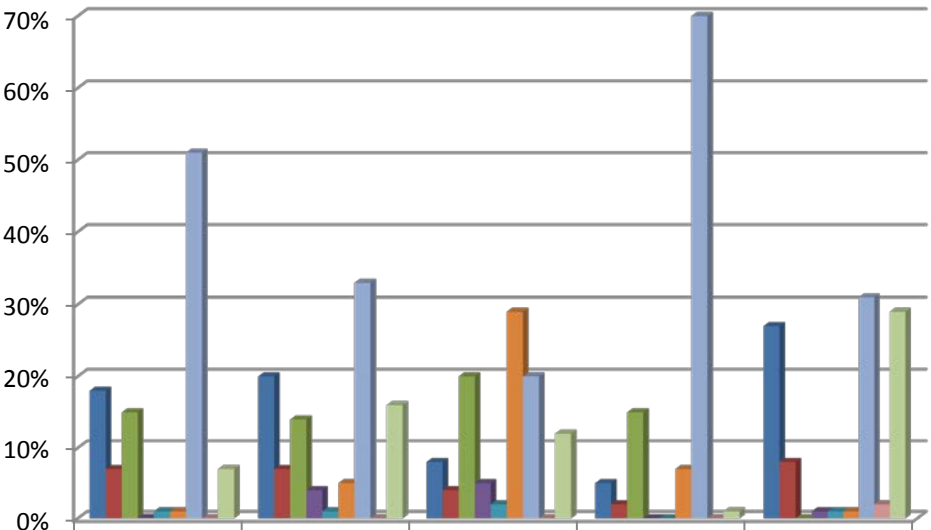
Over the last 5 years, the DASD(DT&E) has requested data on the entire T&E workforce. As noted in previous reports, limitations to the data have existed over the years. The DoD Components used manual methods to collect the data and the data were not all-inclusive.

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

Figure 3-2 shows the composition of the T&E workforce based on the data provided in the FY 2013 DoD Component reports.

The Army and DISA have a high percentage of contractor support, with 51 percent and 70 percent, respectively. The Army highlighted its rigorous processes of determining inherently governmental responsibilities. Although DISA has a high percentage of contractor support, it manages its workforce effectively based on workload and enterprise T&E services. The DON shows a relatively balanced workforce, which is attributed to the variation in SYSCOM organizations. MDA has the highest percentage of developer T&E support at 29 percent.



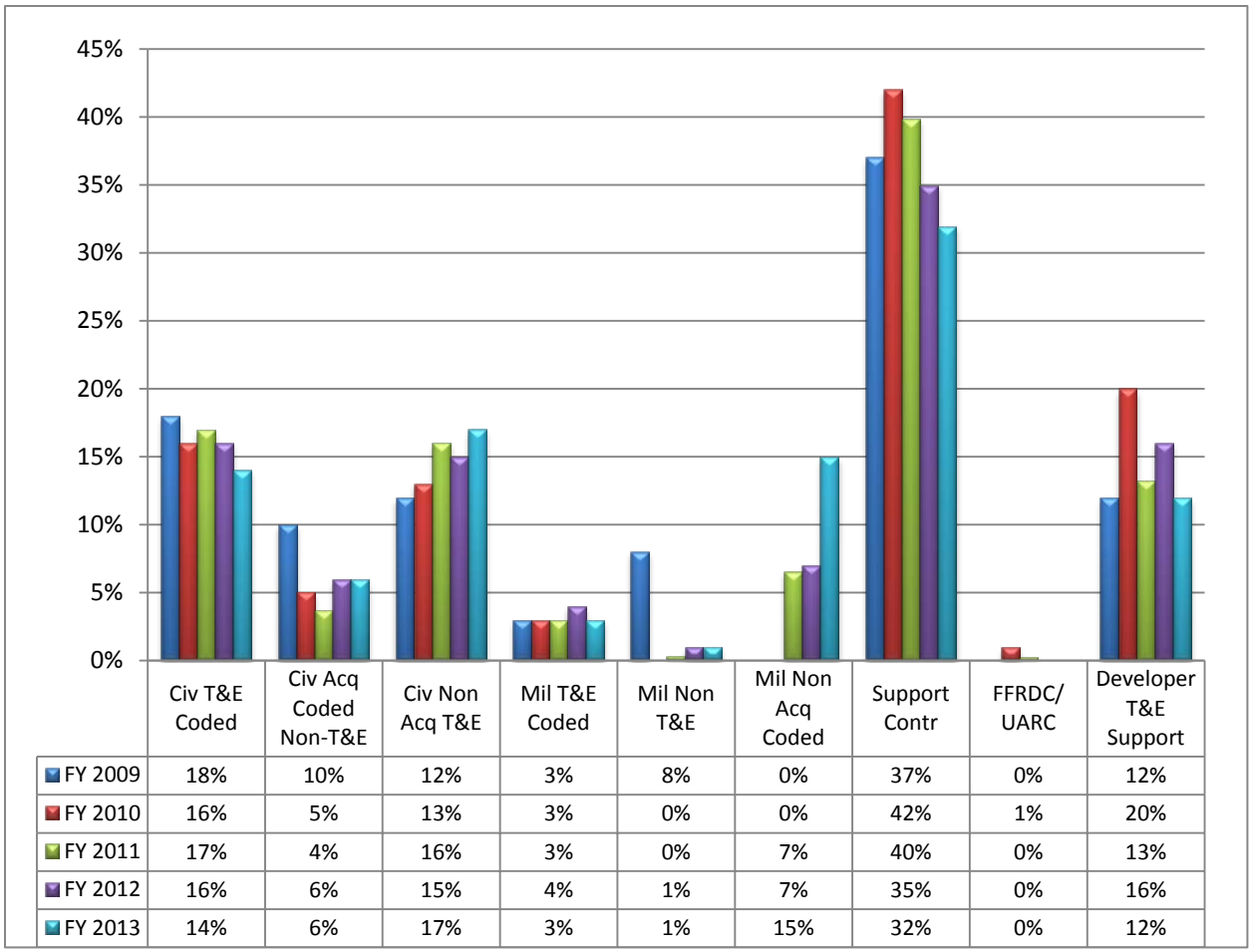
	Army	DON	Air Force	DISA	MDA
Civ T&E Coded	18%	20%	8%	5%	27%
Civ Acq Coded Non-T&E	7%	7%	4%	2%	8%
Civ Non Acq T&E	15%	14%	20%	15%	0%
Mil T&E Coded	0%	4%	5%	0%	1%
Mil Non T&E	1%	1%	2%	0%	1%
Mil Non Acq Coded	1%	5%	29%	7%	1%
Support Contr	51%	33%	20%	70%	31%
FFRDC/ UARC	0%	0%	0%	0%	2%
Developer T&E Support	7%	16%	12%	1%	29%

(0% indicates a number less than 1%)

Figure 3-2. FY 2013 T&E Personnel Breakdown

Figure 3-3 shows the comparison of data from FY 2009 through FY 2013. Overall, the data show a continued reliance on support contractors and non-T&E-coded personnel supporting DT&E efforts. Similar to FY 2012, the percentage of the civilian and military T&E-coded workforce in FY 2013 is at 20 percent of the overall T&E workforce. DASD(DT&E) will continue to request these data and monitor the comprehensive breakdown of T&E personnel.

Figure 3-3 shows large changes in the number of military non-T&E-coded and military non-acquisition-coded positions between FY 2009–FY 2010 and FY 2011–FY 2013. The differences were due to refinement of definitions of the workforce data categories.



	Civ T&E Coded	Civ Acq Coded Non-T&E	Civ Non Acq T&E	Mil T&E Coded	Mil Non T&E	Mil Non Acq Coded	Support Contr	FFRDC/ UARC	Developer T&E Support
FY 2009	18%	10%	12%	3%	8%	0%	37%	0%	12%
FY 2010	16%	5%	13%	3%	0%	0%	42%	1%	20%
FY 2011	17%	4%	16%	3%	0%	7%	40%	0%	13%
FY 2012	16%	6%	15%	4%	1%	7%	35%	0%	16%
FY 2013	14%	6%	17%	3%	1%	15%	32%	0%	12%

(0% indicates a number less than 1%)

Figure 3-3. Comparison of T&E Workforce Data from FY 2009 to FY 2013

A subset of the entire T&E workforce is the acquisition T&E workforce. Table 3-2 shows the acquisition T&E workforce comparison between FY 2012 and FY 2013. Minimal changes occurred in the acquisition T&E workforce over the past 2 years. During FY 2013, the acquisition T&E workforce had an overall decrease of 23 T&E positions. The Army and Air Force showed a decrease in T&E-coded positions, whereas all other DoD Components showed an increase. 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.

Table 3-2. Acquisition T&E Workforce Comparison, FY 2012 vs. FY 2013

DoD Component	FY 2012			FY 2013			Difference
	Civilian	Military	Total	Civilian	Military	Total	
Army	2,102	14	2,116	2,059	21	2,080	-36
DON	2,634	452	3,086	2,644	470	3,114	+28
Air Force*	1,734	1,299	3,033	1,753	1,248	3,001	-32
Fourth Estate**	368		368	385		385	+17
TOTAL	6,838	1,765	8,603	6,841	1,739	8,580	-23

*In FY 2012, the Air Force had a data submission error in the AT&L Workforce Data Mart system. The data update occurred after submittal of the FY 2012 annual report and is reflected in the table.
**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.

3.3.2 Key Leadership Positions (Chief Developmental Testers)

Background. In accordance with sections 835 and 1706 of Public Law 112-81, 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.

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. 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 number of total KLPs and an additional line for those KLPs that are further designated with the special acquisition assignment code of Chief Developmental Tester. An increase of nearly 20 percent in the number of KLPs and Chief Developmental Testers occurred during FY 2013. An analysis of data from the AT&L Workforce Data Mart showed that an additional 17 positions designated with the special acquisition assignment code of Chief Developmental Tester are not aligned with the T&E career field. The majority of these positions are coded as engineering with the remainder coded as program management; IT; and production, quality, and manufacturing. DASD(DT&E) will work with the DoD Components to correctly recode these positions to the T&E career field.

Table 3-3 data are taken from the AT&L Workforce Data Mart as of the end of FY 2013. The DON reported a much higher number of KLPs and Chief Developmental Testers than those reported by the Army and by the Air Force because of the DON emphasis on identifying those positions beginning in FY 2012.

The DoD Components provided DASD(DT&E) with a list of Chief Developmental Testers for each MDAP and MAIS program. With few exceptions, the DoD Components have identified the Chief Developmental Tester by name for each MDAP and MAIS program. The majority of Chief Developmental Testers identified are assigned to a single program; however, some Chief Developmental Testers are assigned to more than one program or to more than one increment of the same program.

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.

As stated in the FY 2012 DT&E Annual Report, per Air Force policy, Air Force KLPs are at the general officer and senior executive service (SES) level and are not specifically assigned to MDAPs and MAIS programs as intended by the USD(AT&L) memorandum.

Table 3-3. T&E KLPs and Chief Developmental Testers in FY 2013

	Fourth Estate	Army		DON		Air Force		Total
	Civilian	Civilian	Military	Civilian	Military	Civilian	Military	
KLPs (All Positions)	4	9	1	47	0	7	5	73
Chief Developmental Testers	1*	6*	0*	46*	0	0*	0*	53

*DoD Components are working to identify qualified Chief Developmental Testers to meet the requirements described in the USD(AT&L) memorandum.

Next Steps. DASD(DT&E) will continue to monitor DoD Component progress in designating Chief Developmental Testers as T&E KLPs for MDAPs and MAIS programs. 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 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 2013 budget and associated staff allocated to carry out assigned responsibilities.

The FY 2013 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))." The additional funds provided by the FY 2013 appropriation allowed DASD(DT&E) to fund the STAT in T&E COE, described in section 2.5.6 of this report, and other projects.

Table 4-1. DASD(DT&E) FY 2013 Budget ($K)

Program Element	FY 2013 President's Budget	FY 2013 Appropriation
0605804D8Z	$15,110	$20,110

DASD(DT&E) executes its statutory responsibilities with a professional staff of 16 Government personnel. Table 4-2 provides the DASD(DT&E) Government workforce and contractor support. Organic staff of the DASD(DT&E) office is the DASD(DT&E), one SES Principal Deputy (vacant), one Military Staff director, five 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 oversight of 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	8	4	12
Military	1	3	4
Contractor/FFRDC Support	53	0	53
Total			69*

*The SES Principal Deputy position is vacant and not included in the above total. DASD(DT&E) planned staffing level is 70.

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 testing and evaluation issues to the Chief Developmental Tester for the program.
- Conducting developmental testing and evaluation 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 the 29 MDAPs being assessed as part of this report. To assess the adequacy of resources available to the Lead DT&E Organizations, DASD(DT&E) requested that each of those MDAPs provide detailed responses to the following:

- Describe the T&E expertise and capabilities (ranges, instrumentation, etc.) needed by the program office to support the MDAP.
- Describe how the Lead DT&E Organization is providing the expertise (e.g., personnel) and capabilities. Describe any gaps in the Lead DT&E Organization and any other participating test organizations supporting the Lead DT&E Organization.
- Identify funding for the Lead DT&E Organization to conduct the DT&E activities for the MDAP (FY 2013 and FY 2014).
- Provide program office comments on the adequacy of the Lead DT&E Organization and any future concerns about this organization.

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

Program Name	Lead DT&E Organization
ARMY	
Armored Multi-Purpose Vehicle (AMPV)	ATEC MSED
Excalibur M982E1 Precision Engagement Projectiles	ATEC AFED
Ground Combat Vehicle (GCV) – Infantry Fighting Vehicle (IFV)	ATEC MSED
Guided Multiple Launch Rocket System–Alternative Warhead (GMLRS-AW)	ATEC AFED
Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155)	ATEC C4ISRED
Handheld, Manpack, and Small Form Fit (HMS) Rifleman Radio (RR) (AN/PRC-154 and AN/PRC-154A Secret and Below (SAB))	ATEC C4ISRED
M109 Family of Vehicles, Paladin Integrated Management (PIM) Self-Propelled Howitzer (SPH) and Carrier, Ammunition, Tracked (CAT) Vehicle	ATEC AFED
Phased Array Tracking Radar to Intercept of Target (PATRIOT)	ATEC AFED
Warfighter Information Network–Tactical (WIN-T) Increment 2 (Inc 2)	ATEC C4ISRED
NAVY	
Air Intercept Missile-9X (AIM-9X) Block II	NAWCWD VX-31
CH-53K Heavy-Lift Replacement Helicopter	NAWCAD HX-21
Cobra Judy Replacement (CJR)	PEO IWS 2I
GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)	PMS 378T
Ground/Air Task Oriented Radar (G/ATOR)	NSWC Crane (Fallbrook)
Joint Precision Approach and Landing System (JPALS)	NAWCAD, AIR 5.1.1
Littoral Combat Ship (LCS)	NSWC PHD
Mobile User Objective System (MUOS)	SPAWAR SSC PAC
MQ-4C Triton Unmanned Aircraft System (UAS)	NAWCAD VX-20
Multi-Mission Maritime Aircraft (P-8A Poseidon)	NAWCAD VX-20
U.S. Navy Integrated Air and Missile Defense (IAMD) Using Air and Missile Defense Radar (AMDR), DDG-51 Flight III Destroyer, and Aegis Modernization Programs; Naval Integrated Fire Control–Counter Air (NIFC-CA)* Capability Using Aegis Modernization, Cooperative Engagement Capability (CEC), and Standard Missile-6 (SM-6) Programs	NSWC PHD for NIFC-CA From-the-Sea (FTS) Capability and NAWC AD/WD for NIFC-CA From-the-Air (FTA) Capability
AIR FORCE	
Global Positioning System (GPS) Enterprise	SMC/GPE
HC/MC-130 Recapitalization	96th Test Wing
KC-46A Tanker Modernization	412th Test Wing
MQ-9 Reaper	AFLCMC/WI
RQ-4B Global Hawk	412th Test Wing
Small Diameter Bomb Increment II (SDB II)	96th Test Wing
Space-Based Infrared System High Component (SBIRS High)	SMC/ISET
DoD	
Ballistic Missile Defense System (BMDS)	MDA/DT
F-35 Joint Strike Fighter (JSF)	NAWCAD VX-23 412th Test Wing
Joint Light Tactical Vehicle (JLTV)	ATEC MSED

*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 assessments in Tables 4-4 through 4-7 used all available information to address 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 Mounted Systems Evaluation Directorate (MSED), Aviation-Fires Evaluation Directorate (AFED), and C4ISR Evaluation Directorate (C4ISRED). 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 MDAPs	Assessment
ATEC MSED	• AMPV • GCV-IFV • JLTV	DASD(DT&E) assesses that the resources for MSED are adequate to support near-term priorities. For the AMPV program, the PM has noted that no gaps have been identified. For the GCV-IFV program, the PM has noted that MSED identified the need to have gunnery positions at the technical test center that mimic the operational positions to facilitate Soldier operations in DT. For the JLTV program, the PM has noted that ATEC does not have a roof-crush facility capable of testing to the Society of Automotive Engineers Standard listed in the JLTV RFP. A private industry facility is being used to conduct testing.
ATEC AFED	• Excalibur M982E1 Precision Engagement Projectiles • GMLRS-AW • M109 Family of Vehicles, PIM SPH and CAT Vehicle • PATRIOT	DASD(DT&E) assesses that the resources for AFED are adequate to support near-term priorities. No gaps have been identified. For the PATRIOT program, the PM has identified a future potential gap. The loss of the PATRIOT test battalion in FY 2014 may force testing to occur on fewer pieces of equipment, thus potentially extending the duration of testing.
ATEC C4ISRED	• HMS MP Radio (AN/PRC-155) • HMS RR (AN/PRC-154 and AN/PRC-154A SAB) • WIN-T Increment 2	DASD(DT&E) assesses that the resources for C4ISRED are adequate to support near-term priorities. No gaps have been identified; however, some difficulties and challenges in testing have been identified. The PM has indicated that EPG has not offered consistent instrumentation solutions for HMS products, making it difficult to characterize system performance and provide reliable data sets to the stakeholders. The PM has noted that EPG is not co-located with the program office, making coordination for testing difficult. Currently, the program office and ATEC HQ are located at Aberdeen Proving Ground (APG), Maryland, with some of the OSD stakeholders in the Washington, DC

Lead DT&E Organization	Supported MDAPs	Assessment
		area. Maintaining a test capability at APG would enhance test oversight and reduce travel costs.

4.2.2.2 Navy Lead DT&E Organizations

The Navy Lead DT&E Organizations include program offices, warfare centers, and PEOs. They include PEO for Integrated Warfare Systems (IWS) 2I; Naval Air Warfare Center, Weapons Division (NAWCWD), Naval Air Test and Evaluation Squadron Three One (VX-31); Naval Air Warfare Center, Aircraft Division (NAWCAD), Naval Rotary-Wing Aircraft Test and Evaluation Squadron Two One (HX-21); Naval Surface Warfare Center (NSWC), Crane Division (Fallbrook Detachment); NAWCAD, AIR 5.1.1; NSWC, Port Hueneme Division (PHD); NAWCAD, Naval Air Test and Evaluation Squadron Twenty (VX-20); Space and Naval Warfare Systems Command (SPAWAR) Systems Center Pacific (SSC PAC); NAWCAD, Air Test and Evaluation Squadron Twenty-Three (VX-23); PMS 378T; and NAWC AD/WD.

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

Lead DT&E Organization	Supported MDAPs	Assessment
PEO IWS 2I	CJR	DASD(DT&E) assesses that the resources for PEO IWS 2I are adequate to support near-term priorities. No gaps have been identified. The CJR program completed DT&E in FY 2013.
NAWCWD VX-31	AIM-9X Block II	DASD(DT&E) assesses that the resources for NAWCWD VX-31 are adequate to support near-term priorities. No gaps have been identified.
NAWCAD HX-21	CH-53K Heavy-Lift Replacement Helicopter	DASD(DT&E) assesses that the resources for NAWCAD HX-21 are adequate to support near-term priorities. No gaps have been identified.
NSWC Crane (Fallbrook)	G/ATOR	DASD(DT&E) assesses that the resources for NSWC Crane (Fallbrook) are adequate to support near-term priorities. No gaps have been identified.
NAWCAD AIR 5.1.1	JPALS	DASD(DT&E) assesses that the resources for NAWCAD AIR 5.1.1 are adequate to support near-term priorities. No gaps have been identified.
NSWC PHD	• LCS Seaframes • LCS Mission Modules (MMs) • NIFC-CA (FTS Capability)	DASD(DT&E) assesses that the resources for NSWC PHD are adequate to support near-term priorities. No gaps have been identified. NIFC-CA is a project and not an MDAP. The MDAPs within NIFC-CA have their own Lead DT&E Organizations: NSWC PHD for FTS and NAWC AD/WD for FTA.
NAWCAD VX-20	• MQ-4C Triton UAS • P-8A Poseidon	DASD(DT&E) assesses that the resources for NAWCAD VX-20 are adequate to support near-term priorities. No gaps have been identified.
SPAWAR SSC PAC	MUOS	DASD(DT&E) assesses that the resources for SPAWAR SSC PAC are adequate to support near-term priorities. No gaps have been identified.
NAWCAD VX-23	F-35 JSF	DASD(DT&E) assesses that the resources for NAWCAD VX-23 are adequate to support near-term priorities. No gaps have been identified.
PMS 378T	CVN 78	The PMS 378 PM has assigned an organization, PMS 378T, within the program office to act as the Lead DT&E Organization. DASD(DT&E) plans to continue to monitor and review the ability of an organization that is part of the program office to perform the statutory

Lead DT&E Organization	Supported MDAPs	Assessment
		responsibilities of a Lead DT&E Organization. The program office approach is to matrix personnel from other organizations (PEO Carriers, NAVSEA, warfare centers) and other Government agencies, as well as contractor support personnel to perform the responsibilities of a Lead DT&E Organization. This approach may work in the near term, but as the program transitions from ship construction and Participating Acquisition Resource Managers/Land-based Tests (PARM/LBTs) oversight to delivery shipboard testing, the staffing and organization will need to be reviewed and restructured to add resources where required.
NAWC AD/WD	NIFC-CA (FTA Capability)	NIFC-CA is a project and not an MDAP. The MDAPs within NIFC-CA have their own Lead DT&E Organizations: NSWC PHD for FTS and NAWC AD/WD for FTA. DASD(DT&E) assesses that the resources for NAWC AD/WD are adequate to support near-term priorities. No gaps have been identified.

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 GPS Directorate's Systems Engineering Division, SMC (SMC/GPE); 96th Test Wing; 412th Test Wing; Intelligence, Surveillance, and Reconnaissance and Special Operations Forces, AFLCMC, Air Force Materiel Command (AFLCMC/WI); 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 MDAPs	Assessment
SMC/GPE	GPS Enterprise	DASD(DT&E) assesses that the resources for SMC/GPE are adequate to support near-term priorities. No gaps have been identified.
96th Test Wing	• HC/MC-130 Recapitalization • SDB II	DASD(DT&E) assesses that the resources for the 96th Test Wing are adequate to support near-term priorities. Some gaps have been identified. For HC/MC-130 Recapitalization, the 96th Test Wing had all requisite personnel to execute the required planning, testing, and reporting. However, the squadron lacked the number of trained personnel to execute flight test at the pace required for this schedule-driven program. The shortfall was mitigated by including OT organization personnel in the DT&E test execution.
412th Test Wing	• KC-46A Tanker Modernization • RQ-4B Global Hawk • F-35 JSF	DASD(DT&E) assesses that the resources for the 412th Test Wing are adequate to support near-term priorities. No gaps have been identified.
AFLCMC/WI	MQ-9 Reaper	DASD(DT&E) assesses that the resources for AFLCMC/WI are adequate to support near-term priorities. No gaps have been identified.
SMC/ISET	SBIRS High	DASD(DT&E) assesses that the resources for SMC/ISET are adequate to support near-term priorities. No gaps have been identified.

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 (DT), 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 MDAP	Assessment
MDA/DT	BMDS	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 the program office to perform the statutory responsibilities of a Chief Developmental Tester and Lead DT&E Organization. MDA reported concerns about the lack of long-term stability in funding for future years. Consistently changing budget profiles add risk and create uncertainty in the planning for future tests. Future resource reductions may lead to a loss of testing capabilities, impacting execution of required testing to support BMDS planned fielding of systems.

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5 DoD Test Resource Management Center

In FY 2013, 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 the management of the Central Test and Evaluation Investment Program (CTEIP), the Test and Evaluation/Science and Technology (T&E/S&T) Program, and the Joint Mission Environment Test Capability (JMETC) Program. Also in FY 2013, the USD(AT&L) transferred responsibility for the National Cyber Range (NCR) to the TRMC.

5.1 State of the T&E Resources

5.1.1 Strategic Plan

In FY 2013, 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.

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

5.1.2 Budget Certification

The TRMC produced a Budget Certification Report (BCR) containing the Director's analysis of the major FY 2014 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 2013, 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 the assessment of the MRTFB and non-MRTFB T&E capabilities and found 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 2013. The composite DoD Component trends observed during this period include the following:

- The total institutional cost of operating the MRTFB has been relatively stable, declining slightly in FY 2012 and FY 2013.
- The customer-funded workload has increased marginally (+3 percent), while institutional funding has decreased by approximately 10 percent.
- The amount of work done for other DoD Components increased until FY 2010, and then decreased slightly through FY 2013.
- The majority of the work done at a particular 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 68 percent of the workload was from programs managed by the owning DoD Component, and work for other DoD Components was approximately 22 percent. The remaining 10 percent of the total workload was from non-DoD sources.
- Total work years used to operate the MRTFB activities declined by about 5 percent. However, the manpower mix has significantly changed, with military and contractor work years dropping by about 16 percent each over this period, while civilian work years have increased by 23 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 (excluding Military Construction projects) was approximately $450 million to $500 million per year through FY 2009 but has declined to approximately $350 million (constant year FY 2006) per year starting in FY 2011.

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.

5.2 Investment Programs

5.2.1 Central Test and Evaluation Investment Program (CTEIP)

CTEIP provides an enterprise approach for DoD investments in T&E capabilities that meet the test requirements of more than one DoD Component.

