

UNCLASSIFIED

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

Version 1.3

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Department of Defense (DoD)
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Forward

The Department of Defense (DoD) M&S Community of Interest (COI) Discovery Metadata Specification defines Discovery Metadata elements for M&S resources 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 (MSC) 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 resources.

This document is divided into two main sections. The first section (Chapter 1) provides information about the scope and purpose of the document, the structure of the MSC-DMS. The second section (Chapters 2 through 6) contains a comprehensive listing of each of the elements and attributes that comprise the various layers of the MSC-DMS. Additionally there are 5 appendices which include a references list, a definitions list, and a schema listing (both text and graphical).

This document describes the MSC-DMS elements 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 elements 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:

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Change History

10 February 2010 - Version 1.3 (Community Release)

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 element
- Modified and improved the VV&A Coverage Metadata Set extension/supplemental component
- Guidance on how to mark a 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 schema 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* subelements (*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 attribute 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 elements to element sets represented with attribute values. This is to allow for easier extensibility of element 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

Type of Change	Element(s)	Belonging To	Comments
Add	<i>Releasability and Security</i>	<i>Resource</i> (root), <i>Title</i> , <i>Description</i> , <i>Association</i> , <i>POC</i> , <i>Usage</i> <i>Media</i>	<i>Releasability</i> : Distribution statements like "A: Unlimited" or "B: US Government agencies only". <i>Security</i> : 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	<i>ADS-Designation</i>	<i>Type</i> , <i>Association</i>	Allow marking of authoritative data sources.
Rename	<i>Associations</i> (from <i>References</i>)	<i>Resource</i>	Applicability is much broader than bibliographic references.
Add	<i>type</i> , <i>ADS-Designation</i> , and <i>constraints</i>	<i>Association</i>	Enhance flexibility of <i>Association</i> .
Add to pick-list	<i>Role</i>	<i>POC Type</i>	Allow <i>ADS-Designator</i> to support Authoritative Data Sources
Add	<i>Description</i>	<i>POC Type</i> <i>Association</i> <i>History</i> <i>Media</i> <i>Configuration</i> <i>Management</i>	E.g., to allow description for metadata elements such as describing ADS designation for a POC

Add	<i>Type and Address</i>	<i>Core Email Type</i>	E.g., NIPR, SIPR, and JWICS addresses.
Add	<i>Capabilities</i>	<i>Core Usage Type</i>	E.g., AAW, ASW, SUW
Add	<i>Configuration Management</i>	Extensions	Include Type to identify, “User Group”, “CCB”, “Executive Steering Committee”, “None” and POC reference
Add	<i>Accreditation (VV&A) Type</i>	Extensions	To support VV&A/VV&C. Relates to work performed in conjunction with the DoD VV&A Documentation Tool (DVDT).
Update	<i>HLA Coverage</i>	Extensions	Enhanced flexibility of HLA coverage and added Name element 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 Metadata Set type*
- Extension of *the History Metadata Set type which is used by the Usage Metadata Set Type* to now include greater information regarding History entry
- Addition of a Relationship field within the *Reference Type*
- Ability to tag Security Attributes at Core Layer for a *Resource Type*

Specifically, it was found that a single date entry in the *Dates* element for Verification and Validation (V&V) and Accreditation are not sufficient. There may be any 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 Type Metadata Set* (now identified as the *Association Type* beginning in Version 1.1) of the metadata has been extended with a *Relationship* metadata element (now identified as an *Association* metadata element beginning in Version 1.1) to better represent hierarchy and organization. This metadata set allows for an M&S resource to identify if a 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-ICMS) standard metadata elements, is applied at the *Resource Type* level. This approach also follows closely with the DDMS style, with the exception that is restricted to the *Resource Type* rather than other types.

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 elements: 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 M&S COI Discovery Metadata specification.

References

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

Definitions

Terms used in this Specification are defined in Appendix B.

Abbreviations and Acronyms

ADS	Authoritative Data Source
ASD	Assistant Secretary of Defense
ASD NII	Assistant Secretary of Defense Networks & Information Integration
AT&L	Acquisition, Technology, and Logistics
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
SISO	Simulation Interoperability Standards Organization
SOA	Service Oriented Architecture
SOM	Simulation Object Model
T&E	Test and Evaluation
URL	Uniform Resource Locator
VV&A	Verification, Validation, and Accreditation
WG	Working Group
XML	Extensible Markup Language
XSD	XML Stylesheet Description

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 resources 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.

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

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

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.

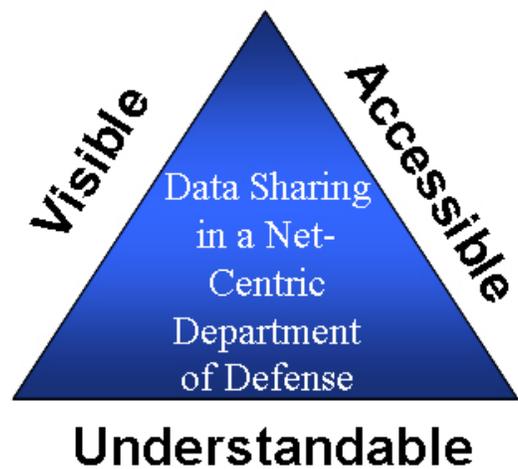
1.2 Terms of Reference

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.

1.2.1 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 resources. Additionally, careful attention has been made to extend upon the DDMS to support M&S resource sharing needs.



² <http://www.dod.mil/cio-nii/coi>

1.2.2 Discovery Metadata

This specification is focused on the concept of metadata with respect to the visibility, accessibility, and understanding of M&S resources. 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.

- **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,
 - taxonomies
- Register in DoD Metadata Registry, use submission package
- About Making things understandable

- **Discovery Metadata**

- aid in the recall and retrieval of artifacts
- Artifacts that we collect resource metadata on (M&S Assets)
 - M&S software
 - Adjunct tools (e.g., data loggers)
 - Federations of simulations
 - M&S services
 - M&S data
 - M&S data models
 - Interface specifications
 - M&S software design documents
- Register in “Metadata Catalogs”, use DDMS bibliographic information
- About Making things visible

Figure 1-2 Types of Metadata

Discovery is defined as “ability to locate data assets through a consistent and flexible search.”⁴ *Discovery Metadata* is focused on tagging the outer shell of resources in a way so that the resource is clearly marked and rediscoverable, whereas *Structural Metadata* is focused on describing the framework and organization of information (the internal aspects). 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.

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

⁴ DDMS web page

1.3 Scope

The scope of this document is to identify the necessary Discovery Metadata components needed to support the visibility, accessibility, and understandability of M&S Resources within the DoD community. Such M&S Resources include, but are not limited to the following;

1. M&S software (*implements a model or simulation*)
2. Adjunct tools (*e.g., data loggers*)
3. Federations of simulations
4. M&S software components
5. M&S services (*models and simulations implemented as web services*)
6. M&S data (*data in M&S-usable format and data produced by M&S*)
7. M&S data models (*structural metadata for M&S data*)
8. Interface specifications
9. M&S software design documents

Each of these M&S Resources is further defined in Appendix B.

In addition to these M&S Resources, several M&S Support Assets have been identified, for which M&S resources may apply. These M&S Support Assets included, but are not limited to the following:

1. M&S infrastructure (*e.g., facilities, networks, communication assets, libraries*)
2. M&S supported events (*e.g., tests, analysis, research, experiments, tasks*)
3. M&S future capabilities requirements
4. M&S related documents (*describes use and application of an M&S resource, event, or future capability*)
5. M&S environment (*set of interconnected M&S elements, e.g., infrastructure, and resources to conduct an event*)

Each of these M&S Support Assets is further defined in Appendix B.

Any of the M&S Resources identified earlier may include associations to artifacts representative of either asset category: M&S Resources or M&S Support Assets.

1.4 Objective

Develop a Discovery Metadata specification suitable for use within the M&S Community of Interest, specifically by the Community and Service efforts that make M&S assets available for use by others, thereby supporting the intent of the DoD Net Centric Data Strategy:

- Ensuring data are visible, accessible, and understandable when needed and where needed to accelerate decision making
- “Tagging” of all data (intelligence, non-intelligence, raw, and processed) with metadata to enable discovery by known and unanticipated users in the Enterprise
- Posting of all data to shared spaces for users to access except when limited by security, policy, or regulations

1.5 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 discovery of metadata assets used for M&S purposes.

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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 both the mandatory core set of metadata and recommended core set of metadata for the discovery of M&S assets, and identifies the supplemental set of metadata for supporting specific community M&S datasets. Figure 2-1 depicts the organization of the metadata. It includes the recommended supplemental set of metadata needed for specific communities such as Acquisition, Test & Evaluation (T&E), and Analysis; Services such as the Navy, Army, Air Force, and Marine Corps; and the associated practices that are cross-cutting for such communities and Services such as verification, validation, and accreditation (VV&A).

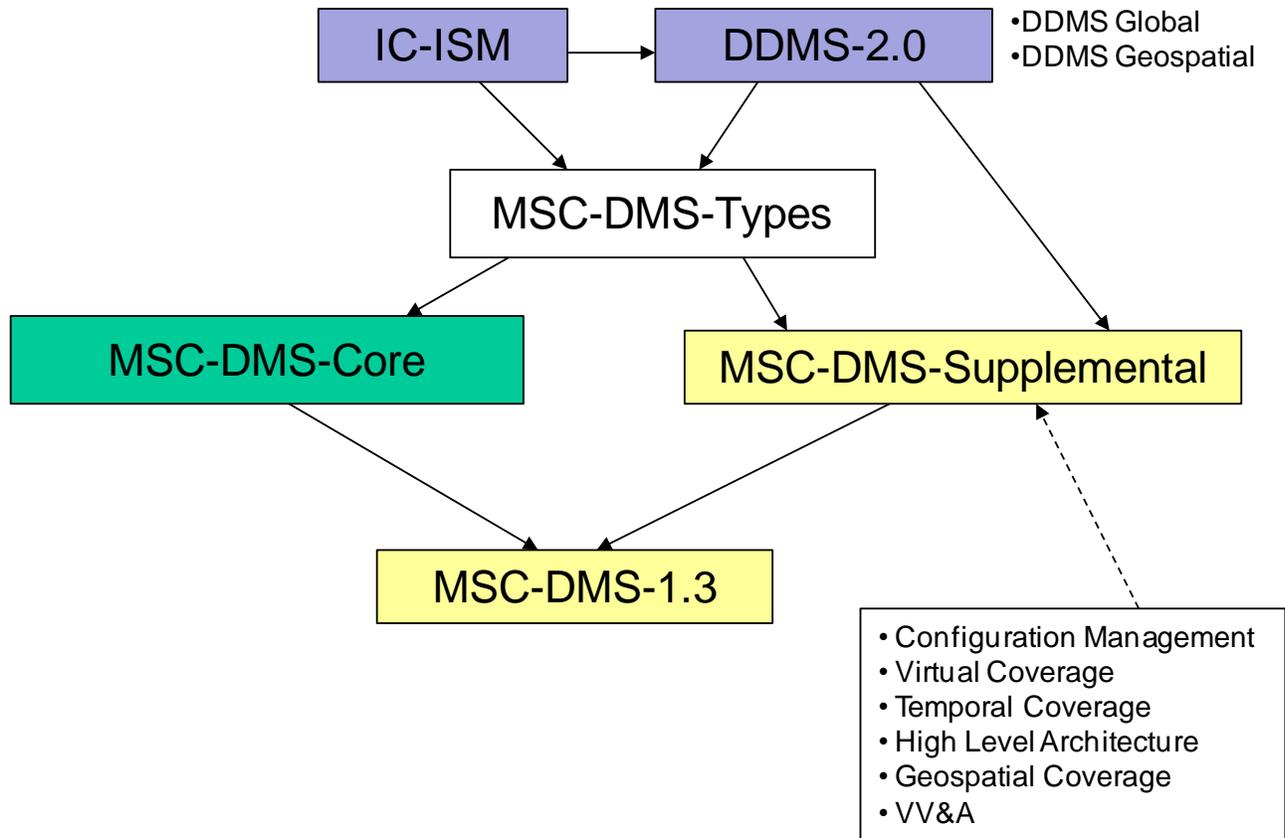


Figure 2-1 Organization Structure for the M&S COI Discovery Metadata Specification

2.2 Organization

The “Green” shaded boxes in Figure 2-1 represent those core metadata elements and entities needed or recommended for all types of M&S resources. The “Yellow” shaded boxes above represent

those supplemental metadata elements and entities which are either suggested or provided to enhance a specific operational requirement or community interest. The “Lavender” shaded boxes above represent existing standards that are leveraged in helping define the MSC Discovery Metadata Types used for the core and supplemental components.

2.2.1 Core Layer

“MSC-DMS-Core” identifies the Core Layer of metadata which should 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 elements and entities. All datasets are driven by the work of the DoD Metadata Working Group including the DoD Metadata Specification (DDMS), and the Intelligence Community (IC) metadata standards, and the various communities of interest. Therefore, this level of metadata is the minimum core for M&S assets regardless of the specific application (acquisition, T&E, VV&A, or analysis). It is designed to assist in discovery and retrieval.

2.2.2 Supplemental Layer

“MSC-DMS-Supplemental” identifies a layer of metadata which is an extension of the MSC-DMS-Core 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.

3 Data Element Guide

3.1 Notes on Element Definitions

This section provides notes to assist the reader in understanding the various MSC-DMS elements, herein referred to as metadata elements. The metadata elements defined in this document are organized similarly to the DDMS structure with the exception that metadata elements are described using a set of tables with descriptive fields closely associated to the style used in the Institute of Electrical and Electronics Engineers (IEEE) 1516.3 High Level Architecture (HLA) Object Model Template (OMT) – Section 4: HLA OMT Components. Specifically, the table style has been augmented to include data types (or enumerated values) and comments related to metadata elements.

The metadata elements that compose the MSC-DMS are contained in Sections 4 and 5 of this document. Each major metadata element, which contains sub-elements, is formally identified as a metadata set. Each metadata set is defined by a table, which lists the metadata elements contained within the Metadata Set. Additionally, a second table is provided to illustrate implementation examples and aid in understanding. Table 3-1 lists and defines the fields used in the primary Metadata Sets. 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 elements associated to the Metadata Set.

Table 3-1 Metadata Set - Columns and Explanations

Metadata Element	Description	Occurs	Values	Comment
Specifies the categories of data recognized as elements or sub-elements that are provided in this table. Sub-elements, if applicable, are always indented.	A plain text definition of the element.	Specifies whether use of the element is mandatory, optional	Italics are used to denote the type of data that is provided (e.g., text). Normal font is used to denote potential literal values (i.e., enumerations).	Specifies what the element encompasses, or any useful notes

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

Table Format		XML Format
Metadata Element	Value	
Specifies the categories of data that are provided in this table (e.g., element or sub-elements). Sub-elements, if applicable, are indented.	A plain text example depicting values pertaining to a metadata element.	If provided, identifies an example using XML syntax

3.2 Notes on Conventions

Conventions in this document specify how entries are to be formulated when identifying Discovery Metadata for an M&S Resource. The following conventions pertain to this specification.

3.2.1 Names

This specification defines an XML Schema for representing the core and supplemental components needed to represent M&S resources. Thus, specific metadata element “names,” which are represented in the schema as XML elements or attributes adhere to XML naming conventions. 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.).

3.2.2 Dot Notation

Dot Notation is a text convention for describing the affiliation of items, such as object classes and attributes, by placing them 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. A Dot Notation is used to ensure that the reference within the template component is unambiguous.

For example, the scheme **Platform.land.tank.M1.turret** is used to identify and use an **M1** tank as the *class* of interest, and the **turret** as the *attribute* that is of interest. Both the **M1** and **turret** are easily referenced by the class hierarchy tree defined in the text.

4 Resource Metadata Set

A design goal for all M&S resources is to facilitate reuse. Discovery Metadata provides information that enables inferences to be drawn regarding a resource’s reuse potential. It is important to include a minimum but sufficient degree of descriptive information for an M&S resource. 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 within an M&S resource is important. The purpose of the Resource Metadata Set is to document certain key *metadata* information about an M&S resource.

