



Discovery of Modeling & Simulation Assets to Support Systems Engineering

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Presenter

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- The ability to ***discover, evaluate, and reuse relevant M&S assets*** could potentially improve engineering results and lower overall program costs.
- Tools to increase visibility and accessibility of DoD M&S assets are needed.

Disclaimer: The views presented in this paper are those of the authors and do not necessarily represent the views of the Department of Defense or its Components.

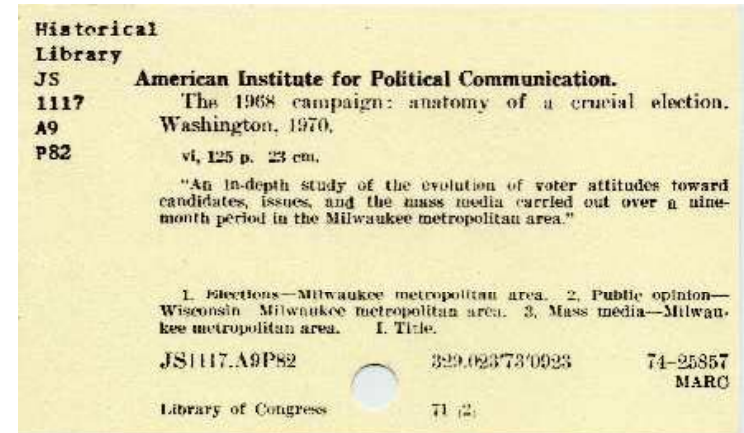
- Review the role of M&S in SE and Acquisition
- Become familiar with M&S metadata concepts, specifications, and tools
- Know where to find additional information

Goal: Increase ROI of M&S Assets Through Improved Discovery and Reuse

- DoD Directive 5134.01
 - USD (AT&L) shall “... develop policies, plans, and programs to coordinate, harmonize, and rationalize DoD M&S ... ***and ensure that DoD M&S investments support operational needs and the acquisition process.***”
- DoD Directive 5000.59
 - “M&S tools, data, and services ***shall be visible and accessible.***”

- Defense Acquisition Guidebook
 - “***Models and simulations are SE tools*** used ... during all life-cycle phases.”
 - “M&S should be developed and documented, to include ***metadata (MSC-DMS)*** ...”
 - “The PM and SE should establish and maintain a ***repository of all relevant M&S data products*** that describe what the system is and does.”

- Metadata
 - Descriptive information about the meaning of other data (“Data about data”)
- Discovery Metadata
 - Information about M&S assets, such as resources, contacts, taxonomies
- Structural Metadata
 - Information about the rules governing metadata structure and format, such as schemas and transforms

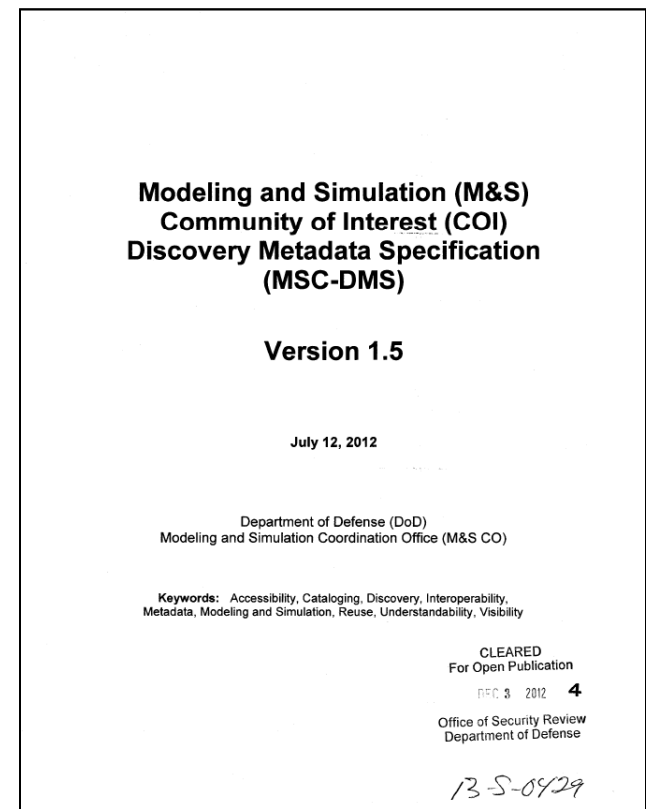


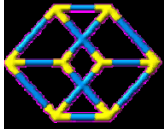
Where is Metadata?