During FY 2013, CTEIP continued to make significant progress in the development and deployment of test infrastructure capabilities. In 2013, nine projects were successfully completed, and 33 projects continued in execution. The CTEIP 2013 Annual Report will be published in early 2014 and will contain detailed information on all CTEIP projects.

In FY 2013, advanced EW test capabilities were a substantive focus of analysis, investment, and capability upgrades. Between 2011 and 2013, CTEIP's EW test resource requirements studies highlighted significant increases in EW system design complexity as well as technological advances in potential adversary's threat radar capabilities. Analysis of these technical advances indicated that investments were needed in both EW test ground facility and open-air range infrastructure to support adequate DT/OT of systems such as F-35, Next-Generation Jammer (NGJ), F-15 Eagle Passive/ Active Warning Survivability System (EPAWSS), and B-2 Defensive Management System (DMS). To address the shortfalls, CTEIP has established the Electronic Warfare Test Resource Enhancement Program (EWTREP) as a stand-alone development portfolio to upgrade EW test capabilities at both ground facility and open-air ranges. Systems Integration Laboratory (SIL) and Installed System Test Facility (ISTF) upgrades will expand on the capabilities of the Next-Generation Electronic Warfare Environment Generator (NEWEG) Block B already in CTEIP development. To address the Department's need to realistically represent existing and emerging threats on its open-air range shortfalls, CTEIP initiated the Electronic Warfare Infrastructure Improvement Project (EWIIP) to develop a family of high-power, reprogrammable, relocatable open-loop RF emitter systems that accurately emulate the radar signals of a wide variety of Pacific Rim threat systems. Surface-to-air missile (SAM) simulators that represent the most stressing threats will also be developed under EWIIP. These very high fidelity closed-loop systems will simulate detect, track, and missile fly-out functions and be fielded at the Electronic Combat Range (ECR) in China Lake, California, and the Nevada Test and Training Range (NTTR). Other key investments within CTEIP are summarized below.

- EW Testing. The CTEIP ongoing NEWEG project is developing a multiple jammer characterization system (Block A) and a high-fidelity EW environment generator (Block B). During FY 2013, CTEIP also completed the Radar Missile Gun System (RMGS) project under the Resource Enhancement Project (REP), and the Wideband Configurable Control Jammer (WCCJ) II project under the Threat Systems Project (TSP).
- Net-Centric and Cyber Warfare Testing. During FY 2013, CTEIP fielded the joint command, control, communications, computers, intelligence, surveillance, and reconnaissance (JC4ISR) Interoperability Test and Evaluation Capability (InterTEC) test capability and initiated the Automated Test Case Generator Web Service (ATC-Gen WS). InterTEC provided a network-based test environment and a suite of software tools to support joint testing.

- Space Flight and Strategic Warfare Testing. During FY 2013, CTEIP fielded two capabilities: the Space Threat Assessment Testbed Spiral 1 and the Military Satellite Communications (MILSATCOM) Atmospheric Scintillation Simulator (MASS).
- Safe, Realistic Testing of Large-Footprint Weapons. Flight safety for increasingly smaller, longer range (large footprint) weapons combined with more limited internal space requires development of subminiature flight termination systems. The ongoing Subminiature Flight Termination System (SFSS) project combines previously developed GPS and digital flight termination capabilities with a high-capacity data link in a miniaturized system. SFSS capabilities will be demonstrated on the joint air-to-surface standoff missile (JASSM).
- Spectrum-Efficient Telemetry. The integrated Network Enhanced Telemetry (iNET) project enhances current one-way serial streaming telemetry with a two-way network capability that leverages other ongoing TRMC initiatives to use the newly available C-band bandwidth. (See section 5.3.6 of this report.)
- High-Accuracy Time-Space-Position Information (TSPI). The ongoing CTEIP Common Range Integrated Instrumentation System (CRIIS) project replaces the aging Advanced Range Data System (ARDS) and provides ranges with the capability to collect highly accurate TSPI (i.e., less than 1 meter) and selected aircraft data bus information via a spectrally efficient data link. The CTEIP ongoing Advanced Range Tracking and Imaging System (ARTIS) project improves optical tracking capability to observe and record performance (including TSPI) of aircraft or surface-launched missiles and munitions during launch, fly-out, and endgame phases of testing, and provides a replacement for the 40-year-old optical tracking systems, such as Kineto Tracking Mounts (KTMs), in use today.
- Aircraft Survivability. In FY 2013, CTEIP REP also began development of the Joint Standard Instrumentation Suite (JSIS) project that measures and collects signature, TSPI, and related data of threat missile and hostile fire munitions (e.g., small arms and rocket-propelled grenades) firings.
- Unmanned Autonomous System (UAS) Testing. To establish a road map for investments, CTEIP completed the Autonomous Systems T&E Requirements Study (ASTERS) during FY 2013 to assess the current state of autonomous ground vehicle (AGV) T&E capabilities. This study is currently being used by the Tri-Service Reliance Panels to develop FY 2016 and beyond test capability solutions that will be integrated into Service Program Objective Memorandums (POMs) and project nominations to the TRMC.
- Urban Test Environments. In FY 2013, CTEIP REP initiated the C2 and Urban Background Environment Simulator (CUBES) project. CUBES will develop an ISTF capability for high-density, open-loop simulated urban background communications band signals, as well as provide a limited number of closed-loop signals of interest for electronic support measures and communications jamming purposes.

5.2.2 T&E/S&T Program

The T&E/S&T Program seeks out and 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. The T&E/S&T Program 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 EW Testing, Cyberspace Testing, Net-Centric Systems Testing, High-Speed Systems Testing, Directed Energy Testing, UAS Testing, Advanced Instrumentation Systems Technology, and Spectrum-Efficient Technology.

The T&E/S&T Program also advances OSD 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.

Recent Technology Transitions

- **Improving Supersonic Weapon Separation Testing**. The High-Speed Systems Test Technology Area transitioned a prototype high-temperature, six-degree-of-freedom balance-and-strain gauge capable of supporting weapon separation testing in wind tunnels with speeds up to Mach 4. This technology was transitioned into wind tunnels at the Arnold Engineering Development Center (AEDC), Air Force Research Laboratory, National Aeronautics and Space Administration (NASA) Glenn Research Center, and NASA Langley Research Center.
- **Improving High-Energy Laser (HEL) Weapon Testing**. The Directed Energy Test Technology Area transitioned a prototype HEL sensor array to the High-Energy Laser Systems Test Facility (HELSTF). The sensor array was used by HELSTF to support an HEL Joint Technology Office counter-intelligence, surveillance, and reconnaissance unmanned aerial vehicle (UAV) test, the first nondestructive test using an instrumented tactical class UAV. The sensors provided previously unavailable data that were used to improve the Army/Defense Advanced Research Projects Agency (DARPA) Solid-State Laser Mobile Demonstrator (SSL MD) M&S codes.
- **Improving IRCM Testing**. The EW Test Technology Area delivered to the Air Combat Environment Test and Evaluation Facility (ACETEF), Patuxent River, Maryland, a high-power laser target board for testing directed infrared countermeasures (DIRCM) jam laser performance. This technology is key to enabling ISTF T&E of DIRCM laser pointing accuracy.
- **Improving Quality of DoD Range Telemetry**. The Spectrum Efficient Test Technology Area transitioned policy-based quality-of-service (QoS) software to the CTEIP iNET project to support development of the iNET Network Telemetry Link Manager System. The QoS software enhances network telemetry link throughput by prioritizing data packets, transmitting higher priority data first, and recording lower priority data onboard the test platform.

Significant Ongoing Technology Developments

- **Improving Cyberspace Testing**. The Cyberspace Test Technology Area is developing a prototype tool to automate advanced cyberspace threat representations for use in testing system vulnerabilities. This technology will rapidly analyze threats, identify trends, and formulate cyber threat representations adequate for a test environment.
- **Improving IRCM Systems Testing**. The EW Test Technology Area is developing a two-color superlattice light-emitting diode to more realistically test IRCM systems in DoD ISTFs. This technology will reduce the risk for the CTEIP Joint Distributed IRCM Ground-Test System (JDIGS) project at ACETEF, Patuxent River, Maryland.
- **Improving Radar and Electronic Countermeasures Testing**. The EW Test Technology Area is developing a digital radio-frequency memory (DRFM) algorithm that generates more independent false targets than existing, statically allocated schemes. This technology will significantly improve the testing of radars that need to detect and track large numbers of targets, as well as reactions to DRFM-based jamming.
- **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 HELs.** The Directed Energy Test Technology Area is developing an HEL predictive avoidance tool for open-air test ranges. Consistent with DoD probabilistic-based practices (i.e., MIL-STD-882E), this test tool will generate a risk assessment to personnel, aircraft, sensors, and satellites for the HEL test event, identifying safe test time windows for a given test configuration.
- **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 NAWCWD, Point Mugu, California.
- **Improving Behavior Prediction for Autonomous System Testing**. The UAS Test Technology Area is developing stress-testing for UAS software that reveals behavior performance failures within the system. This technology supports testing of the Autonomous Mobility Appliqué System (AMAS) Joint Capability Technology Demonstration (JCTD) at Aberdeen Test Center (ATC).
- **Improving Data Collection in Harsh Environments**. The Advanced Instrumentation Systems Test Technology Area is developing a fiber-optic instrumentation suite to integrate into test projectiles to measure magnetic field strength in the harsh environment of an electromagnetic railgun (EMRG) test firing at the Naval Surface Warfare Center, Dahlgren Division.

Areas of Emerging Significance or Greater Emphasis

Beyond the ongoing test technology development in all eight Test Technology Areas, the T&E/S&T Program is refining test technology road maps in response to expanded DoD emphasis on EW, cyberspace, and autonomous warfighting capabilities, which exceed current test infrastructure capabilities.

5.2.3 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 seventh 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.

In FY 2013, JMETC continued to make progress in accomplishing the objectives of the Testing in a Joint Environment Roadmap. Summarized below are the FY 2013 highlights of JMETC contribution:

- Expanded the JMETC persistent infrastructure to 72 sites, with an additional 15 sites planned. Increased network connectivity to industry and academia with the addition of peering points to the MITRE Corporation, Georgia Tech Research Institute (GTRI), and Lockheed Martin Corporation.
- Supported 48 distinct customer distributed Live-Virtual-Constructive (LVC) test activities to DoD acquisition programs and events.
- Increased JMETC customer base to include P-8A Poseidon (Increment 3), Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS), EMRG, Three-Dimensional Expeditionary Long-Range Radar (3DELRR), Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW), Advanced Anti-Radiation Guided Missile (AARGM), and JMS.
- Supported the Joint Integrated Air and Missile Defense Organization (JIAMDO) in the successful renegotiation of the international agreement between the United States and the United Kingdom for Correlation/Decorrelation Interoperability Test (C/DIT).
- Collaborated with and supported the DoD Joint Tactical Networking Center (JTNC) in the development of an RF-over-fiber capability to digitize and extend an RF signal over the JMETC network, enabling remote radio play in geographically separated networks.
- Enabled the test-analyze-fix-test process of the Navy's Aegis baselining software during multiple iterations of the Aegis Accelerated Midterm Interoperability Improvement Program as risk reduction for verification before at-sea OT.
- Continued active participation in the DoD Information Assurance Certification and Accreditation Process (DIACAP) Technical Advisory Group (TAG), composed of senior Service and Defense Agency IA personnel, to enact changes in upcoming revisions of IA policy to address the unique challenges posed by the dynamic nature of the RDT&E community's mission.

- Assisted and supported customers with distributed test tools and expertise for planning and executing their distributed events.

Cyberspace T&E

In FY 2013, JMETC continued efforts to build and sustain the infrastructure to support current and future cyberspace T&E requirements. Significant highlights of these activities include the following:

- Continued participation in assessments of the adequacy of T&E resources to address the Nation's cyber threats across the four major thrust areas of T&E policy, T&E methodologies, T&E infrastructure, and workforce qualifications.
- Initiated the Cyber Range Interoperability Standards (CRIS) effort, developing a common lexicon and a standard cyber test process and beginning the effort to prioritize needed standards that will result in efficiencies through improved interoperability and scalability. This effort was executed through participation by representatives from across the cyber range community.
- Worked with DASD(DT&E), the Army Threat Systems Management Office, and the Air Force 96th Test Wing to conduct an Interoperability Test and Evaluation Capability (InterTEC) Cyber Event (ICE). This cyber test event proved that the infrastructure is adequate to test a C2 system. However, it also pointed out the significant need for improvements in areas such as event planning and involvement of the red team in planning, red and blue environments, cyber test instrumentation, and a cyber visualization capability.
- Deployed the first of several production Regional Service Delivery Points (RSDPs). Each RSDP operates at multiple independent levels of security and consists of (nominally) seven computer racks providing computing power (servers), storage capability, automated system management capability, and network connectivity. The first system resides at Redstone Arsenal, Alabama, and will provide enterprise resources for computing, storage, and common services. JMETC funded the development of the second RSDP, which will provide increased capacity for cyber test and training. The RSDPs will also promote efficiencies by providing enterprise services, such as realistic traffic generation, visualization tools, instrumentation, and other tools.
- Developed Cyber T&E Use Cases, a set of operational and system architecture driven products, that help identify potential threat vectors and test concepts needed to identify cyber T&E infrastructure requirements for testing representative C2 systems, combat systems, weapon systems, and business IT systems.
- Initiated planning for significant distributed test infrastructure enhancements that will support multiple, concurrent classification up to and including top secret (TS)/sensitive compartmented information (SCI), with a focus on leveraging the RSDP capabilities and incorporating both kinetic and non-kinetic assets to address growing interoperability and cyber T&E requirements.

5.2.4 National Cyber Range (NCR)

In FY 2013, the USD(AT&L) transferred responsibility for the NCR to the TRMC. The JMETC Program Manager is now also the Director of the NCR. Located in Orlando, Florida, the NCR is a cyber-test facility, a majority of which is a fully accredited sensitive compartmented information facility (SCIF). The facility is composed of an array of servers, networking and storage devices, and

an integrated tool suite. Considerable technological advancements were incorporated into the integrated tool suite, which is highlighted by the significant level of automation and the ability to support up to four concurrent events, executed in completely isolated test beds, at different levels of classification.

Highlights of significant NCR accomplishments in FY 2013 include the following:

- The NCR received authority to operate at the TS/SCI/special access program (SAP)/special access requirement (SAR) level through the Defense Intelligence Agency (DIA) Authorizing Official.
- NCR supported users in FY 2013 included DOT&E, U.S. Pacific Command, U.S. Cyber Command, other Defense Agencies, and DoD development programs. Their objectives included testing for vulnerabilities, scalability, malware propagation, and effective defenses. Even though the primary focus has been on functionalizing, refining, and accrediting the capabilities, the NCR conducted eight events through August 2013.
- Studies of NCR automated tools were conducted to assess their utility to the cyber T&E community with a view toward providing the tools as cloud-based services at RSDPs.
- The NCR coordinated with Government, industry, and academia to assess cyber tools that could be integrated into the NCR to expand the range's capabilities for threat generation, traffic generation, and visualization.

5.3 Other Significant Activities

5.3.1 Workforce Development

The TRMC launched its first-ever comprehensive internship program in collaboration with NAVAIR, Patuxent River, during the summer of 2013. The TRMC STEM Internship Program was established to support undergraduate and graduate students pursuing STEM-related degrees at historically black colleges and universities (HBCUs) and minority-serving institutions (MSIs). The internship program successfully recruited more than 40 qualified HBCU/MSI students who spent the summer learning about T&E through hands-on projects with TRMC partners nationwide, including DoD test ranges, industry, and academia. This year's program immediately impacted the workforce depth at White Sands Missile Range (WSMR), New Mexico, with the extension of five co-op offers to maintain employment on key existing programs. Successful internships will help promote employment in T&E and shore up the gaps resulting from attrition of key talent across the range. Concurrently, the TRMC has developed focused investments at several HBCUs and MSIs to support their growth in test technology development for DoD.

5.3.2 Hypersonic Study

The FY 2013 NDAA called for the Director of the Office of Science and Technology Policy (OSTP) to conduct a study, in conjunction with the Secretary of Defense and Administrator of NASA, 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 the

Secretary of Defense to submit 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 July 1, 2014.

5.3.3 Fifth-Generation Threat Requirements Study

The TRMC has noted that broad agreement exists within the weapon system community on the need for a representative threat capability to test against fifth-generation threat aircraft. However, there are considerable long-standing differences on threat emulation requirements and current threat simulation capability gaps. The TRMC is conducting a Service-coordinated study intended to produce validated user community needs for emulating fifth-generation aerial threats.

5.3.4 TEMP Review Process

The TRMC provided TEMP assessment of the test resources required to complete T&E for more than 50 defense acquisition programs in 2013. This review assessed the adequacy of test resources documented in the TEMP, including test infrastructure, distributed testing, interoperability, and cyberspace T&E resources. This test resource assessment provided feedback to program offices to improve documentation in the TEMP on test resources needed to successfully complete T&E and identified several test infrastructure areas of interest for further TRMC study.

5.3.5 Range Sustainability

Range sustainability is a comprehensive approach to preserving test capabilities by actively managing resources to ensure that the required capabilities are available to meet test requirements. Competition for finite land, air, sea, and spectrum resources is imposing ever-increasing challenges to the test community, and the TRMC is responding accordingly. Traditionally, endangered species protection, cultural preservation, and urban sprawl have been the predominate issues threatening range capability. Although these issues persist, issues such as competition for frequency spectrum and renewable energy siting conflicts are posing an even greater threat to the operation and capabilities of test ranges.

The TRMC has dedicated additional resources to become a persistent value-added presence for addressing sustainability issues and their impacts on DoD test ranges and facilities and helping to develop mitigation strategies. The TRMC is also actively involved in efforts to implement the DoD Electromagnetic Spectrum Strategy to meet the emerging DoD mission requirements and to address the challenges of maintaining spectrum access in view of an ever-growing consumer demand for new and innovative wireless commercial services and applications.

During the second half of FY 2013, the TRMC completed 41 reviews of proposed energy infrastructure projects and served as the Department’s functional expert on several teams working with developers to mitigate incompatible effects of energy infrastructure development with testing infrastructure.

5.3.6 Compression of Aeronautical Telemetry Operations in 1755–1780 Megahertz

The TRMC is the lead organization for RF spectrum-related policy actions for the DoD T&E community. The TRMC objective is to ensure continued access to adequate RF spectrum resources to properly conduct current and future planned test activities.

As part of the President's National Broadband Initiative to make 500 megahertz of Federal spectrum available to industry, one of the first RF bands identified for reallocation is the 1755–1850 megahertz band (upper L-band); this band is used to support many DoD operations including aeronautical mobile telemetry (AMT). As opposed to reallocation of the entire portion of RF spectrum, the DoD CIO outlined an alternate proposal to proceed with the auction of the 1755–1780 megahertz portion of the upper L-band and compress AMT operations into the remaining portion of the upper L-band (1780–1850 megahertz). Additional DoD systems are affected by this proposal but are not within the purview of the TRMC (e.g., air combat training system (ACTS), tactical targeting network technology (TTNT), precision-guided munitions (PGMs)). As part of the proposal, $100 million would be allocated to cover reallocation and compression costs for the four systems, including AMT.

In conjunction with the Service T&E Executives and the Office of the DoD CIO, the TRMC formed a tiger team composed of a subset of MRTFB spectrum managers, telemetry engineers, and RF engineers, as well as representatives from each of the Service headquarters.

The objective of the tiger team was to (1) determine whether it is possible for the MRTFB to compress AMT operations as outlined in the DoD CIO proposal, (2) determine whether the $100 million in funding is adequate to cover the costs to compress the AMT operations into the 1780–1850 megahertz band, and (3) identify any additional technical concerns/challenges associated with the proposal.

In response to the DoD CIO proposal, the TRMC provided the following findings and determinations:

- The DoD MRTFB is able to compress AMT operations into the 1780–1850 megahertz portion of the upper L-band.
- The allocated $100 million to cover compression/relocation costs for the four systems, including AMT, is insufficient to cover the compression costs for AMT alone; for the subset of MRTFB ranges included in the analysis, this cost is in excess of $170 million.
- As outlined, the proposal does not address protection of AMT systems from out-of-band interference and emissions in both the 1780–1850 megahertz and the 2200–2290 megahertz bands based on the pairing of 1755–1780 megahertz and 2155–2180 megahertz for the auction; the DoD will require protection levels in accordance with International Telecommunication Union Recommendation (ITU-R) M.1459.

The data gathered by the tiger team enabled the DoD CIO and TRMC, in partnership, to develop mitigation strategies for the cost and out-of-band interference concerns listed above, which led to the satisfactory resolution of both issues in CY 2013.

5.3.7 Nuclear Weapons Effects (NWE) T&E Infrastructure

The TRMC is actively involved with the Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (ASD(NCB)) in several Secretary of Defense-directed initiatives to improve the Department's oversight of the nuclear enterprise and nuclear survivability posture. These initiatives include the following:

- The TRMC serves in a Government advisory role to the Defense Science Board Task Force (DSB/TF) on the Survivability of DoD Systems and Assets to Electromagnetic Pulse (EMP) and Other NWE.
- The TRMC participates in the Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Oversight Group (CSOG) to develop DoD nuclear survivability instructions and identify mission-critical systems with CBRN "operate through" requirements and survivability to NWEs including EMP. To date, the Services have identified 497 CBRN mission-critical systems.
- The TRMC and the Defense Threat Reduction Agency (DTRA) co-chair the T&E Sub-Group, which includes representatives from OSD offices, the Services, Defense Agencies, and the Department of Energy National Nuclear Security Administration (NNSA). This sub-group focuses on the NWE T&E resources that the Services may need to assess system survivability and vulnerability.

The outputs of these groups inform future Strategic Plans. The TRMC is also developing an EMP/high-power microwave (HPM) T&E infrastructure assessment for Congress that will identify capabilities, needs, and gaps in T&E capability as required by the H.R. 1960 NDAA for FY 2014.

6 PROGRAM ENGAGEMENT AND ASSESSMENTS

The FY 2013 Annual Report highlights the engagement activities and assessments of 35 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 DT&E assessments, first test flight, completed system integration lab testing, completed ground testing, and dedicated Government DT&E. For those programs that received a DT&E assessment during the fiscal year, a separate paragraph highlighting the findings and recommendations of that assessment is included. None of the programs in this report requested a deviation or a waiver from the TEMP. Assessments are as of the end of FY 2013 (September 30, 2013); however, some assessments may include information on program status through the 1st quarter FY 2014 (December 31, 2013).

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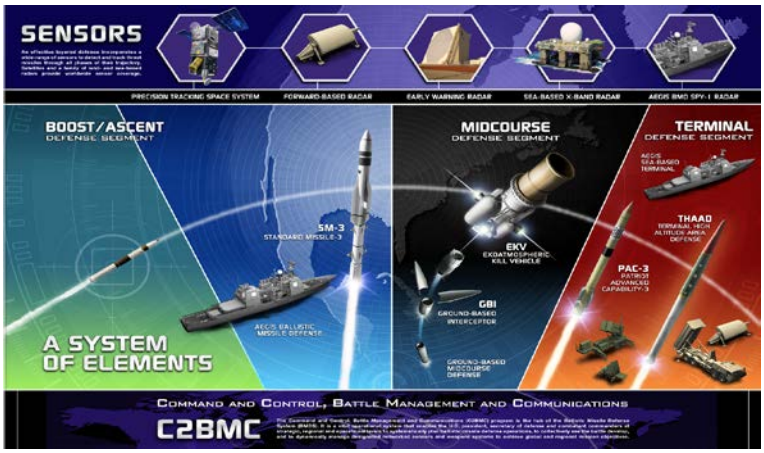
6.1 DoD Programs

This section includes summaries of the following 5 programs:

- Ballistic Missile Defense System (BMDS)
- F-35 Joint Strike Fighter (JSF)
- Joint Light Tactical Vehicle (JLTV)
- Public Key Infrastructure (PKI) 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 (C2BMC) system that networks, integrates, and synchronizes missile defense systems operations, providing the Warfighter with the needed links between the sensors and weapon systems.

Lead DT&E Organization: Missile Defense Agency, Director for Test (MDA/DT)

Summary of FY 2013 DT&E Activities

- November 19–30, 2012, MDA completed a hardware-in-the-loop (HWIL) ground test involving the Army-Navy Ground Transportable Radar Surveillance (AN/TPY-2) and Aegis Ballistic Missile Defense (BMD) 4.0.2. to assess search fence AN/TPY-2 capability using Southwest Asia scenarios with short- and medium-range ballistic missile threats.
- January 26, 2013, MDA conducted a three-stage ground-based interceptor (GBI) only, non-intercept flight test using a Capability Enhancement-II (CE-II) Exoatmospheric Kill Vehicle (EKV).
- February 8, 2013, MDA conducted an HWIL ground test involving Aegis BMD 4.0.1 and Ground-based Midcourse Defense (GMD) Fire Control (GFC) 6B1.5 to assess interoperability.
- February 12, 2013, Aegis BMD conducted a lethal intercept of a target with medium-range ballistic missile (MRBM) characteristics, launch-on-remote doctrine, Aegis BMD 4.0.2, and a Standard Missile-3 (SM-3) Block IA missile.
- February 2013, MDA completed a distributed ground test involving an AN/TPY-2 and associated C2BMC to evaluate the capability to augment existing combatant command BMDS capability.
- April 14–May 23, 2013, MDA completed an HWIL test using the 10V Space Chamber to assess EKV discrimination performance.
- April 22–25 and September 27–October 2, 2013, MDA completed an HWIL ground test involving Terminal High-Altitude Area Defense (THAAD), C2BMC, and AN/TPY-2 software updates to assess the capability to perform debris mitigation.
- May 15, 2013, Aegis BMD conducted a lethal engagement of a complex separating short-range ballistic missile (SRBM) target with Aegis BMD 4.0.2 and an SM-3 Block IB missile.
- July 5, 2013, MDA attempted an intercept of an intermediate-range ballistic missile class target exercising a long interceptor time of flight, medium closing velocity engagement, and EKV functions to discriminate the lethal object from a representative target scene.

