

## Test and Evaluation Resources

Title 10, U.S. Code requires the Director to assess the adequacy of operational and live fire testing conducted for programs under oversight and to include comments and recommendations on resources and facilities available for operational test and evaluation and levels of funding made available for operational test and evaluation activities. DOT&E monitors and reviews DoD and Service-level strategic plans, investment programs, and resource management decisions to ensure capabilities necessary for realistic operational tests are supported. This report addresses the major areas of concern: test infrastructure, resources, and encroachment.

### DOT&E Resources

My highest priority is to satisfy my responsibilities under Title 10 USC to conduct independent, rigorous, and comprehensive evaluation of the operational effectiveness and suitability of the Department's weapons programs. In my interactions over the past two years with the DoD Efficiencies Task Force, I identified the technical analyses I obtain from a federally-funded research and development center (FFRDC) as absolutely critical to meeting those Title 10 responsibilities. The Task Force agreed that support was critical to my mission and was not subject to the Secretary's direction to reduce unneeded and or inappropriate support obtained from contractors.

However, as part of the reductions I implemented in response to the Efficiencies Task Force, I have reduced contractor support obtained for my non-Title 10 activities. My FY11 President's Budget projection for contractor support was \$49 million and is now \$45 million. This is an 8.2 percent reduction in total contractor support that I took in areas outside my core, high-priority statutory activities. About 90 percent of DOT&E's remaining budget for contractor support funds FFRDC technical evaluations critical to the Office's fulfillment of its statutory responsibilities. Any further reductions to FFRDC support will critically undermine my ability to conduct independent, rigorous, and comprehensive test and evaluation of the Department's weapons systems.

In response to the Efficiencies Task Force, I also eliminated or restructured some of the DOT&E non-core activities. Specifically, I eliminated the Independent Resource Analysis Team, integrating this function into in-sourced government billets. I also eliminated the Target Management Initiative, relying on existing Service efforts to develop and field targets for operational testing. Finally, I reduced and re-structured the Test and Evaluation Threat Resource Activity. These actions resulted in a net saving of \$40.7 million across the Future Years Defense Program (FYDP).

If the Department continues efforts to further reduce future levels of funding, it will adversely affect my ability to continue non-core activities. For example, an additional 10 percent reduction to my appropriation (totaling \$100.2 million across the FYDP)

would require me to reduce substantially or eliminate a non-core activity such as the Joint Test and Evaluation program in order to protect my ability to fulfill my statutory responsibilities.

### Test Infrastructure

The DoD budget is currently under severe fiscal pressure, and constrained resources can be expected to continue through the next decade. While cognizant of the need to reduce funding, it is critical that the Department maintain the infrastructure necessary to rigorously, robustly, and efficiently test the systems the Department buys. To this end, DOT&E is working closely with the Deputy Assistant Secretary of Defense, Development Test and Evaluation (DT&E) / Director, Test Resource Management Center (TRMC) to ensure that the Department retains sufficient core capabilities to conduct realistic testing. Future funding decrements to the T&E infrastructure will come from an already declining investment base, as depicted in the figure below.

Investment Funding  
(Constant FY 2012 dollars in millions)

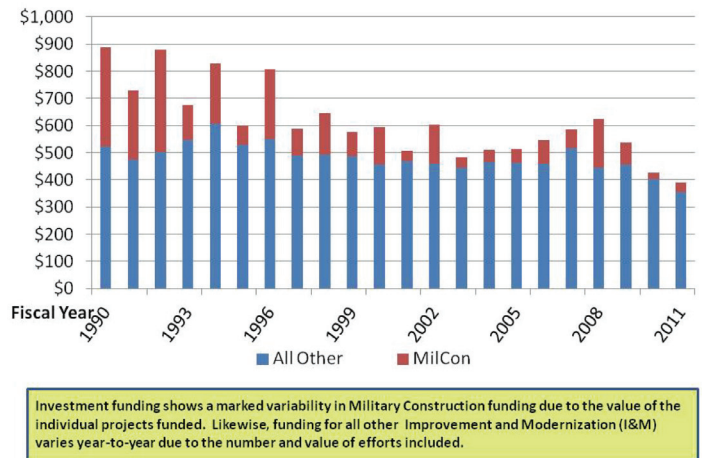


Figure 1: Investment Funding

Accordingly, DOT&E will ensure that the Department's senior leaders are fully informed of potential consequences should a Service or agency identify the need to reduce necessary T&E infrastructure. This is particularly important because the Department's budget process does not permit sufficient time for the Services to fully analyze the effects their budget submissions may have on other Service programs. The Major Range and Test Facility Bases contain many unique test assets such as wind tunnels and remote testing facilities. In many instances the Service Executive Agent is not the primary user of the test assets. Given this period of significant fiscal pressure, it is imperative that the Department's leadership be made fully aware and allowed to assess any proposals made to eliminate assets and determine the impact such proposals might have on all the Services, not just the Service that is the Executive Agent.

