

INTRODUCTION



FY 2010 Annual Report

In my first report to you last year, I discussed four initiatives I was undertaking as Director of Operational Test and Evaluation. In this Introduction, I describe the progress I have made during the past year in executing those initiatives.

PROGRESS ON INITIATIVES

1. Field new capability rapidly. My first initiative is to field new capability rapidly. This has also been the top priority for the Secretary of Defense. We must get the capabilities needed by our fighting forces to them as quickly as possible. This initiative remains a challenge. While we want to move technology to the operating forces quickly, we must assure that the added capability is an improvement and that it does not create added risk in the field. In this effort, the operational testers must rely heavily upon the results of developmental testing. This includes the incorporation of field conditions into developmental tests and the early assessment and achievement of reliability growth. Here, innovation and teamwork among the entire test community are essential. My staff continually reviews programs to identify candidates for early fielding or accelerated testing. DOT&E reviewed acquisition programs on DOT&E oversight that have not have started engineering and manufacturing development. Nearly half of these early programs have had or plan to have some type of realistic operational assessment in 2010 or 2011 prior to their Milestone B decision.

Rapid fielding does not mean we bypass testing. One consequence, however, is that systems can be committed to combat operations before Initial Operational Test and Evaluation and full-rate production. Under that circumstance, Congress requires DOT&E to submit Early Fielding Reports. In FY10, DOT&E delivered a report on the Littoral Combat Ship in compliance with Title 10, Section 2399 of U.S. Code. We submitted another report to the Secretary of Defense concerning the National Capitol Region Integrated Air Defense System. Early Fielding Reports are also provided to the Services to support their fielding decisions and to the Combatant Commanders to make our joint forces aware of the systems' capabilities and limitations. In addition, we are striving to make all our operational test and evaluation reports more readily available to the end users of the equipment. Our reports are now available through the Defense Technical Information Center (DTIC). We have established points of contact within each Combatant Command, and we have a classified website that is accessible throughout the DoD. We are exploring other options to ensure the information is provided not only to decision makers but to the fighting forces as well.

Last year I reported on the successful rapid acquisition of the Mine Resistant Ambush Protected (MRAP) Combat Vehicles. DOT&E played an important role in the success of the MRAP deployment. I delivered my assessment of the test and evaluation of the MRAP Family of Vehicles to Congress in March. As described in that report, testing revealed a need for improvements to selected MRAPs; those improvements were developed and implemented rapidly.

DOT&E utilized lessons learned from initial MRAP testing to generate a plan for testing the MRAP All-Terrain Vehicle (M-ATV). The plan incorporated features to identify and mitigate potential vulnerabilities early in the test program, enabling the Department to rapidly procure vehicles providing Service members with both the mobility and protection required for combat operations in Afghanistan.

The Army intends to improve the survivability of the Stryker family of vehicles deployed to Afghanistan by the development of an improved hull design, referred to as the Double-V Hull (DVH). DOT&E has supported this rapid acquisition with a test program enabling an assessment of DVH survivability and protection prior to the vehicles' positioning in Afghanistan in 2011. The T&E program will compare the performance of the new Double-V design with the baseline, fielded Stryker vehicles to ensure that the new hull design improves survivability afforded to soldiers against under-vehicle Improvised Explosive Devices, while maintaining other aspects of Stryker effectiveness and suitability, particularly its mobility.