- August 13–20, 2013, MDA completed an HWIL test to assess sea-based X-band radar.
- August 29–September 6, 2013, MDA completed a system-level post-flight reconstruction ground test to support Aegis BMD, AN/TPY-2, C2BMC, joint tactical ground station, PATRIOT, SBIRS, and THAAD HWIL M&S validation.
- September 18, 2013, Aegis BMD conducted a lethal engagement of a complex SRBM target with Aegis BMD 4.0.2 and an SM-3 Block IB missile using a salvo size 2 firing policy.
- October 3, 2013, Aegis BMD conducted a lethal engagement of an MRBM target using Aegis BMD 4.0.2 and an SM-3 Block IB missile.

Summary of FY 2013 DT&E Engagement and Assessments

- In response to a DASD(DT&E) request, MDA presented briefings describing its DT&E process. The briefings described how MDA develops an integrated master assessment plan (IMAP) that identifies system assessment requirements to address Integrated Master Test Plan (IMTP) ground test activities and develops critical engagement conditions and empirical measurement events that address flight test parameters required to support M&S development. The IMAP/IMTP begins to define a closed-loop process in which M&S, system requirements, and test planning are affected by the assessment results. MDA has agreed to complete a decision-planning-testing-assessing cycle to ensure that adequate information is provided to support acquisition, programmatic, and technical decisions. DASD(DT&E) will assist MDA with the development of an evaluation framework to achieve this.
- M&S is critical to making informed decisions on technical maturity, risk, and system performance. To this point, DASD(DT&E) and MDA have initiated an effort that examines how specific M&S and ground testing events can support technical and programmatic decisions.
- In the FY 2011 and FY 2012 annual reports to Congress, DASD(DT&E) identified issues concerning GBI flight tests and, more specifically, the Failure Review Board (FRB) findings. During 2013, DASD(DT&E) and DASD(SE) attended GBI FRB meetings, which continue to occur. MDA has pledged to provide additional data/reports to better assess BMDS performance and reliability.
- The Aegis BMD system completed the necessary ground and flight T&E to support a production decision for SM-3 Block IBs. The T&E includes successful intercept tests conducted on May 15, September 18, and October 4, 2013. Investigation into an inflight interceptor failure that occurred during the September 18 event is ongoing.
- MDA is not required to have a TEMP at the BMDS level and therefore did not request any waivers or deviations.

F-35 Joint Strike Fighter (JSF)

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 fourth year of a 7-year DT program. To date, 18 DT test aircraft have been delivered to the 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) to Edwards Air Force Flight Test Center, and five F-35B STOVL variants and four F-35C CVs to Naval Air Warfare Center, Patuxent River, Maryland.

The program is approaching the midpoint in execution with roughly 46 percent of the nearly 70,000 planned flight test points flown mainly in the Block 2 envelope and Block 2B mission systems testing. Overall, Block 2B flight test and test point closure are behind that planned for 2013 with flight sciences test execution nearly at the planned schedule, but mission systems test execution is notably behind due primarily to late software delivery to flight test and exceeding the projected test point re-fly rate due to growth. With the majority of Block 2B functionality just delivered in October 2013, there remains significant opportunity for discovery throughout 2014. Although nearly all of the major technical issues examined in separate Department assessments have an identified way ahead, all are behind in their originally projected verification through test.

Lead DT&E Organization: 412th Test Wing; NAWCAD Air Test and Evaluation Squadron Twenty-Three (VX-23)

Summary of FY 2013 DT&E Activities

- During FY 2013, the test program accomplished the following:
  - Completed LRIP 4/5 flight envelope and Block 2A mission systems test requirements for release to the Integrated Training Center.
  - Completed the second F-35B shipboard compatibility, envelope, and maintenance evaluations onboard USS WASP; completed 95 vertical landings and 94 short takeoffs including night compatibility tests.
  - Conducted F-35C carrier suitability, catapult compatibility, and launch and arrestment loads tests to support the arresting hook system (AHS) redesign.
  - Started high-angle-of-attack testing.
  - Conducted airborne weapon separation testing on all F-35 variants and initiated live weapons delivery accuracy testing.
  - Completed Block 2A mission systems testing, including initial night/instrument meteorological conditions capability with Block 2A mission systems.
  - Completed first life (8,000 hours) durability testing on all three variants. STOVL test article testing has been suspended pending root cause analysis of a bulkhead failure.
  - Completed first weapon delivery events of GBU-12, GBU-32, and AIM-120.
  - Completed first four-ship mission with all three variants exchanging information via the multifunction advanced datalink (MADL) system.

Summary of FY 2013 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 JSF against current and planned threats. Specific DASD(DT&E) engagement in FY 2013 included the following:
  - Completed an Installed System Test Facility (ISTF) study and its assessments for a separate Threat Tiger Team study for future test infrastructure investment.
  - Developed, in coordination with the DOT&E, a plan and achieved Department approval for urgently needed investments to Air Force and Navy test chambers and open-air ranges to support adequate testing of JSF as well as all future fighters and EW systems.
  - Led the test focus area assessment, for the USD(AT&L), of key technical issues likely to affect completion of the development program and production increase.
  - Assessed and assisted the program and Service test teams in developing more executable revisions to the test program and flight test schedule, which were incorporated into the revised TEMP that DASD(DT&E) approved for DT adequacy in May 2013.
- The program is meeting projected fly rates at this stage of test execution with roughly 46 percent of the nearly 70,000 planned flight test points flown mainly in the Block 2 envelope and Block 2B mission systems functionality.
- Although flight test execution at the two primary test sites is meeting planned fly rates, 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, two aircraft groundings, late software delivery to flight test, and sequestration furloughs. For example, Block 2B software was delivered 4 months late to flight test resulting in a commensurate slip in test.
- Block 2B flight test and test point closure are behind the 2013 plan. Although flight sciences execution is nearly at the planned schedule, mission systems execution is 30 percent below the 2013 plan compounded by a test point growth. Risk to Block 2B DT execution is expected to rise in 2014 as the complexity of mission system testing increases.
- Nearly all of the major technical issues examined in separate Department assessments have an identified way ahead, though all are behind in their originally projected verification through test.
- Full-scale ground durability testing is in various stages of completion with F-35A at 8,000 hours (50 percent complete); F-35B at just over 9,000 hours (57 percent complete); and F-35C at 8,000 hours (50 percent complete) with structural deficiencies being uncovered commensurate with those predicted, though in the case of F-35B, a recent major bulkhead crack is currently under investigation. The implications of this event relate primarily to production aircraft.
- Performance across all variants is significantly below the planned reliability growth curves (RGCs) 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.
- Sequester and Government furlough related reductions have had some near-term impact to test execution, though software delivery remains the key pacing item for flight test.
- The Autonomic Logistics Information System (ALIS) is currently behind in development, with version 1.0.3 delivered to the field with major issues. Stable ALIS operability with commensurate spare parts availability is a significant factor in maintaining efficient flight test execution. ALIS version 2.0.1 to support Block 2B fleet delivery is behind schedule.
- The F-35 program did not request a waiver or deviation from requirements in the TEMP.

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. It will consist of two-seat and four-seat variants, each expected to possess maximum commonality and a set of mission-specific components to meet the requirements of all mission packages. The four-seat variant includes a general purpose vehicle, heavy guns carrier (HGC), and close combat weapons carrier (CCWC). The two-seat variant includes a utility/prime mover/shelter carrier.

The JLTV is intended to support rapid deployment and offensive operations across the full spectrum of Army and Marine Corps military operations. The JLTV should interoperate in units with other tactical vehicles and weapon systems to provide maneuver, combat power, support, and sustainment at key decision points, and disperse to conduct subsequent operations. It is expected to provide increased force protection, reliability, maintainability, availability, and fuel efficiency over current light tactical wheeled vehicles, while providing similar mobility, net-centricity, transportability, and reduced logistical footprint.

The program entered the Technology Development (TD) phase in December 2007 and underwent DT from May 2010 through June 2011. The Joint Requirements Oversight Council (JROC) approved the CDD and the USD(AT&L) authorized release of the EMD RFP in January 2012. The JLTV has eight KPPs (mobility, transportability, net-ready, force protection, vehicle survivability, payload, sustainment, and training) and four KSAs (reliability, fuel efficiency, unit cost, and ownership cost).

The program entered the EMD phase in August 2012, and the Army awarded three contracts in August 2012 to AM General, Lockheed Martin, and Oshkosh. Each vendor delivered 22 vehicles (16 two-seat variants and 6 four-seat variants) to undergo DT beginning in September 2013 and continuing through October 2014.

Lead DT&E Organization: ATEC MSED

Summary of FY 2013 DT&E Activities

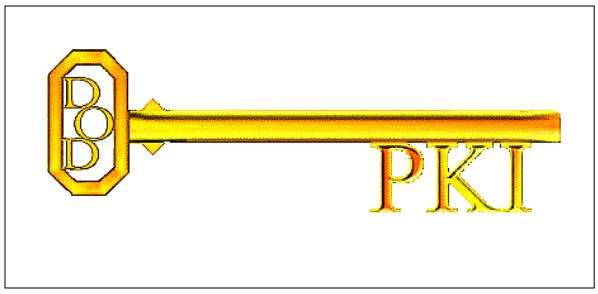
- November 2012–January 2013, the Aberdeen Test Center (ATC) and the U.S. Army Tank Automotive Research, Development, and Engineering Center (TARDEC) conducted ballistic coupon-level testing.
- March–August 2013, ATC conducted ballistic hull and exploitation testing.
- June–July 2013, the three JLTV vendors conducted reliability break-in and shakedown testing.
- February and July 2013, the JITC and TARDEC Tactical IA Team conducted baseline and intermediate IA and software scans.
- The program conducted a developmental TRR in August 2013 and Government DT began in September 2013.

- In FY 2013, the Army and the Marine Corps took a $5.2 million decrement through a combination of sequestration effects and congressional marks. This decrement caused a delay of the start of reliability, availability, and maintainability (RAM), performance, and ballistic testing until September 3, 2013. The Government shutdown on October 1, 2013, caused a 1-week halt to all testing. These compounding delays could significantly impact the amount of test data available to support the source selection and MS C decision date. The testers have sufficient funds to continue testing through FY 2014.

Summary of FY 2013 DT&E Engagement and Assessments

- OSD approved the EMD TEMP in June 2012 and it remains current. Because of sequestration, the PMO made detailed test schedule and vehicle test event allocation changes, but these changes are not significant enough to require a TEMP update.
- In July 2013, DASD(DT&E) conducted an independent assessment of the JLTV DT plans and made the following recommendations to the PMO at the developmental TRR:
  - Maintain a fixed vehicle armor configuration during each reliability growth testing phase to reduce the potential of confounded test results.
  - Conduct cybersecurity penetration and exploitation testing during EMD to avoid discovery after the MS C decision.
  - Execute an inspection plan throughout corrosion, performance, and reliability growth testing to detect any issues related to the use of high hard steel as structural components.
  - Conduct roof-crush testing of the CCWC variant with the gunner protection kit (GPK) or conduct M&S of the HGC and the CCWC with the GPK under as-tested conditions to assess the impact of the GPK on the vehicle roof-crush protection.
- The PMO accepted the DASD(DT&E) recommendation with respect to executing an inspection plan.
- Initial and intermediate IA and software scans revealed several design deficiencies. The closure of Category I and Category II high-risk controls is proceeding well for all vendors, which will implement corrective actions 150 days before the limited user test (LUT). JITC will verify the corrective actions during the final IA and software scans before the LUT to support the interim authority to test (IATT).
- Ballistic hull and exploitation testing revealed several design deficiencies. The vendors will implement corrective actions before the start of DT. These changes are not expected to have a negative impact on the automotive performance or reliability of the vehicles.
- Reliability break-in and shakedown testing uncovered several early-on failure modes and revealed the extent to which the vendors demonstrated the Government's initial reliability expectations. The vendors implemented corrective actions prior to the start of reliability growth testing. Demonstration of reliability on or above the RGC at corrective action period (CAP) 1 of reliability growth testing will indicate that the vendors are on track to achieve the required threshold by the end of EMD.
- The JLTV program did not request a waiver or deviation from requirements in the TEMP.

Public Key Infrastructure (PKI) Increment 2



Executive Summary: The goal of the DoD-wide infrastructure is to provide PKI for the generation, production, distribution, control, revocation, recovery, and tracking of public key certificates and their corresponding private keys and enabling commercial off-the-shelf (COTS) and Government off-the-shelf (GOTS) applications that provide IA and e-business capabilities. PKI will issue and manage electronic/digital identities and associated credentials and key materials for users, applications, servers, and network components. Increment 2 initiatives include the use of a hardware token on the Secret Internet Protocol Router Network (SIPRNET).

In FY 2013, the PMO fielded a series of enhancements to the Token Management System (TMS) to improve its usability. Key capabilities to be added include whitelisting, which ensures that only eligible tokens are able to be used for enrollment; blacklisting, which permanently removes tokens from the system; and key recovery, which allows users to recover private encryption keys. The PMO also fielded Release 2.3.1 in May 2013, which included minor enhancements to TMS usability. Release 2.3.2, included in the Sprint 2 test, provides additional capabilities for group, role, and code-signing tokens, as well as pin reset authorizations for trusted agents. Problem reports generated during the Sprint 2 test delayed fielding of those capabilities until 2014. The National Security Agency (NSA) Service Acquisition Executive declared a significant change in September 2013 and a critical change in October 2013, as the program office does not expect to achieve a full deployment decision (FDD) by March 2014. The DoD CIO plans to provide NSA with a prioritized list of remaining Service requirements that will assist the critical change team in making program restructuring recommendations in early FY 2014.

Lead DT&E Organization: DoD PKI PMO

Summary of FY 2013 DT&E Activities

- November 13–15, 2012, the PMO and users conducted a system test of TMS enhancements, which include whitelisting, blacklisting, and key recovery.
- March 7–8, 2013, the developmental contractor conducted a test of TMS Release 2.3.1 at the contractor facility with PMO observation.
- April 9–11, 2013, the PMO and users conducted a system test of the TMS Release 2.3.1 software at multiple sites with joint participants.
- May 15–17, 2013, the contractor conducted a test of Sprint 2 at the contractor facility with participation from the Navy and Army.
- September 4–12, 2013, the PMO and users conducted a system test of the TMS Sprint 2 software release at multiple sites with joint participants.

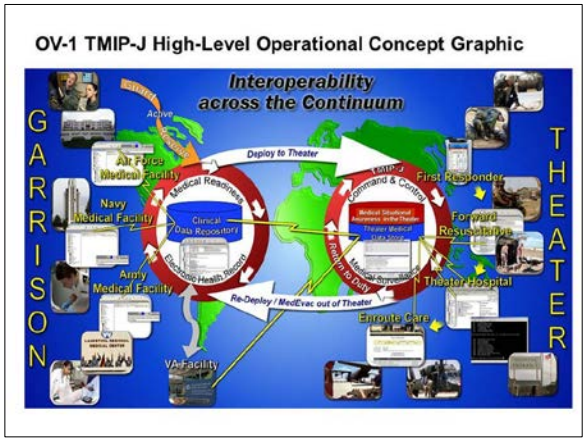
Summary of FY 2013 DT&E Engagement and Assessments

- DT planning and execution remain focused on pass/fail execution of pre-scripted procedures vice measurement of system performance. Due to late distribution of test plans and cursory TRRs,

users did not have an adequate opportunity to review those procedures to ensure that they reflect how the Services and Defense Agencies need the system to perform.

- DASD(DT&E) provided input to two Integrating Integrated Product Team meetings and two OIPT meetings to address schedule breaches that the program incurred or anticipated.
  - The TEMP Addendum to clarify Spiral 3 test details is still not complete after more than a year of effort.
  - Test planning appears schedule-driven and does not allow the PMO adequate time to address findings or conduct regression testing.
- DASD(DT&E) advocated for a more rigorous review and compilation of the traceability for derived requirements that constitute the majority of the capabilities in Spiral 3 of this increment.
  - Although the exercise helped the PMO and stakeholders better understand the origins of the derived requirements, a gap still exists between derived requirements and formally documented requirements.
- The SE and configuration management processes are poorly documented, leading to test findings reflecting the inability of the system to meet user needs. Users are not part of any formal design review process, so routinely, their first view of the developmental capabilities being delivered is at the system test, resulting in process and capability acceptance problems that further delay delivery.
  - Sprint 2 system test findings include five priority 2 test deficiency reports (DRs). The DRs reflect a lack of understanding of the users' CONOPS as well as an inability to tailor the system for differing CONOPS among the different Services and Defense Agencies.
- DASD(DT&E) provided an assessment of program status for a DAES review briefing to the Defense Acquisition Executive (DAE) in October 2012.
  - DASD(DT&E) consistently rated the program as a high risk for T&E in DAES over the course of 2013.
  - Input highlighted poor DT planning and analysis and inadequate PMO test staff.
- The PKI program did not request a waiver or deviation from requirements in the TEMP.

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. Major applications include AHLTA-Mobile, AHLTA-Theater (AHLTA-T), Mobile Computing Capability, Defense Medical Logistics Standard Support customer assistance module (DCAM), Maritime Medical Modules, Patient Movement Items Tracking System, Single Sign-On, TMIP Composite Health Care System Caché (TC2), and U.S. Transportation Command Regulating and Command and Control Evacuation System–Mobile. 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. TMIP-J delivers information support through the electronic health record, integrated medical logistics, patient movement and tracking, and medical C2. The system provides information at the point of care and to the theater tactical and strategic decision makers through efficient, reliable data capture and data transmission to a centralized theater database. TMIP-J provides the capability to document current medical care; document exposure to different environmental or occupational hazards; and retrieve, record, and augment the life-long medical record. The system design uses an open system architecture approach to integrate COTS, GOTS, commercial, and non-developmental items (NDIs), thus accommodating changes and facilitating the integration of future systems and technology.

The TMIP-J Acquisition Strategy (AS) 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 AS outlines developing and deploying TMIP-J in two increments with multiple releases. Increment 1 is fully deployed, as is Increment 2 Release 1. Increment 2 Release 2 (I2R2) supersedes Release 1. The FY 2013 DT focused on I2R2 system integration and acceptance testing. The multi-Service system test team verified and validated all five KPPs during an MOT&E conducted during the 3rd quarter 2013. The current deployment schedule calls for an FDD in December 2013. The final capability release is Increment 2 Release 3 (I2R3), providing an aeromedical evacuation capability plus system technical upgrades and enhancements. The program projects full deployment for 1st quarter FY 2016.

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

Summary of FY 2013 DT&E Activities

- October 1–15, 2012, the PMO conducted AHLTA-T I2R2 system integration test (SIT) in Falls Church, Virginia, focused on testing AHLTA-T fixes for defects identified during the operational assessment (OA) event conducted August 22–24, 2012.
- January 4–30, 2013, the Services independently conducted I2R2 DT2 in Service labs located in Fort Detrick, Maryland; Norfolk, Virginia; and Hanahan, South Carolina, to perform integration testing.
- January 22–March 1, 2013, the Services conducted independent I2R2 system acceptance testing in Fort Detrick, Maryland; Camp Pendleton, California; Gunter Air Force Base (AFB), Alabama; and aboard USS REAGAN (CVN 76).
- April 29–May 6, 2013, the PMO performed the I2R2 Service Pack 1 SIT in Falls Church, Virginia, to verify upgrades to TC2.
- June 20–28, 2013, the PMO conducted the TC2 I2R2 SIT in Falls Church, Virginia, to verify fixes for TC2 defects identified during the MOT&E event held May 20–June 13, 2013.
- August 2–5, 2013, the PMO conducted the DCAM SIT in Falls Church, Virginia, to verify DCAM fixes for defects identified during the MOT&E event.
- September 12–13, 2013, the PMO performed the TC2 I2R2 security update in Falls Church, Virginia, to verify TC2 fixes to address red team MOT&E findings.

Summary of FY 2013 DT&E Engagement and Assessments

- The program successfully completed planned T&E activities; the program is on track and making favorable progress toward FDD.
- The PMO resolved defects found during all FY 2013 DT events, leaving no unresolved Priority 1 or 2 or cluster 3-level defects.
- Overall MOT&E results demonstrated a stable and mature system with minimal risk; follow-on DT verified fixes to identified defects.
- The approved TEMP supports I2R2 activities; the PMO is coordinating the I2R3 TEMP update.
- JITC anticipates issuing a joint interoperability certification with conditions in the 2nd quarter FY 2014; not all interfaces are available to evaluate during MOT&E. JITC will conduct follow-on evaluations when interfaces become available.
- The PMO and the multi-Service system test team are developing the I2R3 T&E strategy; the PMO will document the plan in an I2R3 TEMP.
- The TMIP-J program did not request a waiver or deviation from the requirements in the TEMP.

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6.2 Army Programs

This section includes summaries of the following 10 programs:

- Armored Multi-Purpose Vehicle (AMPV)
- Distributed Common Ground System–Army (DCGS-A) Increment 1
- Excalibur M982E1 Precision Engagement Projectiles
- Ground Combat Vehicle (GCV) – Infantry Fighting Vehicle (IFV)
- Guided Multiple Launch Rocket System–Alternative Warhead (GMLRS-AW)
- Handheld, Manpack, and Small Form Fit (HMS) Manpack (MP) Radio (AN/PRC-155)
- Handheld, Manpack, and Small Form Fit (HMS) Rifleman Radio (RR) (AN/PRC-154 and AN/PRC-154A Secret and Below (SAB))
- M109 Family of Vehicles, Paladin Integrated Management (PIM) Self-Propelled Howitzer (SPH) and Carrier, Ammunition, Tracked (CAT) Vehicle
- Phased Array Tracking Radar to Intercept of Target (PATRIOT)
- Warfighter Information Network–Tactical (WIN-T) Increment 2 (Inc 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 provides improved force protection, survivability, mobility, situational awareness, sustainment, and capability for future growth. The combined protection and automotive performance capabilities of the AMPV will 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 ICD, approved in February 2010. In March 2012, the DAE 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 the formulation of the AMPV CDD across the five mission roles and shaped the development of the RFP. The JROC validated the CDD in January 2013; the CDD identifies core AMPV capabilities.

Lead DT&E Organization: ATEC MSED

Summary of FY 2013 DT&E Activities

- October 2012–September 2013, DASD(DT&E) engaged with the Army in a series of working-level and IPT meetings to develop a test strategy that would support the development of an EMD TEMP and deliver the data needed to support a MS C LRIP decision. This strategy would be included in the EMD RFP.
- June 2013, DASD(DT&E) participated as a member of the OSD peer review team that reviewed the draft EMD RFP. This effort ensured that the test strategy outlined in the TEMP is consistent with Government provisions in the RFP.

Summary of FY 2013 DT&E Engagement and Assessments

- In developing the EMD test strategy, DASD(DT&E) recommended that the Army consider the following:
  - Determine the system reliability requirements for each AMPV variant to enable an evaluation of the full system in addition to the vehicle.

  - Pursue more reliability growth during EMD to increase confidence that the system meets the requirement at EMD.
  - Conduct natural environments testing and higher fidelity cybersecurity testing during EMD to support the production decision.
  - Adjust vehicle test resources to reduce schedule risk to the program.
- Based on the legacy M113, the Army developed system-level reliability benchmarks for each AMPV variant. The Army increased the reliability incentive target in the EMD contract to incentivize the contractor to achieve more growth but did not adjust the reliability growth plan. A review of the vehicle's Operational Mode Summary/Mission Profile (OMS/MP) document included recommendations for natural environments testing to provide data on the vehicle's ability to perform in all operational environments including the Asia/Pacific region. The Army included natural environments and higher fidelity cybersecurity testing in the draft TEMP, ensuring the appropriate planning and resourcing.
- In June 2013, DASD(DT&E) published a DT&E assessment to support the EMD RFP release DAB. The results of the evaluation are summarized below.

DT&E Assessment

- In June 2013, DASD(DT&E) assessed the AMPV test strategy and planning and published an assessment to support the EMD RFP release DAB.
  - This assessment highlighted that the CDD reliability threshold requirement excludes mission equipment packages and Government-furnished equipment (GFE), making it a platform- vice system-level requirement. This approach could result in an effective platform but an overall system that does not meet Soldier needs. In response to this concern, the Army developed system-level reliability benchmarks for all variants and adjusted the test strategy so that the mortar carrier and mission command variants can be evaluated in accordance with the OMS/MP. This strategy provides for reduced system-level reliability risk without increasing program cost. However, the developer would still not be responsible for overall system-level reliability.
  - DASD(DT&E) recommended that cybersecurity test planning begin during EMD to ensure that vehicle command, control, and communications system vulnerabilities are characterized in DT, allowing potential design changes to occur early before a production baseline is established.
  - To reduce performance risk, DASD(DT&E) recommended that the Army modify the reliability growth plan to achieve more growth during EMD. This could be accomplished by adding test miles and adding an additional corrective action period during the program's EMD phase to provide for the majority of potential reliability growth before MS C. Although the Army did increase the contract's reliability incentive targets, the Army did not adjust the reliability growth plan.
- The AMPV program did not request a waiver or deviation from requirements in the TEMP.

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 contains three software releases. Release (Rel) 1 is in the field. Rel 2 consists of four components. Three components make up the system's "Low Side": the ISR Fusion Server 3.2, DCGS-Enabled Common Ground System, and DCGS-Enabled Digital Topographic Support System−Light, which operate on a Secret-level network. The fourth component, or the "High Side," operates on TS/SCI-level networks. Rel 3 begins to integrate cloud computing technology in compliance with the Intelligence Community Information Technology Enterprise, formerly referred to as the DCGS Standard Cloud (DSC).

The DAE approved the Increment 1 FDD in December 2012, which authorized deployment of Rel 1 capabilities, and directed the Army to take a variety of actions including the following related to DT&E:

- Obtain DASD(DT&E) and DOT&E approval of a Rel 2 T&E strategy before the start of Rel 2 formal qualification test (FQT).
- Submit an updated AS, TEMP, and Systems Engineering Plan (SEP) to OSD for review and approval.
- Return with Rel 2 test results before fielding.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2013 DT&E Activities

- The PMO verified fixes to Rel 1 "Low Side" IA shortfalls during 4th quarter FY 2012 laboratory DT at APG, Maryland, and deferred fixes to "High Side" IA shortfalls to Rel 2. Additionally, the PMO conducted system regression testing throughout 2013 to resolve reoccurring and uncover new software "bugs."
- The PMO conducted regression testing at APG laboratory facilities during November–December 2012 to verify software fixes to the remaining IOT&E issues.
- The PMO oversaw contractor FQT of the Increment 1, Rel 2 architecture during the 3rd and 4th quarters FY 2013. The PM's FQT objectives were to validate the KPPs and KSAs and the family-of-systems architecture that will go into Government DT.
- The PMO deferred FY 2013 Government DT three times; it is now scheduled during FY 2014.

