

# DIRECTOR'S INTRODUCTION

This year has been very active and productive for the office of the Director, Operational Test and Evaluation (DOT&E). In support of our core mission, in FY04 my staff oversaw the planning and execution of OT&E and live fire test and evaluation (LFT&E) for some 200 systems being developed and acquired by our military Services. I provided to the Secretary of Defense and Congress beyond low-rate initial production (BLRIP) reports on the operational effectiveness, suitability, and survivability of 14 systems scheduled to enter full-rate production and fielding to our combat forces. This report fulfills my Title 10 annual report requirement. I will submit my report on missile defense in February 2005, as required by law.

My office continued to address critical issues highlighted in last year's annual report: transforming T&E to maintain its relevance and influence while dealing with changing acquisition approaches, testing complex systems in a system-of-systems context, and funding to rebuild our T&E infrastructure.

## TESTING SYSTEMS UNDER NEW ACQUISITION STRATEGIES

We should judge effectiveness and suitability based on how American forces will use a system, not on the acquisition strategy employed in developing and procuring that system. It is difficult to implement that approach if acquisition strategies do not include the Services' development of operational requirements.

In such an environment, the test and evaluation community either ends up with poor criteria against which to measure a new system or it attempts to develop its own. Neither alternative is acceptable. A third alternative of waiting until the test is over and have the user define, or redefine, the requirement, has been implemented on a few systems, but resulted in removing discipline within the process.

Fortunately, the acquisition directive provides guidance that offers, in most cases, a way out. The DoD directive states that the purpose of the whole acquisition system is to provide systems that meet user needs, and to provide a measurable increase in mission capability over existing systems and/or forces. In most cases, a mission focus – compared to the current way of doing the mission – is more than adequate as a measure of effectiveness and suitability. The F-22 offers an example of mission focus during operational testing, and a comparison test with a baseline force to demonstrate a measurable increase in mission capability.

The test and evaluation community has also used combat experience in its evaluations. This year, for example, interviews and surveys of soldiers in Iraq and Afghanistan were a primary source of information in the evaluation of the Force XXI Battle Command Brigade and Below (FBCB2) system. Generally, this is not a good approach to evaluation because it means sending equipment into the field without being able to adequately describe the systems' capabilities and limitations for the soldiers, sailors, airmen, and marines who will use that equipment in combat.

Existing DoD policy does not require the Services to develop, acquire, and deploy non-combat systems with crew protection against ballistic threats. If the user does not specify a requirement for ballistic crew protection, it will not be part of the system design. The Services, Joint Chiefs of Staff, or the Office of the Secretary of Defense (OSD), must define crew protection requirements early. A policy change that requires ballistic crew protection kits for non-combat vehicles operating in a combat zone will significantly reduce risk.

Acquisition strategies now propose buying many systems before testing is complete. This makes fixing problems more expensive, and it involves giving our forces equipment without being able to objectively define the capabilities and limitations on its use.

## POOR RELIABILITY - AN ONGOING PROBLEM

I am encouraged by the accomplishments and transformational initiatives of my staff and the service Operational Test Agencies (OTAs). However, I remain concerned about some adverse trends in the testing and fielding of combat equipment to our forces. Of the 14 systems on which we wrote BLRIP reports in FY04, two were not operationally effective, and seven were not operationally suitable. The trend in suitability results is disturbing, as more systems are going to the field despite being unsuitable as tested. In the history of DOT&E reports to Congress since 1983, about 30 percent of systems (36 of 126) were less than suitable. Recent years have witnessed an increase in the number of

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systems found unsuitable in operational testing and evaluation. Suitability problems add significantly to the logistics burden and life cycle costs of programs.

The Defense Science Board in 2000 pointed out that 80 percent of defense systems brought to operational test fail to achieve even half of their reliability requirement. This was followed later by data showing that with all the streamlining of the acquisition process, the number of systems failing to meet the reliability requirement has increased. As stated earlier, this trend is evident in the reports DOT&E sends to Congress. The situation has not improved.