The Joint Test and Evaluation (JT&E) program, established in 1972, continues to provide rapid solutions to operational problems identified by the joint military community. DOT&E manages the JT&E program and executes it in partnership with the Combatant Commanders. Products of the program include improved tactics, techniques, and procedures (TTPs) and training packages. In addition to seven joint tests, the JT&E program conducted 12 quick reaction tests and two special

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projects this past year. The Hostile Fire Indicator (HFI) special project developed TTPs to improve rotary wing aircraft survivability against unguided munitions. Our recent rotorcraft survivability study showed that unguided ballistic weapons such as rocket propelled grenades, rockets, small arms, and automatic weapons have been the most prevalent threats to helicopters since 2002 in both Operation Enduring Freedom and Operation Iraqi Freedom. The Services are currently adapting existing warning systems and countermeasures used to defeat infrared and radio frequency-guided weapons to also defeat unguided weapons. Tactics development has been very important for using these HFI systems to improve the overall survivability of flights of single and multiple aircraft. The JT&E special project also recommended that the Services add an HFI training capability to their existing helicopter simulators used for training and tactics development.

2. Engage early to improve requirements. One of the key problems facing testers and developers is requirements that are not testable or technically feasible. Unless programs start with clear, sensible, and rationalized requirements, the program and its testing suffer. To help address this issue, DOT&E action officers participate in the requirements generation process to help ensure the DoD gets them right.

A recent example of DOT&E's involvement in early review of requirements is the Army's Ground Combat Vehicle (GCV). I conducted an assessment in which I compared the GCV's requirements to those for the Future Combat System (FCS) Manned Ground Vehicle (MGV) and the M2A3 Bradley. I found that in terms of mobility and transportability, there were no significant design constraints. However, other requirements such as survivability, reliability, and command, control, and communications (C3) were problematic. In particular, the reliability requirement was twice that of the Bradley, and has yet to be demonstrated by any heavy tracked vehicle. In addition, the C3 requirements were ambiguous, leaving to the contractor the responsibility to develop both hardware and software to implement the battle command network, with no mention of integrating government furnished equipment such as Blue-Force tracker or the Joint Tactical Radio System. At the direction of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)), the Army has re-structured the GCV request for proposals to assure the vehicle's design requirements reflect essential combat capabilities that can be achieved within five to seven years.

Another example involves the Navy's Advanced Hawkeye (E-2D). The E-2D program is integrating Cooperative Engagement Capability (CEC) hardware and software onto the aircraft. The reliability requirement for the CEC components was written for the shipboard system, which operates continuously. However, the aircraft reloads the software prior to each flight, implying the need for a less stringent reliability requirement than for shipboard operations. Nonetheless, the initial E-2D CEC reliability requirement of 450 hours was about 50 times higher than the corresponding requirement for the aircraft's radar. DOT&E questioned the Navy about this requirement and the Service agreed it was unrealistic. The Navy has now adopted a more realistic reliability requirement for the E-2D radar.

As another example of early involvement, I provided the USD (AT&L) an operational assessment of the Joint High Speed Vessel (JHSV) prior to the Milestone B decision point. The Army and Navy are procuring the JHSV to provide for rapid intra-theater transport of medium-sized Army and Marine Corps payloads. The JHSV is a modified version of an existing commercially-available catamaran. Classified as a non-combatant, the JHSV will be constructed to American Bureau of Shipping standards and will not be required to meet Navy survivability standards. I reported in my assessment that the Army and Navy plans for employing the JHSV did not match the capabilities that were being built; additionally, the system would not satisfy the Joint Integration Concept for Sea-basing. As a result of our early involvement, the Department's leaders made decisions resolving the mismatch between JHSV's capabilities and the Services' plans for using the vessel. Both Services revised their concept of operations once they understood the technical and design limitations of the JHSV.

DOT&E seeks opportunities to be involved in reviewing requirements whenever possible. For each project under oversight, we strive to identify operational and testing concerns to program offices and the Department's leadership at the earliest possible time so that issues can be resolved in a timely manner. As part of the T&E working group, we assure developers and the operational community share a clear, common understanding of the planned Concept of Operations (CONOPS) or identify inconsistencies in those views. If the CONOPS is not available, we work to assure a representative set of CONOPS is included in the development of the Test Strategy.