Discovery Metadata is composed of a group of interrelated elements specifying clarifying information related to an M&S resource. Figure 4-1 provides an illustration of the Resource Metadata Set, which integrates Core Layer and Supplemental Layer component views pertaining to Discovery Metadata.

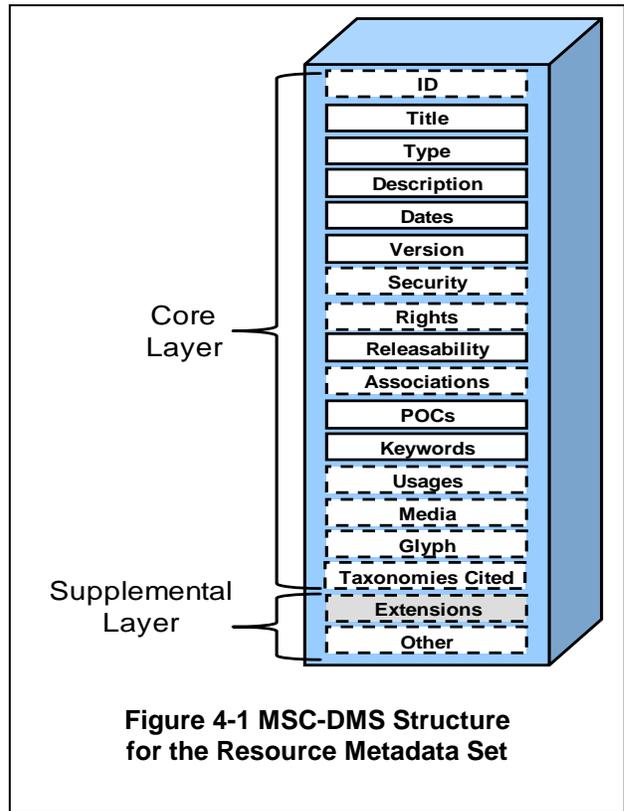


Figure 4-1 MSC-DMS Structure for the Resource Metadata Set

4.1 Purpose / Background

The Resource Metadata Set identifies the foundational metadata elements of an M&S resource required for both the Core and Supplemental Layers. Subcomponents pertaining to the Core Layer are presented within Section 5. Subcomponents pertaining to the Supplemental Layer are presented within Section 6.

4.2 Table Format

Table 4-1 provides a description of the metadata elements pertaining to the Resource Metadata Set information. The boxes with a solid outline represent required metadata elements, whereas the boxes with a dashed outline represent optional metadata elements. Many of the metadata elements used for the Resource Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were extended, altered or added to better support the M&S Community of Interest (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 Element	Description	Occurs	Values	Comment
<i>resource_ID</i>	Unique identifier associated to the related Resource being described	0..1	<i>Text</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.
<i>metacard_ID</i>	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>Text</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.
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing a Resource element.	0..1	<i>Text</i>	Any element 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)
<i>Title</i>	Title information assigned to the resource.	1	(see <i>Title – Section 5.1</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.
<i>Type</i>	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 – Section 5.2</i>)	
<i>Description</i>	This field provides an account of the content of the resource.	1	(see <i>Description – Section 5.3</i>)	
<i>Dates</i>	A calendar date associated with an event in the life cycle of the resource.	1		
<i>Date</i>	Identifies information for each date.	1..many	(see <i>Date – Section 5.4</i>)	
<i>Other</i>	Specifies other date information deemed relevant by the author of the resource.	0..many	<i>Text</i>	
<i>Version</i>	This field specifies the version identification assigned to the resource.	1	(see <i>Version – Section 5.5</i>)	
<i>Rights</i>	Information about rights held in and over the resource.	0..1	(see <i>Rights – Section 5.6</i>)	
<i>Releasability</i>	Information about the releasability of the title information.	1	(see <i>Releasability – Section 5.7</i>)	
<i>Security</i>	Information about the security of the resource.	0..1	(see <i>Security – Section 5.8</i>)	
<i>Associations</i>	Specifies references to original source material used to develop or derive the resource.	0..1		Serves as a container class to identify multiple references.
<i>Association</i>	Identifies information for each reference.	1..many	(see <i>Association – Section 5.9</i>)	
<i>Other</i>	Specifies other reference information deemed relevant by the author of the resource.	0..many	<i>text</i>	
<i>POCs</i>	Specifies organizations and/or persons who have a particular role with respect to the M&S resource.	1		At least one set of POC information be supplied. Multiple sets may be supplied.
<i>POC</i>	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 – Section 5.10</i>)	
<i>Other</i>	Specifies other POC information deemed relevant by the author of the resource.	0..many	<i>text</i>	

<i>Keywords</i>	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.
<i>Keyword</i>	Identifies information for each keyword.	1..many	(see <i>Keyword</i> – Section 5.13)	
<i>Other</i>	Specifies other keyword information deemed relevant by the author of the resource.	0..many	Text	
<i>Usages</i>	Specifies information about usages pertaining to the M&S resource.	0..1		
<i>Usage</i>	Identifies information for each usage.	1..many	(see <i>Usage</i> – Section 5.14)	
<i>Other</i>	Specifies other usage information deemed relevant by the author of the resource.	0..many	Text	
<i>Media</i>	Specifies information about the media pertaining to the M&S resource.	0..1	(see <i>Media</i> – Section 5.15)	The value that specifies the originating agency or discipline of the language vocabulary.
<i>Glyph</i>	Specifies an image that can be used to visually represent a resource.	0..many	(see <i>Glyph</i> – Section 5.16)	
<i>Taxonomies Cited</i>	Specifies taxonomies pertaining to a domain vocabulary source, which may be used in describing the M&S resource.	0..1		
<i>Taxonomy Cited</i>	Identifies information for each taxonomy cited.	1..many	(see <i>Taxonomy Cited</i> – Section 5.17)	
<i>Other</i>	Specifies other usage information deemed relevant by the author of the resource.	0..many	Text	
<i>Extensions</i>	Specifies the various extensions that can be added to the core M&S resource metadata.	0..1	(see Section 6 – Supplemental Layer Metadata Sets)	
<i>Virtual Coverage</i>	Specifies virtual coverage extension that can be added to core metadata.	0..many		
<i>Temporal Coverage</i>	Specifies temporal coverage extension that can be added to core metadata.	0..many		
<i>Geospatial Coverage</i>	Specifies geospatial coverage extension that can be added to core metadata.	0..many		
<i>HLA Coverage</i>	Specifies HLA coverage extension that can be added to core metadata.	0..1		
<i>Configuration Management</i>	Specifies configuration management aspects that can be added to the core metadata.	0..1		
<i>VVA Coverage</i>	Specifies additional vv&a coverage aspects that can be added to the core metadata.	0..1		
<i>Other</i>	Specifies other extension information deemed relevant by the author of the resource.	0..many		text
<i>Other</i>	Specifies other data deemed relevant by the author of the resource.	0..many	text	

4.3 Inclusion Criteria

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

5 Core Layer Metadata Sets

A design goal for the M&S COI Discovery Metadata template is to facilitate reuse. This section describes the Core set of metadata needed across communities. This includes the following metadata sets:

- Title
- Type
- Description
- Date
- Version
- Rights
- Releasability
- Security
- Association
- POC
- POC.Person
- POC.Organization
- Keyword
- Usage
- Media
- Glyph
- TaxonomiesCited

5.1 Title Metadata Set

5.1.1 Purpose / Background

It is important to identify a title pertaining to an M&S resource. This section describes the table format identified for capturing details for documenting a *Title*.

5.1.2 Table Format

Table 5-1 provides a description of the metadata elements pertaining to the Title Metadata Set. Many of the metadata elements used for the Title Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. 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 Title Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>value</i>	A name, or names, assigned to the resource.	1	<i>Text</i>	Typically, a title will be a name by which the resource is formally known.
<i>subtitle</i>	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	<i>Text</i>	Typically, a subtitle will be a name by which the resource may also be known or provides amplifying information about the resource.
<i>acronym</i>	An acronym used to also identify the resource	0..1	<i>Text</i>	Typically, an acronym will be an identifier by which the resource may also be known.
<i>document Number</i>	An alphanumeric identifier for an information resource that is assigned by the configuration manager for this type of resource.	0..1	<i>Text</i>	Often a document may be identified by a specific unique number, which may contain alphanumeric characters.
<i>Releasability</i>	Information about the releasability of the title information.	0..1	(see <i>Releasability – Section 5.7</i>)	
<i>Security</i>	Information about the security of the title information.	0..1	(see <i>Security – Section 5.8</i>)	

<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Title element.	0..1	<i>Text</i>	Any element 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)
<i>other</i>	Specifies other title information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.1.3 Inclusion Criteria

The metadata elements specified in Table 5-1 are necessary for all elements 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 *Title* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-2 Title Metadata Example

Table Format		XML Format
Metadata Element	Values	
<i>value</i>	Ballistic Model Algorithm	<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>
<i>subtitle</i>	Short Range Trajectory	
<i>acronym</i>	BMA-SRT	
<i>document Number</i>	ALGO_1523.13	
<i>Releasability</i>	—see Table 5.14 for example	
<i>Security</i>	—see Table 5.16 for example	
<i>other</i>	na	

5.2 Type Metadata Set

5.2.1 Purpose / Background

It is important to identify the type of M&S resource being cataloged. This section describes the table format identified for capturing details for documenting a resource *Type*.

5.2.2 Table Format

Table 5-3 provides a description of the metadata elements pertaining to the Type Metadata Set. Many of the metadata elements used for the Type Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. 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 Type Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>value</i>	Type includes terms describing general categories, functions, genres, or aggregation levels for content.	1	software, tool, federation, software_component, services, data, data_models, interface_specifiaton, software_design_document, other text	Recommended best practice is to select a value from a controlled vocabulary.
<i>subtype</i>	Identifies subtype of resource.	0..1	text	Depends on Type value.
<i>ADS designation</i>	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.
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Type element.	0..1	Text	Any element 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)
<i>other</i>	Specifies other type information deemed relevant by the author of the resource.	0..many	text	

5.2.3 Inclusion Criteria

The metadata elements specified in Table 5-3 are necessary for all elements 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 *Type* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-4 Type Metadata Example

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

5.3 Description Metadata Set

5.3.1 Purpose / Background

It is important to provide a description pertaining to an M&S resource. This section describes the table format identified for capturing details for providing a *Description*.

5.3.2 Table Format

Table 5-5 provides a description of the metadata elements pertaining to the Description Metadata Set. Many of the metadata elements used for the Description Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. 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 Description Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Text</i>	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.
<i>Releasability</i>	Information about the releasability of the title information.	0..1	<i>(see Releasability – Section 5.7)</i>	
<i>Security</i>	Information about the security of the title information.	0..1	<i>(see Security – Section 5.8)</i>	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Description element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.3.3 Inclusion Criteria

The metadata elements specified in Table 5-5 are necessary for all elements 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 a *Description* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-6 Description Metadata Example

Table Format		XML Format
Metadata Element	Values	
<i>Text</i>	algorithm used for high fidelity short range attack models	<pre> <ms:Description> <ms:Text>"algorithm used for high fidelity short range attack models"</ms:Text> <ms:Releasability/> <ms:Security/> </ms:Description> </pre>
<i>Releasability</i>	—see Table 5.14 for example	
<i>Security</i>	—see Table 5.16 for example	
<i>other</i>	na	

5.4 Date Metadata Set

5.4.1 Purpose / Background

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 table format identified for capturing details for documenting a *Date*.

5.4.2 Table Format

Table 5-7 provides a description of the metadata elements pertaining to the Date Metadata Set, which is leveraged by several elements within the Resource Metadata Set. Many of the metadata elements used for the Date Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-7 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 5-7 Date Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>type</i>	The type of date being represented for a specific state of the resource.	1	created, posted, accepted, modified, validTil, infoCutOff, used, VV, accreditation, retired, <i>last_verified</i> , <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 5.14.
<i>value</i>	This field identifies the specific date being disclosed.	1	YYYY YYYY-MM YYYY-MM-DD YYYY-MM-DDThh:mmTZD YYYY-MM-DDThh:mm:ssTZD YYYY-MM-DDThh:mm:ss.sTZD	YYYY 0000 through current year MM 01 through 12 (month) DD 01 through 31 (day) hh 00 through 24 (hour) mm 00 through 59 (minute) ss 00 through 60 (second) .s .0 through 999... (fractional second) This profile suggests two ways of handling time zone offsets: 1. Times are expressed in UTC (Coordinated Universal Time), with a special UTC designator ("Z"). 2. Times are expressed in local time, together with a time zone offset in hours and minutes. A time zone offset of "+hh:mm" indicates that the date/time uses a local time zone which is "hh" hours and "mm" minutes ahead of UTC. A time zone offset of "-hh:mm" indicates that the date/time uses a local time zone which is "hh" hours and "mm" minutes behind UTC. The values "Unknown" and "Not Applicable" are also supported values for the date Metadata Set elements.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.4.3 Inclusion Criteria

The metadata elements specified in Table 5-7 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.4.4 Example

Table 5-8 provides an example of a *Date* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-8 Date Metadata Example

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

5.5 Version Metadata Set

5.5.1 Purpose / Background

It is important to identify the version pertaining to an M&S resource. This section describes the table format for identifying a *Version*.

5.5.2 Table Format

Table 5-9 provides a description of the metadata elements pertaining to the Version Metadata Set. Many of the metadata elements used for the Version Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-9 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 5-9 Version Metadata Set

Metadata Element	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>text</i>	

5.5.3 Inclusion Criteria

The metadata elements specified in Table 5-9 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

<i>.Name.value</i>	Identifies the name of the organization.	1	<i>text</i>	
<i>Description</i>	Provides a Description of the POC that may be helpful	0..1	Follows same format convention as Description – Section 5.3).	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Rights element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other rights information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.6.3 Inclusion Criteria

The metadata elements specified in Table 5-11 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.6.4 Example

Table 5-12 provides an example of a *Rights* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-12 Rights Metadata Example

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

<i>other</i>	<i>na</i>	<pre> <ms:Name ms:value="SprocketSim"/> </ms:Org> <ms:Description> <ms:Text>"Org w SBIR data rights"</ms:Text> </ms:Description> </ms:POC> </ms:Rights> </pre>
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5.7 Releasability Metadata Set

5.7.1 Purpose / Background

The releasability of resources 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 table format identified for documenting *Releasability* coverage.

5.7.2 Table Format

Table 5-13 provides a description of the metadata elements pertaining to Releasability, which is leveraged by the *root*, *Title*, *Description*, *Associations.Association*, *POCs.POC*, *Usages.Usage*, and *Media* elements within the Resource Metadata Set. Italics are used in the Values column of Table 5-13 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values (i.e., enumerations).

Table 5-13 Releasability Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>value</i>	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>	
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>Text</i>	

5.7.3 Inclusion Criteria

The metadata elements specified in Table 5-13 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.7.4 Example

Table 5-14 provides an example of a *Releasability* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-14 Releasability Coverage Metadata Example

Table Format		XML Format
Metadata Element	Information	<code><ms:Releasability ms:value= "A: Unlimited distribution"/></code>
<i>value</i>	A: Unlimited distribution	
<i>other</i>	na	

5.8 Security Metadata Set

5.8.1 Purpose / Background

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 table format identified for documenting *Security* coverage.

