

UNCLASSIFIED

Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification (MSC-DMS)

Version 1.4

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Department of Defense (DoD)
Modeling and Simulation Coordination Office (M&S CO)

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The DoD Office of Security Review has cleared this report for public release (Distribution A) (Case No. 11-S-2706)

Forward

The Department of Defense (DoD) M&S Community of Interest (COI) Discovery Metadata Specification defines Discovery Metadata components for documenting M&S assets posted to community and organizational shared spaces. “Discovery” is understood as the ability to locate data assets through a consistent and flexible search. The M&S COI Discovery Metadata Specification (MSC-DMS) specifies a set of information fields that are to be used to describe M&S data or service assets that are made known to the Enterprise, and it serves as a reference for developers, architects, and engineers by building upon the foundation for Discovery Services initially reflected within the DoD Discovery Metadata Specification (DDMS). The DDMS, established by Assistant Secretary of Defense (Networks & Information Integration), and other standards, practices, and approaches have been cross integrated to formulate a concise, practical, and flexible specification, identified as the MSC-DMS, for Discovery Metadata to be used across the Communities and Services for tagging M&S assets that will be made accessible via the Global Information Grid (GIG). All activities that publish the availability of M&S assets will need to use the MSC-DMS so that federated searches across the GIG will provide consistent discovery of assets including M&S Resources, M&S Contacts, and M&S Taxonomies.

This document is divided into two main sections. The first section (Chapters 1 through 3) provides information about the scope, purpose, logical structure and organization of the MSC-DMS. The second section (Chapters 4 through 6) contains a comprehensive listing of each of the metadata components used to create MSC-DMS metacards. Additionally there are 4 appendices which include a references list, a definitions list, and a schema listing.

This document describes the MSC-DMS components and their logical groupings. It serves as an interchange specification for conveying discovery metadata; however this document is not intended to offer substantive implementation guidance. The MSC-DMS components as specified in this document provide a basis for M&S focused organizations to begin planning, transitioning, and implementing metadata tagging initiatives that support the Department’s goal of increased data visibility and Enterprise Discovery.

The M&S CO will be responsible for configuration management of the M&S COI Discovery Metadata Specification, and will ensure consistency with the Department’s Net-Centric Data Strategy Objectives. Through coordination with the M&S COI members in the form of a working group (WG), candidate additions and/or modifications will be identified for inclusion in subsequent versions of the M&S COI Discovery Metadata Specification. As the M&S COI Discovery Metadata Specification is enhanced, and refined consideration will be given to the usage of the Library of Congress MARC 21 Format for Bibliographic Data.

Comments and suggestions pertaining specifically to the DoD M&S COI Discovery Metadata Specification should be sent to the following:

Modeling & Simulation Coordination Office (M&S CO)
1901 N. Beauregard St., Suite 500
Alexandria, VA 22311, USA

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M&S CO

Paul Dumanoir
Dr. Amy Henninger
Roy Scrudder
Ralph Gibson

John Daly
John Diem
Ali Nikolai
Dr. Dave Lashlee

Editor

Paul Gustavson

Additional Document Contributions

Tram Chase (XML Schema Support)
Curtis Blais (Navy Postgraduate School)
Hart Rutherford

Contributing Community and Service POCs

Dr. Richard Daehler-Wilking (M&S Catalog) David Broyles (Navy)
Jim Hollenbach (Acquisition) Frank Landry (Army)
Max Lorenzo (Test and Evaluation) Ken Persing (Air Force)
Ed Weinberg (Analysis) Michael Meehan (MSIAC)
Steve Hunt (Analysis)

M&S Catalog Source Working Group

Brandi Greenberg (bgreenberg@alionscience.com)
Curt Blais (clblais@nps.edu)
David H. Broyles (david.h.broyles@navy.mil)
Dr. Tom Holland (orgal.holland@navy.mil)
Gary Stewart (gstewart@lce.com)
George Stone (gstone@alionscience.com)
Hart Rutherford (hrutherford@simventions.com)
Jason Ferreira (jason.ferreira@navy.mil)
Kathie Reece (KathieR@dsoft-tech.com)
Kathleen Gue (Kathleen.Gue@afspc.af.mil)
Laurie H. Talbot (ltalbot@alionscience.com)
Mark Henry (mark.d.henry@navy.mil)
Matthew Warren (matthew.warren2@navy.mil)
Michael Meehan (michael.meehan.ctr@osd.mil)
Michael Roberts (michael.roberts.ctr@afams.af.mil)
Paul Gustavson (pgustavson@simventions.com)
Richard Daehler-Wilking (r.daehler-wilking@navy.mil)
Robert Starkweather (robert.starkweather.ctr@osd.mil)
Russell Hutt (russell.hutt@afams.af.mil)
Sarah Epps (epps@cutlass-se.com)
Steve M Hunt (Stephen.Hunt.ctr@osd.mil)
Wanda Warton (Wanda.Warton@us.army.mil)

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Change History

24 December 2010 - Version 1.4

This version reorganizes the specification to include two new types of asset metacards (Contact and Taxonomy) and also Multicards, which captures multiple metacards. Significant feedback was received by the M&S community and resulting changes are marked with a star (★):

- Resource Metacards
 - consolidated into one section rather than across three sections.
 - the diagrams, which were previously presented in the Appendices, have been moved earlier into the corresponding Resource “metadata set” section to provide greater clarity of each metadata component set, and helps better organize the specification.
- Contact Metacards ★
 - added to specify how contact information can be defined that represents individuals such as subject matter experts (SMEs) and organizations. This is an extraction of the POC subcomponent of a Resource Metacard.
- Taxonomy Metacards ★
 - added to specify how taxonomy classifications may be defined that detail the glossary of terms pertaining to a domain or organization that may have been used to describe a Resource. Aids the **taxonomy cited** subcomponent of a Resource Metacard.
- Multicards
 - added to provide a way to capture a collection of metacards (Resources, Contacts, and/or Taxonomies) as one file.

Additional changes to the MSC-DMS include the following:

- Update of the Resource Metadata Set as follows:
 - Modification of the enumerations for Resource Type, including renaming
 - “**interface_specification**” to “**interface_model_specification**” to more closely align with current M&S best practices.
 - “**software_design_document**” to “**resource_document**” to support the ability to use metacards for other resource related documents.
- Update of the Association Metadata Set as follows: ★
 - Reduction and extension of the enumerations for an Association Type to support broader relationships with other assets. The enumeration list now includes the following:
 - **resource_asset**
 - if an association is made to another resource, then that resource’s metacard, will specify the resource type (it no longer needs to be specified within the association type).
 - **contact_asset**
 - **taxonomy_asset**
 - **support_asset**
- Update of the HLA Coverage Metadata Set as follows: ★
 - eliminate “**waiver**” requirement, and

- provide an additional HLA certification enumeration, which now includes, "**yes**," "**no**," or "**waiver**."
- Glossary in Appendix B has been consolidated into one single table and additional terms have been included or updated to better reflect key terms used in the specification.
- Updates of the MSC-DMS have been made to more closely align with DDMS version 3.0
 - The Person Metadata Set, which is used to support **Contacts** and **Resource.POCs**, now includes the following:
 - **Affiliation** has been added as a subcomponent to match with DDMS. As a result, the **Position** subcomponent has been moved under **Affiliation**, and **Org** has been removed from **Position** since it is supported by **Affiliation**.
 - The **ID** attribute changed to **personID** to stay consistent with the naming style (see Section 3.1), and more closely match with DDMS, which uses **UserID**. The intent is to include a prefix on all IDs as done for other Metadata Sets.
 - Cardinality for **Email**, **Phone** number changed to *optional* to match with DDMS.
 - Cardinality for **Address**, which is not supported by DDMS, changed from *required* to *optional*.
 - The Organization Metadata Set now includes the following:
 - Cardinality for **Email**, **Phone** number changed to *optional* to match with DDMS
 - Cardinality for **Address**, which is not supported by DDMS, changed from *required* to *optional*.
 - A **Security** subcomponent has been added to more of the Metadata Sets, which were not previously supported in prior versions of the DDMS but are now supported in Version 3.0 of the DDMS. Also, to be consistent with Metadata Sets within the MSC-DMS, **Releasability** and **Description** subcomponents were also included in this addition. The following Metadata Sets have been affected
 - Virtual Coverage
 - Temporal Coverage
 - Geospatial Coverage
 - HLA Coverage
 - VV&A Coverage
 - Configuration Management
- Provision of a relaxed MSC-DMS schema components have been added to the specification package to assist those developing experimental and prototype metacards that may not be fully completed. ★

22 March 2010 - Version 1.3.1 (Community Release)

This version corrects pagination and formatting issues that existed in Version 1.3. In addition, a naming inconsistency pertaining to POC references has been resolved within the supporting XML schema representing this specification. No other technical impact resulted from these changes.

10 February 2010 - Version 1.3

This version includes updates to several enumerated data types, which can be assigned to some of the MSC-DMS attribute values. These changes include the following:

- Usage Application Domain Set (added “**intelligence**”)
- Date Type (Added “**last_verified**”)
- Association Qualifier (was open text field, added new pick-list which includes “**URL**”)
- Association Type (added new association types including “**Subject Matter Expert**”)

In addition to these enumeration types, the following other adjustments have been made:

- Formally added a capability to identify specific taxonomies for any MSC-DMS component
- Modified and improved the VV&A Coverage Metadata Set extension/supplemental component
- Guidance on how to mark a M&S Resource as “**FOUO**”
- Several grammatical errors have also been corrected within the specification and schema, such as **PostalCode**, which was originally misspelled in the schema as **PostcalCode**.

9 September 2009 - Version 1.2.1 (Community Release)

This version corrects a minor defect pertaining to the inclusion (import) of the DDMS XML schemas within only the MSC-DMS Core and Supplemental XML schemas that resulted in a namespace conflict for some XML parsers. The principal schema, MSC-DMS-v1.2, was not affected. Thus, any metacards developed using the original 1.2 version of the MSC-DMS XML schema need not be updated. However, the new MSC-DMS Core and Supplemental XML schemas files provided with the 1.2.1 version should be used to replace the prior 1.2 versions of these same XML schema files.

20 February 2009 - Version 1.2 (Community Release)

This version incorporates the most recent update of the DDMS, version 2.0, and IC-IMS, version 2.1. The known impact is that the Media Format subcomponents (**extent**, and **medium**) are now *optional* as opposed to *required*. For additional changes pertaining to the DDMS, please examine the DDMS, Version 2.0 specification and its release notes. Updates to the IC-IMS include an additional attribute, identified as “**derivativelyClassifiedBy**”, which is used for further amplifying security characteristics pertaining to a Resource. This additional attribute is now available to users of the MSC-DMS.

Additionally, this version resolves several editorial issues including the following:

- a) spelling and grammatical mistakes,
- b) incorrect references to sections and example tables,
- c) incomplete examples, and

- d) style naming conventions that were inconsistent. (Specifically the enumeration list for **associationTypeEnumerations** was updated to match the style used by the **typeValueEnumerations**; in which underscores are used in place of spaces.)

Otherwise, functionally, this version of the MSC-DMS is equivalent to version 1.1.

27 August 2008 - Version 1.1 (Community Release)

This version integrates adjudicated and accepted comments submitted by an initial set of community of users. This community of users includes the DoD M&S Catalog Project team, which has indicated their desire to use the MSC-DMS to provide a common mechanism to reflect M&S Resources gathered and reflected from the various set of repositories available, such as the DoD Modeling and Simulation Resource Repository (MSRR), Navy MSRR, and Air Force MSRR. In addition several components of the MSC-DMS have migrated from standalone components to component sets represented with attribute values. This is to allow for easier extensibility of component nodes as changes may warrant in the future without compromising the integrity and validity of older XML instances, which were founded on version 1.1 or newer editions of this metadata specification. This version of the specification also maintains conformance with the DDMS, proving an extension of that work in support of M&S discovery.

The technical updates that have been made to support the DoD M&S Catalog project needs are identified in Table 1.

Table 1 Summary of Changes to MSC-DMS for Version 1.1

Type of Change	Component(s)	Belonging To	Comments
Add	Releasability and Security	Resource (root), Resource.Title, Resource.Description, Resource.Association, Resource.POCs.POC, Resource.Usages.Usage Resource.Media	Releasability: Distribution statements like "A: Unlimited" or "B: US Government agencies only". Security: Allow IC-ISM tagging at least of fields to be available to public, so they can be explicitly marked as not-sensitive and releasable.
Add	ADS-Designation	Resource.Type, Resource.Associations.Association	Allow marking of authoritative data sources.
Rename	Associations (from References)	Resource	Applicability is much broader than bibliographic references.
Add	type, ADS-Designation, and constraints	Resource.Association	Enhance flexibility of Association.
Add to pick-list	Role	Resource.POCs.POC	Allow ADS-Designator to support Authoritative Data Sources
Add	Description	Resource.POCs.POC Resource.Associations.Association Resource.Usages.Usage.History Resource.Media Resource.Extensions.ConfigurationManagement	E.g., to allow description for metadata components such as describing ADS designation for a POC
Add	Type and Address	Resource.POCs.POC.Person.Email Resource.POCs.POC.Organizaiton.Email	E.g., NIPR, SIPR, and JWICS addresses.
Add	Capabilities	Resource.Usages.Usage	E.g., AAW, ASW, SUW

Add	Configuration Management	Resource.Extensions	Include Type to identify, "User Group", "CCB", "Executive Steering Committee", "None" and POC reference
Add	Accreditation (VV&A) Type	Resource.Extensions	To support VV&A/VV&C. Relates to work performed in conjunction with the DoD VV&A Documentation Tool (DVDT).
Update	HLA Coverage	Resource.Extensions	Enhanced flexibility of HLA coverage and added Name component HLA FOM / SOM being used (if applicable)

21 January 2008 - Version 1.0.1 (Community Release)

Since the Version 0.8.1 draft release, several small yet significant items were identified, which are now rectified in this release. In addition to editorial updates, the following technical updates have been made:

- Extension of **Date.Type** for **Date Metadata Set**
- Extension of **History.Type** for History Metadata Set which is used by the Usage Metadata Set to now include greater information regarding History entry
- Addition of a **Relationship** field within the Reference Metadata Set
- Ability to tag **Security** attributes for a Resource Metadata Set

Specifically, it was found that a single date entry in the **Dates** component for Verification and Validation (V&V) and Accreditation are not sufficient. There may be many V&V activities with different dates and multiple accreditations since M&S Resources are validated and accredited in the context of a specific use.

Additionally, the Reference Metadata Set (now identified as the Association Metadata Set beginning in Version 1.1) of the metadata has been extended with a Relationship metadata component (now identified as an Association metadata component beginning in Version 1.1) to better represent hierarchy and organization. This metadata set allows for an M&S Resource to identify if an M&S Resource "is part of" a larger component set, and/or if the Resource "has a" set of one or more other subcomponents that should be identified as an assembly or project set. Also it provides a means to identify if an M&S Resource "is a type of" another component or Resource that maybe more common and understood.

Finally, there was a concern that Security should be addressed at the core level as opposed to the supplemental level. This issue has been addressed, and security, using the Intelligence Community Metadata Standard for Information Security Marking (IC-ISM) standard metadata components, is applied at the Resource level. This approach also follows closely with the DDMS style, with the exception that it is contained within its own Security Metadata Set rather than included with the attributes of various Metadata Sets. This allows Security to be clearly identified and parsed by tools and repositories.

13 September 2007 - Version 0.8.1 (Internal Draft Release)

Version 0.8, which had provided a lot of rationale for this specification, was split into two components: one representing a more concise specification, which is embodied by this version 0.8.1; and the other into a supplemental Study Report providing research details and rationale for the M&S COI (MSC) Discovery Metadata Specification that has been developed. Because much text was removed from the original 0.8 draft, key text has been inserted as necessary. This includes a new Terms of Reference section within the Introduction section, which was originally in the Rationale section, which Version 0.8 provided.

Additionally, the Date Metadata Set was extended with two more date types: **Date V&V** (verified and validated) and **Date Accredited**.

5 September 2007 - Version 0.8 (Preliminary Internal Review Version)

Version 0.8 draft represented the original preliminary review version of the MSC-DMS.

References

The list of documents referenced within this Specification is defined in Appendix D.

Definitions

Terms used in this Specification are defined in Appendix A.

Abbreviations and Acronyms

ADS	Authoritative Data Source
ASD AT&L	Assistant Secretary of Defense Acquisition, Technology, and Logistics
ASD NII	Assistant Secretary of Defense Networks & Information Integration
BOM	Base Object Model
COI	Community of Interest
DAMSMP	DoD Acquisition Modeling and Simulation (M&S) Master Plan
DCMI	Dublin Core Metadata Initiative
DDMS	DoD Discovery Metadata Specification
DIF	Data Interchange Format
DIS	Distributed Interactive Simulation
DISA	Defense Information Systems Agency
DISR	DoD Information Technology Standards Registry
DoD	Department of Defense
DODD	Department of Defense Directive
DOT&E	Director of Operational Test and Evaluation
DT&E	Developmental Test and Evaluation
DTIC	Defense Technical Information Center
EXCIMS	Executive Council for Modeling and Simulation
FEDEP	Federation Development and Execution Process
FOM	Federation Object Model
GIG	Global Information Grid
HLA	High Level Architecture
IC-ISM	Intelligence Community Metadata Standard for Information Security Marking
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IP	Intellectual Property
IP	Internet Protocol
ISO	International Organization for Standardization
JDS	Joint Data Support
M&S	Modeling and Simulation
M&S CO	Modeling and Simulation Coordination Office
MSC-DMS	Modeling and Simulation COI Discovery Metadata Specification
MSRR	Modeling and Simulation Resource Repository
MWG	Metadata Working Group
OMT	Object Model Template
OSD	Office for the Secretary of Defense
PDMS	Product Development Metadata Specification
PM	Program Manager
POCs	Points of Contact
SDEM	Simulation Data Exchange Model
SISO	Simulation Interoperability Standards Organization
SOA	Service Oriented Architecture
SOM	Simulation Object Model
TENA	Test and Evaluation Enabling Architecture
T&E	Test and Evaluation
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
VV&A	Verification, Validation, and Accreditation
WG	Working Group
XML	Extensible Markup Language
XSD	XML Stylesheet Description
XSLT	Extensible Stylesheet Language Transformation

1 Introduction

The Modeling and Simulation Coordination Office (M&S CO), which is chartered by the Office of the Secretary Defense (OSD), is focused on facilitating simulation interoperability across government agencies and communities including testing and evaluation, analysis, and acquisition. There is great interest at the Department of Defense (DoD) level and with M&S CO, to support the discovery of M&S assets for these communities and services as directed by the DoD Net-Centric Data Strategy. Discovery is defined as “the ability to locate data assets through a consistent and flexible search.”¹ The DoD Net-Centric Data Strategy (dated May 9, 2003) defines goals and approaches for users and systems to discover and access a wide range of data assets throughout the DoD Enterprise. This document reports on the necessary discovery metadata to support the net-centric goals of data visibility of M&S assets across the DoD.

1.1 Purpose

The purpose of this specification is to standardize on the set of metadata used to describe assets in Modeling and Simulation Resource Repository (MSRR) nodes and similar applications, and to ensure that the product metadata template will align with the DoD Discovery Metadata Specification (DDMS) as part of the Global Information Grid (GIG) /Net-Centric Data Strategy.

Given ubiquitous Internet Protocol capable communications, the Department’s approach to net-centricity has been set forth in a document called the DoD Net-Centric Data Strategy. It was signed by Assistant Secretary of Defense Networks & Information Integration (ASD NII) on 9 May 2003. This strategy lays out the six clear-cut actionable goals shown in Figure 1-1. The questions beside each goal clarify their intent. Progress toward these goals can be monitored and measured by observation of what capabilities are actually appearing online, who is using them, and what the users feed back to developers and operators.

Visible	Is an information resource discoverable by most users?
Accessible	Is it available on the network, and are tools readily available to use it?
Understandable	Can it be intelligibly used? Are the semantics well documented?
Trusted	Is the source, accuracy and currency of the data available to users?
Interoperable	Can it be combined or compared with other information? Can it be mediated?
Responsive	Is the data what users need? Are robust user feedback mechanisms in place to improve it?

Figure 1-1 DoD Net-Centric Data Strategy Goals

¹ Deputy Assistant Secretary of Defense, Department of Defense Discovery Metadata Specification (DDMS), Version 1.4, July 1, 2007.

Visibility, accessibility, and understandability are the high priority goals of the DoD Net-Centric Data Strategy. Of these goals, visibility and discovery are intimately linked as identified by DoD Directive 8320.2.

1.1 Terms of Reference

Appendix B provides a complete list of key terms used in this document, however the following terms are central to the purpose and scope of this specification.

1.1.1 M&S Community of Interest (COI)

A COI is defined as “a collaborative group of people that must exchange information in pursuit of its shared goals, interests, missions, or business processes and therefore must have a shared vocabulary for the information it exchanges.”² DoD Directive 8320.2 identifies that COIs are responsible for making data Visible, Accessible, and Understandable, and that each COI should extend DDMS to support data sharing needs.

The information that is represented by this specification is a result of the M&S COI’s responsibility to identify what is required for visibility, accessibility, and understanding of M&S assets, which include Resources, Contacts (such as an SME), and Taxonomies. Additionally, careful attention has been made to extend the DDMS to support M&S Resource sharing needs.



1.1.2 Discovery Metadata

This specification is focused on the concept of metadata with respect to the visibility, accessibility, and understanding of M&S assets. Metadata is defined as “structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities.”³ To state it more simply, metadata is data about data. When exploring the concept of metadata there are two types of metadata that can be identified: Structural Metadata and Discovery Metadata. These two types of metadata are illustrated in Figure 1-2.

² <http://www.dod.mil/cio-nii/coi>

³ The Final Report of the Association for Library Collections and Technical Services’ Task Force on Metadata (2000).

- **Structural Metadata**
 - “Rules governing a chunk” - Name, description, data constraints, and relationships of tags used in information resources to delimit one chunk of data from another chunk
 - Artifacts where structural metadata is described:
 - XML schemas,
 - RDBMS structures,
 - Taxonomy scheme
 - Register in DoD Metadata Registry, use submission package
 - About making things understandable
- **Discovery Metadata**
 - Aids in the recall and retrieval of reusable assets
 - M&S assets where discovery metadata is captured and documented
 - Resources, (software, tools, federations, services, data, data models, interface models, resource specific documentation)
 - Contacts,
 - Taxonomy Classifications (i.e., glossary of defined terms)
 - Register in “Metadata Catalogs”, submit metacards
 - About making things visible

Figure 1-2 Types of Metadata

Discovery is defined as the ability to locate data assets through a consistent and flexible search. *Discovery Metadata* is focused on tagging the outer shell of an asset in a way so that the asset is clearly marked and rediscoverable, whereas *Structural Metadata* is focused on describing the framework and organization of information. Typically, a metadata discussion that doesn’t quantify which type of metadata is being discussed could lead to misinterpretation or misunderstanding among stakeholders. Therefore, it is important to clarify the type of metadata that is being discussed and also the attributes associated to each type. This specification is focused on defining the necessary attributes for Discovery Metadata as it pertains to M&S Resources, Contacts and Taxonomy Classifications.

1.2 Scope

The scope of this document is to identify the necessary discovery metadata components needed to support the visibility, accessibility, and understandability of Resources, Contacts, and Taxonomy Classifications within the DoD community. This document specifies how such metadata components should be captured to provide a common and consistent mechanism that can be used across the communities influenced by Modeling and Simulation (M&S).

1.2.1 Resources

M&S Resources include, but are not limited to the following items identified in Table 1-1.

Table 1-1 - M&S Resource Specific Types

	Types	Description	Notes
1	Software	Implements a model or simulation.	Sometimes referred to as a Federate or a Member Application.

2	Adjunct Tool	Software and/or hardware that is either used to provide part of a simulation environment or to transform and manage data used by or produced by a simulation environment.	Adjunct tools are differentiated from simulation software in that they do not provide a virtual or constructive model to the simulation environment.
3	Federation	A named set of interacting federate applications, a common object model, and software infrastructure through which they communicate that are used as a whole to achieve some specific objective.	<i>(was previously Federations of Simulations)</i>
4	Software Component	A software component used as part of modeling and simulation software. May be source code, binary or byte code, or remote procedures; can be used to construct models and/or provide functionality for simulation systems.	Components serve as reusable building blocks with a known set of inputs and provide expected output behavior, but the implementation details may be hidden.
5	Services	Implements a well-defined interface that delivers data or interactions in support of M&S.	The service itself may or may not be a model or simulation as its implementation is abstracted away by its interface. Typically used to support / represent a Service Oriented Architecture (SOA) based environment.
6	Data	Data in M&S-usable format and data produced by M&S.	M&S data may be operational data, data specifically derived from operational data that has been formatted or augmented for M&S use, or synthetic data created for M&S use. M&S data is also any data produced by a model or simulation that provides a synthetic view of reality.
7	Data Model	Structural meta-model for describing M&S data.	<p>A representation of entities (distinguishable persons, places, things, events, or concepts about which information is kept), their properties, and relationships among the entities and/or properties.</p> <p>Data models may be constructed to describe high-level or detailed concepts (known as conceptual and logical data models) or instantiations of data structures such as XML documents or relational databases (known as physical data models).</p>
8	Interface Model Specification	A well-defined agreement or capability, which, if implemented properly, will yield anticipatable results allowing applications (M&S software and adjunct tools), federations, components and/or services to connect and communicate. Interfaces specifications include structures and/or classes including properties, methods, and/or events which serve to provide the well-defined agreement. Model Specifications might include a well documented conceptual model.	<p>An Interface Model Specification might be an HLA Federation Object Model (FOM), TENA LROM, Base Object Model (BOM), or other Data Exchange Model (DEM) used to classify capability.</p> <p><i>(was previously Interface Specification)</i></p>

9	M&S Resource Document	A resource dependent document such as a requirements or design specification that specifies information related to an M&S resource.	Such document is limited by the use / application of M&S. A plan, design, or specification identifying the characteristics that affects and controls function or development of an application (M&S software and adjunct tool), federation, component, and/or service. <i>(was previously M&S Software Design Document)</i>
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The mechanism for documenting M&S Resources as independent metacard is described in Section 4. Additionally, each of these M&S Resource types is further defined in Appendix B.

1.2.2 Contacts

An M&S Contact representing a person or an organization can also be a valuable asset to help others achieve related goals such as reusing and/or integrating M&S Resources. For instance, when simulation developers wish to pose detailed questions to those who were responsible for the development and distribution of a model, point-of-contact (*POC*) information can be vital.

Until version 1.4 of the MSC-DMS, the mechanism to capture metadata about Persons and Organizations was to explicitly embed that information with a Resource Metacard using the POC component (see Section 4.10). Contact Metacards could not be easily documented independently. However, beginning with version 1.4, Contact Metacards representing Persons or Organizations can be documented independently from an M&S Resource. There is also a capability to *associate* M&S Contacts (Persons and Organizations) to one or more M&S Resources.

1.2.3 Taxonomy Classifications

Many M&S assets correspond to a specific taxonomy of terms and definitions. Beginning with version 1.4, the MSC-DMS provided a means to capture M&S Taxonomies in a way that allows the discovery metadata relevant to a resource to be understood more richly. An M&S Taxonomy metacard identifies a glossary of terms used by an organization, program or focus group that can be attributed to one or more M&S assets. Such Taxonomies provide a greater context for understanding the underlying metadata descriptions provided within an M&S Resource. An M&S Resource may include *citations* to relevant taxonomies that have been defined. (See Section 4.17). The mechanism for documenting an M&S Taxonomy as an independent metacard is described in Section 6.

1.2.4 M&S Support Assets

In addition to Resources, Contacts and Taxonomy Classifications, several M&S Support Assets have been identified, for which M&S Resources, Contacts and Taxonomies may apply. These M&S Support Assets included, but are not limited to the following items identified in Table 1-2.

Table 1-2 - M&S Support Assets

	Types	Description	Notes
1	M&S Infrastructure	A set of interconnected M&S support elements that facilitates the use of a set of M&S Resources in a simulation environment.	Can include training facilities, test facilities, analysis facilities, labs, computing assets, communications assets, networks, personnel, instrumentation and test equipment, dictionaries and libraries, environments.
2	M&S Activity	An M&S procedure or function, involving tasks that consume time and resources, necessary for events or for moving from event to event.	M&S Activities include M&S infrastructure management, M&S infrastructure operation, M&S infrastructure design and implementation <i>(was previously a part of M&S Support Event)</i>
3	M&S Event	An interaction between M&S infrastructure components that is associated with a particular point in time that results in something happening or changing.	M&S Events include tests, analysis, research and design, training, experiments, M&S infrastructure interactions, and internal model interactions. <i>(was previously M&S Support Event)</i>
4	M&S Environment	A set of interconnected M&S resource assets and support assets needed to conduct an event.	M&S Environment includes <ul style="list-style-type: none"> • Policies • Procedures • People • Infrastructure • Federations
5	Support Document	A document not specific to M&S but describes supporting information such as environmental, event, operational or technical content, or a future capability, which maybe useful in the context of M&S.	A supported document is not constrained by the use / application of M&S. For example, it may be a reference document describing real-world operation phenomena, but useful in the context of an M&S environment. Note: Future Capabilities Requirements was previously a standalone support asset type, which has been absorbed into this type under version 1.4.

An M&S Resource may include associations to relevant artifacts representative of either other Resources or M&S Support Assets. Section 4.10 provides further details on how to identify supporting assets associated with an M&S Resource using the Association Metadata Set.

1.3 Objective

The objective of this document is to provide a Discovery Metadata specification suitable for use within the M&S Community of Interest (COI) that supports the intent of the DoD Net-Centric Data Strategy as it relates to M&S. The key attributes of the DoD Net-Centric Data Strategy is

- (1) to ensure data assets are visible, available and usable,
- (2) “tagging” such assets with metadata to enable discovery,
- (3) posting assets to shared spaces with access for validated users,
- (4) enabling the interoperability and exchange required of a net-centric data environment.

An M&S net-centric data focus centers upon the sharing and reuse of M&S assets, specifically Resources, Contacts and Taxonomies. This document specifies the mechanisms to tag such M&S assets with *metacards*, and also the mechanism to tag multiple metacards, which is identified as a *multicard*.

1.4 Intended Audience

This document is intended for individuals and organizations in the DoD M&S community including government, industry, and academia who are interested in supporting the reuse and discovery of metadata assets (resources, contacts and taxonomies) used for purposes related to M&S.

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2 MSC-DMS Logical Model

2.1 Approach

Based on the needs of the DoD M&S community, this document identifies the core and supplemental set of metadata for the discovery of M&S assets, which includes Resources, Contacts and Taxonomies.

Figure 2-1 depicts the organization of the MSC-DMS metadata. It includes the following:

- The set of Resource metadata components needed for representing M&S assets and supporting resource specific extensions such as verification, validation, and accreditation (VV&A).
- The set of Contact metadata components that may be needed to represent a person and organization such as a Subject Matter Expert (SME).
- The set of Taxonomy metadata components that may be needed to represent a community’s taxonomy, which defines their glossary of terms, related terms and synonyms used within their domain.

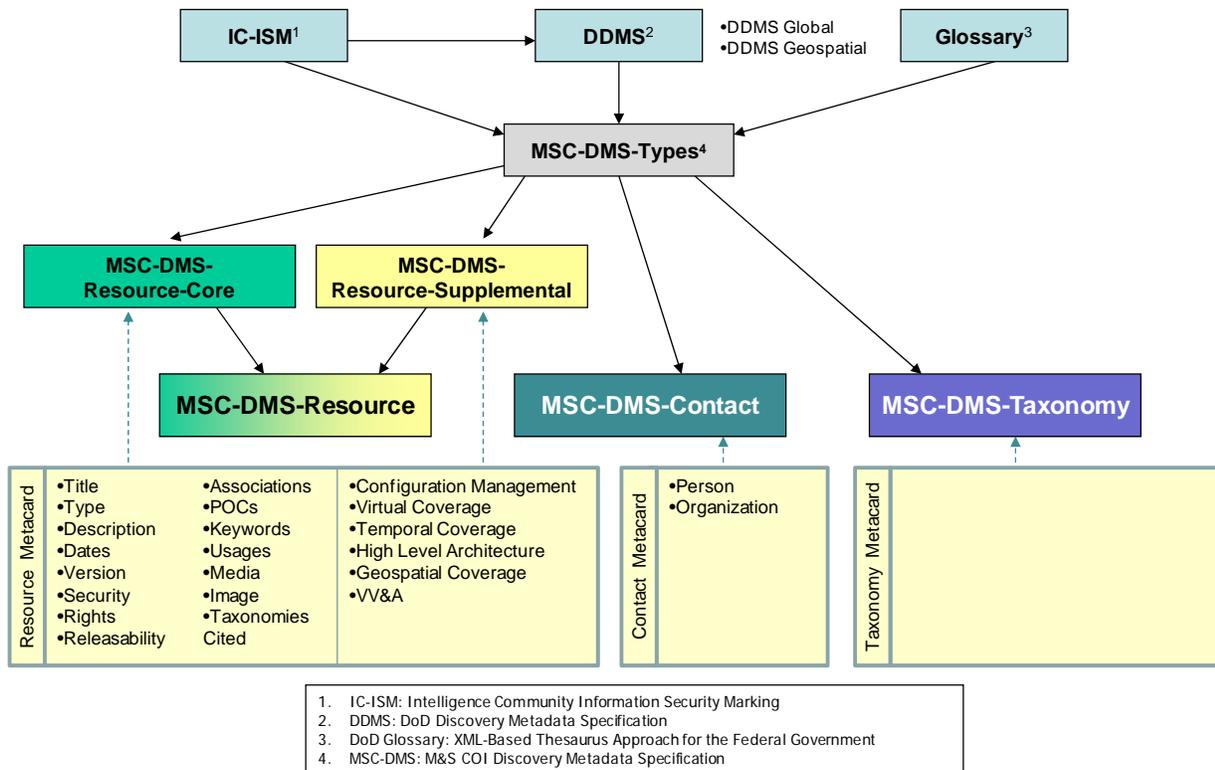


Figure 2-1 Organization Structure for the M&S COI Discovery Metadata Specification

2.2 Organization

The “Light Blue” shaded boxes across the top of Figure 2-1 represent existing standards and specifications that are leveraged in helping define the MSC-DMS. These include the DoD Metadata

Specification (DDMS), the Intelligence Community (IC) metadata standards, and the XML-Based Thesaurus Approach considered for the Federal Government (Glossary).

The “Gray” shaded box, identified as the “MSC-DMS-Types” contains all the type components pulled from these standards and additional type defined which are needed to create MSC-DMS based Resources, Contacts and Taxonomies.

The “Green” shaded box identified as “MSC-DMS-Resource-Core” represents the Core Layer of a Resource Metacard, which is intended to be used by all DoD Agencies, the Intelligence Community, and other Organizations or Activities, independent of the specific M&S assets being described. This metadata is the initial driver for interoperability across all activities and establishes, at this level, a minimum set of mandatory and recommended core M&S metadata components.

The “Yellow” shaded box identified as “MSC-DMS-Resource-Supplemental” represents the Supplemental Layer of a Resource Metacard which extends upon the Core Layer. It is useful for supporting specific M&S communities and/or which may be required in some security, data quality, or geospatial contexts. M&S communities that are recognized by this level of metadata include Acquisition, T&E, VV&A, and Analysis.

The “Teal” shaded box identified as “MSC-DMS-Contact” represents the Contact Metacard structure needed to document a Person or Organization.

The “Purple” shaded box identified as “MSC-DMS-Taxonomy” represents the Taxonomy Metacard structure needed to classify terms and definitions relevant to a community or domain.

3 Data Element Guide

This section provides notes to assist the reader in understanding the various conventions used to present the MSC-DMS components, herein referred to as metadata components, which are organized within this document. The metadata components that compose the MSC-DMS are explicitly defined in sections 4, 5, 6 and 7 of this document. Each of these sections reflects the components for building Resource Metacards, Contact Metacards, Taxonomy Metacards, and Multicards. Each major metadata component documented within these sections is formally identified as a Metadata Set.

The Metadata Sets defined in this document are organized similarly to the DDMS structure with the exception that metadata components are specified using a set of tables with descriptive fields closely associated to the style used in many of the IEEE standards⁴. Specifically, the table style has been augmented to include data types (or enumerated values) and comments related to metadata components. In addition a graphical notation has been included to provide a visual understanding of the metadata component structure.

3.1 Graphical Diagrams

A graphic related diagram is used for each Metadata Set to assist the reader in understanding the underlying component structure. An example of a graphic diagram is provided in Figure 3-1.