3. Integrate developmental, live fire, and operational testing. This initiative encourages all testers – contractor, developmental, operational, and live fire – to plan an integrated test program, seeking an efficient continuum. Each test type has a different objective, but data from each test can provide insight into others. Our goal is to have an efficient test program that is not duplicative.

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In Figure 1, a notional test program shows increasing operational realism earlier in the program may help decrease testing further on. We want to test early in a mission context and in realistic operational environments – even for component testing – to discover problems early. Evaluators must plan to use all test data to support their evaluations to the extent possible. But, dedicated operational testing is still required.

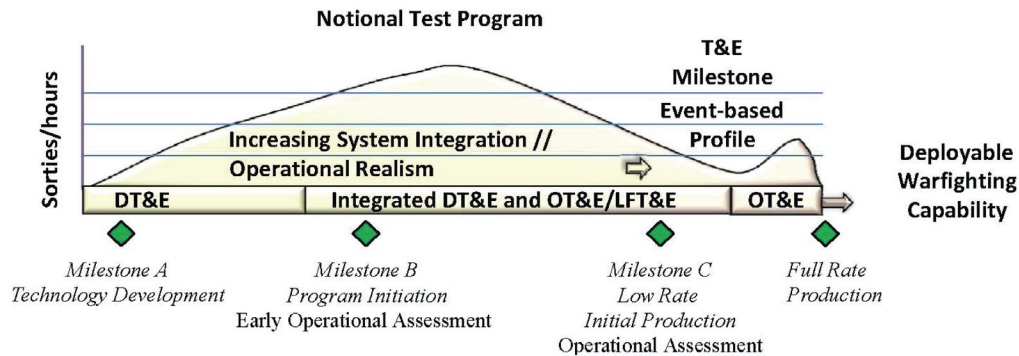


FIGURE 1. NOTIONAL INTEGRATED TEST CONTINUUM

Our test resources are limited. For example, in some cases our test ranges are not large enough to conduct full-scale tests. We also have limited time available for testing and the number of test articles is limited – either by cost or by the time to produce them. To overcome these constraints, we must use statistical tools. Stochastic simulations provide synthetic forces to supplement the use of operational units and also supplement field tests for conditions that cannot be replicated in the field. Statistical methods also facilitate rigorous assessments of systems when only small samples of test data are available.

To deal with many of the foregoing testing constraints, we are promoting the use of Design of Experiments (DOE), which is a structured and rigorous statistical tool. We are working to make DOE commonly used throughout the test community for test planning, execution, and evaluation. DOE will help develop an integrated developmental and operational test program providing confidence that the performance of a system is understood. In May 2009, DOT&E and the Operational Test Agencies (OTAs) signed a joint letter endorsing the use of DOE. I provided further guidance on the application of DOE that I expect to see in Test and Evaluation Master Plans (TEMPS) and detailed Test Plans. We have engaged in joint training with the Director, Developmental Test and Evaluation (DDT&E) on the use of DOE. With DDT&E, the OTAs, and other Service parties, we are developing a roadmap for the institutionalization of scientific test design and statistical rigor by using DOE in test planning and evaluation. To develop the roadmap, we will assess the current state of analytic capabilities within each of the Services and OSD and develop options for providing the support that Services and Agencies will need to increase the rigor of test design.

4. Substantially improve suitability before IOT&E. My office has made improving suitability, particularly reliability, a priority for many years. The importance of Reliability and Maintainability for reducing life cycle costs is gaining recognition throughout DoD. Numerous studies on the subject indicate there are solid returns on investments made for reliability ranging from about 7:1 up to as much as 50:1 if reliability testing is incorporated early in a program's life cycle. Over the past two years, DOT&E and USD (AT&L) have worked together to achieve improvements in system reliability. Examples include:

- Updated policy in DoDI 5000.02 to require reliability growth
- Approved a new industry standard for best practices for reliability – ANSI/GEIA-STD-0009: Reliability Program Standard for Systems Design, Development, and Manufacturing
- Published sample RFP and contract language to assure reliability growth is incorporated in system design and development contracts
- Updated the DoD *Reliability, Availability, Maintainability & Cost (RAM-C) Manual*
- Sponsored development of the Reliability Investment Model; and
- Began drafting the *Reliability Program Handbook*, HB-0009
- Prepared a draft Directive Type Memorandum “Reliability, Analysis, Planning, Tracking, and Reporting”

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The Weapon Systems Acquisition Reform Act (WSARA) of 2009 also added emphasis on reliability by specifying responsibilities for the Director of Systems Engineering and the DDT&E. Nevertheless, our data show that nearly 25 percent of the programs we reported on in 2010 were not suitable because of poor reliability. Results of operational testing over 25 years of DOT&E's existence show a steady decrease in the percentage of systems rated as suitable until about 2006. This encompasses the bulk of the period of "Acquisition Reform" in which the Department gave up many of its previous roles in the acquisition process including the promulgation of standards and the oversight of quality control, systems engineering, reliability, and developmental testing. In the 2005-2006 time period, we implemented several initiatives to improve system reliability before systems entered their Initial Operational Test and Evaluation. The initial fruits of this effort may be seen in the slight upturn in the number of systems assessed as suitable since 2006, as shown in Figure 2.

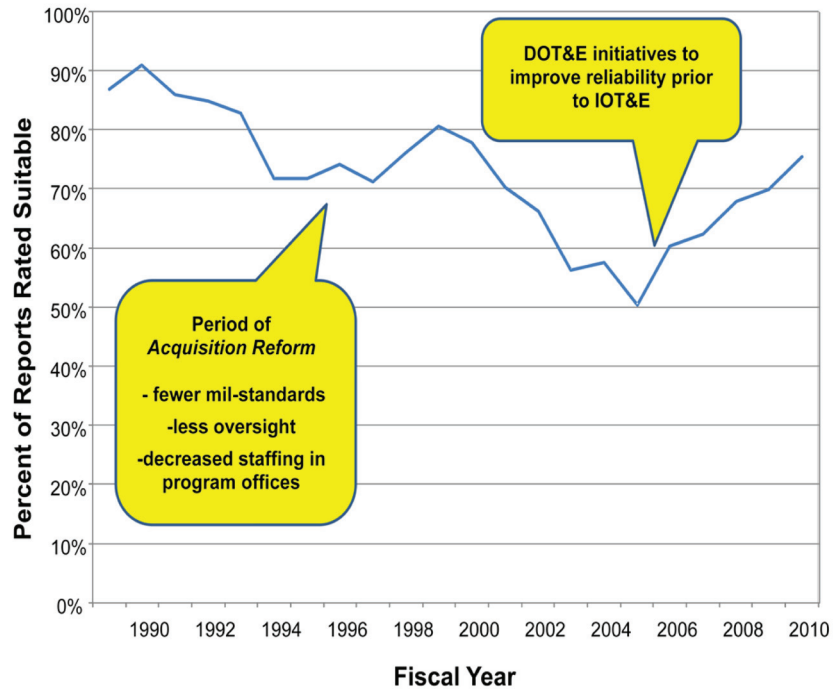


FIGURE 2. FRACTION OF REPORTS WITH FINDINGS RATED SUITABLE (5-YEAR MOVING AVERAGE)

A review of TEMPs submitted for formal review in FY10 showed increased inclusion of reliability considerations from 2009. As shown in Figure 3, in 2009, only eight percent of TEMPs reviewed included reliability growth curves compared with 24 percent of TEMPs reviewed in FY10. Sixty-five percent of FY10 TEMPs documented a reliability strategy (35 percent of those included a growth curve), while only 20 percent of FY09 TEMPs had a documented reliability strategy. Further, three TEMPs were disapproved, citing the need for additional reliability documentation, and four other TEMPs were approved with a caveat that the next revision must include more information on the program's reliability growth strategy.