5.8.2 Table Format

Table 5-15 provides a description of the metadata elements pertaining to *Security* coverage, which is leveraged by the *root*, *Title*, *Description*, *Associations.Association*, *POCs.POC*, *Usages.Usage*, and *Media* elements of the Resource Metadata Set. Many of the metadata elements used for the Security Coverage set are leveraged from the IC-IMS (*Security Attribute Option Group*). Italics are used in the Values column of Table 5-15 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 5-15 Security Coverage Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>classification</i>	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 resource is "FOUO" the 'classification' must be "U". See also 'disseminationControls'.
<i>ownerProducer</i>	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>	
<i>SCI Controls</i>	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>	
<i>SARIdentifier</i>	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	<i>text</i>	Example: "SAR-ABC SAR-DEF ..."
<i>disseminationControls</i>	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	<i>text</i>	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

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

<i>FGSourceOpen</i>	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	<i>text</i>	
<i>FGSourceProtected</i>	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	<i>text</i>	
<i>releasableTo</i>	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	<i>text</i>	
<i>nonICmarkings</i>	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	<i>text</i>	
<i>classifiedBy</i>	Use as specified by E.O. 12958.	0..1	<i>text</i>	
<i>derivativelyClassifiedBy</i>	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	<i>text</i>	added to version 2.1 of IC-ISM
<i>classificationReason</i>	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	<i>text</i>	
<i>derivedFrom</i>	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	<i>text</i>	
<i>declassDate</i>	A specific date, in the format YYYY-MM-DD, at which the applicable information is automatically declassified.	0..1	<i>date</i>	
<i>declassEvent</i>	A textual description of an event that triggers declassification.	0..1	<i>text</i>	
<i>declassException</i>	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	<i>text</i>	
<i>typeOfExemptedSource</i>	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	<i>text</i>	
<i>dateOfExemptedSource</i>	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	<i>date</i>	
<i>declassManualReview</i>	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	<i>boolean</i>	

<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Security element.	0..1	Text	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>		0..many		

5.8.3 Inclusion Criteria

The metadata elements specified in Table 5-15 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.8.4 Example

Table 5-16 provides an example of a *Security* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-16 Security Metadata Examples

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

5.9 Association Metadata Set

5.9.1 Purpose / Background

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*.

5.9.2 Table Format

Table 5-17 provides a description of the metadata elements pertaining to the Association Metadata Set information, which is leveraged by the *Associations* element within the Resource Metadata Set. Many of the metadata elements used for the Association Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-17 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

Table 5-17 Association Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>qualifier</i>	The value that specifies a formal identification system used to reference a source.	0..1	URL, code, image, text, doc, <i>other text</i>	Specifies the domain identification system that defines the format of Source Value.
<i>value</i>	The identifier of an associated source.	0..1	<i>text</i>	Source Value can be specified without listing the Source Qualifier.
<i>schema Qualifier</i>	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.
<i>schema Href</i>	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.
<i>relationship</i>	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 intended to identify any child relationships the resource has with other resources.</p> <p>"Is-Part-Of" is intended to identify any parent relationship the resource has with other resources.</p> <p>"Is-Type-Of" is intended to identify any sibling relationships the resource has with other resources.</p> <p>"Is-Described- By" is intended to identify any additional associations that help in further understanding the M&S resource.</p>

<i>type</i>	Identifies the type pertaining to the associated item.	0..1	software, tool, federation, software_component, services, data, data_models, interface_specification, software_design_document, infrastructure, supported_events, future_capabilities_requirements, related_documents, environment, subject_matter_expert, <i>other text</i>	M&S resources may include associations to artifacts representative of either asset categories: Resources or Support Assets. Resource Assets include software, tool, federation, software_component, services, data, data_models, interface_specification, software_design_document) Support Assets include infrastructure, supported events, future capabilities requirements, related documents, environment.
<i>constraints</i>	Identifies any constraints pertaining to the associated item.	0..1	<i>text</i>	
<i>ADS Designation</i>	Identifies Authoritative Data Source Designation.	0..1	<i>text</i>	A data source whose products have undergone producer data verification, validation, and certification activities.
<i>association ID</i>	Specifies Resource ID associated with the referenced association.	0..1	<i>text</i>	
<i>Description.Text</i>	Open narrative used to increase comprehension pertaining to the metadata element.	0..1	<i>text</i>	Follows same format convention as Description – Section 5.3).
<i>Releasability</i>	Information about the releasability of the title information.	0..1	(see <i>Releasability – Section 5.7</i>)	
<i>Security</i>	Information about the security of the title information.	0..1	(see <i>Security – Section 5.8</i>)	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Association element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.9.3 Inclusion Criteria

The metadata elements specified in Table 5-17 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.9.4 Example

Table 5-18 provides an example of an *Association* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-18 Association Metadata Example

Table Format		XML Format
Metadata Element	Values	
<i>qualifier</i>	URL	<code><ms:Association ddms:qualifier="URL"</code>
<i>value</i>	http://www.shortrangealgorithms.com/BMA1003.xml	

<i>schemaQualifier</i>	na	<pre> ddms:value="http://www.shortrangealgos.com/BMA1003.xml" ddms:schemaHref="http://www.shortrangeschemas.com" ms:relationship="is-described-by" ms:type="related documents" ms:constraints="exclude section 4.6" ms:ads-designation="Category I" ms:associationID="4352" ddms:schemaQualifier="na" <ms:Releasability/> <ms:Security/> </ms:Association> </pre>
<i>schemaHref</i>	http://www.shortrangeschemas.com	
<i>relationship</i>	is-described-by	
<i>type</i>	related documents	
<i>constraints</i>	exclude Section 4.6	
<i>ads-designation</i>	Category I	
<i>association ID</i>	4352	
<i>description</i>	"Describes algorithm equation"	
<i>releasability</i>	—see Section 5.14 for example	
<i>security</i>	—see Section 5.16 for example	
<i>other</i>		

5.10 POC Metadata Set

5.10.1 Purpose / Background

No matter what type of M&S resource may be cataloged, invariably there are many individuals or organizations that may be responsible for its development, management, or use. Therefore it is important to capture the essential elements 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.

5.10.2 Table Format

Table 5-19 provides a description of the metadata elements pertaining to the POC Metadata Set information, which is leveraged by the *POCs* element within the Resource Metadata Set. Many of the metadata elements used for the POC Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-19 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 5-19 POC Metadata Set

Metadata Element	Metadata Element Description	Occurs	Values	Comment
<i>Role.value</i>	This field specifies the role that the POC has with respect to the resource.	1	primary author, contributor, publisher, proponent, sponsor, release authority, IP holder, copyright holder, technical POC, <i>other text</i>	
<i>Person</i>	Specifies person.	0..1	(see <i>Person</i> – Section 5.11)	
<i>Organization</i>	Specifies organization.	0..1	(see <i>Organization</i> – Section 5.12)	
<i>Description</i>	This field provides an account of the POC.	0..1	(see <i>Description</i> – Section 5.3)	
<i>Releasability</i>	Information about the releasability of the POC information.	0..1	(see <i>Releasability</i> – Section 5.7)	
<i>Security</i>	Information about the security of the POC information.	0..1	(see <i>Security</i> – Section 5.8)	
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.10.3 Inclusion Criteria

The metadata elements specified in Table 5-19 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.10.4 Example

Table 5-20 provides an example of a *POC* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-20 POC Metadata Example

Table Format		XML Format
Metadata Element	Values	
<i>Role.value</i>	technical POC	<pre> <ms:POC> <ms:Role ms:value="technical POC"/> <ms:Person/> <ms:Organization/> <ms:Description> <ms:Text>"The chief architect of the model"</ms:Text> </ms:Description> <ms:Releasability/> <ms:Security/> </ms:POC> </pre>
<i>Person</i>	—see Section 5.22 for example	
<i>Organization</i>	—see Section 5.24 for example	
<i>Description.Text</i>	The chief architect of the model	
<i>Releasability</i>	—see Section 5.14 for example	
<i>Security</i>	—see Section 5.16 for example	
<i>other</i>	na	

5.11 POC.Person Metadata Set

5.11.1 Purpose / Background

No matter what type of M&S resource may be cataloged, invariably there are many individuals who are responsible for its development, management, or use. Therefore it is important to capture the essential elements pertaining to such individuals who are responsible for an M&S resource. This section describes the table format identified for documenting a *Person*.

5.11.2 Table Format

Table 5-21 provides a description of the metadata elements pertaining to the POC.Person Metadata Set, which is leveraged by the *POCs.POC* element within the Resource Metadata Set. Many of the metadata elements used for the POC.Person Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-21 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 5-21 POC.Person Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>ID</i>	Unique identifier associated to a Person.	0..1	<i>text</i>	A person record can be marked by a unique identifier to support cross referencing by other POC records and for the benefit of organizing data by one or more repositories.

<i>supervisor ID</i>	Specifies the unique identifier associated to a supervisor if applicable.	0..1	text	Search Person records to cross reference supervisor Id and learn about supervisor.
<i>sponsor ID</i>	Unique identifier associated to a sponsor POC	0..1	text	Search Person records to cross reference supervisor Id and learn about sponsor.
<i>Title.value</i>	Identifies honorific (e.g., Dr., Ms., etc) or rank.	0..1	text	
<i>Name</i>	Name of the person.	1		
<i>first</i>	First Name of the person.	1	text	
<i>middle</i>	Middle Name of the person.	0..1	text	Helps differentiate common names.
<i>last</i>	Last Name of the person.	1	text	
<i>Position</i>	Position held by the person.	0..many		
<i>value</i>	Identifies the position of the person.	1	text	The value for a keyword must be supplied.
<i>Org</i>	Identifies the organization affiliated with the person.	1		
<i>organization ID</i>	References the organization ID.	0..1	text	Can be used to correlate with POC.Organizations that have been identified.
<i>Name.value</i>	Identifies the name of the organization.	1	text	
<i>Other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	text	
<i>Address Info</i>	Specifies Address associated to Person.	1..many		
<i>AddressLine1.value</i>	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.
<i>AddressLine2.value</i>	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.
<i>AddressLine3.value</i>	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.
<i>City.value</i>	Specifies city associated to Person's Address.	0..1	text	The city of the address where the POC may be contacted.
<i>State.value</i>	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.
<i>Country.value</i>	Specifies country associated to Person's Address.	0..1	text	The country code of the address where the POC may be contacted.
<i>Postal Code.value</i>	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.
<i>Phone</i>	Specifies the telephone number for the person including the international telephone code for the POC's country, and fax.	1..many		
<i>type</i>	Specifies the phone type.	1	work, home, DSN, mobile, fax, other text	
<i>number</i>	Specifies the specific number associated with the phone type.	1	text	
<i>extension</i>	Specifies an extension to the phone number	0..1	text	
<i>Email</i>	Specifies the email address(es) of the Person.	1..many	text	
<i>type</i>	Specifies the email type.	1	work home, NIPRNET, SIPRNET, JWICS, DKO, AKO, other text	
<i>address</i>	Specifies the email address.	1	text	

<i>URL.value</i>	Specifies the web address(es) that might be associated with the Person.	0..1	text	
<i>Contact Instruction.value</i>	Specifies instructions for making contact.	0..1	text	
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	text	

5.11.3 Inclusion Criteria

The metadata elements specified in Table 5-21 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.11.4 Example

Table 5-22 provides an example of a *POC.Person* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-22 POC.Person Metadata Example

Table Format		XML Format
Metadata Element	Information	
<i>ID</i>	231	<code><ms:Person</code>
<i>supervisor ID</i>	230	<code> ms:ID="231"</code>
<i>sponsor ID</i>	332	<code> ms:supervisorID="230"</code>
<i>Title.value</i>	System Engineer	<code> ms:sponsorID="332"></code>
<i>Name</i>		<code> <ms>Title ms:value="System Engineer"/></code>
<i>first</i>	John	<code> <ms>Name</code>
<i>niddle</i>	Michael	<code> ms:first="John"</code>
<i>last</i>	Davidson	<code> ms:middle="Michael"</code>
<i>Position</i>		<code> ms:last="Davidson"/></code>
<i>value</i>	Developer	<code> <ms:Position ms:value="Developer"/></code>
<i>Org</i>		<code> <ms:Org ms:organizationID="331"></code>
<i>organization ID</i>	331	<code> <ms>Name ms:value="Sprocket Sim"/></code>
<i>Name.value</i>	Sprocket Sim	<code> </ms:Org></code>
<i>Address Info</i>		<code> <ms:AddressInfo></code>
<i>Address Line 1.value</i>	123 Jetway Drive	<code> <ms:AddressLine1 ms:value="123 Jetway Dr."/></code>
<i>Address Line 2.value</i>	Suite	<code> <ms:AddressLine2 ms:value=""/></code>
<i>Address Line 3.value</i>	ATTN: John Davidson	<code> <ms:AddressLine3 ms:value=""/></code>
<i>City.value</i>	Alexandria	<code> <ms:City ms:value="Alexandria"/></code>
<i>State.value</i>	Virginia	<code> <ms:State ms:value="VA"/></code>
<i>Country.value</i>	USA	<code> <ms:Country ms:value="USA"/></code>
<i>Postal Code.value</i>	22308	<code> <ms:PostalCode ms:value="22308"/></code>
<i>Phone</i>		<code> </ms:AddressInfo></code>
<i>type</i>	Work	<code> <ms:Phone</code>
<i>number</i>	703-360-3767	<code> ms:type="work"</code>
<i>extension</i>	351	<code> ms:number="703-360-3767"</code>
<i>Email</i>		<code> ms:extension="351"/></code>
<i>type</i>	Work	<code> <ms:Phone</code>
<i>address</i>	jdavidson@sprocketsim.com	<code> ms:type="mobile"</code>
<i>URL.value</i>	http://www.sprocketsim.com	<code> ms:number="540-755-5555"/></code>
<i>Contact Instruction.value</i>	Leave message at help desk if no answer	<code> <ms>Email</code>
		<code> ms:type="work"</code>
		<code> ms:address="jdavidson@sprocketsim.com"/></code>
		<code> <ms:URL ms:value="http://www.sprocketsim.com"/></code>
		<code> <ms>ContactInstruction</code>
		<code> ms:value="Leave message at help desk if no</code>
		<code> answer."/></code>
		<code></ms:Person></code>

5.12 POC.Organization Metadata Set

5.12.1 Purpose / Background

Typically there is at least one organization that is responsible for the development, management, or distribution of an M&S resource. Therefore it is important to capture the essential elements pertaining to such organizations that are responsible for an M&S resource. This section describes the table format identified for documenting an *Organization*.

5.12.2 Table Format

Table 5-23 provides a description of the metadata elements pertaining to the POC.Organization Metadata Set, which is leveraged by the *POCs.POC* element within the Resource Metadata Set. Many of the metadata elements used for the POC.Organization Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-23 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 5-23 POC.Organization Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>ID</i>	Unique identifier associated to an Organization.	0..1	<i>Text</i>	An organization record can be marked by a unique identifier to support cross referencing by other POC records and for the benefit of organizing data by one or more repositories
<i>sponsor ID</i>	Unique identifier associated to a sponsor POC	0..1	<i>text</i>	Search Organization records to cross reference supervisor Id and learn about sponsor.
<i>parent ID</i>	Specifies the unique identifier associated to a parent organization if applicable.	0..1	<i>Text</i>	Search Organization records to cross reference Parent Id and learn about parent organization.
<i>Name.value</i>	Specifies organization name.	1	<i>Text</i>	
<i>Type</i>	Specifies organization type	1	government, academia, industry, <i>other text</i>	Examples might include Defense Contractor, Government, and Academia.
<i>Address Info</i>	Specifies Address associated to Organization.	1..many		
<i>AddressLine1.value</i>	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.
<i>AddressLine2.value</i>	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.
<i>AddressLine3.value</i>	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.
<i>City.value</i>	Specifies city associated to Organization's Address.	0..1	<i>Text</i>	The city of the address where the Organization may be contacted.
<i>State.value</i>	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.
<i>Country.value</i>	Specifies country associated to Organization's Address.	0..1	<i>Text</i>	The country code of the address where the Organization may be contacted.
<i>Postal Code.value</i>	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.