Summary of FY 2013 DT&E Engagement and Assessments

- December 2012 FDD Information Technology Acquisition Board: DASD(DT&E) assessed Rel 1 as low risk and supported full fielding but assessed Rel 2 as moderate risk and recommended an updated T&E strategy to ensure mature capabilities before fielding.
  - Rel 1. The "High Side" component deferral to Rel 2 removed the most significant issues discovered during IOT&E. The Army demonstrated fixes to the majority of the IOT&E issues attributed to the "Low Side" components.
  - Rel 2. The Army needs to demonstrate "High Side" component fixes as part of Rel 2 testing.
  - The architectural evolution and integrated testing of DSC applications over time is unclear, including whether DSC replaces, complements, or deletes other current DCGS-A capabilities.
- The Army provided a Rel 2 T&E strategy briefing to DASD(DT&E) and DOT&E in two sessions, during April and June 2013, which provided adequate context for the conduct of the FQT. The Army submitted a Rel 2 TEMP dated December 3, 2013. After the Army resolved critical comments, DASD(DT&E) approved the DT&E strategy portion of the TEMP. The Army has not approved submittal of the OT portion of the TEMP for OSD review.
- T&E risks after FQT revolve around the test and training schedule, attaining an interim authority to transmit, and enough software maturity to support Government DT. FQT performance data indicate that approximately 85 percent of 2,396 PMO functional requirements passed the standards. However, the number of critical software issue reports that resulted and the slope of the resolution trend line is a leading indicator that the PMO will have a difficult time being able to meet the entrance criteria established to commence scheduled Government DT.
- The DCGS-A program did not request a waiver or deviation from requirements in the TEMP.

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 Ia is currently in FRP and is forward deployed providing precision fires capability in operational theaters at a 90 percent reliability rate. The Increment Ib makes updates to the guidance, navigation, and control (GNC) section and the fuze, safe, and arm component.

Increment Ib is intended to fill current and future force capability gaps for the brigade combat team while improving theater agility and munitions efficiency. Increment Ib 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 PIM (M109A7).

Increment Ib is an Acquisition Category (ACAT) IC program that entered the Production and Deployment (P&D) phase in December 2012. In February 2013, the Army decided to combine the IOT&E of Excalibur Increment lb and Precision Guidance Kit. Subsequent changes to the developmental and operational test plans resulted in an update to the approved TEMP. The IOT&E is scheduled for 2nd quarter FY 2014. The FRP decision is scheduled for 3rd quarter FY 2014.

Lead DT&E Organization: ATEC AFED

Summary of FY 2013 DT&E Activities

- September 2012, the Army began a parallel reliability growth test program to lower the risk of meeting its reliability KPP at initial operational capability (IOC). This testing is ongoing.
- October 2012–August 2013, the Army conducted a series of customer-led DTs to validate proposed fixes and production process changes for five failure modes uncovered in Sequential Environmental Test (SET) Series One. Failure modes included the base hood seal, warhead detonation/field programmable gate array fuze, GPS dropout, guidance electronic assembly (GEA)/5-volt power, and second/arming failures.
- October 2012, the Army began soft-catch (SCat) recovery gun DT&E on the Increment Ib GNC assembly to demonstrate performance in extreme environmental conditions as part of the Army's ongoing reliability growth testing of SET Series One failures. This testing began phase two of Government DT&E.
- June 2013, the Army conducted the pre-IOT&E and environmental qualification test (EQT) DT&E. The pre-IOT&E projectiles were fired at near IOT&E conditions to better validate and assess IOT&E risk. The EQT was executed to evaluate the Increment Ib readiness to enter SET Series Two.

- July 2013, the Army conducted Increment Ib SET for Safety (SET-S2) testing. SET-S2 evaluated projectile safety after the projectile was subjected to permissible maximum pressure (PMP), temperature, and vibration test extremes.
- August 2013, the Army conducted Increment Ib SET for Performance (SET-P2). SET-P2 evaluated projectile performance and reliability after the projectile was subjected to temperature and vibration testing under specific DOE firing profiles.
- November–December 2013, the Army conducted the Army Interoperability Certification (AIC) 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 IOT&E projectile configuration and the FRP process.

Summary of FY 2013 DT&E Engagement and Assessments

- The Army successfully conducted parallel reliability growth testing that quickly resolved five of eleven Increment 1b failure modes, resulting in the program currently meeting three of five KPPs with reliability at the planned value on the RGC.
- During the SCat test, the Army identified the root cause of the GEA/5-volt power failure. SCat tests reproduced the failure mode under high charge/cold conditions in the pre-fix configuration, in which three of four GEAs failed. SCat tests on GNCs with the proposed GEA/5-volt power fix configuration produced eight of eight successes, though only four trials were under high charge/cold conditions. The GEA/5-volt power fix was successfully tested during FAT.
- During the pre-IOT&E DT, the Army demonstrated success in 11 of 12 trials, resulting in a median circular error probable (CEP) of 1.40 meters. The single failure is attributed to the known GEA/5-volt power problem.
- During the EQT, the Army demonstrated success in 10 out of 10 trials, resulting in high reliability and a median CEP of 1.14 meters for this event. The EQT verified that the program was ready to enter SET Series Two.
- The SET-S2 test series consisted of 18 total rounds. All 18 successfully passed the 5-pounds-per-square-inch base seal pressure test, but two projectiles failed to 'Set' during initialization. The remaining 16 Increment Ib projectiles fired from the M109A6 Paladin at PMP, safely exited the muzzle, and maintained structural integrity during flight. Four of the 16 projectiles failed to power up, maintained structural integrity during flight on a ballistic trajectory, and impacted in the ballistic impact point (BIP). Analyses of the 12 projectiles that successfully guided to the target indicate a median CEP of 4.2 meters, exceeding the KPP requirement of less than 10 meters CEP for unjammed accuracy.
- Data from the SET-P2 test series show that 30 of 35 Increment Ib projectiles guided accurately to the target and detonated in the proper fuze mode. Two of the five failures are attributed to the known GEA/5-volt power failure. Three of the five projectiles experienced one of two new failure modes and flew as designed on a ballistic trajectory to the BIP. One experienced the new inertial measurement unit (IMU) failure for which the program has a screening fix in place. The remaining two experienced a new fuze failure, traced back to a new distributor, attributed to failed solder joints on the power conditioning unit circuit board. Although a fix has been identified, its implementation was not in time for inclusion into the FAT and IOT&E projectile configuration. Preliminary analyses of the 30 reliable projectiles indicate a median CEP of 1.62 meters (unjammed, 19 shots) and 1.65 meters (jammed, 13 shots). Demonstrated CEP accuracy for both unjammed and jammed conditions exceeds requirements.
- Emerging data from the FAT show that 28 of 30 Increment Ib 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 (FAT fuze No-detonation (safe separation timer reset) failure). One projectile failed to guide to the target and flew to the BIP after an IMU Bias (above threshold) failure. One projectile failed to guide to the target and flew to the BIP after the GPS receiver lost time, an A-mode low-risk GPS failure (no planned fix), and the IMU suffered an IMU Accelerometer hard failure.

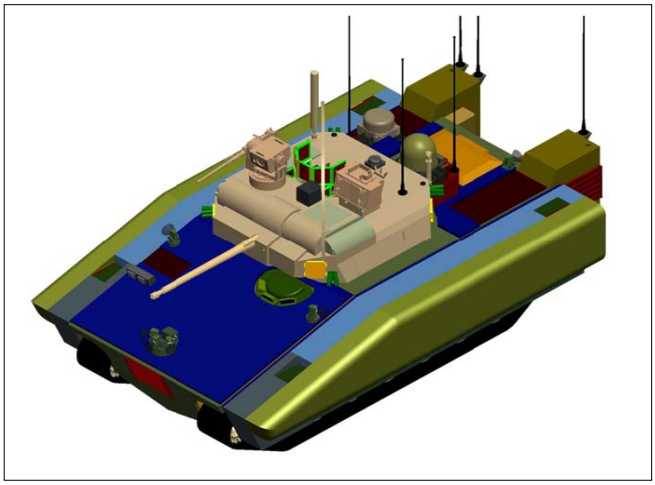
- In August 2013, DASD(DT&E) provided the Army with a DT&E assessment to support the Army's LRIP 2 decision.
- DASD(DT&E) approved the Excalibur Increment lb MS C TEMP update on January 7, 2014.
- DASD(DT&E) published a final DT assessment to inform the Army's OTRR process and the Army's decision to enter IOT&E at the conclusion of FAT.

DT&E Assessments

- In August 2013, DASD(DT&E) provided the Army with a DT&E assessment to support the Army's LRIP 2 decision, and in January 2014, DASD(DT&E) provided the Army with a final DT&E assessment to inform the Army's OTRR process.
- The August 2013 assessment showed that the 1b program was on the planned RGC and supported the program proceeding to LRIP 2. The assessment noted that the Army identified potential fixes to two (GEA and IMU) of three failure modes identified during SET-P2 and that the third (fuze failure) remained under investigation. The assessment concluded that with a successful demonstration of the GEA power failure anomaly, the program would be on track to meet the reliability KPP of 90 percent at IOC.
- The January 2014 assessment showed that three KPPs were met: Unjammed Accuracy (KPP 2), Reliability (KPP 4), and Maximum Range (KPP 5). Two primary CTPs were also met: Minimum Range (CTP) and Jammed Accuracy (CTP). 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 (79 percent lower confidence limit at 80 percent confidence). Five of 11, low risk of occurrence, failure modes remain under investigation.
- The Excalibur program did not request a waiver or deviation from requirements in the TEMP.

Ground Combat Vehicle (GCV) – Infantry Fighting Vehicle (IFV)

Executive Summary: The GCV-IFV is intended to be a highly mobile, protected combat vehicle, designed to carry a nine-man infantry squad and three crew members (driver, gunner, and commander). The GCV-IFV requires growth capability over time in terms of size, weight, power, and cooling. The GCV-IFV will require a medium-caliber primary weapon system, secondary coaxial-mounted machine gun, commander's independent weapon station, and a reconfigurable armor package. The design concept (pictured here) is a notional depiction of the GCV.



The GCV-IFV is intended to fill the Bradley IFV role within the current fleet of combat vehicle capabilities, with greater lethality, force protection, survivability, and connectivity. It is intended to fulfill capability gaps in mobility, reliability, and operational flexibility within a wide range of terrain and environments and across a wide spectrum of joint forces ground combat operations.

In January 2013, the USD(AT&L) directed the Army to extend the TD phase by 6 months to allow the two competing developers time for additional preliminary design effort resulting from requirements changes. The program office completed mine blast and threat defeat testing using both competitors' initial design subsystem prototypes, as well as armor coupon testing and human factors evaluations. Based on the updated requirements, both developers updated their designs, completed their preliminary design reviews (PDRs), and completed or will complete additional analysis/testing of updated subsystem prototypes.

Lead DT&E Organization: ATEC MSED

Summary of FY 2013 DT&E Activities

- December 2012, the Army provided the final report on the assessment of non-developmental vehicles (NDVs) in support of the AoA and requirements analysis.
- December 2012, the Army completed its requirements analysis, drafted an updated CDD, and briefed the DAE, leading to the TD extension direction.
- January–April 2013, both competing developers completed mine blast and threat defeat testing using their initial design subsystem prototypes.
- March–May 2013, the two competing developers briefed their respective design changes based on the updated requirements and outlined how they would modify their subsystem prototypes to test the new design.
- April 2013, the program office briefed its latest reliability growth strategy.
- August–September 2013, one developer completed two updated mine blast test article tests.
- September and October 2013, the competing developers completed their PDRs.

Summary of FY 2013 DT&E Engagement and Assessments

- The NDV assessment provided valuable insight to IFV requirements and tradeoffs and supported the Army's refinement of GCV requirements.
- The requirement changes adopted by the Army were intended to reduce program risks in the areas of cost, weight, technical maturity, and threat reduction in order to maintain the program strategy and schedule. However, the significance and breadth of the changes created an unintended effect in that the two competing developers needed to redesign their subsystem test articles and complete additional testing within the program timeline.
- The mine blast testing of subsystem prototypes identified vehicle design risks and important design changes. However, the time to redesign and retest added risk to the program strategy and schedule. The developers are necessarily conducting design and engineering development within the TD timeframe, and the need to redesign and retest compressed these efforts further.
- The threat defeat testing identified significant issues relative to the requirement. Specific details are classified. However, the technology involved requires additional design work and may drive changes to some system requirements. The Army will need to consider a number of aspects with respect to system timing to obtain the best effects, and the Army should examine operational employment with respect to current IFV operations (system use in proximity to personnel). The Army deferred this capability in the updated CDD and intends to pursue it as a stand-alone program. This deferral should allow the Army time to mature the capability.
- The program office has been working the reliability growth strategy continuously since last year. This work included analysis that relates current Bradley reliability performance (stated in miles between failures) to the new GCV-IFV mission profile (which requires hours between failures). Based on the work, the Army updated the requirement to a lower risk target. Also, the reliability team constructed a test strategy within the TEMP that maximizes vehicle use and test time to gather as much reliability data as possible. Despite these changes, some risks remain. The new requirement (220 hours between system aborts) represents a significant improvement (about 47 percent) over current Bradley performance. However, the GCV will use mature, current technologies in a more complex vehicle. The GCV will weigh considerably more than the current Bradley (approximately 60 to 70 tons versus 40 tons). Also, the reliability growth required in DT&E to meet the requirement with confidence represents the upper limit of performance predicted by the competing developers at this point in design/development.
- DASD(DT&E) previously recommended that the Army include sufficient time/test articles in the EMD program schedule and test strategy to support an iterative design process and a rigorous test-fix-test strategy. The program adopted this recommendation. The January 2013 USD(AT&L) direction also added time to the EMD phase, and the RFP for EMD will recommend that the developers use test rigs to update their designs prior to building the first full prototypes used for Government DT. Each developer is already developing such test rigs.
- DASD(DT&E) previously recommended that the Army adopt a lower risk reliability strategy and account for system and vehicle reliability with and without GFE. Although the program has done well in reducing reliability growth risk and ensuring an adequate strategy, the requirements still stipulate GCV reliability that excludes GFE.
- DASD(DT&E) recommends that the program closely monitor the developer design and development during EMD and tailor the EMD strategy and test article objectives to address limitations identified in TD testing.
- DASD(DT&E) recommends that the program continue to closely monitor and update the reliability growth strategy as the developers gain greater insight into their design reliability potential.
- The GCV-IFV program did not request a waiver or deviation from requirements in the TEMP.

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 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 (ATK) 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 brigade, division, corps, joint/coalition forces, and Marine air-ground task forces (MAGTFs) in full, limited, or expeditionary operations.

Lead DT&E Organization: ATEC AFED

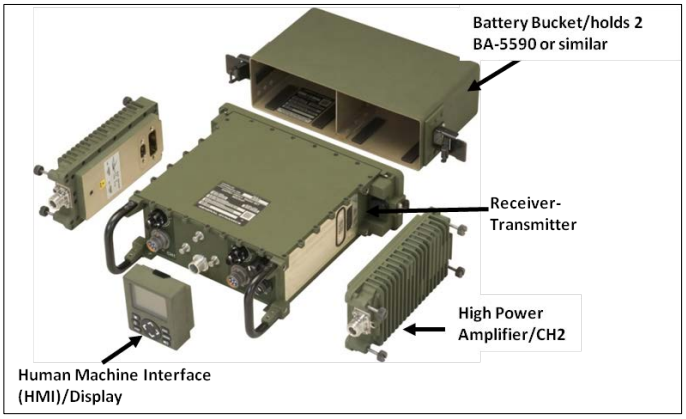
Summary of FY 2013 DT&E Activities

- November 2012, OSD approved the updated MS B TEMP containing the selected warhead vendor.
- January–April 2013, ATK conducted contractor DT and completed design verification tests (DVTs) on the alternative warhead.
- February–May 2013, Lockheed Martin (LM) conducted contractor DT and completed risk reduction DVTs on the GMLRS rocket.
- February–September 2013, LM conducted contractor DT and completed engineering design test (EDT) ground testing.
- April and September 2013, LM conducted contractor DT and completed EDT flight testing.
- September 2013, the Army finalized plans for Government DT.

Summary of FY 2013 DT&E Engagement and Assessments

- The GMLRS-AW rocket successfully completed contractor DT in September 2013, and preliminary results indicate that the rocket is performing as projected.
- Government DT is well planned and execution began in 1st quarter FY 2014 as scheduled.
- The GMLRS-AW program did not request a waiver or deviation from requirements in the TEMP.

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



Executive Summary: The U.S. Army Tactical Radios (TR) PMO 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-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 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 U.S. Navy MUOS program. The MP radio is employed in both mounted and dismounted configurations and includes a handset, batteries, and 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.

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 LRIP 2 quantity brings the overall LRIP to 6 percent of the total planned procurement of 71,814. The HMS MP program focused its FY 2013 DT activities on demonstrating fixes for performance issues from FY 2012 OT and DT. The testing used LRIP 1 Lot 1 and LRIP 2 MP radios, which included hardware and software improvements from LRIP 1 radios. In the 1st quarter FY 2014, the U.S. Army requested an LRIP increase from the current approved quantity of 3,826 to 5,326 (an increase of 1,500 MP radios) to fill the delivery gap between the end of the current LRIP and the start of FRP to complete fielding of the MP radio in support of Capability Set 14 deployment. In support of the U.S. Army's LRIP increase request, DASD(DT&E) provided a summary DT&E assessment to the USD(AT&L) in December 2013.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2013 DT&E Activities

- September–October 2012, ATEC conducted Government Developmental Test (GDT) 3 at the U.S. Army EPG, Fort Huachuca, Arizona, to demonstrate fixes to MOT&E issues in order to support the LRIP 2 decision.
- January–May 2013, the U.S. Army conducted DT of the MP radio through two customer tests (CTs). ATEC conducted both tests at EPG for the TR PMO.
- July 2013, the U.S. Army initiated a CT but stopped record testing because of numerous radio hardware design issues that impacted performance with the SRW and SINCGARS waveform.

- Interoperability testing conducted in FY 2013 consisted of waveform standards conformal performance testing for the three threshold waveforms.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) provided a DT&E assessment briefing to the DAE in 1st quarter FY 2013 based on GDT 3 in support of the U.S. Army's request for a second LRIP of 3,726 MP radios. The assessment concluded the following:
  - SINCGARS voice performance was significantly improved over previous DT and MOT&E.
  - Although there was no recurrence of fixed MOT&E failure modes, there was also no significant improvement in system reliability.
  - Additional DT is necessary to demonstrate full functionality prior to FRP.
- DASD(DT&E) provided a DT&E assessment to the DAE in 1st quarter FY 2013 based on the CY 2013 CTs to support the U.S. Army request to increase the LRIP by an additional 1,500 MP radios. A summary of that assessment is provided below.

DT&E Assessment

- DASD(DT&E) provided a DT&E assessment to the DAE in 1st quarter FY 2014 in response to the U.S. Army request to increase the LRIP quantity for an additional 1,500 MP radios to bridge a delivery gap between approved LRIP quantities and first delivery for FRP. The assessment concluded the following:
  - The radio is achieving the threshold requirement for tactical voice communications but has not achieved the threshold requirement for data exchange. The radio has the ability to share automatically generated position location information (PLI); however, DT to date has not included the movement of mission command messages.
  - The radio has partially demonstrated multichannel operations requirements for threshold waveforms including simultaneity, routing, and retransmission.
  - System reliability is still well below the threshold KPP and has not significantly improved since GDT 3.
- The program will improve its DT results by documenting a clear DT&E strategy in a TEMP update to guide individual test planning and by eliminating recurring test limitations including the following:
  - Using surrogate tactical vehicles in lieu of operationally configured vehicles.
  - Adding dynamic mobility across operating conditions in accordance with the Operational Mode Summary/Mission Profile.
  - Testing the MP network gateway functionality for the Army's tactical network.
  - Testing tactical data communications and interoperability with mission command systems, such as Joint Battle Command–Platform.
- The HMS MP program did not request a waiver or deviation from requirements in the TEMP.

Handheld, Manpack, and Small Form Fit (HMS) Rifleman Radio (RR) (AN/PRC-154 and AN/PRC-154A Secret and Below (SAB))

Executive Summary: The U.S. Army Tactical Radio PMO has responsibility for development of the RR. The HMS RR is an ACAT 1D program. Phase 1 of the RR program focuses on one-channel radio sets that require NSA Type 2 encryption (AN/PRC-154). Phase 2 of the RR program adds NSA Type 1 encryption to enable transmission of SAB voice and data communications (AN/PRC-154A SAB). The AN/PRC-154A SAB is integrated into the U.S. Army Nett Warrior (NW) program, as the radio that meets the NW security requirements. The RR is designed to provide tactical military commanders with the flexibility to command, control, and communicate with platoons and squads, both mounted and dismounted, via voice, video, and data media. The RR consists of a receiver-transmitter, antenna, battery, headset or handset, and associated cables. The system includes an embedded commercial-grade GPS receiver that provides situational awareness through position location information (PLI) either audibly through the headset upon user request or visually through integration of an external end-user device, which is a separate system. The AN/PRC-154A SAB incorporates modifications, including hardware (keypad function update, keypad materiel change, new multiband antenna, circuit card subcomponent upgrades) and software changes (updated operating environment), that enable encrypted SAB capability. There are two vendors for both configurations of the RR: General Dynamics and Thales.

The Army completed the majority of planned DT for the AN/PRC-154 in FY 2012 and focused its FY 2013 DT efforts on the AN/PRC-154A SAB in conjunction with the NW program. The program is in its second LRIP based on a May 23, 2012, DAB that approved procurement of 13,077 RR units, including a limited number of AN/PRC-154A SAB RRs for the NW program T&E needs in FY 2013. The U.S. Army provided a JTRS program status review to the DAE in May 2013, which included plans to request an increase to the LRIP 2 authorization and to shift all remaining LRIP procurement to the AN/PRC-154A. DASD(DT&E) provided an assessment of the AN/PRC-154A SAB RR configuration in August 2013 to support DAE consideration of the Army's request.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2013 DT&E Activities

- January 28–March 15, 2013, the NW program conducted a reliability growth and performance test at APG, Maryland. DT events included the integration of the AN/PRC-154A SAB RR.
- March 2013, the Army conducted a customer test (CT) with the AN/PRC-154A SAB radio at EPG, Fort Huachuca, Arizona, to test reliability and voice call completion.
- April 2013, the Army conducted a CT with the AN/PRC-154A SAB radio at EPG to confirm voice call completion rates using the SRW.
- April 2013, the Army conducted a joint CT with the NW program at EPG to assess NW system performance with the AN/PRC-154A SAB.
- August 2013, DASD(DT&E) published a DT&E assessment for the Phase 2 RR (AN/PRC-154A SAB radio).

- August–September 2013, the Army conducted regression testing for the AN/PRC-154 RR at EPG.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) published a DT&E assessment in August 2013 recommending a delay of LRIP 2 procurement for the AN/PRC-154A SAB configuration until completion of DT to assess performance against the RR CPD. Details are provided in the DT&E Assessment section below.
- DASD(DT&E) recommends extreme climate testing for the AN/PRC-154A SAB version.
- DASD(DT&E) recommends that the Army submit an updated TEMP to OSD to account for additional testing necessary to resolve issues discovered during DT and IOT&E, to adequately evaluate the AN/PRC-154A SAB configuration, and to support the program's FRP competition strategy.

DT&E Assessment

- The majority of DT&E for the AN/PRC-154A SAB conducted in FY 2013 was executed as part of the NW program T&E strategy, leaving significant gaps in DASD(DT&E) understanding of the AN/PRC-154A SAB RR performance as a stand-alone radio against the RR CPD.
- DASD(DT&E) recommends additional DT&E to ensure that the AN/PRC-154A SAB meets the RR CPD requirements before additional LRIP 2 quantities are procured. A summary of the DT&E assessment follows:
  - Performance. Test data are not sufficient to determine whether the AN/PRC-154A SAB radio can support KPP 1, intrasquad communications at tactical ranges, using SAB voice, at 90 percent delivery performance reliability, in accordance with the CPD (v6.3, rev 2). The radio does support SRW voice and PLI data transmission, but test data are inadequate to assess performance at the threshold requirement. Available data are also inadequate to determine whether the radio automatically transmits PLI and enables selected leaders to receive Soldier PLI at 85 percent reliability (KPP 2).
  - Reliability. Test data are not sufficient to demonstrate that the AN/PRC-154A SAB radio meets threshold reliability or availability requirements. RR must achieve 0.95 probability of completing a 24-hour mission period without an essential function failure, which equates to a mean time between essential function failures (MTBEFF) of 477 hours. The RR also must achieve operational availability that meets or exceeds current force tactical radios, with a threshold value of 0.96. The AN/PRC-154A SAB RR has not completed environmental testing in accordance with MIL-STD-810F.
  - Interoperability. The Army has not planned or conducted interoperability testing for the AN/PRC-154A SAB or coordinated with the Joint Interoperability Test Command to conduct interoperability and certification testing. SRW standards conformance testing is needed to ensure that RR performance is not impacted because of SAB functionality.
  - Cybersecurity Testing. The AN/PRC-154A SAB has a current interim authority to test (IATT) at the Mission Assurance Category I Classified (Secret) level approved by the Designated Approval Authority (DAA). The IATT supports the planned testing of the SAB radio during Network Integration Evaluation (NIE) 14.1. An information assurance certification and accreditation audit is pending for interim authority to operate (IATO) or authority to operate (ATO) approval by the DAA in September 2013. Two Category II issues remain open with fixes planned for the audit prior to final NSA certification in December 2013. The NSA issued a July 17, 2013, memorandum of support that allows operation of AN/PRC-154A SAB RRs by trained and cleared operators in CONUS locations only.
- The HMS RR program did not request a waiver or deviation from requirements in the TEMP.