- Discovery Metadata → catalogs
- Structural Metadata → registries
- M&S Assets → repositories

***You're Already in the Metadata Business.
You Just Don't Think About It.***

- MSC-DMS: M&S Community of Interest Discovery Metadata Specification
 - The metadata specification tailored for the M&S COI that conforms to DDMS
 - Named in DAG Section 4.3.19.1 “Modeling and Simulation”
- On the horizon (2014): Trusted Data Format (TDF)
 - Harmonizes DoD and IC metadata specifications





```
1 |<?xml version="1.0" encoding="UTF-8"?>
2 |<ns:Resource xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" xmlns:ddms="http://metadata.dod.mil/mdr/rs/DDMS/2.0/" xmlns:gml="http://www.opengis.net/gml"
3 |  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:icism="urn:us:gov:ic:ism:v2" xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
4 |  xsi:schemaLocation="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/ MSC-DMS-Resource-v1.4.xsd" ms:metacard_ID="0ME9D2V4mH">
5 |  <ms:Title ms:value="Modular Ocean Data Assimilation System Lite (MODAS-Lite) Model, ver 2.1"/>
6 |  <ms:Type ms:value="software_component"/>
7 |  <ms:Description>
8 |    <ms:Text>MODAS-Lite 2.1 provides Fleet users the ability to generate MODAS grid fields on various on-scene prediction system platforms for both shallow and deep-water
9 |    applications. This upgraded model has been designed to be Joint Maritime Command Information System (JMCIS) compliant and its output has been verified to match that of the larger
10 |    MODAS Model, Version 2.1, which is Administrative Model Oversight Panel (AMOP) certified, and is presently providing ocean data field predictions at Navy METOC Centers and at the
11 |    NAVOCEANO War-fighting Support Center. The MODAS "unique" climatology segment will accompany the model delivery as a non-configuration managed item until a
12 |    compatible Generalized Digital Environmental Model (GDEM) Global Ocean Climatology Upgrade is made available.</ms:Text>
13 |  </ms:Text>
14 |  </ms:Description>
15 |  <ms:Dates>
16 |    <ms>Date ms:value="2012-04-16" ms:type="created"/>
17 |  </ms:Dates>
18 |  <ms:Version ms:value="2.1"/>
19 |  <ms:Releasability ms:value="X: Those eligible to obtain export-controlled technical data"/>
20 |  <ms:Associations>
21 |    <ms:Association ms:value="Appendix D (Ordering Products), is located in the Oceanographic and Atmospheric Master Library Summary document (OAML-SUM-21T)" ns:type="support_asset">
22 |      <ms:Description>
23 |        <ms:Text>Ordering Information for Ocean and Atmosphere Master Library (OAML) Products. Refer to point of contact (POC) for detailed information.</ms:Text>
24 |      </ms:Description>
25 |    </ms:Association>
26 |  </ms:Associations>
27 |  <ms:POCs>
28 |    <ms:POC ms:role="technical POC">
29 |      <ms:Organization>
30 |        <ms>Name ms:value="The NAVOCEANO Systems Integration Division (Code N64)"/>
31 |        <ms>Type ms:value="government"/>
32 |      </ms:Organization>
33 |      <ms>Description>
34 |        <ms:Text>The NAVOCEANO Systems Integration Division (Code N64) is the designated ConfigurationControl Center (CCC) for the OAML. The CCC is responsible for Quality Assurance
35 |        (QA) of the software and documentation, and for providing the automated functions for configuration identification, control, status accounting, change implementation, and
36 |        distribution. Once a copy of OAML baseline elements (i.e., software and documentation) is distributed to a user, it is the users responsibility to implement the software correctly,
37 |        request certification, safeguard, or seek assistance, as required.</ms:Text>
38 |      </ms>Description>
39 |    </ms:POC>
40 |    <ms:POC ms:role="unspecified">
41 |      <ms:Organization>
42 |        <ms>Name ms:value="The DOD contracting command"/>
43 |        <ms>Type ms:value="government"/>
44 |        <ms>ContactInstruction ms:value="The DOD contracting command must forward written formal requests for OAML products and associated documentation to:Commander, Naval
45 |        Meteorology and Oceanography Command, Code N94, 1100 Balch Boulevard, Stennis Space Center, MS 39529-5005. The written request shall: List the information desired on the OAML
46 |        Product Request (OPR) Form. Validate the contractor's need for this information under an active existing contract. Verify that the contractor is aQualified U.S. Contractor (i.e.,
47 |        holds a valid DD Form 2345). Certify that the contractor meets the security requirements for CLASSIFIED and controlled technical information or material (i.e., holds a certified DD
48 |        Form 254)."/>
49 |      </ms:Organization>
50 |      <ms>Description>
51 |        <ms:Text>Ordering OAML Products:The DOD contracting command must forward written formal requests for OAML products and associated documentation. Refer to the Contact
```