Reliability results from operational tests (OTs) appear to be significantly worse than those from development tests (DTs). OT results appear to be a factor of two to four times worse than those from DT and, in some cases, OT results are more than a factor of ten worse than DT. DT gives a false impression of system quality. We must develop methods to account for this phenomenon.

Our forces might derive a misunderstanding of a system's capability from DT alone, unless we perform an OT and collect reliability data. An OT environment is more operationally stressful than that during DT. The difference suggests that failure modes are being missed in DT, where they might be corrected if caught early enough in the design and redesign phase. We should discover reliability problems before OT to avoid the costly fixes and the time delays.

To address this problem, we are working with the acquisition community to develop a new Reliability, Availability, and Maintainability Guide for program managers. This guide will not have the influence of a directive, but it is a good start. Reliability and Maintainability are cost drivers during the entire life of the system. Estimates show that over half the total life cycle cost of a system is attributable to operating and support costs after the system is acquired. This drain on the budget takes money away from other priorities.

## MISSILE DEFENSE

I testified twice before Congress in FY04, on Missile Defense. In February 2004, I submitted a separate report, required by law, on my FY03 Assessment of the Ballistic Missile Defense System (BMDS). The immaturity of the system at the time of that report made it difficult to judge its effectiveness. In cooperation with MDA's senior leadership, we have made significant progress during this past year in enhancing and extending the depth of our oversight and ability to conduct more meaningful operational assessments of the MDA programs.

Through a memorandum of agreement, we have established a lead Service Operational Test Agency (OTA) to streamline the interface between the test and evaluation communities and the various MDA program offices. There is now the effective cooperation and communication necessary to provide senior-level decision makers with continuous evaluations of this immense capability-based spiral development program. A subsequent section of this report provides more detail on these activities as well as an unclassified updated assessment of the BMDS programs.

## TESTING IN A JOINT ENVIRONMENT - THE ROADMAP

During this past year, DOT&E led a collaborative effort to develop a roadmap for establishing a robust joint test and evaluation capability. Once achieved, it will permit the testing of our current and future weapon systems in a joint environment representative of future combat. This pioneering effort, approved by the Deputy Secretary of Defense in November 2004, is the product of unprecedented cooperation among my office, the Joint Staff, Joint Forces Command (JFCOM), several key elements of OSD and the Service T&E agencies.

The roadmap is based on my finding that the successful development of systems and tactics, techniques, and procedures (TTPs) for joint military operations require a change in testing capability and procedures. The most important change in capability will come from the ability to link existing facilities (both testing and training) into a single network to create the complex environment needed to represent joint operations. The procedural changes are designed to ensure that the evaluation of systems is conducted from a joint perspective, not a single Service view.

These changes are essential as the Department continues to move towards an integrated information-sharing environment. Evaluating operational effectiveness will depend on how well systems not only perform individually, but how well they share information within Service functional areas and across functional and Service boundaries to support overall

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mission accomplishment. Evaluating single systems and single interfaces will no longer suffice – developing an integrated environment will be the key to determining system and mission operational effectiveness, suitability, and survivability.

Building the capabilities and developing the processes called for in the Roadmap will take time. We cannot wait for the implementation of those enhancements to begin testing in a joint environment. Particularly noteworthy are the plans for evaluating the Army Battle Command System (ABCS). The Army is taking the lead by “experimenting” with a system-of-systems test methodology that should provide all the Service OTAs with lessons learned for future testing of command and control systems.

## **JOINT T&E**

We also completed our restructure of the Joint Test and Evaluation (JT&E) program, streamlining the test nomination process, establishing the Joint Test Support Cell (JTSC), and introducing a Quick Reaction Test (QRT) capability. Combatant Commanders and the Services have noted that JT&Es are now more agile and responsive to operational requirements. The QRT capability is significant because we can now address immediate warfighter concerns within a year, compared to standard JT&E three-year projects.