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

Executive Summary: The PIM program consists of two individual platforms: an SPH and a CAT vehicle. The SPH is an aluminum armored, full-tracked 155-millimeter SPH, capable of carrying a minimum of 39 projectiles and a minimum of 31 modular artillery charge system (MACS) 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 PIM is force application-engagement. PIM supports combined arms maneuver, wide area security, and other full-spectrum operations as part of the land component of a joint task force. PIM is planned to be employed as part of a fires battalion in the 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 September 2009. As a result of program restructure and cost increases, the USD(AT&L) designated PIM as an ACAT ID program in April 2011. DT&E started in May 2011 at Yuma Proving Ground, Arizona, and APG, Maryland, in accordance with the draft TEMP and ATEC detailed test plans. During FY 2011 and FY 2012, the program began the production prove-out 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) RAM demonstration conducted on the prototype CATs. 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. Phase 2 completes PPT and includes 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. Phase 3 DT will use LRIP vehicles for production qualification testing (PQT), involving eight SPHs and five CAT vehicles.

Lead DT&E Organization: ATEC AFED

Summary of FY 2013 DT&E Activities

- The PMO updated the TEMP for MS C and P&D phase testing. This update reduced concurrent testing and schedule risk during the P&D phase, added testing to characterize the expected impact of the objective-level underbody kit on SPH performance and reliability, and incorporated a new Operational Mode Summary/Mission Profile.
- During FY 2013, the program completed all significant DT planned before MS C including the majority of Phase 2 DT (post-MS C CPO testing remains to be completed). All major elements of DT were executed in accordance with the TEMP. The four prototype SPH platforms completed a total of 2,153 rounds, 270 hours, and 4,721 miles during PPT. The two prototype CAT platforms completed 2,702 miles (including a 1,100-mile RAM demonstration) during PPT. The program conducted an additional 54 hours, 677 miles, and 312 rounds of testing on the SPH at the Force Protection/Survivability Threshold 2 (T2) weight.

Summary of FY 2013 DT&E Engagement and Assessments

- 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 IA/cybersecurity testing. TEMP updates regarding IA/cybersecurity have been resolved. The analysis regarding DT in natural environments is ongoing and not closed at this time.
- During FY 2013, the program successfully executed an aggressive test schedule driven by concurrency of the prototype design refinement and DT&E, but there is limited time for applying and verifying CPO changes identified during EMD before LRIP.
- In August 2013, DASD(DT&E) published a DT&E assessment to support the MS C DAB. Based on the DT&E conducted to date, the DASD(DT&E) recommended proceeding to LRIP. The results of the evaluation are summarized below.

DT&E Assessment

- In August 2013, DASD(DT&E) assessed system performance, reliability, interoperability, and cybersecurity based on PPT2 and published a DT&E assessment to support the MS C DAB.
  - Performance. The SPH met three KPPs, partially met three KPPs, and met the rate-of-fire KPP in only four of eight trials. The CAT met one KPP and partially met three KPPs. For both the SPH and CAT, one KPP requires additional testing during IOT&E. The SPH is also not meeting the accuracy KSA. The PM plans to correct SPH and CAT shortcomings identified during EMD DT and demonstrate fixes during PQT before IOT&E.
    - For KPP 5 (Rate of Fire), the SPH must be capable of firing 12 rounds in less than 3 minutes with a sustained rate of one round per minute thereafter until limited by tube temperature sensor. In four of eight trials under operationally realistic but non-stressing conditions (i.e., low quadrant elevation (QE) angle and single projectile charge), the system and crew met the KPP. EMD DT highlighted that crew training/proficiency is a significant factor in rate-of-fire performance. DASD(DT&E) expects that more stressful firing conditions (higher QE, multiple charges) will challenge crews to meet the rate-of-fire requirement.
    - The SPH partially met the requirement for KSA 4 (Accuracy). The KSA has the following two elements:
      – For ranges of 6 kilometers or less, the SPH using the M107 projectile and MACS propellant must have a total circular error probable (CEP) not to exceed 0.9 percent of range. DT results indicate that the system did not satisfy the requirement, achieving a CEP of about 1.2 percent of range between 4 and 6 kilometers. DT

identified two issues that may impact accuracy performance: M107 projectile weight variability and M231 MACS propellant muzzle velocity variability.
  - For ranges beyond 6 kilometers, the SPH using the M795 projectile and MACS propellant must have a CEP not to exceed 0.85 percent of range. DT results indicate that the system did not meet the requirement at the minimum range (6 kilometers) but did meet the requirement at the maximum range (21.5 kilometers), demonstrating CEPs of 1.38 percent and 0.47 percent of range, respectively. There was not enough testing in between 6 and 16 kilometers to determine at what range the system meets the accuracy requirement for the M795 projectile.
- The Army subsequently deleted the accuracy requirement for the M107 projectile at ranges of 6 kilometers or less. The Army also relaxed the requirement for the M795 at shorter ranges and tightened the requirement at the longer ranges consistent with demonstrated performance.
- The program conducted testing on SPH and CAT prototypes at the Force Protection/ Survivability Threshold 1 (T1) weight. Emerging results of DT of the SPH at the T2 weight suggest that the additional weight has no significant impact on SPH automotive, firing, or reliability performance.

o Reliability
- The SPH reliability requirement is to achieve 75 percent probability of completing an 18-hour combat mission. DT data show that the SPH achieved 78 percent probability of the SPH completing an 18-hour combat mission (80 percent confidence interval from 58 to 91 percent) based on a point estimate of 74.2 hours mean time between system abort (MTBSA). The 74.2 hours MTBSA is above the reliability growth curve, but further testing, in accordance with the PIM reliability growth plan, is needed to tighten the 80 percent confidence bound range.
- The CAT reliability requirement is to achieve 84 percent probability of completing an 18-hour combat mission. DT data show that the CAT achieved 90 percent probability of completing an 18-hour combat mission (80 percent confidence interval from 75 to 97 percent) based on a point estimate of 167 hours MTBSA. As with the SPH, further testing is needed to tighten the 80 percent confidence interval. The impact of the T2 weight on reliability and firing performance will be available before MS C.
- The Army plans to incorporate about 82 CPO changes into the LRIP configuration post-MS C. The number and nature of these changes have the potential to induce new failure modes and increase risk that SPH and CAT reliability will fall below required levels at PQT.

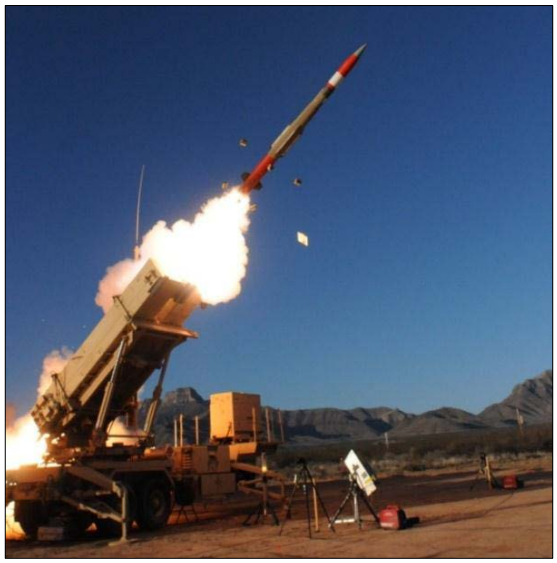
o Interoperability. The system partially met the requirement for KPP 1 (Net-Ready). In accordance with the approved TEMP, the program will conduct Army Interoperability Certification (AIC) testing during PQT.

o Cybersecurity. DASD(DT&E) expects programs to conduct a number of test events including the DIACAP, vulnerability assessments, and penetration testing of the system and its subcomponents within a realistic cyber environment during DT. The program plans to conduct vulnerability and penetration testing of the production software and demonstrate, in a realistic cyber environment, the effective exchange of information for PIM critical missions during post-MS C contractor DT and during PQT.

- Based upon DT conducted to date, DASD(DT&E) made the following recommendations:
  - o Proceed to MS C and begin LRIP as planned.
  - o Reevaluate the KPP 5 rate-of-fire performance requirement and modify the 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.
  - 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 PIM program did not request a waiver or deviation from requirements in the TEMP.

Phased Array Tracking Radar to Intercept of Target (PATRIOT)



Executive Summary: The PATRIOT program consists of software and hardware upgrades to respond to the evolving threat, component obsolescence, and deficiencies identified in the field. Software upgrades are being accomplished incrementally in a series of post-deployment builds (PDBs). The PATRIOT system consists of C-band phased-array radars for target detection, tracking, classifying, identifying, and discrimination; battalion and battery battle management elements; information coordination central and engagement control station; communications relay groups; antenna mast groups; and a mix of missiles. The PDB-7 upgrade corrects deficiencies and adds functionality to include the ability to launch the Patriot Advanced Capability (PAC)-3 Missile Segment Enhancement (MSE) interceptor variant. Hardware upgrades included with PDB-7 are the PAC-3 MSE, modern adjunct processor, limited Mode 5 identification, friend or foe capability, and implementation of the PAC-3 MSE interceptor launching station.

Lead DT&E Organization: ATEC AFED

Summary of FY 2013 DT&E Activities

- October 22–November 16, 2012, and January 29, 2013, ATEC conducted a PDB-7 LUT.
- November 29, 2012, the Medium Extended Air Defense System program conducted missile flight test (MFT) with an MSE interceptor.
- December 6, 2012, the Lower Tier Project Office (LTPO) conducted a PAC-3 MSE MFT, a ripple-fire engagement against a tactical ballistic missile (TBM) target.
- June 6, 2013, PATRIOT conducted a PDB-7 MFT, a PAC-3 MSE ripple-fire engagement against a TBM target and a PAC-3 MSE (shoot-look-shoot) engagement against an air-breathing target.

Summary of FY 2013 DT&E Engagement and Assessments

- Preliminary test data indicate that flight test mission objectives were successfully achieved. The June 6, 2013, MFT is the final PAC-3 MSE MFT to support the 2nd quarter FY 2014 MS C DAB.
- The PATRIOT CPD identifies system-level requirements for the PATRIOT system but does not provide separate requirements for the missile variants. The PAC-3 MSE LRIP decision is being made based on the results of PDB-7 T&E, and results indicate acceptable performance to recommend proceeding with LRIP. The PAC-3 MSE FRP decision will be based on the MSE MFTs performed as part of the PATRIOT system T&E program supporting the PDB-8 IOC. The PDB-8 is currently in development and was intended to support full capability performance for the PAC-3 MSE. However, because of budgetary constraints, full PAC-3 MSE capability will not be met until a future PDB. DASD(DT&E) recommends that requirements for MSE FRP be clearly identified.

- The PEO Missiles and Space, LTPO, and IAMD organizations manage T&E schedules and integration and expected availability of the WSMR, New Mexico, test bed and PATRIOT test battalion. DASD(DT&E) previously recommended tracking the risk of concurrent T&E for the PATRIOT and IAMD programs. The test battalion and associated equipment are no longer available for PATRIOT and IAMD T&E. DASD(DT&E) recommends that the PEO Missiles and Space, LTPO, and IAMD organizations assess the impact if Soldiers and equipment are not available for T&E.
- System reliability remains an issue during T&E. The radar is the primary cause for reliability issues.
- System instability during PDB-7 DT&E resulted in increased operator workload. Additional Soldier training and time are required to keep the system operational. Training and operational workload were previously identified as issues. DASD(DT&E) recommends continued monitoring to ensure that tactics, techniques, and procedures and operator training and workload do not affect system performance evaluation.
- The PATRIOT program did not request a waiver or deviation from requirements in the TEMP.

Warfighter Information Network–Tactical (WIN-T) Increment 2 (Inc 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. Inc 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 Inc 2 consists of multiple vehicle configuration items including the Tactical Communications Node (pictured), the Network Operations and Security Center, Point of Presence, and the Soldier Network Extension (SNE), among others.

WIN-T Inc 2 is an ACAT ID program in LRIP. It completed IOT&E as part of the Army's NIE based at WSMR, New Mexico, in May 2012. The DOT&E beyond LRIP report found the majority of the system to be effective with the exception of the SNE, HNW, and tactical relay–tower (TR-T) and not operationally suitable because of significant reliability and maintainability shortfalls. As a result, the DAE limited additional procurement to Lot 3 and deferred the FRP decision until the program demonstrates improved performance and reliability in follow-on operational test and evaluation (FOT&E). This annual report covers the FY 2013 DT activities to verify corrective actions and improvements leading up to FOT&E.

Lead DT&E Organization: ATEC C4ISRED

Summary of FY 2013 DT&E Activities

- October–December 2012, Reliability Test Event (RTE) 1. The PM conducted RTE 1 at the contractor facility at Taunton, Massachusetts, to exercise the system to demonstrate successful fixes to reliability failure modes identified during IOT&E and identify new failure modes.
- January 2013, the U.S. Army Research Laboratory's Survivability/Lethality Analysis Directorate conducted an IA vulnerability assessment at the vendor facility in Taunton, Massachusetts, to test fixes to previously identified IA vulnerabilities.
- January–March 2013, RTE 2. After a corrective action period, the PM conducted another RTE to demonstrate effective corrective actions and identify new failure modes.
- February 2013, Risk Reduction Event (RRE). The PM conducted RRE at Taunton, Massachusetts, to demonstrate correction of performance fixes in the areas of SNE voice over internet protocol (VoIP), data throughput, HNW net management, HNW fragmentation and cycling, and TR-T performance.
- August 23, 2013, DASD(DT&E) approved the TEMP describing post-FOT&E DT activities in 2014.

Summary of FY 2013 DT&E Engagement and Assessments

- October 2012–March 2013, DASD(DT&E) reviewed DT plans; provided recommended improvements; observed DT at Taunton, Massachusetts; and reviewed and analyzed test data and reports.
- March 2013, DASD(DT&E) supported entry to FOT&E at OTRR 2 based on the following assessment:

  - There was no recurrence of IOT&E reliability failure modes during DT. The RTE environment was benign and although reliability improvements were noted, some drop during FOT&E may be expected.
  - The SNE supported mission command applications and VoIP with high completion rates, required throughput, and solid quality of service during RRE.
  - HNW fragmentation, cycling issues, and network management were improved.
  - Test limitations included the RTE benign environment; limited ranges available at Taunton, Massachusetts; and lack of Soldier participation to identify potential human-system integration failure modes.
- August 2013, DASD(DT&E) presented an assessment, similar to that presented to the OTRR 2, to the OIPT prior to the DAB.
- The WIN-T Inc 2 program did not request a waiver or deviation from requirements in the TEMP.

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6.3 Navy Programs

This section includes summaries of the following 12 programs:

- Air Intercept Missile-9X (AIM-9X) Block II
- CH-53K Heavy-Lift Replacement Helicopter
- Cobra Judy Replacement (CJR)
- Consolidated Afloat Networks and Enterprise Services (CANES)
- GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78)
- Ground/Air Task Oriented Radar (G/ATOR)
- Joint Precision Approach and Landing System (JPALS)
- Littoral Combat Ship (LCS) Programs
- Mobile User Objective System (MUOS)
- MQ-4C Triton Unmanned Aircraft System (UAS)
- Multi-Mission Maritime Aircraft (P-8A Poseidon)
- U.S. Navy Integrated Air and Missile Defense (IAMD) and Naval Integrated Fire Control–Counter Air (NIFC-CA) Capability

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.

Testing began with the Block I AIM-9X-2 configured missile, with redesigned electronics, a new battery, a new ignition safety device, a data link, and the advanced fuze. Capability was further expanded to Block II with the addition of advanced software. The Block II missile hardware has approximately 85 percent commonality with that of the AIM-9X Block I.

Lead DT&E Organization: NAWCWD VX-31

Summary of FY 2013 DT&E Activities

- The Navy decertified the AIM-9X Block II in the summer of 2013 for OT based upon anomalous behavior not observed in the 2012 DT&E. The program is investigating the root cause of the flight test anomalies. Corrective actions include enhancements to the design and fabrication of the inertial measuring unit and advanced development of a follow-on software release to address other deficiencies noted in OT.
- An additional DT period composed of simulator evaluations, captive-carry non-launch events, and regression missile firings has been inserted into the test program to validate fixes before returning to IOT&E.

Summary of FY 2013 DT&E Engagement and Assessments

- Following the decertification of Block II for OT in the summer of 2013, DASD(DT&E) defined the expectations for the DT necessary to support resumption of OT and supported the Navy's position that the corrective action software release be brought forward and implemented to fix deficiencies discovered in IOT&E.
- The additional DT period composed of captive-carry and four free-flight tests is expected to conclude in time to support a 3rd quarter FY 2014 return to OT.
- The AIM-9X program did not request a waiver or deviation from requirements in the TEMP.

CH-53K Heavy-Lift Replacement Helicopter

Executive Summary: The CH-53K is intended to meet the Marine Corps heavy-lift requirements beyond 2025 by providing 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, incorporating the latest vertical lift, survivability, reliability, maintainability, and avionics technologies to meet the emerging Marine air-ground task force (MAGTF) vertical heavy-lift, warfighting requirements.

Lead DT&E Organization: NAWCAD HX-21

Summary of FY 2013 DT&E Activities

- Required testing is on track to enable the start of ground test vehicle (GTV) testing.
- The structural test article (STA) is at the Sikorsky facility in Stratford, Connecticut, and began testing in 1st quarter 2013.
- In December 2013, Sikorsky completed the CH-53K GTV (no rotor blades installed) and installed required instrumentation, and the integrated test team began testing. The full-up GTV (with rotor blades installed) is on schedule to begin testing in the 2nd quarter FY 2014. GTV testing will provide data in support of first flight currently scheduled for early FY 2015.
- Four EMD aircraft are being built at the West Palm Beach, Florida, facility and are on schedule to support a first flight currently scheduled for early FY 2015.

Summary of FY 2013 DT&E Engagement and Assessments

- OSD approved the CH-53K TEMP in 2005. The Navy is updating the TEMP to reflect changes to the program since that time.
- In FY 2013, the program successfully executed an aggressive development schedule driven by concurrence in development of the STA test assets and subsystem testing, but the program has appropriate risk mitigation measures in place.
- DASD(DT&E) is concerned that the program re-fly rate is overly optimistic (planned at 11 percent) and that the EMD test article delivery rate is aggressive. Although the re-fly rate is optimistic, the program has committed to collecting all test data points needed to support the system evaluation.
- The CH-53K program did not request a waiver or deviation from requirements in the TEMP.

Cobra Judy Replacement (CJR)

Executive Summary: The CJR, USNS HOWARD O. LORENZEN, T-AGM-25, is a Navy ACAT ID program to replace Cobra Judy, scheduled to be decommissioned in April 2014. CJR is a one-of-a-kind ship capable of collecting data on satellites and ballistic missiles with S-band and X-band phased-array radars.

DT was completed in July 2013. Multi-Service OT was completed in November 2013 and followed by the post-shakedown availability and scheduled regular overhaul. Following the IOC decision, expected in March 2014, the program will transition to the Air Force.

Lead DT&E Organization: PEO IWS 2I

Summary of 2013 DT&E Activities

- May 2013, the Commander, Operational Test and Evaluation Force (COMOPTEVFOR) reported results of the second OA, which was completed in February 2013. COMOPTEVFOR reported that the program was on track to be effective in meeting the Operational Requirements Document (ORD) requirements and was on track to support the national intelligence requirements for treaty verification, threat awareness, and nonproliferation but was not on track to meet the suitability requirements of the ORD. Progress was considered adequate toward readiness for OT.
- May 2013, PEO IWS 2I completed at-sea integration testing, DT-VI, in which T-AGM-25 acquired and tracked an operationally realistic Atlas V missile launch.
- June 7, 2013, PEO IWS 2I conducted a Technical Evaluation (TECHEVAL) Readiness Review at the contractor facility in Massachusetts.
- July 15, 2013, PEO IWS 2I completed 5 weeks of TECHEVAL, which included at-sea demonstrations and testing of the radars against standard radar targets, and used M&S to assess compliance of CJR systems in meeting all KPPs, KSAs, and other specified technical performance measures and functions.
- August 9, 2013, Raytheon, the prime contractor, completed the TECHEVAL report.

Summary of 2013 DT&E Program Engagement and Assessments

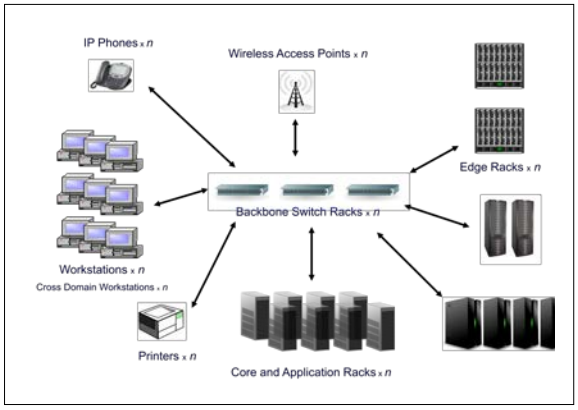
- DASD(DT&E) participated as a stakeholder in all Integrated Test Team (ITT) meetings throughout the year that defined and planned the integrated tests. In May 2013, the ITT reviewed data from the February 2013 Atlas V missile launch, which was the first ballistic target of opportunity acquired and tracked by CJR, and determined the changes needed to improve performance.
- As a voting member of the TECHEVAL Readiness Review, DASD(DT&E) traveled to the prime contractor's facility for an independent discussion of outstanding technical issues that existed at the start of TECHEVAL to assess the severity and impact of these issues and to evaluate the proposed plan of action to correct or develop acceptable work-arounds for them.

- On June 7, 2013, DASD(DT&E) voted to approve CJR entry into TECHEVAL. DASD(DT&E) also worked closely with the Lead DT&E Organization, PEO IWS 2I, through the 5 weeks of TECHEVAL.
- A DT&E assessment was conducted in August 2013 to support the readiness decision to commence MOT&E. Based on the DT&E conducted to date, the DASD(DT&E) recommended proceeding to MOT&E. The results of the evaluation are provided in the DT&E Assessment section below.
- At the August 23, 2013, OTRR, DASD(DT&E) supported the decision to proceed to OTRR.

DT&E Assessment

- On August 15, 2013, DASD(DT&E) provided the DT&E assessment in support of the readiness decision to commence MOT&E and recommended that CJR proceed to OT. A summary of the DT&E assessment follows:
  - Performance. T-AGM-25 has performed well in DT. The ship and mission equipment (ME) have met or exceeded all threshold values for the six KPPs, 11 KSAs, and 40 of 41 technical performance measures. A deviation has been approved for the measure that matched but failed to improve on Cobra Judy performance.
  - Reliability. The CJR ME reliability is required to be greater than150 hours mean time between critical failures (MTBCF). At the conclusion of TECHEVAL, CJR ME reliability is 312 hours MTBCF.
  - Interoperability. The interoperability KPP has been demonstrated through simulation with the CJR ME. On August 9, 2013, JITC certified that CJR ME has the potential to meet the net-ready KPP requirements.
  - Cybersecurity Testing. Previously identified cybersecurity concerns identified in OAs 1 and 2 have all been corrected. CJR has ATO documentation for OT. Additional cybersecurity tests are planned during MOT&E.
- The CJR program did not request a waiver or deviation from requirements in the TEMP.

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, 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 COTS, NDI systems integration effort that utilizes state-of-the-industry networking hardware and core services software.

The Milestone Decision Authority approved MS C for the program in December 2012 based on testing completed in FY 2012 and the plan for additional testing early in FY 2013. Specific direction in the ADM to the program called for a system maturity assessment after the program completed early DT events. Testing schedule delays have limited the utility of that DT as a means to identify and reduce risk of continued installations prior to IOT&E. The IOT&E platform, USS MILIUS, availability has been extended at least 5 months because of the poor material condition of the ship. Meanwhile, CANES installations are in progress on eight DDGs, two CVNs, and one LHD. Of the DDGs, the forward-deployed USS McCAMPBELL installation is complete and the platform is operational. The remaining seven DDG installations will also be complete before completion of the IOT&E test event. These schedule delays have led the program to begin preparations for a critical change report, which was declared on December 31, 2013. In addition, the program has not been tracking trends in software error identification rates to gauge software and configuration maturity. In the April 2013 review of the MS C SEP, DASD(SE) directed the inclusion of software metrics. The program office has been working with stakeholders to identify appropriate software metrics and develop a method to track and report them. Also, disconnects between the SE and testing communities have delayed adequate test planning.

Lead DT&E Organization: Tactical Networks Program Office (PMW 160)

Summary of FY 2013 DT&E Activities

- January–February 2013, the PMO conducted an IA baseline assessment.
- February 7–May 20, 2013, the PMO conducted a unit-level application integration (AI) SIT in the Enterprise Engineering and Certification laboratory at Point Loma Naval Base, California. Unstructured integration efforts were followed by formal configuration testing with the assistance of the application developers.
- August 26–October 25, 2013, contractor SIT for the CVN configuration was conducted at the Northrup Grumman facility in San Diego, California, with contractor SIT for LHD platforms following in November 2013.

Summary of FY 2013 DT&E Engagement and Assessments

- December 2012 MS C DAB: DASD(DT&E) concurred in the program's readiness to proceed to MS C given the urgency of the operational need while expressing concern regarding the extent of testing available to minimize risk given the aggressive installation schedule.
  - Although the scope of pre-MS C DT was limited, it demonstrated that the network could support basic operations and the system managers could monitor, manage, and report on the network's health and stability.
  - DASD(DT&E) recommended that the Navy provide the USD(AT&L) with an updated system maturity assessment based on post-MS C lab-based DT to inform and reduce risk for additional installations on destroyers and the first aircraft carrier prior to IOT&E.
- DASD(DT&E) reviewed and approved the DT planning within the TEMP on August 21, 2013.
  - Seventy-eight applications were approved to participate in unit-level AI SIT and 59 of them completed the process. The remainder were included in regression testing over the course of 2013. One application was dropped and will be included in the force-level SIT in FY 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 ADM-directed updated system maturity assessment following IT-C1 is no longer in a position to inform the risk of continued ship installations beyond the first two DDGs.
  - The program now requires greater concurrency between testing and installation activities. The SE staff must now update laboratory test assets and assist with installations around the world, as well as assist the test staff with procedure development and provide needed configuration management data. As a result, the PMO is deferring development and validation of key test procedures until just prior to test execution.
  - T&E staff must now conduct the lab-based IT-C1 and analyze the results while developing the plan for the shipboard IT-C2; the program will have little opportunity to correct issues discovered during IT-C1 before IT-C2 because of minimal time between tests.
- The CANES program did not request a waiver or deviation from requirements in the TEMP.