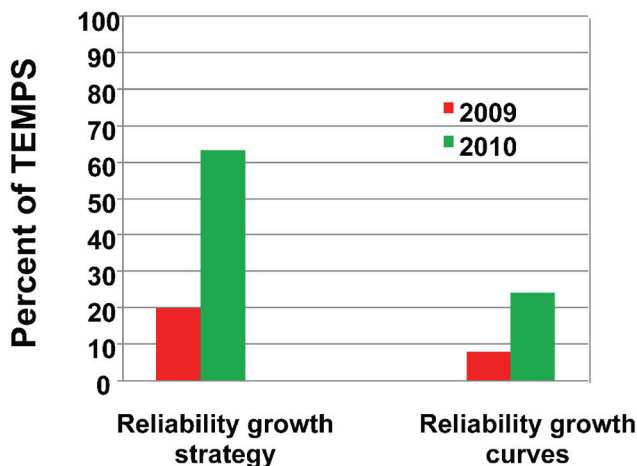


FIGURE 3. PERCENTAGE OF TEMPs WITH RELIABILITY GROWTH STRATEGIES/CURVES

However, a great deal remains to be done. To remedy this, I proposed to the USD (AT&L) that we take action in three areas:

- Clarify and strengthen Department policy and require more complete and uniform compliance,
- Add workforce resources and upgrade the Department's educational programs, and
- Introduce more rigor and objectivity into planning reliability test programs.

To this end, the USD (AT&L) has tasked the Reliability Senior Steering Group to "...assess existing reliability policy, and ... propose actions for [his] approval that will improve effectiveness." The steering group established three working groups to examine changes with respect to policy, practices and personnel. A Directive-Type Memorandum (DTM), which implements changes to the Department's policies meant to improve the reliability of weapon systems, should be signed soon.

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OTHER INTEREST AREAS

Test and Training Ranges. The Department's test and training ranges continue to face the challenge of maintaining mission capability while remaining compatible with external factors such as environmental concerns, urban sprawl, frequency spectrum usage, and renewable energy initiatives. These external pressures increasingly are limiting factors for conducting realistic operational tests. A noteworthy limitation for operational test and evaluation is the decreased access to frequency spectrum. Worldwide demand for frequency spectrum access is increasing and DoD spectrum requirements are following suit. I will remain vigilant in encouraging DoD to address these challenges.

Body Armor. As indicated in last year's report, protecting our Soldiers is a critical mission. Last year, in response to the Government Accountability Office recommendation to conduct an outside review of the Department's procedures to conduct body armor testing, I engaged the National Academies and their experts to review the Army's body armor testing. The academies have rendered two interim reports and will issue their final report in January of 2011. I can report that the experts from the National Academies confirmed the validity of the Department's testing methods and procedures and provided a range of recommendations to improve body armor testing. I support these recommendations and have obtained funding to implement them. One key recommendation, to implement a statistically based test protocol, has been accomplished. The study committee also applauded DOT&E for assuming a National leadership role in the body armor test community.

Active Protection Systems. In response to FY08 legislation, DOT&E continues to direct testing of active protection systems with the potential of protecting tactical vehicles. Presently, six manufacturers (two foreign, two domestic, and two combined foreign/domestic) are participating in this program. Testing will continue through 2QFY11. Upon completion, DOT&E will provide reports to Congress and the Department's acquisition leadership. This effort will determine the capabilities of current active protection system technology and guide future acquisition decisions regarding the incorporation of that technology in combat vehicles.

Missile Defense. We are developing methods to quantify confidence in the performance of ballistic missile defenses using all available data. The available data include flight tests, ground tests, modeling and simulation, and evaluations by subject matter experts. In performing this analysis, we are utilizing Bayesian methods to rigorously aggregate these disparate information sources. The techniques we are using have shown good results in certifying the performance of both medical equipment and the U.S. nuclear stockpile.