## **Active Electronically Scanned Array Jamming Test Capability**

The 2010 Tri-Service Electronic Warfare Test Capability Study, in which DOT&E participated, identified several critical Active Electronically Scanned Array radar jamming capability upgrades needed for the facilities and open-air ranges currently used to evaluate U.S. weapon systems such as the F-35 and the Navy's Next Generation Jammer. These critical upgrades include:

- Next generation electronic warfare environment generator at indoor facilities and on open-air ranges to represent advanced high-fidelity threat emitter digital processing capabilities (DOT&E cost estimate \$4 million for open-air range capability; the indoor lab capability has been funded through OSD).
- Implement the capability to measure and characterize advanced U.S. jammers' multi-beam steering accuracy and power distribution at the target location at indoor facilities and on open-air ranges (DOT&E cost estimate \$13.3 million for open-air range capability; the indoor lab capability has been funded through OSD).
- Develop next-generation surface-to-air-missile models and simulators that are not currently represented for hardware-in-the-loop facilities and open-air ranges (DOT&E cost estimate \$62 million).
- Develop a transportable urban threat representative communications environment that can be used to both stimulate U.S. communication jammers and evaluate jamming effectiveness on open-air ranges (DOT&E cost estimate \$17 million).

The OSD-funded Central T&E Investment Program is partially addressing the first two upgrades, allocating \$32.9 million to the indoor portions of the threat environment generation and jammer beam characterization capabilities. DOT&E estimates \$79 million, in addition to the \$8 million supplied by the Navy, to fund the open-air portions of the first two efforts as well as develop two high priority next-generation surface-to-air-missile threat simulators.

## **Cyber Assessment Capability**

The capacity to assess realistically advanced cyber warfighting capabilities must be increased to keep pace with heightened demand for those capabilities, advancing technologies, and the growing cyber threat. In February 2011, the Chairman of the Joint Chiefs of Staff issued a memorandum directing that all major exercises include realistic cyber adversary elements as a training objective. To comply with this order, the cyber content and rigor of exercises executed each year will need to increase. The Joint Information Operations Range offers a multi-level security environment to integrate and conduct simultaneous cyber activities. DOT&E identified a \$90 million need over the FYDP to upgrade range operations and capacity to conduct additional events, handle larger amounts of message traffic, and portray cyber threats and responses with increased fidelity. Additionally, DOT&E estimates \$59 million over the FYDP is needed to provide additional capabilities for realistic threat development and assessment, as well as additional expertise and training for the Red Teams employing cyber threats during training and

test events. Lastly, DOT&E estimates additional funding of \$46 million across the FYDP will support assessments during all appropriate Combatant Commander annual exercises.

## **Fifth Generation Aerial Target**

No U.S. aerial target, including the QF-16 currently in development, can replicate fifth generation fighter characteristics such as low observability or embedded electronic attack. The result is operationally realistic testing cannot be accomplished for U.S. air-to-air and surface-to-air weapons systems against fifth generation fighters. Therefore, DOT&E is executing a target design study based on the recommendation of the Defense Science Board with a goal of determining if an affordable Fifth Generation Aerial Target can be developed. A preliminary design and associated cost estimates are anticipated in FY12.

## **Anti-Ship Ballistic Missile Target**

A threat representative Anti-Ship Ballistic Missile (ASBM) target for operational open-air testing has become an immediate test resource need. China is fielding the DF-21D ASBM, which threatens U.S. and allied surface warships in the Western Pacific. While the Missile Defense Agency has exo-atmospheric targets in development, no program currently exists for an endo-atmospheric target. The endo-atmospheric ASBM target is the Navy's responsibility, but it is not currently budgeted. The Missile Defense Agency estimates the non-recurring expense to develop the exo-atmospheric target was \$30 million with each target costing an additional \$30 million; the endo-atmospheric target will be more expensive to produce according to missile defense analysts. Numerous Navy acquisition programs will require an ASBM surrogate in the coming years, although a limited number of targets (3-5) may be sufficient to validate analytical models.

## **Advanced Electronic Countermeasures Test Capability**

Digital radio frequency memory (DRFM) jamming technology presents one of the biggest challenges to the development and testing of U.S. radar countermeasures. DRFM jamming threats effectively target and disrupt U.S. fighter aircraft, ship-borne, and ground-based radar systems. To support operational testing of U.S. radars, flexible and programmable DRFM jammers that adequately replicate current threats need to be developed. These threat jammers must have the capability to incorporate new and advanced techniques as the threat evolves. In the interim, DoD is pursuing a better understanding of the threat systems and using opportune training events, such as the Northern Edge joint training exercise, to develop aircrew tactics, techniques, and procedures under the Joint Electronic Protection for Advanced Combat organization. Nevertheless, a test resource investment of approximately \$10 million in DRFM research and development remains a need.