Joint Survivability (JSURV) was our first QRT. Through it, we developed and delivered convoy survivability procedures to U.S. Central Command (USCENTCOM) to help minimize combat casualties. We distributed over 40,000 copies of the “Combat Convoy Handbook” that are in use by military convoys in Iraq and Afghanistan. Two additional, ongoing QRTs are Joint Shipboard Weapons and Ordnance (JSWORD) and Joint Low Altitude Aircraft Survivability (JLAAS). JSWORD is establishing joint procedures for weapons loading for U.S. Army and U.S. Special Operations Command (USSOCOM) helicopters while operating on U.S. Navy ships. JLAAS is developing TTPs for fixed and rotor wing aircraft that enable them to avoid or defeat potential enemy threats such as Man-Portable Air Defense Systems.

## **INFORMATION ASSURANCE (IA)**

Our initiative to evaluate information assurance (IA) and interoperability during Combatant Command and Service exercises continues to mature. This fiscal year, teams led by the OTAs performed 18 IA evaluations, including two with units scheduled to deploy and one in Iraq. We have made significant progress in identifying operational performance metrics and synchronizing realistic Red Team scenarios with exercise training objectives. These are critical steps in making IA relevant to the warfighter.

We will work with Combatant Command and Service exercise authorities to help transform OT&E. We expect to find more opportunities to satisfy OT&E requirements during exercises while adding value to training. In the next fiscal year, we will perform nearly 30 evaluations. Data from these evaluations will support our first trend analyses.

The IA section of this report fulfills the reporting requirement of the FY03 Appropriations Bill.

## **REBUILDING THE T&E INFRASTRUCTURE**

The Department made progress in meeting the 2003 National Defense Authorization Act requirement to establish the Defense Test Resource Management Center (DTRMC). Under the auspices of the Under Secretary of Defense for Acquisition, Technology, and Logistics, a permanent staff began to assemble in May of this year and a Director for the DTRMC took the helm in December 2004. OSD and the Services changed the Department’s Financial Management Regulations to restore institutional funding to the Major Range and Test Facilities Base. The FY06 President’s Budget should reflect these changes, thus satisfying one of the major items in the legislation.

We still have work to do in developing a strategic plan that will guide future investments in the Department’s T&E infrastructure. The plan developed in 2003 and 2004 was not mature enough to support the certifications of FY05 budget adequacy. With a permanent staff under the leadership of a full-time Director, the DTRMC will now be able to develop a strategic plan and assess the adequacy of T&E infrastructure investments to carry out that plan.

Other study efforts continue to highlight the need to improve the resources that support the test and evaluation infrastructure. Most of the cases where a lack of resources poses a significant problem for adequate testing of systems fall

into three categories: instrumentation, targets, and open-air range size and diversity. Funding for test and evaluation doesn't compete well in the Service budgets. Therefore, OSD-sponsored Central T&E Investment Program (CTEIP) becomes more and more important in our attempts to address many of these deficiencies.

#### **T&E INFRASTRUCTURE INVESTMENT AND CTEIP**

CTEIP will transfer to the Defense Test Resource Management Center in early 2005. It is an integral part of our effort to provide the enhanced test infrastructure necessary to address the T&E challenges resulting from the Department's transformational initiatives.

The drive for rapid fielding and redesign of systems requires continuous testing and evaluation throughout the development cycle. We will need unprecedented flexibility in our T&E infrastructure to ensure that it is capability, rather than platform-based. New technologies generally require new infrastructure and environmental conditions we have not yet had to replicate. We should not depend on modeling and simulation alone to test these systems at the "edge of the envelope."

CTEIP should be strategically aligned with other T&E stakeholders. A coalition for T&E strategic planning will provide the manpower, adequate funding, and the necessary expertise. In order to achieve the vision of a test infrastructure that is capable of meeting the aforementioned challenges, we must overcome a number of specific obstacles:

- Lack of interoperability due to closed architectures and insufficient standards.
- Insufficient frequency spectrum to support testing.
- Lack of investment in the advanced test infrastructure.

In a subsequent section of this report, we discuss specific CTEIP projects that address each of these obstacles.

#### **CONCLUSION**

Four years ago in my first annual report, I promised rigorous tests, support for an infrastructure to do that testing, and "tell-it-like-it-is" reports. Subsequent reports identified needed policy changes and specific investments to achieve those ends. During that time, the Department realigned some responsibilities with respect to T&E. I believe the annual reports over the last four years can serve as a blueprint for action.

  
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Director