Acquisition and T&E
M&S Practitioners Panel

Mr. George Rumford
T&E/S&T Program Manager
JMETC Lead Systems Engineer
Report Documentation Page

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

<table>
<thead>
<tr>
<th>1. REPORT DATE</th>
<th>2. REPORT TYPE</th>
<th>3. DATES COVERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 MAR 2008</td>
<td>N/A</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. TITLE AND SUBTITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition and T&amp;E M&amp;S Practitioners Panel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5a. CONTRACT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5b. GRANT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5c. PROGRAM ELEMENT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5d. PROJECT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5e. TASK NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5f. WORK UNIT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. AUTHOR(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Mission Environment Test Capability T&amp;E/S&amp;T Program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. PERFORMING ORGANIZATION REPORT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. SPONSOR/MONITOR’S ACRONYM(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. SPONSOR/MONITOR’S REPORT NUMBER(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. DISTRIBUTION/AVAILABILITY STATEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved for public release, distribution unlimited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13. SUPPLEMENTARY NOTES</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>14. ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. SUBJECT TERMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16. SECURITY CLASSIFICATION OF:</th>
<th>17. LIMITATION OF ABSTRACT</th>
<th>18. NUMBER OF PAGES</th>
<th>19a. NAME OF RESPONSIBLE PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. REPORT</td>
<td>unclassified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ABSTRACT</td>
<td>unclassified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. THIS PAGE</td>
<td>unclassified</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Theory, there’s no difference between Theory and Practice

But, in Practice, there is
In Theory, there’s no difference between M&S and T&E

But, in Practice, there is
In Theory, “seamless”, “plug-n-play” LVC interoperability can be achieved with Standards

But, in Practice, it depends
In Theory, models and simulations developed for one T&E program can be reused by other T&E programs

But, in Practice, it depends
This Briefing

....So much to say...so little time

• Could talk about **Lessons Learned** from Using M&S in T&E
• Could talk about the **Challenges** in Using M&S in T&E
• Could talk about the **Differences** in using M&S in T&E
• Could talk about our **Approach to Improve** using M&S in T&E
• Could talk about **Current Solutions** in using M&S in T&E
• Could talk about **New Initiatives** using M&S in T&E
• Could talk about **Opportunities** in using M&S in T&E
Most Important Point Up Front

• We’re always open to **new ideas** and **new approaches**
• If you have a suggestion, recommendation, question, etc., please do ask…if not here at this Conference, then please:
  – Attend a JMETC Users Group meeting
  – Attend a TENA AMT meeting
  – Talk to us at ITEA workshops, NDIA meetings, Test Week 2008
  – Submit a question at www.tena-sda.org
  – Send an e-mail to jmetc-feedback@jmetc.org
    – OR –
    **Send an e-mail to tena-feedback@tena-sda.org**
    – OR –
    **Drop me an e-mail directly at george.rumford@osd.mil**
  – Call me at 703-601-5233 or my assistant at 703-601-5202

To Make DoD-wide Progress in Practicing the Art of Using M&S in T&E, **Your Engagement is Required** (politeness is not)
What’s the best solution to move dirt?
Recurring Elements of Successful M&S Solutions in T&E

• Requirements Documented
• Use Case Analysis
• Several Prototypes
• User Involvement / Participation
What’s more important?

– Finding bugs before integration
– Finding bugs during integration
What’s more important?

– Easy to Use

– Hard to Use Wrong
What’s more important?

– Flexibility (easy to evolve)

– Specificity (easy to integrate)
TRMC Investment Programs Overview

T&E/S&T
- Established in FY2002
- Develops technologies required to test future warfighting capabilities
- 6.3 RDT&E funds
- ~$65M / year
- 7 current focus areas
  - Directed Energy
  - Hypersonics
  - Netcentric Systems
  - Unmanned Systems
  - Non-intrusive Instruments
  - Spectrum Efficiencies
- 82 current projects

CTEIP
- Established in FY1991
- Develops or improves test capabilities that have multi-Service utility
- 6.4 RDT&E funds
- ~$140M / year
- 52 current projects
  - 27 projects developing core Joint capabilities
    - 2 projects improving interoperability test cap.
  - 9 projects improving threat representations used in testing
  - 16 projects addressing near-term OT shortfalls

JMETC
- Established in FY2007
- Provides corporate infrastructure for distributed Joint testing
- 6.5 RDT&E funds
- ~$10M / year
- 8 current sites
  - Expanding to 26 sites
- Maintains
  - Network connections
  - Security agreements
  - Integration software
  - Interface definitions
  - Distributed test tools
  - Reuse repository
T&E/S&T Example of M&S Use: Ground Test Facility Design

• Current Ground Test Conditions
  – Fixed Mach number conditions
  – Fixed geometry that limit Mach number to a constant value

• T&E Needs
  – Simulate variable Mach number airflow
  – Create the transitional flow environment without introducing significant uncertainties

• M&S Role
  – Design nozzle shapes
  – Simulate flow conditions required for ground test
  – Verify nozzle design
  – Lower overall design cost
T&E/S&T Example of M&S Use: Multi-Spectral Scene Generation

• Current Conditions
  – Unable to generate realistic conditions for multi-spectral sensors and seekers testing

• T&E Needs
  – Multi-spectral scenes to enhance test data measurement
  – Simulation for hardware-in-the-loop testing

• M&S Role
  – Create realistic and dynamic multi-spectral scenes using computational technology
  – Portray full range battlespace or test environment phenomena
  – Verify sensor / seeker response and performance
Interoperability Testing Needs
Past, Present, and Future

Yesterday’s Solution

Platform Centric Tactics
Technical Interoperability

Link 11 Link 16
IBS JVMF
Conformance Test

Today’s Need

Joint Operations
System Interoperability

Future

Network Centric Ops
Operational Interoperability

Key Metrics
• Certify Interoperability & Net Readiness in the Joint Battlespace
• End-to-End Networked Execution of Joint Mission Threads
Testing in a Joint Environment

Analysis

Test Control

TEST NETWORK

Joint Test Environment

GIG
Interoperability Test & Evaluation Capability (InterTEC)

C4ISR Instrumentation & Analysis
- Data Capture
- Stimulation
- Analysis
- Display

Test Control
- Planning
- Rehearsal
- Control
- Monitoring
- Reporting

Virtual Components
- HWIL Interfaces
- Message Generation

Live Components
- Range Interfaces
- Range Instrumentation

Constructive Components
- Simulation Interfaces

Synthetic Battlespace Environment

Joint C4ISR Test Environment

Test Control

Distributed Test Suites
Joint Mission Environment Test Capability (JMETC)
Test & Training Enabling Architecture (TENA)

- Requirements
  - Interoperability
  - Reuse
  - Composability
  - Support Rapid Integration
  - Gradual Deployment

- Supports
  - Testers & Trainers
  - Joint, Army, Navy, Air Force, Agencies
  - Live, Virtual, Constructive
  - Range, Laboratories, Simulations
  - Real-Time & Non-Real-Time

- Guiding Principles
  - Non-Proprietary
  - Provide middleware
  - Use real software objects
  - Maximize code generation
  - Management by users (AMT)
  - No license fee (GOTS)
Summary

• We’re always open to new ideas and new approaches to improve our current capabilities
• We’re investing in new technologies
  – Look for the upcoming Broad Agency Announcement (BAA)
• We’re investing in new capabilities
• We’re sustaining a core integration capability

• We want you to participate
  – Attend a JMETC Users Group meeting
  – Drop us an e-mail or give us a call
    • JMETC-feedback@jmetc.org
    • TENA-feedback@tena-sda.org
    • george.rumford@osd.mil