- Create, edit, search, and exchange M&S metadata
 - Web-based, GOTS tool built on low-cost open source software
 - Real-time dashboard of asset inventory information
 - Moving to “.mil” server this year

This is a demonstration website for managing M&S metadata.



EMBR Portal Version 1.0 Build 1223
Enterprise Metacard Builder Resource

Welcome Hart Rutherfordford! Click Here to [Logout](#)
Click Here for [Account Preferences](#)

[Home](#) | [Search](#) | [Workbench](#) | [Feedback](#) | [Community](#) | [Support](#)

EMBR Portal Tools

Find an M&S asset for your project

[Advanced Search](#)

Manage Metacards

Share Usage Feedback

Workbench Links

[My Metacards](#)
[My Collaborations](#)
[Tracked Metacards](#)
[Previous Searches](#)
[Review Asset Feedback](#)

Notifications

Collaboration Requests

No Recent Requests

Collaboration Messages

No Recent Messages

Comments Received

No Recent Comments

Recently Updated Metacards

EMBR Portal

- [cJCAS-RequestApproval](#) - Updated: 2012-03-23
- [cJCAS-Request](#) - Updated: 2012-03-23
- [Test](#) - Updated: 2012-03-20
- [Model Repository](#) - Updated: 2012-03-20
- [CTIA Force Structure Component](#) - Updated: 2012-03-16

[Prev](#) 1 of 159 [Next](#)

