T&E M&S War Game Results

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Game Overview

• Purpose:
  – Recent seminar war game for modeling and simulation (M&S) sponsor to identify areas for M&S strategic investments in support of future force developmental and operational test and evaluation (T&E)

• Participation:
  – About 30 players from T&E, M&S, developmental & operational test & evaluation (DT&E/OT&E) and other communities
  – Divided into three interdisciplinary teams
  – Game research, design, facilitation and reporting provided to players

• Game Research:
  – Purpose:
    Understand the challenges
    Gather appropriate issues for game discussion
    Build credible scenarios
    Identify subject matter experts
  – Generate interest in game
  – About 15 DoD, joint and service commands and organizations visited
Game Scenarios and Moves

• Scenarios (2015 – 2020):
  – Provide participants with a context for discussion – not an operational war game
  – Three representative scenarios (linked to Defense Planning Guidance (DPG) scenarios)*:
    Urban canyon
    Triple canopy jungle
    Rugged terrain

• Four moves (Given a Future Blue Force):
  – Move 1: Red Move – Counter the Blue Force
  – Move 2: Blue Force Evaluation Metrics
  – Move 3: Test the Blue Force – Identify needed T&E capabilities and specific M&S challenges
  – Move 0: Characterize the barriers between present and future state and capture T&E, M&S strategic priorities

* All with Deep Underground (DUG) facilities
Game Approach

Phase I: Game Design & Development
- Game Research Visits
- Research Questions
- Scenario Development
  - ~30 Days

Phase II: Game Preparation
- War Game Site Visit
- Game Materials Production
  - ~7 Days
- Game Dry Run
  - ~7 Days

Phase III: Game Execution
- Game Intro
- Game Days 1 & 2
  - Game Day 1
  - Game Days 1 & 2
- Game Report
  - Game Day + 7
  - Game Day + 30

Phase IV: Assessment/Analysis
- Game Quicklook
  - Game Day + 7
- Game Report
  - Game Day + 30
## Game Move Design

<table>
<thead>
<tr>
<th>Scenario A</th>
<th>Move 1</th>
<th>Move 2</th>
<th>Move 3</th>
<th>Move 0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Team A: Red-team Blue force</td>
<td>Team A: Develop Blue force metrics</td>
<td>Team A: ID T&amp;E caps and M&amp;S challenges</td>
<td>Team A: Strategic priorities</td>
</tr>
<tr>
<td>Scenario B</td>
<td>Team B: Red-team Blue force</td>
<td>Team B: Develop Blue force metrics</td>
<td>Team B: ID T&amp;E caps and M&amp;S challenges</td>
<td>Team B: Strategic priorities</td>
</tr>
<tr>
<td>Scenario C</td>
<td>Team C: Red-team Blue force</td>
<td>Team C: Develop Blue force metrics</td>
<td>Team C: ID T&amp;E caps and M&amp;S challenges</td>
<td>Team C: Strategic priorities</td>
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### Tactical Operational Strategic

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[Image: Raytheon Integrated Defense Systems]

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Competing T&E M&S Paradigms

- The current/“old” paradigm of reduced modeling and simulation as hardware comes on line will no longer apply as M&S matures and as T&E integrates with other systemic M&S

The Old Paradigm of Modeling and Simulation vs. Hardware T&E

- As Hardware Comes on Line for Test
- M&S Tails Off . . .

With Full Spectrum Integration, M&S Level of Use Doesn’t Tail Off . . .
- It Spirals Upward

The T&E Virtuous Spiral
Recommended Actions (1)

• Develop a mapping of M&S capabilities into T&E requirements
• Develop plans to better integrate M&S into design and T&E of future forces
• Create a DoD T&E and M&S professional society to facilitate T&E and M&S exchange and interactions and to foster development of next generation of T&E and M&S professionals
• Integrate M&S into development and acquisition programs in a value-added manner
• Organize Electronic Attack (EA) T&E/M&S workshops to address how EA and other network disruptions are addressed in programs, T&E and M&S
• Examine how T&E and M&S is being employed by specific programs to address C4ISR backbone issues
• Define situational awareness/understanding and sensor fusion representation requirements for developmental and acquisition programs and for T&E and M&S communities
Recommended Actions (2)

- Work with National Geospatial-Intelligence Agency (NGA) to develop common set of terrain requirements and representations to support programs and T&E
- Promote improved collaboration between T&E and M&S community and joint/service Red, intel, and doctrine development (including joint).
- Integrate M&S into development and acquisition programs in a value-added manner to facilitate integrated development and T&E
- Invest in M&S representation of sensor fusion to support system development and T&E
- Examine use of M&S in development of future force with an eye toward integrating it in such a way that it optimally supports system development and T&E (i.e., Improvised Explosive Devices (IEDs))
- Institute DoD M&S/T&E professional organization to support information exchange, coordination, and community replenishment and growth
- Streamline and update DoD testing security protocol to keep current with changing requirements to protect developmental capabilities
- Work with T&E and community to collaborate on various visions, paradigms and versions of future programs
Major Strategic Findings

• Make investments:
  – M&S of system of systems and representation of C⁴ISR fusion
  – Developing joint M&S collaborative environment, infrastructure and common framework
  – Scalable/high-fidelity, composable, transformable architecture;
  – Robust synthetic natural environment
    i.e., wave propagation and terrain modeling

• Develop capabilities
  – Provide replication of:
    Equipment and systems
    Trained personnel
    Territory
  – Capture secondary, systemic effects of equipment and system changes
  – Experiment with new doctrine and developmental capabilities – e.g., asymmetric warfare