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, 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 the PEO IWS plan to remove the Multifunction Radar (MFR) array from the Surface Combat System Center (SCSC) in Wallops Island, Virginia, in December 2014. In spring 2013, the Navy reactivated the Dual-Band Radar (DBR) Engineering Development Models (EDMs) MFR and Volume Search Radar (VSR) at SCSC to conduct combat system integration testing. The Navy plans to install a production MFR in 2nd quarter FY 2014, and DBR testing will continue through 1st quarter FY 2015. Following removal of the production MFR in 2nd quarter FY 2015, the lack of a replacement MFR array at SCSC could impact continued combat system and air traffic control (ATC) testing and verification of corrected problems found during testing.

Lead DT&E Organization: PMS 378T

Summary of FY 2013 DT&E Activities

- CVN 78 construction 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 2013, EMALS performance, shared-system, and aircraft compatibility testing occurred and included 792 dead loads and 85 aircraft launches.
- January–September 2013, AAG Jet Car Track Site commissioning testing and performance phase testing, including off-center and divergent trajectory events, occurred; and 171 total system arrestments were conducted.
- April–September 2013, land-based ATC engineering testing with both simulated and live DBR occurred at SCSC.
- May–September 2013, Ship Self-Defense System (SSDS) contractor systems integration testing (SIT) occurred at SCSC.

Summary of FY 2013 DT&E Program Engagement and Assessments

Air Operations – Sortie Generation Rate (SGR)

- During the design and construction phase, SGR is assessed using M&S. NAVAIR sponsored the development of the Virtual Carrier Model, a detailed Monte Carlo simulation model of the FORD flight deck, ordnance handling, and aircraft readiness. Simulation results to date indicate that the ship has the physical capability to meet the SGR KPP when supporting systems meet their requirements and the crew is proficient.

- EMALS: Aircraft Compatibility Testing (ACT) Phase II, now in progress, is more extensive than ACT Phase I and is testing a wider range of normal and faulted launch conditions. Environmental qualification and component reliability have been the subject of separate component and subsystem testing. Electromagnetic interference testing has been performed on components and on the system functional demonstration system at Lakehurst, New Jersey. Land-based testing and issue resolution continues.
- AAG: Structural failure of a water twister last year required a major redesign of that component. In addition, the program is still dealing with challenges attendant to the potential range of off-center and skewed-angle landing arrestments that can occur in the operational environment. These challenges have slowed AAG DT, which lags that for EMALS. However, the water twister redesign is complete and factory tested, and a shipboard-representative water twister has been installed at the test site. AAG testing continues to assess system performance, identifying systems deficiencies requiring correction.
- Both EMALS and AAG are below their expected RGCs. EMALS reliability growth is improving with the increase in test cycles. The design of AAG has matured more slowly, and the longer times required to conduct a test event have resulted in far fewer test cycles upon which to base reliability calculations. The AAG Runway Arrested Landing Site testing, scheduled for late FY 2015 and FY 2016, will provide better data to measure reliability.
- Advanced Weapons Elevator: Contractor DT has demonstrated performance specification achievement, and the systems are now undergoing industrial testing.
- ATC: Basic ATC functionality was performed in October 2013 during DBR and AN/TPX-42 integration testing utilizing the single-face EDM DBR at SCSC. The testing was conducted using both simulated DBR inputs and live DBR tracking of a single aircraft. Interface deficiencies were discovered and corrected during testing. ATC performance will be refined in conjunction with combat system land-based test events using live DBR until the MFR array is removed in 2014. After removal of the MFR array, further ATC development will be performed using simulated DBR assets.

Combat Systems

- SSDS: Site activation for SCSC testing of SSDS Mk 2 Mod 6C continued in FY 2013.
- DBR: DBR has performed adequately during element-level DT&E. Combat system integration testing with DBR is under way including the missile support functionality of MFR. The EDM MFR array will be replaced in FY 2014 by a production MFR array. SCSC also includes an EDM VSR array to provide the functionality of DBR and the CVN 78 combat system.
- DASD(DT&E) is closely monitoring planning for the CVN 78 program and the impact on MFR testing for DDG 1000. DBR testing at SCSC will continue through 1st quarter FY 2015 to verify system performance. Current plans call for removal of the production MFR array at SCSC in December 2014 in order to install it in the Self-Defense Test Ship (SDTS) for the DDG 1000 anti-ship cruise missile self-defense testing. This reduces the time for integration, testing, and correction verification of the MFR with the CVN 78 combat system. The EDM MFR array that was removed from SCSC would support continued live testing, but budget constraints prohibit its installation.

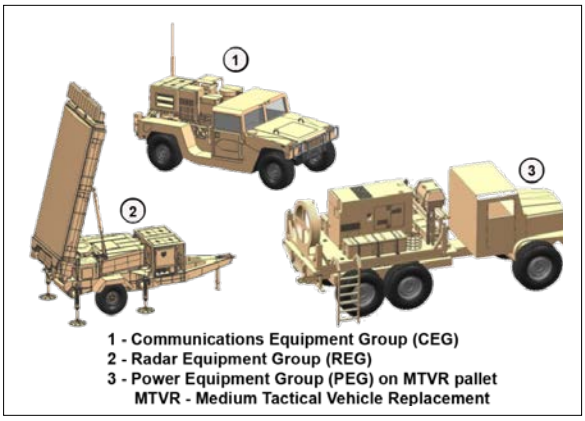
C4ISR

- 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.

- Radio Communication System (RCS): C4ISR system interoperability land-based testing was completed at the Test and Integration Facility, Charleston, South Carolina. No major testing issues were discovered during this interface testing, and the RCS has been delivered to the shipyard for installation on CVN 78.

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

Ground/Air Task Oriented Radar (G/ATOR)



Executive Summary: The G/ATOR system consists of an active electronically scanned antenna, which supports the multi-rotation rates and waveforms for tactical air operations center air surveillance and air traffic control missions, and supports future ground counter-battery/fire control capability. The system is highly mobile and is transported with one high-mobility multipurpose wheeled vehicle (HMMWV) and one medium tactical vehicle replacement (MTVR) vehicle. The radar equipment group is mounted on a trailer and towed by the MTVR. The communications equipment group is mounted on a modular pallet that is mounted on the HMMWV. The power equipment group includes a 60-kilowatt generator, mounted on a pallet and carried on the MTVR.

G/ATOR Block (GB) 1 will provide the MAGTF airborne command element with the capability to detect cruise missiles, fixed- and rotary-wing aircraft, and unmanned aerial systems and will support a combat identification capability. GB2 will provide the capability to support the ground counter-battery/counter-fire and registration of friendly fires missions of the Marine artillery regiments, who will operate and maintain GB2 for the MAGTF ground combat element. GB4 expeditionary airport surveillance radar provides technical and operational upgrades to the basic GB1 system that will improve performance and enhance the joint and civil airspace system interoperability.

G/ATOR GB1 DT occurred throughout FY 2012 and FY 2013, culminating in an added DT phase, DT1B4, which provided more time to resolve system issues. During March 2013, the Milestone Decision Authority moved MS C from 4th quarter FY 2013 to 1st quarter FY 2014. In conjunction with this decision, the Marine Corps determined that an OA scheduled during the May 2013 Weapons and Tactics Instructor (WTI) course would be canceled and replaced with a field user evaluation (FUE). The Marine Corps Operational Test and Evaluation Activity (MCOTEA) and the G/ATOR PMO conducted the FUE using the draft OA test plan. The FUE provided an opportunity to assess G/ATOR progress toward critical operational issue resolution. During September 2013, DOT&E and DASD(DT&E) concurred in an MCOTEA assessment that data collected from the FUE could be used to support a G/ATOR OA. However, OSD concluded that additional data are required from the DT1B4 test period and 4th quarter FY 2013 WTI exercise to adequately satisfy the OA requirement in support of the G/ATOR MS C. Following MS C, the PM will purchase eight LRIP units, which will support additional DT, scheduled to commence during FY 2016. The PM's plan to refurbish the EDM was canceled because of funding shortfalls.

Lead DT&E Organization: NSWC, Crane Division (Fallbrook Detachment)

Summary of FY 2013 DT&E Activities

- August 20–November 19, 2012, the PMO conducted DT1B1 at Wallops Island, Virginia. This DT event was an initial assessment of the EDM. The primary focus was on system performance, combat identification support, electromagnetic environmental effects, and spectrum supportability to take advantage of the test site environment.

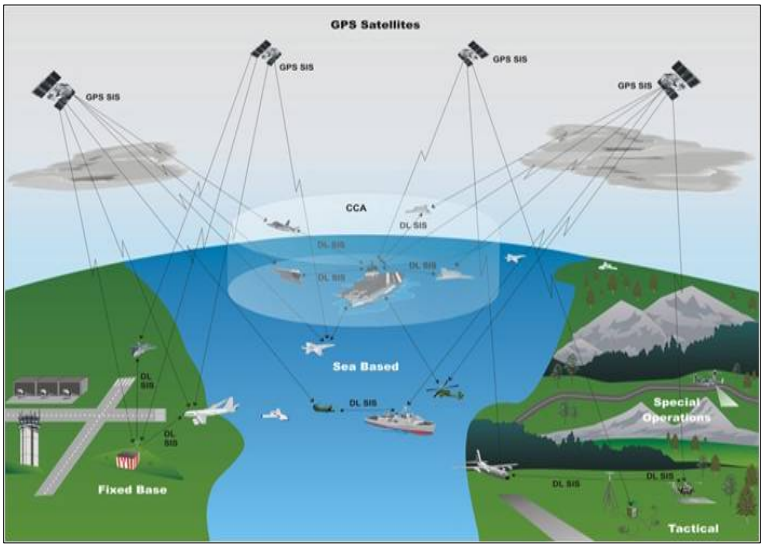
- November 26–December 19, 2012, the PMO conducted DT1B2 at Wallops Island, Virginia. This DT event was focused on interoperability with Marine Corps C2 systems, as well as operations within the electromagnetic environment. G/ATOR interfaced with intra-Service control nodes and tracked dedicated targets, targets of opportunity, and simulated targets while being operated via a remote C2 node.
- January 7–February 20, 2013, the PMO conducted DT1B3 at Marine Corps Air Station (MCAS) Yuma, Arizona. This DT event focused on system performance against live targets in stressing clutter environments. DT1B3 also assessed G/ATOR ability to execute mission-representative test scenarios (i.e., reconfigure, move, reconfigure, operate, reconfigure, move).
- April 1–27, 2013, the PMO conducted an FUE, an operationally representative DT, in conjunction with a semiannual exercise at MCAS Yuma. The primary purpose of the FUE was to mitigate problem areas/concerns and provide informal observations to the PEO and PMO in preparation for a fall 2013 OA. MCOTEA later deemed the fall 2013 OA unnecessary to support a MS C decision.
- July 8–September 13, 2013, the PMO conducted DT1B4 at MCAS Yuma. This final DT event focused on system performance in an operationally realistic environment to demonstrate the effectiveness of hardware and software changes implemented during the corrective action period (CAP). DT1B4 also assessed G/ATOR system stability.

Summary of FY 2013 DT&E Engagement and Assessments

- Performance. DT1B demonstrated that the system has either met or is progressing toward meeting threshold levels of GB1 KPPs with some minor system deficiencies. Main radar performance deficiencies revolve around radar tracking range and radar height accuracy test limitations. Updated systems software and future resource availability will help alleviate these deficiencies. The PMO will validate the new CPD requirement, net ready KPP, during post-MS C DT.
- Reliability. Although the mean time between operational mission failure (MTBOMF) and mean time between failure (MTBF) have continued to improve over the course of DT1B and CAPs, the system is still far below the threshold KSA requirements. The PMO is developing a restructured reliability growth program to help achieve the threshold reliability KSAs after post-MS C DT and before the FRP decision.
- Interoperability. Emerging DT1B test data validate that G/ATOR can satisfactorily interoperate with the tactical air operations module and Composite Tracking Network (CTN) with minor system deficiencies and limitations. The PMO developed and installed a corrective software load to help correct anomalies. Regardless, the G/ATOR system will require additional LRIP DT and an adaptive layer of the legacy CTN in order to demonstrate the full interoperability requirement. JITC will witness portions of post-MS C DT to gather information for G/ATOR interoperability certification during IOT&E.
- Cybersecurity. The G/ATOR program had a current IATO in place throughout DT1B, and demonstrated adequate IA processes within a controlled testing environment with minor deficiencies and limitations. The PMO is still developing the GB1 Program Protection Plan and planning for a robust vulnerability assessment and penetration testing during post-MS C DT.
- DASD(DT&E) is preparing a detailed DT&E assessment to support the Navy's planned 2nd quarter FY 2014 MS C decision.
- The G/ATOR program did not request a waiver or deviation from the requirements in the TEMP.

Joint Precision Approach and Landing System (JPALS)

Executive Summary: The JPALS is being developed to meet the requirement for a next-generation GPS-based precision approach and landing system. It is intended to function in environments ranging from clear skies (no jamming or precipitation) and unlimited visibility to obscured skies with GPS jamming, heavy precipitation, and low visibility.



The Federal Aviation Administration (FAA) decision to postpone retiring the civilian instrumented landing system led to the Air Force decision to withdraw from this joint program. The Navy continues to pursue this capability for incorporation in the F-35B/C and the UCLASS system onboard Navy ships.

The Navy proposes to re-scope the structure of JPALS to reflect the focus on F-35 and UCLASS as forward-fit platforms, combining the previous planned multiple increments of development into a single increment.

Lead DT&E Organization: NAWCAD AIR 5.1.1

Summary of FY 2013 DT&E Activities

- Two Navy F/A-18C aircraft and an MH-60S helicopter underwent test-specific modifications to support the 2013 and beyond integrated test periods.
- May–July 2013, PMA-213 with HX-21 and VX-23 completed initial sea-based testing, comprising more than 120 approaches with JPALS-equipped surrogate test bed, MH-60S and F/A-18C aircraft, on USS GEORGE H.W. BUSH (CVN 77).
- October 2013, VX-23 successfully completed an initial demonstration of the auto-land mode in the F/A-18C with 77 approaches to touchdown at the landing systems test facility at Naval Air Station, Patuxent River, Maryland.
- November 2013, VX-23 conducted additional risk reduction flights utilizing the JPALS-equipped F/A-18C onboard USS THEODORE ROOSEVELT (CVN 71) to demonstrate the auto-land capability of the EDM.
- JPALS demonstrated the ability to support fully automatic approaches and landings to an aircraft carrier in an operational environment, and under a variety of weather conditions and sea states, conducting more than 100 manual and 70 fully automatic landings aboard CVN 71.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) oversees the integrated test program phase and assesses system capability and performance as satisfactory based on shore- and ship-based performance. JPALS has demonstrated the capability to guide Navy aircraft to touchdown within precision standards.

- The Navy and DASD(DT&E) are assessing T&E strategies if the decision is made to combine the JPALS program Increment 1 (ship system), Increment 3 (auto-land), and Increment 4 (unmanned aircraft) into a single increment to accelerate system IOC in support of F-35 deployment and full auto-land capability for the UCLASS platform. DASD(DT&E) assess the JPALS Increment 1A development and test to be on track. If the program restructures to combine multiple increments, the initial fielding date of the ship-based system will be extended to 2019.
- Key development risk areas include integration on the F-35 and UCLASS aircraft. Because of the aircraft development cycle, integration on these platforms will follow IOC of the ship-based JPALS.
- The JPALS program did not request a waiver or deviation from requirements in the TEMP.

Littoral Combat Ship (LCS) Programs

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 an aluminum superstructure, 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 a mission package (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 52 LCS seaframes and 64 MMs.

Lead DT&E Organization: NSWC PHD

Summary of FY 2013 DT&E Activities

- USS FREEDOM (LCS-1): After completing pre-deployment workups and certifications, LCS-1 deployed to the Western Pacific theater of operations in March 2013, outfitted with a prototype SUW MP. LCS-1 returned from deployment on December 23, 2013.
- USS INDEPENDENCE (LCS-2): LCS-2 supported MCM MP testing in August 2013, which included modifications to the twin-boom extensible crane (TBEC). The TBEC was tested to evaluate launch and recovery of remote minehunting system (RMS) vehicles using a redesigned capture spine assembly. Additionally, the multi-vehicle communication system (MVCS), which was installed during the LCS-2 post-shakedown availability, underwent testing to demonstrate simultaneous control of two RMSs. Wake field experiments were also conducted on LCS-2 to evaluate waterjet settings to minimize wake turbulence during launch and recovery operations of RMS and small boats. Data from wake field testing are still under analysis.
- USS FORT WORTH (LCS-3): LCS-3 supported SUW MP testing beginning in September 2013, in preparation for the Freedom-class seaframe and the SUW MP Increment 2 TECHEVAL in 2nd quarter FY 2014.
- USS CORONADO (LCS-4): Delivered to the Navy in September 2013. Post-delivery tests and trials are in progress, in preparation for commissioning in April 2014.
- MCM MPs:
  - Major DT events included vertical takeoff and landing tactical UAV integration testing (January–March 2013), MVCS testing (July–August 2013), RMS reliability testing (March–June 2013), and remote multi-mission vehicle (RMMV) launch and recovery testing (July–August 2013).
  - The airborne mine neutralization system (AMNS) conducted live-fire DT (October–December 2012) and high-current testing (February–May 2013).

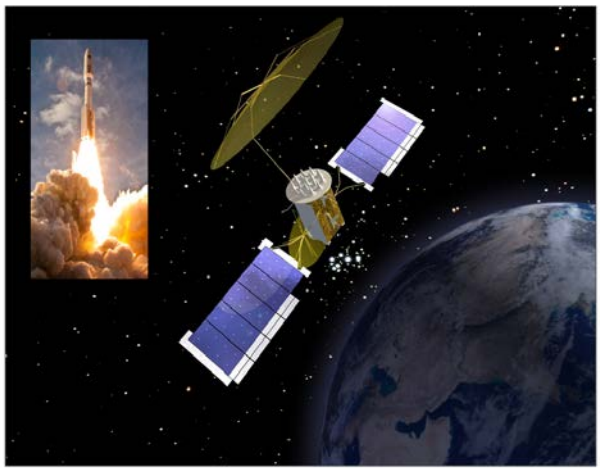
- SUW MPs: The SUW MP Increment 2 conducted DT in September 2013 onboard USS FORT WORTH (LCS-3). This testing included integrated testing of the 30-millimeter gun mission modules along with the 57-millimeter gun, which is organic to the seaframe. Although analysis is ongoing, results appear to be positive and will support the SUW MP Increment 2 TECHEVAL in early 2014.
- ASW MPs: Components of the ASW MP continue to be defined and engineered. Because of funding challenges, overall ASW MP DT has been delayed until FY 2015.

Summary of FY 2013 DT&E Engagement and Assessments

- LCS TEMP: DASD(DT&E) reviewed and approved the updated LCS Program TEMP (Revision A) in August 2013. This revision updated the 2008 TEMP to better describe the overall T&E program for the LCS seaframes and MMs. This revision included updated descriptions of systems and incremental testing and revised testing requirements and resources.
  - At DASD(DT&E)'s suggestion, PEO LCS is implementing the OSD four-step process for early preparation and testing of cybersecurity/IA measures in DT. The program offices within PEO LCS are currently developing detailed cybersecurity/IA testing plans for the individual programs and MMs.
- DASD(DT&E) continues to engage with the PEO LCS program offices to ensure that MPs are adequately tested and exhibit sufficient maturity to support TECHEVAL events and fleet introduction of LCS seaframes and MPs.
  - RMS reliability continues to improve during continued testing of RMMV version 4.2. Contractor-based testing suggests that RMMV version 4.2 meets the reliability requirements for the RMS program. This will be validated during DT and an OA in early FY 2014. DASD(DT&E) is working with the RMS program office to confirm that RMS performance and reliability are sufficient to support MCM MP TECHEVAL in FY 2015.
  - DASD(DT&E) worked with the RMS and LCS MM program offices throughout the development of MVCS, including RMS reliability verification tests and LCS-2 DT events. Basic MVCS radio capabilities have been successfully demonstrated during shore-based events and at-sea testing using the LCS-2 seaframe. Additional MVCS testing is required before achieving final certification and MCM MP TECHEVAL.
  - MCM MP Increment 1 components continue to test on the system level in preparation for integrated MCM MP testing in FY 2014. The AMNS, airborne laser mine detection system, RMS, and MCM MP support equipment are completing individual system testing and will begin integrated MP testing in FY 2014. Because of the concurrency in development, testing, and production of the components of the MCM MP, the test schedule is very integrated and has little room for event slippage.
  - SUW MP Increment 2 has shown great improvements over the last year, correcting many of the issues that plagued the MP in early testing. The MP TECHEVAL started in 2nd quarter FY 2014.
- The LCS program did not request a waiver or deviation from requirements in the TEMP.

Mobile User Objective System (MUOS)

Executive Summary: MUOS provides worldwide ultrahigh frequency (UHF) beyond line-of-sight tactical 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 capability will provide communications support for a wide range of DoD and Government operations, especially those operations involving highly mobile users. The system's planned accessibility to operating forces will establish MUOS as a means for providing minimum levels of mobile command and control communications in ad hoc crisis situations.

The MUOS test program progressively continues its phased T&E approach toward demonstrating the system's operational capability. In 2013, the second MUOS satellite was successfully launched and reached its geosynchronous orbit. On-orbit testing was completed, and the second satellite and operations and maintenance of three of four ground stations were transferred to Government responsibility on November 15, 2013. Readiness of the third space vehicle (SV-3) for the third satellite launch was delayed because of an output multiplexer failure experienced in the legacy UHF payload during thermal vacuum testing. Root cause was identified as insufficient solder during manufacturing. SV-4 will be used for the third satellite launch, which is delayed until January 2015. With the overall responsibility to deliver a MUOS end-to-end (E2E) system, the program has taken the lead in executing the MUOS E2E Capability Test Strategy.

Lead DT&E Organization: SPAWAR SSC PAC

Summary of FY 2013 DT&E Activities

- October 13–20, 2012, the contractor completed End-to-End #3 (N2N-3) Part A factory system testing with satellite #4.
- January 3, 2013, COMOPTEVFOR released the MOT&E-1 test report.
- March 1–18, 2013, as part of the MUOS E2E Capability Test Strategy, the E2E Risk Reduction (RR)-1a test was completed.
- June 3–July 12, 2013, the E2E RR-1b test was completed.
- July 19, 2013, MUOS Satellite-2 (MUOS-2) was successfully launched.
- August 5–16, 2013, the E2E Defense Information Systems Network (DISN) system interface test (DSIT) was completed.
- September 25–October 27, 2013, Lockheed Martin conducted on-orbit system validation (OSV)-2 checkout and rehearsal activities in preparation for the OSV-2 test event in late

October–November 2013; these dry-run activities include network management, satellite control, geolocation, and over-the-air WCDMA call execution.
- September 26, 2013, the MUOS-2 on-orbit test completed.
- November 13, 2013, MUOS OSV-2 was conducted but not fully completed.

Summary of FY 2013 DT&E Engagement and Assessments
- Contractor N2N-3 Part A testing demonstrated use of the Network Management System fault management function, MUOS-MUOS Geolocation, and operation of basic gain variation closed-loop power control.
- MOT&E-1 demonstrated systems capability to support UHF communications and the satellite control segment (SCS) capability to command and control the spacecraft. COMOPTEVFOR reports that the MUOS legacy payload and SCS are operationally effective and operationally suitable.
- E2E RR-1a test demonstrated the first over-the-air integration effort between the MUOS Satellite-1 in orbit and the Army Handheld, Manpack, and Small Form Fit (HMS) Manpack radio with the MUOS High Power Amplifier (MHPA) radio that demonstrated basic registration, point-to-point (P2P), voice/data, and point-to-network interface.
- E2E RR-1b test expanded the integration and characterization of the MUOS waveform on the Army HMS MHPA to cover longer, more complex tests in different over-the-air conditions, including group voice/data calls, HMS human-machine interface demonstration, intra-satellite mobility, stressed terminal, emission control, local notching, JTRS Enterprise Network Manager provisioning, legacy/MUOS spectrum compatibility, and group multicast.
- E2E DSIT demonstrated Defense Switched Network and Nonsecure Internet Protocol Router Network (NIPRNET)/SIPRNET functionality through the MUOS-teleport interface and demonstrated use of the space situational awareness Generic Discovery Server (GDS) for GDS registration and queries in P2P operations using HMS MHPA.
- OSV-2 concluded on November 13, 2013. Three of four primary test objectives were successfully completed. WCDMA integration requires technical maturity and will be further tested as part of the MUOS E2E test strategy, prior to system technical evaluation planned in April 2014.
- The MUOS program did not request a waiver or deviation from requirements in the TEMP.

MQ-4C Triton Unmanned Aircraft System (UAS)

Executive Summary: The MQ-4C Triton UAS provides persistent maritime ISR 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 targets.

Lead DT&E Organization: NAWCAD Naval Air Test and Evaluation Squadron Twenty (VX-20)

Summary of FY 2013 DT&E Activities

- The Triton UAS accomplished first flight on May 22, 2013.
- Envelope expansion is ongoing, with seven flights conducted for 29.6 flight hours in 2013. Maximum altitude reached was 40,000 feet at the initial (medium) weight.
- The program continued MFAS radar risk reduction flight testing on a Northrup Grumman surrogate testbed aircraft, completing 13 test flights in FY 2013.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) actively engaged with the Triton UAS program in 2013 to establish flight test data access and prepare for a production decision.
- A ruddervator limit cycle oscillation condition was discovered in ground testing, leading to a first flight delay to incorporate a mass balance modification. Stability issues with the flight control integrated mission management computer caused additional delays in the first flight.
- Risk reduction T&E of the MFAS radar on the surrogate testbed aircraft continues to make slow but steady progress in maturing the radar modes before integration onto the Triton aircraft.
- The program continues to build up a significant interoperability development and test capability, using actual components and T&E networking capabilities. Development is progressing and the program is working through various connectivity issues.
- A MS B TEMP update was approved in January 2012 to support execution of T&E activities during the EMD phase and planning for P&D phase T&E. Continuing delays in software development of system capability are stretching out the DT program. A slip in the production decision has so far allowed the program to maintain the T&E strategy outlined in the TEMP.
- Initial safety-of-flight and flight envelope expansion testing has started, and the limited results by the end of FY 2013 indicate a nominal level of aircraft maturity for this early stage of DT. Flight test progress is slower than planned, and software development for communications and sensor functions necessary for the ferry flight and sensor integration are not complete.
- The MQ-4C program did not request a waiver or deviation from requirements in the TEMP.

