Partnering with the T&E Community to Ensure the Relevancy of T&E to 21st Century Defense

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Outline

• National Priorities for 21st Century Defense

• TRMC Activities to Enhance Relevancy

• A Challenge to Move T&E into the Future
Defense Strategic Guidance

Summary

• Reasons for Development
  – Transition from a decade of war in Iraq/Afghanistan to emerging priorities in Asia and the Middle East
  – Respond to mandated reductions in defense spending

• Intent
  – Clarify our strategic interests
  – Guide our defense priorities and spending over the coming decade
  – Drive strategic decisions on implementing the $487B in reductions over the next 10 years
  – Avoid proportional reductions
Defense Strategic Guidance
Primary Missions of U.S. Armed Forces

1) Counter-Terrorism and Irregular Warfare
2) Deter and Defeat Aggression
3) Project Power Despite Anti-Access / Area Denial Challenges
4) Counter WMDs
5) Operate Effectively in Cyberspace and Space
6) Maintain a Safe, Secure, and Effective Nuclear Deterrent
7) Defend the Homeland and Provide Support to Civil Authorities
8) Provide a Stabilizing Presence
9) Conduct Stability and Counter-Insurgency Operations
10) Conduct Humanitarian, Disaster Relief, and Other Operations
Defense Strategic Guidance

8 Principles for Building Joint Force 2020

1) Maintain a broad portfolio of military capabilities
2) Maintain an ability to make a course change
3) Maintain a ready and capable force, even as we reduce our overall capacity
4) Continue to reduce the “cost of doing business”
5) Ensure limited resources better tuned to their requirements – includes renewed emphasis on a globally networked approach to deterrence and warfare
6) Examine mix of Active and Reserve Component elements best suited to strategy
7) Retain and build on key advancements in networked warfare in which joint forces have finally become truly interdependent
8) Maintain an adequate industrial base and our investment in S&T
Key T&E Attributes for the 21st Century

- Agile
- Responsive
- Efficient
- Effective
- Persistent, Distributed Test Infrastructure
- Focus on Assessment of Military Capability
- Robust Testing of Networked Warfare and Cyberspace
- Aggressive Investments in T&E/S&T and new Test Capabilities
- Test the System-of-Systems with the Goal of Testing the Mission

*Test Early – Test Often – Test the Mission*
TRMC Activities to Enhance Relevancy

- USD/AT&L-Directed Comprehensive T&E Infrastructure Review
- RMD-Directed Study on Alternative Resourcing Approaches for T&E Infrastructure
- Funding Model for Hypersonic Test Facilities
- DASD DT&E / TRMC Re-Organization
- JMETC Plus-Up for Cyberspace T&E Infrastructure
- T&E/S&T Investments in Net-Centric Systems Test and Cyberspace Test Technology
- InterTEC Cyber Event
Cyberspace T&E Strategy
Cyberspace T&E Vision

Four Major Thrusts

1. Cyberspace T&E Process
   - Additional activities to test cyberspace during the acquisition process

2. Cyberspace T&E Methodology
   - Test approach to adequately assess cyberspace capabilities/limitations

3. Cyberspace T&E Workforce
   - T&E training to enable T&E professionals to conduct future cyberspace T&E

4. Cyberspace T&E Infrastructure
   - Existing DoD Labs, Ranges, & Networks
   - Industry & Academia Accessible
   - Common Framework for:
     - Cyberspace Environment Tools
     - Cyberspace Test Instrumentation

An integrated T&E enterprise capable of creating a realistic cyberspace test environment at all required security levels, collecting performance & vulnerability test data, and assessing effects.

Test & Evaluation that accurately and affordably measures cyberspace effectiveness and vulnerabilities of warfighting systems and DoD information systems, to verify the warfighter's capability to achieve mission success while operating in cyberspace.

