



Test &  
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## Test and Evaluation Resources

The Director is required under Title 10, U.S. Code to assess the adequacy of the planning for, and execution of, operational testing conducted on systems under oversight. The ranges, test sites, and assets used in testing are important elements in assessing the adequacy of operational and live fire testing. DOT&E monitors DoD and Service-level strategic plans, involvement in investment programs, and the assessment of budget decisions to ensure key T&E capabilities necessary for operationally realistic T&E are supported. DOT&E collaborates with the Defense Test Resources Management Center (TRMC) to address critical T&E resource needs through its Central T&E Investment Program (CTEIP), and the Test and Evaluation Science and Technology (T&E S&T) program. DOT&E also conducts studies of resource needs and potential solutions through the Threat Systems program. This section outlines key interest areas for this reporting period.

## Summary

The DoD saw progress in specific high-interest test resource capabilities, such as aerial and land targets, offshore ranges, and joint test capabilities, yet saw setbacks in areas such as instrumentation and other targets. The operational testing environment continues to become more complex as a result of advances in weapon and sensors, new threats, new methods of employing current systems, and the proliferation of advanced technology. Service budget projections will further stress investment in and support of test resources and staffing at test centers and activities.

DOT&E, either on its own or in coordination with the TRMC and Services, sponsored over 30 new prototype projects and studies to upgrade threat models, simulations, and processors and delivered low-cost threat realistic static, movable, and mobile targets for use in testing across many of U.S. ranges. There are also ongoing studies and prototype efforts for common target sub-systems, submarine targets, undersea warfare countermeasures, and capabilities to test aircraft early warning systems.

## Threat Trends Affecting T&E Resources

Advances in threat capabilities continue to present challenges to test resources development and procurement. The increasing sophistication of foreign weapons systems and network attack capabilities require increasingly complex test resources. Current threat sensors and weapons and new anti-ship ballistic missiles, coupled with increased operations in urban and littoral areas, proliferation of unmanned vehicles, and non-traditional Chemical Warfare agents continue to stress Service and DoD resource strategic planning.

## Testing Jointly

The test community, primarily through TRMC, DOT&E, and the Defense Information Systems Agency in partnership with the Joint Forces Command, is making progress in its ability to innovatively test weapons systems in a joint environment. In the five years since the approval of the DoD's Testing in a Joint Environment Roadmap, there has been marked progress, but work remains if the DoD expects a persistent capability by the end of FY12 and a fully interactive capability in FY15.

The most significant progress has been in infrastructure, primarily under the Joint Mission Environment Test Capability program. The Joint Test and Evaluation Methodology program completed its efforts this year, with a follow-on transition program further developing the methods and processes. The Joint Forces Command is continuing its efforts in fundamental joint mission-area descriptions. The areas of future focus will be in managing system representations and developing the processes to effectively and efficiently test in this new environment. In this regard, the Army's demonstrations of simulations and visualizations for testing families of systems, system-of-systems, and joint test events have been encouraging, but considerable work remains.

## Aerial Targets and Target Control

The aerial target suite reached a major milestone as the Air Force initiated a replacement program for the aging QF-4 aerial target. However, this effort only addresses part of the future need as this solution does not adequately represent future 5th Generation fighters. A study on affordable ways to provide 5th Generation threat characteristics to the test community with preliminary cost analysis supports a follow-on effort further refining the preliminary design and cost models.

Target interoperability across test ranges remains a key objective. The DoD's Strategic Plan for Test Resources, as well as a 2005 Defense Science Board Task Force, recognized that legacy systems are becoming difficult to support and reemphasized the need for Services to test at all major ranges. DOT&E is part of tri-Service efforts examining control systems and standards used by the tactical unmanned systems community for use by the targets community.

## Land and Urban Warfare, Real-Time Casualty Assessment and Instrumentation

The DoD made good progress this year with the introduction of a number of capabilities for low-cost, operationally realistic, pop-up, portable, and moving target systems critical for precision weapons testing. These targets better reflect the unique demands

of operating in urban environments as well as exercise the entire sensor-to-shooter kill chain.

Operating in an urban environment is identified as a requirement in over 40 percent of new programs. This year, the U.S. Joint Forces Command and the Army initiated a study to identify key capability requirements and conduct surveys of currently available test and training ranges to support an Analyses of Alternatives.