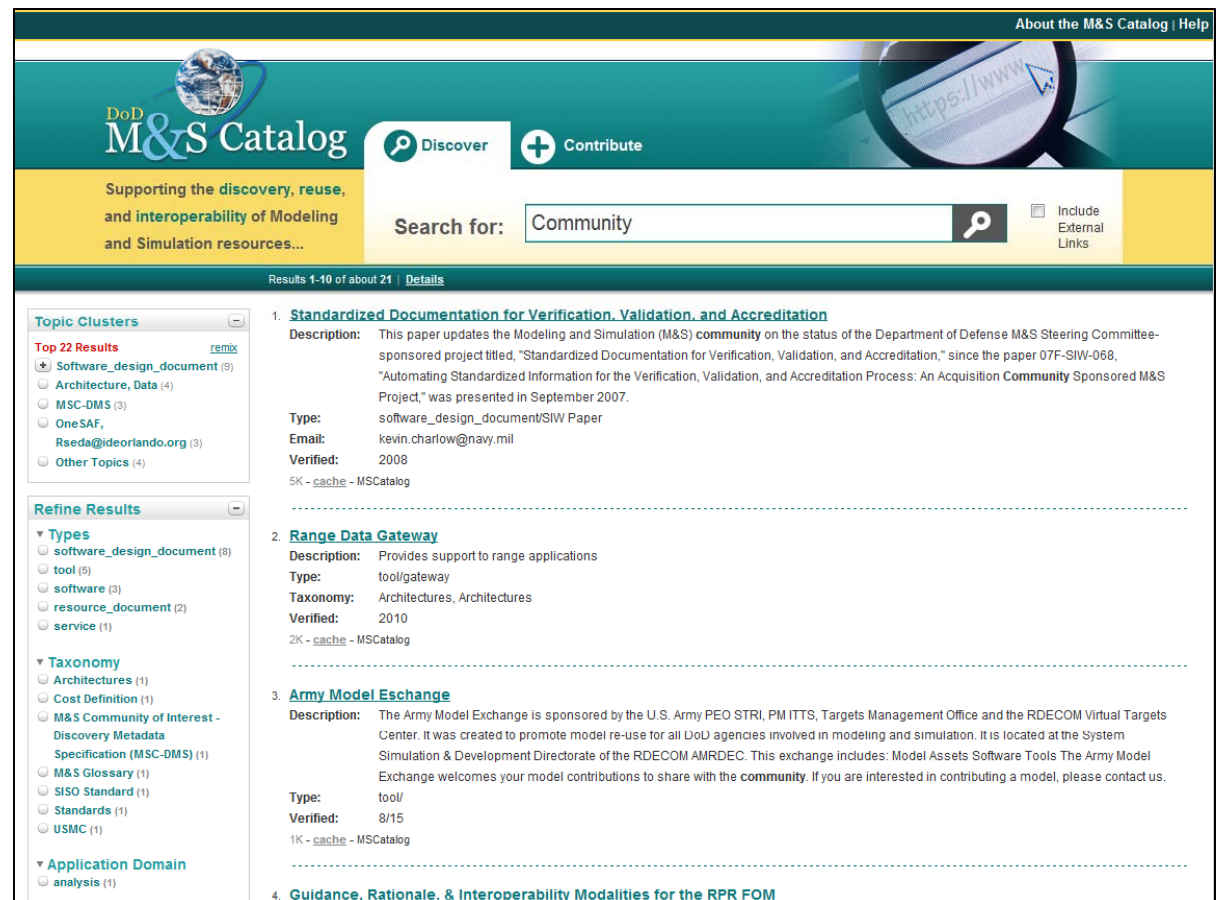
My Metacards & My Collaborations

[Range Data Gateway](#) - Updated: 2011-01-20



- A web-enabled card catalog for M&S assets
 - Access to anyone with Common Access Card (CAC)

- New user interface concept design
 - Still in development



DoD M&S Catalog

Supporting the discovery, reuse, and interoperability of Modeling and Simulation resources...

Search for: Community

Results 1-10 of about 21 | Details

Topic Clusters

Top 22 Results [remix](#)

- Software_design_document (9)
- Architecture, Data (4)
- MSC-DMS (3)
- OneSAF, Rseada@ideorlando.org (3)
- Other Topics (4)

Refine Results

Types

- software_design_document (8)
- tool (5)
- software (3)
- resource_document (2)
- service (1)

Taxonomy

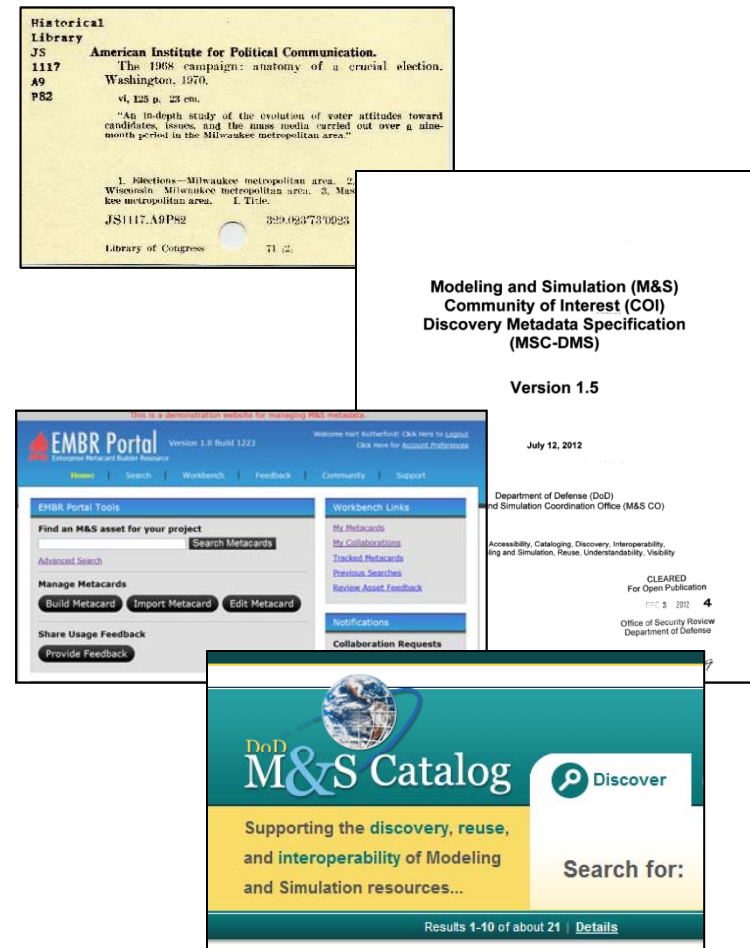
- Architectures (1)
- Cost Definition (1)
- M&S Community of Interest - Discovery Metadata Specification (MSC-DMS) (1)
- M&S Glossary (1)
- SISO Standard (1)
- Standards (1)
- USMC (1)