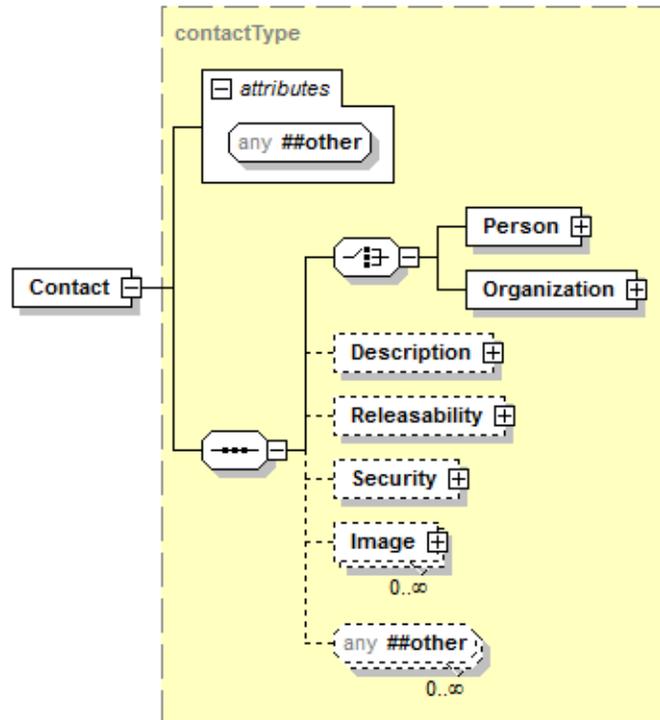


Figure 3-1 Contact Metadata Set

⁴ Institute of Electrical and Electronics Engineers (IEEE) 1516.3 High Level Architecture (HLA) Object Model Template (OMT) – Section 4: HLA OMT Components

In this example the organization of the Contact Metadata Set is represented, which is used to document a Contact Metacard. The **Contact** component is shown to contain either a **Person** or **Organization**. It also contains **Description, Role, Releasability, Security** and **Image**. The dashed lines in the diagram indicate that the subcomponent is *optional*. The value range label placed underneath a subcomponent (i.e., *0..infinity*) indicates if multiple items pertaining to the subcomponent can exist. The plus symbol in the node indicates that there is further underlying structure to support the subcomponent. The **##other** attribute and element is provided to allow additional information to be captured and associated with Metadata Set.

These diagrams that are used were generated from the supporting MSC-DMS XML Schemas using the Altova® XMLSpy® tool. The symbols and nomenclature found within these graphic diagrams are further described in Appendix D.

3.2 Dot Notation

Dot Notation is a text convention used for each Metadata Set for describing the affiliation of metadata components and their subcomponents, which is achieved by placing the set of related metadata component within a hierarchical scheme that is representative of a tree structure. Dot Notation reads left to right or from the root of the tree out to branches and leaves. Periods separate the levels or branches.

For example, the convention **POC.Person** is used to identify that the metadata component of interest is a Person, which is attributed to the POC Metadata Set illustrated previously in section 3.1. The convention **Resource.POCs.POC.Person** further expands the hierarchy tree as it pertains to the MSC-DMS. A Dot Notation is used to ensure that the reference pertaining to a metadata component is unambiguous. The metadata sets for which **Person** stems from (POC and Resource) are easily referenced by the class hierarchy tree defined in the text.

3.3 Table Format

Each Metadata Set is defined by a table, which lists the underlying metadata components. Table 3-1 lists and defines the fields used in for specifying the Metadata Sets.

Table 3-1 Metadata Set - Columns and Explanations

Metadata Component	Description	Occurs	Values	Comment
Specifies the categories of metadata recognized as components or sub-components that are provided in this table. Sub-components, if applicable, are always indented, and may be reflected using dot notation. These components are defined in XML as either XML Elements or XML Attributes.	A plain text definition of the metadata component.	Specifies whether use of the component is mandatory, optional	<p>Italics are used to denote the type of values that is supported (e.g., text).</p> <p>Normal font is used to denote potential literal values (i.e., enumerations).</p>	Specifies what the component encompasses, or any useful notes

Additionally, a second table is provided to illustrate implementation examples and aid in understanding. Table 3-2 lists and defines the formats of the example tables. Each of these tables,

when applied, will result in one or more rows representing the metadata components associated to the Metadata Set.

Table 3-2 Metadata Set Example Table - Columns and Explanations

Table Format		XML Format
Metadata Component	Value	If provided, identifies an example of the Metadata Set using XML syntax
Specifies the categories of metadata that are provided in this table (e.g., component or sub-components). Sub-components, if applicable, are always indented, and may be reflected using dot notation.	A plain text example depicting values pertaining to a Metadata Component. Dot notation used as appropriate.	

3.4 Naming Conventions

This specification defines an XML Schema for representing M&S Resources, Contacts, Taxonomy Classifications and the collection of metacards identified as an M&S Multicard. Specific Metadata Component names, which are represented in a schema as either XML Elements or XML Attributes adhere to XML naming conventions. MSC-DMS Metadata components defined using **UpperCamel** case reflects a metadata component supported via an XML Element. Whereas, Metadata components defined using **lowerCamel** case reflect a metadata component supported via an XML Attribute. XML conventions require that names be constructed from a combination of letters, digits, hyphens, colons, full stops (periods), and underscores with no spaces or other breaking characters (e.g., tabs, carriage returns, etc.). The MSC-DMS metadata components used within the diagrams, tables and text are presented in accordance with these XML naming conventions.

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4 Resource Metacards

An M&S Resource represents assets that contribute to the composition or operation of an M&S event, environment or infrastructure. M&S Resources include such things as services, software, components, federations, adjunct tools, data, data models, interface model specifications, and resource specific documents. The supporting Discovery Metadata for an M&S Resource enables inferences to be drawn regarding its application and reuse potential.

For reuse to be effective, it is important to include a minimum but sufficient degree of descriptive information for a Resource Metacard. For instance, when integrators wish to pose detailed questions to those who were responsible for the development and distribution of a data model, point of contact (POC) information within an M&S Resource is important.

Figure 4-1 provides an illustration of the MSC-DMS Resource Structure, which integrates Core and Supplemental Layer component views pertaining to Discovery Metadata. The boxes with a solid outline represent *required* metadata components, whereas the boxes with a dashed outline represent *optional* metadata components.

This section describes both the Core Layer of metadata components commonly needed across communities, and also the Supplemental Layer of metadata components needed to support the various communities and domain needs. This includes the following metadata sets:

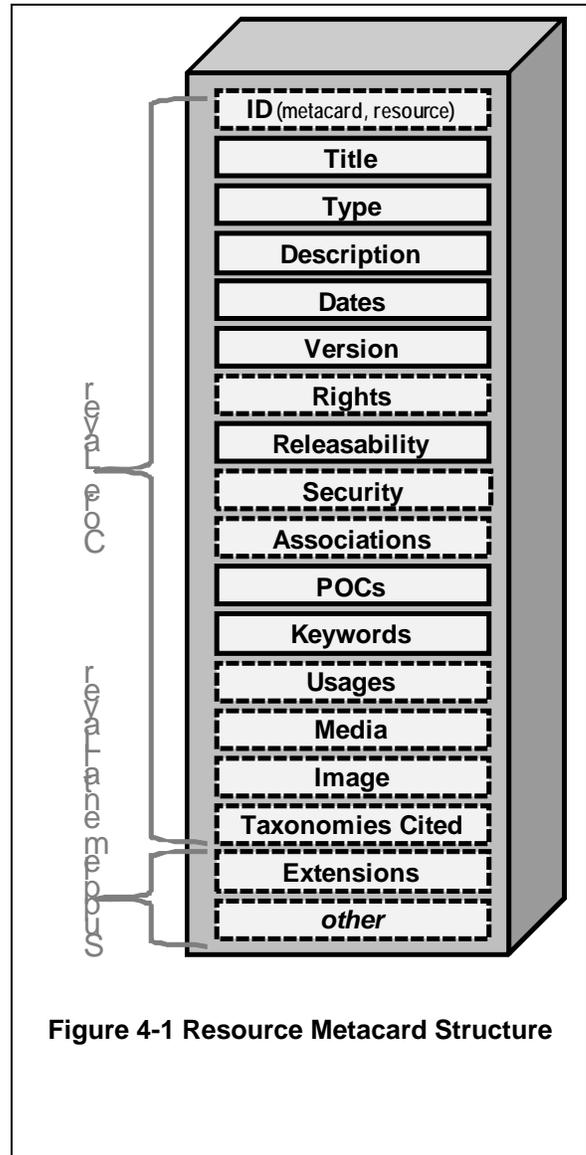


Figure 4-1 Resource Metacard Structure

Core Layer

- Resource (root)
- ID
- Title
- Type
- Description
- Date
- Version
- Rights
- Releasability
- Security
- Association
- POC
- POC.Person
- POC.Organization
- Keyword
- Usage
- History
- Media
- Image
- TaxonomiesCited

Supplemental Layer (via Extensions)

- Temporal Coverage
- Virtual Coverage
- Geospatial Coverage
- HLA Coverage
- VV&A Coverage
- Configuration Management

4.1 Resource Metadata Set

The purpose of the Resource Metadata Set is to document certain key metadata information about an M&S Resource. The Resource Metadata Set identifies the foundational metadata components of an M&S Resource at the Core Layer. This is illustrated in Figure 4-1a. Additionally the extensions for supporting the Supplemental Layer of an M&S Resource metacard is illustrated in Figure 4-1b.

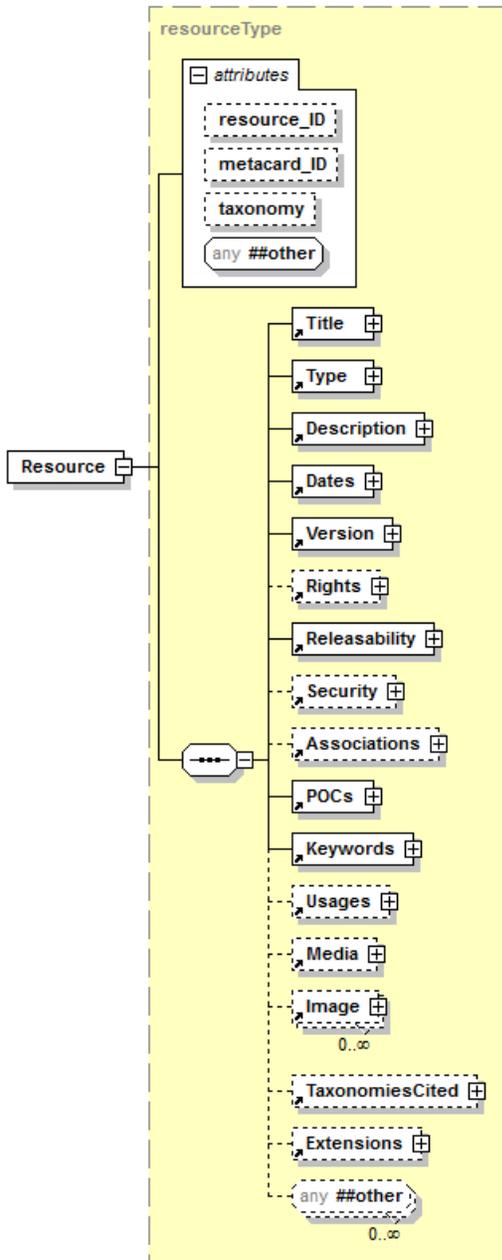


Figure 4-1a Resource Metadata Set (Core Layer)

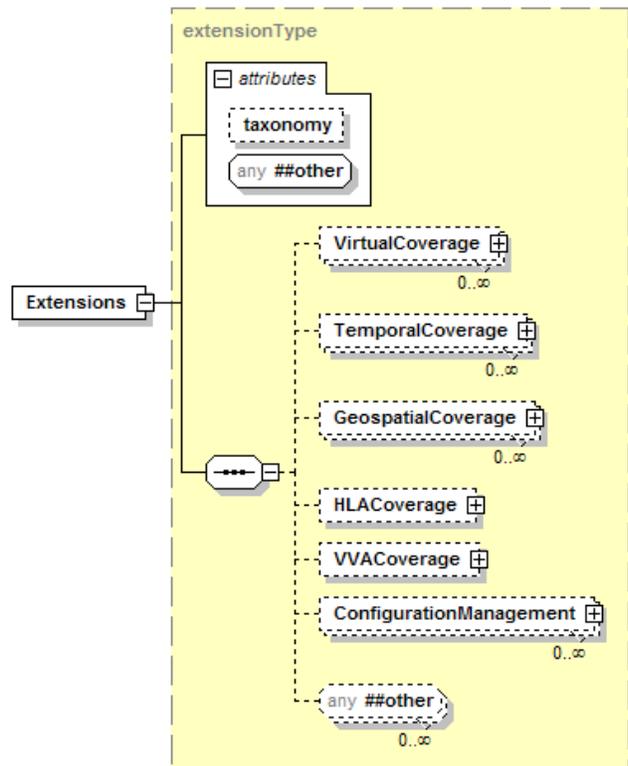


Figure 4-1b Resource Extensions (Supplemental Layer)

4.1.1 Scope

Metacard Type: Resource Metacard
Use Path(s): none (*this is the root component for a Resource metacard*)
 Multicard.Metacards.Resources (*see Multicard Metadata Set*)
Required: yes (*if you are building a Resource metacard, but not required for a Multicard*)
Schema: MSC-DMS-Resource

4.1.2 Table Format

Table 4-1 provides a description of the metadata components pertaining to the Resource Metadata Set information. Many of the metadata components used for the Resource Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were extended, altered or added to better support the M&S COI. Italics are used in the Values column of Table 4-1 to denote the type of data to be provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-1 Resource Metadata Set

Metadata Component	Description	Occurs	Values	Comment
resource_ID	Unique identifier associated to the related Resource being described	0..1	<i>URI</i>	A Resource record can be marked by a unique identifier to support cross referencing by other Resources and for the benefit of organizing data by one or more repositories. This should not be confused with version number, or document number.
metacard_ID	Unique identifier associated to the metacard of the Resource being described, which is captured in an XML document conforming to this specification.	0..1	<i>URI</i>	It may be possible for the Resource_ID and metacard_ID to have corresponding IDs. For those creating Resources and/or generating metacards, please check with the practices of your organization or the repository/catalog for which you are posting your Resource and Resource metacard.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing a Resource component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16)
Title	Title information assigned to the Resource.	1	-- see <i>Title Metadata Set</i>	A Resource may not only be identified by a title value, but also by a subtitle, acronym, or document number. Typically these values, once determined, do not change even if the Resource is updated.
Type	This field specifies the type that the Resource represents. Also described as the nature, genre, or discipline of the content of the Resource.	1	-- see <i>Type Metadata Set</i>	Section 4.3

Description	This field provides an account of the content of the Resource.	1	-- see <i>Description Metadata Set</i>	Section 4.4
Dates	A calendar date associated with an event in the life cycle of the Resource.	1		
Date	Identifies information for each date.	1..many	-- see <i>Date Metadata Set</i>	Section 4.5
other	Specifies other date information deemed relevant by the author of the Resource.	0..many	any	
Version	This field specifies the version identification assigned to the Resource.	1	-- see <i>Version Metadata Set</i>	Section 4.6
Rights	Information about rights held in and over the Resource.	0..1	-- see <i>Rights Metadata Set</i>	Section 4.7
Releasability	Information about the releasability of the title information.	1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
Associations	Specifies references to original source material used to develop or derive the Resource.	0..1		Serves as a container class to identify multiple references.
Association	Identifies information for each reference.	1..many	-- see <i>Association Metadata Set</i>	
other	Specifies other reference information deemed relevant by the author of the Resource.	0..many	any	
POCs	Specifies organizations and/or persons who have a particular role with respect to the M&S Resource.	1		At least one POC must be supplied.
POC	Specifies an organization or a person that has a significant level or responsibility or ownership pertaining to M&S Resource.	1..many	-- see <i>POC Metadata Set</i>	
other	Specifies other POC information deemed relevant by the author of the Resource.	0..many	any	
Keywords	Specifies keywords attributed to the M&S Resource.	1		Typically, a Keyword will be expressed as keywords, key phrases, or classification codes that describe a topic of the Resource. Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme. This may list keywords that apply to the Resource, or a particular subject Metadata Set, which will aid the user in understanding the genre of the content.
Keyword	Identifies information for each keyword.	1..many	-- see <i>Keyword Metadata Set</i>	
other	Specifies other POC information deemed relevant by the author of the Resource.	0..many	any	
Usages	Specifies information about usages pertaining to the M&S Resource.	0..1		
Usage	Identifies information for each usage.	1..many	-- see <i>Usage Metadata Set</i>	Section 4.13
other	Specifies other POC information deemed relevant by the author of the Resource.	0..many	any	
Media	Specifies information about the media pertaining to the M&S Resource.	0..1	-- see <i>Media Metadata Set</i>	The value that specifies the originating agency or discipline of the language vocabulary.
Image	Specifies an image that can be used to visually represent a Resource.	0..many	-- see <i>Image Metadata Set</i>	
Taxonomies Cited	Specifies taxonomies pertaining to a domain vocabulary source, which may be used in describing the M&S Resource.	0..1		

Taxonomy Cited	Identifies information for each taxonomy cited.	1..many	-- see <i>Taxonomy Cited Metadata Set</i>	
other	Specifies other POC information deemed relevant by the author of the Resource.	0..many	any	
Supplemental Extensions	Specifies the various extensions that can be added to the core M&S Resource metadata.	0..1		
Virtual Coverage	Specifies virtual coverage extension that can be added to core metadata.	0..many	-- see <i>Virtual Coverage Metadata Set</i>	
Temporal Coverage	Specifies temporal coverage extension that can be added to core metadata.	0..many	-- see <i>Temporal Coverage Metadata Set</i>	
Geospatial Coverage	Specifies geospatial coverage extension that can be added to core metadata.	0..many	-- see <i>Geospatial Coverage Metadata Set</i>	
HLA Coverage	Specifies HLA coverage extension that can be added to core metadata.	0..1	-- see <i>HLA Coverage Metadata Set</i>	
VVA Coverage	Specifies additional VV&A coverage aspects that can be added to the core metadata.	0..1	-- see <i>VVA Coverage Metadata Set</i>	
Configuration Management	Specifies configuration management aspects that can be added to the core metadata.	0..1	-- see <i>Configuration Management Metadata Set</i>	
other	Specifies other extension information deemed relevant by the author of the Resource.	0..many	any	
other	Specifies other data deemed relevant by the author of the Resource.	0..many	any	

4.1.3 Inclusion Criteria

The metadata components specified in Table 4-1 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.1.4 Example

Table 4-2 provides an example of the Resource Metadata Set component that can be reflected within the metacard for an M&S Resource.

Table 4-2 Resource Metadata Set Example

Table Format	
Metadata Component	Value
resource_ID	4
metacard_ID	23433
taxonomy	missile_defense
Title	
.Value	BallisticModelAlgorithm
.Subtitle	ShortRangeTrajectory
.Title Acronym	BMA-SRT
.Document Number	ALGO_1523.13
Type	
.Qualifier	DCMITYPE
.Value	Software
.Subtype	Java
.ADS-Designation	--
Description.Text	algorithm used for high fidelity short range attack models
Dates.Date	—see <i>Date Metadata Set for example</i>

Version.Value	1.0
Rights	—see <i>Rights Metadata Set for example</i>
Releasability	—see <i>Releasability Metadata Set for example</i>
Security	—see <i>Security Metadata Set for example</i>
Associations.Association	—see <i>Associations Metadata Set for example</i>
POCs.POC	—see <i>POC Metadata Set for example</i>
Keywords.Keyword	—see <i>Keyword Metadata Set for example</i>
Usages.Usage	—see <i>Usage Metadata Set for example</i>
Media	—see <i>Media Metadata Set for example</i>
Image	—see <i>Image Metadata Set for example</i>
Taxonomy Cited	—see <i>Taxonomy Cited Metadata Set for example</i>
Extensions	
.Virtual Coverage	—see <i>Virtual Coverage Metadata Set for example</i>
.Temporal Coverage	—see <i>Temporal Coverage Metadata Set for example</i>
.Geospatial Coverage	—see <i>Geospatial Coverage Metadata Set for example</i>
.HLA Coverage	—see <i>HLA Coverage Metadata Set for example</i>
.Configuration Management	—see <i>Configuration Management Metadata Set for example</i>
.VV&A Coverage	—see <i>VVA Metadata Set for example</i>

4.2 Title Metadata Set

It is important to identify the Title attributed to an M&S Resource. This section describes Title Metadata Set for documenting the Resource Title as illustrated in Figure 4-2.

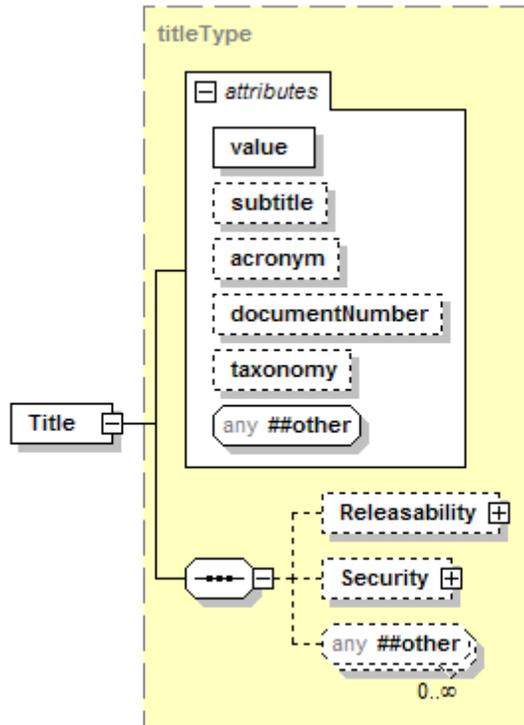


Figure 4-2 Title Metadata Set

4.2.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Title (*see Resource Metadata Set*)
Required: yes
Schema: MSC-DMS-Resource

4.2.2 Table Format

Table 4-3 provides a description of the metadata components pertaining to the Title Metadata Set. Many of the metadata components used for the Title Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-3 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-3 Title Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	A name, or names, assigned to the Resource.	1	text	Typically, a title will be a name by which the Resource is formally known.
subtitle	A subtitle may be any form of the title used as a substitute, or it may be an alternative to the formal title of the Resource.	0..1	text	Typically, a subtitle will be a name by which the Resource may also be known or provides amplifying information about the Resource.
acronym	An acronym used to also identify the Resource	0..1	text	Typically, an acronym will be an identifier by which the Resource may also be known.
documentNumber	An alphanumeric identifier for an information Resource that is assigned by the configuration manager for this type of Resource.	0..1	text	Often a document may be identified by a specific unique number, which may contain alphanumeric characters.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Title component.	0..1	text	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16)
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the title information.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other title information deemed relevant by the author of the Resource.	0..many	any	

4.2.3 Inclusion Criteria

The metadata components specified in Table 4-3 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.2.4 Example

Table 4-4 provides an example of a **Title** component that can be reflected within the metacard for an M&S Resource.

Table 4-4 Title Metadata Example

Table Format		XML Format
Metadata Component	Values	<pre> <ms:Title ms:value="Ballistic Model Algorithm" ms:subtitle="Short Range Trajectory" ms:acronym="BMA-SRT" ms:documentNumber="ALGO_1523.13"> <ms:Releasability/> <ms:Security/> </ms:Title> </pre>
value	Ballistic Model Algorithm	
subtitle	Short Range Trajectory	
acronym	BMA-SRT	
document Number	ALGO_1523.13	
Releasability	—see Table 4.16 for example	
Security	—see Table 4.18 for example	
other	na	

4.3 Type Metadata Set

It is important to identify the Type of M&S Resource being cataloged. This section describes the Type Metadata Set for documenting the Resource Type as illustrated in Figure 4-3.

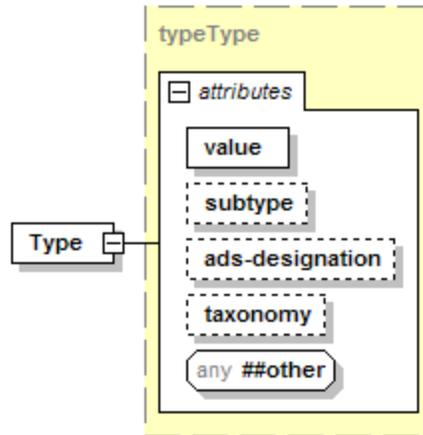


Figure 4-3 Type Metadata Set

4.3.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Type (see Resource Metadata Set)
Required: yes
Schema: MSC-DMS-Resource

4.3.2 Table Format

Table 4-5 provides a description of the metadata components pertaining to the Type Metadata Set. Many of the metadata components used for the Type Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-5 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-5 Type Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	Type includes terms describing general categories, functions, genres, or aggregation levels for content.	1	software, tool, federation, software_component, service, data, data_model, interface_model_specification, resource_document, <i>other text</i>	Recommended best practice is to select a value from a controlled vocabulary.

subtype	Identifies subtype of Resource.	0..1	text	Depends on Type value.
ads-designation	Identifies Authoritative Data Source Designation.	0..1	Category I Category II Category III Authoritative - T Approved - T Other – T other text	A data source whose products have undergone producer data verification, validation, and certification activities.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Type component.	0..1	text	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16)
other	Specifies other type information deemed relevant by the author of the Resource.	0..many	any	

4.3.3 Inclusion Criteria

The metadata components specified in Table 4-5 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.3.4 Example

Table 4-6 provides an example of a **Type** component that can be reflected within the metacard for an M&S Resource.

Table 4-6 Type Metadata Example

Table Format		XML Format
Metadata Component	Values	<pre><ms:Type ms:value="software_component" ms:subtype="C++" ms:ads-designation="Category I" /></pre>
<i>value</i>	software_component,	
<i>subtype</i>	C++	
<i>ADS designation</i>	Category I	
<i>other</i>	na	

4.4 Description Metadata Set

It is important to provide a Description pertaining to an M&S Resource. This section describes the Description Metadata Set for documenting the Resource Description as illustrated in Figure 4-4.

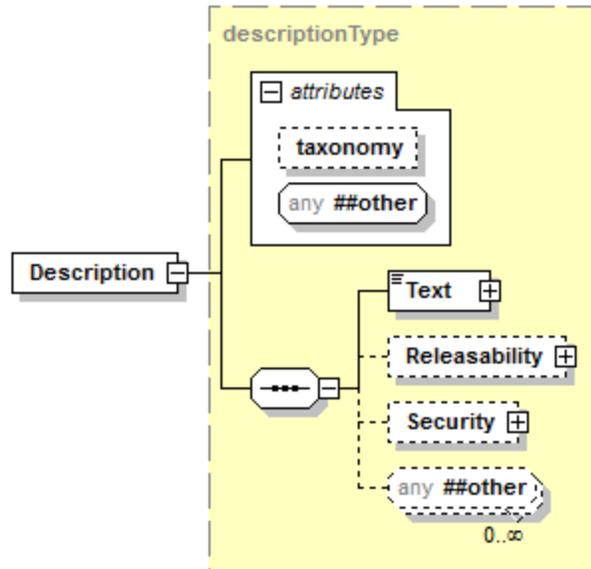


Figure 4-4 Description Metadata Set

4.4.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Use Path(s):	Resource.Description (<i>see Resource Metadata Set</i>)
Required:	yes
Schema:	MSC-DMS-Resource

4.4.2 Table Format

Table 4-7 provides a description of the metadata components pertaining to the Description Metadata Set. Many of the metadata components used for the Description Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 5-5 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-7 Description Metadata Set

Metadata Component	Description	Occurs	Values	Comment
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Description component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Text	Reflects the narrative associated to the description.	1	<i>text</i>	Typically, a description will provide the context and scope of the M&S Resource.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	
Security	Information about the security of the title information.	0..1	-- see <i>Security Metadata Set</i>	
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.4.3 Inclusion Criteria

The metadata components specified in Table 4-7 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.4.4 Example

Table 4-8 provides an example of a **Description** component that can be reflected within the metacard for an M&S Resource.

Table 4-8 Description Metadata Example

Table Format		XML Format
Metadata Component	Values	<pre> <ms:Description> <ms:Text>"algorithm used for high fidelity short range attack models"</ms:Text> <ms:Releasability/> <ms:Security/> </ms:Description> </pre>
<i>Text</i>	algorithm used for high fidelity short range attack models	
<i>Releasability</i>	—see Table 4.16 for example	
<i>Security</i>	—see Table 4.18 for example	
<i>other</i>	na	

4.5 Date Metadata Set

It is important to capture the essential Dates pertaining to an M&S Resource such as when it was created, accepted, or modified. This section describes the Date Metadata Set for documenting a Resource Date as illustrated in Figure 4-5.

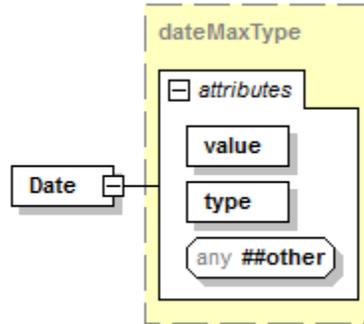


Figure 4-5 Date Metadata Set

4.5.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Dates (see Resource Metadata Set)
Required: yes
Schema: MSC-DMS-Resource

4.5.2 Table Format

Table 4-9 provides a description of the metadata components pertaining to the Date Metadata Set, which is leveraged by several components within the Resource Metadata Set. Many of the metadata components used for the Date Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-9 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-9 Date Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	This field identifies the specific date being disclosed for the Resource.	1	YYYY-MM-DD	YYYY 0000 through current year MM 01 through 12 (month) DD 01 through 31 (day)
type	The type of date being represented for a specific state of the Resource.	1	created, posted, accepted, modified, validTil, infoCutOff, used, VV, accreditation, retired, last_verified, <i>other text</i>	At least one date value should be provided, which should be the creation date. Other dates as identified in the enumerated list, if known, should also be provided. Additionally, the enumerated list is extensible and can include other date types. Date type is also used to mark a Usage.History entry, see Section 4.13.

other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	
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4.5.3 Inclusion Criteria

The metadata components specified in Table 4-9 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.5.4 Example

Table 4-10 provides an example of a **Date** component that can be reflected within the metacard for an M&S Resource.

Table 4-10 Date Metadata Example

Table Format		XML Format
Metadata Component	Values	<code><ms:Date</code>
value	2007-08-13	<code>ms:value="2007-08-13"</code>
type	created	<code>ms:type="created"/></code>

4.6 Version Metadata Set

It is important to identify the Version pertaining to an M&S Resource. This section describes the Version Metadata Set for documenting the Resource Version as illustrated in Figure 4-6.

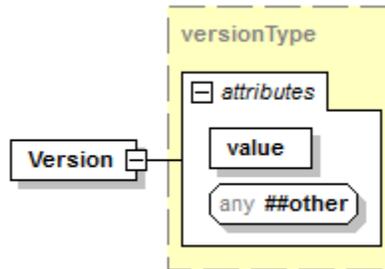


Figure 4-6 Version Metadata Set

4.6.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Version (see Resource Metadata Set)
Required: yes
Schema: MSC-DMS-Resource

4.6.2 Table Format

Table 4-11 provides a description of the metadata components pertaining to the Version Metadata Set. Many of the metadata components used for the Version Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-11 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-11 Version Metadata Set

Metadata Component	Description	Occurs	Values	Comment
<i>value</i>	A version value assigned to the Resource.	1	<i>text</i>	A version may be an internal, external, and/or universal identification label for representing an M&S Resource by means of a string or number conforming to a formal identification system. An example of an identifier would be an International Standard Serial Number (ISSN).
<i>other</i>	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.6.3 Inclusion Criteria

The metadata components specified in Table 4-11 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.6.4 Example

Table 4-12 provides an example of a **Version** component that can be reflected within the metacard for an M&S Resource.

Table 4-12 Version Metadata Example

Table Format		XML Format
Metadata Component	Values	
<i>value</i>	1.0	<code><ms:Version ms:value="1.0" /></code>
<i>other</i>	<i>na</i>	

4.7 Rights Metadata Set

It is important to identify the rights pertaining to an M&S Resource. This section describes the Rights Metadata Set for documenting a Resource Rights as illustrated in Figure 4-7.

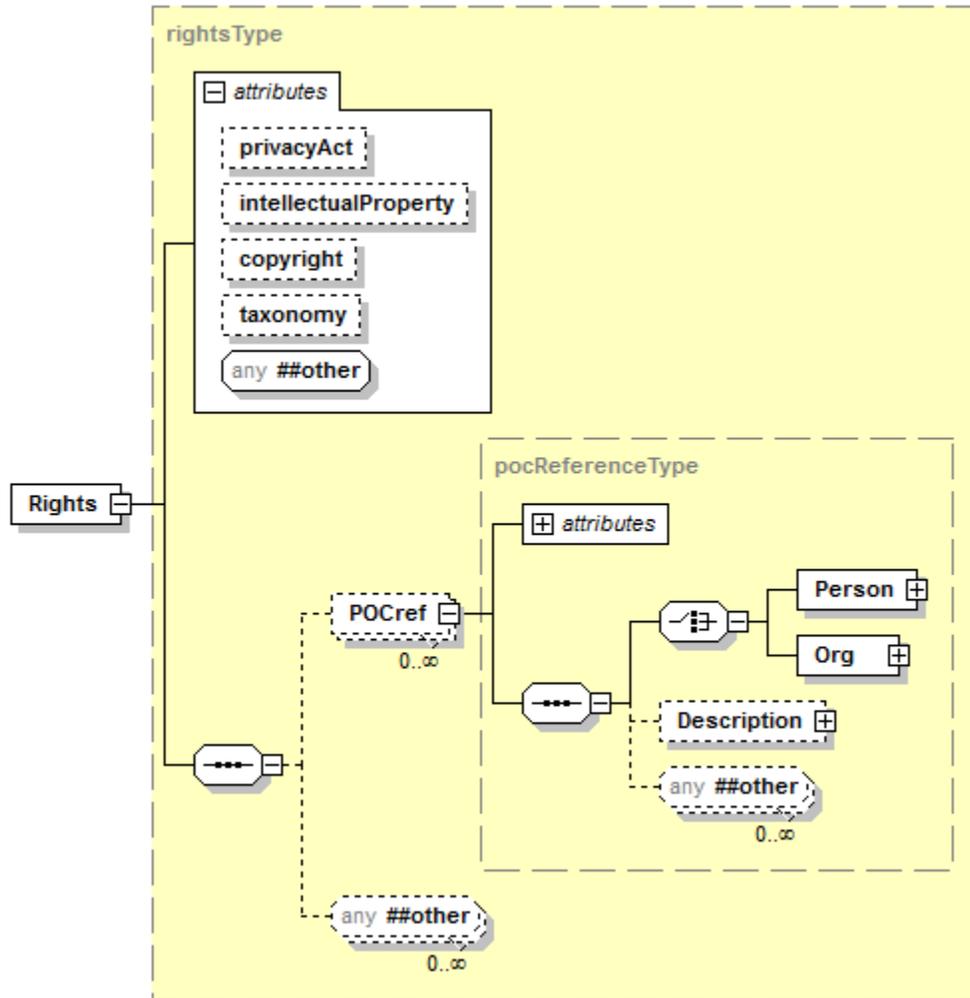


Figure 4-7 Rights Metadata Set

4.7.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Use Path(s):	Resource.Rights (see Resource Metadata Set)
Required:	no
Schema:	MSC-DMS-Resource

4.7.2 Table Format

Table 4-13 provides a description of the metadata components pertaining to the Rights Metadata Set. Many of the metadata components used for the Rights Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-13 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-13 Rights Metadata Set

Metadata Component	Description	Occurs	Values	Comment
privacy act	An indicator that this Resource is categorized as containing personal information subject to protection by the Privacy Act.	0..1	<i>boolean</i>	A yes/no value used to specify applicability of the rights. The default is "false."
intellectual property	An indicator identifying Resources under protection against reproduction and distribution without the express written permission of the intellectual property rights owner.	0..1	<i>boolean</i>	A yes/no value used to specify applicability of the rights. The default is "false."
copyright	An indicator identifying Resources under protection against reproduction and distribution without the express written permission of the copyright owner.	0..1	<i>boolean</i>	A yes/no value used to specify applicability of the rights. The default is "false."
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Rights component.	0..1	<i>text</i>	The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.17) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
POCref	Specifies a reference to an organization or a person who holds Intellectual Property (IP) or copyright pertaining to M&S Resource.	0..many		
Person	Identifies a Person	1		Person or Org (only one selected per POC identified).
.personID	Unique identifier associated to a Person	0..1	<i>text</i>	
.Name	Name of the person	1		
.first	First Name of the person.	1	<i>text</i>	
.middle	Middle Name of the person.	0..1	<i>text</i>	
.last	Last Name of the person.	1	<i>text</i>	
Org	Identifies an Organization.	1		
.organizationID	References the organization ID.	0..1	<i>text</i>	
.Name.value	Identifies the name of the organization.	1	<i>text</i>	
Description.Text	Provides a description of the POC that may be helpful	0..1	<i>text</i>	
other	Specifies other rights information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.7.3 Inclusion Criteria

The metadata components specified in Table 4-13 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.7.4 Example

Table 4-13 provides an example of a **Rights** component that can be reflected within the metacard for an M&S Resource.