<i>Phone</i>	Specifies the telephone number for the organization including the international telephone code for the Organization's country, and fax.	0..many		
<i>type</i>	Specifies the phone type.	1	work, home, DSN, mobile, fax, <i>other text</i>	
<i>number</i>	Specifies the specific number associated with the phone type.	1	<i>Text</i>	
<i>extension</i>	Specifies an extension to the phone number	0..1	<i>text</i>	
<i>Email</i>	Specifies the email address(es) of the Organization.	0..many	<i>Text</i>	
<i>type</i>	Specifies the email type.	1	work home, NIPRNET, SIPRNET, JWICS, DKO, AKO, <i>other text</i>	
<i>address</i>	Specifies the email address.	1	<i>text</i>	
<i>URL.value</i>	Specifies the web address(es) associated with the Organization.	0..1	<i>Text</i>	
<i>Contact Instruction.value</i>	Specifies instructions for making contact.	0..1	<i>Text</i>	
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.12.3 Inclusion Criteria

The metadata elements specified in Table 5-23 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.12.4 Example

Table 5-24 provides an example of an *POC.Organization* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-24 POC.Organization Metadata Example

Table Format		XML Format
Metadata Element	Information	
<i>ID</i>	256	<pre> <ms:Organization ms:ID="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> <ms:Phone ms:type="work" ms:number="703-360-3767" </pre>
<i>parent ID</i>	255	
<i>Name</i>	SprocketSim, Inc	
<i>Type</i>	Industry	
<i>Address Info</i>		
<i>Address Line 1</i>	123 Jetway Drive	
<i>Address Line 2</i>	Suite 5	
<i>Address Line 3</i>	ATTN: John Davidson	
<i>City</i>	Alexandria	
<i>State</i>	Virginia	
<i>Country</i>	USA	
<i>Postal Code</i>	22308	
<i>Phone</i>		
<i>type</i>	work	
<i>number</i>	703-360-3767	
<i>Email</i>		

<i>type</i>	Work	<pre> <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> </pre>
<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.	

5.13 Keyword Metadata Set

5.13.1 Purpose / Background

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. This section describes the table format identified for documenting a *Media Format*.

5.13.2 Table Format

Table 5-25 provides a description of the metadata elements pertaining to the Keyword Metadata Set, which is leveraged by the *Resource.Keyword* element within the Resource Metadata Set. Many of the metadata elements used for the Keyword Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-25 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 5-25 Keyword Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>value</i>	This field specifies the word or concept that is addressed by the resource.	1	<i>text</i>	The value for a keyword must be supplied.
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Keyword element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.13.3 Inclusion Criteria

The metadata elements specified in Table 5-25 are necessary for all elements of this metadata set unless “0..1” is identified in the Occurs column.

5.13.4 Example

Table 5-26 provides an example of a *Keyword* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-26 Keyword Metadata Example

Table Format		XML Format
Metadata Element	Information	<ms:Keyword
<i>taxonomy</i>	http://en.wikipedia.org/wiki/Projectile	ms:taxonomy=
<i>value</i>	simulation	"http://en.wikipedia.org/wiki/SimulatedProjectile ddms:value="simulation"/>

5.14 Usage Metadata Set

5.14.1 Purpose / Background

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*.

5.14.2 Table Format

Table 5-27 provides a description of the metadata elements pertaining to the Usage Metadata Set information, which is leveraged by the *Resource.Usages.Usage* element within the Resource Metadata Set. Many of the metadata elements used for the Usage Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added including *History*, 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 5-27 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 5-27 Usage Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Purpose.value</i>	This field specifies the purpose for which the resource was developed or used.	1	<i>text</i>	

<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Usage element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other usage information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.14.3 Inclusion Criteria

The metadata elements specified in Table 5-27 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.14.4 Example

Table 5-28 provides an example of a *Usage* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-28 Usage Metadata Example

Table Format		XML Format
Metadata Element	Information	
<i>Purpose</i>	To model short range projectile accuracy	<code><ms:Usage ms:taxonomy="Missile_Defense"></code>
<i>ApplicationDomain</i>	Test and Evaluation	<code> <ms:Purpose ms:value= "To test short range projectile accuracy"/></code>
<i>Limitations</i>	Not intended for elevations above 3K ft	<code> <ms:ApplicationDomain ms:value="test and evaluation"/></code>
<i>History</i>		<code> <ms:Limitations ms:value= "Not intended for elevations above 3K ft."/></code>
<i>Date</i>		<code> <ms:History></code>
<i>value</i>	2007-10-01	<code> <ms>Date ms:value="2007-10-01" ms:type="used"/></code>
<i>type</i>	used	<code> <ms:Description></code>
<i>Description.Text</i>	Successful in supporting joint and coalition littoral warfare exercises October 2007	<code> <ms:Text> Successful in supporting joint and coalition littoral warfare exercises October 2007</ms:Text></code>
<i>POC</i>		<code> </ms:Description></code>
<i>Person.personID</i>	345	<code> <ms:POC></code>
<i>Person.Name</i>		<code> <ms:Person ms:personID="345"></code>
<i>first</i>	Samuel	<code> <ms>Name ms:first="Samuel" ms:middle="Albert" ms:last="Drake"/></code>
<i>middle</i>	Albert	<code> </ms:Person></code>
<i>last</i>	Drake	<code> </ms:POC></code>
<i>other</i>	---	<code> </ms:History></code>
<i>Language</i>		
<i>qualifier</i>	ISO 639-1	
<i>value</i>	fr	
<i>Capabilities</i>	capable for use in seaboard experiments	
<i>Releasability</i>	—see Table 5.14 for example	
<i>Security</i>	—see Table 5.16 for example	
<i>taxonomy</i>	Missile_Defense	

other	na	<pre> <ms:Language ddms:qualifier="ISO 639-1" ddms:value="fr"/> <ms:Capabilities ms:value="capable for use in seaboard experiments"/> <ms:Releasability/> <ms:Security/> </ms:Usage> </pre>
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5.15 Media Metadata Set

5.15.1 Purpose / Background

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.

5.15.2 Table Format

Table 5-29 provides a description of the metadata elements pertaining to the Media Metadata Set. Many of the metadata elements used for the Media Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 5-29 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 5-29 Media Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Format</i>	The physical or digital manifestation of the resource.	0..1		
<i>mime type</i>	The MIME type for the product object to which this metadata applies.	1	<i>text</i>	<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/.</i>
<i>extent</i>	A related data size, compression rate, or pixel size (etc.) of the resource.	0..1		
<i>qualifier</i>	A vocabulary that specifies the type of format extent that will be supplied.	0..1	<i>text</i>	<i>The qualifier attribute indicates the type of extent value listed.</i> <ul style="list-style-type: none"> <i>In the case of data bytes, it may indicate 'byte size'.</i> <i>In the case of a document length, it may indicate 'page count'.</i> <i>In the case of streaming content, it may indicate 'bits per second' or 'frames per second'.</i>
<i>value</i>	A related data size, compression rate, or pixel size (etc.) of the resource.	0..1	<i>text</i>	

<i>medium</i>	The physical medium or instantiation of the resource.	0..1	<i>text</i>	<i>Type used to model the medium attribute of the ddms:medium element</i>
<i>Location.value</i>	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>	
<i>Description</i>	This field provides an account of the media.	0..1	(see <i>Description – Section 5.3</i>)	
<i>Releasability</i>	Information about the releasability of the title information.	0..1	(see <i>Releasability – Section 5.7</i>)	
<i>Security</i>	Information about the security of the resource.	0..1	(see <i>Security – Section 5.8</i>)	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Media element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other media information deemed relevant by the author of the resource.	0..many	<i>text</i>	

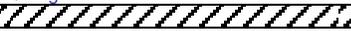
5.15.3 Inclusion Criteria

The metadata elements specified in Table 5-29 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.15.4 Example

Table 5-30 provides an example of a *Media* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-30 Media Metadata Example

Table Format		XML Format
Metadata Element	Values	
<i>Format</i>		<code><ms:Media ms:taxonomy="logistics_support"></code>
<i>mime type</i>	Text/XML	<code> <ms:Format></code>
<i>extent</i>		<code> <ddms:mimeType>Text/XML/HTML</ddms:mimeType></code>
<i>qualifier</i>	byte size	<code> <ddms:extent</code>
<i>value</i>	75000	<code> ddms:qualifier=</code>
<i>medium</i>	Digital	<code> "byte size"</code>
<i>Format</i>		<code> ddms:value="75000"/></code>
<i>mime type</i>	String	<code> <ddms:medium>digital</ddms:medium></code>
<i>extent</i>		<code> </ms:Format></code>
<i>qualifier</i>	http://www.dms.gov/id=2348923498732	<code> <ms:Format></code>
<i>medium</i>	Digital	<code> <ddms:mimeType>String</ddms:mimeType></code>
<i>Location.value</i>	http://simmodelsrus.com/software	<code> <ddms:extent</code>
<i>Location.value</i>	http://www.simdeleverance.com	<code> ddms:qualifier=</code>
<i>Description.Text</i>	Used with any Java VM	<code> "http://www.dms.gov/id=2348923498732"</code>
<i>Releasability</i>	—see Section 5.14 for example	<code> <ddms:medium>digital</ddms:medium></code>
<i>Security</i>	—see Section 5.16 for example	<code> </ms:Format></code>
<i>taxonomy</i>	logistics_support	<code><ms:Location</code>

Other	/Na	<pre> ms:value="http://simmodelsrus.com/software"/> <ms:Location ms:value="http://www.simdeleverance.com"/> <ms:Description> <ms:Text>"Used with any Java VM"</ms:Text> </ms:Description> <ms:Releasability/> <ms:Security/> </ms:Media> </pre>
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5.16 Glyph Metadata Set

5.16.1 Purpose / Background

It is often helpful to visually tag resources so that they can be more easily identified. The *Glyph* component provides a means to visually associate an image with an M&S resource. This section describes the table format identified for documenting a *Glyph*.

5.16.2 Table Format

Table 5-31 provides a description of the metadata elements pertaining to the Glyph Metadata Set, which is leveraged by the *Glyph* element within the Resource Metadata Set. The metadata elements used for the Glyph 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 5-31 Glyph Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Src</i>	Specifies the location for the image	1	<i>any URI</i>	Location described using an URL.
<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 glyph image represented in the <i>Image</i> field.	0..1	<i>short</i>	
<i>Width</i>	This field specifies the pixel width of the glyph 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 glyph information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.16.3 Inclusion Criteria

The metadata elements specified in Table 5-31 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.16.4 Example

Table 5-32 provides an example of a *Glyph* component that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-32 Glyph Metadata Example

Table Format		XML Format
Metadata Element	Information	
<i>Src</i>	"http://www.simrus.com/missile.jpg"	<pre> <ms:Glyph 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	

5.17 Taxonomy Cited Metadata Set

5.17.1 Purpose / Background

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 *Taxonomy Cited*. Any taxonomy cited can be referenced by other elements within an MSC-DMS based metacard. The Taxonomy Cited Location, contained within this metadata set, provides a means to identify the location of the taxonomy source.

5.17.2 Table Format

Table 5-33 provides a description of the metadata elements pertaining to the Taxonomy Cited Metadata Set information, which is leveraged by the *Taxonomies Cited* element within the Resource Metadata Set. Italics are used in the Values column of Table 5-33 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 5-33 Taxonomy Cited Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>value</i>	The value identifier of the cited taxonomy source.	0..1	<i>text</i>	A unique name should be used to identify the taxonomy source.
<i>version</i>	A version of the taxonomy source, if known.	0..1	<i>text</i>	

<i>Location.value</i>	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>	Used in the same manner as Location pertaining to Media – Section 5.15).
<i>Description</i>	Open narrative used to increase comprehension pertaining to the metadata element.	0..1	Follows same format convention as Description – Section 5.3).	
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

5.17.3 Inclusion Criteria

The metadata elements specified in Table 5-33 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

5.17.4 Example

Table 5-34 provides an example of two *Taxonomy Cited* components that can be reflected within the Core Layer of the Discovery Metadata associated with an M&S Resource.

Table 5-34 Taxonomy Cited Metadata Example

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

6 Supplemental Layer Metadata Sets

A design goal for the M&S COI Discovery Metadata template is to facilitate reuse. Section 5 described the Core set of metadata needed across communities. This section identifies Supplemental extensions that can be applied to support the various communities and domain needs. This includes the following metadata sets; others may be added:

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

These metadata sets provide information that enables inferences to be drawn regarding the reuse potential for supporting the extension and creation of M&S resources for specific communities and domains. Each of these supplemental extensions is intended to add value to MSC Discovery Metadata.

6.1 Temporal Coverage Metadata Set

6.1.1 Purpose / Background

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.

6.1.2 Table Format

Table 6-1 provides a description of the metadata elements pertaining to the Temporal Coverage Metadata Set, which is leveraged by the *Temporal Coverage* element within the Resource Metadata Set. Many of the metadata elements used for the Temporal Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 6-1 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 6-1 Temporal Coverage Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Time Period</i>	An interval of time, which can be expressed as a named era.	0..1		
<i>Name</i>	A name to identify time period / era.	0..1	<i>text</i>	<i>The default value for Time Period is "unknown."</i>
<i>Start</i>	The start date of a period of time.	1	<i>text</i>	<i>The default value for Date Start is "unknown."</i>
<i>End</i>	The end date of a period of time.	1	<i>text</i>	<i>The default value for Date End is "unknown."</i>

<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Temporal Coverage element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

6.1.3 Inclusion Criteria

The metadata elements specified in Table 6-1 are necessary for all elements 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 a Temporal Coverage component that can be reflected within the Supplemental Layer of the Discovery Metadata associated with an M&S Resource. If applicable the Dot Notation described in Section 3 is applied to identify other table components that would complete an element group.

Table 6-2 Temporal Coverage Example

Table Format		XML Format
Metadata Element	Information	
<i>Time Period</i>		<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>
<i>Name</i>	GMT Start	
<i>Start</i>	2001-12-17T08:30:46.0Z	
<i>End</i>	2004-09-17T08:36:56.0Z	

6.2 Virtual Coverage Metadata Set

6.2.1 Purpose / Background

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.

6.2.2 Table Format

Table 6-3 provides a description of the metadata elements pertaining to the Virtual Coverage Metadata Set, which is leveraged by the *Virtual Coverage* element within the Resource Metadata

Set. Many of the metadata elements used for the Virtual Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 6-3 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 6-3 Virtual Coverage Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Network Protocol</i>	The type of rules for data transfer that apply to the Virtual Address.	0..1	<i>text</i>	<i>TCP, UDP, http, etc.</i>
<i>Virtual Address</i>	A computer or telecommunications network address, or a network name or locale.	0..1	<i>text</i>	<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.</i>
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Virtual Coverage element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

6.2.3 Inclusion Criteria

The metadata elements specified in Table 6-3 are necessary for all elements 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 a Virtual Coverage component that can be reflected within the Supplemental Layer of the Discovery Metadata associated with an M&S Resource.

Table 6-4 Virtual Coverage Metadata Example

Table Format		XML Format
Metadata Element	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>

6.3 Geospatial Coverage Metadata Set

6.3.1 Purpose / Background

M&S resources may also need to be tagged with geographic place names or coordinates 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.

6.3.2 Table Format

Table 6-5 provides a description of the metadata elements pertaining to the Geospatial Coverage Metadata Set, which is leveraged by the *Geospatial Coverage* element within the Resource Metadata Set. Many of the metadata elements used for the Geospatial Coverage Metadata Set are leveraged from the DDMS; however there are some additional metadata elements that were added. Italics are used in the Values column of Table 6-5 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 6-5 Geospatial Coverage Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Geographic Identifier</i>	Identifier associated with Geospatial content if applicable.	0..1		
<i>Name</i>	The name of a place of interest, other than a country, region, or facility.	0..1	<i>text</i>	
<i>Region</i>	The name of a sub-national or transnational geographic or geopolitical region that is a subject of the resource.	0..1	<i>text</i>	
<i>Country Code</i>	A standards-based abbreviation of a country name.	1		
<i>qualifier</i>	A vocabulary that specifies the type of that will be supplied.	0..1	<i>text</i>	<i>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'.</i>
<i>value</i>	A related country code value.	0..1	<i>text</i>	
<i>Facility Identifier</i>	A specific identification number or point location of a facility or installation.	1		
<i>beNumber</i>		0..1	<i>text</i>	<i>See DDMS 1.4.1</i>
<i>osuffix</i>		0..1	<i>text</i>	<i>See DDMS 1.4.1</i>
<i>Bounding Box</i>		1		
<i>WestBL</i>	The westernmost longitude of the area of interest.	1	<i>double</i>	
<i>EastBL</i>	The easternmost longitude of the area of interest	1	<i>double</i>	
<i>SouthBL</i>	The southernmost latitude of the area of interest.	1	<i>double</i>	
<i>NorthBL</i>	The northernmost latitude of the area of interest.	1	<i>double</i>	
<i>Geographic Bounding Geometry</i>	One or more Polygons and Points.	1		
<i>Polygon</i>	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>	
<i>Point</i>	Specifies a position using a single coordinate tuple. See also ISO 19136.	1..many	<i>PointType</i>	
<i>Postal Address</i>	A wrapper for postal address elements including street, city, state or province, postal code, and country code.	1		
<i>Street</i>	A line of a postal address.	0..6	<i>text</i>	
<i>City</i>	A city name.	0..1	<i>text</i>	
<i>State/Province</i>	An abbreviation of a state/province.	1	<i>text</i>	
<i>Postal Code</i>	A mailing code designation, such as a ZIP code in the U.S. or a postcode in Britain.	0..1	<i>text</i>	
<i>Country Code</i>	A standards-based abbreviation of a country name.	0..1	<i><enumerated list></i>	
<i>Vertical Extent</i>	A wrapper for child elements used to describe the vertical extent applicable to the resource.	0..1		
<i>Unit of Measure</i>		1	<i>LengthMeasureType</i>	

<i>Datum</i>		1	<i>VerticalDatumType</i>	
<i>Minimum Vertical Extent</i>	The lowest vertical point within the coverage.	1	<i>VerticalDistanceType</i>	
<i>Maximum Vertical Extent</i>	The highest vertical point within the coverage.	1	<i>VerticalDistanceType</i>	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Geospatial Coverage element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>Other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

6.3.3 Inclusion Criteria

The metadata elements specified in Table 6-5 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

6.3.4 Example

Table 6-6 provides an example of a Geospatial Coverage component that can be reflected within the Supplemental Layer of the Discovery Metadata associated with an M&S Resource.