Application Domain

- analysis (1)

- Standardized Documentation for Verification, Validation, and Accreditation**
 Description: This paper updates the Modeling and Simulation (M&S) community on the status of the Department of Defense M&S Steering Committee-sponsored project titled, "Standardized Documentation for Verification, Validation, and Accreditation," since the paper 07F-SIW-068, "Automating Standardized Information for the Verification, Validation, and Accreditation Process: An Acquisition Community Sponsored M&S Project," was presented in September 2007.
 Type: software_design_document/SIW Paper
 Email: kevin.charlow@navy.mil
 Verified: 2008
 5K - [cache](#) - MSCatalog
- Range Data Gateway**
 Description: Provides support to range applications
 Type: tool/gateway
 Taxonomy: Architectures, Architectures
 Verified: 2010
 2K - [cache](#) - MSCatalog
- Army Model Exchange**
 Description: The Army Model Exchange is sponsored by the U.S. Army PEO STRI, PM ITTS, Targets Management Office and the RDECOM Virtual Targets Center. It was created to promote model re-use for all DoD agencies involved in modeling and simulation. It is located at the System Simulation & Development Directorate of the RDECOM AMRDEC. This exchange includes: Model Assets Software Tools The Army Model Exchange welcomes your model contributions to share with the community. If you are interested in contributing a model, please contact us.
 Type: tool/
 Verified: 8/15
 1K - [cache](#) - MSCatalog
- Guidance, Rationale, & Interoperability Modalities for the RPR FOM**

- Highlights
 - Metadata
 - Metadata Specification
 - Metadata Tool
 - Metadata Catalog



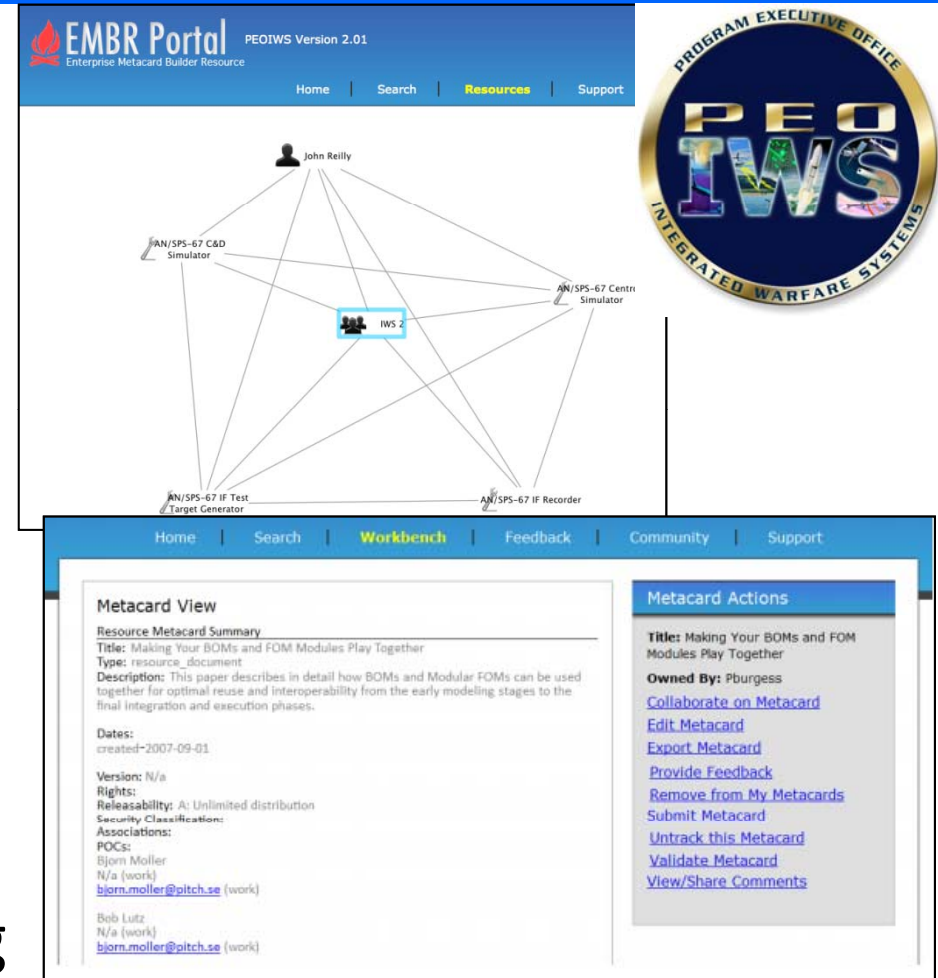
Historical Library
American Institute for Political Communication.
 JS 1117 The 1968 campaign: anatomy of a crucial election.
 A9 Washington, 1970.
 P82 vi, 125 p. 23 cm.
 "An in-depth study of the evolution of voter attitudes toward candidates, issues, and the mass media carried out over a nine-month period in the Milwaukee metropolitan area."
 1. Elections—Milwaukee metropolitan area. 2. Wisconsin—Milwaukee metropolitan area. 3. Masses metropolitan area. I. Title.
 JS1117.A9P82 329.0937370625
 Library of Congress 71 2.