Cyberspace Attack Effects and Impacts:
- Unauthorized Access
- Unauthorized Use
- Disruption of Ops
- Loss of Control
- Data Corruption
- Data Fabrication
- Target Spoofing

Federated Cyberspace T&E Capability
Cyber Assessment Issue Paper

• DOT&E sponsored Cyber Assessment Issue Paper improves assessments of cyber-warfighting capabilities
  – More operationally realistic warfighting environments
  – More representative cyberspace threats and effects

• JMETC enhancements from the Cyber Assessment Issue Paper will:
  – Enhance cyberspace T&E infrastructure capabilities
  – Leverage existing TRMC processes to mature cyberspace technologies into fielded test capabilities
  – JMETC Funding Plus-Up

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>> Cyberspace BAA Topics

>> Net-Centric Systems BAA Topics
1. **Utilize JCAS Operational Use Case to provide valid context for achieving 2011 cyberspace T&E test objectives**

2. **Conduct a series of tests that measure progress towards stakeholder goals:**
   - **Verify Interoperability:** Establish baseline operational mission performance in a benign environment – *conducted as part of InterTEC Systems Acceptance Testing (SAT) to leverage existing, proven methodology*
   - **Conduct Penetration Test:** Conduct representative cyberspace attacks to evaluate mission performance in a threat-enriched operational environment

3. **Gauge progress towards stakeholder goals:**
   - Assess Infrastructure connectivity, tools, and processes for repeatability and gaps
   - Assess validity of utilized cyberspace T&E methodologies and measures
How Would We Test This?
**Mission**
ID & Fill Gaps in Global Sensor Coverage spanning multiple AORs

**T&E Needs**
Assess existing sensor integration capabilities for C2/SA T&E environment with requirements trace & fidelity artifacts to attain customer confidence

**Challenge**
Integrate Radar & IR Sensor data into Common Operational Picture

**Successes**
Joint and Multi Mission issues within existing joint architectures successfully integrated and assessed
Sensor Integration Test

Range Information Grid
Bidirectional Secure Range Network

- Unmanned Systems & Networks
- Mobile Apps & Adaptive Networks
- Joint Task Force
- C4I Providers
- Range Control Facility
- C2 CONTROL NET
- TAC NET
- C2 CONTROL NET
- CEC
Challenges of Testing in a Complex Environment

- Cyberspace T&E Methodology, Infrastructure & Workforce
- Testing Mobile Apps
- Cross-Domain Solution for a Distributed Test Environment
- Testing Autonomy
- Ubiquitous Spectrum/Bandwidth Availability
How Do We Make This a Reality?

- **Material Development Analysis**: Material Development Decision, T&E Strategy
- **Technology Development**: T&E Activities:
  - Rqmts Testability Review
  - Mission/Functional Analysis
  - Joint Experimentation/ACTD
- **Engineering & Manufacturing Development**: T&E Activities:
  - Design OA
  - ACTD/ATD
  - RAM Analysis & Testing
- **Production & Deployment**: T&E Activities:
  - Lab-Based M&S DT&E / EOA
  - Safety DT&E / EOA
  - RAM DT&E / EOA
  - Conf T&E for IOP / DT&E
- **Operations & Support**: T&E Activities:
  - OAs
  - LUFT
  - IOT&E & IOP T&E
  - LFT&E

- **Push T&E Earlier – Use Distributed LVC T&E**

- **Test Platform**
  - Test Often
  - Test Continuously
  - Continuous Evaluation Feedback

- **Test System**
  - Test Early

- **Test SoS**
  - Ability to influence system design
  - Defect correction & upgrade cost

- **Mission Capability Verification**

- **Learn & Fix Early**

- **RISK IDENTIFICATION**
My Challenge to You

• Do you agree that these represent our greatest challenges for future T&E?

• If not, what are they?

• Let’s conduct a panel at the next conference that dives into bringing the required test environment and test process to reality in the next four years.
Back Up
Cyberspace Test Technologies

BAA Topic Areas

• Cyberspace Test Planning
  – Defense Cyber Operations Assessment
  – Improve Cyberspace Test Design

• Cyberspace Threats
  – Improve Cyberspace Threat Representation
  – Scalable Cyberspace Threat Environment

• Cyberspace Test Execution/Analysis
  – Cyberspace T&E Visualization
  – Advance Cyberspace Instrumentation
  – Improve Cyberspace Analysis

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Net-Centric Systems Test Technologies

**BAA Topic Areas**

- **System of Systems Testing**
  - Flexible Test Harness Generator
  - Analysis of DoD Capabilities in a Mission Context
  - Accuracy Improvement in Distributed Testing

- **Test Automation**
  - Automated Test Planning & Test Scenario Development
  - Automated Test Execution and Control
  - Automated Testing Using a Cloud Environment
  - Rapid Analysis of Voluminous Unstructured Data ("Data to Decision")

- **Modeling & Simulation**
  - Determining Required Fidelity in Test Simulations
  - Verification & Validation (V&V) Techniques Across Integrations
  - Aggregation Techniques for System Evaluation
  - Human, System, Communications, Environmental Representations

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