Table 4-14 Rights Metadata Example

Table Format		XML Format
Metadata Component	Values	
privacy act	false	<pre> <ms:Rights ddms:privacyAct="false" ddms:intellectualProperty="false"> ddms:copyright="false" <ms:POCref> <ms:Person ms:personID="345"> <ms:Name ms:first="Samuel" ms:last="Drake" /> </ms:Person> </ms:POCref> <ms:POCref> <ms:Person ms:personID="346"> <ms:Name ms:first="William" ms:middle="Austin" ms:last="Gilbert" /> </ms:Person> <ms:Org ms:personID="321"> <ms:Name ms:value="SprocketSim" /> </ms:Org> <ms:Description> <ms:Text>"Org w SBIR data rights"</ms:Text> </ms:Description> </ms:POCref> </ms:Rights> </pre>
intellectual property	false	
copyright	false	
POCref		
Person		
.personID	345	
.Name		
.first	Samuel	
.last	Drake	
POCref		
Person		
.personID	346	
.Name		
.first	William	
.middle	Austin	
.last	Gilbert	
POCref		
Org		
.organizationID	321	
.Name	SprocketSim	
Description.Text	Org w SBIR data rights	
other	na	

4.8 Releasability Metadata Set

The releasability of a Resource is often restricted in some way, therefore it is important to reflect the releasability information pertaining to an M&S Resource. This section describes the Resource Metadata Set for documenting a resource's Releasability coverage as illustrated in Figure 4-8.

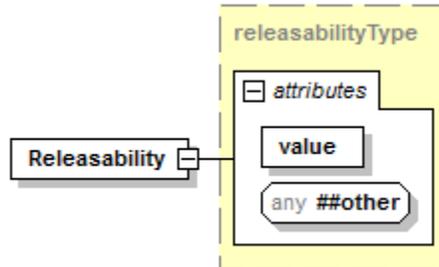


Figure 4-8 Releasability Metadata Set

4.8.1 Scope

Metacard Type: Resource Metacard (Core Layer)

Use Path(s): Resource.Releasability (*see Resource Metadata Set*)
 Resource.Title.Releasability (*see Title Metadata Set*)
 Resource.Description.Releasability (*see Description Metadata Set*)
 Resource.Associations.Association.Releasability (*see Association Metadata Set*)
 Resource.POCs.POC.Releasability (*see POC Metadata Set*)
 Resource.Usages.Usage.Releasability (*see Usage Metadata Set*)
 Resource.Media.Releasability (*see Media Metadata Set*)
 Resource.Extension.VirtualCoverage.Releasability (*see Virtual Coverage Metadata Set*)
 Resource.Extensions.TemporalCoverage.Releasability (*see Temporal Coverage Metadata Set*)
 Resource.Extensions.GeospatialCoverage.Releasability (*see Geospatial Coverage Metadata Set*)
 Resource.Extensions.HLACoverage.Releasability (*see HLA Coverage Metadata Set*)
 Resource.Extension.VVACoverage.Releasability (*see VVA Coverage Metadata Set*)
 Resource.Extensions.ConfigurationManagement.Releasability (*see Configuration Management Metadata Set*)

Required: yes (*only for Resource, optional for all others*)

Schema: MSC-DMS-Resource

4.8.2 Table Format

Table 4-15 provides a description of the metadata components pertaining to Releasability, which is leveraged by a Resource's **root** node, **Title**, **Description**, **Associations.Association**, **POCs.POC**, **Usages.Usage**, and **Media** components within the Resource Metadata Set. Italics are used in the

Values column of Table 4-15 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values (i.e., enumerations).

Table 4-15 Releasability Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	A value assigned to the releasability of the Resource.	1	A: Unlimited distribution B: U.S. Govt. agencies only C: U.S. Govt. agencies and contractors only D: DoD and DoD contractors only E: DoD components only F: As directed by DoD originator X: Those eligible to obtain export-controlled technical data <i>other text</i>	
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.8.3 Inclusion Criteria

The metadata components specified in Table 4-15 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.8.4 Example

Table 4-16 provides an example of a **Releasability** component that can be reflected within the metacard for an M&S Resource.

Table 4-16 Releasability Coverage Metadata Example

Table Format		XML Format
Metadata Component	Information	<pre><ms:Releasability ms:value= "A: Unlimited distribution"/></pre>
value	A: Unlimited distribution	
other	na	

4.9 Security Metadata Set

Resources often are restricted in some way; therefore it is important to reflect the security information pertaining to an M&S Resource. This section describes the Security Metadata Set for documenting Security as illustrated in Figure 4-9.

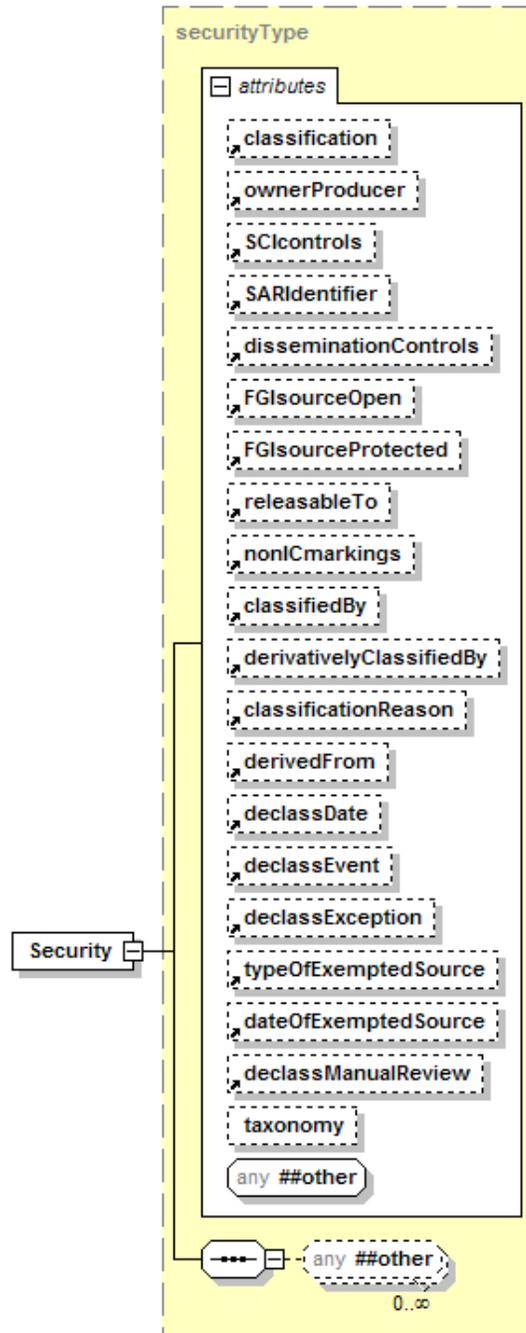


Figure 4-9 Security Metadata Set

4.9.1 Scope

- Metacard Type:** Resource Metacard (Core Layer)
- Use Path(s):** Resource.Security (*see Resource Metadata Set*)
 Resource.Title.Security (*see Title Metadata Set*)
 Resource.Description.Security (*see Description Metadata Set*)
 Resource.Associations.Association.Security (*see Association Metadata Set*)
 Resource.POCs.POC.Security (*see POC Metadata Set*)
 Resource.Usages.Usage.Security (*see Usage Metadata Set*)
 Resource.Media.Security (*see Media Metadata Set*)
 Resource.Extension.VirtualCoverage.Security (*see Virtual Coverage Metadata Set*)
 Resource.Extensions.TemporalCoverage.Security (*see Temporal Coverage Metadata Set*)
 Resource.Extensions.GeospatialCoverage.Security (*see Geospatial Coverage Metadata Set*)
 Resource.Extensions.HLACoverage.Security (*see HLA Coverage Metadata Set*)
 Resource.Extension.VVACoverage.Security (*see VVA Coverage Metadata Set*)
 Resource.Extensions.ConfigurationManagement.Security (*see Configuration Management Metadata Set*)
- Required:** no
- Schema:** MSC-DMS-Resource

4.9.2 Table Format

Table 4-17 provides a description of the metadata components pertaining to **Security** coverage. The metadata components used for the Security Metadata Set are leveraged from the IC-IMS’s Security Attribute Option Group. Italics are used in the Values column of Table 4-17 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values (i.e., enumerations).

Table 4-17 Security Metadata Set

Metadata Component	Description	Occurs	Values	Comment
classification	A simple type in which a name token is restricted to the US, non-US, and joint classification portion mark abbreviations from the CAPCO Register.	0..1	U,C, S, TS, R, CTS, CTS-B, CTS-BALK, NU, NR, NC, NS, NS-S, NS-A, CTSA, NSAT, NCA	If an asset is “FOUO” the ‘classification’ must be “U”. See also ‘disseminationControls’.
ownerProducer	ISO 3166-1 trigraph(s) of the owner or producer country(ies) and/or CAPCO-specified tetragraphs of international organizations. Either (a) a single trigraph or tetragraph or (b) a space-delimited list of trigraphs followed by tetragraphs. Trigraphs must be in alphabetical order and tetragraphs must be in alphabetical order.	0..1	<i>text</i>	
SCI Controls	Authorized abbreviation(s) of SCI control system(s). Either (a) a single abbreviation or (b) a space-delimited list of abbreviations in the order prescribed in the CAPCO Register.	0..1	<i>text</i>	

SARIdentifier	Authorized Special Access Required program digraph(s) or trigraph(s) preceded by "SAR-". Either (a) a single digraph or trigraph or (b) a space-delimited list of digraphs or trigraphs.	0..1	text	Example: "SAR-ABC SAR-DEF ..."
disseminationControls	Authorized dissemination control portion mark abbreviation(s). Either (a) a single abbreviation or (b) a space-delimited list of abbreviations in the order shown in the CAPCO Register. Exception: For the "REL" abbreviation, omit the country code trigraph(s) and instead place the trigraph(s) in the "releasableTo" attribute value.	0..1	text	To add FOUO to the DDMS or MSC-DMS, mark the "disseminationControls" attribute with the value "FOUO", whereas the 'classification' must be "U" for unclassified. ⁵
FGIsourceOpen	Non-US classification portion marking for foreign government information in a document portion. Use this attribute to record a source country when the intent is to post the document to a shared space with the source identified.	0..1	text	
FGIsourceProtected	Non-US classification portion marking for foreign government information in a document portion. Use this attribute to record a source country when the intent is to filter out the identity of the source prior to posting the document to a shared space.	0..1	text	
releasableTo	ISO 3166-1 trigraphic codes of countries to which the associated content can be released. Include "USA" in all instances. Use a space-delimited list with "USA" first, followed by the other trigraph(s) in alphabetical order.	0..1	text	
nonICmarkings	Authorized non-IC portion marking abbreviation(s) from the CAPCO Register. Either (a) a single non-IC abbreviated marking or (b) a space-delimited list of abbreviations in the order shown in the CAPCO Register.	0..1	text	
classifiedBy	Use as specified by E.O. 12958.	0..1	text	
derivativelyClassifiedBy	Used primarily at the Resource level to specify the identity, by name or personal identifier, and position title of the derivative classifier for a Resource. It is manifested only in the 'Classified By' line of a Resource's Classification/Declassification block	0..1	text	added to version 2.1 of IC-ISM
classificationReason	A text string containing one or more paragraph numbers, 1.4(a) through 1.4(h), taken from E.O. 12958, as amended. Enter the paragraph references as they should appear in a classification / declassification block.	0..1	text	
derivedFrom	A text string containing (a) the title and date of a specific source document, or (b) the title and date of an organization classification guide, or (c) the literal string "Multiple Sources."	0..1	text	
declassDate	A specific date, in the format YYYY-MM-DD, at which the applicable information is automatically declassified.	0..1	date	
declassEvent	A textual description of an event that triggers declassification.	0..1	text	
declassException	One or more of the exceptions to 25-year declassification: specify "25X1-human", "25X1", "25X2", ..., "25X9". If more than one exception applies, use a space-delimited list. If "25X1-human" applies, it should be first in a list.	0..1	text	
typeOfExemptedSource	One or more tokens indicating that a source that is exempted from automatic declassification applies. Specify "OADR", "X1", "X2", ..., "X8". If more than one applies, use a space-delimited list.	0..1	text	
dateOfExemptedSource	A specific date, in the format YYYY-MM-DD. Used in conjunction with attribute "typeOfExemptedSource." If there are multiple exempted sources, specify the date of the exempted source that has the most recent date.	0..1	date	
declassManualReview	A true/false indication that manual review is required for declassification. Use this attribute to force the appearance of "//MR" in the header and footer marking titles. Use this attribute ONLY when it is necessary to override the business logic applied to classification and control markings in the document to determine whether manual review is required.	0..1	boolean	

⁵ Implementation Profile for Information Security Markings (XML Encoding): Developer's Guide, Version 1.0

taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Security component.	0..1	text	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 5.17) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

4.9.3 Inclusion Criteria

The metadata components specified in Table 4-17 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.9.4 Example

Table 4-18 provides an example of a **Security** component that can be reflected within the metacard for an M&S Resource.

Table 4-18 Security Metadata Examples

Table Format		XML Format
Metadata Component	Information	
classification	U	<code><ms:Security</code>
ownerProducer	USA	<code> icism:classification="U"</code>
SCI Controls	ST	<code> icism:ownerProducer="USA"</code>
SARIdentifier	SAR-ABC SAR-DEF	<code> icism:SCIcontrols="ST"</code>
disseminationControls	FOUO	<code> icism:SARIdentifier="SAR-ABC SAR-DEF"</code>
FGIsourceOpen	AUS NZL NATO	<code> icism:disseminationControls="FOUO"</code>
FGIsourceProtected	USA AUS	<code> icism:FGIsourceOpen="AUS NZL NATO"</code>
releasableTo	USA	<code> icism:FGIsourceProtected="AUS USA"</code>
nonICmarkings	NMTOKEN	<code> icism:releasableTo="USA"</code>
classifiedBy	John Doe, FSO	<code> icism:nonICmarkings="NMTOKEN"</code>
derivativelyClassifiedBy		<code> icism:classifiedBy="John Doe, FSO"</code>
classificationReason	1.4(b)	<code> icism:derivativelyClassifiedBy=" "</code>
derivedFrom	fundamentaldocument.doc	<code> icism:classificationReason="1.4(b) "</code>
declassDate	2010-01-01	<code> icism:derivedFrom="fundamentaldocument.doc"</code>
declassEvent		<code> icism:declassDate="2010-01-01"</code>
declassException	NONE	<code> icism:declassEvent=" "</code>
typeOfExemptedSource	AUS	<code> icism:declassException="NONE"</code>
dateOfExemptedSource	1997-08-13	<code> icism:typeOfExemptedSource="AUS"</code>
declassManualReview	false	<code> icism:dateOfExemptedSource="1997-08-13"</code>
		<code> icism:declassManualReview="false" /></code>

4.10 Association Metadata Set

No matter what type of M&S Resource may be cataloged, invariably there are many other materials that may be associated with the Resource. Therefore it is important to capture the essential associations pertaining to such related materials. This section describes the table format identified for documenting an Association. This is illustrated in Figure 4-10.

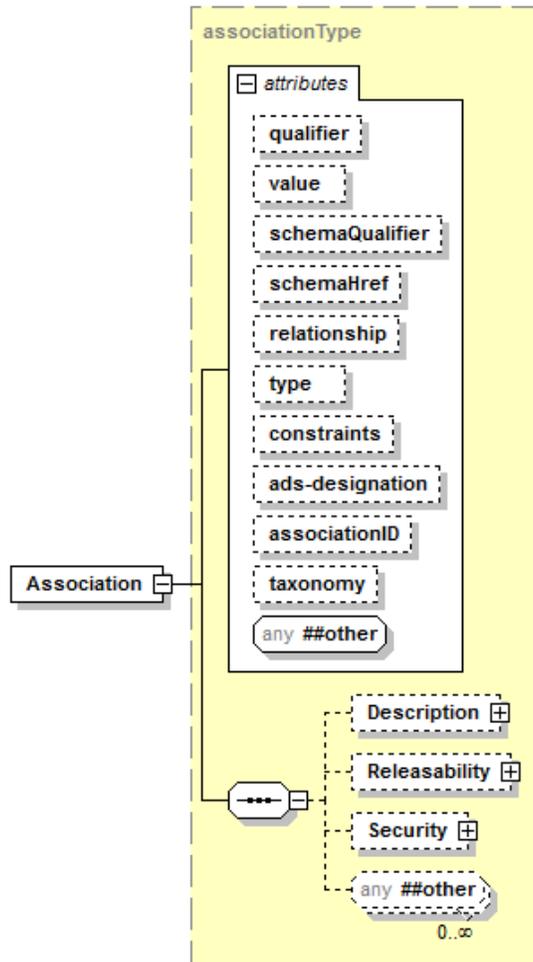


Figure 4-10 Association Metadata Set

4.10.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Paths: Resource.Associations (see *Resource Metadata Set*)
Required: yes (only if Resource.Associations has been declared)
Schema: MSC-DMS-Resource

4.10.2 Table Format

Table 4-19 provides a description of the metadata components pertaining to the Association Metadata Set information, which is leveraged by the **Associations** component within the Resource Metadata Set. Many of the metadata components used for the Association Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-19 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-19 Association Metadata Set

Metadata Component	Description	Occurs	Values	Comment
qualifier	The value that specifies a formal identification system used to associate a source.	0..1	URL, code, image, text, doc, <i>other text</i>	Specifies the domain identification system that defines the format of Association value.
value	The identifier of an associated source.	0..1	<i>text</i>	Association value can be specified without listing a qualifier.
schemaQualifier	The schema type used to identify the format of the Resource.	0..1	<i>text</i>	The schema type used to identify the format of the Resource.
schemaHref	A resolvable reference to the schema for the data asset.	0..1	<i>anyURI</i>	A resolvable reference to the schema for the data asset.
relationship	Identifies the relationship of the association with the Resource.	0..1	has-a, is-part-of, is-type-of, is-described-by, <i>other text</i>	<p>“Has-a” is used to identify an asset that belongs to (is a part or a member of) the described Resource. In DDMS, this would be marked with a <i>direction</i> of “inbound” where the relationship direction is from the associated resource to the resource being described</p> <p>“Is-Part-Of” is used to identify that the described Resource belongs to another asset (i.e. the Resource is a child to the associated item). In DDMS, this would be marked with a <i>direction</i> of “outbound” where the relationship direction is from the resource being described to the associated resource identified.</p> <p>“Is-Type-Of” is used to identify that the described Resource is an implementation of the associated item. In DDMS, this would be marked with either a <i>direction</i> of “outbound” or “bidirectional” where the relationship is bidirectional between the resource being described and the related resource identified.</p> <p>“Is-Described- By” is used to identify that the described Resource is documented or characterized in some way by the associated item. In DDMS, this would be marked with a <i>direction</i> of “outbound”.</p>
type	Identifies the type pertaining to the associated item.	0..1	resource_asset, contact_asset, taxonomy_asset, support_asset, <i>other text</i>	<p>M&S Resources may include associations to artifacts representative of other types of assets, which include:</p> <ul style="list-style-type: none"> • other Resource Assets (see 1.2.1), • Contact Assets (see 1.2.2), • Taxonomy Assets (see 1.2.3), or • Support Assets (see 1.2.4).
constraints	Identifies any constraints pertaining to the associated item.	0..1	<i>text</i>	
ads-designation	Identifies Authoritative Data Source Designation.	0..1	<i>text</i>	A data source whose products have undergone producer data verification, validation, and certification activities.
associationID	Specifies Resource ID associated with the referenced association.	0..1	<i>anyURI</i>	

taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Association component.	0..1	text	The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 5.17) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Description.Text	Open narrative used to increase comprehension pertaining to the metadata component.	0..1	text	Follows same format convention as Description – Section 4.4).
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the title information.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

4.10.3 Inclusion Criteria

The metadata components specified in Table 4-19 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.10.4 Example

Table 4-20 provides an example of an **Association** component that can be reflected within the metacard for an M&S Resource.

Table 4-20 Association Metadata Example

Table Format		XML Format
Metadata Component	Values	<pre> <ms:Association ddms:qualifier="URL" ddms:value="http://www.shortrangealgos.com/BMA1003.xml" ddms:schemaHref="http://www.shortrangeschemas.com" ms:relationship="is-described-by" ms:type=" support_asset " ms:constraints="exclude section 4.6" ms:ads-designation="Category I" ms:associationID="4352" ddms:schemaQualifier="na" <ms:Releasability/> <ms:Security/> </ms:Association> </pre>
qualifier	URL	
value	http://www.shortrangealgos.com/BMA1003.xml	
schemaQualifier	na	
schemaHref	http://www.shortrangeschemas.com	
relationship	is-described-by	
type	support_asset	
constraints	exclude Section 4.6	
ads-designation	Category I	
association ID	4352	
description	"Describes algorithm equation"	
releasability	—see Table 4.16 for example	
security	—see Table 4.18 for example	
other		

4.11 POC Metadata Set

No matter what type of M&S Resource may be cataloged, invariably there are individuals or organizations that may be responsible for its development, management, or use. Therefore it is important to capture the essential components pertaining to such individuals and organizations that are responsible for an M&S Resource. This section describes the table formats identified for capturing details about a POC. There are other subcomponents used by the POC Metadata Set, which are also presented in Section 5. The POC Metadata Set is illustrated in Figure 4-11.

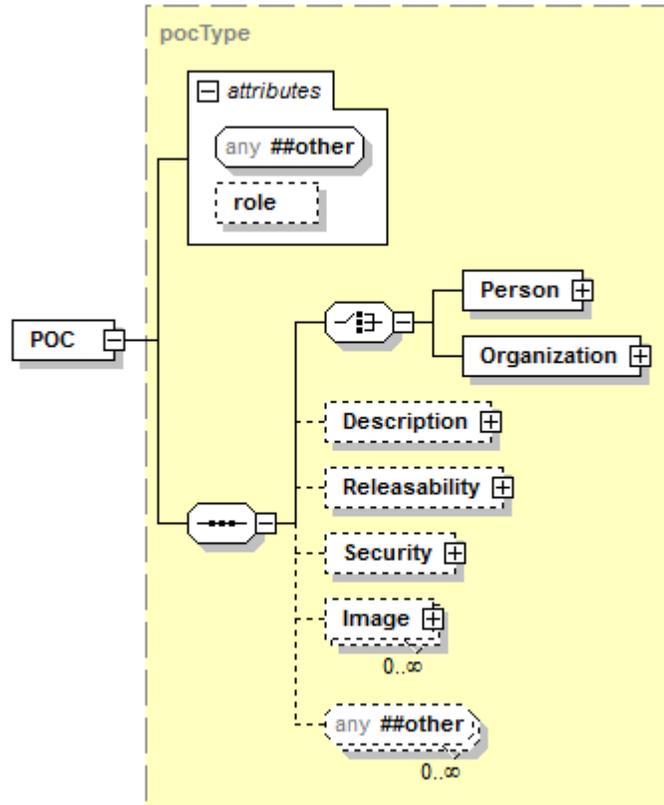


Figure 4-11 POC Metadata Set

4.11.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.POCs (see Resource Metadata Set)
Required: yes (only if Resource.POCs has been declared)
Schema: MSC-DMS-Resource

4.11.2 Table Format

Table 4-21 provides a description of the metadata components pertaining to the POC Metadata Set information, which is an extension of the Contact Metadata Set. The difference between Contact Metadata Set and POC Metadata Set is that the POC Metadata Set allows a **role** to be identified, whereas Contact Metadata Set does not. Many of the metadata components used for the POC Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-21 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-21 POC Metadata Set

Metadata Component	Metadata Component Description	Occurs	Values	Comment
role	This field specifies the role that the POC has with respect to the Resource Metacard.	0..1	primary author, contributor, publisher, proponent, sponsor, release authority, IP holder, copyright holder, technical POC, unspecified, <i>other text</i>	Prior to version 1.4 this originally was represented as an XML Element within a POC. Role is not supported by the Contact Metadata Set.
Person	Specifies person.	0..1	-- see <i>Person Metadata Set</i>	Section 5.2
Organization	Specifies organization.	0..1	-- see <i>Organization Metadata Set</i>	Section 5.3
Description.Text	This field provides an account of the POC.	0..1	<i>text</i>	
Releasability	Information about the releasability of the POC information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the POC information.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
Image	Allows an image to be identified with the POC.	0..1	-- see <i>Image Metadata Set</i>	Section 4.16
other	Specifies other information deemed relevant by the author of the Resource Metacard.	0..many	<i>any</i>	

4.11.3 Inclusion Criteria

The metadata components specified in Table 4-21 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.11.4 Example

A POC is reflective of either a Person or an Organization. It must be one or the other for each POC. Table 4-22 provides an example of a **POC.Person** component that can be reflected within the metacard for an M&S Resource. The Person Metadata Set used to fill out a Resource POC is provided by the Contact Metadata Set and is described in section 5.2

Table 4-22 POC.Person Metadata Example

Table Format		XML Format
Metadata Component	Information	
role	technical POC	<ms:POC role="technical POC">
Person		<ms:Person/>
personID	231	ms:personID="231"
supervisorID	230	ms:supervisorID="230"
sponsorID	332	ms:sponsorID="332">
Name		<ms:Name
title	Mr.	ms:title="Mr."
first	John	ms:first="John"
middle	Michael	ms:middle="Michael"
last	Davidson	ms:last="Davidson"/>
Affiliation		<ms:Affiliation
organizationID	331	ms:organizationID="331"
value	Sprocket Sim	ms:value="Sprocket Sim"
position	Developer	ms:position="Developer"/>
JobTitle.value	System Engineer	<ms:JobTitle ms:value="System Engineer"/>
Address Info		<ms:AddressInfo>
Address Line 1.value	123 Jetway Drive	<ms:AddressLine1 ms:value="123 Jetway Dr."/>
Address Line 2.value	Suite	<ms:AddressLine2 ms:value=""/>
Address Line 3.value	ATTN: John Davidson	<ms:AddressLine3 ms:value=""/>
City.value	Alexandria	<ms:City ms:value="Alexandria"/>
State.value	Virginia	<ms:State ms:value="VA"/>
Country.value	USA	<ms:Country ms:value="USA"/>
Postal Code.value	22308	<ms:PostalCode ms:value="22308"/>
Phone		</ms:AddressInfo>
type	Work	<ms:Phone
number	703-360-3767	ms:type="work"
extension	351	ms:number="703-360-3767"
Email		ms:extension="351"/>
type	Work	<ms:Phone
address	jdavidson@sprocketsim.com	ms:type="mobile"
WebAddress.value	http://www.sprocketsim.com	ms:number="540-755-5555"/>
ContactInstruction.value	Leave message at help desk if no answer	<ms:Email
Description.Text	The chief architect of the model	ms:type="work"
Role.value	technical POC	ms:address="jdavidson@sprocketsim.com"/>
Releasability	-- see Releasability Metadata Set for example	<ms:WebAddress ms:value="http://www.sprocketsim.com"/>
Security	-- see Security Metadata Set for example	<ms>ContactInstruction
Image	-- see Image Metadata Set for example	ms:value=" Leave message at help desk if no
other	na	answer."/>
		</ms:Person>
		<ms:Description>
		<ms:Text>"The chief architect of the model"</ms:Text>
		</ms:Description>
		<ms:Releasability/>
		<ms:Security/>
		<ms:Image/>
		</ms:POC>

Table 4-23 provides an example of a **POC.Organization** component that can be reflected within the metacard for an M&S Resource. The Organization Metadata used to fill out a Resource POC is provided by the Contact Metadata Set and is described in section 5.2

Table 4-23 POC.Organization Metadata Example

Table Format		XML Format
Metadata Component	Information	
role	contributor	<ms:POC role="contributor">
Organization		<ms:Organization
organizationID	231	ms:organizationID="256"
parentID	255	ms:parentID="255">
Name	SprocketSim, Inc	<ms:Name ms:value="SprocketSim, Inc"/>
Type	Industry	<ms:Type ms:value="industry"/>
Address Info		<ms:AddressInfo>
		<ms:AddressLine1 ms:value="123 Jetway Dr."/>

Address Line 1	123 Jetway Drive	<ms:AddressLine2 ms:value="Suite 5" />
Address Line 2	Suite 5	<ms:AddressLine3 ms:value="ATTN: John Davidson" />
Address Line 3	ATTN: John Davidson	<ms:City ms:value="Alexandria" />
City	Alexandria	<ms:State ms:value="VA" />
State	Virginia	<ms:Country ms:value="USA" />
Country	USA	<ms:PostalCode ms:value="22308" />
Postal Code	22308	</ms:AddressInfo>
Phone		<ms:Phone
type	work	ms:type="work"
number	703-360-3767	ms:number="703-360-3767"
Email		<ms:Email
type	Work	ms:type="work"
address	jdavidson@sprocketsim.com	ms:address="jdavidson@sprocketsim.com" />
WebAddress	http://www.sprocketsim.com	<ms:URL ms:value="http://www.sprocketsim.com" />
ContactInstruction	contact John Davidson	<ms:ContactInstruction
ContactInstruction	For general assistance, dial 0 for an operator.	ms:value="contact John Davidson" />
Description.Text	The chief architect of the model	<ms:ContactInstruction
Releasability	-- see <i>Releasability Metadata Set for example</i>	ms:value="For general assistance, dial 0 for an operator" />
Security	-- see <i>Security Metadata Set for example</i>	</ms:Organization>
Image	-- see <i>Image Metadata Set for example</i>	<ms:Description>
other	na	<ms:Text>"performer on the task that developed resource"</ms:Text>
		</ms:Description>
		<ms:Releasability/>
		<ms:Security/>
		<ms:Image/>
		</ms:POC>

4.12 Keyword Metadata Set

Typically, a Resource can be identified by a set of keywords or key phrases or classification codes that describe a topic of an M&S Resource. The Keywords component provides a means to reflect a keyword that applies to the resource, or a particular subject category, which will aid the user in understanding the genre of the content. This section describes the table format identified for documenting a Keyword. This is illustrated in Figure 4-12.

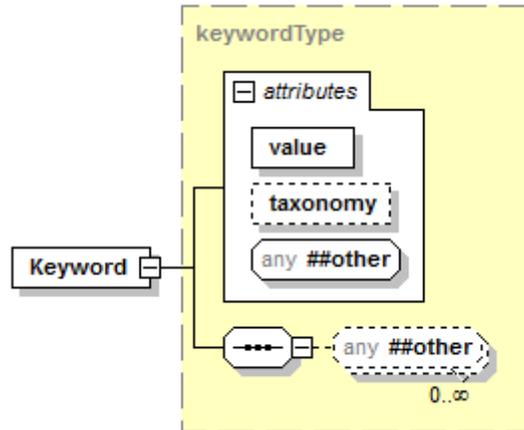


Figure 4-12 Keyword Metadata Set

4.12.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Use Path(s):	Resource.Keywords.Keyword (see <i>Resource Metadata Set</i>)
Required:	yes (if only <i>Resource.Keywords</i> has been declared)
Schema:	MSC-DMS-Resource

4.12.2 Table Format

Table 4-24 provides a description of the metadata components pertaining to the Keyword Metadata Set, which is leveraged by the **Resource.Keywords.Keyword** component within the Resource Metadata Set. Many of the metadata components used for the Keyword Metadata Set are leveraged from the Source component of the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-24 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-24 Keyword Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	This field specifies the word or concept that is addressed by the Resource.	1	text	The value for a keyword must be supplied.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Keyword component.	0..1	text	The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme. The Keyword Metadata Set provides a means to identify both the keywords or phrase values, and a taxonomy identifying the controlled vocabulary or formal classification scheme.

4.12.3 Inclusion Criteria

The metadata components specified in Table 4-24 are necessary for all components of this metadata set unless “0..1” is identified in the Occurs column.

4.12.4 Example

Table 4-25 provides an example of a Keyword component that can be reflected within the metacard for an M&S Resource.

Table 4-25 Keyword Metadata Example

Table Format		XML Format
Metadata Component	Information	<pre><ms:Keyword ms:taxonomy="missile_defense" ddms:value="simulation" /></pre>
taxonomy	missile_defense	
value	simulation	

The location for taxonomy can be looked up via the taxonomies cited table, which is described by the Taxonomies Cited Metadata Set.

4.13 Usage Metadata Set

It is often important to recognize and understand the intended and actual usage of an M&S Resource. The Usage component provides a means to reflect this information. This section describes the table format identified for documenting Usage. The Usage component also includes the ability to describe History metadata; since Resources are intended to be used, it is important to reflect the stories and experiences of how a Resource may have been used. It is also recognized that an M&S Resource may not always be developed within the United States. Some models, for example, may be developed overseas and yet still be a viable model for sharing within the COI. The *Usage* component also includes the ability identify the primary language of the intellectual content of the M&S Resource. This section describes the table format identified for documenting *Language*. This is illustrated in Figure 4-13.

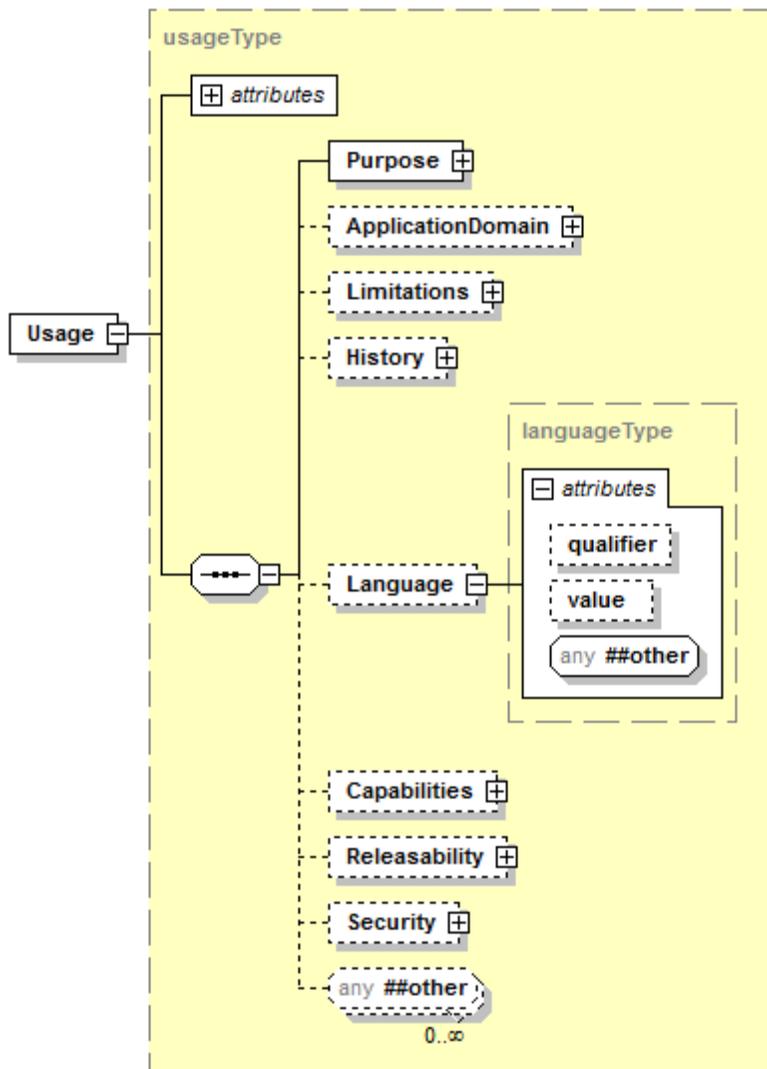


Figure 4-13 Usage Metadata Set

4.13.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Usages.Usage (*see Resource Metadata Set*)
Required: no
Schema: MSC-DMS-Resource

4.13.2 Table Format

Table 4-26 provides a description of the metadata components pertaining to the Usage Metadata Set information, which is leveraged by the **Resource.Usages.Usage** component within the Resource Metadata Set. Many of the metadata components used for the Usage Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. This includes the History metadata component, which borrows from the commercial retail community such as Amazon.com, which provides a means for readers to comment on books that others may be considering buying. Italics are used in the Values column of Table 4-26 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-26 Usage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Usage component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 5.17) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Purpose.value	This field specifies the purpose for which the Resource was developed or used.	1	<i>text</i>	
ApplicationDomain.value	Specifies the type or class of application to which the Resource pertains.	0..1	analysis, training, t&e, engineering, acquisition, planning, assessment doctrine, logistics, support to ops, intelligence, <i>other text</i>	
Limitations.value	This field specifies any known applications for which this Resource has been found not to be appropriate.	0..1	<i>text</i>	
History	Specifies a description of where the Resource has been used in the construction of other object models. A date and POC can be provided with each History log.	0..1	-- see <i>History Metadata Set</i>	Section 4.14
Language	The primary language of the intellectual content of the Resource.	0..1		

qualifier	The value that specifies the originating agency or discipline of the language vocabulary.	0..1	text	Specifies the domain vocabulary of which the Language Value is a member. ISO 639-1 and ISO 639-2, Codes for the representation of names of languages, reference 2 and 3 digit language codes. (Follows DDMS convention)
value	The identification of the content language.	0..1	text	The identification of the content language. Must be a valid code from the vocabulary specified in the Language Qualifier. (Follows DDMS convention)
other	Specifies other language information deemed relevant by the author of the Resource.	0..many	text	
Capabilities.value	Specifies the capabilities ascribed to the usage of the Resource	0..1	text	
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	
other	Specifies other usage information deemed relevant by the author of the Resource.	0..many	any	

4.13.3 Inclusion Criteria

The metadata components specified in Table 4-26 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.13.4 Example

Table 4-27 provides an example of a **Usage** component that can be reflected within the metacard for an M&S Resource.