Helmets. The Department continues to test new designs of combat helmets. This year the Marine Corps began developmental testing the new Enhanced Combat Helmet (ECH), which seeks to provide increased ballistic protection over current helmet designs. The Marine Corps has worked hard to address this technically challenging effort, and I anticipate the first of several ECH designs will begin rigorous live-fire testing under DOT&E oversight in early 2011.

Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC). As a result of our MRAP report, the Secretary directed that actions be taken to improve the availability of combat casualty data coming from the Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) Program Office. These data are necessary to assess how well vehicles are performing in theater, both in comparison to test events, as well as to identify any new or unusual trends in threat or vehicle response that may require additional testing and/or exploitation. We led the effort, in collaboration with the Army Surgeon General, to initiate and implement a Lean Six Sigma process with the JTAPIC Program Office, as well as JTAPIC partners, to increase the availability of combat casualty data coming from the JTAPIC Program Office to support vehicle design, development, and test and evaluation.

OT&E MISSION ACCOMPLISHMENTS, FISCAL YEAR 2010

I continually review and revise T&E policy as needed to promote consistency among the Services in the conduct and reporting of testing. This year I provided additional guidance on the content and timeliness of reporting of operational test and evaluation results, the timely provision of test data, and the standardization of Hard Body Armor and Combat Helmet testing. I also updated the guidelines for assessing information assurance and guidance for the operational test and evaluation of Information and Business Systems.

During this fiscal year, my office monitored 348 Major Defense Acquisition Programs (MDAPs) and special interest programs. We reviewed 53 TEMPs and Test and Evaluation Strategies and 70 Operational Test and Evaluation Plans for specific test events.

During FY10, DOT&E delivered seven Beyond Low-Rate Initial Production Reports (BLRIPs) (three of which were combined OT&E and Live Fire Reports), four special reports (three of which were combined OT&E and Live Fire and one of which was a review of the Army's Body Armor testing), and one Early Fielding Report to the Secretary of Defense

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and Congress (see Table 1). In addition to the Ballistic Missile Defense Systems (BMDS) section of this Annual Report, I provided a separate classified report on my assessment of BMDS to Congress, as well as a report on the Airborne Laser.

DOT&E also published eleven Operational Assessment reports and sixteen reports on Major Automated Information System (MAIS) programs (see Tables 2 and 3).

TABLE 1. DOT&E REPORTS TO CONGRESS DURING FISCAL YEAR 2010

PROGRAM	REPORT TYPE	DATE
BLRIP Reports		
Acoustic Rapid Commercial Off-the-Shelf (COTS) Insertion (A-RCI) AN/BQQ-10(V) Sonar System	OT&E BLRIP Report	October 2009
<i>Virginia</i> Class Submarine	Combined OT&E/LFT&E BLRIP Report	November 2009
Department of the Navy Large Aircraft Infrared Countermeasures (DoN LAIRCM)	OT&E BLRIP Report	December 2009
Vertical Launch Anti-Submarine Rocket (ASROC) with the Mk 54 Mod 0 Lightweight Hybrid Torpedo (VLA Mk 54)	OT&E BLRIP Report	January 2010
CV-22 Osprey	OT&E BLRIP Report	January 2010
USS <i>San Antonio</i> Class (LPD 17) Amphibious Transport Dock Ship	Combined OT&E/LFT&E BLRIP Report	June 2010
USMC H-1 Upgrades (AH-1Z)	Combined OT&E/LFT&E BLRIP Report	September 2010
Special Reports		
Assessment of the Mine Resistant Ambush Protected (MRAP) Family of Vehicles	Combined OT&E/LFT&E Special Report	March 2010
Operational and Live Fire Report of the M915A5 Truck Tractor, Line Haul	Combined OT&E/LFT&E Special Report	May 2010
Live Fire and Operational Test and Evaluation Report on the Mine Resistant Ambush Protected (MRAP) All-Terrain Vehicle (M-ATV)	Combined OT&E/LFT&E Special Report	June 2010
DOT&E Independent Assessment of the Army's Phase I and Phase II Follow-On Testing of Hard Body Armor	Special Report	July 2010
BMDS Reports		
Airborne Laser (ABL)	Missile Defense Report	January 2010
2009 Assessment of the Ballistic Missile Defense Systems	Annual Report	February 2010
Early Fielding Reports		
Littoral Combat Ship (LCS) 1	Early Fielding Report	July 2010

