Test and Evaluation Resources

As the Services develop budgets to support the Long War on Terror, Test and Evaluation (T&E) capability improvements compete for resources in a constrained funding environment, notwithstanding the emergence of such new threats as:

- Increased accuracy and maneuvering capabilities of modern ballistic and supersonic sea-skimming missiles
- Improvised explosive devices and unmanned vehicle delivered weapons
- Advanced air-to-air and surface-to-air missile systems
- Proliferation of counter-capabilities, including GPS and communications denial and threat operations against our warfighting and support networks
- Armed small craft and advanced naval mines and torpedoes in the littorals

During Fiscal Year 2006, DOT&E challenged the T&E community to ensure the DoD's test capabilities meet the demands of new warfighting technologies and evolving operational concepts. DOT&E worked with the newly staffed Test Resource Management Center (TRMC) to ensure that T&E strategic planning reflects the required capabilities of DoD's T&E ranges and facilities and that Service budgets are adequate to support these required capabilities.

DOT&E's critical interest items continue to include: the adequacy of aerial and ground targets to allow operationally realistic testing, real-time casualty assessment and instrumentation programs, the realism of test environments and threat models, and the challenges presented in the testing of networked joint operations. Other significant items of interest include: self defense, electronic warfare and counter-weapon test capabilities, chemical and biological defense test capabilities, test and training range sustainability, and the health of the operational test agencies.

Targets

DoD is facing critical anti-ship cruise missile target and full-scale aerial target capability shortfalls. Specifically, a unique high interest threat anti-ship cruise missile target has not been funded by the Navy and the envisioned QF-4 full-scale aerial target drone replacement, funded by the Air Force and Navy, does not fully address fifth generation threat aircraft characteristics. These threat-representative test resources are necessary for test adequacy to determine the operational effectiveness of at least 16 Major Defense Acquisition Programs, including: F-35, F-22, F-18, F-15, E-2D, AIM-9, AIM-120, PAC-3/Medium Extended Air Defense System, SM-6, Evolved Sea Sparrow Missile, Rolling Airframe Missile, DDG 1000, CVN-21, LHA, Ship Self Defense System. Without funding to support the development and procurement of these target capabilities, DOT&E will not be able to approve the associated Test and Evaluation Master Plans and operational test plans of these Major Defense Acquisition Programs as adequate to determine operational effectiveness and suitability.

Likewise, affordable ground targets with multi-spectral signature attributes and representative mobility and maneuverability are critical to testing precision weapon systems. DOT&E is pursuing a tri-Service Multi-Spectral Mobile Ground Target initiative for a new family of low-cost, threat-realistic target facades mounted on modified commercial truck chassis. These targets will implement an open architecture and standards-based approach to a common control system in an effort to attain economies in acquisition, maintenance, and training. This Army/Navy-led demonstration program has the potential to yield a repeatable and reconfigurable threat-realistic target presentation for weapons and sensor testing at significantly lower cost to the Department. DOT&E similarly sponsored a study and demonstration project with the Army and Marine Corps for realistic, low-cost, pop-up threat vehicle targets for evaluating sensors and ground weapon systems.

Real-Time Casualty Assessment and Range Instrumentation

Real-Time Casualty Assessment (RTCA), complemented with a federation of integrated combat simulations, is essential to the testing of the Army's Future Combat System (FCS). The Army's One Tactical Engagement Simulation System (OneTESS), currently under development, is intended to provide a combined arms force-on-force (live and simulated) instrumentation capability for data collection and analysis for both test and training. DOT&E added OneTESS to the list of acquisition programs under oversight as it will be the core of the FCS tactical simulation system.

The availability of secure, non-intrusive, and cost-effective instrumentation is also critical to assessing the effectiveness of our future forces. The TRMC, together with the Services, identified the system requirements for a development program to provide a range data system with state-of-the-art capabilities for Time Space Position Instrumentation accuracy, data throughput, radio frequency spectrum efficiency, miniaturization, and encryption. DOT&E endorsed the Common Range Integrated Instrumentation System project of the Central Test and Evaluation Investment Program in order to provide these capabilities.