Table 4-27 Usage Metadata Example

Table Format		XML Format
Metadata Component	Information	
Purpose	To model short range projectile accuracy	<pre> <ms:Usage ms:taxonomy="Missile_Defense"> <ms:Purpose ms:value= "To test short range projectile accuracy"/> <ms:ApplicationDomain ms:value="test and evaluation"/> <ms:Limitations ms:value= "Not intended for elevations above 3K ft."/> <ms:History/> <ms:Language ddms:qualifier="ISO 639-1" ddms:value="fr"/> <ms:Capabilities ms:value="capable for use in seaboard expirments"/> <ms:Releasability/> <ms:Security/> </ms:Usage> </pre>
ApplicationDomain	Test and Evaluation	
Limitations	Not intended for elevations above 3K ft	
History	--see <i>History Metadata Set for Example</i>	
Language		
qualifier	ISO 639-1	
value	fr	
Capabilities	capable for use in seaboard experiments	
Releasability	—see <i>Releasability Metadata Set for example</i>	
Security	—see <i>Security Metadata Set for example</i>	
taxonomy	Missile_Defense	
other	na	

4.14 History Metadata Set

Since Resources are intended to be used, it is important to reflect the stories and experiences of how a Resource may have been used and by whom. The History component provides a means to reflect this information. The History Metadata Set is illustrated in Figure 4-14.

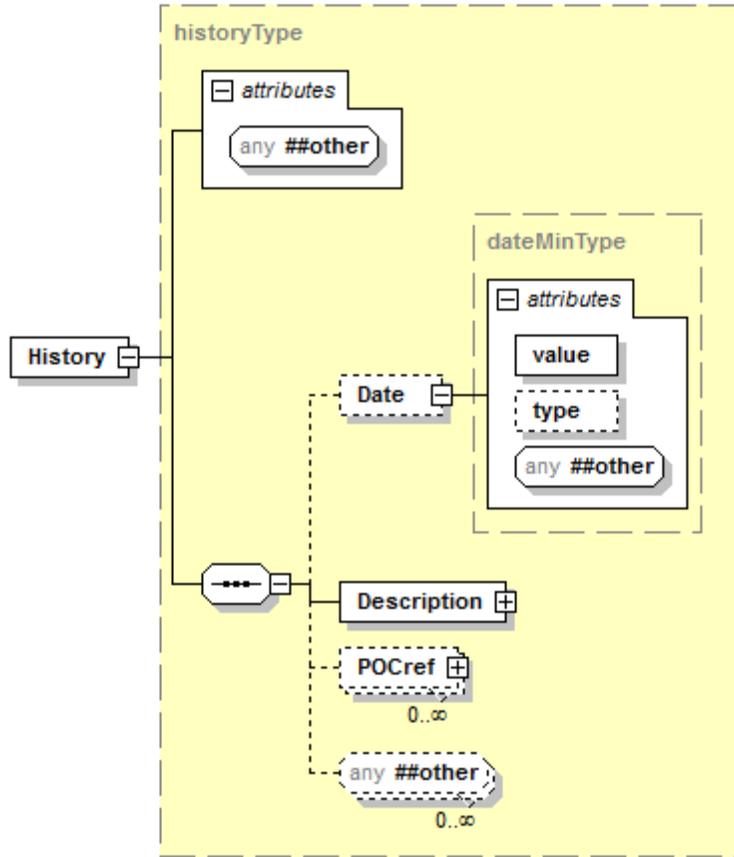


Figure 4-14 History Metadata Set

4.14.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Schema:	MSC-DMS-Resource
Use Path(s):	Resource.Usages.Usage.History (see Usage Metadata Set)
Required:	no

4.14.2 Table Format

The History metadata component borrows from the commercial retail community such as Amazon.com, which provides a means for readers to comment on books that others may be considering buying. Table 4-28 provides a description of the metadata components pertaining to

the History Metadata Set information, which is leveraged by the **Resource.Usages.Usage.History** component within the Resource Metadata Set. Italics are used in the Values column of Table 4-28 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-26 History Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Date	Identifies the historical date the Resource was used.	0..1		
value	The type of date being represented for a specific state of the Resource.	1	created, posted, accepted, modified, validTil, infoCutOff, used, VV, accreditation, retired, last verified, <i>other text</i>	
type	This field identifies the specific date being disclosed.	1	YYYY-MM-DD	
Description.Value	Used to describe the experience pertaining to the historical use of a Resource.	1	<i>text</i>	
POCref	Identifies the specific POC reporting the use history experience.	0..1	-- see how it is specified in Rights Metadata Set	Identifies a POC reference including id and name
other	Specifies other history information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.14.3 Inclusion Criteria

The metadata components specified in Table 4-28 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.14.4 Example

Table 4-29 provides an example of a **Usage** component that can be reflected within the metacard for an M&S Resource.

Table 4-29 History Metadata Example

Table Format		XML Format
Metadata Component	Information	
Date		<pre> <ms:History> <ms>Date ms:value="2007-10-01" ms:type="used"/> <ms>Description> <ms:Text> Successful in supporting joint and coalition littoral warfare exercises October 2007</ms:Text> </ms>Description> <ms:POCref> <ms:Person ms:personID="345"> <ms:Name ms:first="Samuel" ms:middle="Albert" </pre>
value	2007-10-01	
type	used	
Description.Text	Successful in supporting joint and coalition littoral warfare exercises October 2007	
POCref		
Person.personID	345	
Person.Name		
first	Samuel	
middle	Albert	
last	Drake	
other	---	

other	<i>na</i>	<pre>ms:last="Drake"/> </ms:Person> </ms:POCref> </ms:History></pre>
-------	-----------	---

4.15 Media Metadata Set

Often media properties may be associated to an M&S Resource. This section describes the table format identified for capturing details for documenting Media properties. The Media properties include Format and Location. It is often important to recognize and understand the physical or digital manifestation of an M&S Resource. The **Media.Format** component provides a means to reflect this information. The **Media.Location**, on the other hand, provides a means to identify the location of the media. The Media Metadata Set is illustrated in Figure 4-15.

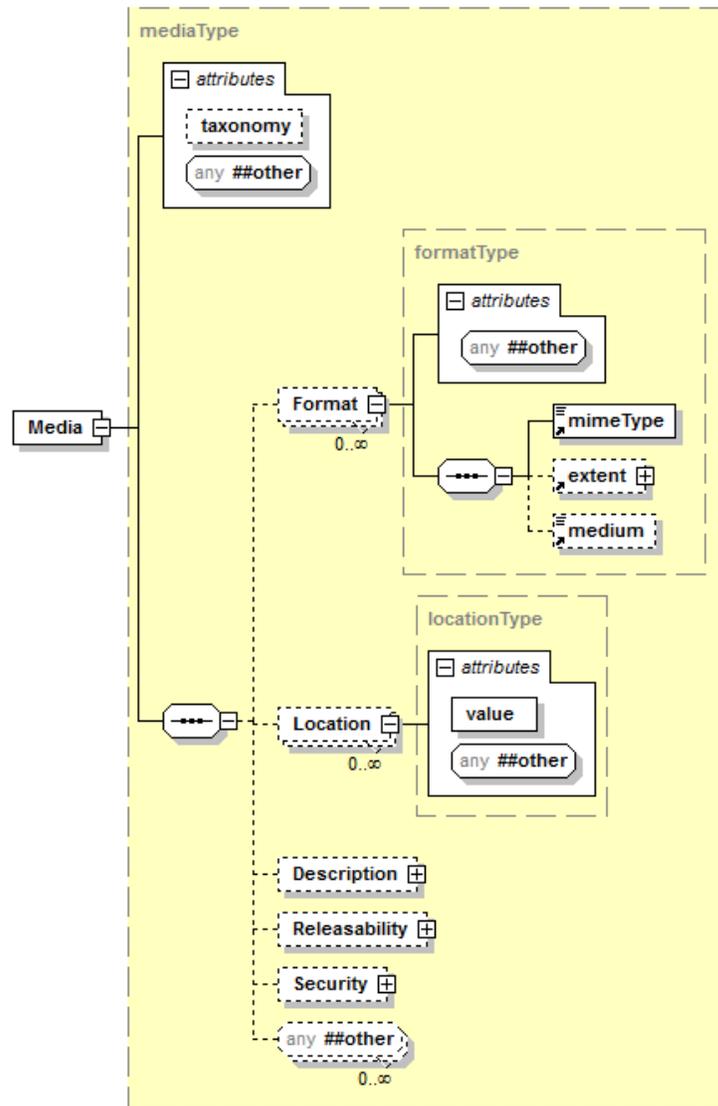


Figure 4-15 Media Metadata Set

4.15.1 Scope

Metacard Type: Resource Metacard (Core Layer)
Use Path(s): Resource.Media (*see Resource Metadata Set*)
Required: no
Schema: MSC-DMS-Resource

4.15.2 Table Format

Table 4-28 provides a description of the metadata components pertaining to the Media Metadata Set. Many of the metadata components used for the Media Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-28 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-28 Media Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Format	The physical or digital manifestation of the Resource.	0..1		
mime type	The MIME type for the product object to which this metadata applies.	1	<i>text</i>	The Internet Media Type [MIME] of the Resource. The MIME type is expressed as: category/specific-type, such as "image/gif". A comprehensive list of existing MIME types is available on the Internet at http://www.iana.org/assignments/media-types/ .
extent	A related data size, compression rate, or pixel size (etc.) of the Resource.	0..1		
qualifier	A vocabulary that specifies the type of format extent that will be supplied.	0..1	<i>text</i>	The qualifier attribute indicates the type of extent value listed. <ul style="list-style-type: none"> • In the case of data bytes, it may indicate 'byte size'. • In the case of a document length, it may indicate 'page count'. • In the case of streaming content, it may indicate 'bits per second' or 'frames per second'.
value	A related data size, compression rate, or pixel size (etc.) of the Resource.	0..1	<i>text</i>	
medium	The physical medium or instantiation of the Resource.	0..1	<i>text</i>	Type used to model the medium attribute of the ddms:medium component
Location.value	The location address which may be used to access the information Resource content, e.g., a URI or file system location.	0..many	<i>text</i>	
Description.Text	This field provides an account of the media.	0..1	<i>text</i>	
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9

taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Media component.	0..1	text	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
other	Specifies other media information deemed relevant by the author of the Resource.	0..many	any	

4.15.3 Inclusion Criteria

The metadata components specified in Table 4-28 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.15.4 Example

Table 4-29 provides an example of a **Media** component that can be reflected within the metacard for an M&S Resource.

Table 4-29 Media Metadata Example

Table Format		XML Format
Metadata Component	Values	
Format		<code><ms:Media ms:taxonomy=" logistics_support"></code>
mime type	Text/XML	<code> <ms:Format></code>
extent		<code> <ddms:mimeType>Text/XML/HTML</ddms:mimeType></code>
qualifier	byte size	<code> <ddms:extent</code>
value	75000	<code> ddms:qualifier=</code>
medium	Digital	<code> "byte size"</code>
Format		<code> ddms:value="75000"/></code>
mime type	String	<code> <ddms:medium>digital</ddms:medium></code>
extent		<code> </ms:Format></code>
qualifier	http://www.dms.gov/id=2348923498732	<code> <ms:Format></code>
medium	Digital	<code> <ddms:mimeType>String</ddms:mimeType></code>
Location.value	http://simmodelsrus.com/software	<code> <ddms:extent</code>
Location.value	http://www.simdeleverance.com	<code> ddms:qualifier=</code>
Description.Text	Used with any Java VM	<code> "http://www.dms.gov/id=2348923498732"</code>
Releasability	—see Table 4.16 for example	<code> <ddms:medium>digital</ddms:medium></code>
Security	—see Table 4.18 for example	<code> </ms:Format></code>
taxonomy	logistics_support	<code> <ms:Location</code>
Other	Na	<code> ms:value="http://simmodelsrus.com/software"/></code>
		<code> <ms:Location</code>
		<code> ms:value="http://www.simdeleverance.com"/></code>
		<code> <ms:Description></code>
		<code> <ms:Text>"Used with any Java VM"</ms:Text></code>
		<code> </ms:Description></code>
		<code> <ms:Releasability/></code>
		<code> <ms:Security/></code>
		<code></ms:Media></code>

4.16 Image Metadata Set

It is often helpful to visually tag Resources so that they can be more easily identified. The Image component provides a means to associate a visual image with an M&S Resource. This section describes the table format identified for documenting an **Image**. The Image Metadata Set is illustrated in Figure 4-16.

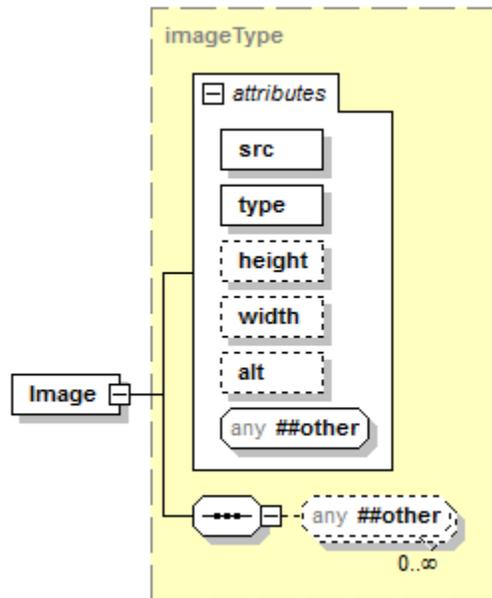


Figure 4-16 Image Metadata Set

4.16.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Use Path(s):	Resource.Image (see <i>Resource Metadata Set</i>) Resource.POCs.POC.Person.Image (see <i>POC Metadata Set</i>) Contact.Person.Image (see <i>Contact Metadata Set</i>)
Required:	no
Schema:	MSC-DMS-Resource

4.16.2 Table Format

Table 4-30 provides a description of the metadata components pertaining to the Image Metadata Set, which is leveraged by the Image component within the Resource Metadata Set. The metadata components used for the Image Metadata Set are leveraged from the HLA Object Model Template (OMT) and Base Object Model (BOM) Specification. Italics are used in the Values column of Table 5-31 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-30 Image Metadata Set

Metadata Component	Description	Occurs	Values	Comment
<i>src</i>	Specifies the location for the image	1	<i>anyURI</i>	Location described using a URI.
<i>type</i>	This field holds the image type being represented.	1	BMP, GIF, JPG, PNG, TIFF, <i>other text</i>	
<i>height</i>	This field specifies the pixel height of the Image represented in the <i>Image</i> field.	0..1	<i>short</i>	
<i>width</i>	This field specifies the pixel width of the image represented in the <i>Image</i> field.	0..1	<i>short</i>	
<i>alt</i>	This field specifies an alternative text in case the image represented in the <i>Image</i> field cannot be displayed.	0..1	<i>text</i>	
<i>other</i>	Specifies other Image information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.16.3 Inclusion Criteria

The metadata components specified in Table 4-30 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.16.4 Example

Table 4-31 provides an example of an **Image** component that can be reflected within the metacard for an M&S Resource.

Table 4-31 Image Metadata Example

Table Format		XML Format
Metadata Component	Information	
<i>src</i>	"http://www.simrus.com/missile.jpg"	<pre> <ms:Image ms:src= " http://www.simrus.com/missile.jpg" ms:type="JPG" ms:alt="Ballistic Algo" ms:height="32" ms:width="32" /> </pre>
<i>type</i>	JPG	
<i>alt</i>	Ballistic Algo	
<i>height</i>	32	
<i>width</i>	32	
<i>other</i>	na	

4.17 Taxonomy Cited Metadata Set

To increase comprehension and understanding of the metadata describing an M&S Resource, the taxonomy pertaining to a domain vocabulary source can be cited using this metadata set. This section describes the table format identified for documenting a **TaxonomyCited**. Any taxonomy cited can be referenced by other components within an MSC-DMS based metacard. The **TaxonomyCited.Location**, contained within this metadata set, provides a means to identify the location of the taxonomy source. This is illustrated in Figure 4-17.

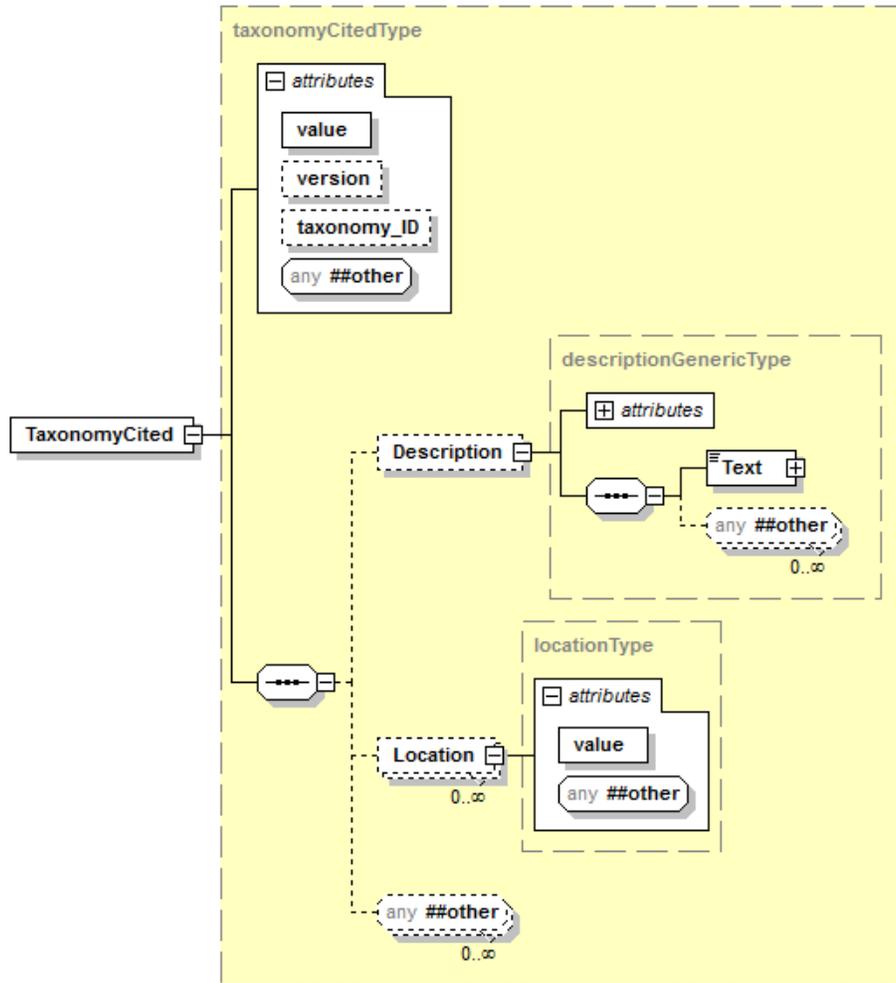


Figure 4-17 Taxonomy Cited Metadata Set

4.17.1 Scope

Metacard Type:	Resource Metacard (Core Layer)
Use Path(s):	Resource.TaxonomyCited (see Resource Metadata Set)
Required:	no
Schema:	MSC-DMS-Resource

4.17.2 Table Format

Table 4-32 provides a description of the metadata components pertaining to the Taxonomy Cited Metadata Set information, which is leveraged by the **TaxonomiesCited** component within the Resource Metadata Set. Italics are used in the Values column of Table 4-32 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-32 Taxonomy Cited Metadata Set

Metadata Component	Description	Occurs	Values	Comment
value	The value identifier of the cited taxonomy source.	0..1	<i>text</i>	A unique name should be used to identify the taxonomy source.
version	A version of the taxonomy source, if known.	0..1	<i>text</i>	
Location.value	The location address which may be used to access the information Resource content, e.g., a URI or file system location.	0..many	<i>anyURI</i>	Used in the same manner as Location pertaining to Media Metadata Set
Description.Text	Open narrative used to increase comprehension pertaining to the metadata component.	0..1	<i>text</i>	
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.17.3 Inclusion Criteria

The metadata components specified in Table 4-32 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.17.4 Example

Table 4-33 provides an example of two **TaxonomyCited** components that can be reflected within the metacard for an M&S Resource.

Table 4-33 Taxonomy Cited Metadata Example

Table Format		XML Format
Metadata Component	Values	
value	<i>logistics_support</i>	<pre> <ms:TaxonomiesCited <ms:TaxonomyCited value="logistics_support" version="1.3" <ms:Location ms:value="http://logistics_r_us.com" /> <ms:Description> <ms:Text>" Taxonomy identifies all the key terms for support logistics on the battlefield"</ms:Text> </ms:Description> </ms:TaxonomyCited> <ms:TaxonomyCited value="Missile_Defense" version="1.1" <ms:Location </pre>
version	1.3	
Location.value	http://www.logistics_r_us.com	
Description.Text	Taxonomy identifies all the key terms for support logistics on the battlefield	
other	<i>na</i>	
value	<i>Missile_Defense</i>	
version	1.1	
Location.value	http://www.star-wars.com	
Description.Text	Taxonomy identifies all the key terms for missile defense	

other	na	<pre> ms:value="http://star-wars.com"/> <ms:Description> <ms:Text>" Taxomony identifies all the key terms for missile defense"</ms:Text> </ms:Description> </ms:TaxonomyCited> </ms:TaxonomyCited> </pre>
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4.18 Virtual Coverage Metadata Set

Virtual Coverage identifies subject-matter coverage of an M&S Resource in terms of one or more virtual addresses. For this purpose, a “virtual” address is a computer network address, expressed as a set of Internet Protocol (IP) octets, a uniform Resource locator (URL), or some other network-addressing scheme, such as a network name or locale. The Virtual Coverage Metadata Set is illustrated in Figure 4-18.

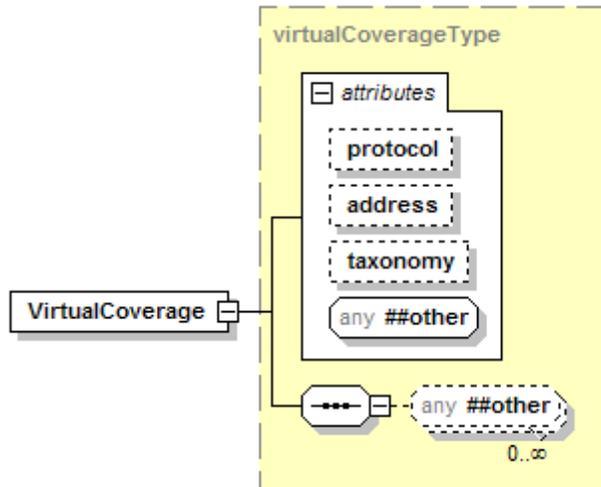


Figure 4-18 Virtual Coverage Metadata Set

4.18.1 Scope

Metacard Type:	Resource Metacard (Supplemental Layer)
Use Path(s):	Resource.Extensions.VirtualCoverage (<i>see Resource Metadata Set</i>)
Required:	no
Schema:	MSC-DMS-Resource

4.18.2 Table Format

Table 4-34 provides a description of the metadata components pertaining to the Virtual Coverage Metadata Set, which is leveraged by the **VirtualCoverage** component within the Resource Metadata Set. Many of the metadata components used for the Virtual Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-34 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-34 Virtual Coverage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
protocol	The type of rules for data transfer that apply to the Virtual Address.	0..1	<i>text</i>	TCP, UDP, http, etc.
address	A computer or telecommunications network address, or a network name or locale.	0..1	<i>text</i>	The form of this will depend on the network protocol in use; whether a specific node or an entire subnet is being addressed, etc. Examples of virtual addresses are Internet protocol (IP) octets and uniform Resource locators (URLs), or a network name or locale.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Virtual Coverage component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.18.3 Inclusion Criteria

The metadata components specified in Table 4-34 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.18.4 Example

Table 4-35 provides an example of a **VirtualCoverage** component that can be reflected within the metacard for an M&S Resource.

Table 4-35 Virtual Coverage Metadata Example

Table Format		XML Format
Metadata Component	Information	<code><ms:VirtualCoverage</code>
<i>Virtual Address</i>	123.456.789.101	<code>ddms:address="123.456.789.101"</code>
<i>Network Protocol</i>	TCP/IP	<code>ddms:protocol="TCP/IP"/></code>

4.19 Temporal Coverage Metadata Set

Temporal Coverage identifies periods of time associated to a Resource. For example, a data set such as weather, which may be used in a simulation, pertaining to a certain period of time and therefore it must be properly marked. The Temporal Coverage Metadata Set is illustrated in Figure 4-19.

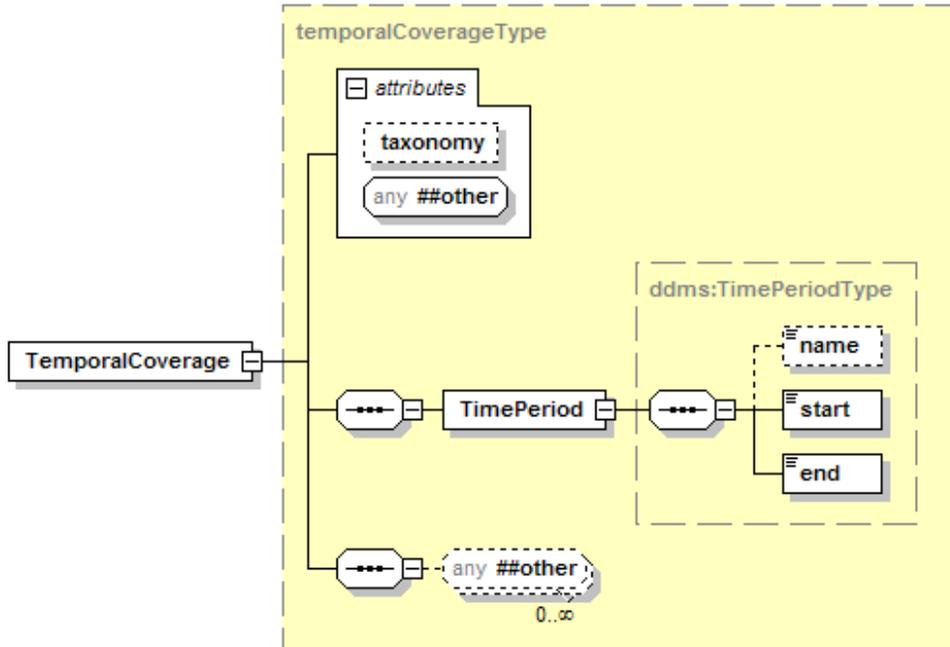


Figure 4-19 Temporal Coverage Metadata Set

4.19.1 Scope

Metacard Type:	Resource Metacard (Supplemental Layer)
Use Path(s):	Resource.Extensions.TemporalCoverage (<i>see Resource Metadata Set</i>)
Required:	no
Schema:	MSC-DMS-Resource

4.19.2 Table Format

Table 4-36 provides a description of the metadata components pertaining to the Temporal Coverage Metadata Set, which is leveraged by the **TemporalCoverage** component within the Resource Extensions Metadata Set. Many of the metadata components used for the Temporal Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-36 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-36 Temporal Coverage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Temporal Coverage component.	0..1	text	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Time Period	An interval of time, which can be expressed as a named era.	0..1		
name	A name to identify time period / era.	0..1	text	The default value for Time Period is "unknown."
start	The start date of a period of time.	1	text	The default value for Date Start is "unknown."
end	The end date of a period of time.	1	text	The default value for Date End is "unknown."
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

4.19.3 Inclusion Criteria

The metadata components specified in Table 4-36 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.19.4 Example

Table 4-37 provides an example of a **TemporalCoverage** component that can be reflected within the metacard for an M&S Resource.

Table 4-37 Temporal Coverage Example

Table Format		XML Format
Metadata Component	Information	
Time Period		<pre> <ms:TemporalCoverage> <ddms:TimePeriod> <ddms:name>GMT Start</ddms:name> <ddms:start>2001-12-17T08:30:46.0Z</ddms:start> <ddms:end>2004-09-17T08:36:56.0Z</ddms:end> </ddms:TimePeriod> </ms:TemporalCoverage> </pre>
Name	GMT Start	
Start	2001-12-17T08:30:46.0Z	
End	2004-09-17T08:36:56.0Z	

4.20 Geospatial Coverage Metadata Set

M&S Resources may also need to be tagged with a geographical location that relate to the Resource, such as a jurisdiction, point, area, or volume on land, in space, or at sea. An example of this is a weather dataset, or a terrain database used for the purposes of M&S exercises. The Geospatial Coverage Metadata Set is illustrated in Figure 4-20.

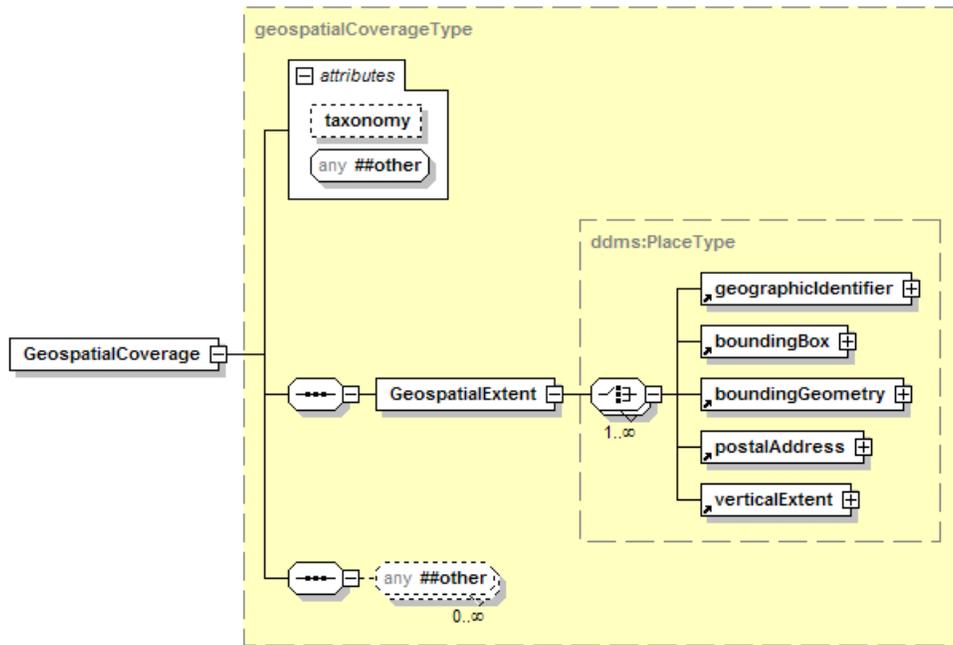


Figure 4-20 Geospatial Coverage Metadata Set

4.20.1 Scope

Metacard Type:	Resource Metacard (Supplemental Layer)
Use Path(s):	Resource.Extensions.GeospatialCoverage (<i>see Resource Metadata Set</i>)
Required:	no
Schema:	MSC-DMS-Resource

4.20.2 Table Format

Table 4-38 provides a description of the metadata components pertaining to the Geospatial Coverage Metadata Set, which is leveraged by the **GeospatialCoverage** component within the Resource Extensions Metadata Set. Many of the metadata components used for the Geospatial Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 4-38 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-38 Geospatial Coverage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Geographic Identifier	Identifier associated with Geospatial content if applicable.	0..1		This component must contain one or more name, region, country code or facility identifier components.
Name	The name of a place of interest, other than a country, region, or facility.	0..1	text	
Region	The name of a sub-national or transnational geographic or geopolitical region that is a subject of the Resource.	0..1	text	
Country Code	A standards-based abbreviation of a country name.	1		
qualifier	A vocabulary that specifies the type of that will be supplied.	0..1	text	The qualifier attribute indicates the type of extent value listed. In the case of data bytes, it may indicate 'byte size'. In the case of a document length, it may indicate 'page count'. In the case of streaming content, it may indicate 'bits per second' or 'frames per second'.
value	A standards-based abbreviation of a country name.	0..1	text	A permissible value according to the vocabulary specified in Country Code qualifier.
Facility Identifier	A specific identification number or point location of a facility or installation.	1		
beNumber	A DIA-specific identification number of a facility or installation according to a gric location system.	0..1	text	See DDMS
osuffix	A specific identification number for a facility located at the installation associated by the Facility BE Number.	0..1	text	See DDMS
Bounding Box	A wrapper for components containing the bounding longitudes and latitudes for describing a geographic extent. See also ISO 19115.	0..1		This component must contain a valid geographic reference using the WGS-84 Coordinate Reference System. It is recommended that the latitudes and longitudes be expressed in decimal degrees in order to provide a standard representation. This component is the wrapper for components Westbound Longitude, Eastbound Longitude, Northbound Latitude and Southbound Latitude.
WestBL	The westernmost longitude of the area of interest.	1	double	This component is mandatory if the Geographic Bounding Box is being used to specify a geospatial area of interest. It is recommended that the latitudes and longitudes be expressed in decimal degrees in order to provide a standard representation. This component must use the WGS-84 Coordinate Reference System.
EastBL	The easternmost longitude of the area of interest	1	double	This component is mandatory if the Geographic Bounding Box is being used to specify a geospatial area of interest. It is recommended that the latitudes and longitudes be expressed in decimal degrees in order to provide a standard representation. This component must use the WGS-84 Coordinate Reference System.
SouthBL	The southernmost latitude of the area of interest.	1	double	This component is mandatory if the Geographic Bounding Box is being used to specify a geospatial area of interest. It is recommended that the latitudes and longitudes be expressed in decimal degrees in order to provide a standard representation. This component must use the WGS-84 Coordinate Reference System.
NorthBL	The northernmost latitude of the area of interest.	1	double	This component is mandatory if the Geographic Bounding Box is being used to specify a geospatial area of interest. It is recommended that the latitudes and longitudes be expressed in decimal degrees in order to provide a standard representation. This component must use the WGS-84 Coordinate Reference System.

Geographic Bounding Geometry	One or more Polygons and Points.	0..1		This component must contain either a gml:Point or gml:Polygon component. This component must also be used in instances where a bounding polygon is to be specified using a Coordinate Reference System other than WGS-84.
Polygon	Specifies a position using a list of coordinates that define the boundary for the geographic extent. See also ISO 19136.	1..many	<i>PolygonType</i>	The gml:Polygon component is used to describe a closed, geographic area using a list of coordinates (the exterior ring). Exterior rings are specified within LinearRing subcomponents that contain 4 or more gml:pos components used to mark the control points of the polygon. To close the polygon it is necessary that the last coordinate be the same as the first. The gml:Polygon component uses the gml:SRSReferenceGroupSRSNameRequired to provide a set of common attributes to indicate the spatial reference system for the coordinates.
Point	Specifies a position using a single coordinate tuple. See also ISO 19136.	1..many	<i>PointType</i>	The gml:Point component is used to specify a position using coordinates. The gml:Point component uses the gml:SRSReferenceGroupSRSNameRequired to provide a set of common attributes to indicate the spatial reference system for the coordinates.
Postal Address	A wrapper for postal address components including street, city, state or province, postal code, and country code.	0..1		See Street, City, State, Province, Postal Code, and Country Code components.
Street	A line of a postal address.	0..6	<i>text</i>	Use for street number and name, or PO box number, or attention line, or department name. Do not use for city, state, or province name, or for the postal code.
City	A city name.	0..1	<i>text</i>	
State/Province	An abbreviation of a state/province.	1	<i>text</i>	
Postal Code	A mailing code designation, such as a ZIP code in the U.S. or a postcode in Britain.	0..1	<i>text</i>	
Country Code	A standards-based abbreviation of a country name.	0..1	<enumerated list>	
Vertical Extent	A wrapper for child components used to describe the vertical extent applicable to the Resource.	0..1		This component when used must specify a minimum vertical extent and a maximum vertical extent. See Minimum Vertical Extent and Maximum Vertical Extent components. Vertical extent requires two attributes unitOfMeasure, which can have values Fathom, Foot, Inch, Meter, StatuteMile, Kilometer, or NauticalMile, and datum which can have values AGL (Above Ground Level), MSL (Mean Sea Level), or HAE (Height Above Ellipsoid).
unit Of Measure		1	<i>LengthMeasureType</i>	
datum		1	<i>VerticalDatumType</i>	
Minimum Vertical Extent	The lowest vertical point within the coverage.	1	<i>VerticalDistanceType</i>	The value of this component must be less than or equal to the value of the Maximum Vertical Extent.
Maximum Vertical Extent	The highest vertical point within the coverage.	1	<i>VerticalDistanceType</i>	The value of this component must be greater than or equal to the value of the Minimum Vertical Extent.
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Geospatial Coverage component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 5.17) If a taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8

Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

4.20.3 Inclusion Criteria

The metadata components specified in Table 4-38 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.20.4 Example

Table 4-39 provides an example of a **GeospatialCoverage** component that can be reflected within the metacard for an M&S Resource.