**Modeling and Simulation (M&S)
 Community of Interest (COI)
 Discovery Metadata Specification
 (MSC-DMS)**
 Version 1.5
 July 12, 2012
 Department of Defense (DoD)
 and Simulation Coordination Office (M&S CO)
 Accessibility, Cataloging, Discovery, Interoperability,
 ing and Simulation, Reuse, Understandability, Visibility
 CLEARED
 For Open Publication
 OFFICE 3 2012 4
 Office of Security Review
 Department of Defense

EMBR Portal Version 1.0 Build 1223
 Welcome Matt Rutherford! Click Here to Logout
 Click Here for Account Preferences
 Home Search Workbench Feedback Community Support
 EMBR Portal Tools
 Find an M&S asset for your project
 Search Metacards
 Advanced Search
 Manage Metacards
 Build Metacard Import Metacard Edit Metacard
 Share Usage Feedback
 Provide Feedback
 Workbench Links
 My Metacards
 My Collaborations
 Tracked Metacards
 Previous Searches
 Review Asset Feedback
 Notifications
 Collaboration Requests

DoD M&S Catalog
 Supporting the discovery, reuse,
 and interoperability of Modeling
 and Simulation resources...
 Discover
 Search for:
 Results 1-10 of about 21 | Details

- M&S IPT established to foster organizational collaboration
 - Metadata tools and specs are key enablers
- Initial analysis revealed previously unknown dependencies
 - Several teams were using the same data source for analysis and testing
- PEO IWS better understands its investments



The screenshot displays the EMBR Portal interface. At the top, it shows the logo and version (PEO IWS Version 2.01). A navigation bar includes Home, Search, Resources, and Support. The main content area features a network diagram with a central node labeled 'IWS 2' and several peripheral nodes: 'AN/SPS-67 C&D Simulator', 'AN/SPS-67 Centn Simulator', 'AN/SPS-67 IF Test Target Generator', and 'AN/SPS-67 IF Recorder'. A user profile for 'John Reilly' is visible at the top of the diagram. To the right of the diagram is the circular logo for the Program Executive Office (PEO) IWS Integrated Warfare Systems.