The continued lack of a reliable high-fidelity Real-Time Casualty Assessment (RTCA) system to support operational testing and evaluation of unit combat effectiveness remains a major concern. The Army does not have a high-fidelity RTCA system for testing of large force-on-force engagements. Consequently, the Army is relying on a collection of existing and modified low-fidelity training systems. The OneTESS Program, intended as follow-on-capability for both test and training, sustained major setbacks forcing a program restructuring. Nevertheless, selected OneTESS technologies are being integrated into the existing training systems to field a limited RTCA capability.

The inclusion of compatible and less-intrusive test instrumentation throughout the DoD's ranges is a high priority. The Common Range Integrated Instrumentation System jointly supports land, naval, and air testing needs. There are numerous system capability tradeoffs necessary that present risk to the DoD's ability to provide a robust capability sometime shortly after FY12. To reduce risk, the TRMC initiated a study to support selecting the most promising instrumentation solutions.

#### **Anti-Ship Cruise Missile Supersonic Sea-Skimming and Other Missile Targets**

The Multi-Stage Supersonic Target program, cited as a capability gap in the 2005 DoD Strategic Plan for Test and Evaluation Resources, will conduct early flight testing in 2010. Delays in resolving this long-standing issue for key ship self-defense systems present significant risk to future tests.

To satisfy other near-term ship self-defense testing requirements, testing of the GQM-163A supersonic sea-skimming target concluded, which supported a full-rate production approval. In addition, after a series of failed tests, other modified sub-sonic aerial targets simulating other high-interest anti-ship cruise missile threats were delivered. Finally, the Navy initiated a replacement program for the aging, and non-threat representative, BQM-74E subscale aerial target. Together, these developments represent marked progress in long-standing deficiencies.

The Anti-Ship Ballistic Missile (ASBM) has emerged as a key threat for a number of Navy programs. A validated target is now cited as a test capability need in the 2009 TRMC Strategic Plan for Test Resources. ASBM surrogates will become crucial aspects of future ship self-defense testing. At this time, no such surrogate development program is programmed.

#### **Navy Ranges and Naval Warfare Test Resources**

Significant progress was seen in offshore test ranges. The west coast shallow water training range extensions at the Southern California Offshore Range have been approved. The Navy will improve its littoral training (and test) capability in the Jacksonville and Virginia Capes areas having released the Records of Decision for the Environmental Impact Statements. This decision paves the way for improvements in Atlantic Fleet testing and training that could be in place by 2014 if follow-on environmental reviews are successful.

In addition, there was progress in portable ranges and test capabilities for minefield testing with the introduction of new portable tracking systems and an instrumented mine surrogate for a high-interest threat. However, the DoD needs a more realistic threat surrogate for modern threat diesel submarines. The existing diesel submarine surrogate target is no longer available to support testing, while use of foreign assets present their own unique security challenges.

The DoD requires adequate seaborne targets and scoring systems for anti-surface warfare testing, but ensuring sufficient quantities of threat representatives targets continues to be a challenge.

#### **Countermeasure, Counter Weapon, and Electronic Warfare Test Capabilities**

Operational testing of integrated defensive systems requires threat-representative hardware and validated models, simulations, and test environments. The DoD continues its efforts integrating threat models at test facilities as part of a four-year effort to upgrade the Services' inventory of missile simulators with standard, validated models. Long-term maintenance of these models and the increasing complexity of integrated sensor and warning systems continue to be a challenge.

#### **Health of the Operational Test Agencies**

The DoD carries out its operational test and evaluation responsibilities largely through the Operational Test Agencies (OTAs). Accordingly, the "health of the OTAs," (the adequacy of their mission funding and military, government, and contractor workforce) to carry out the operational testing and evaluation of weapons systems is a matter of DOT&E interest. With an increased emphasis on early involvement during acquisition, joint experimentation, and rapid testing for urgently required systems for war, the OTAs face challenges. The budget expenditures for the OTAs were relatively constant between FY08 and FY09 and essentially flat in FY10 and beyond. The impacts of any potential in-sourcing of contractor-to-government civilian personnel has not yet been assessed.