Table 4-39 Geospatial Coverage Example

Table Format		XML Format
Metadata Component	Information	
Geographic Identifier		
Name	The White House	
Region	Mid-Atlantic	
Geographic Bounding Box		
WestBL	39	
EastBL	48	
SouthBL	29	
NorthBL	38	
Geographic Bounding Geometry		
Polygon		
Name	http://metadata.dod.mil/mdr/ns/GSIP/crs/WGS84E_2D	
Postal Address		
Street	1600 Pennsylvania Avenue NW	
City	Washington	
State	D.C.	
Postal Code	20500	
Country Code	USA	
Vertical Extent		
Unit of Measure	Meter	
Datum	AGL	
Minimum Vertical Extent	0	
Maximum Vertical Extent	100	

```

<ms:GeospatialCoverage>
  <ddms:GeospatialExtent>
    <ddms:geographicIdentifier>
      <ddms:name>The White House</ddms:name>
      <ddms:name>Mid-Atlantic</ddms:name>
    </ddms:geographicIdentifier>
    <ddms:boundingBox>
      <ddms:WestBL>39</ddms:WestBL>
      <ddms:EastBL>48</ddms:EastBL>
      <ddms:SouthBL>29</ddms:SouthBL>
      <ddms:NorthBL>38</ddms:NorthBL>
    </ddms:boundingBox>
  </ddms:GeospatialExtent>
</ms:GeospatialCoverage>

```

4.21 HLA Coverage Metadata Set

Many M&S Resources that are developed and intended for reuse include simulations. For such Resources that are HLA compliant, it is important to understand what HLA capabilities a resource may possess. The HLA Coverage Metadata Set is illustrated in Figure 4-21.

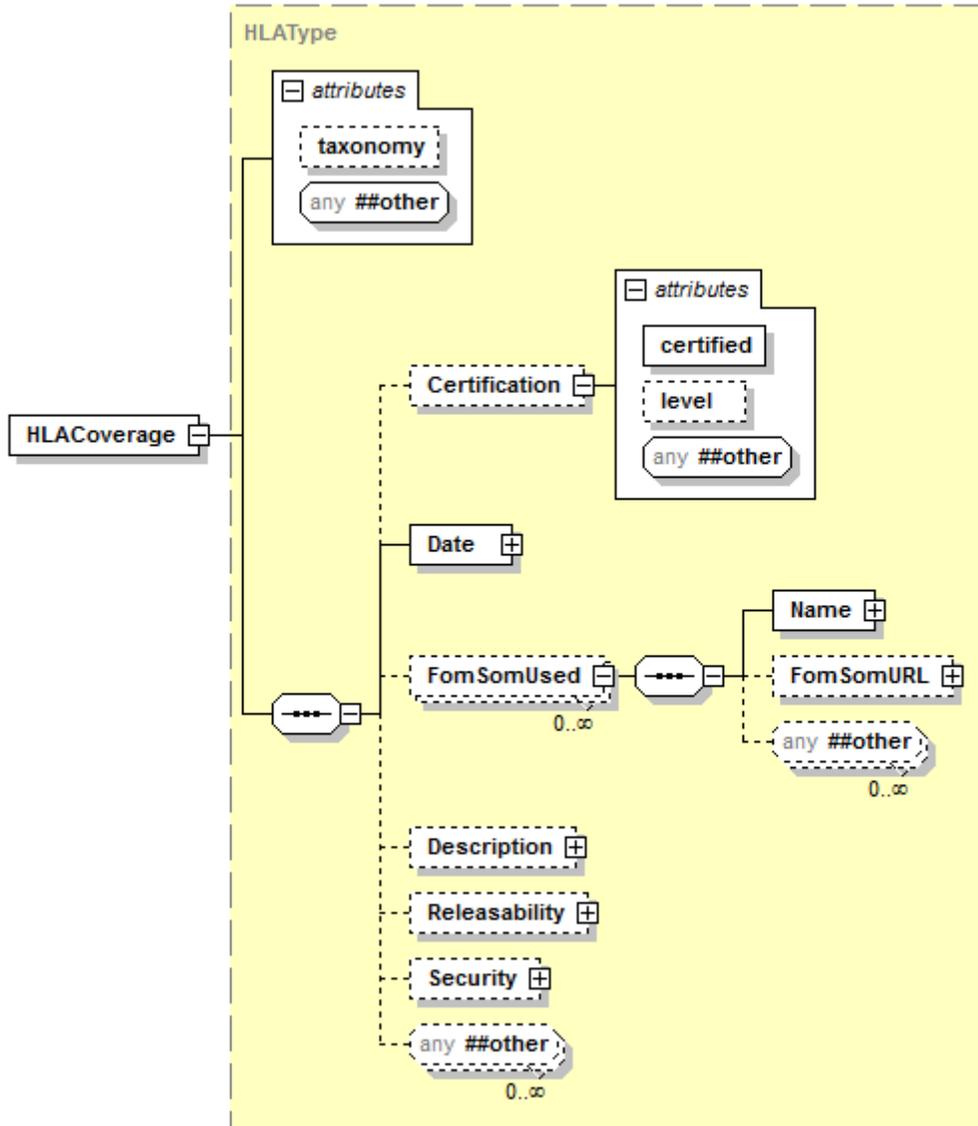


Figure 4-21 HLA Coverage Metadata Set

4.21.1 Scope

Metacard Type: Resource Metacard (Supplemental Layer)
Use Path(s): Resource.Extensions.HLACoverage (see Resource Metadata Set)

Required: no
Schema: MSC-DMS-Resource

4.21.2 Table Format

Table 4-40 provides a description of the metadata components pertaining to the HLA Coverage Metadata Set, which is leveraged by the **HLACoverage** component within the Resource Metadata Set. Many of the metadata components used for the HLA Coverage Metadata Set are leveraged from the various service MSRRs. Italics are used in the Values column of Table 4-40 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-40 HLA Coverage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Certification	Identifiers certification level in respect to HLA.	0..1		
certified	Identifies if the resource has been HLA Certified	1	<i>yes</i> <i>no</i> , <i>waivered</i>	Identifies whether or not Resource was waived from HLA compliance.
level	Identifies level of certification	0..1	<i>text</i>	Only filled in if "certified" is yes
Date	Specifies date of HLA compliance	1	<i>date</i>	
Fom Som Used	Specifies what FOM or SOMs are used.	0..*		FOM = Federation Object Model, SOM = Simulation Object Model
Name	Specifies the FOM or SOM name	1	<i>text</i>	
Fom Som URL	Specifies location of FOM or SOM used.	0..1	<i>text</i>	
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the HLA Coverage component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.21.3 Inclusion Criteria

The metadata components specified in Table 4-40 are necessary for all components of this metadata set unless "0..1" or "0..many" is identified in the Occurs column.

4.21.4 Example

Table 4-41 provides an example of a **HLACoverage** component that can be reflected within the metacard for an M&S Resource.

Table 4-41 HLA Coverage Metadata Example

Table Format		XML Format
Metadata Component	Information	
<i>Certification</i>		<ms:HLACoverage>
<i>certified</i>	yes	<ms:Certification
<i>level</i>	Certified with IEEE 1516	ms:certified="yes"
<i>Date</i>	2005-10-23	ms:level="Certified with IEEE 1516"/>
<i>Fom Som Used</i>		<ms:Date ms:value="2005-10-23"/>
<i>.Name</i>	RPR FOM	<ms:FomSomUsed>
<i>.Fom Som URL</i>	www.sisostds.org	<ms:Name ms:value=" RPR FOM"/>
		<ms:FomSomURL ms:value=" www.sisostds.org "/>
		</ms:FomSomUsed>
		</ms:HLACoverage>

4.22 VV&A Coverage Metadata Set

Resources often go through a process of verification, validation, and accreditation (VV&A) to provide evidence and confidence in the use of that resource for some intended purpose. Therefore, it is important to reflect the VV&A information pertaining to an M&S Resource.

A particular M&S Resource may undergo a variety of VV&A activities related to various intended uses. These activities can result in numerous VV&A documents, including such items as an Accreditation Plan, Verification and Validation (V&V) Plan, V&V Report, and Accreditation Report. The VV&A Coverage Metadata Set supports description of a VV&A documentation project as well as individual VV&A documents that are produced by a project. The VV&A Metadata Set illustrated in Figure 4-22.

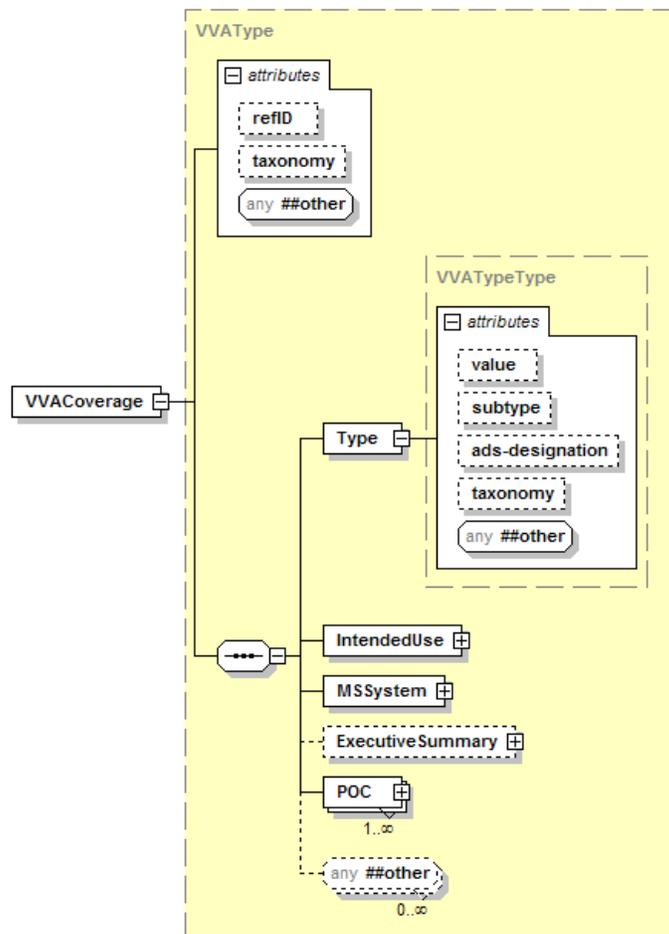


Figure 4-22 VV&A Metadata Set

4.22.1 Scope

Metacard Type: Resource Metacard (Supplemental Layer)
Use Path(s): Resource.Extensions.VVACoverage (see Resource Metadata Set)

Required: no
Schema: MSC-DMS-Resource

4.22.2 Table Format

Table 4-42 provides a description of the metadata components pertaining to the VV&A Coverage Metadata Set, which is leveraged by the **VVACoverage** component within the Resource Metadata Set. Italics are used in the Values column of Table 4-42 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-42 VV&A Coverage Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Type	Type of VV& Coverage. Here, it denotes that the Resource information describes a VV&A documentation project.	1		
value	Value associated to type	0..1	<i>text</i>	VV&A Documentation (<i>Project Level Metadata Supplement</i>)
subtype	Type of VV&A document described by this metadata.	0..1	<i>Accreditation Plan V&V Plan V&V Report Accreditation Report Accreditation Decision Letter</i>	(<i>Document Level Metadata Supplement</i>)
ADS Designation	Identifies Authoritative Data Source Designation.	0..1	Category I Category II Category III Authoritative - T Approved - T Other – T <i>other text</i>	A data source whose products have undergone producer data verification, validation, and certification activities.
IntendedUse.value	Description of the intended use of the M&S system. Helps define the context and scope of the VV&A documentation effort.	1	<i>text</i>	
MSSystem.value	Name of the M&S System that is being addressed by the VV&A document described as an M&S Resource.	1	<i>text</i>	<i>VV&A documents describe planning and execution of VV&A processes in the context of a particular M&S system</i>
ExecutiveSummary.value	Executive Summary from the VV&A document providing an overview of the document, including synopsis of the major components from all sections of the document, with emphasis on the scope of the respective VV&A activity, M&S requirements, acceptability criteria, methodology of the respective VV&A activity, and issues of the respective VV&A activity.	0..1	<i>text</i>	
POCref	Contact information on other individuals who can provide information about the VV&A document or can provide access to the VV&A document.	1..many	-- <i>see how it is specified in Rights Metadata Set</i>	Identifies a POC reference including id and name
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the VV&A Coverage component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy

				Cited (see Section 5.17) If a taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

4.22.3 Inclusion Criteria

The metadata components specified in Table 4-42 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.22.4 Example

Table 4-43 provides an example of a **VVACoverage** component that can be reflected within the metacard for an M&S Resource.

Table 4-43 VV&A Coverage Metadata Example (Document-Level Metadata)

Table Format		XML Format
Metadata Component	Information	<pre> <ms:VVACoverage> <ms:Type ms:value=" VV&A Documentation" ms:subtype="Accreditation Report" ms:ads-designation="Category I"/> <ms:IntendedUse ms:value="Training Army brigade command staff future command staff future planning cell personnel in the rapid decision- making process."/> <ms:MSSystem ms:value="RDMP Trainer"/> <ms:ExecutiveSummary ms:value="text excerpt from the Executive Summary section of the Accreditation Report providing an overview of the document (omitted here to conserve space in the table)"/> <ms:POCref> <ms:Person ms:personID="345"> <ms:Name ms:first="Samuel" ms:middle="Albert" ms:last="Drake"/> </ms:Person> </ms:POCref> </ms:VVACoverage> </pre>
Type.value	VV&A Documentation	
Type.subtype	Accreditation Report	
Type.ads-designation	Category I	
IntendedUse	Training Army brigade command staff future planning cell personnel in the rapid decision-making process.	
MSSystem	RDMP Trainer	
ExecutiveSummary	text excerpt from the Executive Summary section of the Accreditation Report providing an overview of the document (omitted here to conserve space in the table)	
POCref		
Person		
.personID	345	
.Name		
.first	Samuel	
.middle	Albert	
.last	Drake	

4.23 Configuration Management Metadata Set

Resources often go through a process of configuration management as updates and revisions are made. It is often important to track and maintain an account of such updates. The Configuration Management Metadata Set supports description of the Configuration Management documentation project as well as individual VV&A documents that are produced by a project. The Configuration Management Metadata Set is illustrated in Figure 4-23.

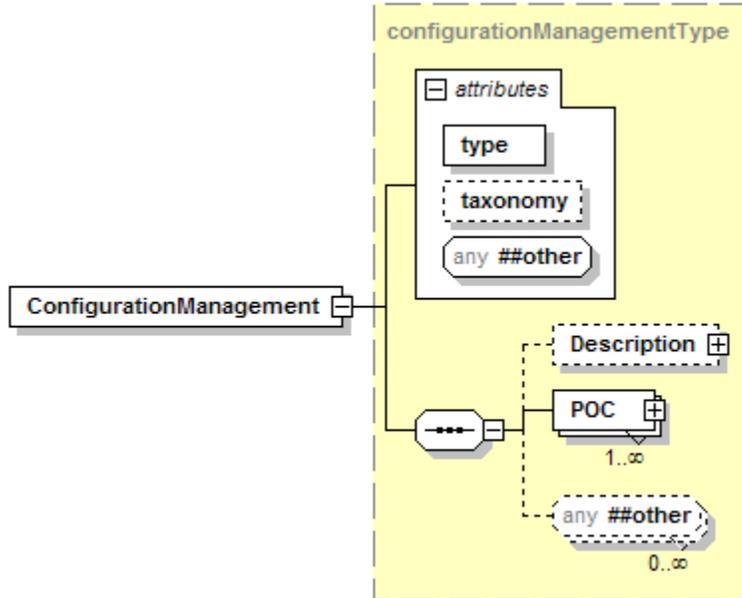


Figure 4-23 Configuration Management Metadata Set

4.23.1 Scope

Metacard Type:	Resource Metacard (Supplemental Layer)
Use Path(s):	Resource.Extensions.ConfigurationManagement (<i>see Resource Metadata Set</i>)
Required:	no
Schema:	MSC-DMS-Resource

4.23.2 Table Format

Table 4-44 provides a description of the metadata components pertaining to the Configuration Management Metadata Set, which is leveraged by the **ConfigurationManagement** component within the Resource Metadata Set. Italics are used in the Values column of Table 4-44 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 4-44 Configuration Management Metadata Set

Metadata Component	Description	Occurs	Values	Comment
type	Type of infrastructure / body responsible for configuration management.	1	User Group CCB Executive Steering Committee None <i>text</i>	
taxonomy	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Configuration Management component.	0..1	<i>text</i>	Any component within an MSC-DMS based metacard, which describes or reflects unique semantic information, can be marked by a specific taxonomy identifier to increase semantic interoperability. The value of the taxonomy attribute should match with an identifier value associated within a Taxonomy Cited (see Section 4.16) If taxonomy was identified by the Resource component, one does not need to be identified here unless the taxonomy being used for describing this component is different.
Releasability	Information about the releasability of the title information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Resource.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
Description.Text	Open narrative used to increase comprehension pertaining to the metadata component.	0..1	<i>text</i>	
POCref	Contact information on other individuals who can provide information about the configuration management.	1..many	-- see <i>how it is specified in Rights Metadata Set</i>	Identifies a POC reference including id and name
other	Specifies other information deemed relevant by the author of the Resource.	0..many	<i>any</i>	

4.23.3 Inclusion Criteria

The metadata components specified in Table 4-44 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

4.23.4 Example

Table 4-45 provides an example of a **ConfigurationManagement** component that can be reflected within the metacard for an M&S Resource.

Table 4-45 Configuration Management Metadata Example

Table Format		XML Format
Metadata Component	Information	
Type	CCB	<pre> <ms:ConfigurationManagement ms:type="Configuration Control Board (CCB)"> <ms:Description> <ms:Text>Included 35 approved bug fixes based on requirement changes</ms:Text> </ms:Description> <ms:POCref> <ms:Person ms:personID="345"> </pre>
Description.Text	Included 35 approved bug fixes based on requirement changes	
POCref		
Person.personID	345	
Person.Name		
.first	John	
.last	Dillon	

<i>Other</i>	<i>na</i>	<pre><ms:Name ms:first="John" ms:last="Dillon"/> </ms:Person> </ms:POCref> </ms:ConfigurationManagement> </ms:Usage></pre>
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5 Contact Metacards

A person or an organization can also be a valuable asset to help others achieve related goals such as reusing and/or integrating an M&S Resources. For instance, when federation developers wish to pose detailed questions to those who were responsible for the development and distribution of a model, point-of-contact (POC) information can be vital.

The MSC-DMS provides a means to capture and share Contacts information independent from a Resource Metacard. Figure 5-1 provides an illustration of the MSC-DMS Contact Structure. The boxes with a solid outline represent required metadata components, whereas the boxes with a dashed outline represent *optional* metadata components.

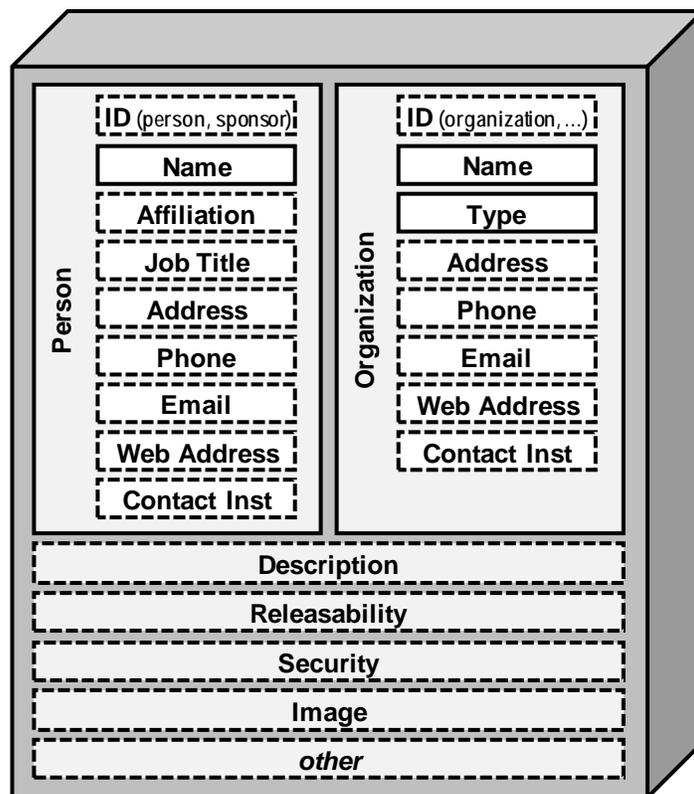


Figure 5-1 Contact Metacard Structure

This section describes the following metadata sets:

- Contact (root)
- Person
- Organization

5.1 Contact Metadata Set

There may be many individuals or organizations responsible for the development, management, or use of an M&S asset. Therefore, it is important to capture the essential components pertaining to individuals and organizations that are knowledgeable about an M&S asset. This section describes the table formats identified for capturing details about a Contact. There are other subcomponents used by the Contact Metadata Set, which are also presented in Section 5. The Contact Metadata Set is illustrated in Figure 5-1.

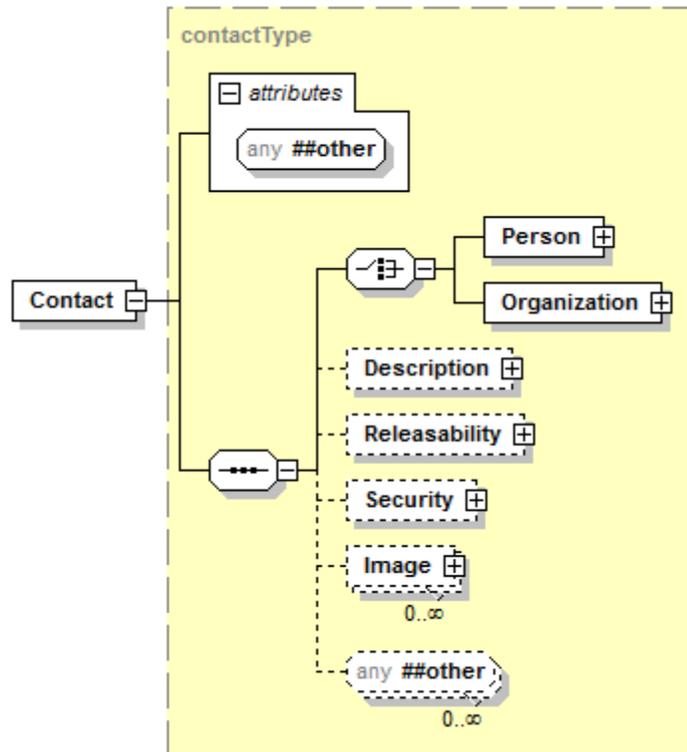


Figure 5-1 Contact Metadata Set

5.1.1 Scope

Metacard Type: Contact Metacard
Use Path(s): none (*this is the root component for a Contact Metacard*)
 Multicard.Metacards.Contacts (*see Multicard Metadata Set*)
Required: yes (*if you are building a Contact Metacard, but not required for a Multicard*)
Schema: MSC-DMS-Contact

5.1.2 Table Format

Table 5-1 provides a description of the metadata components pertaining to the Contact Metadata Set information, which is also leveraged by the **POCs** component within the Resource Metadata Set. The difference between Contact Metadata Set and POC Metadata Set is that the POC Metadata Set allows a **role** to be identified, whereas Contact Metadata Set does not. Many of the metadata components used for the Contact Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 5-1 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 5-1 Contact Metadata Set

Metadata Component	Metadata Component Description	Occurs	Values	Comment
Person	Specifies person.	0..1	-- see <i>Person MetadataSet</i>	Section 5.2
Organization	Specifies organization.	0..1	-- see <i>Organization Metadata Set</i>	Section 5.3
Description.value	This field provides an account of the POC.	0..1	<i>text</i>	
Releasability	Information about the releasability of the Contact Metacard.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Contact Metacard.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
Image	Allows an image to be identified with the Contact Metacard.	0..1	-- see <i>Image Metadata Set</i>	Section 4.16
other	Specifies other information deemed relevant by the author of the Contact Metacard.	0..many	<i>any</i>	

5.1.3 Inclusion Criteria

The metadata components specified in Table 5-1 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.1.4 Example

Table 5-2 provides an example of a **Contact** component that can be reflected within a Contact Metacard.

Table 5-2 Contact Metadata Example

Table Format		XML Format
Metadata Component	Values	
Person	<i>—see Section 5.2 for example</i>	<pre> <ms:Contact> <ms:Person/> <ms:Organization/> <ms:Description> <ms:Text>"The chief architect of the model"</ms:Text> </ms:Description> <ms:Releasability/> <ms:Security/> </ms:Contact> </pre>
Organization	<i>—see Section 5.3 for example</i>	
Description.Text	<i>The chief architect of the model</i>	
Releasability	<i>—see Section 4.8 for example</i>	
Security	<i>—see Section 4.9 for example</i>	
Image	<i>—see Section 4.15 for example</i>	

5.2 Person Metadata Set

There may be an individual responsible for the development, management, or use of an M&S asset. Therefore, it is important to capture the essential metadata information pertaining an individual that may be knowledgeable about an M&S asset. This section describes the table format identified for documenting a **Person**. The Person Metadata Set is illustrated in Figure 5-2.

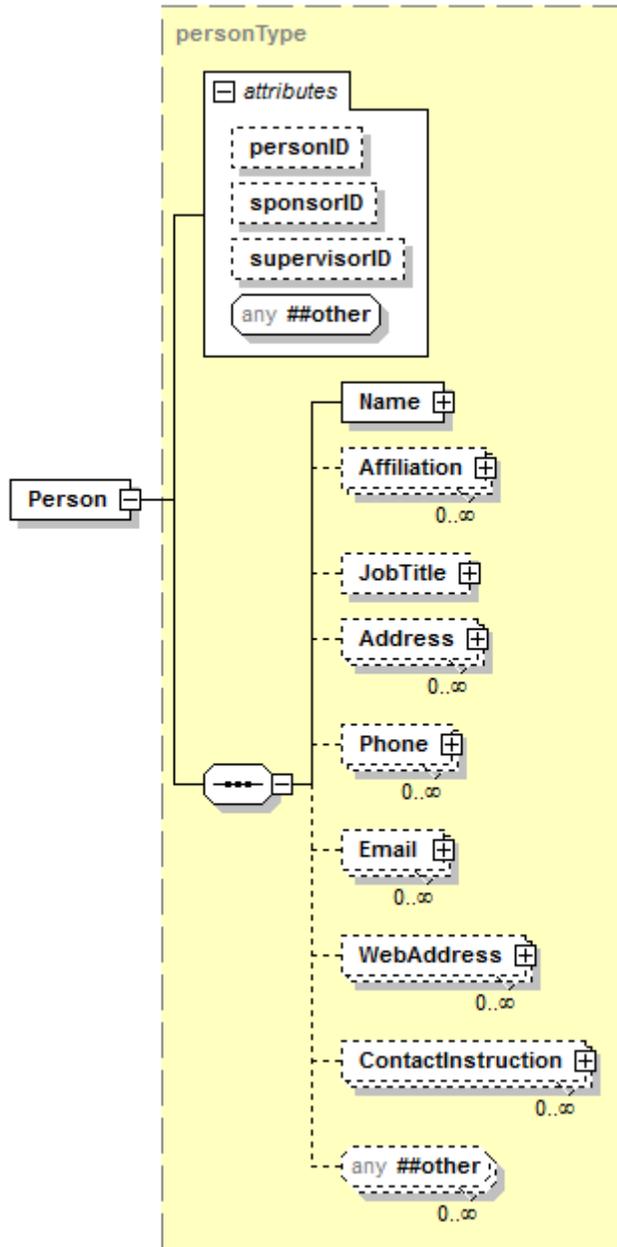


Figure 5-2 Person Metadata Set

5.2.1 Scope

Metacard Type: Contact Metacard
Use Path(s): Contact.Person
 Resource.POCs.POC.Person
Required: choice (*if not provided than an Organization is required*)
Schema: MSC-DMS-Contact

5.2.2 Table Format

Table 5-3 provides a description of the metadata components pertaining to the Person Metadata Set, which is leveraged by both the **Resource.POCs.POC** component within the Resource Metadata Set (see section 4.11), and also by the **Contact** component within the Contact Metadata Set component (see section 5.1). Many of the metadata components used for the Person Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 5-3 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 5-3 Person Metadata Set

Metadata Component	Description	Occurs	Values	Comment
personID	Unique identifier associated to an author, coauthor, POC, tasking requester or addressee.	0..1	<i>URI</i>	A person record can be marked by a unique identifier to support cross referencing by other contact records and for the benefit of organizing data by one or more repositories.
sponsorID	Unique identifier associated to a sponsor of the contact.	0..1	<i>URI</i>	
supervisorID	Specifies the unique identifier associated to a supervisor if applicable.	0..1	<i>URI</i>	Search Person records to cross reference supervisor Id and learn about supervisor.
Name	Name of the person.	1		
title	Title given to a person	0..1	Dr. Miss Mr. Mrs. Ms. Prof. <i>other text</i>	
first	First name given to a person at birth or baptism.	1	<i>text</i>	
middle	Middle name given to a person at birth or baptism, in addition to first name.	0..1	<i>text</i>	Helps differentiate common names.
last	A name shared in common to identify members of a family; also called "surname."	1	<i>text</i>	This value must contain a complete name, and cannot be an initial.
suffix	Suffix given to a person.	0..1	I, II, III, Jr., Sr., <i>other text</i>	
Affiliation	Identifies the organization affiliated with the person.	0..many		
organizationID	References the organization ID.	0..1	<i>text</i>	Can be used to correlate with Organization that has been identified.
position	Position held by the person.	0..1	<i>text</i>	
value	Identifies the name of the organization.	1	<i>text</i>	
JobTitle.value	Identifies job title	0..1	<i>text</i>	
Address Info	Specifies Address associated to Person.	1..many		

AddressLine1.value	Main Address.	0..1	text	The first line in the address where the POC may be contacted. This will typically be used for a street number and name.
AddressLine2.value	Supplemental Address such as suite.	0..1	text	The second line in the address where the POC may be contacted. This will typically be used for amplifying information such as a suite number or mail stop.
AddressLine3.value	Supplemental Address such as POC.	0..1	text	The third line in the address where the POC may be contacted. This will typically be used for additional amplifying information such as "attention" instructions.
City.value	Specifies city associated to Person's Address.	0..1	text	The city of the address where the POC may be contacted.
State.value	Specifies state associated to Person's Address.	0..1	text	The state, province, or comparable boundary of the address where the POC may be contacted.
Country.value	Specifies country associated to Person's Address.	0..1	text	The country code of the address where the POC may be contacted.
PostalCode.value	Specifies postal code associated to Person's Address.	0..1	text	The postal code of the address where the POC may be contacted. For US addresses, this will be a ZIP code.
Phone	Specifies the telephone number for the person including the international telephone code for the contact's country, and fax.	0..many		
type	Specifies the phone type.	1	work, home, DSN, mobile, fax, google_voice, skype, other text	
number	Specifies the specific number associated with the phone type.	1	text	This value must include country code and area code, when applicable
extension	Specifies an extension to the phone number	0..1	text	
Email	Specifies the email address(es) of the Person for electronic mail.	1..many	text	
type	Specifies the email type.	1	work home, NIPRNET, SIPRNET, JWICS, DKO, AKO, other text	
address	Specifies the email address.	1	text	
Web Address.value	Specifies the web address(es) that might be associated with the Person.	0..many	text	
Contact Instruction.value	Specifies instructions for making contact.	0..many	text	
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

5.2.3 Inclusion Criteria

The metadata components specified in Table 5-3 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.2.4 Example

Table 5-4 provides an example of a **Person** component that can be reflected within the metacard for an M&S Contact (or as part of a POC component of an M&S Resource metacard).

Table 5-4 Person Metadata Example

Table Format		XML Format
Metadata Component	Information	
personID	231	<ms:Contact>
sponsored	332	<ms:Person
supervisorID	230	ms:personID="231"
Name		ms:sponsorID="332">
first	John	ms:supervisorID="230"
middle	Michael	<ms>Title ms:value="System Engineer"/>
last	Davidson	<ms>Name
Affiliation		ms:title="Mr."
organization ID	331	ms:first="John"
position	Developer	ms:middle="Michael"
value	Sprocket Sim	ms:last="Davidson"/>
JobTitle.value	System Engineer	<ms:Affiliation
Address Info		ms:organizationID="331"
Address Line 1.value	123 Jetway Drive	ms:position=" Developer"
Address Line 2.value	Suite	ms:value="Sprocket Sim"/>
Address Line 3.value	ATTN: John Davidson	<ms:AddressInfo>
City.value	Alexandria	<ms:AddressLine1 ms:value="123 Jetway Dr."/>
State.value	Virginia	<ms:AddressLine2 ms:value=""/>
Country.value	USA	<ms:AddressLine3 ms:value=""/>
Postal Code.value	22308	<ms:City ms:value="Alexandria"/>
Phone		<ms:State ms:value="VA"/>
type	Work	<ms:Country ms:value="USA"/>
number	703-360-3767	<ms:PostalCode ms:value="22308"/>
extension	351	</ms:AddressInfo>
Email		<ms:Phone
type	Work	ms:type="work"
address	j davidson@sprocketsim.com	ms:number="703-360-3767"
WebAddress.value	http://www.sprocketsim.com	ms:extension="351"/>
ContactInstruction.value	Leave message at help desk if no answer	<ms:Phone
		ms:type="mobile"
		ms:number="540-755-5555"/>
		<ms>Email
		ms:type="work"
		ms:address=" j davidson@sprocketsim.com"/>
		<ms:URL ms:value="http://www.sprocketsim.com"/>
		<ms>ContactInstruction
		ms:value=" Leave message at help desk if no
		answer."/>
		</ms:Person>
		<ms>Description>
		<ms:Text>"The chief architect of the
		model"</ms:Text>
		</ms>Description>
		<ms:Releasability/>
		<ms:Security/>
		</ms>Contact>

5.3 Organization Metadata Set

There may be an organization responsible for the development, management, or use of an M&S asset. Therefore, it is important to capture the essential metadata information pertaining to an organization that may be knowledgeable about an M&S asset. This section describes the table format identified for documenting an **Organization**. The Organization Metadata Set is illustrated in Figure 5-3.

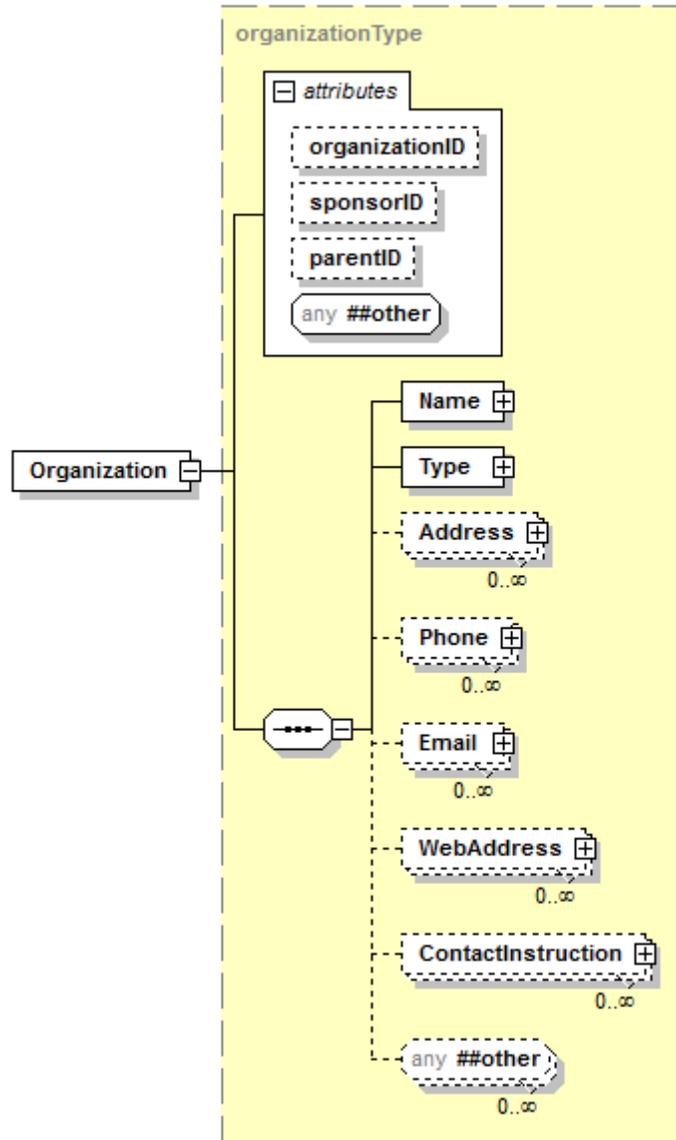


Figure 5-3 Organization Metadata Set

5.3.1 Scope

Metacard Type: Contact Metacard
Use Path(s): Contact.Organization

Resource.POCs.POC.Organization
Required: choice (*if not provided than a Person is required*)
Schema: MSC-DMS-Contact

5.3.2 Table Format

Table 5-5 provides a description of the metadata components pertaining to the Organization Metadata Set, which is leveraged by the **Resource.POCs.POC** component within the Resource Metadata Set (see section 4.11), and also by the **Contact** component within the Contact Metadata Set component (see section 5.1). Many of the metadata components used for the Organization Metadata Set are leveraged from the DDMS; however there are some additional metadata components that were added to better support the M&S COI. Italics are used in the Values column of Table 5-5 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 5-5 Organization Metadata Set

Metadata Component	Description	Occurs	Values	Comment
organizationID	Unique identifier associated to an Organization.	0..1	<i>URI</i>	An organization record can be marked by a unique identifier to support cross referencing by other contact records and for the benefit of organizing data by one or more repositories
sponsorID	Unique identifier associated to a sponsor (person or organization) if applicable.	0..1	<i>URI</i>	Search Organization records to cross reference supervisor Id and learn about sponsor.
parentID	Specifies the unique identifier associated to a parent organization if applicable.	0..1	<i>URI</i>	Search Organization records to cross reference Parent Id and learn about parent organization.
Name.value	Specifies organization name.	1	<i>text</i>	
Type	Specifies organization type	1	government, academia, industry, <i>other text</i>	Examples might include Defense Contractor, Government, and Academia.
Address Info	Specifies Address associated to Organization.	0..many		
AddressLine1.value	Main Address of the Organization.	0..1	<i>text</i>	The first line in the address where the Organization may be contacted. This will typically be used for a street number and name.
AddressLine2.value	Supplemental Address such as suite.	0..1	<i>text</i>	The second line in the address where the Organization may be contacted. This will typically be used for amplifying information such as a suite number or mail stop.
AddressLine3.value	Supplemental Address such as POC.	0..1	<i>text</i>	The third line in the address where the Organization may be contacted. This will typically be used for additional amplifying information such as "attention" instructions.
City.value	Specifies city associated to Organization's Address.	0..1	<i>text</i>	The city of the address where the Organization may be contacted.
State.value	Specifies state associated to Organization's Address.	0..1	<i>text</i>	The state, province, or comparable boundary of the address where the Organization may be contacted.
Country.value	Specifies country associated to Organization's Address.	0..1	<i>text</i>	The country code of the address where the Organization may be contacted.
PostalCode.value	Specifies postal code associated to Organization's Address.	0..1	<i>text</i>	The postal code of the address where the Organization may be contacted. For US addresses, this will be a ZIP code.