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 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 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 in preparation for IOT&E. DASD(DT&E) completed its assessment of operational test readiness and recommended proceeding to OT with moderate risk.

Lead DT&E Organization: NAWCAD VX-20

Summary of FY 2013 DT&E Activities

- The P-8A completed its second phase of DT&E in September 2013, clearing or downgrading significant mission-affecting items discovered in the initial DT&E period. These areas included the following:
  - Safety: Fuel vapor inerting system.
  - Aircraft Systems: Flight management computer, fuel, and environmental control system.
  - Warfare: Weapons bay temperature control, countermeasures dispensing.
  - Sensors/Communications: Radar imaging and tracking, electro-optical/infrared sensors, common data link, SATCOM.
- Continued with improvements to and testing of the electronic support measures system to address DT&E and IOT&E performance shortfalls necessary for reconnaissance and targeting.
- Successfully completed aircraft icing tests and AGM-84 Harpoon captive-carry tests.
- Successfully released four AGM-84 Harpoon missiles near-simultaneously.
- Successfully engaged a surface target with a Harpoon missile.
- Began Increment 2 (additional ASW and anti-surface warfare capabilities) DT&E in July 2013.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) engaged in numerous data assessments with the Navy to support software increment testing with no restrictions to data.
- DASD(DT&E) worked with the program to update the baseline program TEMP for the Increment 2 effort as well as develop a draft Increment 3 TEMP.

- DT&E assessments were completed in June and September 2013 to support low-rate and full production decisions, respectively.

DT&E Assessment

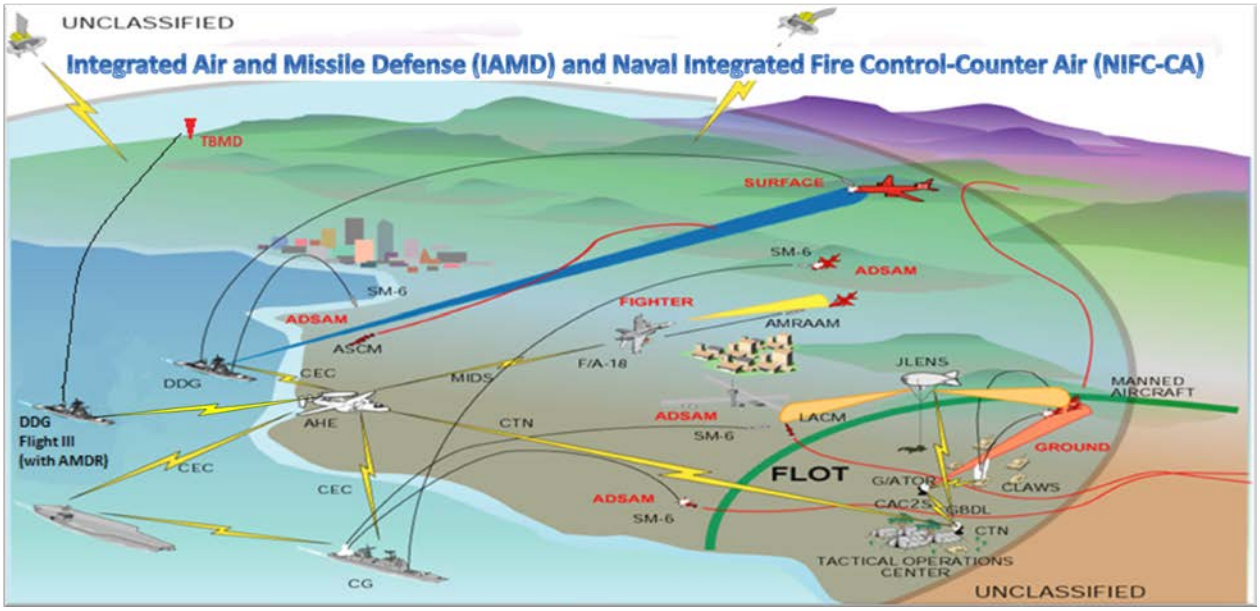
- In an October 18, 2013, memorandum, the DASD(DT&E) supported an additional limited production as well as an FRP decision based on favorable results in DT that addressed discrepancies found in DT&E.
  - All required KPPs and KSAs were either met or on track to be met by IOC.
  - Most major discrepancies were fixed, downgraded, or on track to be fixed or downgraded by IOC.
  - The program exceeded the logistics reliability KSA by more than 300 percent. The supporting reliability attribute of mean flight-hours between operational mission failure is assessed to be within approximately 10 percent of its threshold and continues to improve. Neither the DT&E test program nor current fleet training has experienced any negative effects from this shortfall.
  - Aircraft availability exceeds its threshold requirement by 15 percent and continues to grow toward its final requirement at IOC plus 2 years.
  - Test results identified no deficiency that would preclude aircraft production.
- DT&E results, confirmed by the results from the Navy's OTA 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 as noted for the electronic support measures system.
- The baseline P-8A system (with the correction of deficiencies demonstrated in DT&E) meets its requirements, is successfully performing the ASW mission as a P-3C replacement, and made its debut operational deployment in December 2013. Broad-area ASW concerns raised in the DOT&E beyond LRIP report will be addressed as part of a much larger Navy effort that will include future P-8 increments and integration of other affiliated ACAT programs in the ASW family of systems.
- The P-8A program did not request a waiver or deviation from requirements in the TEMP.

U.S. Navy Integrated Air and Missile Defense (IAMD)

Using Air and Missile Defense Radar (AMDR), DDG-51 Flight III Destroyer, and Aegis Modernization Programs

Naval Integrated Fire Control–Counter Air (NIFC-CA) Capability

Using Aegis Modernization, Cooperative Engagement Capability (CEC), and Standard Missile-6 (SM-6) Programs



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 in the context of a system of systems (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 FTS surface-to-air engage-on-remote 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 (JLENS); 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 PEO IWS 7.0 and supported by the individual programs. NIFC-CA FTA air-to-air engage-on-remote 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 this 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 the other NIFC-CA systems, the AMDR will provide the Flight III with a significant increase in IAMD and NIFC-CA capability.

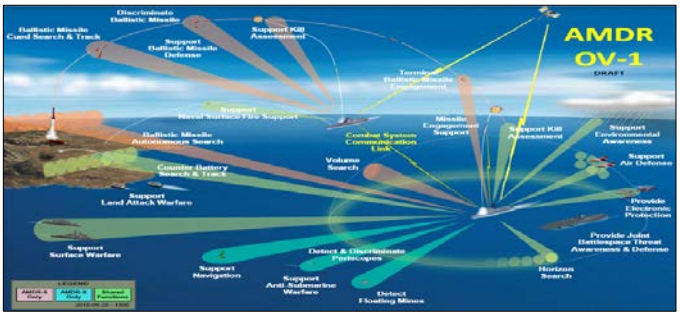
Each of the individual programs and their test plans/results that are integrated into the IAMD and NIFC-CA capabilities are discussed below.

DDG-51 Flight III

DDG-51 Flight III

The ARLEIGH BURKE (DDG-51) class ship is a multi-mission surface combatant capable of simultaneously engaging strike, antiair, antisurface, and antisubmarine warfare threats. DDG-51 class ships operate offensively and defensively as part of a carrier battle group, surface action group, amphibious task force, and underway replenishment group. The Navy is currently building the Flight IIA configuration (DDG-79 through DDG-122) 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 the new Flight III T&E.

Lead DT&E Organization: NSWC PHD



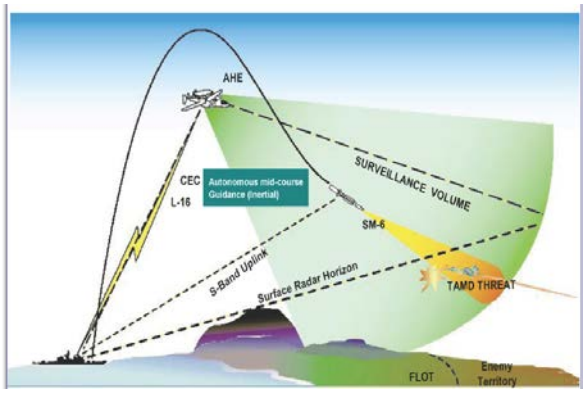
Air and Missile Defense Radar

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 engage-on-remote 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. ASN(RD&A) has agreed to provide a combined surface/air NIFC-CA TEMP for testing of Increment 2, which starts in 2019. The Chief Developmental Tester positions for the FTS, or surface-to-air, and FTA, or air-to-air, capabilities are vacant.

Lead DT&E Organization for FTS Capability: NSWC PHD
Lead DT&E Organization for FTA Capability: NAWC AD/WD

Aegis Modernization

The Aegis Modernization program consists of successive ACB upgrades to the Aegis Weapon System (AWS) 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 planned for testing in 2012, ACB 16 in 2016, and ACB Next 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 BL 9 T&E Strategy utilizes five test phases: Phase 1 consists of land-based tests (LBTs) to verify design requirements, Phase 2 consists of hardware/software tests in which the system goes through installation and checkout onboard the ship, Phases 3 and 4 consist of tests on production hardware in which system readiness for OT is verified, and Phase 5 is OT. BL 9 conducted Phases 1 through 3 testing in 2013.

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 currently being upgraded concurrently 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 an integrated fire control architecture (e.g., 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 supplemental tests in 2013, which are described below, and successfully achieved FRP.

Lead DT&E Organization: NSWC PHD

Summary of FY 2013 DT&E Activities

DDG-51 Flight III

- DDG-51 Flight III first ship DT is scheduled to begin in 2021.
- Preliminary planning for DDG-51 integrated system testing using Aegis ACB Next and AMDR has begun.

Air and Missile Defense Radar

- AMDR had no Government test events during 2013 but completed final TD phase contractor prototype testing.
- USD(AT&L) approved the AMDR program for the EMD phase during a MS B in September 2013.
- The AMDR program submitted a TEMP for OSD approval in August 2013.

NIFC-CA

- NIFC-CA FTS conducted SoS tracking exercises at SCSC, Wallops Island, Virginia, from January through March 2013 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.
- NIFC-CA FTS conducted tracking exercises and a live-fire demonstration in April 2013 at WSMR, New Mexico.
- NIFC-CA FTS conducted tracking exercises at SCSC and at sea from May through June 2013.
- NIFC-CA FTS conducted tracking exercises and a live-fire exercise at sea with tactically representative targets and tactical NIFC-CA architecture in August 2013.
- NIFC-CA FTA conducted various test events as part of the individual program (F-18, E-2D, AMRAAM, and MIDS) test events.

Aegis Modernization

- The Aegis Modernization program submitted a TEMP for OSD approval in August 2013.
- Aegis Modernization conducted a series of DT phases (DT-B2C and DT-B2D) in various BL configurations at SCSC in February 2013 to evaluate system performance against the requirements in the Naval Capabilities Document.

- Aegis Modernization was scheduled for a series of DT phases (DT-B2D through DT-B2L) at sea throughout 2013 aboard CG-60, CG-62, and DDG-53 representing the various BL configurations. This testing was initiated onboard USS CHANCELLORSVILLE (CG-62) but was suspended before all events were conducted because of a mishap with a threat target drone. The testing that was scheduled for this period is being rescheduled.

Cooperative Engagement Capability

- CEC continued the DT-IIIE-1 phase of testing into 2013 to assess the integration and interoperability between CEC and Aegis BL 9 as well as across all versions of CEC and to certify CEC readiness for OT-IIIG.
- CEC also conducted DT-IIIE-2 at SCSC during most of 2013 with the AN/USG-2B (CEC BL 2.1) along with the AWS BL 9 system. Additional land-based test site (LBTS) assets included legacy CEC variants and combat systems.
- CEC conducted DT-IIIE-3 testing at sea on the West Coast in conjunction with the Aegis Modernization and NIFC-CA testing in May, August, and November 2013 on an Aegis BL 9 ship. Specific CEC testing included simulated SM-2 and SM-6 engagements, interoperability testing, and various composite tracking events.

Standard Missile-6

- SM-6 conducted Flight Test Round (FTR) 25A live-fire test in August 2013 to regression test processor upgrades as part of the Processor Replacement Program and as part of SM-6 FOT&E.
- SM-6 conducted a live-fire (LF)-02 test at sea during the Aegis Modernization testing onboard CG-62 in August 2013.
- SM-6 was scheduled for two FOT&E test events during Aegis Modernization testing in November 2013 to evaluate SM-6 system performance against the requirements in the CPD. This testing was initiated onboard USS CHANCELLORSVILLE (CG-62) but was suspended before all events were conducted because of a mishap with a threat target drone. The testing that was scheduled for this period is being rescheduled.

Summary of FY 2013 DT&E Engagement and Assessments

DDG-51 Flight III

- The Navy intends to propose an update to the current Aegis Modernization TEMP as a starting point for the Flight III TEMP, which is required for the FY 2016 DAB. This approach will require the DDG-51 Flight III TEMP to include hull mechanical and electrical (HM&E) systems in addition to the ACB Next test plan. DASD(DT&E) desires this TEMP to coordinate the three significant test efforts that form the ship SoS (DDG-51 Flight III HM&E systems, Aegis Modernization ACB Next, and AMDR), but at a minimum, the Navy should strive for a common review and approval cycle for these TEMPs.
- 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 need for an upgraded SDTS to conduct live engagements in the near self-defense region to verify and validate the proposed end-to-end M&S is still unresolved. Additionally, 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 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 Next combat system development is complete, and a large number of Flight III ships have already been approved.

- DDG-51 Flight III will challenge the Chief of Naval Operations newly directed space, weight, power, and cooling KPP for all new platforms because all of these areas will be close to their design limits as a result of installing AMDR into a DDG-51 hull, leaving little margin for any future upgrading.

Air and Missile Defense Radar

- The AMDR program submitted a TEMP that covers DT at its LBTS in Hawaii in support of MS C in 2017.
- DASD(DT&E) approved the TEMP for land-based DT in support of MS C. The AMDR program must submit an updated TEMP for approval that covers post-MS C LBTS and at-sea testing.
- DASD(DT&E) directed the AMDR program to provide justification before conducting any AMDR IAMD DT using the Aegis Readiness Assessment Vehicle–M target that use of this target satisfies test objectives.
- DOT&E did not approve the TEMP because of the Navy's failure to program for an upgraded SDTS for post-MS C testing.
- 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. DASD(DT&E) encouraged the Navy and MDA to use the time during which the AMDR EDM is located at the Pacific Missile Range Facility (PMRF) as an opportunity to explore integration and testing with the existing Aegis Ashore LBTS and other BMDS components. By keeping the EDM array at PMRF beyond MS C, significant opportunities exist to use MDA test events that provide challenging ballistic missile targets and presentations to collect data and further refine AMDR modeling.

NIFC-CA

- NIFC-CA FTS is successfully conducting its test program in a deliberate "integrate a little, test a little, and learn a lot" approach.
- NIFC-CA FTS Increment 1 tracking exercises and live-fire events in 2013 were successful and achieved all test objectives.
- During this early NIFC-CA testing at the SCSC LBTS, at WSMR, and at sea onboard a CG configured with Aegis Modernization BL 9 combat system and SM-6, testing uncovered numerous issues that affect SoS performance. Details of these test results are classified and the Navy continues to pursue resolution before deployment of the NIFC-CA capability.
- DASD(DT&E) agreed with a Navy proposal to use its NIFC-CA FTS testing strategy approved by PEO IWS in September 2012 for NIFC-CA Increment 1 (testing through 2018), and the Navy will provide a NIFC-CA TEMP (covering both FTS and FTA) for OSD approval for Increment 2 testing.

Aegis Modernization

- The Aegis Modernization program submitted a TEMP that covers developmental and operational testing of the ACB 12 (BL 9) combat system upgrade.
- DOT&E did not approve the TEMP because of an inadequate probability of raid annihilation (P_{RA}) test strategy to support operational evaluations.

- 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 Aegis BL 9 against all requirements. However, DASD(DT&E) gave limited approval of DT in the proposed TEMP to conduct early testing in 1st quarter 2014, which was not P_{RA}-centric. The Aegis Modernization program must submit an updated TEMP for OSD approval before conducting DT beyond this early testing phase.
- Aegis Modernization tracking exercises and live-fire events in 2013 were generally successful. Most test events achieved all test objectives, and of the four live-fire missile tests, three were successful and one was unsuccessful. The T&E team is still investigating the cause of the unsuccessful missile, but it appears to be a reliability issue.
- During a tracking exercise as part of the Aegis Modernization DT-B2K, a threat target drone malfunctioned and physically impacted the test ship, USS CHANCELLORSVILLE (CG-62). The program suspended the remaining testing, which will need to be rescheduled. The Navy has suspended use of low-altitude, subsonic target drones until the mishap teams and failure boards complete their reports. This delay may impact the Aegis Modernization test schedule.

Cooperative Engagement Capability

- CEC planned to assess seven test objectives during the DT-IIIE phase. This phase of testing is still ongoing and final results are not yet available. Of the six objectives that have been tested, two objectives have preliminary results and four objectives still have testing/analysis in progress. One objective has not been tested.
- Interoperability issues with CEC and host systems still exist. These issues are being assessed during midterm actions of the Accelerated Midterm Interoperability Improvement Program testing, which continues into FY 2015. Situational awareness issues remain, and final fixes will be required in CEC and host system combat systems and are not expected to be in place until the far-term interoperability resolution post-FY 2015.

Standard Missile-6

- The SM-6 program conducted FTR-25A successfully at WSMR and demonstrated all test objectives.
- The SM-6 program conducted LF-02 and LF-04 (NIFC-CA) at sea aboard CG-62 during Aegis Modernization testing in August 2013. The flight test was successful and met all test objectives.
- SM-6 is rescheduling the additional LF-11 and LF-14 at-sea testing because of the mishap aboard CG-62 during Aegis Modernization testing in November 2013 as discussed above.

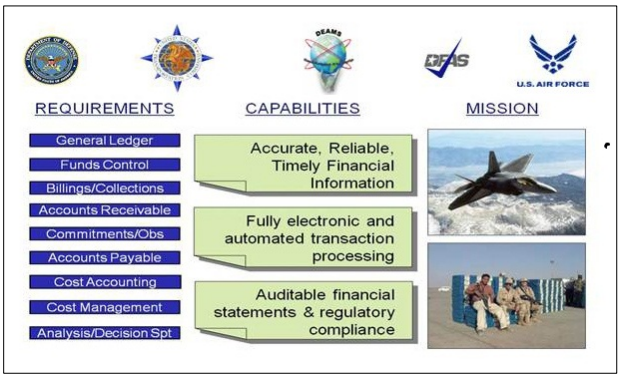
- The AMDR, DDG-51 Flight III Destroyer, Aegis Modernization, CEC, and SM-6 programs did not request a waiver or deviation from requirements in the TEMP.

6.4 Air Force Programs

This section includes summaries of the following 8 programs:

- Defense Enterprise Accounting and Management System (DEAMS)
- Global Positioning System (GPS) Enterprise
- HC/MC-130 Recapitalization
- 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 COTS-based funds management solution qualified by the Joint Financial Management Improvement Program. The goal of DEAMS is to provide accurate, reliable, and timely financial information through a modernized and integrated software solution accompanied by sound accounting processes proven through successful audits. The system integrates accounting and finance to manage both DoD appropriated and working capital funds and provides the functional capabilities necessary to manage a general ledger, control spending, make payments, manage receivables, measure costs, reconcile the agency's fund balance with the Department of the Treasury, and report in the Federal environment.

The DEAMS program achieved MS B in January 2012. The PMO focused development and testing efforts in FY 2013 toward mitigating adverse findings in DEAMS program processes and system performance identified in Air Force Operational Test and Evaluation Center (AFOTEC) and DOT&E reports based on an independent OA of DEAMS Increment 1 Release 1 in May–June 2012. The PMO developed and tested a series of corrective action post-production support (PPS) releases to Increment 1 Release 1 in parallel with development and test of functional enhancements in Increment 1 Release 2. In September 2013, the Milestone Decision Authority approved fielding to four more Air Mobility Command (AMC) bases to support another OA and to validate the Air Force multi-base deployment strategy. The PM updated the production baseline to Increment 1 Release 2 for all prior operating locations and deployed it to these four new bases effective October 1, 2013. AFOTEC began the second OA in August 2013 to complete in early 2nd quarter FY 2014. The assessment results will support any additional 2014 AMC fielding decisions. Delays occurred in issuing the RFP for COTS Oracle Enterprise Business Suite (EBS) R12 upgrade and the reimplementation planned for Release 3 to form the foundation of Releases 4–6. Additional technical discovery during remediation activities led the program to conclude that proceeding with the EBS upgrade from R11i to R12 was not technically required, more costly, and greater risk to schedule and execution complexity. At the request of the Milestone Decision Authority, the DEAMS program is preparing an updated business case and supporting documentation to support approval of a revised acquisition strategy.

Lead DT&E Organization: AFLCMC/HNIZ Enterprise Integration Branch

Summary of FY 2013 DT&E Activities

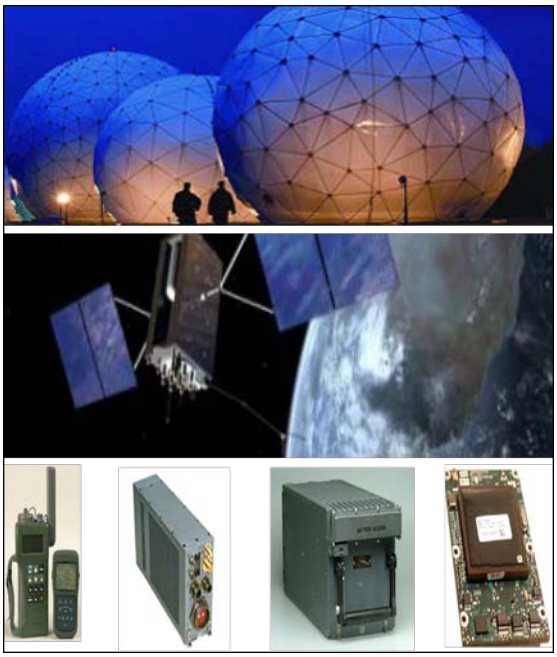
- August 8, 2012–February 15, 2013, contractor component validation and integration (CV&I) and Government qualification test and evaluation (QT&E) of defect fixes from post-McConnell fielding and to incorporate Oracle COTS user management components (1.R1.2, 1.R1.3).

- August 13, 2012–March 23, 2013, contractor CV&I and Government QT&E of fixes to defects identified from post-McConnell fielding (PPS 1.R1.3.1).
- August 15, 2012–July 16, 2013, contractor CV&I and Government QT&E of Oracle COTS user help and training aid components (1.R1.4).
- December 21, 2012–February 21, 2013, contractor CV&I and Government QT&E of Oracle COTS governance, risk, and compliance components (effort is not continuous) (1.R1.4).
- March 20–July 26, 2013, contractor CV&I and Government QT&E of Increment 1 Release 2, additional functional capabilities, and interfaces to support AMC bases (1.R2.1, 1.R2.2).
- June 9–August 16, 2013, contractor CV&I and Government QT&E of additional interfaces and defect fixes related to status of funds reporting and end of fiscal year activities (1.R2.4, 1.R2.5).
- June 18–June 20, 2013, 92nd Information Operations Squadron (IOS) performed a full blue team IA vulnerability assessment.
- Contractor CV&I and Government QT&E of defect fixes and minor enhancements resulting from the OA event conducted May/June 2012 took place as follows:
  - November 11, 2012–March 18, 2013 (PPS 1.R1.3.2).
  - February 4–May 10, 2013 (PPS 1.R1.4.2).
  - March 13–June 25, 2013 (PPS 1.R1.4.3).
  - June 12–December 13, 2013 (PPS 1.R2.5.1).
  - July 15–December 13, 2013 (PPS 1.R2.5.2).
  - August 21–December 13, 2013 (PPS 1.R2.5.4).

Summary of FY 2013 DT&E Engagement and Assessments

- The DEAMS program successfully completed planned DT&E release activities and continues to make progress remediating 2012 OA findings. The 2012 OA rated six of nine KPPs and three of six KSAs as significantly failing to meet threshold requirements. The PMO regularly collects operational data of deployed site usage of the production baseline. The September 2013 data indicate improvement across all prior shortfalls; however, two of nine KPPs and two of six KSAs remain significantly below threshold requirements. Procedural and system corrective actions are in progress to further improve system performance. The PM's get-well plan projects resolution of the remaining significant KPP/KSA shortfalls by August 2014.
- The PMO resolved deficiencies found during FY 2013 DT events, leaving no unresolved Severity 1 or 2 deficiencies prior to promoting the software to production.
- The 92nd IOS blue team vulnerability assessment found that the program satisfactorily mitigated all 2012 OA IA findings.
- The PMO is updating the TEMP to support MS C and reflect the revised acquisition strategy.
- The DEAMS program did not request a waiver or deviation from the requirements in the TEMP.

Global Positioning System (GPS) Enterprise



Executive Summary: GPS is a dual-use, military/civil system providing 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 an RF signal containing 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 completed several GPS III payload tests; assembly, integration, and test activities; seven functional configuration audits; five physical configuration audits; two exercises; one compatibility and integration (C&I) test; and two live-sky military navigation broadcast test events between the GPS III testbed and the Next Generation Operational Control System (OCX). GPS has used DT&E to demonstrate progress and reduce risk in its modernization and constellation sustainment efforts.