Table 6-6 Geospatial Coverage Example

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

Table 6-10 HLA Coverage Metadata Example

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

6.5 VV&A Coverage Metadata Set

6.5.1 Purpose / Background

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 a 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.

6.5.2 Table Format

Table 6-11 provides a description of the metadata elements pertaining to the VV&A Coverage Metadata Set, which is leveraged by the *VV&A Coverage* element within the Resource Metadata Set. Italics are used in the Values column of Table 6-11 to denote the type of data that is provided (e.g., text). Normal font is used in this column to denote potential literal values.

6.5.4 Example

Table 6-12 provides an example of a VV&A Coverage component that can be reflected within the Supplemental Layer of the Discovery Metadata associated with an M&S Resource. Additional information about the VV&A project or VV&A document products (e.g., submitter, submission date, version, title, etc.) will be described using constructs from the Core Layer of the MSC-DMS.

Table 6-12 VV&A Coverage Metadata Example (Document-Level Metadata)

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

6.6 Configuration Management Metadata Set

6.6.1 Purpose / Background

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.

6.6.2 Table Format

Table 6-13 provides a description of the metadata elements pertaining to the Configuration Management Metadata Set, which is leveraged by the *Configuration Management* element within the Resource Metadata Set. Italics are used in the Values column of Table 6-13 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 6-13 Configuration Management Metadata Set

Metadata Element	Description	Occurs	Values	Comment
<i>Type</i>	Type of infrastructure / body responsible for configuration management.	1	User Group CCB Executive Steering Committee <i>None</i> <i>text</i>	
<i>Description</i>	Open narrative used to increase comprehension pertaining to the metadata element.	0..1	Follows same format convention as Description – Section 5.3).	
<i>POC</i>	Contact information on other individuals who can provide information about the configuration management.	1..many	<i>Identifies a POC reference including id and name</i>	
<i>taxonomy</i>	Specifies a taxonomy identifier pertaining to a domain vocabulary source, which is applicable in describing the Configuration Management element.	0..1	<i>Text</i>	Any element 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 element, one does not need to be identified here unless the taxonomy being used for describing this element is different.
<i>other</i>	Specifies other information deemed relevant by the author of the resource.	0..many	<i>text</i>	

6.6.3 Inclusion Criteria

The metadata elements specified in Table 6-13 are necessary for all elements of this metadata set unless “0..1” or “0..many” is identified in the Occurs column.

6.6.4 Example

Table 6-14 provides an example of a Configuration Management component that can be reflected within the Supplemental Layer of the Discovery Metadata associated with an M&S Resource. Additional information about the Configuration Management products (e.g., history) will be described using constructs from the Core Layer of the MSC-DMS.

Table 6-14 Configuration Management Metadata Example

Table Format		XML Format
Metadata Element	Information	
<i>Type</i>	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:POC> <ms:Person ms:personID="345"> </pre>
<i>Description.Text</i>	Included 35 approved bug fixes based on requirement changes	
<i>POC</i>		
<i>Person.personID</i>	345	
<i>Person.Name</i>		
<i>.first</i>	John	
<i>.last</i>	Dillon	

<i>Other</i>	<i>na</i>	<pre><ms:Name ms:first="John" ms:last="Dillon"/> </ms:Person> </ms:POC> </ms:ConfigurationManagement> </ms:Usage></pre>
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Appendix A - 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 listed in Table A-1. If any of the specifications identified in Table A-1 are superseded by an approved revision, then the revision shall apply.

Table A-1 Reference Documents

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 Element 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
RPG BUILD 2.5	VV&A Recommended Practices Guide
SISO-STD-003	Base Object Model (BOM) Template Specification

* The document associated to this reference may be replaced with any superseding document that is considered an update.

Appendix B - Definitions

The definitions identified Table B-1 are common terms and resource terms used in 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.

B.1 Common Terms

Table B-1 identifies the common terms described in this document related to M&S metadata requirements.

Table B-1 Common Terms

Term	Definition
Accreditation	<p>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>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?”</i> (DON M&S VVA Implementation Handbook)</p>
Acquisition	<p>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. (Glossary of Defense Acquisition Acronyms and Terms)</p>
Analysis	<p>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. (Department Analysis Definition from JDS)</p>
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>
Community of Interest	<p>A group of people who have common concerns and interests.</p>
Configuration Management	<p>Recording and reporting of change processing and implementation of M&S resources.</p>

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. (DDMS 1.4)
DoD Components	Referred to as “the DoD Components,” are identified as the: <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. (DoD5025.1-M)
Enterprise	Refers to the Department of Defense, its organizations, and related agencies.
Extensible Markup Language (XML)	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 elements and attributes. It also uses semantically rich labels to describe elements and attributes to enable meaningful comprehension. An example of XML data describing an element named “Person” can appear as follows: <pre><Person> <Name> <First>John</First> <Middle>H</Middle> <Last>Doe</Last> </Name> </Person></pre>
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.
M&S Resource	Services, software, components, federations, adjunct tools, data, interface specifications, design documents, data models, and infrastructures, used in computer-based simulation of operations, or processes which contribute to operations. (See M&S Resource Terms, Table B-2)
Metadata	“Structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities.” ⁶ Information describing the characteristics of data; data or information about data; descriptive information about an organization’s data, data activities, systems, and holdings. (DoDD 8320.2)

⁶ The Final Report of the Association for Library Collections and Technical Services’ Task Force on Metadata (2000).

Metamodel	A model of a model. Metamodels are abstractions of other models, relating more generic concepts. (DoD 5000.59-M)
Model	A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. (DoD 5000.59-M)
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. (Net-Centric Environment Joint Functional Concept, Version 1.0, April 7, 2005)
Schema	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. (DDMS 1.4)
Simulation	A sequence of executions of a model. A method for implementing a model over time. (DoD 5000.59-M)
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. (DDMS 1.4)
Uniform Resource Locator (URL)	A unique identifier used to represent the location of a resource on the Internet.
Validation	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) The process of determining the fitness of an M&S resource and its associated data for a specific purpose. (FEDEP 1.5) 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)

Verification	<p>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)</p> <p>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)</p>
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B.2 M&S Resource Specific Terms

Table B-2 defines the various M&S resources that have been recognized by the COI.

Table B-2 M&S Resource Specific Terms

Term	Definition
Conceptual Model	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.” ⁷
Data Model	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. 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).
Federate	An M&S Resource identifying 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. 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).” ⁸
Federation	An M&S Resource identifying a collection of one or more federates capable of interoperating within a distributed synthetic environment. 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.” ⁹
Federations of Simulations	An M&S Resource providing 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.
Interface Specifications	An M&S Resource identifying a 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.
M&S Adjunct Tools	An M&S Resource featuring 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.

⁷ IEEE 1516.3, IEEE Recommended Practice for High Level Architecture (HLA) Federation Development and Execution Process (FEDEP), March 2003.

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

⁹ IEEE 1516-2000, IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Framework and Rules, March 2000.

M&S Data	An M&S Resource providing a representation of real-world facts or concepts that is in a format usable 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.
M&S Data Models	An M&S Resource providing a data model that describes M&S data.
M&S Environment	A set of interconnected M&S support elements (infrastructure) and resources used to conduct an event.
M&S Event	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.
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, laboratories, computing assets, communications assets, networks, personnel, instrumentation and test equipment, dictionaries and libraries, environments.
M&S Related Document	A document that describes the use and application of an M&S resource, an event, or a future capability.
M&S Requirement	Modifications or development of an M&S Resource or significant enhancement to an existing M&S Resource.
M&S Services	An M&S Resource providing a service (in a Service Oriented Architecture (SOA) with 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.
M&S Software	An M&S Resource providing software that implements a model or simulation.
M&S Software Component	An M&S Resource featuring reusable building blocks that have a known set of inputs and provide expected output behavior, but the implementation details may be hidden. Such components are useful for constructing simulations and/or providing functionality for simulation systems.
M&S Software Design Documents	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.
M&S Taxonomy	Represents a designation of controlled vocabulary terms pertaining to an M&S body of interest.

Appendix C – MSC Discovery Metadata DIF

An XML Schema has been defined to represent the Data Interchange Format (DIF) needed for the cataloging and discovery of M&S Resources. The major elements of the M&S COI (MSC) Discovery Metadata DIF branch from the Resource Metadata Set as illustrated in Figure C-1. These major elements include the following:

- *ID*
- *Title*
- *Type*
- *Description*
- *Dates*
- *Version*
- *Rights*
- *Releasability*
- *Security*
- *Associations*
- *POCs*
- *Keywords*
- *Usages*
- *Media*
- *Glyph*
- *Taxonomies Cited*
- *Extensions*

For the Resource Metadata Set and other Metadata Sets that are described in this appendix, an *##other* attribute and element is provided to allow additional information to be captured and associated with the MSC Discovery Metadata template component element.

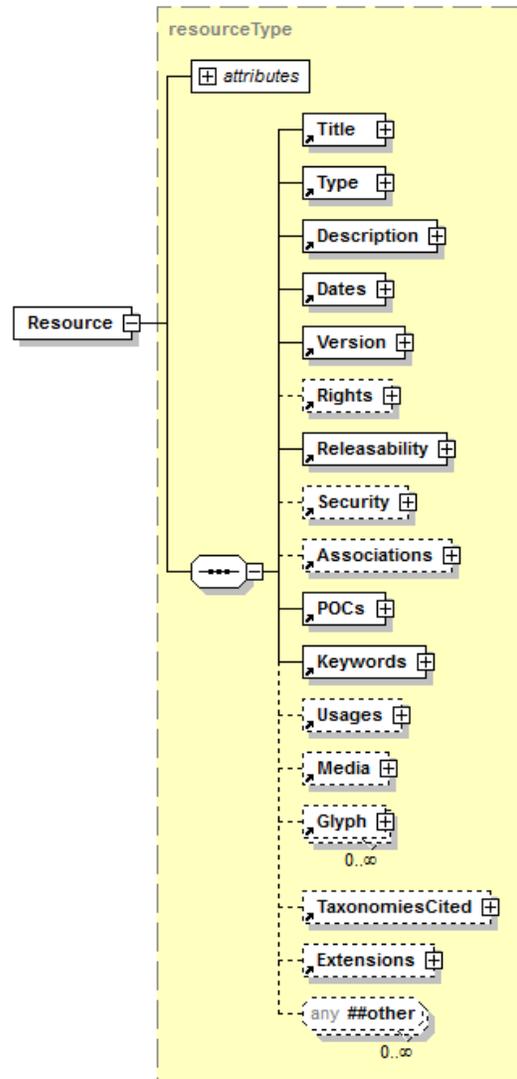
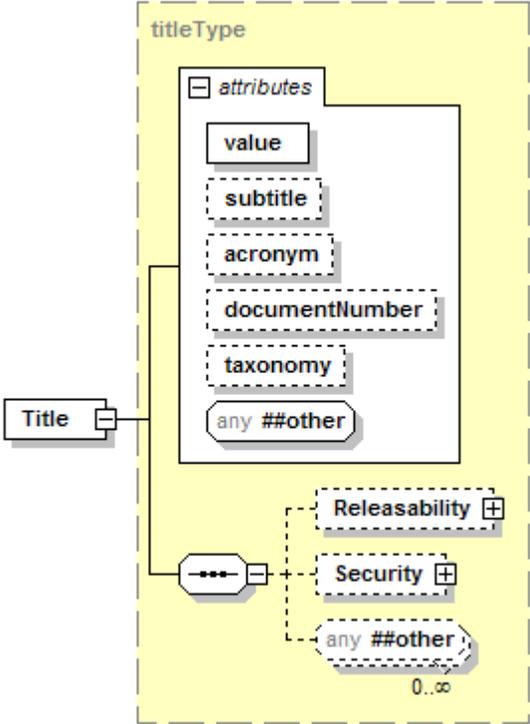
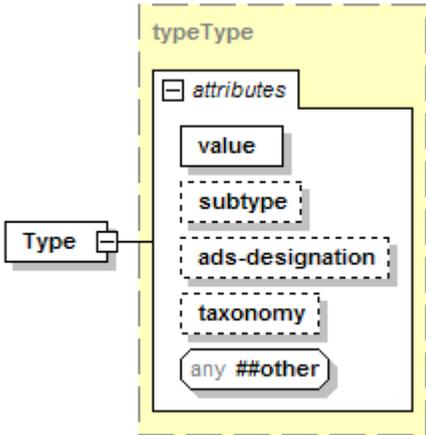


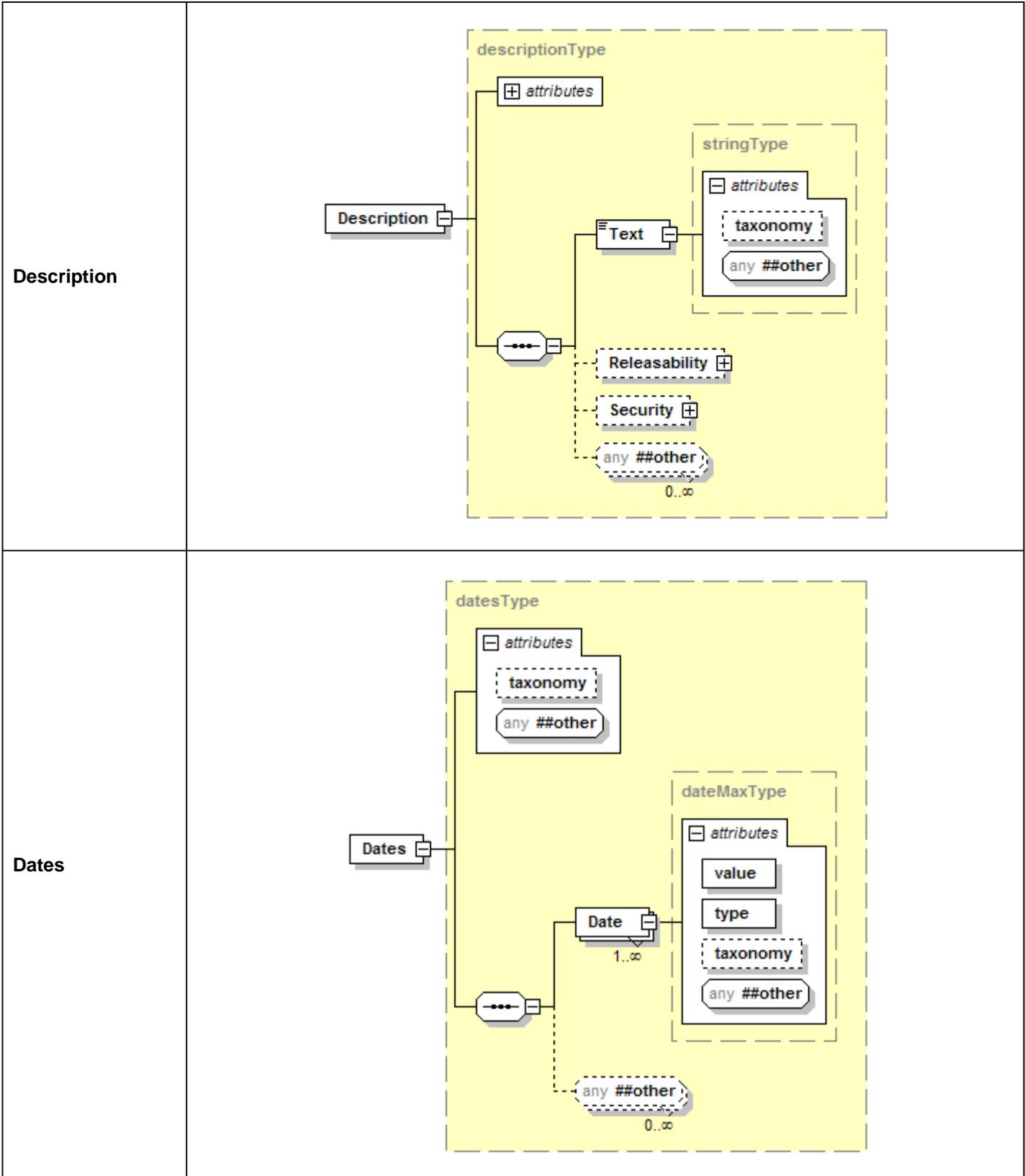
Figure C-1 MSC Discovery Metadata DIF Resource Elements

