M&S Standards Overview

Names

Conference Name and Date
M&S CO’s Standards Responsibilities

• Manage the MSSM Standardization Area in accordance with DoD 4120.24-M, Defense Standardization Program (DSP) Policies and Procedures.
  – Coordinate the review and adoption of standards in other Standardization Areas that are utilized in support of M&S efforts.
  – Coordinate M&S standardization among Services, JFCOM and other DoD Components
  – Maintain liaison with non-Governmental standards bodies (NGSBs) that sponsor standardization documents that are utilized for M&S applications.

• Manage the M&S TWG in accordance with Standard Operating Procedures for the ITSC, IT Subcommittee Chairs (ISCs), and TWGs. (DISA, 2007)
  – Recommend the disposition of M&S standards listed or proposed for listing in the DISR
  – Coordinate the disposition of standards in other technical areas that are of interest to the M&S community
  – Represent M&S interests on other TWGs
  – Publish a M&S Standards Profile detailing the recommended application of standards listed in the DISR that are used for M&S applications
  – Staff ITSC action items of interest to the M&S community

• Develop, coordinate, promulgate and maintain NATO M&S STANAGS (Approved M&S CO Roles and Missions)
# Order of Precedence as it Relates to the Adoption of M&S

<table>
<thead>
<tr>
<th>Priority</th>
<th>Standards Source Hierarchy</th>
<th>Standards Bodies</th>
<th>Example Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>International (Treaty)</td>
<td>NATO, ASCC</td>
<td>STANAGS [e.g., HLA (IEEE 1516, 1516.1, 1516.2), SEDRIS]</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>International Non-Governmental Standards Body</td>
<td>ISO, IEEE, SISO</td>
<td>SEDRIS-EDCS (ISO-IEC 18025) HLA DIS (IEEE 1278.1, 1278.1a, 1278.2, 1278.3, 1278.4) BOM (SISO-STD-003)</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>National Non-Governmental Standards Body</td>
<td>ANSI</td>
<td>Programming Language PL/1 (ANSI-X3.53)</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Government</td>
<td>FIPS</td>
<td>DSS (FIPS 186-2)</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Military (Defense Standards)</td>
<td>DSP</td>
<td>VV&amp;A (MIL-STD-3022) HLA (HLA 1.3 [retired]) NFDD</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Professional Society; Technology Consortia; Industry Association</td>
<td>IETF; W3C; OASIS; OMG</td>
<td>XML, UML</td>
</tr>
</tbody>
</table>
What is an “M&S Standard”?

DoD M&S SC Standards Profile

ASSIST
M&S Standards

RPR FOM (SISO-STD-001)
HLA API (SISO-STD-004)

JC3IEDM (STANAG 5525)
SIMPLE (STANAG 5602)

LINK 11 (SISO-STD-005)

IDEF0 (FIPS PUBS 183)
IDEF1X (FIPS PUBS 184)

MDA
CORBA
SEDEP

OpenFlight***
X3D
NetWars

XML
SysML
XML MI

MIL-STD-2407

LINK 16 (SISO-STD-002)

M&S SC Standards Portfolio

DSEEP (IEEE P1730)

M&S VV IE
GM V&V

VV&A Overlay
To FEDEP (IEEE 1516.4)

DoDAF
NATO Architecture Framework

MSC DMS*

M&S Glossary*

VV&A RPG

DTED
TENA
SCORM

**Not an open standard

*Not in current Profile
Content Description of the DoD M&S Standards Profile

Document Structure

1. INTRODUCTION
2. STANDARDS SELECTION CRITERIA AND CONSIDERATIONS
3. MODELING AND SIMULATION STANDARDS
4. STANDARDS OF INTEREST
5. PROFILE GAPS
6. CONCLUSIONS AND RECOMMENDATIONS

APPENDIX A: STANDARDS DESCRIPTION TEMPLATE (METADATA TEMPLATE)
APPENDIX B: STANDARDS DESCRIPTIONS (DETAILED METADATA FOR EACH STANDARD)
APPENDIX C: POINTS OF CONTACT
APPENDIX D: ACRONYMS
APPENDIX E: GLOSSARY

Background Information and Summary of Standards Provided in Document Body.
Detailed Descriptions of Standards Provided in Appendix. B.
Modeling and Simulation COI
Discovery Metadata Specification (MSC-DMS)

• Concept
  − M&S Resources need to be cataloged using a common consistent and understandable labels
  − Consistent Discovery Metadata allows resources to be more easily
    − Searched and Discovered, and
    − Compared