Lead DT&E Organization: SMC/GPE

Summary of FY 2013 DT&E Activities

- January and May 2013, GPS III conducted two security test and evaluations (ST&Es).
- February 10–15, 2013, the GPS program office conducted Modernized User Equipment (MUE) live-sky broadcast. The objective was to provide additional data to support critical technology elements: full backward compatibility and military code (M-Code) cryptology engine tracking and ranging.
- February 2013, the test team conducted GPS III Launch and Checkout System (LCS)/Launch and Checkout Capability (LCC) Exercise #2 and planned and executed a liquid apogee engine burn and exercised major mission sequence activities. The test team also performed telemetry, tracking, and command user interface checkout, maneuver planning tool checkout, and orbit determination activities.
- June 17–28, 2013, the GPS program office conducted MUE live-sky broadcast. The objectives were to compare MUE-Completion (MUE-C) anti-spoof performance to the Military GPS User Equipment Technical Requirements Document, direct M-code acquisition in challenged environments, and compare MUE-C blue force electronic attack (BFEA) performance to MUE final qualification test in BFEA and red jamming.
- July 13, 2013, Space Vehicle (SV) 01 completed nonoperational closed-loop and operational closed-loop testing. Redundancy management test development as well as transient suppression assembly characterization testing are ongoing; all are part of SV01 functional testing.

- July 29–August 2, 2013, GPS System Engineering and Integration (SE&I) conducted LCS/LCC Exercise #3. GPS SE&I will collect data for analysis/reporting of the system's ability to detect and resolve simple LCC/SV01 anomalies. Data from Exercise #3 will contribute to a Directorate-level launch readiness decision.
- October 4, 2013, Lockheed Martin Space Systems completed GPS III Nonflight Satellite Testbed (GNST) C&I test, designed to test early compatibility between the SV and ground antenna and as early risk reduction and path finding of compatibility between the SV and control segment.

Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) participated in the Annual GPS Enterprise Review Independent Program Assessment (Test Lead) (February 11 to March 1, 2013).
- DASD(DT&E) staff reviewed the MUE live-sky assessment February 2013 event test report. In all test cases, all MUE receiver cards operated as expected on both L1 and L2.
- DASD(DT&E) staff attended the Generation 3 Test Integrated Product Team via teleconference biweekly.
- DASD(DT&E) staff attended the MUE performance using M-code live-sky broadcast (June 2013 Event) at WSMR, New Mexico, and reviewed the Hot Wash slides. The test activates supported major program objectives mentioned above, to include improved anti-spoof capability.
- DASD(DT&E) staff reviewed the LCC/LCS Exercise #3 quick-look briefing, dated August 15, 2013. All test objectives and success criteria were met.
- DASD(DT&E) staff reviewed the SE&I assessment of GNST C&I execution. All GNST C&I baseline objectives were successfully completed ahead of schedule.
- DASD(DT&E) staff reviewed the GPS III program management review presentation, dated September 11–12, 2013. All but two GPS III technical performance measures (TPMs) exceed required threshold values; both exceptions are tagged as watch items.
- DASD(DT&E) staff led the way in development of the developmental evaluation framework for the GPS Enterprise TEMP (E-TEMP). DASD(DT&E) staff led two core team meetings, participated in three ITTs and E-TEMP Working Groups, and participated in meetings at all levels in coordinating the developmental evaluation framework inclusion into the E-TEMP.
- DASD(DT&E) developed an assessment of GPS cybersecurity DT&E. Recommendations include the following: update the current E-TEMP to address the cybersecurity DT&E process in the DT section of the TEMP, incorporate the IA items for the OCX from the developmental evaluation framework into IA test objectives so they are tested during early ST&E activities, and review the OCX software verification plan when available and include the software verification activity in the DT section of the TEMP.
- DASD(DT&E) recommends updating the E-TEMP to include the developmental evaluation framework (system level and segment levels), acquisition strategy changes, and information security, and incorporating segment-level DT&E into the core E-TEMP.
- The GPS program did not request a waiver or deviation from requirements in the TEMP.

HC/MC-130 Recapitalization

Executive Summary: The HC/MC-130 Recapitalization program will replace an aging fleet of HC-130P/N legacy aircraft incorporating the latest refueling, airdrop, and command and control communications technology to meet personnel recovery mission requirements. The primary mission of the HC-130J is helicopter air refueling and pararescue jumper deployment with rescue-related equipment. The MC-130J will incorporate the latest refueling, airdrop, and communications technology to meet special operations mission requirements.

The HC/MC-130 successfully completed developmental flight testing and evaluation on schedule and under budget. It successfully demonstrated all key requirements during DT&E, including reliability measures.

Lead DT&E Organization: 96th Test Wing

Summary of FY 2013 DT&E Activities

- No DT&E was conducted during FY 2013.

Summary of FY 2013 DT&E Engagement and Assessments

- A DT&E assessment was conducted in April 2013 to support the FRP decision. Based on the DT&E conducted to date, the DASD(DT&E) conveyed support of a favorable decision to the Acting Assistant Secretary of the Air Force for Acquisition.

DT&E Assessment

- In an April 17, 2013, memorandum, the DASD(DT&E) assessed that the HC/MC-130J met all of its key performance criteria and system attributes during DT&E. The HC/MC-130J demonstrated the ability to simultaneously refuel a helicopter and CV-22 and met its classified survivability criteria, and its observed 96 percent mission capable rate exceeded the 76 percent threshold.
  - The DASD(DT&E) expressed concern that the HC-130J configuration to be fielded will be augmented with additional capability that should undergo additional DT&E. A post-IOT&E modification to the HC-130J variant added multiple systems to provide similar capability to the HC-130P/N in performing personnel recovery missions. Although most of the additional systems are fielded on the HC-130P/N, the Specialized Automated Mission Suite with enhanced situational awareness had not been previously fielded.
  - The Force Development Evaluation (FDE) of the new mission suite concluded that key radar and defensive system control operations were adversely affected. The modification remains uncertified for interoperability because of critical combat identification issues. The Air Force plans to test fixes in FY 2014 that, if successful, should lead to interoperability certification.
- The HC/MC-130 Recapitalization program did not request a waiver or deviation from requirements in the TEMP.

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 aerial refueling 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 early phases of DT&E planning with no test aircraft having been delivered, and limited testing has been conducted to date.

Lead DT&E Organization: 412th Test Wing

Summary of FY 2013 DT&E Activities

- The program successfully completed the KC-46A critical design review in August 2013.
- Boeing delivered its Stage 3 test plans in April 2013, with the final Stage 4 test plan details scheduled for delivery in March 2014.
  - Flight testing of the B767-2C is scheduled to begin in June 2014, with the KC-46A first flight in January 2015.
- Testing in Boeing's software integration labs (SILs) progressed well, completing 54 percent of the total planned testing. SIL testing is running only about 2 weeks behind schedule. Software problem reports are being generated and closed at the expected rates. The bulk of the military-specific systems testing, including air refueling and defensive systems, had just begun at the end of FY 2013.
- DASD(DT&E) continued to work with the ITT to develop a more efficient flight test schedule. DASD(DT&E) led joint Air Force and Navy test team sessions to optimize air refueling receiver test efforts to qualify the KC-46 as a tanker in time to acquire sufficient test results to support the MS C decision as scheduled.
- Air Force maintainers will verify a portion of technical orders on the pre-DD-250 company-owned test aircraft during the DT phase.

Summary of FY 2013 DT&E Engagement and Assessments

- The military flight test schedule remains aggressive, requiring more efficient workload planning for test aircraft. The Stage 4 test plans should reflect Boeing's "right-sized" test approach and also level the workload between the test aircraft. Risk mitigations must be implemented and aggressively monitored to complete the test program on schedule.
- DASD(DT&E) continues to be actively engaged in the receiver certification issues. A significant gap must be closed during Stage 4 test plan build to align what Boeing has proposed for receiver certification testing prior to IOT&E and what DoD certifying agencies require. DASD(DT&E) is working with the Lead DT&E Organization and the program office to close this gap.
- DASD(DT&E) remains concerned about the insufficient calendar time planned for the correction of significant discrepancies and/or deficiencies discovered during DT prior to the planned start of

OT based on previous experience on like programs and is working with the ITT to find efficiencies within the schedule.

- 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 Boeing initiative to allow Air Force maintainers to validate some technical orders during the test program helps mitigate that particular portion of the risk.
- DASD(DT&E) has concerns about the current planning for interoperability testing. Some military-specific communication items have been binned for FAA testing, which will not likely provide sufficient information to support the required military certifications. DASD(DT&E) is working with the Lead DT&E Organization and the program office to ensure the appropriate binning, content, and DoD observation of the military-specific 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.

MQ-9 Reaper

Executive Summary: The MQ-9 Reaper is a multi-mission hunter-killer and 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 aircraft and obtained a low-rate production decision for Increment I, Block 5 aircraft in November 2012. The program continues development of Increment I, Block 5 capabilities along with incorporation of new, unplanned capabilities to support overseas contingency operations. The MQ-9 system meets the killer KPP and partially meets those for the hunter and net-ready.

Lead DT&E Organization: AFLCMC/WI

Summary of FY 2013 DT&E Activities

- MQ-9 Block 5 hardware and software development and testing continued in 2013 at the flight test facility in Gray Butte, California, and the system integration laboratory in Poway, California.
- The MQ-9 Block 5 prototype completed DT demonstration flights in 2013, showing basic system operation with the Block 30 Ground Control Station (GCS). Developmental evaluations of the Block 5 and Increment I functionality began in 2013.

Summary of FY 2013 DT&E Engagement and Assessment

- DASD(DT&E) was engaged in developing T&E options to support accelerating the fielding of Increment I capability resulting in a decision to conduct Block 5 FOT&E prior to Block 1 FDE.
- The MQ-9 TEMP was updated to address Block 5 T&E, reliability growth, and follow-on testing, and was approved in September 2012.
- The Block 1 system has demonstrated operational capability in the killer role and is currently in sustainment.
- The Air Force deferred 11 CPD requirements in 2011–2012 that the system will not meet or will only partially meet.
- Development continues for Increment I, Block 5 capabilities along with incorporation of new, unplanned capabilities to support overseas contingency operations. Correction of a fuel bladder design and installation issue delayed completion of Block 5 demonstration flight tests by several months. The Increment I configuration had 12 Category 1 deficiency reports remaining open at the end of 2013.
- Demonstration testing revealed that the integrated Block 5 configuration generates additional heat load, which limits ground operating times in hot weather environments. This appears to be a system design limitation that can be partially mitigated with some hardware and software modifications. This and other developmental issues are causing unplanned software changes and extending the development schedule.
- The system meets the "killer" requirement and partially meets the hunter and net-ready key parameters due to sensor limitations with specific target sizes and motion as well as imagery transmission issues.

- The demonstrated reliability of the Block 1 aircraft is 21 hours MTBCF, against a revised threshold of 19 hours for the Block 5 aircraft. At this time, there is insufficient operating time in the Block 5 configuration to assess its reliability.
- The integrated Increment I configuration was successfully demonstrated with the use of a Block 30 GCS to control a Block 5 prototype.
- The MQ-9 Reaper program did not request a waiver or deviation from requirements in the TEMP.

RQ-4B Global Hawk

Executive Summary: The Global Hawk is a high-altitude, long-endurance UAS providing ISR to Warfighters in low to medium threat environments. Global Hawks have been developed in discrete blocks of capability, and only Block 40 remains in development. Block 40 shares a similar airframe as 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 (GMTI) capability, spot and wide area search (WAS) imagery, and the capability to concurrently or separately collect GMTI and spot/WAS imagery.

Block 40 first flight was in November 2009 and the development effort is scheduled to complete in 2014. The program is preparing for a MS C decision following a Nunn-McCurdy breach in 2011.

Lead DT&E Organization: 412th Test Wing

Summary of FY 2013 DT&E Activities

- November 2012, completed analysis and reporting of radar performance testing.
- January 2013, accomplished software DT to assess the addition of radar collection management functions to the mission control station.
- Radar stability and interoperability update testing throughout 2013.
- Block 40 conducted 20 DT flights for 260 hours in FY 2013.

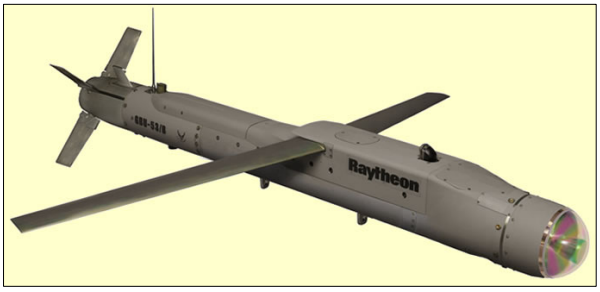
Summary of FY 2013 DT&E Engagement and Assessments

- DASD(DT&E) was engaged in developing an overall test strategy and assessing performance to support the Block 40 early fielding initiative in 2013.
- The Block 40 completed the radar system-level performance verification testing in July 2012, and analyses indicate that radar performance meets the draft CPD radar key performance requirements for SAR imagery and GMTI detections. The radar met 115 of 123 technical requirements, with shortfalls in SAR image quality, high resolution, and accuracy in one combined mode of operation.
- A software update added the radar collection management capability to the Block 40 control station, and testing demonstrated the capability to control both the aircraft and sensor from a single mission control station.
- Additional software updates addressed radar stability issues with concurrent imagery and GMTI collection, with early test results indicating a reduction of approximately 10 percent in the number of restarts.
- The Block 40 system has satisfied joint urgent operational need, threshold GMTI capabilities for a limited early operational capability, by demonstrating delivery of GMTI information to the National Geospatial-Intelligence Agency Real-time Dissemination and Operational Transmission Services server for retrieval and use by intelligence analysts.

- Continuing delays in software updates for the external Air Force Distributed Common Ground Station system to permit the exploitation of Block 40 radar imagery are delaying the completion of remaining interoperability and integrated system-level tests.
- The existing DT&E strategy, documented in the TEMP, is outdated and does not address current DT&E for Block 40. A TEMP update is in progress; however, its completion is dependent upon CPD requirement approval and is not likely to 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.

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.



SDB II is a joint interest Air Force and Navy program that as of December 2013 is 41 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 (CTVs) 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. Flight testing that began at WSMR, New Mexico, has since moved to Eglin AFB, Florida. Because of delays at the start and anomalies in the initial test flights, completion of the threshold test program will likely reset the LRIP decision to September 2014.

Lead DT&E Organization: 96th Test Wing

Summary of FY 2013 DT&E Activities

- DT continued with three tests in the spring of 2013 (CTV-5) and two GTV flights (GTV-3 and GTV-4) before testing was suspended for a 5-month period to evaluate performance anomalies related to guidance system control and glide wing deployment. Flight test resumed in the fall of 2013 after resolution of those outstanding anomalies with successful test events CTV-6, GTV-2A, and GTV-5, revisiting the test scenarios that revealed the anomalies as well as advancing into new scenarios. A December GTV-4a successfully guided to target but revealed an anomaly within the data link system that is under investigation.
- Captive flight testing continued with seven events collecting more than 200 hours of sensor performance in a variety of environmental conditions including rain, snow, and high humidity.
- The NSA Information Assurance Director certified the TacNet 1.1 radio, enabling Link-16 and UHF communications between the weapon and controlling platforms.
- F-35 integration tests demonstrated that the SDB-II fit within the weapons bay and had clearance for jettison.
- Hazards of electromagnetic radiation testing for ordnance compatibility was completed.
- The program office conducted design audits as a result of the previous fight test anomalies to identify other potential risk areas.

Summary of FY 2013 DT&E Engagement and Assessment

- Performance shortfalls in the guidance system under certain circumstances were significant enough for mission failure in the GTV-4 test. The program office worked with the vendor to identify and correct an error in the guidance software. These corrections will be verified during the remaining 2013 flight tests and into 2014.
- A design flaw discovered in the CTV-5 event led to a redesign of the wing tie rod assembly that has since been proven in successive CTV and GTV events.

- DASD(DT&E) has maintained that the limited production decision be based upon successful execution of nine specific guided flight test vehicle launches as well as two live-fire ("warshot") tests.
- The delays resulting from flight test anomaly resolution, modification and assembly of weapons, and slip in flight test due to Government shutdown result in a 12-month slip from original baseline estimates to complete the test program. Therefore, the earliest feasible initial production decision point is September 2014.
- To avoid additional delays to flight test, the program is modifying a replacement helicopter for captive-carry tests resulting from the loss of Army support for the UH-1 helicopter used by the program.
- The SDB II program did not request a waiver or deviation from requirements in the TEMP.

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 operational on hosted payloads. An integrated ground system acquisition baseline re-plan was completed in FY 2013, with planned IOC in 2nd quarter FY 2016 and full operational capability (FOC) in 3rd quarter FY 2018. The mobile ground system, SBIRS Survivable Endurable Evolution (S2E2), was put on contract on June 28, 2013, with anticipated delivery of the first article in 3rd quarter FY 2018.

Lead DT&E Organization: SMC/ISET

Summary of FY 2013 DT&E Activities

- Completed planned system-level pre-launch tests on GEO-2, including external interface testing and launch base compatibility testing, leading to successful launch on March 19, 2013.
- Completed planned system-level on-orbit testing of GEO-2, including an initial function test, crew readiness demonstration, and payload calibration leading up to trial period entry and subsequent entry into operations.
- Performed regression testing of revised ground and GEO flight software, paving the way for software updates prior to the GEO-2 trial period.
- Significantly revised and began coordination of the E-TEMP documenting future SBIRS T&E plans. OSD coordination is targeted for February 2014, prior to Block 10.2 testing, which is currently not reflected in the approved E-TEMP.

Summary of FY 2013 DT&E Engagement and Assessments

- GEO initial operations/E-5 (Effectivity 5: GEO Message Certification) integrated test, trial period, initial mono-track operations:
  - Initial operational trial period occurred from September 27 to November 27, 2012. An additional trial period occurred in April–May 2013, after resolution of a dependability-based deficiency.
  - Air Force Space Command operationally accepted GEO-1 on May 17, 2013.
- GEO-1 Root Cause Analysis Review (January 28, 2013):
  - Assessed completeness of analysis and potential impacts of a dependability-based deficiency prior to GEO-2 launch.

  - Determined that root cause analysis was sufficient to increase confidence in the resolution of the GEO-1 dependability-based deficiency and that implementation on future vehicles would not negatively affect operations.
- GEO-2 launch compatibility testing, on-orbit testing, sensor calibration:
  - GEO-2 successfully launched on March 19, 2013, and completed early orbit testing; initial Remote Ground Station–East acquisition, sensor tuning, ground software update, and regression testing completed in August 2013, and the final DT report has been completed. GEO-2 entered a trial period on October 21, 2013, with no liens.
- Ground segment (Block 10.1, 10.2) installation, checkout:
  - The integrated ground segment acquisition strategy involves four deliveries designated Blocks 10.1, 10.2, 10.3, and 20.
  - Block 10.1 involves delivering the hardware and software Increment 2 baseline to the Launch and Anomaly Recovery Center in the Mission Control Station (MCS) at Buckley AFB, Colorado. Although not an operational delivery, this capability is essential for testing GEO-3 in SBIRS System Test 5003 and to be used later for launch and early on-orbit test (planned for September 2015). The hardware and software are being integrated at the MCS. Testing of the installed hardware and software has not yet started.
  - Block 10.2 is a risk reduction phase that involves replacing the Increment 1, Silicon Graphics-based IRIX Mission Processor hardware suite with an IBM-based AIX suite. Associated ground control software will undergo the AIX upgrade as necessary to provide non-degradation of Increment 1 capabilities. Block 10.2 is not an operational delivery but will provide the foundation for GEO starer processing. The hardware and software are being integrated at the contractor's facility. Testing has not yet started. Once tested at the contractor's facility, the hardware and software will be installed at the MCS.
- Future SBIRS Enterprise T&E planning:
  - The SBIRS TEMP Working Group and Core Team produced a comprehensive update to the SBIRS E-TEMP, documenting future T&E activities through future space vehicle deliveries (GEO 5–6, HEO 3–4), integrated ground system (Block 10.3, 20), and mobile ground system (S2E2).
  - The updated E-TEMP includes DT and cyber evaluation frameworks to provide evaluation-guided test planning; decision criteria for acoustic testing beyond GEO-4 to ensure sufficient ground DT&E for mission assurance; and installation/checkout associated DT&E, integrated test, and OT&E plans to deliver ground capabilities as efficiently as possible.
  - The STAT in T&E Center of Excellence (COE) has engaged with the program through ITT discussions, leading an evaluation of E-5 OUE data to inform updates to DT&E M&S scenarios to ensure rigorous evaluation of IOC and FOC.
- The SBIRS program did not request a waiver or deviation from requirements in the TEMP.

Abbreviations and Acronyms

ABCT	Armored Brigade Combat Team
ACAT	Acquisition Category
ADM	Acquisition Decision Memorandum
AEC	Army Evaluation Center
AEDC	Arnold Engineering Development Center
AF/TE	Air Force Directorate of Test and Evaluation
AFB	Air Force base
AFED	Aviation-Fires Evaluation Directorate
AFLCMC	Air Force Life Cycle Management Center
AMPV	Armored Multi-Purpose Vehicle
AoA	analysis of alternatives
APG	Aberdeen Proving Ground
AS	Acquisition Strategy
ASN(RD&A)	Assistant Secretary of the Navy for Research, Development, and Acquisition
ASW	antisubmarine warfare
ATEC	Army Test and Evaluation Command
ATO	authority to operate
BMDS	Ballistic Missile Defense System
C2	command and control
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
C4ISRED	C4ISR Evaluation Directorate
CDD	Capability Development Document
CIO	chief information officer
CLM	continuous learning module
COE	center of excellence
COMOPTEVFOR	Commander, Operational Test and Evaluation Force

CONOPS	Concept of Operations
COTS	commercial off-the-shelf
CPD	Capability Production Document
CTEIP	Central Test and Evaluation Investment Program
CTP	critical technical parameter
CY	calendar year
DAB	Defense Acquisition Board
DACM	director of acquisition career management
DAE	Defense Acquisition Executive
DAES	Defense Acquisition Executive Summary
DAG	Defense Acquisition Guidebook
DASD(DT&E)	Deputy Assistant Secretary of Defense for Developmental Test and Evaluation
DASD(SE)	Deputy Assistant Secretary of Defense for Systems Engineering
DAU	Defense Acquisition University
DAWDF	Defense Acquisition Workforce Development Fund
DAWIA	Defense Acquisition Workforce Improvement Act
DIACAP	DoD Information Assurance Certification and Accreditation Process
DISA	Defense Information Systems Agency
DoD	Department of Defense
DoDI	DoD Instruction
DOE	design of experiments
DON	Department of the Navy
DOT&E	Director of Operational Test and Evaluation
DT	developmental test/testing
DT&E	developmental test and evaluation
EDM	Engineering Development Model
EMD	Engineering and Manufacturing Development
EMRG	electromagnetic railgun
EPG	Electronic Proving Ground

EW	electronic warfare
FAA	Federal Aviation Administration
FDD	full deployment decision
FDE	Force Development Evaluation
FFRDC	Federally Funded Research and Development Center
FIPT	Functional Integrated Product Team
FOT&E	follow-on operational test and evaluation
FRP	full-rate production
FTA	From-the-Air
FTS	From-the-Sea
FY	fiscal year
GFE	Government-furnished equipment
GOTS	Government off-the-shelf
GPS	Global Positioning System
HEL	high-energy laser
IA	information assurance
IAMD	integrated air and missile defense
IATO	interim authority to operate
ICBM	intercontinental ballistic missile
ICD	Initial Capabilities Document
iNET	integrated Network Enhanced Telemetry
IOC	initial operational capability
IOT&E	initial operational test and evaluation
IPT	Integrated Product Team
IRCM	infrared countermeasures
ISR	intelligence, surveillance, and reconnaissance
ISTF	Installed System Test Facility
IT	information technology
ITT	Integrated Test Team

IWS	Integrated Warfare Systems
JITC	Joint Interoperability Test Command
JMETC	Joint Mission Environment Test Capability
JMS	Joint Space Operations Center (JSpOC) Mission System
JROC	Joint Requirements Oversight Council
KLP	Key Leadership Position
KPP	key performance parameter
KSA	key system attribute
LRIP	low-rate initial production
LUT	limited user test
LVC	live, virtual, and constructive
M&S	modeling and simulation
MAGTF	Marine air-ground task force
MAIS	Major Automated Information System
MDA	Missile Defense Agency
MDAP	Major Defense Acquisition Program
MOT&E	multi-Service operational test and evaluation
MRTFB	Major Range and Test Facility Base
MS	Milestone
MSED	Mounted Systems Evaluation Directorate
MTBCF	mean time between critical failures
NASA	National Aeronautics and Space Administration
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

NIE	Network Integration Evaluation
NSWC	Naval Surface Warfare Center
NSA	National Security Agency
OA	operational assessment
OIPT	Overarching Integrated Product Team
OSD	Office of the Secretary of Defense
OT	operational test
OT&E	operational test and evaluation
OTA	Operational Test Agency
OTRR	operational test readiness review
OUE	operational utility evaluation
P&D	Production and Deployment
PEO	program executive office
PHD	Port Hueneme Division
PIM	Paladin Integrated Management
PM	program manager
PMO	program management office
RAM	reliability, availability, and maintainability
RDT&E	research, development, test, and evaluation
REP	Resource Enhancement Project
RF	radio frequency
RFP	request for proposal
RGC	reliability growth curve
RSDP	Regional Service Delivery Point
S&T	science and technology
SATCOM	satellite communications
SBIRS	Space-Based Infrared System
SCI	sensitive compartmented information
SCSC	Surface Combat System Center

SDTS	Self-Defense Test Ship
SE	systems engineering
SEP	Systems Engineering Plan
SES	senior executive service
SIPRNET	Secret Internet Protocol Router Network
SIT	system integration test
SMC	Space and Missile Systems Center
SME	subject matter expert
SoS	system of systems
SPAWAR	Space and Naval Warfare Systems Command
SRW	Soldier radio waveform
SSC PAC	SPAWAR Systems Center Pacific
STAT	scientific test and analysis techniques
STEM	science, technology, engineering, and mathematics
SYSCOM	systems command
T&E	test and evaluation
TD	Technology Development
TECHEVAL	technical evaluation
TEMP	Test and Evaluation Master Plan
TEWG	T&E Working Group
TRMC	Test Resource Management Center
TRR	test readiness review
TS	top secret
UARC	University Affiliated Research Center
UAS	unmanned aircraft system
UAV	unmanned aerial vehicle
UCLASS	Unmanned Carrier-Launched Airborne Surveillance and Strike
UHF	ultrahigh frequency
U.S.C.	United States Code

USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
WSMR	White Sands Missile Range

Department of Defense Developmental Test and Evaluation FY 2013 Annual Report

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