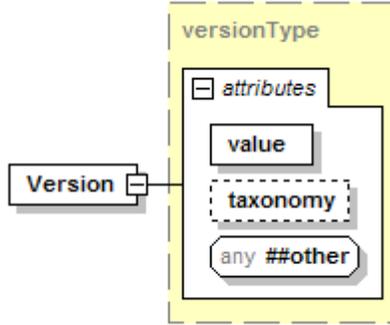
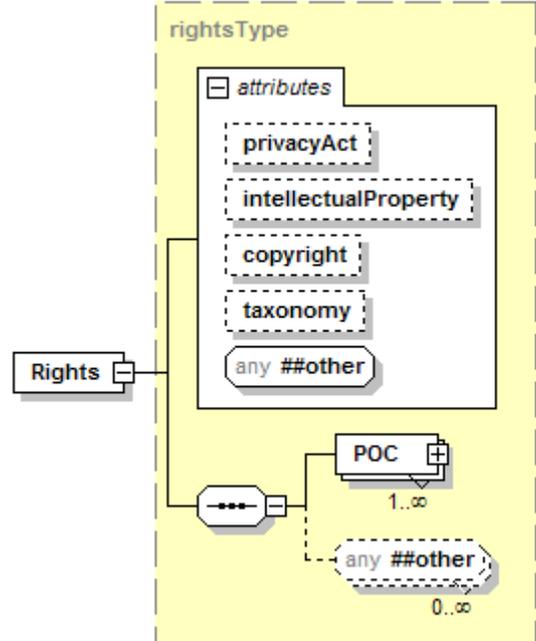
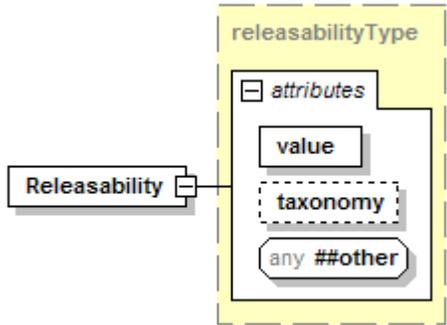
Appendix E provides an explanation of the graphical notations used in this section.

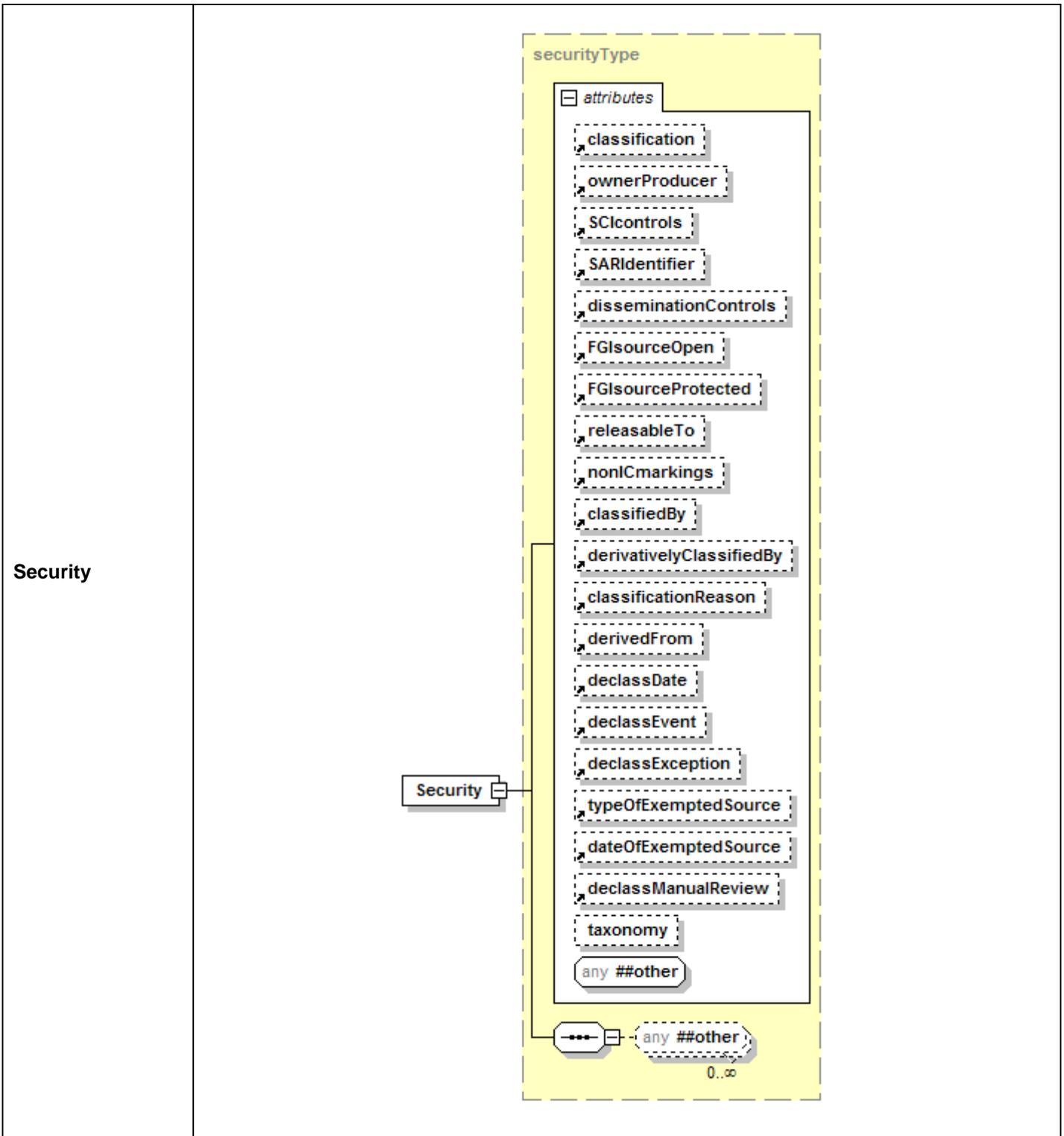
Table C-1 examines the elements identified in Figure C-1 that are part of the Core Layer of the MSC Discovery Metadata DIF.

Table C-1 Core Layer DIF Components

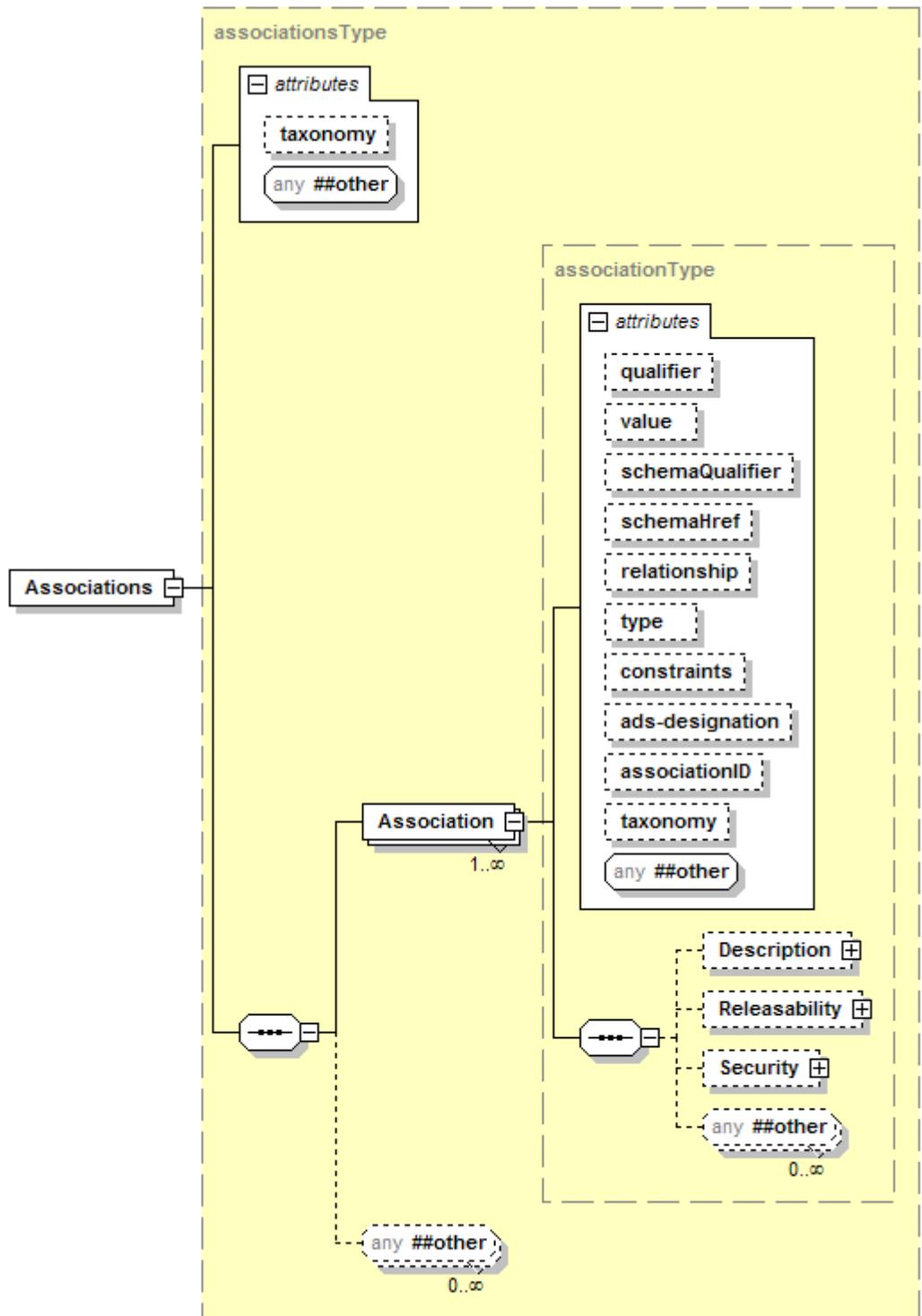
<p>Title</p>	 <p>The diagram shows a component labeled 'Title' connected to a larger structure labeled 'titleType'. The 'titleType' structure is enclosed in a dashed yellow box and contains an 'attributes' section with a minus sign icon. Inside 'attributes', there are several elements: 'value' (solid box), 'subtitle' (dashed box), 'acronym' (dashed box), 'documentNumber' (dashed box), 'taxonomy' (dashed box), and 'any ##other' (dashed box with a plus sign). Below the 'attributes' section, there is a connector with a plus sign and a dashed line leading to three more elements: 'Releasability' (dashed box with a plus sign), 'Security' (dashed box with a plus sign), and 'any ##other' (dashed box with a plus sign). At the bottom right of the 'titleType' box, the cardinality '0..∞' is indicated.</p>
<p>Type</p>	 <p>The diagram shows a component labeled 'Type' connected to a larger structure labeled 'typeType'. The 'typeType' structure is enclosed in a dashed yellow box and contains an 'attributes' section with a minus sign icon. Inside 'attributes', there are several elements: 'value' (solid box), 'subtype' (dashed box), 'ads-designation' (dashed box), 'taxonomy' (dashed box), and 'any ##other' (dashed box with a plus sign).</p>

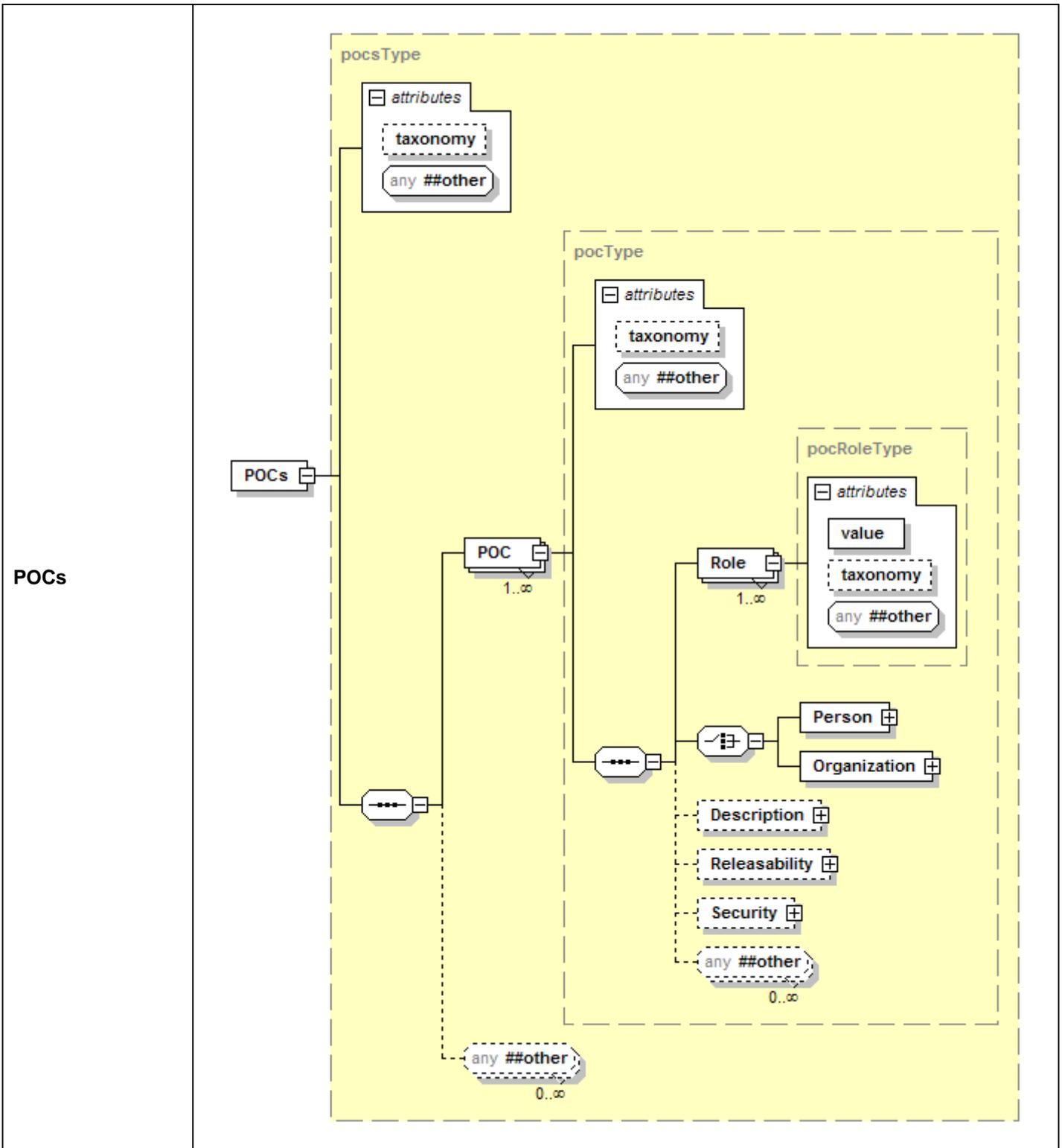


<p>Version</p>	 <p>The diagram shows a class named Version connected to a class named versionType. The versionType class contains an attributes container with three elements: value, taxonomy, and any ##other.</p>
<p>Rights</p>	 <p>The diagram shows a class named Rights connected to a class named rightsType. The rightsType class contains an attributes container with five elements: privacyAct, intellectualProperty, copyright, taxonomy, and any ##other. Below the attributes container, there is a POC class with a multiplicity of 1..∞ and an any ##other class with a multiplicity of 0..∞.</p>
<p>Releasability</p>	 <p>The diagram shows a class named Releasability connected to a class named releasabilityType. The releasabilityType class contains an attributes container with three elements: value, taxonomy, and any ##other.</p>