TABLE 2. DOT&E OPERATIONAL ASSESSMENT REPORTS DURING FISCAL YEAR 2010

Program	Date
Joint High Speed Vessel (JHSV)	November 2009
National Capital Region Integrated Air Defense System (NCR IADS)	December 2009
Early Infantry Brigade Combat Team (E-IBCT) Increment 1 Limited User Test (LUT)	January 2010
Extended Range Multi-Purpose (ERMP) Unmanned Aircraft System (UAS)	January 2010
Warfighter Information Network -Tactical (WIN-T) Increment 2 LUT	January 2010
Non-Line-of-Sight-Launch System (NLOS-LS) Flight LUT	March 2010
Mobile User Objective System (MUOS)	June 2010
Global Hawk Integrated System Evaluation (ISE)	June 2010
AH-64D Apache Block III (AB3)	June 2010
Navy Multiband Terminal (NMT)	July 2010
Extended Range Multi-Purpose (ERMP) Unmanned Aircraft System (UAS) Quick Reaction Capability (QRC) 2 LUT	August 2010


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TABLE 3. DOT&E MAJOR AUTOMATED INFORMATION SYSTEM (MAIS) REPORTS FOR FISCAL YEAR 2010

Program	Date
Operational Test and Evaluation of the Global Combat Support System – Joint (GCSS-J) Version 7.1.0	November 2009
General Fund Enterprise Business System (GFEBS) Initial Operational Test and Evaluation (IOT&E) Results and Recommendations	December 2009
Global Combat Support System – Marine Corps (GCSS-MC)/Logistics Chain Management (LCM) Block 1, Release 1.1 System Assessment	January 2010
Battle Control System – Fixed Interim	February 2010
Family of Advanced Beyond-Line-of-Sight Terminal (FAB-T), Increment 1 Operational Assessment (OA-2) Report	February 2010
Rebuilding Analysis (RebA) Operational Assessment (OA) and Training Assessment	February 2010
Global Command and Control System – Maritime (GCCS-M) Version (v) 4.0.3 Test Results and Recommendations	March 2010
Operational Assessment of Public Key Infrastructure (PKI) Increment 2, Spiral 3	May 2010
Department of Defense Teleport Generation Two Phase Two Multi-Service Operational Test and Evaluation Results	June 2010
Expeditionary Combat Support System (ECSS) Release 1	June 2010
Expeditionary Combat Support System (ECSS) Release 1 (status update)	July 2010
Air Force Distributed Common Ground System (AF DCGS)	August 2010
Follow-on Operational Test and Evaluation II of Net-Centric Enterprise Services Increment 1	August 2010
Operational Assessment of Public Key Infrastructure (PKI) Increment 2, Spiral 4	August 2010
General Fund Enterprise Business system (GFEBS) Release 1.4.1 Limited User Test (LUT) Results and Recommendations	September 2010
Logistics Modernization Program (LMP)	September 2010

CONCLUSION

Since my report last year, I am gratified to report we have made progress implementing all my initiatives; more however, remains to be done. I will continue our alliance with the DDT&E and help that office achieve its mission defined in WSARA. I remain committed to assuring the Defense Department's operational and live fire tests are rigorous, objective, and clearly reported. It is with pleasure that I submit this report, as required by law, summarizing the operational and live fire test and evaluation activities of the Department of Defense during Fiscal Year 2010.


J. Michael Gilmore
Director

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