Emerging Battlefield Environments

DoD needs to be able to test combat systems in warfare environments with the realistically representative densities, structures, and clutter of urban and littoral battlefields. The Army Urban Environment study in FY06 identified necessary T&E infrastructure enhancements and instrumentation for the planned Combine Arms Collective Training Facility at Fort Bliss, Texas. The Army is also improving its other limited urban environment

test and training sites by adding telemetry and upgrading their instrumentation.

However, the fragmented approach to providing littoral test capabilities necessary to test new, agile, and stealthy naval surface and underwater combatants and amphibious combat systems remains a problem. The Navy and Marine Corps need to be able to conduct instrumented surface and underwater testing, including live weapons firing, with a variety of manned and unmanned air, surface, and subsurface vehicles associated with such new ship classes as DDG-1000, LPD-17, SSN-774, and LCS-1. This testing needs to be conducted in operationally realistic littoral environments. Delays in littoral range initiatives, such as the East Coast Undersea Warfare Training Range, increase program costs and force workarounds to move testing to other, less operationally-representative ranges.

Networked and Joint Operations

The continuing transformation of our forces to employ joint weapons in net-centric operations presents a significant challenge to the ability of the operational test community to assess the overall mission effectiveness of these "systems-of-systems." Realistic, operational testing of networked systems requires robust transmission performance monitoring and referee systems, as well as the ability to replicate real world clutter, jamming, and urban radio frequency interference utilizing distributed information operations and assurance capabilities. DOT&E, together with the Air Force and Army, is sponsoring development of three Central Test and Evaluation Investment Program subprojects to provide command and control network performance monitoring and portable communications jamming capabilities for testing the Department's networked systems.

However, Federal Communications Commission frequency spectrum restrictions continue to limit network testing in the Very High Frequency/Ultra High Frequency radio bands. To address this problem, DOT&E initiated a study to investigate the requirements for future radio frequency testing and to identify alternative actions to accommodate the security concerns involved.

Self-Defense, Electronic Warfare, and Counter Weapon Test Capabilities

Our enemies seek to protect high value targets with air defense systems; degrade or deny our use of GPS; and use camouflage, concealment, and deception, or combinations thereof, to impede or defeat our precision weapons. Additionally, Electronic Warfare is evolving to incorporate integrated defensive systems that feature decoys and multi-spectral detection and warning systems, as well as specialty detection radars with embedded electronic warfare capability. Assessing weapons effectiveness in these environments requires robust integrated threat-representative hardware simulators and validated software models and simulations. DOT&E led a joint Service study to determine the resources necessary for testing sensors and weapon systems in unique radio frequency environments, and has worked with the TRMC to include this requirement in their Strategic Plan.

Signature reduction is a feature of new weapon systems that are intended to operate in littoral battlefield environments. Upgrades to T&E infrastructure are required to adequately measure the reduced signatures of modern naval platforms. DOT&E, in coordination with the Navy, sponsored an upgrade to the Norfolk, Virginia, magnetic signature facility that will allow more realistic operational testing in FY07. DOT&E is initiating similar efforts in acoustic measurements by leveraging Navy upgrades for submarine noise testing capabilities and applying them to surface ship testing. Similar upgrades to radar cross-section measurement facilities will be required to adequately validate the stealth or radar return minimizing designs of new ships such as the DDG-1000. DOT&E worked with the Navy to define the necessary initial test requirements, as accurate measurement capabilities will be needed to test ship effectiveness and survivability and to validate the Navy's ship self-defense models.

Chemical and Biological Defense Test Capabilities

During FY06, DOT&E worked with the Joint Program Executive Officer for Chemical and Biological Defense to establish a Joint Threat Coordinating Group to examine test and employment techniques for the use of threat-realistic simulants.