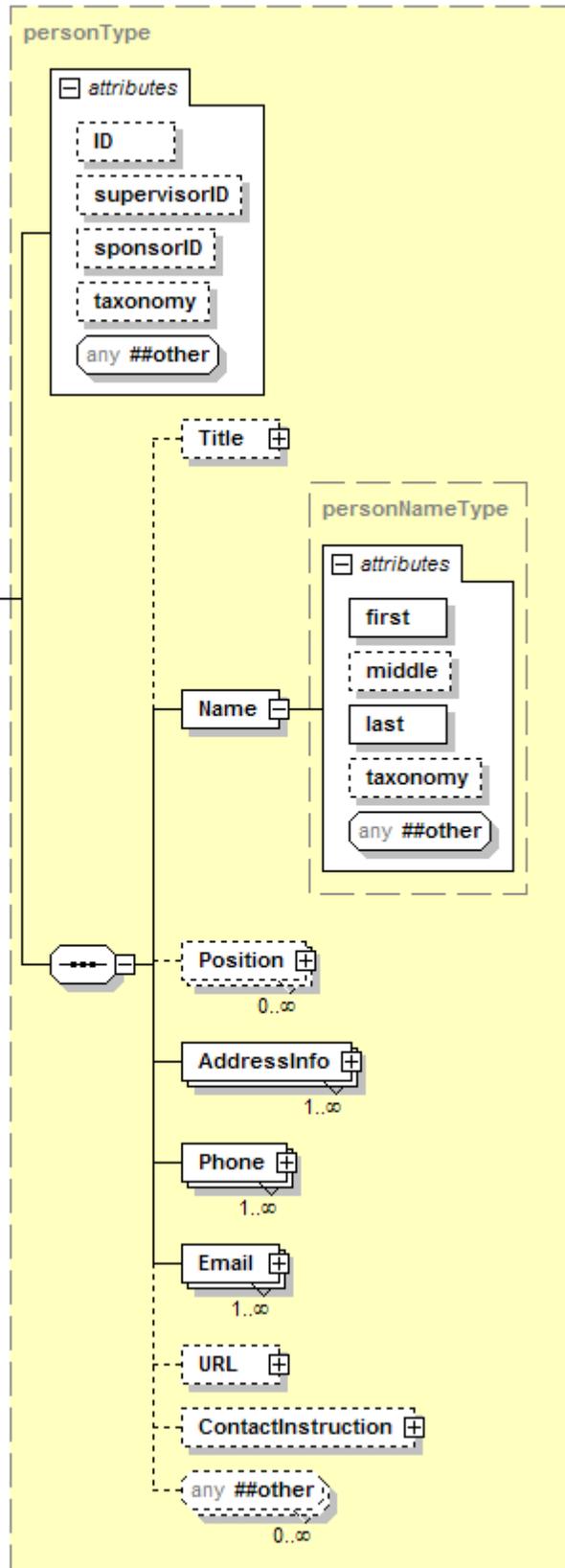


Associations

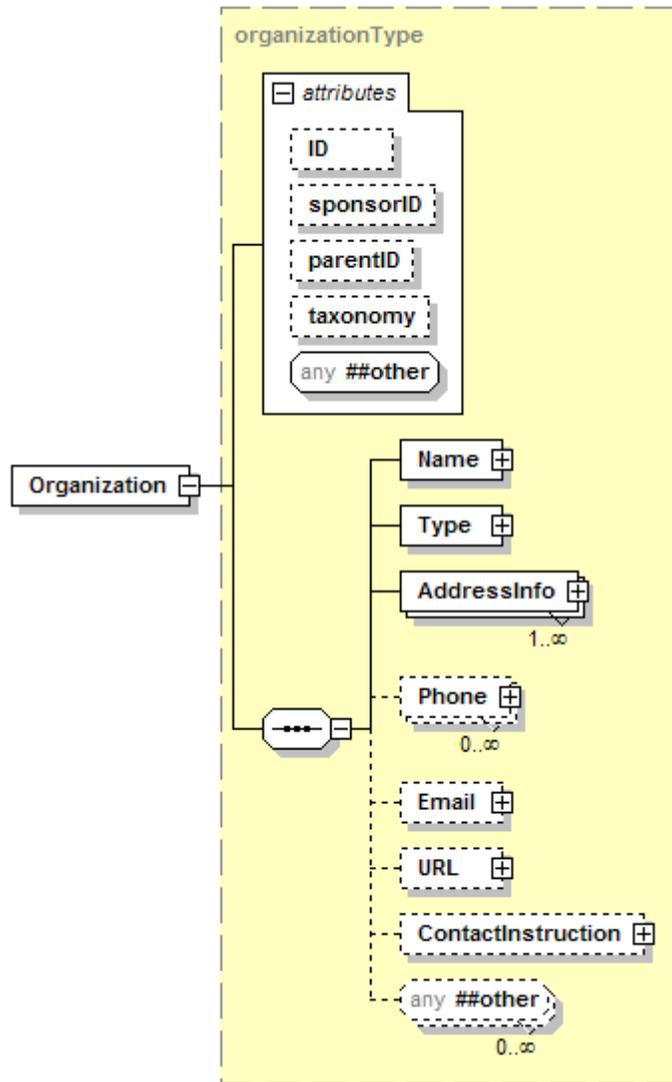


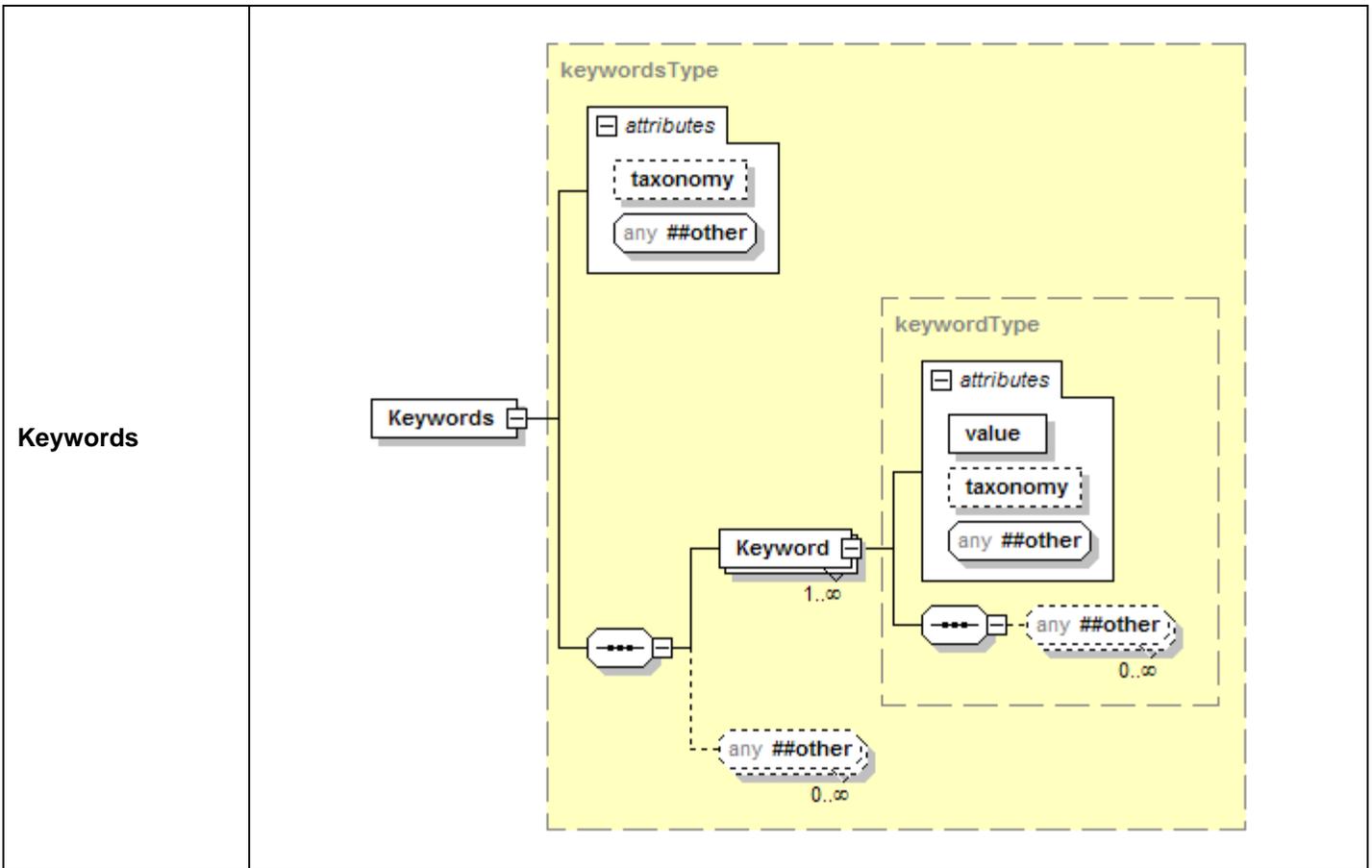


POC.Person

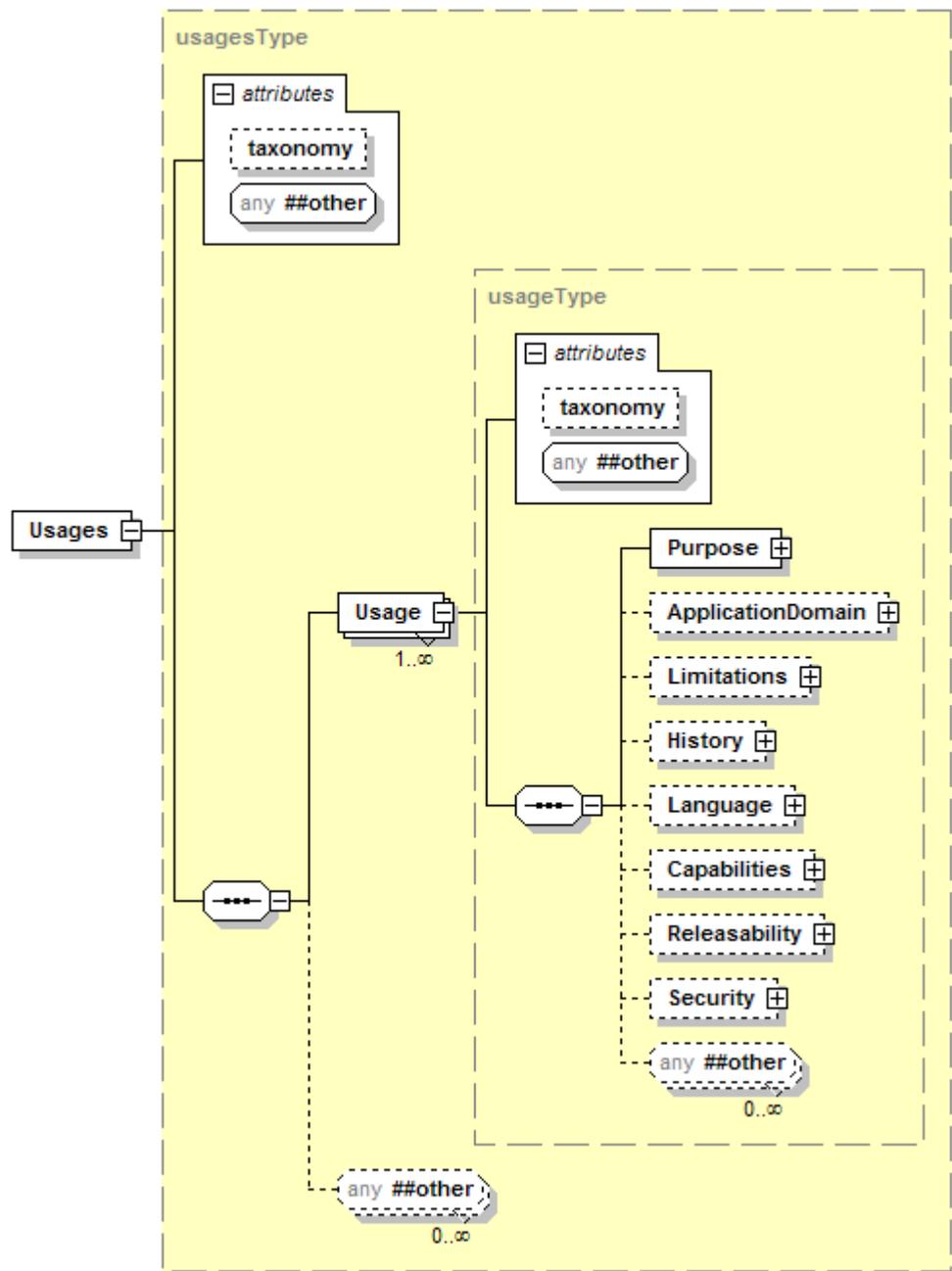


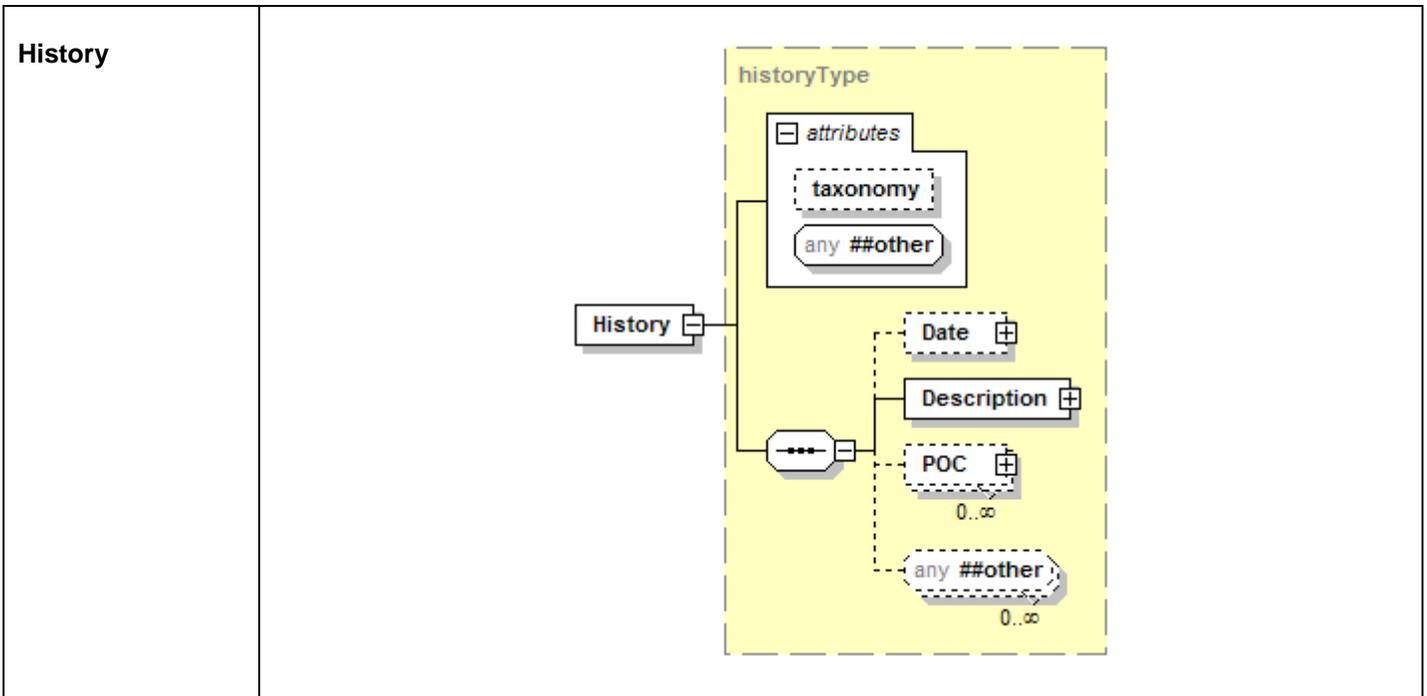
