

## Test and Evaluation Resources

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The Director is required under Title 10, U.S. Code to assess the adequacy of planning for, and execution of, operational and live fire 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 budget decisions to ensure T&E capabilities necessary for realistic

T&E are supported. DOT&E collaborates with the Defense Test Resources Management Center (TRMC) to help address critical T&E resource needs through its Central T&E Investment Program (CTEIP) and the T&E Science and Technology (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 from FY10.

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### TARGETS

#### **Anti-Ship Ballistic Missile Targets**

In order to adequately test Navy ship self-defense systems, DoD must develop threat-representative anti-ship ballistic missile targets that emulate a major threat to aircraft carriers and large deck ships. The Missile Defense Agency, with input from the Navy, is planning and budgeting for development of a target to meet this test need for exo-atmospheric engagements. This \$90 Million developmental program includes \$30 Million non-recurring engineering and production of two target vehicles for SM-3 testing. It does not include flight test costs. The complete program cost is estimated to be \$230 Million. Reentry and terminal phase targets required for multiple Fleet Air Defense system test programs will necessitate a follow-on development program for a more complex target. It is estimated that the cost of such a follow-on target will be at least twice that of the exo-atmospheric target now in development.

#### **Aerial Targets**

There is a need for threat-representative full-scale aerial targets that emulate fifth-generation fighter characteristics in order to adequately test U.S. fighter aircraft, air defense combat systems, and missiles. Recent test flights of the Russian PAK-FA reinforce this assessment. The current Air Force program to drone QF-16s does not provide the requisite suite of fifth-generation threat characteristics to support end-to-end testing. DOT&E has conducted several studies to examine the feasibility and affordability of developing a fifth-generation threat fighter target that would be complementary to the QF-16 and address its shortfalls. A prototype program using best practices of general aviation has been proposed that would demonstrate the feasibility of manufacturing an affordable threat-representative target. Development and demonstration of this target, as well as production of six targets, is estimated to cost about \$90 Million.

#### **Multi-Stage Supersonic Targets**

Adequate operational testing of Navy surface ship air defense systems requires a multi-stage supersonic target that emulates anti-ship cruise missiles with threat level capabilities. The Navy has a \$120 Million program to develop a threat level target,

including production for one year. Follow-on production has not been programmed.

#### **Rotary Wing Targets**

In the summer of 2010, two of the three remaining QUH-1 rotary wing targets were destroyed during Navy ship self-defense system testing. The remaining QUH-1 is not operational. At least five Army and Navy programs require these targets to complete operational testing. Over the past two years, DOT&E has worked with the Services to define performance requirements and develop acquisition documentation necessary for a demonstration contract. In FY11, a capability demonstration of up to three candidate systems is planned. A radar signature characterization will be conducted on the candidate selected from this demonstration. However, the Army, which serves as lead for rotary wing targets, has not programmed procurement funding. Consequently, rotary wing targets will not be available to support future operational test requirements. Adequate rotary wing target capability to support operational testing is estimated to cost \$21 Million for procurement and operations and maintenance over a five-year period.

#### **Submarine Targets**

The effectiveness of U.S. anti-submarine aircraft, surface combatant ships, and submarines must be evaluated against modern diesel submarine threats. The U.S. does not have diesel submarines, so testing using either a foreign diesel or a threat surrogate is needed. Although the Navy trains regularly against foreign diesel submarines, availability for their use in testing is infrequent. DOT&E assesses that all current threat surrogate options are inadequate. This resulted in the Virginia class submarine being fielded with its effectiveness against diesel submarines unresolved. Similarly, the end-game effectiveness of U.S. torpedoes against threat submarines must be evaluated. Undersea weapons that must hit the target are not currently evaluated on manned submarine targets due to safety issues. DOT&E is monitoring two Navy initiatives that may provide some target capabilities for both of the foregoing test requirements. The first initiative is a \$10 Million effort that will

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provide a surrogate diesel submarine training target. The second effort is a \$3 Million initiative that will provide five set-to-hit targets for torpedo end game performance testing. After these

initiatives have been demonstrated in FY11, DOT&E will assess their potential for use in operational testing.