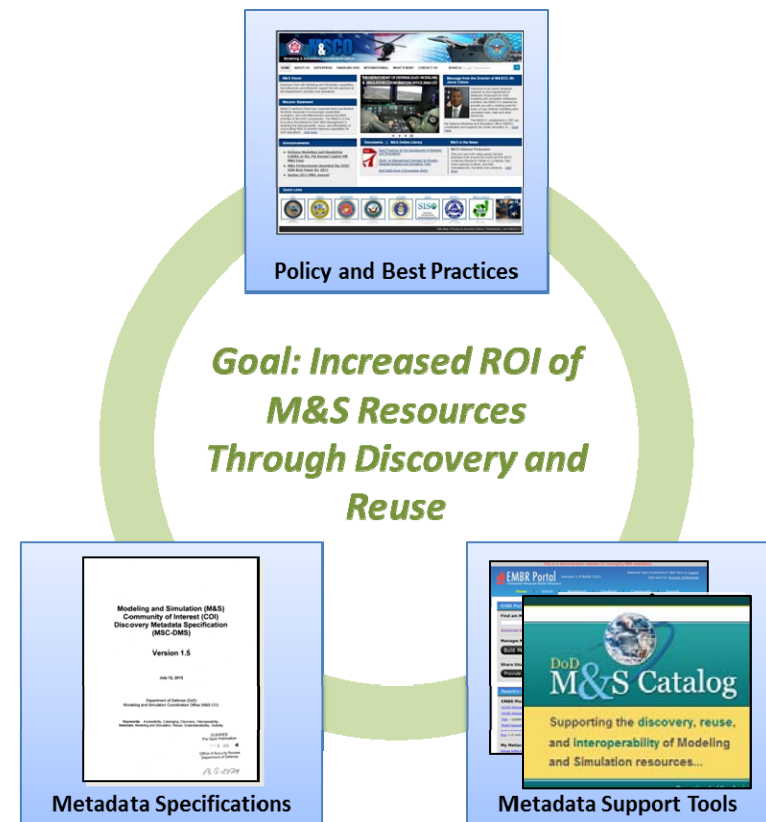
Below the diagram is a 'Metacard View' section. It includes a 'Resource Metacard Summary' with the following details:

- Title:** Making Your BOMs and FOM Modules Play Together
- Type:** resource_document
- Description:** This paper describes in detail how BOMs and Modular FOMs can be used together for optimal reuse and interoperability from the early modeling stages to the final integration and execution phases.
- Dates:** created-2007-09-01
- Version:** N/a
- Rights:**
- Releasability:** A: Unlimited distribution
- Security Classification:**
- Associations:**
- POCs:** Bjorn Moller, N/a (work), bjorn.moller@pitch.se (work)
- Bob Lutz:** N/a (work), bjorn.moller@pitch.se (work)

To the right of the summary is a 'Metacard Actions' panel with the following options:

- Title:** Making Your BOMs and FOM Modules Play Together
- Owned By:** Pburgess
- [Collaborate on Metacard](#)
- [Edit Metacard](#)
- [Export Metacard](#)
- [Provide Feedback](#)
- [Remove from My Metacards](#)
- [Submit Metacard](#)
- [Untrack this Metacard](#)
- [Validate Metacard](#)
- [View/Share Comments](#)

- Efficient discovery and reuse of M&S assets
- Effective management and analysis of current and planned M&S investments
- Improved collaboration within M&S COI and among COIs



- M&S Standards Profile to support Acquisition
 - Help us “ ... provide guidance on the selection and use of modeling and simulation standards and recommended practices to support the acquisition lifecycle.”



- I/ITSEC
 - Visit M&SCO at Booth 1981 for demonstrations and technical information



- **Defense Acquisition Guidebook** – 16 Sept 2013
(https://acc.dau.mil/docs/dag_pdf/dag_complete.pdf)
- **DoD Acquisition Modeling and Simulation Working Group**
“Systems Engineering Modeling, Simulation, and Analysis Fundamentals” – version 2.5, July 2013
(<http://www.acq.osd.mil/se/docs/SE-MSA-Fundamentals.pdf>)
- **M&S Journal Fall 2011 “Asset Discovery”**
(<http://msco.mil/documents/MSJournal2011Fall.pdf>)

- Continue engagement with M&S practitioners
 - Gather additional use cases and future needs
- Refine enterprise metadata architecture
 - Improve M&S tools and data exchange
 - Improve the usefulness of Catalog metadata

- Questions? Comments?

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Background

- DoD Net-Centric Data Strategy (NCDS)
 - Describes DoD enterprise data visibility goals and DDMS
 - Establishes COIs and “COI-specific metadata structures”
- DoD Directive 8320.02 establishes data sharing policy
 - Data shall be **visible** through discovery metadata
 - Data shall be **accessible** in shared spaces
 - Data shall be **understandable** via structural metadata