## **Joint Urban Test Capability**

The U.S. military has a requirement for joint urban testing in an operationally realistic environment with challenges to air, ground, and maritime systems while stressing a systems-of-systems approach. Specifically, threat representative urban test facilities that provide adequate structures, electromagnetic signatures,

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and improved instrumentation are needed. Urban training sites are typically scheduled beyond capacity and lack the necessary precise instrumentation to measure the effects from currently employed capabilities. The Joint Urban Test Capability project has been initiated under the Central T&E Investment Program to address this test resource need.

## **Real Time Casualty Assessment Capability**

Real time casualty data collected during live/virtual/constructive force-on-force tests allow for the evaluation of the performance of Soldiers and their weapons using a systems-of-systems approach for realistically assessing the degree of battlefield damage, particularly in a Joint Urban Environment. The challenge is understanding weapon systems interactions during these engagements and the fidelity of instrumentation required to be effective yet affordable. An enterprise strategy to include real-time casualty assessments in the ongoing Network Integration Evaluations would leverage the dismounted Soldier's use of integrated resources under test. Generating such a strategy would help resolve the competing Army test priorities for the initial \$71 million it programmed in 2010.

## **Hostile Fire Indication Capability**

The DoD's Helicopter Survivability Task Force, in response to helicopter combat losses due to unguided hostile ground fires, determined that there is a vital need for a comprehensive, standardized instrumentation package to be used on live-fire Hostile Fire Indication gun, Rocket Propelled Grenade (RPG), and Man-Portable Air-Defense (MANPAD) events for gathering critical data for development of aircraft protective systems and mission tactics. Standardized high-resolution data will support model development for use in digital simulation models, installed system test facilities, and open-air simulators; and, provide validated data to assess Aircraft Survival Equipment performance. DOT&E, authorized by Congress, is facilitating standardization by obtaining a limited amount of threat articles and exploring alternatives to conventional (continental) U.S. data collection and testing practices through the Foreign Cooperative Program, and assisting the Services in obtaining the requisite data.

## **Frequency Spectrum**

The T&E community competes with commercial and other Federal entities for access to the radio-frequency (RF) spectrum. There has been an increase in RF spectrum allocated to commercial uses via congressional reallocation of the government spectrum and from petitioning the Federal Communications Commission (FCC) for additional frequency assignments. The result is insufficient spectrum to support T&E telemetry operations (primarily in the L and S frequency

bands) and FCC restrictions on DoD RF emissions and jamming operations. This problem is exacerbated by the growth in data transmission rates needed as more complex weapon systems are developed and the military's need to demonstrate RF spectrum exploitation to disrupt and deny spectrum access by adversaries. To offset these problems, funding and support from Congress as well as other federal agencies is needed. The objective would be to pursue the following:

- Protect critical T&E RF spectrum bands from reallocation.
- Acquire additional RF spectrum to offset reallocated spectrum. This would include development of a multi-Service implementation plan to ensure acquisition programs and range facilities also utilize the additional spectrum to facilitate spectrum compatibility.
- Develop methods and technologies that more efficiently use the RF spectrum.
- Develop mobile T&E range assets that can be employed to areas where RF spectrum encroachment and interference are minimized.

## **Sustainable Range Initiative**

Live testing of weapons systems is dependent on the continued availability of land, air, sea, undersea areas, and test instrumentation capabilities to measure the performance of systems under test. The Sustainable Range Initiative, as chartered by DoD in 2001, provides the framework for the Department to address and mitigate issues that may degrade test and training mission capabilities. For instance, renewable energy infrastructure, such as wind turbines, has been documented to interfere with range instrumentation capabilities. To address mission compatibility with renewable energy developments, Congress authorized DoD to issue procedures to address these impacts on military operations. DOT&E, along with the Deputy Under Secretary of Defense for Installations and Environment, and the Deputy Under Secretary of Defense for Readiness have co-led the DoD process to develop procedures to evaluate, and mitigate, where possible, the effects of renewable energy developments on military operations. A DoD Energy Siting Clearinghouse has been established and has reviewed the backlog of renewable energy projects from the Federal Aviation Administration Obstruction Evaluation process, as well as some projects that were proposed on Bureau of Land Management (BLM) lands. Of the 249 projects reviewed, 238 were found either to not interfere with DoD mission operations or that acceptable mitigation options were available. The remaining 11 projects require further evaluation and currently are being addressed along with new renewable energy project proposals that have come to the Department's attention.

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