Phone	Specifies the telephone number for the organization including the international telephone code for the Organization's country, and fax.	0..many		
type	Specifies the phone type.	1	work, home, DSN, mobile, fax, google_voice, skype, other text	
number	Specifies the specific number associated with the phone type.	1	text	This value must include country code and area code, when applicable
extension	Specifies an extension to the phone number	0..1	text	
Email	Specifies the email address(es) of the Organization for electronic mail.	0..many	text	
type	Specifies the email type.	1	work home, NIPRNET, SIPRNET, JWICS, DKO, AKO, other text	
address	Specifies the email address.	1	text	
WebAddress.value	Specifies the web address(es) associated with the Organization.	0..many	text	
ContactInstruction.value	Specifies instructions for making contact.	0..many	text	
other	Specifies other information deemed relevant by the author of the Resource.	0..many	any	

5.3.3 Inclusion Criteria

The metadata components specified in Table 5-5 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.3.4 Example

Table 5-6 provides an example of an **Organization** component that can be reflected within the metacard for an M&S Contact (or as part of a POC component of an M&S Resource metacard).

Table 5-6 Organization Metadata Example

Table Format		XML Format
Metadata Component	Information	
OrganizationID	256	<pre> <ms:Contact> <ms:Organization ms:organizationID="256" ms:parentID="255"> <ms:Name ms:value="SprocketSim, Inc"/> <ms:Type ms:value="industry"/> <ms:AddressInfo> <ms:AddressLine1 ms:value="123 Jetway Dr."/> <ms:AddressLine2 ms:value="Suite 5"/> <ms:AddressLine3 ms:value="ATTN: John Davidson"/> <ms:City ms:value="Alexandria"/> <ms:State ms:value="VA"/> <ms:Country ms:value="USA"/> <ms:PostalCode ms:value="22308"/> </ms:AddressInfo> </pre>
parent ID	255	
Name	SprocketSim, Inc	
Type	Industry	
Address Info		
Address Line 1	123 Jetway Drive	
Address Line 2	Suite 5	
Address Line 3	ATTN: John Davidson	
City	Alexandria	
State	Virginia	
Country	USA	
Postal Code	22308	
Phone		
type	work	

<i>number</i>	703-360-3767	<pre> <ms:Phone ms:type="work" ms:number="703-360-3767" <ms:Email ms:type="work" ms:address="jdavidson@sprocketsim.com"/> <ms:URL ms:value="http://www.sprocketsim.com"/> <ms:ContactInstruction ms:value="contact John Davidson"/> <ms:ContactInstruction ms:value="For general assistance, dial 0 for an operator"/> </ms:Organization> <ms:Description> <ms:Text>"Lead system integrator"</ms:Text> </ms:Description> <ms:Releasability/> <ms:Security/> </ms>Contact> </pre>
<i>Email</i>		
<i>type</i>	Work	
<i>address</i>	jdavidson@sprocketsim.com	
<i>URL</i>	http://www.sprocketsim.com	
<i>Contact Instruction</i>	contact John Davidson	
<i>Contact Instruction</i>	For general assistance, dial 0 for an operator.	

6 Taxonomy Metacards

The text used to describe most assets corresponds to a specific taxonomy of terms and definitions. It is important to have a mechanism that can identify such terms and definitions. The MSC-DMS provides a means to capture Taxonomies in a way that allows the discovery metadata relevant to a resource to be understood more richly. Figure 6-1 provides an illustration of the MSC-DMS Taxonomy Metacard structure. The boxes with a solid outline represent required metadata components, whereas the boxes with a dashed outline represent *optional* metadata components.

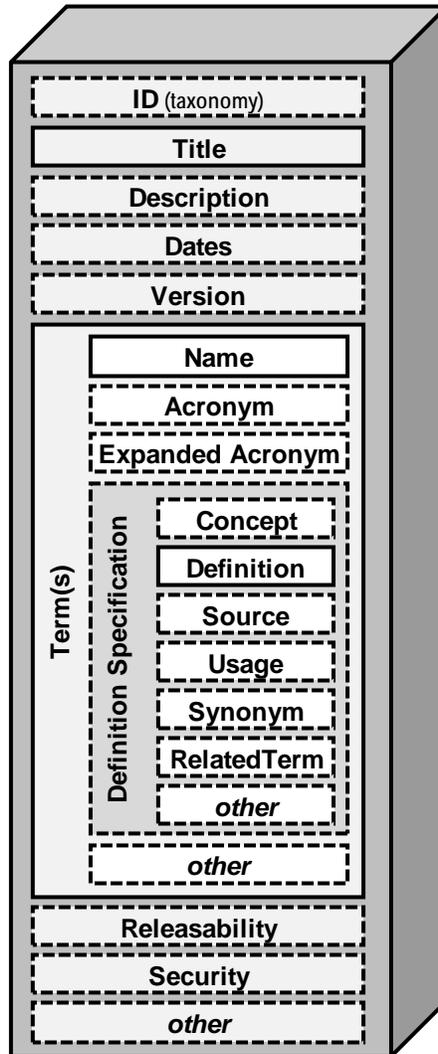


Figure 6-1 Taxonomy Metacard Structure

This section describes the following metadata sets:

- Taxonomy (root)
- Definition Specification

6.1 Taxonomy Metadata Set

The purpose of the Taxonomy Metadata Set is to document certain key metadata information about an M&S Taxonomy that is applicable to a community or domain area. The Taxonomy Metadata Set identifies the foundational metadata components of M&S Taxonomy at the root level. The Taxonomy Metadata Set illustrated in Figure 6-1.

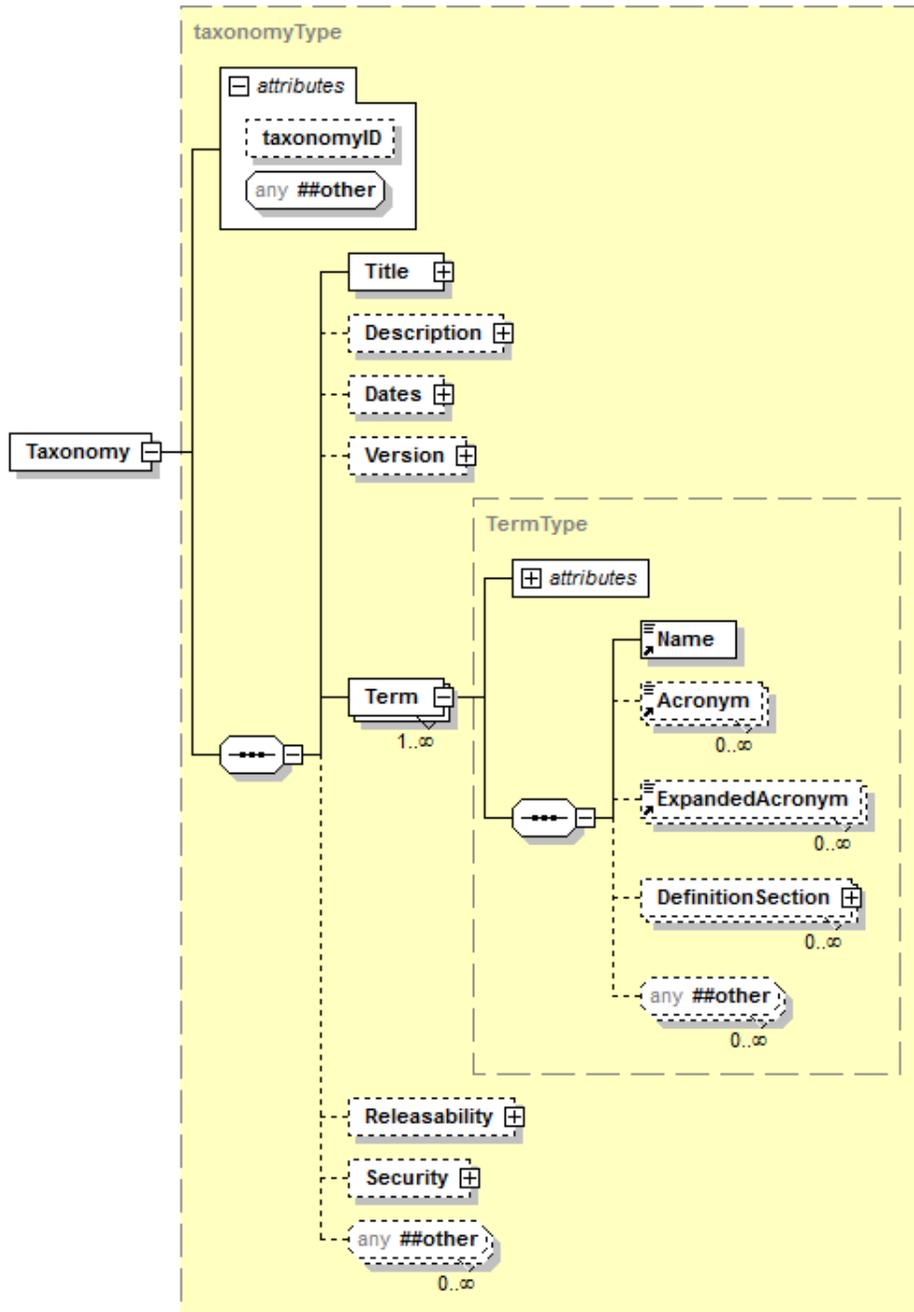


Figure 6-1 Taxonomy Metadata Set

6.1.1 Scope

Metacard Type: Taxonomy Metacard
Use Paths: none (*this is the root component for a Taxonomy metacard*)
 Multicard.Metacards.Taxonomies (*see Multicard Metadata Set*)
Required: yes (*if you are building a Taxonomy metacard, but not required for a Multicard*)
Schema: MSC-DMS-Taxonomy

6.1.2 Table Format

Table 6-1 provides a description of the metadata components pertaining to the Taxonomy Metadata Set. Many of the metadata components used for the Taxonomy Metadata Set are leveraged from a DoD community specification identified as the “Thesaurus Approach for the Federal Government”, This work includes an XML schema that has provided the basis for the Taxonomy Metadata Set and the Term Metadata Set; however there are some additional metadata components that were extended, altered or added to better support the M&S COI. Italics are used in the Values column of Table 6-1 to denote the type of data to be provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 6-1 Taxonomy Metadata Set

Metadata Component	Description	Occurs	Values	Comment
taxonomyID	Unique identifier associated to the related Taxonomy Classification being defined	0..1	<i>URI</i>	A Taxonomy record can be marked by a unique identifier to support cross referencing by other metacards (i.e. Resource Metacards) and for the benefit of organizing data by one or more repositories. This should not be confused with version number, or document number.
Title	Text identifier for the Taxonomy	1	<i>text</i>	
Description.Value	Open narrative used to increase comprehension pertaining to the taxonomy.	0..1	<i>text</i>	
Dates	Identifies date information related to the Taxonomy Classification asset.	0..1	-- see <i>Date Metadata Set</i>	Section 4
Version	This field specifies the version identification assigned to the Taxonomy metacard.	0..1	<i>text</i>	
Term	Container for each term that is to be named and defined.	1..many		
Name	Identifies the name of the term.	1	<i>text</i>	
Acronym	Specifies an acronym associated with term	0..many	<i>text</i>	
ExpandedAcronymn	Expands the acronym fully.	0..many	<i>text</i>	
DefinitionSection	Specifies other date information deemed relevant by the author of the Resource.	0..many	-- see <i>Definition Metadata Set</i>	Section 6.2
other	Specifies other extension information deemed relevant by the author of the Taxonomy Term.	0..many	<i>any</i>	
Releasability	Information about the releasability of the Taxonomy Metacard.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the Taxonomy Metacard.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9

other	Specifies other data deemed relevant by the author of the Taxonomy.	0..many	any	
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6.1.3 Inclusion Criteria

The metadata components specified in Table 6-1 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

6.1.4 Example

Table 6-2 provides an example of the **taxonomy** component that can be reflected within the metacard for an M&S Taxonomy.

Table 6-2 Taxonomy Metadata Set Example

Table Format		XML Format
Metadata Component	Value	
taxonomyID	4	<code><ms:Taxonomy ms:taxonomyID="4"></code>
version	0.1	<code> <ms>Title ms:value="MS Glossary"/></code>
Title	MS Glossary	<code> <ms>Description></code>
Description.Text	This is an example of a taxonomy classification documenting key terms and definitions for the MS Community	<code> <ms:Text>This is an example of a taxonomy classification documenting key terms and definitions for the MS Community</ms:Text></code>
Dates.Date	-- see Date Metadata Set	<code> <ms:Dates></code>
Term		<code> <ms>Date ms:type="created" ms:value="2007-08-13"/></code>
Name	ontology	<code> </ms:Dates></code>
Acronym	na	<code> <ms:Version ms:value="0.1"/></code>
ExpandedAcronym	na	<code> <ms:Term ID="ID_1"></code>
DefinitionSection	-- see Definition Metadata Set	<code> <ms>Name>ontology</ms>Name></code>
Releasability	--see Section 4.8 for example	<code> <ms:Acronym>na</ms:Acronym></code>
Security	--see Section 4.9 for example	<code> <ms:ExpandedAcronym>na</ms:ExpandedAcronym></code>
		<code> <ms:DefinitionSection/></code>
		<code> </ms:Term></code>
		<code> <ms:Releasability ms:value="A: Unlimited distribution "/></code>
		<code> <ms:Security/></code>
		<code></ms:Taxonomy></code>

6.2 Definition Metadata Set

The purpose of the Definition Metadata Set is to document certain key metadata information about an M&S Taxonomy Terms that is applicable to a community or domain area. The Definition Metadata Set illustrated in Figure 6.2.

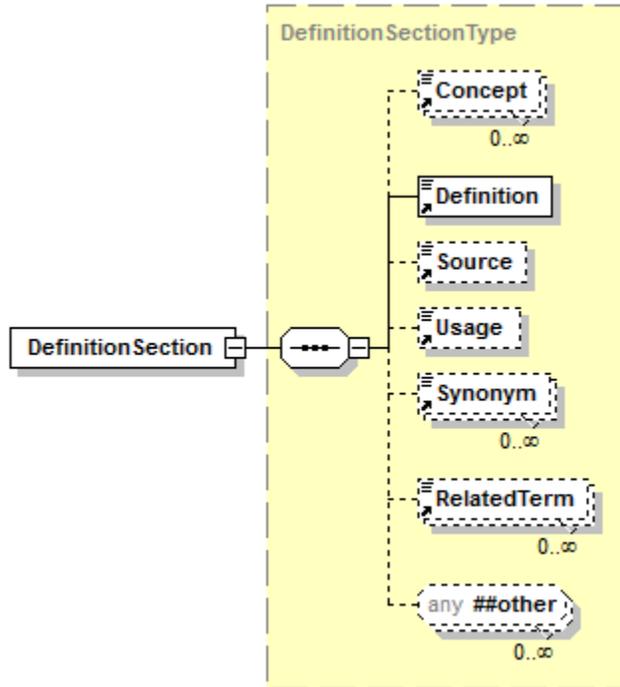


Figure 6-2 Definition Metadata Set

6.2.1 Scope

Metacard Type: Taxonomy Metacard
Use Path(s): Taxonomy.Term.DefinitionSection (*see Taxonomy Metadata Set*)
Required: yes
Schema: MSC-DMS-Taxonomy

6.2.2 Table Format

Table 6-3 provides a description of the metadata components pertaining to the Definition Metadata Set information. Many of the metadata components used for the Definition Metadata Set are leveraged from prior work identified as the “Thesaurus Approach for the Federal Government”, which produced an XML schema that has provided the basis for the Taxonomy Metadata Set and the Term Metadata Set; however there are some additional metadata components that were extended, altered or added to better support the M&S COI. Italics are used in the Values column of

Table 6-3 to denote the type of data to be provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 6-3 Definition Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Concept	Abstract idea or notion; a unit of thought; holds term and related terms.	0..1	text	
Definition	A statement or formal explanation of the meaning of a concept.	1	text	
Source	The source of the definition.	1	text	Official names and URLs are preferred, but specific names of people or agencies are acceptable. Please follow the bibliographic citation conventions.
Usage	An illustration of the use of the concept, such as in a sentence.	1	text	This is not the same as the Usage Metadata Set used for a Resource.
Synonym	Identifies another term that has equivalent meaning	0..many	text	
RelatedTerm	A concept with which there is an associative semantic relationship.	1..many	text	
other	Specifies other data deemed relevant by the author of the Taxonomy Definition.	0..many	any	

6.2.3 Inclusion Criteria

The metadata components specified in Table 6-3 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

6.2.4 Example

Table 6-4 provides an example of the **DefinitionSection** component that can be reflected within the metacard for an M&S Taxonomy.

Table 6-4 Taxonomy Definition Metadata Set Example

Table Format		XML Format
Metadata Component	Value	
Concept	Semantic web	<pre> <ms:DefinitionSection> <ms:Concept> Semantic web </ms:Concept> <ms:Concept> Knowledge management </ms:Concept> <ms:Definition> Defines the common words and concepts used to describe and represent an area of knowledge, and so standardizes the meanings. </ms:Definition> <ms:Source> Daconta, Obrst, Smith </ms:Source> <ms:Usage> An onotology can range from the simple notion of a taxonomy to a thesaurus, to a conceptual model, to a logical theory. </ms:Usage> <ms:Synonym> Classification system </ms:Synonym> <ms:RelatedTerm>taxonomy</ms:RelatedTerm> <ms:RelatedTerm>OWL</ms:RelatedTerm> </ms:DefinitionSection> </pre>
Concept	Knowledge management	
Definition	Defines the common words and concepts used to describe and represent an area of knowledge, and so standardizes the meanings.	
Source	Daconta, Obrst, Smith	
Usage	An ontology can range from the simple notion of a taxonomy to a thesaurus, to a conceptual model, to a logical theory.	
Synonym	Classification system	
RelatedTerm	taxonomy	
RelatedTerm	OWL	

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7 Multicards

Many developers and integrators and the organizations representing such individuals need to be able to package and distribute multiple sets of metacards not just a single metacard. The MSC-DMS provides a means to contain multiple metacards including Resources, Contacts and Taxonomies using a Multicard.

Figure 7-1 provides an illustration of an M&S Multicard Structure. The boxes with a solid outline represent required metadata components, whereas the boxes with a dashed outline represent *optional* metadata components.

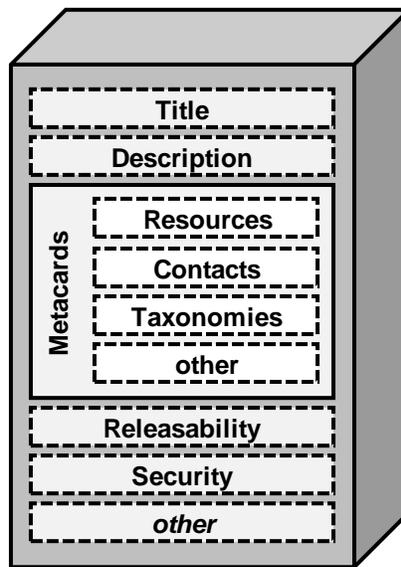


Figure 7-1 Multicard Structure

Section 7.1 further describes the Multicard Metadata Set:

7.1 Multicard Metadata Set

The purpose of the Multicard Metadata Set is to create a document with combined metacards, which can include Resources, Contacts, or Taxonomy Classifications. The Multicard Metadata Set is used to help distribute multiple metacards as a single file. The Multicard Metadata Set is illustrated in Figure 7-1.

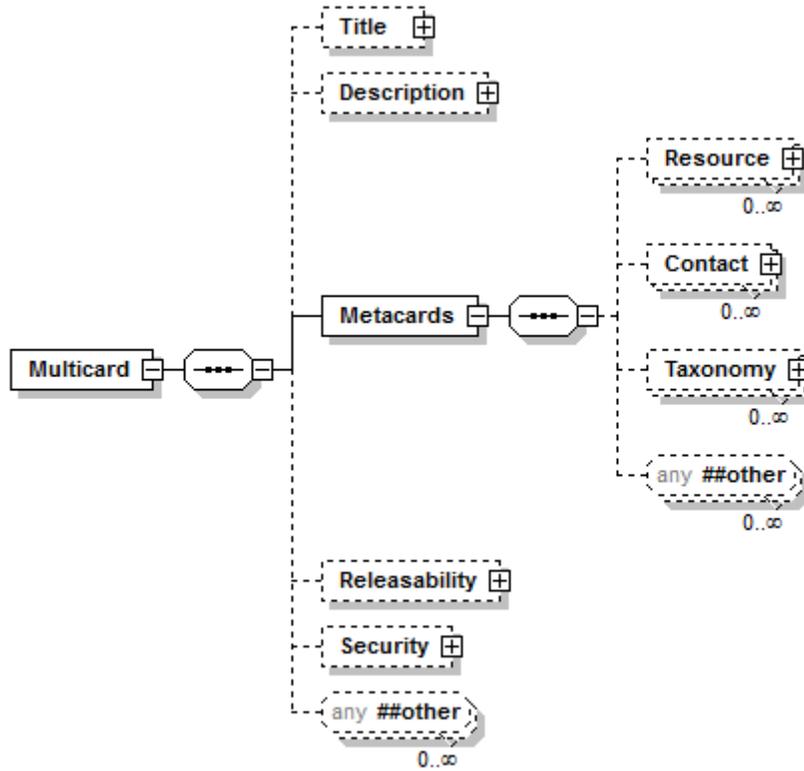


Figure 7-1 Multicard Metadata Set

7.1.1 Scope

Metacard Type: Multicard Metacard
Use Path(s): none (*this is the root component for a Multicard*)
Required: yes (*if you are building a Multicard*)
Schema: MSC-DMS-Multicard

7.1.2 Table Format

Table 7-1 provides a description of the metadata components pertaining to the Multicard Metadata Set information. None of the leaf components of the Multicard Structure are required, however, it is anticipated that the reason for applying this structure is to catalog multiple metacards, and therefore at least one metacard should be contained within a Multicard. Italics are used in the Values column

of Table 7-1 to denote the type of data to be provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 7-1 Multicard Metadata Set

Metadata Component	Description	Occurs	Values	Comment
Title	Text identifier for the Multicard	1	<i>text</i>	
Description.Text	Open narrative used to increase comprehension pertaining to the multicard.	0..1	<i>text</i>	
Metacards		1		
Resources	Identifies Resource Metacards	0..many	-- see <i>Resource Metadata Set</i>	Section 4
Contacts	Identifies Contact Metacards	0..many	-- see <i>Contact Metadata Set</i>	Section 5
Taxonomies	Identifies Taxonomy Metacards	0..many	-- see <i>Section Metadata Set</i>	Section 6
other	Specifies other types of metacards other information relevant to the multicard	0..many	<i>text</i>	
Releasability	Information about the releasability of the POC information.	0..1	-- see <i>Releasability Metadata Set</i>	Section 4.8
Security	Information about the security of the POC information.	0..1	-- see <i>Security Metadata Set</i>	Section 4.9
other	Specifies other data deemed relevant by the author of the multicard.	0..many	<i>any</i>	

7.1.3 Inclusion Criteria

The metadata components specified in Table 6-1 are necessary for all components of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

7.1.4 Example

Table 7-2 provides an example of a **multicard** component that can be reflected using the MSC-DMS.

Table 7-2 Multicard Metadata Set Example

Table Format		XML Format
Metadata Component	Value	
Title	Surface_Navy_Models	<pre> <ms:Multicard> <ms>Title ms:value="Example Multicard" /> <ms>Description> <ms:Text>This is an example multicard containing various types of MSC- DMS based metacards</ms:Text> </ms>Description> <ms:Metacards> <ms:Resource/> <ms>Contact/> <ms:Taxonomy/> </ms:Metacards> <ms:Releasability/> <ms:Security/> </ms:Multicard> </pre>
Description.Text	The metacards attached represent the models supporting the surface navy	
Metacards		
Resources	-- see <i>Resource Metadata Set</i>	
Contacts	-- see <i>Contacts Metadata Set</i>	
Taxonomies	-- see <i>Taxonomies Metadata Set</i>	
Releasability	--see <i>Releasability Metadata Set for example</i>	
Security	--see <i>Security Metadata Set for example</i>	

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Appendix A - Glossary

The definitions identified Table A-1 are common terms used within this document. Given that the meaning of some of these terms differs among domains of interest, these definitions are provided to identify the meaning of these terms in the scope of this document.

Table A-1 Common Terms

Term	Definition	Related Term
Accreditation	<p>(1) The official certification that a model, simulation, or federation of models and simulations and its associated data are acceptable for use for a specific purpose. (DoD 5000.59-M)</p> <p>(2) The official determination that an M&S application and its associated data are acceptable for use for a specific purpose. <i>Accreditation seeks to answer the question “Is this the right M&S to use?” (DON M&S VVA Implementation Handbook)</i></p>	<ul style="list-style-type: none"> • M&S Activity • Validation • Verification
Acquisition	An M&S Activity that involves the conceptualization, initiation, design, development, test, contracting, production, deployment, logistic support, modification, and disposal of weapons and other systems, supplies, or services to satisfy Department of Defense (DoD) needs intended for use in or in support of military missions. (<i>Glossary of Defense Acquisition Acronyms and Terms</i>)	<ul style="list-style-type: none"> • M&S Activity
Adjunct Tool	Software and/or hardware that is either used to provide part of a simulation environment or to transform and manage data used by or produced by a simulation environment. Adjunct tools are differentiated from simulation software in that they do not provide a virtual or constructive model to the simulation environment.	<ul style="list-style-type: none"> • Resource Asset
Analysis	The application of the scientific method to support senior leader planning, programming, and acquisition decision-making. It is the locus of analytical processes and efforts conducted by core, multi-tiered analytical bodies and it is grounded in a systemic and logical examination of the intellectual or material whole and its component parts. These analyses examine best available evidence, are always subject to correction or improvement, and undergo oversight and scrutiny at all levels. Their purpose is to quantify, measure, and demonstrate the relative value and risk of individual or competing programs, systems, or policies to Department decision makers. (<i>Department Analysis Definition from JDS</i>)	<ul style="list-style-type: none"> • M&S Activity
Artifact	A document, unit of source code, or a data set relevant to a particular model, system, or application, but not necessarily reusable.	<ul style="list-style-type: none"> • Asset
Asset	<p>(1) A collection of associated artifacts that together composes a system or subsystem. May exist in two types: resource asset and support asset.</p> <p>(2) A reusable collection of associated artifacts that together composes a system of subsystem. An asset has capability or content useful beyond its original application, has been developed or enhanced to be of sufficient generality and quality to support reuse, has been approved for reuse, has been documented with pertinent metadata, and has been placed into a repository.</p>	<ul style="list-style-type: none"> • Artifact • Resource Asset • Contact Info • Taxonomy • Support Asset
Catalog	A system that accepts, stores, and provides access to metadata, discovery and structural, for assets.	<ul style="list-style-type: none"> • Registry • Repository
Community of Interest	<p>(1) A collaborative group of people that must exchange information in pursuit of its shared goals, interests, missions, or business processes and therefore must have a shared vocabulary for the information it exchanges.¹</p> <p>(2) A group of people who have common concerns and interests.</p>	<ul style="list-style-type: none"> • Enterprise

Component	<p>(1) A subset of the physical realization (and the physical architecture) of the system to which a subset of the system's function have been (will be) allocated. A component could be integrated hardware and software, a group of people, facilities, or a combination of all of these. (reference (h)).</p> <p>(2) A reusable software package or module that encapsulates a set of related functionality and communicates with other components via an interfaceⁱⁱ.</p> <p>(3) Encapsulated unit of software with a known set of inputs and expected output behavior where the implementation details may be hidden or unknown; it is an interchangeable element of a system that conforms to a specificationⁱⁱⁱ.</p>	<ul style="list-style-type: none"> • Software Component *
Composability	<p>"The ability to rapidly select and assemble components to construct meaningful simulation systems to satisfy specific user requirements. Composability includes the framework, body of knowledge, tools, techniques, and standards necessary to enable effective integration, interoperability, and reuse." (DoD M&S Master Plan)</p>	<ul style="list-style-type: none"> • Reuse • Interoperability
Conceptual Model	<p>A description of "what the [simulation or federation] will represent, the assumptions limiting those representations, and other capabilities needed to satisfy the user's requirements."⁶</p>	<ul style="list-style-type: none"> • Interface Model Specification
Configuration Management	<p>Recording and reporting of change processing and implementation of a developed asset.</p>	<ul style="list-style-type: none"> • M&S Activity
Contact Information	<p>Information describing an individual or organization.</p>	<ul style="list-style-type: none"> • Contact Metacard
Contact Metacard	<p>A discovery metacard that describes an individual or organization of value that may able to offer experience, or further information pertaining to an asset of interest.</p>	<ul style="list-style-type: none"> • Asset • Contact Information • Metacard
Data	<p>(1) A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means.</p> <p>(2) Representation of real-world facts or concepts that is in a format usable by models during simulation. Differentiated from a model in that M&S Data is generally not itself executable, but is rather input to a model that can be executed. May be operational data, data specifically derived from operational data that has been formatted or augmented for M&S use, or synthetic data created for M&S use.</p> <p>(3) Data produced by a model or simulation that provides a synthetic view of reality.</p>	<ul style="list-style-type: none"> • M&S Resource • Resource Asset
Data Asset	<p>Any entity containing data. For example, a database is a data asset that contains a set of data records. System or application output files, databases, documents, or web pages. It also includes services that may be provided to access data from an application. For example, a service that returns individual records from a database would be a data asset. Similarly, a web site that returns data in response to specific queries (e.g., www.defenselink.mil) would be a data asset.^{iv}</p>	<ul style="list-style-type: none"> • Data • Data Model • Resource Asset
Data Model	<p>(1) An abstract but formal representation of entities (distinguishable persons, places, things, events, or concepts about which information is kept), their properties, and relationships among the entities and/or properties.</p> <p>(2) A data model that describes M&S data.</p>	<ul style="list-style-type: none"> • Data
Data Repository	<p>A specialized database containing information about data, such as meaning, relationships to other data, origin, usage, and format, including the information resources needed by an organization.</p>	<ul style="list-style-type: none"> • Catalog • Repository • Shared Space • Storehouse

⁶ IEEE 1516.3, IEEE Recommended Practice for High Level Architecture (HLA) Federation Development and Execution Process (FEDEP), March 2003.

Discovery	<p>(1) The ability to locate data assets through a consistent and flexible search.”^v</p> <p>(2) The process of searching, identifying, and selecting assets for reuse. Enabled by discovery metadata and facilitated by user interfaces with features that support the discovery process.</p> <p>(3) Locating a resource on the Enterprise, using a process (such as a search engine) to obtain knowledge of information content or services that exploit metadata descriptions of enterprise IT resources stored in Directories, Registries, and Catalogs.^{vi}</p>	<ul style="list-style-type: none"> • Query • Search
Discovery Metadata	Metadata that aids in the recall and retrieval of an artifact. May be registered in a metadata catalog. Makes the artifact visible.	<ul style="list-style-type: none"> • Discovery • Discovery Services • Metadata
Discovery Services	A set of services that enables the formulation of search activities within shared space repositories (e.g., catalogs, directories, registries). It provides the means to articulate the required service arguments, provide search service capabilities, locate repositories to search, and return search results. ^{vii}	<ul style="list-style-type: none"> • Catalog • Discovery • Metadata Catalog • Metadata Repository • Query • Registry • Repository • Search • Shared Space
DoD Components	<p>Referred to as “the DoD Components,” are identified as the:</p> <ul style="list-style-type: none"> ▪ Office of the Secretary of Defense, ▪ the Military Departments, ▪ the Chairman of the Joint Chiefs of Staff, ▪ the Combatant Commands, ▪ the Office of the Inspector General of the Department of Defense, ▪ the Defense Agencies, ▪ the DoD Field Activities, and ▪ all other organizational entities in the Department of Defense. <p>(DoD5025.1-M)</p>	<ul style="list-style-type: none"> • Enterprise
DoD Net-Centric Data Strategy	Defines goals and approaches that allow users and systems to find and access a wide-range of data assets throughout the Department of Defense (DoD) Enterprise. ^{viii}	<ul style="list-style-type: none"> • Enterprise • Net-Centric
Enterprise	Refers to the Department of Defense, its organizations, and related agencies.	<ul style="list-style-type: none"> • DoD Components

Extensible Markup Language (XML)	<p>A tagging language used to describe and annotate data so it can be consumed by human and system interactions. XML is typically arranged hierarchically using XML element and attributes. It also uses semantically rich labels to describe element and attributes to enable meaningful comprehension. An example of metadata component describing by element named "Person" can appear as follows:</p> <pre> <Person> <Name> <First>John</First> <Middle>H</Middle> <Last>Doe</Last> </Name> </Person> </pre>	
Federate	<p>(1) A simulation, an interface to a live system, or a supporting utility (or adjunct tool) such as a Logger, Plan View Display, or Stealth Viewer. Such Resources can interoperate with other such software systems in a federation.</p> <p>(2) In HLA, a federate is "an application that may be or is currently coupled with other software applications under a Federation Object Model Document Data (FDD) and runtime infrastructure (RTI)."⁷</p>	<ul style="list-style-type: none"> • Federation • M&S Resource • M&S Software • Member Application
Federation	<p>(1) A collection of one or more federates capable of interoperating within a distributed synthetic environment.</p> <p>(2) In HLA, "a federation is a named set of federate applications and a common Federation Object Model (FOM) that are used as a whole to achieve some specific objective."⁸</p> <p>(3) a named set of interacting federate applications, a common object model, and software infrastructure through which they communicate that are used as a whole to achieve some specific objective.</p>	<ul style="list-style-type: none"> • Federate • M&S Resource • Simulation Environment
Gateway	<p>(1) A member application in a distributed simulation that connects member applications using different interoperability protocols (such as DIS, HLA, or TENA) by translating messages between protocols at run time.</p> <p>(2) Sometimes also referred to as a Bridge</p>	<ul style="list-style-type: none"> • Adjunct Tool
Interface Model Specification	<p>(1) Set of structures and/or classes including properties, methods, and/or events which serve to provide a well-defined agreement for which applications (M&S software and adjunct tools), federations, components and/or services can connect and communicate.^{ix}</p> <p>(2) A specification for a specific model (including conceptual models) which, if implemented properly, will yield anticipatable results allowing components and/or services to connect and communicate.</p>	<ul style="list-style-type: none"> • Conceptual Model • M&S Resource • Resource Asset • Simulation Data Exchange Model
M&S Activity	<p>An M&S procedure or function, involving tasks that consume time and resources, necessary for events or for moving from event to event. M&S Activities include M&S infrastructure management, M&S infrastructure operation, M&S infrastructure design and implementation.</p>	<ul style="list-style-type: none"> • Support Asset
M&S Environment	<p>A set of interconnected M&S resource assets and support assets needed to conduct an event. M&S Environment includes Policies, Procedures, People, Infrastructure, and Federations.</p>	<ul style="list-style-type: none"> • Support Asset
M&S Event	<p>An interaction between M&S infrastructure elements that is associated with a particular point in time that results in something happening or changing. M&S Events include tests, analysis, research and design, training, experiments, M&S infrastructure interactions, and internal model interactions.</p>	<ul style="list-style-type: none"> • Support Asset

⁷ IEEE 1516-2000, IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Framework and Rules, March 2000.

⁸ IEEE 1516-2000, IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Framework and Rules, March 2000.

