Chemical And Biological Defense Modeling and Simulation S&T Support to MDAP Thrust  
(CBD M&S S&T Support to MDAP)  

2006  
Bill Zimmerman  
NSWCDD  

“You must understand the real world, in order to model it”
Topics

- Purpose
- Background
- Problem Statement
- Goals and Milestones
- Challenges and Opportunities
Thrust Area Purpose

- To develop and transition supporting CB M&S for MDAP, and acquisition programs using M&S or M&S programs developing capabilities in support of acquisition
  - What does this mean?
  - What is the scope of the Thrust Area?
Background

- Terminology
- Common and Cross-cutting Services, Tools, Data
- M&S is a tool
- Live, Virtual, Constructive
- Multi-resolution Environment
• **Live**
  - “A simulation involving real people operating real systems.”

• **Virtual**
  - “A simulation involving real people operating simulated systems. Virtual simulations inject Human-In-The-Loop in a central role by exercising motor control skills (e.g., flying an airplane), decision skills (e.g., committing fire control resources to action), or communication skills (e.g., as members of a C4I team).”

• **Constructive**
  - “A simulation involving simulated people operating simulated systems. Real people stimulate (e.g., make inputs) to such simulations, but are not involved in determining the outcomes.”

*Reference: DoD Modeling and Simulation (M&S) Glossary, Jan. 98*
**M&S Interoperability**

- The ability of a model or simulation to provide services to and accept services from other models and simulations, and to use the services so exchanged to enable them to operate effectively together.


• Distributed Simulation
  – Linking together of independent, geographically separate simulations or simulators
  – Tremendous potential for helping ensure combat readiness, especially for combined or joint combat operations
  – Can involve multiple types of military simulations (i.e., live, virtual and constructive)
  – Linking different simulations and simulators depends on a network architecture
    • Allows data and information to be sent, received and used in a consistent manner
  – Issues during distributed simulation events
    • standardized databases, real-time versus faster- or slower-than-real-time simulations, and the accuracy or validity of the underlying models upon which the simulation is based
The New M&S Framework

- Organized by Communities
- DoD M&S coordination structured to support the Communities

1/2 -Star M&S Steering Committee (M&S SC) provides governance.
DMSO transitions to M&S Coordination Office (M&S CO)-- supports the M&S IPT and SC.

Components
OSD, Joint Staff, COCOMs, & Services

$B Goals:
• Interoperability
• Reuse
• Efficiency

Briefed at 1st DoD M&S Conference 1-5 May 2006
Traditional Modeling and Simulation

**Level**

- **Campaign**
  - Force Effectiveness
  - Force Survivability
  - Campaign Outcomes

- **Mission**
  - Mission Effectiveness/Lethality
  - Survivability
  - Mission Outcomes

- **Engagement**
  - System effectiveness
  - Vehicle capabilities

- **Engineering**
  - Sub-system definition
  - Integration of sub-systems
  - System performance

**Use**

**Aggregation**

**Detail**
UNCLASSIFIED

CBRN Multi-resolution Environment

Far Field  |  Mid Field  |  Near Field  |  Internal

Atmospheric
- Global
- Meso
- Local
- Micro

Interactions in Boundary Areas

Surface

Interactions in Boundary Areas

Water
- Large Open Bodies of Water
- Lake and River
- Near Water Intake
- Internal Water Distribution
Virtual Environment

Common Elements?

“Traditional” M&S Focus

“CBRN” M&S Focus

Live
Virtual
Constructive
CBRND

CBRN Threat Representation → CBRN Scenarios → Mission → Objective

Simulation Environments → System Under Test (SUT)

MDAP

Threat Representation → Scenarios → Mission → Objective

Potential CBD M&S S&T MDAP Support Areas

Mapping of CBD Terms to MDAP Terms
CBD M&S S&T MDAP Support

Problem Statement (Future View)

Potential CBD M&S S&T MDAP Support Areas

Mapping of CBD Terms to MDAP Terms
Major Goals and Milestones

- Near Term (FY07 – FY08)
  - Identify Acquisition Program CBD M&S S&T needs
  - Establish pilot S&T program with FCS
  - Establish collaboration activity between broader M&S and CBD M&S
  - Participate with Simulation Interoperability Standards Organization (SISO) Study Group (SG) on LVC Architecture Interoperability
  - Transition initial pilot program
- Mid Term (FY09 – FY11)
  - Identify additional Acquisition Program CBD M&S S&T needs
  - Establish common S&T areas among MDAPs
  - Transition program
- Far Term (FY12 & Beyond)
  - TBD (based on initial efforts)
Challenges and Opportunities

- The CBD M&S S&T MDAP Support Area will
  - Develop interoperability, and supporting analysis technology supporting CBD M&S and MDAP M&S
  - Established architecture or framework for analysis & technology trade-offs
  - Rapidly transition interoperability technology to MDAP
  - Leverage capabilities across DoD, collaboration with US government, universities, companies, foreign countries
  - Support the conduct of concept evaluations by depicting proposed concepts, promising technologies, doctrine, possible TTPs in a synthetic environment, and exercising them in appropriate scenarios.
  - Provide an authoritative and consistent representation of the CBRN environment
Questions?