• Purpose
  − Used to catalog M&S Resource Assets w/ Metacards
  − Enables M&S Information Interoperability
  − Supports DOD M&S Vision for Reuse
  − Aligns with DoD Net-Centric Data Strategy & DDMS
  − Integrates M&S repository / practices / catalog standards against DDMS

M&S Resource Assets Supported
1. M&S Software (models / simulations)
2. M&S Adjunct Tools (data loggers, visual)
3. Federations of Simulations
4. M&S Software Components
5. M&S Services
6. M&S Data
7. M&S Data Models
8. Interface Specifications
9. Documents
M&S SVT Implementation of Process

M&S SVT Status Sheet Highlights
Status of Each Step within Each Stage
(displayed after each step completed)

Concept #1: Nominate

1. Submit Nomination
   - New or Existing Standard?
     - New
     - Existing

2. Technical Review
   - Full Coordination Recommendation Initiated
   - Is it valid? Does it belong?

3. Business Review
   - 3.1 Determine Sponsor
   - 3.2 Confirm Document Type
   - 3.3 Conduct Technical Review

4. Community Review
   - 4.1 Service or Activity Consensus
   - Limited
   - Full

5. Ballot, Approve, Sign
   - 5.1 Ballot
   - 5.2 Approve
   - 5.3 Sign

6. Promulgate, Advocate, Educate

7. Periodic Review

Concept #2: Evaluate

Process Implemented by the M&S SVT

Concept #3: Advocate

STAGE 1: SUBMIT NOMINATION

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitter</td>
<td>Stage 1.1: Submit Proposed Standard</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Secretariat</td>
<td>Stage 1.2: Review Standards Design/Category Leader</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 2: TECHNICAL REVIEW

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned Category Leader</td>
<td>Stage 2.1: Select Assigned Team Leader</td>
<td></td>
</tr>
<tr>
<td>Assigned Category Leader</td>
<td>Stage 2.2: Draft Criteria</td>
<td></td>
</tr>
<tr>
<td>Assigned Team Leader</td>
<td>Stage 2.3: Select Assigned Team Members</td>
<td></td>
</tr>
<tr>
<td>Assigned Category Leader</td>
<td>Stage 2.4: Review/Recommend Assigned Team Members</td>
<td></td>
</tr>
<tr>
<td>Assigned Team Members</td>
<td>Stage 2.4.1: Respond to Requests for Assigned Team Member</td>
<td></td>
</tr>
<tr>
<td>Assigned Category Leader</td>
<td>Stage 2.4.2: Monitor Team Member Responses</td>
<td></td>
</tr>
<tr>
<td>Assigned Category Leader</td>
<td>Stage 2.5: Accept Final Assigned Team Members</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 2.6: Review/Recommend Criteria</td>
<td></td>
</tr>
<tr>
<td>Assigned Team Members</td>
<td>Stage 2.7: Perform Stage 2 Technical Review</td>
<td></td>
</tr>
<tr>
<td>Assigned Team Leader</td>
<td>Stage 2.8: Close Stage 2 Technical Review</td>
<td></td>
</tr>
<tr>
<td>All Registered Users</td>
<td>Summary/Report for Stage 2</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 2.9: Approve to Stage 3</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 3: BUSINESS REVIEW

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;S Standards Secretariat</td>
<td>Stage 3.1: Select Voting Members</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 3.2: Review/Recommend Voting Members</td>
<td></td>
</tr>
<tr>
<td>Voting Members</td>
<td>Stage 3.2.1: Respond to Requests for Voting Members</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 3.2.2: Monitor Voting Member Responses</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 3.3: Accept Final Voting Members</td>
<td></td>
</tr>
<tr>
<td>Voting Members</td>
<td>Stage 3.4: Make Recommendations</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 3.5: Close Stage 3 Business Review</td>
<td></td>
</tr>
<tr>
<td>All Registered Users</td>
<td>Summary/Report for Stage 3</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 3.6: Approve to Stage 4</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 4: COMMUNITY REVIEW

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;S Standards Secretariat</td>
<td>Stage 4.1: Initiate Stage 4 Review</td>
<td></td>
</tr>
<tr>
<td>All Registered Users</td>
<td>Stage 4.2: Review/Recommend Comments</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Secretariat</td>
<td>Stage 4.3: Close Stage 4 Community Review</td>
<td></td>
</tr>
<tr>
<td>All Registered Users</td>
<td>Summary/Report for Stage 4</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 4.4: Approve to Stage 5</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 5: BALLOT, APPROVE, SIGN