M&S Infrastructure	A set of interconnected M&S support elements that facilitates the use of a set of M&S Resources in a simulation environment. Can include training facilities, test facilities, analysis facilities, labs, computing assets, communications assets, networks, personnel, instrumentation and test equipment, dictionaries and libraries, environments.	<ul style="list-style-type: none"> Support Asset
M&S Requirement	<ol style="list-style-type: none"> Modifications or development of an M&S Resource or significant enhancement to an existing M&S Resource. Often defined within an M&S Resource Document 	<ul style="list-style-type: none"> M&S Resource Document
M&S Resource	An asset that contributes to the composition or operation of an M&S event, environment or infrastructure. Includes services, software, components, federations, adjunct tools, data, data models, interface model specifications, and resource specific documents.	<ul style="list-style-type: none"> Resource Asset Resource Metacard
M&S Resource Document	A document specific to M&S that describes resource information such as the requirements, design, scenario or test plan pertaining to software (that implements a simulation or model), adjunct tool, federation, software component, service, data, data model, or interface model specification.	<ul style="list-style-type: none"> Resource Asset M&S Resource
M&S Software	Software that implements a model or simulation.	<ul style="list-style-type: none"> Adjunct Tools M&S Resource Software Component Resource Asset
Member Application	An application that is serving some defined role within a simulation environment. This can include live, virtual, or constructive simulation assets, or can be supporting utility programs such as data loggers or visualization tools. ^x	<ul style="list-style-type: none"> Federate Simulation Environment Software
Metacard	<ol style="list-style-type: none"> Discovery metadata for a particular asset. Often stored in a catalog or metadata catalog. Holds key information that describes a resource including its purpose and application, and other information including points of contact, creation date, and, if available, usage experience. 	<ul style="list-style-type: none"> Discovery Metadata Resource Metacard Contact Metacard Taxonomy Metacard Multicard
Metadata	<ol style="list-style-type: none"> Information describing the characteristics of data; data or information about data; descriptive information about an organization's data, data activities, systems, and holdings.^{xi} Data about data; specification of the content, meaning, structure, and use of the data.^{xii} Searchable data that describes the function and use of an artifact. If the artifact is a model, rather than data, sometimes called a metamodel^{xiii}. Structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities.^{xiv} Information about information. More specifically, information about the meaning of other data.^{xv} 	<ul style="list-style-type: none"> Discovery Metadata Metacard Metadata Component Structural Metadata
Metadata Catalog	A system that contains the instances of metadata associated with individual data assets. Typically, a metadata catalog is a software application that uses a database to store and search records (or cards) that describe such items as documents, images, and videos. Search portals and applications would use metadata catalogs to locate the data assets that are relevant to their query. ^{xvi}	<ul style="list-style-type: none"> Catalog Discovery Metadata Metacard Metadata Registry Registry
Metadata Component	A metadata characteristic, structure or data type often represented as an XML element or attribute.	<ul style="list-style-type: none"> Metacard
Metadata Registry	A system that contains information that describes the structure, format, and definitions of data. Typically, a registry is a software application that uses a database to store and search data, document formats, definitions of data, and relationships among data. ^{xvii}	<ul style="list-style-type: none"> Registry Catalog Metadata Metadata Catalog

Metamodel	<p>(1) A model of a model. Metamodels are abstractions of the M&S being developed that use functional decomposition to show relationships, paths of data and algorithms, ordering, and interactions between model components and subcomponents. Metamodels allow the software engineers who are developing the model to abstract details to a level that subject matter experts can validate.</p> <p>(2) A model of a model; an abstraction of other models, relating more generic concepts. (DoD 5000.59-M)</p> <p>(3) Metadata about a model</p>	<ul style="list-style-type: none"> • Metadata
Model	A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. (DoD 5000.59-M)	<ul style="list-style-type: none"> • Analytical Model • Conceptual Model • M&S Tools • Structural Model
Multicard	The containment of multiple discovery metadata based metacards.	<ul style="list-style-type: none"> • Metacard
Net-Centric	The realization of a robust, globally interconnected, networked environment in which data is shared timely and seamlessly among users, applications, and platforms. ^{xviii}	<ul style="list-style-type: none"> • Net-Centric Environment
Net-Centric Environment	A framework for full human and technical connectivity and interoperability that allows all DoD users and mission partners to share the information they need, when they need it, in a form they can understand and act on with confidence, and protects information from those who should not have it. ^{xix}	<ul style="list-style-type: none"> • Net-Centric
Query	A particular set of criteria and requirements used to search for assets during discovery. Any particular asset may or may not satisfy the query. A query may be saved, modified, and reused.	<ul style="list-style-type: none"> • Discovery • Search
Registry	A system that accepts, stores, and provides access to schemas or templates for metadata (discovery metadata and/or structural metadata), but not the metadata itself.	<ul style="list-style-type: none"> • Catalog • M&S Catalog • Repository
Repository	<p>(1) A central place where M&S resources may be cataloged, stored or accessed.^{xx}</p> <p>(2) A system that accepts, stores, and provides access to assets that may be reused. Typically includes both hardware (e.g., disk storage) and software (e.g., configuration management) aspects. May store software (components or modules), artifacts, metadata, data, or other assets.</p>	<ul style="list-style-type: none"> • Catalog • Data Repository • Registry • Shared Space • Storehouse
Resource (or Resource Asset)	<p>(1) An asset that is recognized as reusable</p> <p>(2) A reusable asset that has been tagged with discovery metadata.</p>	<ul style="list-style-type: none"> • Adjunct Tool • Data • Data Model • Federation • Interface Model Specification • M&S Resource Document • Service • M&S Software • Software Component • Support Asset
Resource Metacard	A discovery metacard that describes a resource asset.	<ul style="list-style-type: none"> • Resource Asset • Metacard

Reuse	<ol style="list-style-type: none"> (1) The practice of using again, in whole or part, existing M&S tools, data, or services. (2) Using a previously developed asset again, either for the purpose for which it was originally developed or for a new purpose or in a new context. Reuse may save time, effort, or cost for development or testing. Reuse may add credibility to the new application if the asset underwent verification, validation, and accreditation for its previous use. (3) The use of M&S assets, (e.g., models, simulations, databases, algorithms, tools) for purposes beyond those for which they were originally developed. Reuse can occur within an organization or in different organizations, or in different application areas. 	<ul style="list-style-type: none"> • Software Reuse
Role	<p>A related and coherent set of actions, responsibilities, and authorities which a person or organization may undertake as part of the overall process of developing a federation and/or reusing assets. One of several perspectives a person or organization may have on those processes. Reuse roles include accreditor, federate developer/integrator, federation engineer/tester, federation manager, federation tester, information technology support/hardware engineer, program manager, security engineer, sponsor, user/operator, and verification and validation agent^{xxi}.</p>	<ul style="list-style-type: none"> • M&S Contact
Scenario	<ol style="list-style-type: none"> (1) Description of an exercise. It is part of the session database that configures the units and platforms and places them in specific locations with specific missions^{xxii} (2) An initial set of conditions and time line of significant events imposed on trainees or systems to achieve exercise objectives^{xxiii}. (3) Often defined within an M&S Resource Document 	<ul style="list-style-type: none"> • M&S Resource Document
Schema	<ol style="list-style-type: none"> (1) Descriptive representation of data and/or data requirements that describe conceptual, internal, or external views of information/data needs. (2) A diagrammatic representation, an outline, or a model. In relation to data management, a schema can represent any generic model or structure that deals with the organization, format, structure, or relationship of data. Some examples of schemas are (1) a database table and relationship structure, (2) a document type definition (DTD), (3) a data structure used to pass information between systems, and (4) an XML schema document that represents a data structure and related information encoded as XML. Schemas typically do not contain information specific to a particular instance of data.^{xxiv} 	<ul style="list-style-type: none"> • Metadata • Metadata Component
Search	<ol style="list-style-type: none"> (1) The portion of the discovery process where assets' discovery metadata is compared to a query to determine whether or not they meet the criteria expressed in that query. (2) A single execution of that portion of the discovery process. 	<ul style="list-style-type: none"> • Query • Discovery
Service	<ol style="list-style-type: none"> (1) A service that provides a capability useful in modeling and simulation; may not be a model or simulation. (2) Within the context of a Service Oriented Architecture (SOA) an M&S Service is characterized by a well-defined interface that delivers data or interactions in support of M&S. (3) An activity that enhances the ability to effectively and efficiently use M&S to accomplish a mission.^{xxv} (4) In a service-oriented architecture, a process or procedure with a well-defined interface that provides specific computation, interaction, or data retrieval functionality and that can be called or invoked by external users. Similar to a component, with encapsulated functionality and interface, but not available for direct integration into a software system; rather invoked via remote procedure call, web service invocation, or similar method. 	<ul style="list-style-type: none"> • M&S Resource • Resource Asset

Shared Space	A mechanism that provides data storage and access capabilities for users within a given network space. Enterprise shared space refers to a store of data that is accessible by all users within or across security domains on the GIG. A shared space provides virtual or physical access to any number of data assets (e.g., catalogs, Web sites, registries, classification networks, document storage, and databases). Any user, system, or application that posts data uses shared space. ^{xxvi}	<ul style="list-style-type: none"> • Catalog • Registry • Repository
Simulation	<ol style="list-style-type: none"> (1) A sequence of executions of a model. (2) A method for implementing a model over time. (DoD 5000.59-M) 	<ul style="list-style-type: none"> • M&S Software • Resource Asset • M&S Resource
Simulation Data Exchange Model	A specification defining the information exchanged at runtime to achieve a given set of simulation objectives. This includes class relationships, data structures, parameters, and other relevant information. ^{xxvii}	<ul style="list-style-type: none"> • FOM, SOM, DIS PDU • Interface Model Specification • Resource Asset
Simulation Environment	A named set of member applications along with a common simulation data exchange model and set of agreements that are used as a whole to achieve some specific objective. ^{xxviii}	<ul style="list-style-type: none"> • Federation • M&S Federation
Software Component	<ol style="list-style-type: none"> (1) A software component used in the development and composition of software (2) A software component used as part of modeling and simulation software. May be source code, binary or byte code, or remote procedures; can be used to construct models and/or provide functionality for simulation systems 	<ul style="list-style-type: none"> • Component • M&S Resource • Resource Asset • M&S Software
Software Design Documents	<ol style="list-style-type: none"> (1) A plan or specification identifying the characteristics that affects and controls function or development of an application (M&S software and adjunct tool), federation, component, and/or service. (2) Often defined within an M&S Resource Document 	<ul style="list-style-type: none"> • M&S Resource Document
Software Reuse	The process of implementing or updating software systems using existing software assets.	<ul style="list-style-type: none"> • Reuse
Storehouse	Generic term for a storage system; includes repository, catalog, and registry.	<ul style="list-style-type: none"> • Catalog • Registry • Repository • Shared Space
Structural Metadata	Metadata that documents the internal characteristics of an artifact, which may include name, description, data constraints, and tag relationships. The HLA OMT standard is an example of structural metadata, where the data described is an HLA object model; an HLA object model is itself structural metadata with respect to a specific run-time set of objects and their attribute values. Makes the artifact understandable.	<ul style="list-style-type: none"> • Metadata • Discovery Metadata
Support Asset	An asset that is of value to the community, but is not a unit of reuse, and is not normally tagged with discovery metadata.	<ul style="list-style-type: none"> • M&S Activity • M&S Environment • M&S Event • M&S Infrastructure • M&S Related Document • Resource Asset
Support Document	A document not specific to M&S but describes supporting information such as environmental, operational or technical content, that maybe useful in the context of M&S.	<ul style="list-style-type: none"> • M&S Resource Document • Support Asset
Taxonomy	<ol style="list-style-type: none"> (1) A classification system. Provides the basis for organizing objects for identification, retrieval and research purposes. (2) Represents a designation of controlled vocabulary terms pertaining to a domain or COI. (3) Identifies the glossary of terms used by an organization, program or focus group that can be attributed to one or more M&S assets. 	<ul style="list-style-type: none"> • Asset
Taxonomy Metacard	A discovery metacard describing a taxonomy of terms and definitions	<ul style="list-style-type: none"> • Metacard • Taxonomy

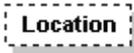
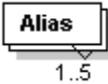
Tools	Software that implements a model or simulation or an adjunct tool, i.e. software and/or hardware that is either used to provide part of a simulation environment (e.g., to manage the execution of the environment) or to transform and manage data used by or produced by a model or simulation. Adjunct tools are differentiated from simulation software in that they do not provide a virtual or constructive representation as part of a simulation environment.	<ul style="list-style-type: none"> • Adjunct Tools • Resource Asset
Uniform Resource Identifier (URI)	A unique identifier used to identify a resource name and/or resource location on the internet.	<ul style="list-style-type: none"> • URL • URN
Uniform Resource Locator (URL)	A string identifying a specific location for finding a resource on the Internet. Often associated with the term hyperlink. A URL is a type of URI.	<ul style="list-style-type: none"> • URI • URL
Uniform Resource Name (URN)	A string identifying a unique name of a resource on the Internet. Often associated with the term namespace. A URN is a type of URI.	<ul style="list-style-type: none"> • URI • URL
Unit of Reuse	A specific, identifiable, and bounded unit that can be searched for, discovered, selected, and reused. May be a concept set (e.g., modeling method), a unit of software (e.g., a component or module), a service, or a data set.	<ul style="list-style-type: none"> • Reuse
Validation	<ol style="list-style-type: none"> (1) The process of determining the degree to which an M&S resource is an accurate representation of the real world from the perspective of the intended uses of the model. (based on DoD 5000.59-M) (2) The process of determining the fitness of an M&S resource and its associated data for a specific purpose. (FEDEP 1.5) (3) The process of determining the degree to which an M&S resource and its associated data are an accurate representation of the real world from the perspective of the intended use of the M&S. <i>The informal question often asked for validation is "Was the right M&S built?"</i> (DON M&S VVA Implementation Handbook) 	<ul style="list-style-type: none"> • Accreditation • Verification
Verification	<ol style="list-style-type: none"> (1) The process of determining that an M&S resource accurately represents the developer's conceptual description and specification. Verification also evaluates the extent to which the model or simulation has been developed using sound and established software engineering techniques. (based on DoD 5000.59-M) (2) The process of determining that an M&S implementation and its associated data accurately represent the developer's conceptual description and specifications. <i>An informal question often applied to verification is "Was the M&S built right?"</i> (DON M&S VVA Implementation Handbook) 	<ul style="list-style-type: none"> • Accreditation • Validation

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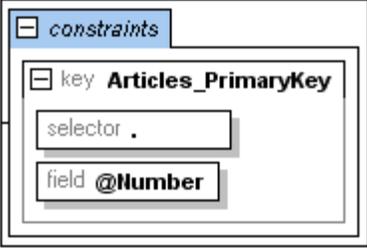
Appendix B – XMLSpy® Schema Design Content Model

Many of the graphic related diagrams provided within this specification were generated using the Altova® XMLSpy® tool. This section describes the symbols and nomenclature found within these diagrams beginning with the Component Symbols identified in Table B-1.⁹

Table B-1 Component Symbols

Symbol	Name	Description
	Mandatory single component	A rectangle with a solid border identifies a required XML schema component. In this example, a mandatory component of <code>Country</code> is required to be identified within the XML instance data.
	Mandatory single component containing parsed character data (i.e., a child text node)	A rectangle with a solid border and line markings in the upper left corner identifies a mandatory XML schema component used to provide simple content (text node only) or mixed content (text and child components). In this example, simple content is denoted because there is no plus sign; a mandatory component of <code>Name</code> containing simple content is defined. This <code>Name</code> component with simple content would be required to be identified within the XML instance data.
	Single optional component	A rectangle with a dashed border identifies an optional XML schema component. In this example, an optional component of <code>Location</code> may be identified within the XML instance data.
	Mandatory multiple component	An overlapping set of rectangles identifies a mandatory XML schema component represented by one or more instances. In this example, up to five <code>Alias</code> component values may be identified within the XML instance data.
	Mandatory multiple component containing child components	A mandatory multiple component with a plus sign identifies a component value containing child components. In this example, an unlimited number of <code>Division</code> component values may be defined with child components within the XML instance data.
	References a global component	The arrow in the bottom left indicates a component referencing a global component, which is defined elsewhere. In this example, an unlimited number of <code>xs:field</code> component values may be defined with child components within the XML instance data.
	Complex Type	An irregular hexagon with a plus sign indicates a complex data type. Complex types can be used either as (i) the datatype of a component, or (ii) the base type of another complex type. In this example, <code>keybase</code> is a global complex type used to define other aspects of the XML schema.
	Model Group	An irregular octagon with a plus sign indicates a model group, which can be used to define and reuse component declarations. In this example, <code>Subsidiaries</code> is a global model group that can be used to define components within the XML schema reuse component declarations.
	Wildcards	An irregular octagon with <code>any</code> at left indicates a wildcard, which can be used as placeholders to allow components not specified in the schema or from other namespaces. The common wildcards used

⁹ “Introduction to XMLSPY 2005 Enterprise Edition,” <http://www.altova.com/manual/>

		<p>within an XML schema are identified below:</p> <p>##other = components that can belong to any namespace other than the target namespace defined in the schema;</p> <p>##any = components that can belong to any namespace;</p> <p>##targetNamespace = components that must belong to the target namespace defined in the schema;</p> <p>##local = components that cannot belong to any namespace;</p> <p>anyURI = components that belong to the namespace you specify.</p>
	<p>Attributes</p>	<p>A double lined rectangle with the word '<i>attributes</i>' in italics, which can be expanded, is used to define XML attributes. Within the interior of the double line rectangle, each attribute is shown in a rectangle with a dashed border. Attributes are of the possession of a component. In this example, a href is the only attribute defined and its owning component is not shown.</p>
	<p>Identity constraints</p>	<p>A rectangle with the word '<i>constraints</i>' in italics is used to define constraints of a content model. The identity constraints listed in the content model of a component show constraints as defined with the key and keyref components, and with the unique component. In this example, Articles_PrimaryKey is defined as a key constraint where the field to be constrained is Number with the selector of ".", which is a decimal point and used to verify the Number is valid.</p>

B.1 Simple Types

A “simple type” component is defined as a data type that only contains values and no component or attributes. For instance, a component declared to be of type **xsd:string** indicates that it is the predefined XML Schema data type for string content. An example is illustrated below:



In this example, the name for the “simple type” is **Name**, and the type used to define **Name** is **xsd:string**.

B.2 Complex Types

“Complex type” is a data type that may contain attributes, components, and mixed content. An example is illustrated in Figure B-1.

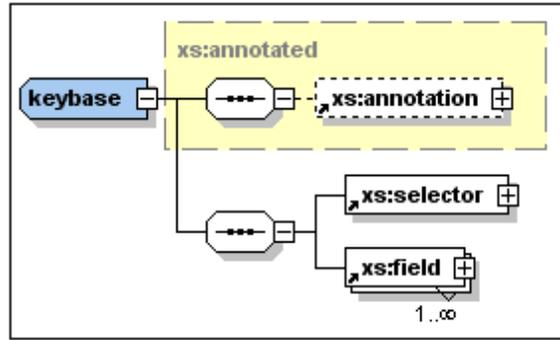


Figure B-1 Complex Types

The **keybase** complex type shown in Figure D-1 was declared with a base type of **xs:annotated**. The base type is displayed as a rectangle with a dashed gray border and a yellow background color. The child components **xs:selector** and **xs:field** extend upon the base type. (Note the tiny arrows in the bottom left corner of the **xs:selector** and **xs:field** rectangles. These indicate that both components reference global components of those names.)

B.3 Compositors

A “Compositor” defines an ordered sequence of sub-components (child components). Examples of compositors are identified in Table B-2.

Table B-2 Compositors

Compositor	Diagram	Description
Sequence		In this example, a sequence of components is used for defining an Altova component instance. These sequences of components include a single Name instance, which is a simple type, and may contain an unlimited number of Division instances. Name must precede Division .
Choice		In this example a choice of components are offered for defining an Altova component instance. These choices include a single Name instance, which is a simple type, or an unlimited number of Division instances.
All		In this example, the components are used for defining an Altova component instance that may be in any order. These components include a single Name instance, which is a simple type, and may contain an unlimited number of Division instances. It makes no difference if Division precedes Name or not.

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Appendix C – MSC-DMS Schema Listings

Section 2 provided the MSC-DMS Logical Model identifying the MSC-DMS schemas required to build the various Metacards. This Appendix provides a listing of these schemas.

Note: the **<any>** and **<anyAttribute>** XML components are used to make the MSC Discovery Metadata more extensible. They allow documents to contain additional components that are not declared in the main XML schema. The **##other** indicates that any well-formed XML that is from a namespace other than the target namespace of the type being defined (unqualified components are not allowed) may be used.

C.1 MSC-DMS-Resource-v1_4.xsd

A listing of the schema for documenting a Resource Metacard is provided below. The root XML element that is required to build a Resource Metacard is **Resource**. However, a relaxed root metacard can be built using **ResourceRELAXED** as the root XML element instead. **ResourceRELAXED** provides a mechanism for developers and integrators to begin the creation of a metacard without having to fill in components that are required to be completed before it can be shared. **ResourceRELAXED** should only be used if incomplete metacards are anticipated and if XML validation of the metacard is intended to be ignored. Keep in mind most repositories and catalogs will only accept Resource Metacards that comply using **Resource** as the root XML element.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<!-- version 1.3.1 - 3/22/2010 -->
<!-- version 1.3 - 3/4/2010 -->
<!-- version 1.2 - 2/20/2009 -->
<!-- version 1.1 - 8/27/2008 -->
<!-- version 1.0.1 - 1/7/2008 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
xmlns:icism="urn:us:gov:ic:ism:v2" xmlns:gml="http://www.opengis.net/gml"
xmlns:mdr="http://metadata.dod.mil/" targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
elementFormDefault="qualified" attributeFormDefault="qualified" version="1.4">
  <xs:include schemaLocation="MSC-DMS-Resource-Core.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Resource-Supplemental.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
    12/20/2010 - updated to incorporate adjudicated 2010 Change Requests (CRs) for
version 1.4
    3/22/2010 - fixed name mangling issue regarding POC and POC reference.
    3/04/2010 - Removed taxonomy schema namespace which was not needed. Additional
commenting provided.
    2/10/2010 - Completed incorporation of Taxonomy support as adjudicated via 2009 CRs.
    1/20/2010 - Updated to incorporate adjudicated 2009 Change Requests (CRs)
    2/20/2009 - Updated to incorporate latest version of DDMS (version 2.0)
    6/26/2008 - Fixed "security" at the root level to be optional as reflected by spec
    6/29/2008 - First draft release - reflecting adjudicated comments from M&S
Catalog Team including adding Releasability, and Associations (was References).
  </xs:documentation>
  </xs:annotation>
<!-- GLOBAL ELEMENTS -->
<xs:element name="Resource" type="resourceType"/>
```

```

<xs:element name="ResourceRELAXED" type="resourceTypeRELAXED"/>
<!-- COMPLEX TYPES -->
<!--resource - Section 4-->
<xs:complexType name="resourceType">
  <xs:annotation>
    <xs:appinfo>
      <mdr:definition>The type definition for the ddms:Resource
element.</mdr:definition>
      <mdr:comment>Defines the structure of a MSC-DMS record.</mdr:comment>
    </xs:appinfo>
  </xs:annotation>
  <xs:sequence>
    <xs:element ref="Title"/>
    <xs:element ref="Type"/>
    <xs:element ref="Description"/>
    <xs:element ref="Dates"/>
    <xs:element ref="Version"/>
    <xs:element ref="Rights" minOccurs="0"/>
    <xs:element ref="Releasability"/>
    <xs:element ref="Security" minOccurs="0"/>
    <xs:element ref="Associations" minOccurs="0"/>
    <xs:element ref="POCs" minOccurs="0"/>
    <xs:element ref="Keywords"/>
    <xs:element ref="Usages" minOccurs="0"/>
    <xs:element ref="Media" minOccurs="0"/>
    <xs:element ref="Image" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="TaxonomiesCited" minOccurs="0"/>
    <xs:element ref="Extensions" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="resource_ID" type="nonEmptyString"/>
  <xs:attribute name="metacard_ID" type="nonEmptyString"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="resourceTypeRELAXED">
  <xs:annotation>
    <xs:appinfo>
      <mdr:definition>The type definition for the ddms:Resource
element.</mdr:definition>
      <mdr:comment>Defines the structure of a MSC-DMS record.</mdr:comment>
    </xs:appinfo>
  </xs:annotation>
  <xs:sequence>
    <xs:element ref="Title" minOccurs="0"/>
    <xs:element ref="Type" minOccurs="0"/>
    <xs:element ref="Description" minOccurs="0"/>
    <xs:element ref="Dates" minOccurs="0"/>
    <xs:element ref="Version" minOccurs="0"/>
    <xs:element ref="Rights" minOccurs="0"/>
    <xs:element ref="Releasability" minOccurs="0"/>
    <xs:element ref="Security" minOccurs="0"/>
    <xs:element ref="Associations" minOccurs="0"/>
    <xs:element ref="POCs" minOccurs="0"/>
    <xs:element ref="Keywords" minOccurs="0"/>
    <xs:element ref="Usages" minOccurs="0"/>
    <xs:element ref="Media" minOccurs="0"/>
    <xs:element ref="Image" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="TaxonomiesCited" minOccurs="0"/>
    <xs:element ref="Extensions" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="resource_ID" type="nonEmptyString"/>
  <xs:attribute name="metacard_ID" type="nonEmptyString"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
</xs:schema>

```

C.2 MSC-DMS-Resource-Core.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<!-- version 1.3.1 - 3/22/2010 -->
<!-- version 1.3 - 2/10/2010 -->
<!-- version 1.2.1 - 9/9/2009 -->
<!-- version 1.2 - 2/20/2009 -->
<!-- version 1.1 - 8/27/2008 -->
<!-- version 1.0.1 - 1/7/2008 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
  <!-- xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../../DDMS/2.0/DDMS-Globals.xsd" -->
  <!-- xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../../DDMS/2.0/DDMS-GeospatialCoverage.xsd" -->
  <!-- xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../../DDMS/2.0/DDMS-v2_0.xsd" -->
  <!-- added 9/2/2009 (v1.2.1) to fix import issue for MDR, in which schema was importing 2
separate schema files using the same XML namespace (DDMS). DDMS-V2_0 already imports these two
schemas, thus the appropriate thing is to import DDMS-V2_0. -->
  <!-- removed 2/10/2010 (v1.3) now supported within import of MSC-DMS_Types (see includ
statement below) -->
  <!-- xs:import namespace="urn:us:gov:ic:ism:v2" schemaLocation="../../../INT/schemas/2008-08-
15/IC-ISM-v2.1.xsd" -->
  <xs:include schemaLocation="MSC-DMS-Types.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
      12/20/2010 - Updated to incorporate adjudicated 2010 Change Requests (CRs)

      3/22/2010 - Fixed name mangling issue regarding POC and POC reference.

      2/10/2010 - Completed incorporation of Taxonomy support as adjudicated via 2009 CRs.
      1/20/2010 - Updated to incorporate adjudicated 2009 Change Requests (CRs)
      9/2/2009 - Updated import of DDMS to main schema rather than Globals and
GeospatialCoverage to resolve namespace conflict
      2/20/2009 - Updated to incorporate latest version of DDMS (version 2.0) and IC-ISM
(version 2.1)
      8/9/2008 - Added ApplicationDomainType to Usage so that it follows patterns for other
elements and use of attributes (specifically the "value" attribute).
      7/16/2008 - Added sponsorID to POC.Person and POC.Organizaiton. This allows
sponsoring organization to be identified with a Person or Organization
      7/16/2008 - Added POCReferenceType including PersonReferenceType and OrgReferenceType
so that "Person.Org" could associate to an already identified organization, and "Rights.POC" and
"Usage.History.POC" could associate to an already identified POC (person or organizations). This
alleviates the requirement that existed before, which required Person and Organization information
to be reentered entirely.
      7/16/2008 - Cleaned up Org element for POC.Person so that it could associate to
existing Organization component (rather than repeating creation of Organization information.
      7/16/2008 - Integrated Version 1.4.1 of DDMS (was Version 1.4 of DDMS)
      7/10/2008 - Added generic Description subelement to POC, Association, Media, History
      7/10/2008 - Added new items for applicationDomainTypeEnumerations to match spec
(analysis, training, t&e, engineering, acquisition, planning
      7/10/2008 - Added new items for applicationDomainTypeEnumerations - per comment #28
from M&S Catalog Team
      7/05/2008 - Added "Security" as an option for Media Type
      6/27/2008 - Made "phone" optional for Organization Type
      6/26/2008 - Made "extension" as an optional attribute for Phone Type
      6/25/2008 - Added "Releasability" as an option for Media Type

```

6/24/2008 - Fixed Description.Text type to properly allow text to be inserted between tags

6/02/2008 - Changed "Reference" to "Association - per comment #32 from M&S Catalog Team

6/02/2008 - Fixed "phoneTypeUnion" - per comment #8 from M&S Catalog Team

6/02/2008 - Added "Security" as an option for Title, Description, POC, Association - per comment #7 from M&S Catalog Team

6/02/2008 - First draft release - reflecting adjudicated comments from M&S Catalog Team

```

</xs:documentation>
</xs:annotation>
<!-- GLOBAL ELEMENTS -->
<xs:element name="Title" type="titleType"/>
<xs:element name="Type" type="typeType"/>
<xs:element name="Description" type="descriptionType"/>
<xs:element name="Dates" type="datesType"/>
<xs:element name="Date" type="dateMaxType"/>
<xs:element name="Version" type="versionType"/>
<xs:element name="Rights" type="rightsType"/>
<xs:element name="Releasability" type="releasabilityType"/>
<xs:element name="Security" type="securityType"/>
<xs:element name="Associations" type="associationsType"/>
<xs:element name="Association" type="associationType"/>
<xs:element name="POCs" type="pocsType"/>
<xs:element name="POC" type="pocType"/>
<xs:element name="Keywords" type="keywordsType"/>
<xs:element name="Keyword" type="keywordType"/>
<xs:element name="Usages" type="usagesType"/>
<xs:element name="Usage" type="usageType"/>
<xs:element name="History" type="historyType"/>
<xs:element name="Media" type="mediaType"/>
<xs:element name="Image" type="imageType"/>
<xs:element name="TaxonomiesCited" type="taxonomiesCitedType"/>
<xs:element name="TaxonomyCited" type="taxonomyCitedType"/>
</xs:schema>

```

C.3 MSC-DMS-Resource-Supplemental.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<!-- version 1.3.1 - 3/22/2010 -->
<!-- version 1.3 - 3/4/2010 -->
<!-- version 1.2.1 - 9/9/2009 -->
<!-- version 1.2 - 2/20/2009 -->
<!-- version 1.1 - 8/27/2008 -->
<!-- version 1.0.1 - 1/7/2008 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
  <!-- xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../DDMS/2.0/DDMS-Globals.xsd" -->
  <!-- xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../DDMS/2.0/DDMS-GeospatialCoverage.xsd" -->
  <xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../DDMS/2.0/DDMS-v2_0.xsd"/>
  <!-- added 9/2/2009 (v1.2.1) to fix import issue for MDR, in which schema was importing 2
separate schema files using the same XML namespace (DDMS). DDMS-V2_0 already imports these two
schemas, thus the appropriate thing is to import DDMS-V2_0. -->
  <xs:import namespace="urn:us:gov:ic:ism:v2" schemaLocation="../../INT/schemas/2008-08-15/IC-
ISM-v2.1.xsd"/>

```

```

<xs:include schemaLocation="MSC-DMS-Types.xsd"/>
<xs:annotation>
  <xs:documentation>CHANGE LOG:
    12/20/2010 - updated to reflect 1.4 approved changes and to map with capability
provided by DDMS 3
    3/22/2010 - fixed name mangling issue regarding POC and POC reference.
    3/4/2010 - Cleanup and commenting
    2/10/2010 - Completed incorporation of Taxonomy support as adjudicated via 2009 CRs.