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## TEST RANGES AND FACILITIES

### Cyber Assessment and Joint Information Operations Range

The capacity to assess realistically advanced cyber warfighting capabilities must increase to keep pace with heightened demand for those capabilities, advancing technologies, and the growing cyber threat. The Joint Information Operations Range offers a closed multi-level security environment supporting the spectrum of non-kinetic activities. However, it lacks the ability to routinely and consistently portray operationally realistic, threat-representative cyber environments. Test resource enhancements are needed to enable assessment of defenses against cyber attacks and the ability to continue network operations in spite of such attacks. Funding of \$106 Million is needed to upgrade the range to provide threat environments, traffic generators, instrumentation, visualization, event control assets, and infrastructure with which to support more test events with greater network loading and the increased fidelity requirements associated with more threat-representative test events. Additional funding of \$32 Million would provide for enhanced Defense Intelligence Agency threat assessments, Red Team portrayal of advanced cyber adversaries, cyber assessment plans and reports, persistent environments, and more advanced cyber test and training methodologies.

### Rotary Wing Survivability Testing

Rotary wing aircraft crews face significant danger from small arms fire and rocket-propelled grenades. The Helicopter Survivability Task Force identified deficiencies including situational awareness and threat detection. DOT&E has taken the lead to coordinate testing in the development of Hostile Fire Indication (HFI) technologies. A test handbook, standards and procedures, portable test instrumentation packages, and a data repository of signatures and prior test results have been developed. HFI systems cannot currently be tested during formation flight, nor can they be tested against moving threats. Open-air testing for current and future systems is a priority and requires ongoing funding to enable end-to-end testing of aircraft survivability equipment. Funding of \$14 Million would provide a second HFI test tower for formation flight testing and a rotary wing target program for open-air testing.

### Instrumentation

Smaller test articles and a trend toward low observable platforms require stand-alone miniaturized instrumentation capable of sub-meter accuracy. In August 2010, the Air Force awarded a \$140 Million contract to develop the next increment of the Common

Range Integrated Instrumentation System. However, packaging concerns remain for installing instrumentation in test articles that have limited space and weight allocations. Time-space-position information (TSPI) systems required to support advanced weapon systems testing must possess accuracies at least one order of magnitude greater than the systems under test.

Real Time Casualty Assessment (RTCA) is a critical function for determining the fidelity of weapons system engagements. An affordable, sustainable, transparent high-fidelity RTCA is required to provide feedback on weapons and systems effectiveness in test evolutions. Two legacy RTCA programs were terminated due to performance deficiencies and rising cost. Subsequently, the Army has pursued a hybrid approach comprising an interim capability to meet RTCA requirements during test events to be conducted in FY11. This will be followed by an objective capability in 2017. The Test Capability Requirements Document (TCRD) for the 2017 capability was completed in FY10. Capabilities Development Documents are being prepared that will specify the funding required to achieve the required RTCA capability.

### Target Control Systems

The Services continue to operate and maintain a variety of different target control systems with little interoperability among them. The result is an inability to use targets across the test ranges. DOT&E has addressed this issue through the tri-Service Target Control Study Group, which has developed open protocols for use in target control systems. Both the Army and Navy plan to upgrade or replace ageing target control systems starting in FY12-13.

### Urban Environment Testing

Urban combat has become increasingly important for ground forces. Test environments require more extensive and precise instrumentation than that used at training sites. An urban test environment capability has been funded at \$95 Million to date with the Army as Executive Agent. An Urban Environment Test Capability Study was completed in 2010. Development of a TCRD, planning documents, cost analysis, and planning implementation are underway. The TCRD will be completed in 2010 and the remainder of the planning documents in 2011. These documents will specify the acquisition cost of an operationally realistic urban test environment.