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;S Standards Secretariat</td>
<td>Stage 5.1: Select Ballot Members</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 5.2: Approve/Recommend Ballot Members</td>
<td></td>
</tr>
<tr>
<td>Ballot Members</td>
<td>Stage 5.2.1: Respond to Requests to be a Ballot Member</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 5.2.2: Monitor Ballot Member Responses</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 5.3: Accept Final Ballot Members</td>
<td></td>
</tr>
<tr>
<td>Ballot Members</td>
<td>Stage 5.4: Submit Ballot</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 5.5: Close Stage 5 Business</td>
<td></td>
</tr>
<tr>
<td>DoD Component/Office Lead</td>
<td>Stage 5.6: Ballot/Office Lead Approval</td>
<td></td>
</tr>
<tr>
<td>Approval Authority</td>
<td>Stage 5.7: Final Approval</td>
<td></td>
</tr>
<tr>
<td>All Registered Users</td>
<td>Summary/Report for Stage 5</td>
<td></td>
</tr>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 5.8: Approve to Stage 6</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 6: PROMULGATE, ADVOCATE, EDUCATE

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Registered Users</td>
<td>Stage 6.1: Promulgate, Advocate, Educate</td>
<td></td>
</tr>
</tbody>
</table>

STAGE 7: PERIODIC REVIEW

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;S Standards Chair</td>
<td>Stage 7.1: Periodic Review</td>
<td></td>
</tr>
</tbody>
</table>
Verification Validation & Accreditation Standards

- **VV&A Recommended Practices Guide:** describes the interrelated processes that make up VV&A from a number of perspectives
- **MIL-STD 3022 Documentation of VV&A for M&S:** establishes templates for the four core products of the M&S VV&A processes
- **IEEE Std 1516.4™-2007:** defines processes and procedures to implement VV&A for federations being developed using the HLA Federation Development and Execution Process (FEDEP)
- **IEEE Std 1278.4™-1997:** defines guidelines for the VV&A of distributed interactive simulation (DIS) exercises
Distributed Simulation Engineering and Execution Process (DSEEP)

- **Concept**
  - A generic, tailor able framework for distributed simulation development
  - Provides a clear, concise introduction to distributed simulation development for new users
  - A systems engineering framework, not a software engineering framework

- **Purpose**
  - Provides a common reference point for communication between federation development team members
  - Provides a common foundation for defining functional overlays to the federation development process, e.g. VV&A, security, tools

**Solving the Standards Puzzle**
High Level Architecture (HLA)

• Concept
  - A generic, flexible architecture for distributed simulation not tied to any modeling domain or physical architecture
  - Enable interoperability and reuse of “best of breed” simulations
  - An “information bus” for publishing and subscribing to data without explicit connection to other simulations

• Purpose
  - Provides a common architecture for distributed modeling and simulation
  - Provides a common template for recording data exchange agreements between participating simulations
SEDRIS Standards

- **Concept**
  - Eight ISO/IEC standards for describing, interchanging, sharing, and reusing environmental data
  - Software interface and implementations for accessing environmental data sets
  - Syntax, semantics, and structure to represent environmental data
  - Tools and utilities to access, manipulate, and evaluate environmental data
  - Framework and approach for thinking about environmental concepts and their representations

- **Purpose**
  - Promotes environmental database reuse among heterogeneous applications
  - Provides users the capability to correlate and integrate data from multiple sources
Backup
Standards Developing Bodies (1 of 2)

- **SISO** - The Simulation Interoperability Standards Organization is an international organization dedicated to the promotion of M&S interoperability and reuse for the benefit of a broad range of M&S communities.
  - SISO SAC is the IEEE’s standards sponsor for simulation interoperability standards

- **IEEE** - The Institute for Electrical & Electronics Engineers Standards Association (IEEE-SA) is the leading developer of global industry standards in a broad-range of industries, including:
  - Power and Energy
  - Transportation
  - Biomedical and Healthcare
  - Nanotechnology
  - Information Technology
  - Information Assurance
Standards Developing Bodies (2 of 2)

- ISO - The International Organization for Standardization is the world's largest developer and publisher of International Standards. ISO is a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

- IETF - The Internet Engineering Task Force is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual.

- W3C - The World Wide Web Consortium develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication, and collective understanding.