    9/2/2009 - updated VVA Coverage - based on approved Change Request from Curtis Blais.
    9/2/2009 - updated import of DDMS to main schema rather than Globals and
GeopsatialCoverage to resolve namespace conflict
    2/20/2009 - Updated to incorporate latest version of DDMS (version 2.0)
    9/12/2008 - Fixed VVA Type/Subtype Enumeration
    7/16/2008 - Used POCReferenceType for VV&A and ConfigurationManagement. This
alleviates the requirement that existed before, which required Person and Organization information
to be reentered entirely.
    6/26/2008 - Updated HLA coverage to include what HLA FOM / SOM(s) used by name
    5/29/2008 - First draft release - reflecting adjudicated comments from M&S
Catalog Team
  </xs:documentation>
</xs:annotation>
<!-- GLOBAL ELEMENTS -->
<xs:element name="Extensions" type="extensionType"/>
<xs:element name="VirtualCoverage" type="virtualCoverageType"/>
<xs:element name="TemporalCoverage" type="temporalCoverageType"/>
<xs:element name="GeopsatialCoverage" type="geopsatialCoverageType"/>
<xs:element name="HLACoverage" type="HLAType"/>
<xs:element name="ConfigurationManagement" type="configurationManagementType"/>
<xs:element name="VVACoverage" type="VVAType"/>
<!-- COMPLEX TYPES -->
<!-- HLA Coverage - Section 4.20-->
<xs:complexType name="HLAType">
  <xs:sequence>
    <xs:element name="Certification" minOccurs="0">
      <xs:complexType>
        <xs:attribute name="certified"
type="certificationLevelTypeUnion" use="required"/>
        <xs:attribute name="level" type="xs:string"/>
        <xs:anyAttribute namespace="##other"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="Date" type="dateMinType"/>
    <xs:element name="FomSomUsed" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Name" type="genericStringValueType"/>
          <xs:element name="FomSomURL"
type="genericStringValueType" minOccurs="0"/>
          <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
    <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
    <xs:element name="Security" type="securityType" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="VVATypeType">
  <xs:attribute name="value" type="xs:string" use="optional" default="VV&A
Documentation"/>
  <xs:attribute name="subtype" type="vvaSubtypeUnion" use="optional"/>
  <xs:attribute name="ads-designation" type="adsDesignationUnion"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!-- VV&A - Section 4.21 -->
<xs:complexType name="VVAType">

```

```

    <xs:sequence>
      <xs:element name="Type" type="VVATypeType"/>
      <xs:element name="IntendedUse" type="genericStringValue"/>
      <xs:element name="MSSystem" type="genericStringValue"/>
      <xs:element name="ExecutiveSummary" type="genericStringValue"
minOccurs="0"/>
      <xs:element name="POC" type="pocReferenceType" maxOccurs="unbounded"/>
      <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
      <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
      <xs:element name="Security" type="securityType" minOccurs="0"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="refID" type="xs:string"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!-- Virtual Coverage - Section 4.17 (added description / releasability / security to
geospatial coverage for 1.4) -->
  <xs:complexType name="virtualCoverageType">
    <xs:complexContent>
      <xs:extension base="ddms:VirtualCoverageType">
        <xs:sequence>
          <xs:element name="Description" type="descriptionGenericType"
minOccurs="0"/>
          <xs:element name="Releasability" type="releasabilityType"
minOccurs="0"/>
          <xs:element name="Security" type="securityType"
minOccurs="0"/>
          <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="taxonomy" type="nonEmptyString"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <!-- Temporal Coverage - Section 4.18 (added description / releasability / security to
geospatial coverage for 1.4) -->
  <xs:complexType name="temporalCoverageType">
    <xs:complexContent>
      <xs:extension base="ddms:TemporalCoverageType">
        <xs:sequence>
          <xs:element name="Description" type="descriptionGenericType"
minOccurs="0"/>
          <xs:element name="Releasability" type="releasabilityType"
minOccurs="0"/>
          <xs:element name="Security" type="securityType"
minOccurs="0"/>
          <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="taxonomy" type="nonEmptyString"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <!-- Geospatial Coverage - Section 4.19 (added description / releasability/security to
geospatial coverage for 1.4) -->
  <xs:complexType name="geospatialCoverageType">
    <xs:complexContent>
      <xs:extension base="ddms:GeospatialCoverageType">
        <xs:sequence>
          <xs:element name="Description" type="descriptionGenericType"
minOccurs="0"/>
          <xs:element name="Releasability" type="releasabilityType"
minOccurs="0"/>
          <xs:element name="Security" type="securityType"
minOccurs="0"/>
          <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>

```

```

        <xs:attribute name="taxonomy" type="nonEmptyString"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:extension>
</xs:complexContent>
</xs:complexType>
<!-- Configuration Management - Section 4.22 -->
<xs:complexType name="configurationManagementType">
    <xs:sequence>
        <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
        <xs:element name="POC" type="pocReferenceType" maxOccurs="unbounded"/>
        <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
        <xs:element name="Security" type="securityType" minOccurs="0"/>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="type" type="configurationManagementTypeUnion" use="required"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="extensionType">
    <xs:sequence>
        <xs:element name="VirtualCoverage" type="virtualCoverageType" minOccurs="0"
maxOccurs="unbounded"/>
        <xs:element name="TemporalCoverage" type="temporalCoverageType" minOccurs="0"
maxOccurs="unbounded"/>
        <xs:element name="GeospatialCoverage" type="geospatialCoverageType"
minOccurs="0" maxOccurs="unbounded"/>
        <xs:element name="HLACoverage" type="HLAType" minOccurs="0"/>
        <xs:element name="VVACoverage" type="VVAType" minOccurs="0"/>
        <xs:element name="ConfigurationManagement" type="configurationManagementType"
minOccurs="0" maxOccurs="unbounded"/>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!-- ENUMERATIONS (i.e. Pick List Types)-->
<xs:simpleType name="certificationLevelTypeEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="yes"/>
        <xs:enumeration value="no"/>
        <xs:enumeration value="waiver"/>
        <!-- updated for version 1.4 -->
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="certificationLevelTypeUnion">
    <xs:union memberTypes="certificationLevelTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="configurationManagementTypeEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Configuration Control Board (CCB)"/>
        <xs:enumeration value="User Group"/>
        <xs:enumeration value="Executive Steering Committee"/>
        <xs:enumeration value="None"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="configurationManagementTypeUnion">
    <xs:union memberTypes="configurationManagementTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="vvaSubtypeEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Accreditation Plan"/>
        <xs:enumeration value="V&V Plan"/>
        <xs:enumeration value="V&V Report"/>
        <xs:enumeration value="Accreditation Report"/>
        <xs:enumeration value="Accreditation Decision Letter"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="vvaSubtypeUnion">
    <xs:union memberTypes="vvaSubtypeEnumerations xs:string"/>
</xs:simpleType>
</xs:schema>

```

C.4 MSC-DMS-Contact-v1_4.xsd

A listing of the schema for documenting a Contact Metacard is provided below. The root XML element that is required to build a Contract Metacard is **Contact**. However, a relaxed root metacard can be built using **ContactRELAXED** as the root XML element. **ContactRELAXED** provides a mechanism for developers and integrators to begin the creation of a Contract Metacard without having to fill in components that are required to be completed before it can be shared. **ContactRELAXED** should only be used if incomplete metacards are anticipated and if XML validation of the metacard is intended to be ignored. Keep in mind most repositories and catalogs will only accept Contract Metacards that comply using **Contact** as the root XML element.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
  <xs:import namespace="urn:us:gov:ic:ism:v2" schemaLocation="../../INT/schemas/2008-08-15/IC-
ISM-v2.1.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Types.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
      12/20/2010 - created schema to represent Contact Metacards
    </xs:documentation>
  </xs:annotation>
  <!-- GLOBAL ELEMENTS -->
  <xs:element name="Contact" type="contactType"/>
  <xs:element name="ContactRELAXED" type="contactTypeRELAXED"/>
  <xs:element name="Person" type="personType"/>
  <xs:element name="Organization" type="organizationType"/>
</xs:schema>
```

C.5 MSC-DMS-Taxonomy-v1_4.xsd

A listing of the schema for documenting a Taxonomy Metacard is provided below. The root XML element that is required to build a Taxonomy Metacard is **Taxonomy**. However, a relaxed root metacard can be built using **TaxonomyRELAXED** as the root XML element instead. **TaxonomyRELAXED** provides a mechanism for developers and integrators to begin the creation of a metacard without having to fill in components that are required to be completed before it can be shared. **TaxonomyRELAXED** should only be used if incomplete metacards are anticipated and if XML validation of the metacard is intended to be ignored. Keep in mind most repositories and catalogs will only accept Taxonomy Metacards that comply using **Taxonomy** as the root XML element.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
```

```

<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
  <xs:import namespace="urn:us:gov:ic:ism:v2" schemaLocation="../../INT/schemas/2008-08-15/IC-
ISM-v2.1.xsd"/>
  <xs:include schemaLocation="DoD-Glossary.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Types.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
      12/20/2010 - created separed schema to support creation of Taxonomy Classifications,
which can be cited by an MSC-DMS Resource
    </xs:documentation>
  </xs:annotation>
  <!-- GLOBAL ELEMENTS -->
  <xs:element name="Taxonomy" type="taxonomyType"/>
  <xs:element name="TaxonomyRELAXED" type="taxonomyTypeRELAXED"/>
  <xs:element name="DefinitionSection" type="DefinitionSectionType"/>
  <xs:element name="DefinitionSectionRELAXED" type="DefinitionSectionTypeRELAXED"/>
  <!-- COMPLEX TYPES -->
  <!--taxonomy - Section 6.1 - updated for 1.4 of the MSC-DMS -->
  <xs:complexType name="taxonomyType">
    <xs:sequence>
      <xs:element name="Title" type="titleGenericType"/>
      <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
      <xs:element name="Dates" type="datesType" minOccurs="0"/>
      <xs:element name="Version" type="versionType" minOccurs="0"/>
      <xs:element name="Term" type="TermType" maxOccurs="unbounded"/>
      <!-- termType is based on DoD XML glossary (see glossary.xsd) -->
      <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
      <xs:element name="Security" type="securityType" minOccurs="0"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="taxonomyID" type="xs:anyURI"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="taxonomyTypeRELAXED">
    <xs:sequence>
      <xs:element name="Title" type="titleGenericType" minOccurs="0"/>
      <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
      <xs:element name="Dates" type="datesType" minOccurs="0"/>
      <xs:element name="Version" type="versionType" minOccurs="0"/>
      <xs:element name="Term" type="TermTypeRELAXED" minOccurs="0"
maxOccurs="unbounded"/>
      <!-- termType is based on DoD XML glossary (see glossary.xsd) -->
      <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
      <xs:element name="Security" type="securityType" minOccurs="0"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="taxonomyID" type="xs:anyURI"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
</xs:schema>

```

C.6 DoD-Glossary.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->

```

```

<!-- this reflects an existing schema identified as the DoD Glossary Definition schema and is used
by the MSC-DMS to classify taxonomies -->
<!--W3C Schema generated by XMLSPY v2004 rel. 3 U (http://www.xmlspy.com)-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">
  <xs:element name="Acronym" type="xs:string"/>
  <xs:element name="Characteristic" type="xs:string"/>
  <xs:element name="Concept" type="xs:string"/>
  <xs:element name="Definition" type="xs:string"/>
  <xs:complexType name="DefinitionSectionType">
    <xs:sequence>
      <xs:element ref="Concept" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Definition"/>
      <xs:element ref="Source" minOccurs="0"/>
      <!-- xs:element ref="Usage" minOccurs="0"/ -->
      <xs:element name="Usage" type="xs:string" minOccurs="0"/>
      <xs:element ref="Synonym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="RelatedTerm" minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DefinitionSectionTypeRELAXED">
    <xs:sequence>
      <xs:element ref="Concept" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Definition"/>
      <xs:element ref="Source" minOccurs="0"/>
      <!-- xs:element ref="Usage" minOccurs="0"/ -->
      <xs:element name="Usage" type="xs:string" minOccurs="0"/>
      <xs:element ref="Synonym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="RelatedTerm" minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:element name="Designation" type="xs:string"/>
  <xs:element name="ExpandedAcronym" type="xs:string"/>
  <xs:element name="Glossary">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="Term" type="TermType" maxOccurs="unbounded"/>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="version" type="xs:string"/>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Name" type="xs:string"/>
  <xs:element name="Nomenclature" type="xs:string"/>
  <xs:element name="Object" type="xs:string"/>
  <xs:element name="PreferredTerm" type="xs:string"/>
  <xs:element name="RelatedTerm" type="xs:string"/>
  <xs:element name="Source" type="xs:string"/>
  <xs:element name="Synonym" type="xs:string"/>
  <xs:complexType name="TermType">
    <xs:sequence>
      <xs:element ref="Name"/>
      <xs:element ref="Acronym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="ExpandedAcronym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="DefinitionSection" type="DefinitionSectionType"
minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="ID" type="xs:ID"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="TermTypeRELAXED">
    <xs:sequence>
      <xs:element ref="Name"/>
      <xs:element ref="Acronym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="ExpandedAcronym" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="DefinitionSection" type="DefinitionSectionTypeRELAXED"
minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

```

```

        </xs:sequence>
        <xs:attribute name="ID" type="xs:ID"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <!-- xs:element name="Usage" type="xs:string" / -->
</xs:schema>

```

C.7 MSC-DMS-Types.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- version 1.4 - 12/20/2010 -->
<!-- version 1.3.1 - 3/22/2010 -->
<!-- version 1.3 - 3/4/2010 -->
<!-- version 1.2.1 - 9/9/2009 -->
<!-- version 1.2 - 2/20/2009 -->
<!-- version 1.1 - 8/27/2008 -->
<!-- version 1.0.1 - 1/7/2008 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
    <xs:import namespace="http://metadata.dod.mil/mdr/ns/DDMS/2.0/"
schemaLocation="../../DDMS/2.0/DDMS-v2_0.xsd"/>
    <xs:import namespace="urn:us:gov:ic:ism:v2" schemaLocation="../../INT/schemas/2008-08-15/IC-
ISM-v2.1.xsd"/>
    <!-- xs:include schemaLocation="glossary.xsd"/-->
    <xs:annotation>
        <xs:documentation>CHANGE LOG:
            12/20/2010 - updated to incorporate adjudicated 2010 Change Requests (CRs), which
            included adding taxonomy ID for taxonomies cited within a Resource, and new types for Contacts and
            Taxonomies
            3/22/2010 - fixed name mangling issue regarding POC and POC reference.
            3/04/2010 - cleanup and commenting plus removal of unnecessary taxonomy attributes to
            match spec.
            2/25/2010 - associationQualifierUnion - enumeration added to association qualifier
            2/17/2010 - removed duplicate "used" enumeration from dateTypeEnumerations
            2/10/2010 - completed incorporation of Taxonomy support as adjudicated via 2009 CRs.
            1/20/2009 - updated schema to reflect ALL complex types in alphabetical order. This
            allows MSC-DMS components to be used for supporting other types of assets.
            9/11/2009 - created separate schema to represent common types shared accross core and
            supplemental (to resolve namespace conflicts for loading in MDR).
        </xs:documentation>
    </xs:annotation>
    <!--SIMPLE TYPES-->
    <xs:simpleType name="nonEmptyString">
        <xs:restriction base="xs:string">
            <xs:minLength value="1"/>
        </xs:restriction>
    </xs:simpleType>
    <!-- COMPLEX TYPES -->
    <xs:complexType name="addressInfoType">
        <xs:sequence>
            <xs:element name="AddressLine1" type="genericStringValue" minOccurs="0"/>
            <xs:element name="AddressLine2" type="genericStringValue" minOccurs="0"/>
            <xs:element name="AddressLine3" type="genericStringValue" minOccurs="0"/>
            <xs:element name="City" type="genericStringValue" minOccurs="0"/>
            <xs:element name="State" type="genericStringValue" minOccurs="0"/>
            <xs:element name="Country" type="genericStringValue" minOccurs="0"/>
            <xs:element name="PostalCode" type="genericStringValue" minOccurs="0"/>
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>

```

```

        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="applicationDomainType">
        <xs:attribute name="value" type="applicationDomainTypeUnion" use="required"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="associationsType">
        <xs:sequence>
            <xs:element name="Association" type="associationType" maxOccurs="unbounded"/>
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
        <!--core metadata container for associationType (see Section 5.9) -->
    </xs:complexType>
    <!--association - Section 4.10-->
    <xs:complexType name="associationType">
        <xs:complexContent>
            <xs:extension base="CompoundSourceIdentifierType">
                <xs:sequence>
                    <xs:element name="Description" type="descriptionGenericType"
minOccurs="0"/>
                    <xs:element name="Releasability" type="releasabilityType"
minOccurs="0"/>
                    <xs:element name="Security" type="securityType"
minOccurs="0"/>
                    <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="relationship" type="associationRelationshipUnion"
default="is-described-by"/>
                <xs:attribute name="type" type="associationTypeUnion" default="related
documents"/>
                <xs:attribute name="constraints" type="xs:string"/>
                <xs:attribute name="ads-designation" type="adsDesignationUnion"/>
                <xs:attribute name="associationID" type="xs:string"/>
                <xs:attribute name="taxonomy" type="nonEmptyString"/>
                <xs:anyAttribute namespace="##other" processContents="lax"/>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <!--CompoundSourceIdentifierType - emulates CompoundSourceIdentifierType used by ddms -->
    <xs:complexType name="CompoundSourceIdentifierType">
        <xs:annotation>
            <xs:appinfo>
                <mdr:definition>Type used to model the ddms:source
element.</mdr:definition>
            </xs:appinfo>
        </xs:annotation>
        <xs:attribute name="qualifier" type="associationQualifierUnion" use="optional"/>
        <xs:attribute name="value" type="xs:string" use="optional"/>
        <xs:attribute name="schemaQualifier" type="xs:string" use="optional"/>
        <xs:attribute name="schemaHref" type="xs:anyURI" use="optional"/>
    </xs:complexType>
    <!--contact - Section 5.1 - updated for MSC-DMS v1.4 - used by Resource.POCs and Contacts-->
    <xs:complexType name="contactType">
        <xs:sequence>
            <xs:choice>
                <xs:element name="Person" type="personType"/>
                <xs:element name="Organization" type="organizationType"/>
            </xs:choice>
            <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
            <!-- xs:element name="Role" type="pocRoleType" minOccurs="0"
maxOccurs="unbounded"/ -->
            <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
            <xs:element name="Security" type="securityType" minOccurs="0"/>
            <xs:element name="Image" type="imageType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>

```

```

<xs:complexType name="contactTypeRELAXED">
  <xs:sequence>
    <xs:choice>
      <xs:element name="Person" type="personType" minOccurs="0"/>
      <xs:element name="Organization" type="organizationType"
minOccurs="0"/>
    </xs:choice>
    <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
    <!-- xs:element name="Role" type="pocRoleType" minOccurs="0"
maxOccurs="unbounded" / -->
    <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
    <xs:element name="Security" type="securityType" minOccurs="0"/>
    <xs:element name="Image" type="imageType" minOccurs="0"
maxOccurs="unbounded" />
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--date - Section 4.5-->
<xs:complexType name="dateMaxType">
  <xs:attribute name="value" type="xs:date" use="required"/>
  <xs:attribute name="type" type="dateTypeUnion" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="dateMinType">
  <xs:attribute name="value" type="xs:date" use="required"/>
  <xs:attribute name="type" type="dateTypeUnion"/>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="datesType">
  <xs:sequence>
    <xs:element name="Date" type="dateMaxType" maxOccurs="unbounded"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<!--description - Section 4.4-->
<xs:complexType name="descriptionGenericType">
  <xs:sequence>
    <xs:element name="Text" type="stringType"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="descriptionType">
  <xs:sequence>
    <xs:element name="Text" type="stringType"/>
    <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
    <xs:element name="Security" type="securityType" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="emailType">
  <xs:attribute name="type" type="emailTypeUnion" use="required"/>
  <xs:attribute name="address" type="xs:string" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="formatType">
  <xs:complexContent>
    <xs:extension base="ddms:MediaType">
      <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:extension>
    <!-- xs:attribute name="taxonomy" type="nonEmptyString" / -->
  </xs:complexContent>
  <!--due to change of DDMS 2.0, "any" subelement no longer supported for format Type -
->
</xs:complexType>
<xs:complexType name="genericStringValue">
  <xs:attribute name="value" type="xs:string" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax" />

```

```

</xs:complexType>
<xs:complexType name="historyType">
  <xs:sequence>
    <xs:element name="Date" type="dateMinType" minOccurs="0"/>
    <xs:element name="Description" type="descriptionGenericType"/>
    <xs:element name="POCref" type="pocReferenceType" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--image - Section 4.15 (was previously glyph)-->
<xs:complexType name="imageType">
  <xs:sequence>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="src" type="xs:anyURI" use="required"/>
  <xs:attribute name="type" type="imageTypeUnion" use="required"/>
  <xs:attribute name="height" type="xs:short"/>
  <xs:attribute name="width" type="xs:short"/>
  <xs:attribute name="alt" type="xs:string"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="keywordsType">
  <xs:sequence>
    <xs:element name="Keyword" type="keywordType" maxOccurs="unbounded"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--keyword - Section 4.14-->
<xs:complexType name="keywordType">
  <xs:complexContent>
    <xs:extension base="ddms:CompoundKeywordIdentifierType">
      <xs:sequence>
        <xs:any namespace="##other" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="taxonomy" type="nonEmptyString"/>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:complexType name="languageType">
  <xs:complexContent>
    <xs:extension base="ddms:CompoundLanguageIdentifierType">
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:complexType name="locationType">
  <xs:attribute name="value" type="xs:anyURI" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--media - Section 4.16-->
<xs:complexType name="mediaType">
  <xs:sequence>
    <xs:element name="Format" type="formatType" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="Location" type="locationType" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
    <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
    <xs:element name="Security" type="securityType" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="organizationType">
  <xs:sequence>

```

```

        <xs:element name="Name" type="genericStringValue" />
        <xs:element name="Type" type="organizationType" />
        <xs:element name="Address" type="addressInfoType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="Phone" type="phoneType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="Email" type="emailType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="WebAddress" type="genericStringValue" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="ContactInstruction" type="genericStringValue"
minOccurs="0" maxOccurs="unbounded" />
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="organizationID" type="xs:anyURI" />
    <xs:attribute name="sponsorID" type="xs:anyURI" />
    <xs:attribute name="parentID" type="xs:anyURI" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="organizationType">
    <xs:attribute name="value" type="organizationTypeUnion" use="required" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="orgReferenceType">
    <xs:attribute name="organizationID" type="xs:anyURI" use="optional" />
    <xs:attribute name="position" type="xs:string" use="optional" />
    <xs:attribute name="value" type="xs:string" use="required" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="personNameType">
    <xs:attribute name="title" type="titleValueUnion" use="optional" />
    <xs:attribute name="first" type="xs:string" use="required" />
    <xs:attribute name="middle" type="xs:string" />
    <xs:attribute name="last" type="xs:string" use="required" />
    <xs:attribute name="suffix" type="suffixValueUnion" use="optional" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="personPositionType">
    <xs:sequence>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="value" type="xs:string" use="required" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="personReferenceType">
    <xs:sequence>
        <xs:element name="Name" type="personNameType" />
    </xs:sequence>
    <xs:attribute name="personID" type="xs:anyURI" use="optional" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
<xs:complexType name="personType">
    <xs:sequence>
        <xs:element name="Name" type="personNameType" />
        <xs:element name="Affiliation" type="orgReferenceType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="JobTitle" type="genericStringValue" minOccurs="0" />
        <xs:element name="Address" type="addressInfoType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="Phone" type="phoneType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="Email" type="emailType" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="WebAddress" type="genericStringValue" minOccurs="0"
maxOccurs="unbounded" />
        <xs:element name="ContactInstruction" type="genericStringValue"
minOccurs="0" maxOccurs="unbounded" />
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="personID" type="xs:anyURI" />
    <xs:attribute name="sponsorID" type="xs:anyURI" />

```

```

        <xs:attribute name="supervisorID" type="xs:anyURI" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="phoneType">
        <xs:attribute name="type" type="phoneTypeUnion" use="required" />
        <xs:attribute name="number" type="xs:string" use="required" />
        <xs:attribute name="extension" type="xs:string" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="pocReferenceType">
        <xs:sequence>
            <xs:choice>
                <xs:element name="Person" type="personReferenceType" />
                <xs:element name="Org" type="orgReferenceType" />
            </xs:choice>
            <xs:element name="Description" type="descriptionGenericType" minOccurs="0" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="pocRoleType">
        <xs:attribute name="value" type="pocRoleUnion" use="required" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="pocsType">
        <xs:sequence>
            <xs:element name="POC" type="pocType" maxOccurs="unbounded" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!-- poc - Section 4.11 (see also contact - Section 5.1)-->
    <xs:complexType name="pocType">
        <xs:complexContent>
            <xs:extension base="contactType">
                <xs:attribute name="role" type="pocRoleUnion" default="unspecified" />
            </xs:extension>
            <!-- xs:sequence
                <xs:element name="Role" type="pocRoleType" minOccurs="0"
                    maxOccurs="unbounded" />
            -->
        </xs:complexContent>
    </xs:complexType>
    <!-- releasability - Section 4.8-->
    <xs:complexType name="releasabilityType">
        <xs:attribute name="value" type="releasabilityValueUnion" use="required" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!-- rights - Section 4.7-->
    <xs:complexType name="rightsType">
        <xs:complexContent>
            <xs:extension base="ddms:RightsType">
                <xs:sequence>
                    <xs:element name="POCref" type="pocReferenceType"
                        minOccurs="0" maxOccurs="unbounded" />
                    <xs:any namespace="##other" minOccurs="0"
                        maxOccurs="unbounded" />
                </xs:sequence>
                <xs:attribute name="taxonomy" type="nonEmptyString" />
                <xs:anyAttribute namespace="##other" processContents="lax" />
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <!-- security - Section 4.9-->
    <xs:complexType name="securityType">
        <xs:annotation>
            <xs:appinfo>
                <mdr:definition>Type used to model the ddms:source
                    element.</mdr:definition>
            </xs:appinfo>
        </xs:annotation>

```

```

        <xs:sequence>
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attributeGroup ref="icism:SecurityAttributesOptionGroup" />
        <xs:attribute name="taxonomy" type="nonEmptyString" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="stringType">
        <xs:simpleContent>
            <xs:extension base="xs:string">
                <xs:anyAttribute namespace="##other" processContents="lax" />
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="taxonomiesCitedType">
        <xs:sequence>
            <xs:element name="TaxonomyCited" type="taxonomyCitedType"
maxOccurs="unbounded" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!--taxonomyCited - Section 4.18-->
    <xs:complexType name="taxonomyCitedType">
        <xs:sequence>
            <xs:element name="Description" type="descriptionGenericType" minOccurs="0" />
            <xs:element name="Location" type="locationType" minOccurs="0"
maxOccurs="unbounded" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="value" type="xs:string" use="required" />
        <xs:attribute name="version" type="xs:string" use="optional" />
        <xs:attribute name="taxonomy_ID" type="xs:anyURI" use="optional" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!--title - Section 4.2-->
    <xs:complexType name="titleType">
        <xs:sequence>
            <xs:element name="Releasability" type="releasabilityType" minOccurs="0" />
            <xs:element name="Security" type="securityType" minOccurs="0" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="value" type="xs:string" use="required" />
        <xs:attribute name="subtitle" type="xs:string" />
        <xs:attribute name="acronym" type="xs:string" />
        <xs:attribute name="documentNumber" type="xs:string" />
        <xs:attribute name="taxonomy" type="nonEmptyString" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="titleGenericType">
        <xs:attribute name="value" type="xs:string" use="required" />
        <xs:attribute name="subtitle" type="xs:string" />
        <xs:attribute name="acronym" type="xs:string" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!--type - Section 4.3-->
    <xs:complexType name="typeType">
        <xs:attribute name="value" type="typeValueUnion" use="required" />
        <xs:attribute name="subtype" type="xs:string" use="optional" />
        <xs:attribute name="ads-designation" type="adsDesignationUnion" />
        <xs:attribute name="taxonomy" type="nonEmptyString" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <xs:complexType name="usagesType">
        <xs:sequence>
            <xs:element name="Usage" type="usageType" maxOccurs="unbounded" />
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
    <!--usage - Section 4.15 -->

```

```

<xs:complexType name="usageType">
  <xs:sequence>
    <xs:element name="Purpose" type="genericStringValue"/>
    <xs:element name="ApplicationDomain" type="applicationDomainType"
minOccurs="0"/>
    <xs:element name="Limitations" type="genericStringValue" minOccurs="0"/>
    <xs:element name="History" type="historyType" minOccurs="0"/>
    <xs:element name="Language" type="languageType" minOccurs="0"/>
    <xs:element name="Capabilities" type="genericStringValue" minOccurs="0"/>
    <xs:element name="Releasability" type="releasabilityType" minOccurs="0"/>
    <xs:element name="Security" type="securityType" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="versionType">
  <xs:attribute name="value" type="xs:string" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!-- ENUMERATIONS (i.e. Pick List Types)-->
<xs:simpleType name="adsDesignationEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Category I"/>
    <xs:enumeration value="Category II"/>
    <xs:enumeration value="Category III"/>
    <xs:enumeration value="Authoritative - T"/>
    <xs:enumeration value="Approved - T"/>
    <xs:enumeration value="Other - T"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="adsDesignationUnion">
  <xs:union memberTypes="adsDesignationEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="applicationDomainTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="analysis"/>
    <xs:enumeration value="training"/>
    <xs:enumeration value="t&e"/>
    <xs:enumeration value="engineering"/>
    <xs:enumeration value="acquisition"/>
    <xs:enumeration value="planning"/>
    <xs:enumeration value="assessment"/>
    <xs:enumeration value="doctrine"/>
    <xs:enumeration value="logistics"/>
    <xs:enumeration value="support to ops"/>
    <xs:enumeration value="intelligence"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="applicationDomainTypeUnion">
  <xs:union memberTypes="applicationDomainTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="associationQualifierEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="URL"/>
    <xs:enumeration value="code"/>
    <xs:enumeration value="image"/>
    <xs:enumeration value="text"/>
    <xs:enumeration value="doc"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="associationQualifierUnion">
  <xs:union memberTypes="associationQualifierEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="associationRelationshipEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="has-a"/>
    <xs:enumeration value="is-part-of"/>
    <xs:enumeration value="is-type-of"/>
    <xs:enumeration value="is-described-by"/>
  </xs:restriction>

```

```

</xs:simpleType>
<xs:simpleType name="associationRelationshipUnion">
  <xs:union memberTypes="associationRelationshipEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="associationTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="resource_asset"/>
    <xs:enumeration value="contact"/>
    <xs:enumeration value="taxonomy"/>
    <xs:enumeration value="support_asset"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="associationTypeUnion">
  <xs:union memberTypes="associationTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="dateTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="created"/>
    <xs:enumeration value="posted"/>
    <xs:enumeration value="accepted"/>
    <xs:enumeration value="modified"/>
    <xs:enumeration value="validTil"/>
    <xs:enumeration value="infoCutOff"/>
    <xs:enumeration value="used"/>
    <xs:enumeration value="v&v"/>
    <xs:enumeration value="accreditation"/>
    <xs:enumeration value="retired"/>
    <xs:enumeration value="lastVerified"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="dateTypeUnion">
  <xs:union memberTypes="dateTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="emailTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="work"/>
    <xs:enumeration value="home"/>
    <xs:enumeration value="NIPRNET"/>
    <xs:enumeration value="SIPRNET"/>
    <xs:enumeration value="JWICS"/>
    <xs:enumeration value="DKO"/>
    <xs:enumeration value="AKO"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="emailTypeUnion">
  <xs:union memberTypes="emailTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="imageTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="BITMAP"/>
    <xs:enumeration value="JPG"/>
    <xs:enumeration value="GIF"/>
    <xs:enumeration value="PNG"/>
    <xs:enumeration value="TIFF"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="imageTypeUnion">
  <xs:union memberTypes="imageTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="organizationTypeEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="government"/>
    <xs:enumeration value="academia"/>
    <xs:enumeration value="industry"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="organizationTypeUnion">
  <xs:union memberTypes="organizationTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="phoneTypeEnumerations">
  <xs:restriction base="xs:string">

```

```

        <xs:enumeration value="work" />
        <xs:enumeration value="home" />
        <xs:enumeration value="DSN" />
        <xs:enumeration value="mobile" />
        <xs:enumeration value="fax" />
        <xs:enumeration value="skype" />
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="phoneTypeUnion">
    <xs:union memberTypes="phoneTypeEnumerations xs:string" />
</xs:simpleType>
<xs:simpleType name="pocRoleEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="primary author" />
        <xs:enumeration value="contributor" />
        <xs:enumeration value="publisher" />
        <xs:enumeration value="proponent" />
        <xs:enumeration value="sponsor" />
        <xs:enumeration value="release authority" />
        <xs:enumeration value="IP holder" />
        <xs:enumeration value="copyright holder" />
        <xs:enumeration value="technical POC" />
        <xs:enumeration value="ADS-Designator" />
        <xs:enumeration value="unspecified" />
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="pocRoleUnion">
    <xs:union memberTypes="pocRoleEnumerations xs:string" />
</xs:simpleType>
<xs:simpleType name="releasabilityValueEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="A: Unlimited distribution " />
        <xs:enumeration value="B: U.S. Govt. agencies only" />
        <xs:enumeration value="C: U.S. Govt. agencies and contractors only" />
        <xs:enumeration value="D: DoD and DoD contractors only" />
        <xs:enumeration value="E: DoD components only" />
        <xs:enumeration value="F: As directed by DoD originator" />
        <xs:enumeration value="X: Those eligible to obtain export-controlled
technical data" />
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="releasabilityValueUnion">
    <xs:union memberTypes="releasabilityValueEnumerations xs:string" />
</xs:simpleType>
<!--Version 1.4 update - pick list added to reflect suffix of person w/ name component-->
<xs:simpleType name="suffixValueEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="I" />
        <xs:enumeration value="II" />
        <xs:enumeration value="III" />
        <xs:enumeration value="IV" />
        <xs:enumeration value="V" />
        <xs:enumeration value="VI" />
        <xs:enumeration value="Jr." />
        <xs:enumeration value="Sr." />
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="suffixValueUnion">
    <xs:union memberTypes="suffixValueEnumerations xs:string" />
</xs:simpleType>
<xs:simpleType name="supportAssettTypeEnumerations">
    <xs:restriction base="xs:string">
        <xs:enumeration value="infrastructure" />
        <xs:enumeration value="supported_events" />
        <xs:enumeration value="future_capabilities_requirements" />
        <xs:enumeration value="related_documents" />
        <xs:enumeration value="environment" />
        <xs:enumeration value="subject_matter_expert" />
    </xs:restriction>
</xs:simpleType>
<!--Version 1.4 update - pick list added to reflect title of person w/ name component-->

```

```

<xs:simpleType name="titleValueEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Dr." />
    <xs:enumeration value="Miss" />
    <xs:enumeration value="Mr." />
    <xs:enumeration value="Mrs." />
    <xs:enumeration value="Ms." />
    <xs:enumeration value="Prof." />
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="titleValueUnion">
  <xs:union memberTypes="titleValueEnumerations xs:string" />
</xs:simpleType>
<!--Version 1.2 update - pick list updated to reflect style of typeValueEnumerations
(underscores instead of spaces) -->
<!--Version 1.4 update - pick list updated to reflect singular values rather than plural and
update of interface_model_specification to interface_model_specification AND resource_document from
software_design_document-->
<xs:simpleType name="typeValueEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="software" />
    <xs:enumeration value="tool" />
    <xs:enumeration value="federation" />
    <xs:enumeration value="software_component" />
    <xs:enumeration value="service" />
    <xs:enumeration value="data" />
    <xs:enumeration value="data_model" />
    <xs:enumeration value="interface_model_specification" />
    <xs:enumeration value="resource_document" />
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="typeValueUnion">
  <xs:union memberTypes="typeValueEnumerations xs:string" />
</xs:simpleType>
</xs:schema>

```

C.8 MSC-DMS-Multicard.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- DoD Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification
(MSC-DMS) -->
<!-- updated with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions,
Inc.) -->
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Curtis Blais (Naval Postgraduate
School) -->
<!-- version 1.4 - 12/20/2010 -->
<!-- version 1.3.1 - 3/22/2010 -->
<!-- version 1.3 - 2/17/2010 -->
<!-- version 1.2 - 5/21/2009 -->
<!-- version 1.1 - 8/27/2008 -->
<!-- version 1.0.1 - 1/7/2008 -->
<xs:schema xmlns="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ms="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/"
xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/1.4/" xmlns:icism="urn:us:gov:ic:ism:v2"
xmlns:gml="http://www.opengis.net/gml" xmlns:mdr="http://metadata.dod.mil/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.4/" elementFormDefault="qualified"
attributeFormDefault="qualified" version="1.4">
  <xs:include schemaLocation="MSC-DMS-Resource-v1_4.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Contact-v1_4.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Taxonomy-v1_4.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
      12/20/2010 - Updated to support version 1.4 (supports Resources, Contacts, and
Taxonomy Classifications)
      3/22/2010 - Updated to support version 1.3.1
      2/17/2010 - Updated to support version 1.3
      4/30/2009 - New schema allowing multiple Resource elements
    </xs:documentation>
  </xs:annotation>

```

```

</xs:annotation>
<xs:element name="Multicard">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Title" type="titleGenericType" minOccurs="0"/>
      <xs:element name="Description" type="descriptionGenericType"
minOccurs="0"/>
      <xs:element name="Metacards">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Resource" type="resourceType"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Contact" type="contactType"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Taxonomy" type="taxonomyType"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:any namespace="##other"
processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="Releasability" type="releasabilityType"
minOccurs="0"/>
      <xs:element name="Security" type="securityType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
</xs:schema>

```

Appendix D - References

Several specifications, documents, and technical references provide the technical foundation for the MSC Discovery Metadata characteristics and structure defined in this specification. As such, this specification should be used in conjunction with the publications and resources listed in Table D-1. If any of the specifications identified in Table D-1 are superseded by an approved revision, then the revision shall apply.

Table D-1 Reference Documents and Resources

Document Number	Title
Air Force MSRR	Air Force Agency for Modeling and Simulation (AFAMS), "Air Force Modeling and Simulation Resource Repository," https://afmsrr.afams.af.mil/
ANSI/NISO X39.85-2001	National Information Standards Organization, "The Dublin Core Metadata Component Set," September 2001
Army MSRR	DAMO-MS/Army Modeling & Simulation Directorate, "Army Modeling and Simulation Resource Repository," http://www.msrr.army.mil/
DAMSMP	Department of Defense Acquisition Modeling and Simulation Master Plan, April 17, 2006
DoD 5000.59-M	"Glossary of Modeling and Simulation Terms," January 15, 1998
DoD Directive 5000.01	"The Defense Acquisition System," May 12, 2003
DoD Directive 5000.59	DoD Modeling and Simulation (M&S) Management," Change 1, January 20, 1998
DoD Discovery Metadata Specification	Deputy Assistant Secretary of Defense (Deputy Chief Information Officer), "Department of Defense Discovery Metadata Specification," Version 2.0, 16 July 2008
DoD MSRR	Modeling and Simulation Information Analysis Center (MSIAC) "DoD Modeling and Simulation Resource Repository," http://msrr.dod-msiac.org/
DoDI 5000.61	"DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)," December 9, 2009
DoN M&S VVA Handbook	DON M&S VVA Implementation Handbook
Glossary of Defense Acquisition Acronyms and Terms	DoD Defense Acquisition University, "Glossary of Defense Acquisition Acronyms and Terms," 12 Edition, July 2005
IEEE SP1122 ISBN 0-7381-2601-2	Authoritative Dictionary of IEEE Standard Terms for Reference, 7 th Edition
IEEE Std 1516.2-2000*	IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Object Model Template (OMT) Specification
IEEE Std 1516.3-2003	IEEE Recommended Practice for High Level Architecture (HLA) Federation Development and Execution Process (FEDEP)
Implementation Profile for Information Security Markings	Implementation Profile for Information Security Markings (XML Encoding): Developer's Guide, version 1.0

Navy MSRR	Navy Modeling and Simulation Office (NMSO), “Navy Modeling and Simulation Resource Repository,” https://nmso.navy.mil
Net-Centric Environment Joint Functional Concept	DTIC, “Net-Centric Environment Joint Functional Concept,” Version 1.0, April 7, 2005, http://www.dtic.mil/futurejointwarfare/concepts/netcentric_jfc.pdf
PDMS	Product Development Metadata Specification
MIL-STD-3022	Documentation of Verification, Validation, and Accreditation (VV&A) for Models and Simulations
SISO-STD-003	Base Object Model (BOM) Template Specification

Additional resources referenced in this document, which are referenced by a footnote identifier, are provided below:

ⁱ <http://www.dod.mil/cio-nii/coi>

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^{viii} Department of Defense, Department of Defense Discovery Metadata Specification (DDMS), Version 3, 7 January 2010

^{ix} Department of Defense Modeling and Simulation Coordination Office. *Modeling and Simulation (M&S) Community of Interest (COI) Discovery Metadata Specification (MSC-DMS)*, Version 1.2, February 20, 2009. On-line at http://www.msco.mil/resource_discovery.html, accessed March 17, 2009.

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^{xii} S. Adelman, L. T. Moss, and M. Abai. *Data Strategy*. Upper Saddle River, NJ: Addison-Wesley, 2005.

^{xiii} M. D. Petty. “M&S Data Strategies.” *Defense Acquisition University Continuous Learning Module*, September 29, 2009.

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^{xvii} Department of Defense, Department of Defense Discovery Metadata Specification (DDMS), Version 3, 7 January 2010

^{xviii} Department of Defense, Department of Defense Discovery Metadata Specification (DDMS), Version 3, 7 January 2010

^{xix} Department of Defense. *Net-Centric Environment Joint Functional Concept*, Version 1.0, April 7, 2005. Online at: www.dtic.mil/futurejointwarfare/concepts/netcentric_jfc.pdf

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^{xxiii} IEEE Std 100-1996, "The IEEE Standard Dictionary of Electrical and Electronics Terms", 6th Edition, 1996.

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^{xxv} Department of Defense. *Directive 5000.59 DoD Modeling and Simulation (M&S) Management*, August 8, 2007. Online at: www.dtic.mil/whs/directives/corres/pdf/500059p.pdf.

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