The Chemical and Biological Defense Program made substantial progress with the approval of the Department's Joint Chemical/Biological Investment Plan. DOT&E's long-standing concerns for the adequacy of agent simulants and the capacity and capabilities of live agent test facilities are now recognized in the Army's investment program plan.

Test and Training Range Sustainability

Working through the Sustainable Ranges Overarching Integrated Process Team (OIPT), DOT&E prepared the February 2006 Memorandum of Understanding (MOU) between DoD, the Department of Energy, and the Department of Interior's Bureau of Land Management to implement the 2005 Energy Policy Act. This MOU establishes DoD as a "Cooperating Agency" and recognizes that DoD has an interest in not only those lands and airspace within its "jurisdiction and control," but also in certain airspace that is above state and private properties.

DOT&E chaired the Working Integrated Process Team Energy Subgroup that completed a review of the 11 Western States Programmatic Environmental Impact Statement outlines and schedules. Recognizing the potential problem of energy corridor encroachment on DoD test and training ranges, DOT&E led the formation of a Quick Reaction Office, consisting of members from the Office of the Secretary of Defense (OSD) and the Services, to address this problem. This team's efforts precluded significant encroachment problems such that only 199 miles, of the 14,902 total miles designated as energy corridors, involve DoD lands.

Outreach to the civil sector is a critical component in sustaining test and training ranges over the long term. DOT&E played a key role in developing DoD Directive 3200.15, Sustainment of Ranges and Operating Areas, which authorizes sponsorship and

participation in national level outreach efforts to promote test and training needs. This directive provided the basis to better provide the public with information on DoD's efforts to preserve natural habitat and open space. Among such efforts has been sponsorship of the annual meeting of the Land Trust Alliance (LTA). At the most recent meeting of the LTA, key members of the Alliance visited test facilities at the Arnold Engineering Development Center in Tullahoma, Tennessee, for an on-site look at the compatibility of a major DoD T&E installation with its surrounding neighbors. Similarly, as Co-Chair of the Sustainable Range OIPT, DOT&E worked with OSD and Service representatives to promote partnerships with the private sector, as well as with state and local governments to enhance test and training range sustainability.

Health of the Operational Test Agencies

DOT&E examined the resources available to the DoD Components' Operational Test Agencies (OTAs), which include the Army Test and Evaluation Command (ATEC), the Navy Operational Test and Evaluation Force (OPTEVFOR), the Marine Corps Operational Test and Evaluation Activity (MCOTEA), the Air Force Operational Test and Evaluation Center (AFOTEC), and the Joint Interoperability Test Command of the Defense Information Systems Agency. This is an area that will require close scrutiny to ensure resources are available in the future to conduct adequate operational test and evaluation.

Though the number of acquisition programs remains relatively constant, the OTAs' workload continues to increase at a time when they face constrained, if not declining, budgetary and staffing resources. The increased workload is the result of a number of factors, including the OTAs' earlier involvement in the acquisition cycle and their participation in Service and joint experimentation and tactics development, as well as additional short-notice testing required to support ongoing operations. Operational deployment of test agency military personnel to Operation Iraqi Freedom and Operation Enduring Freedom has further reduced OTA staff personnel availability, compounding the problem of a shrinking pool of experienced testers.

ATEC appears to be the OTA that has been most seriously affected by shortages in civilian staffing and shortages of mid-grade officers available for operational test assignments. Currently, only about 20 percent of major and minor Army acquisition programs have military personnel available for evaluating operational test results. The realignment move of ATEC headquarters (by the Base Realignment and Closure Commission) will likely exacerbate the civilian staffing shortfalls as personnel choose not to relocate with their ATEC positions.

AFOTEC is now facing similar manning constraints as the Air Force seeks to reduce infrastructure costs and shift funding to higher priority programs. OPTEVFOR and MCOTEA may soon face similar issues. DOT&E will continue to monitor the organizational health of the OTAs and advocate additional resources where warranted to meet increasing workloads that include "non-traditional" T&E of systems being rapidly pushed into theater in response to warfighter urgent needs.