POC.Organization



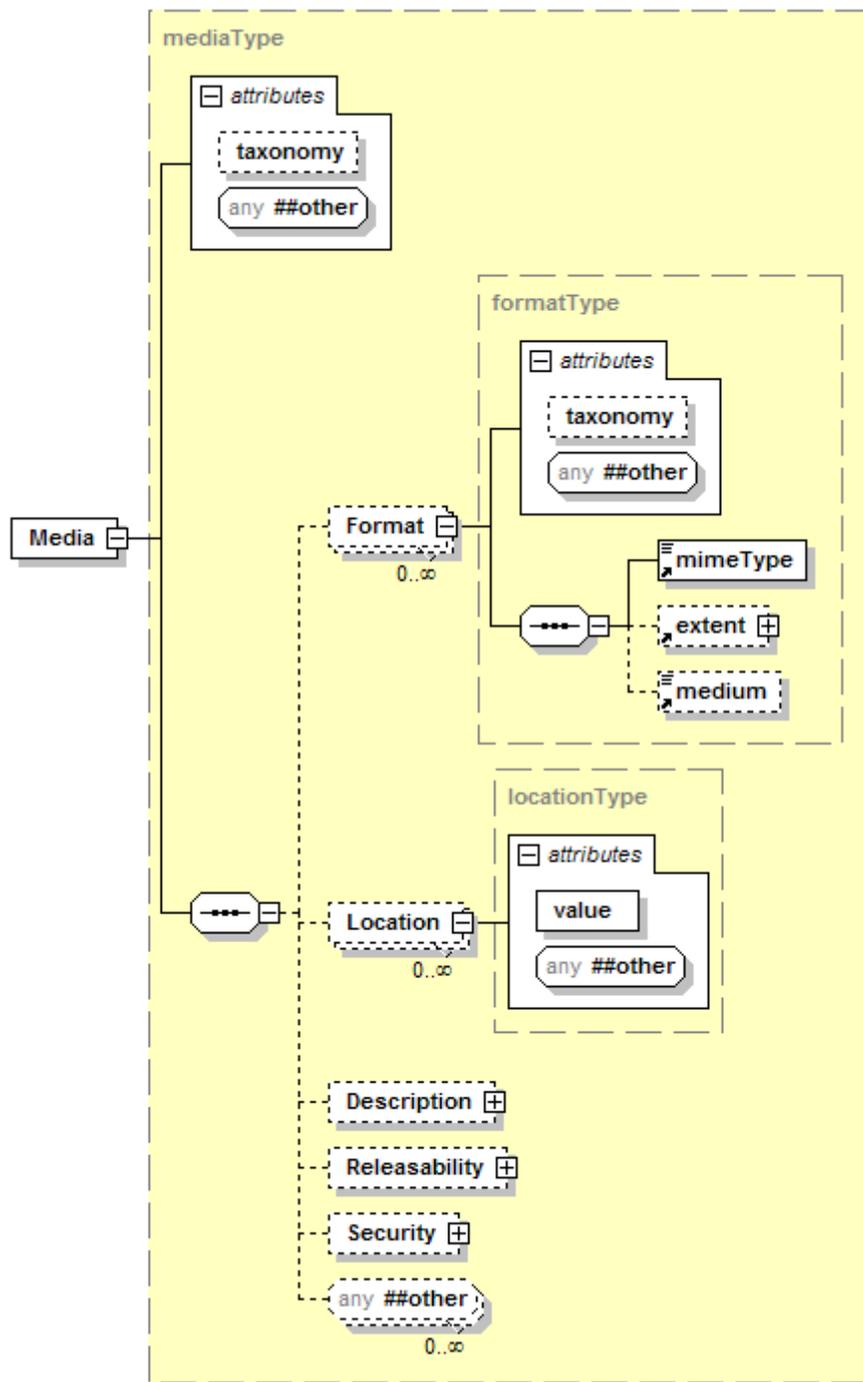


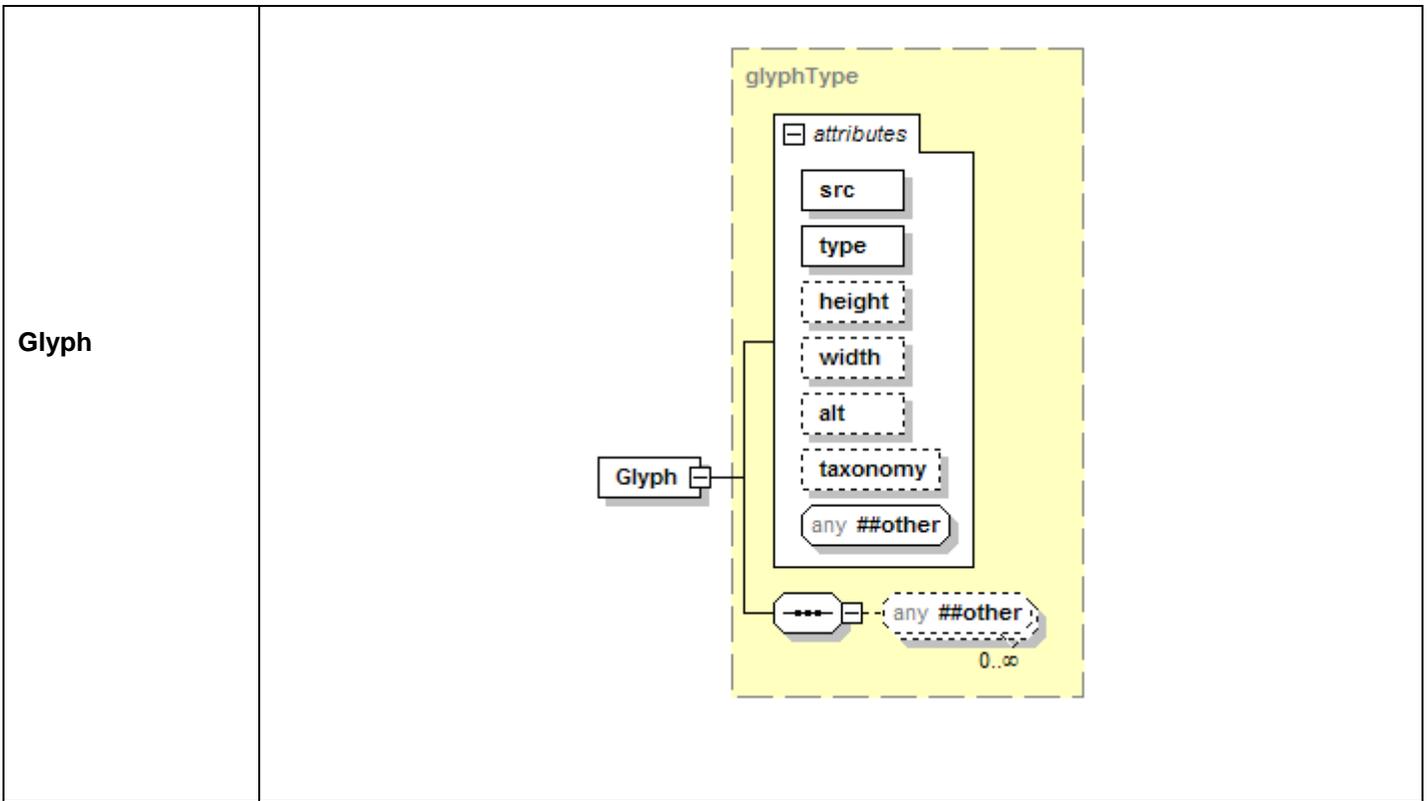
Usages





Media





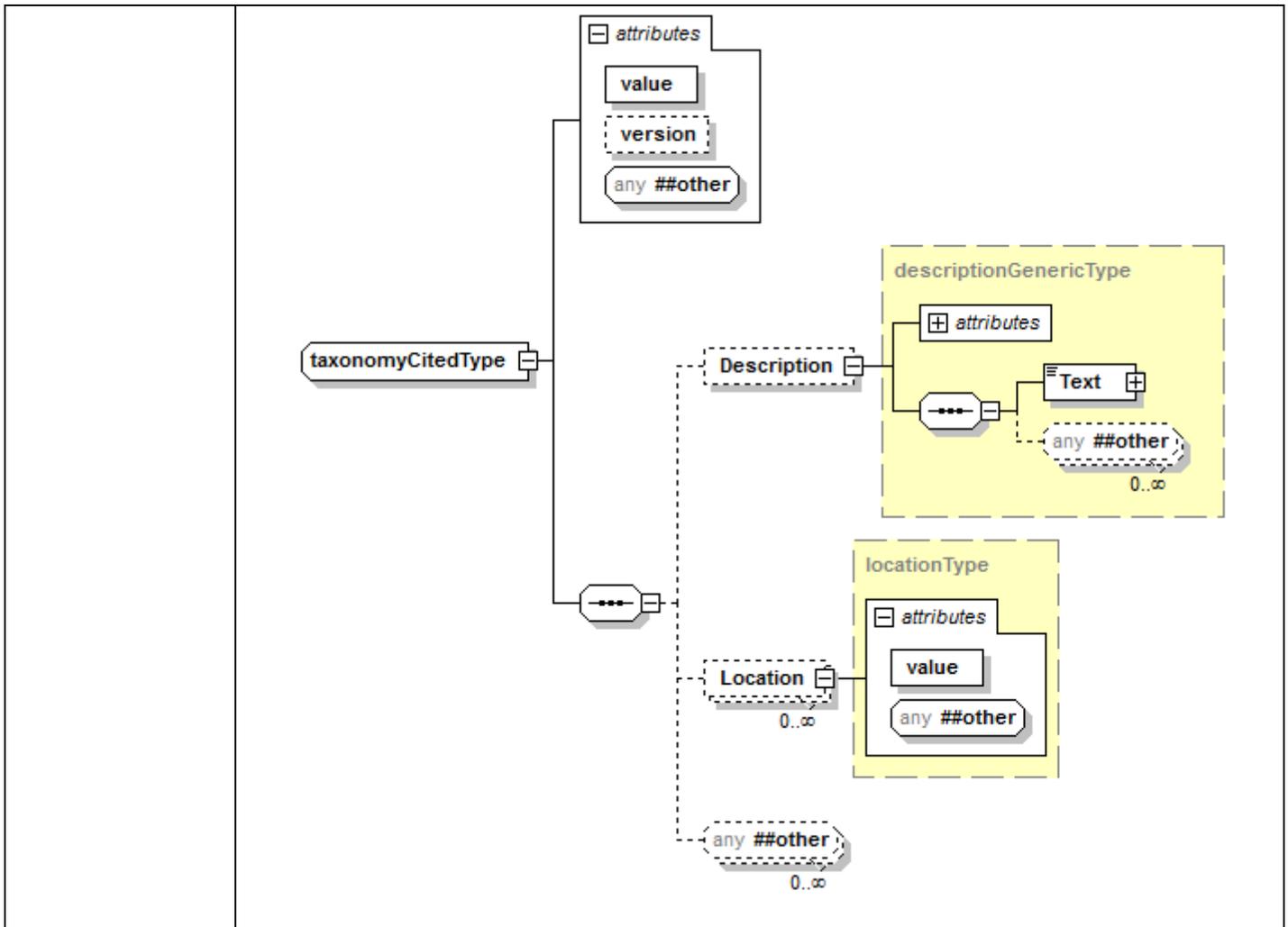
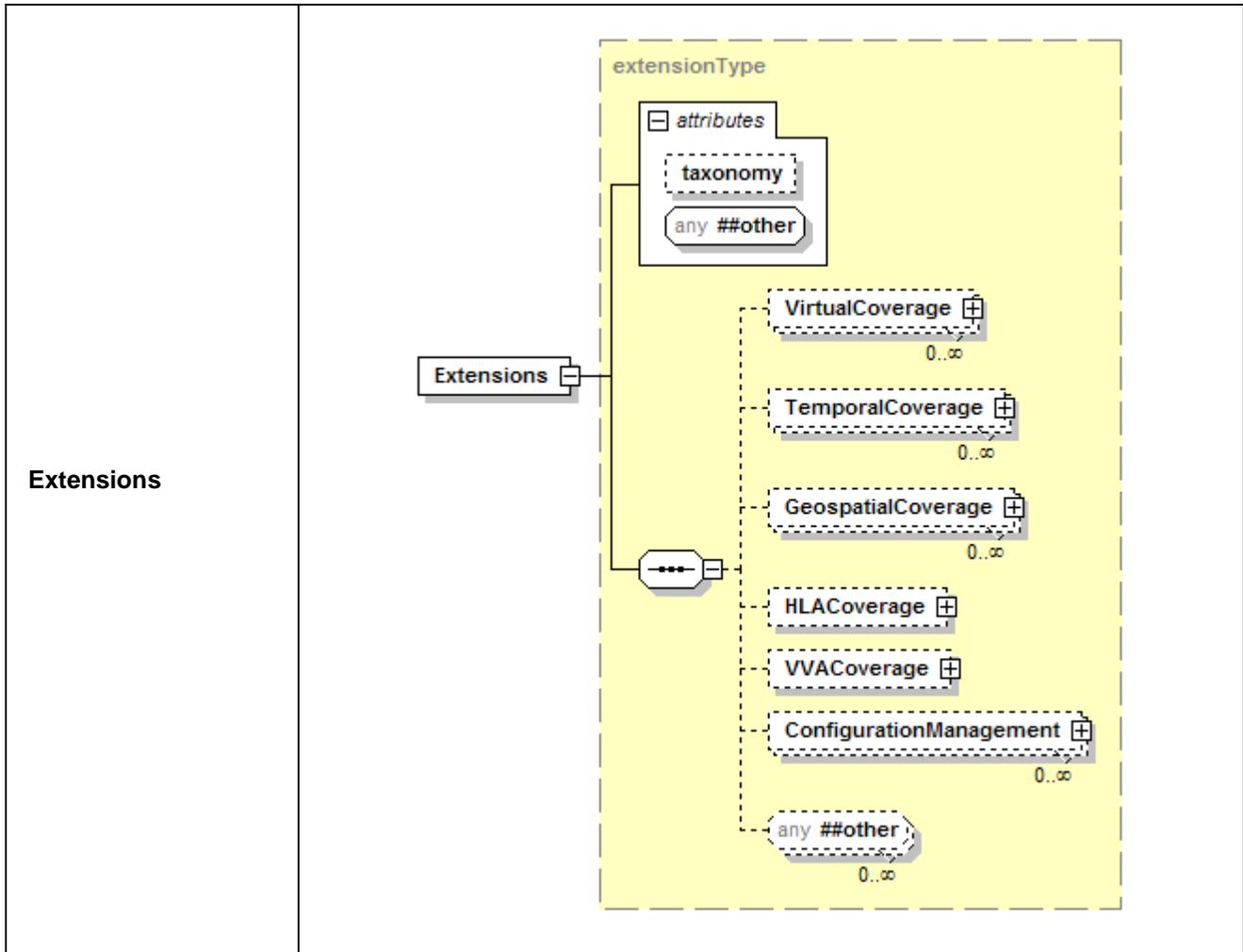
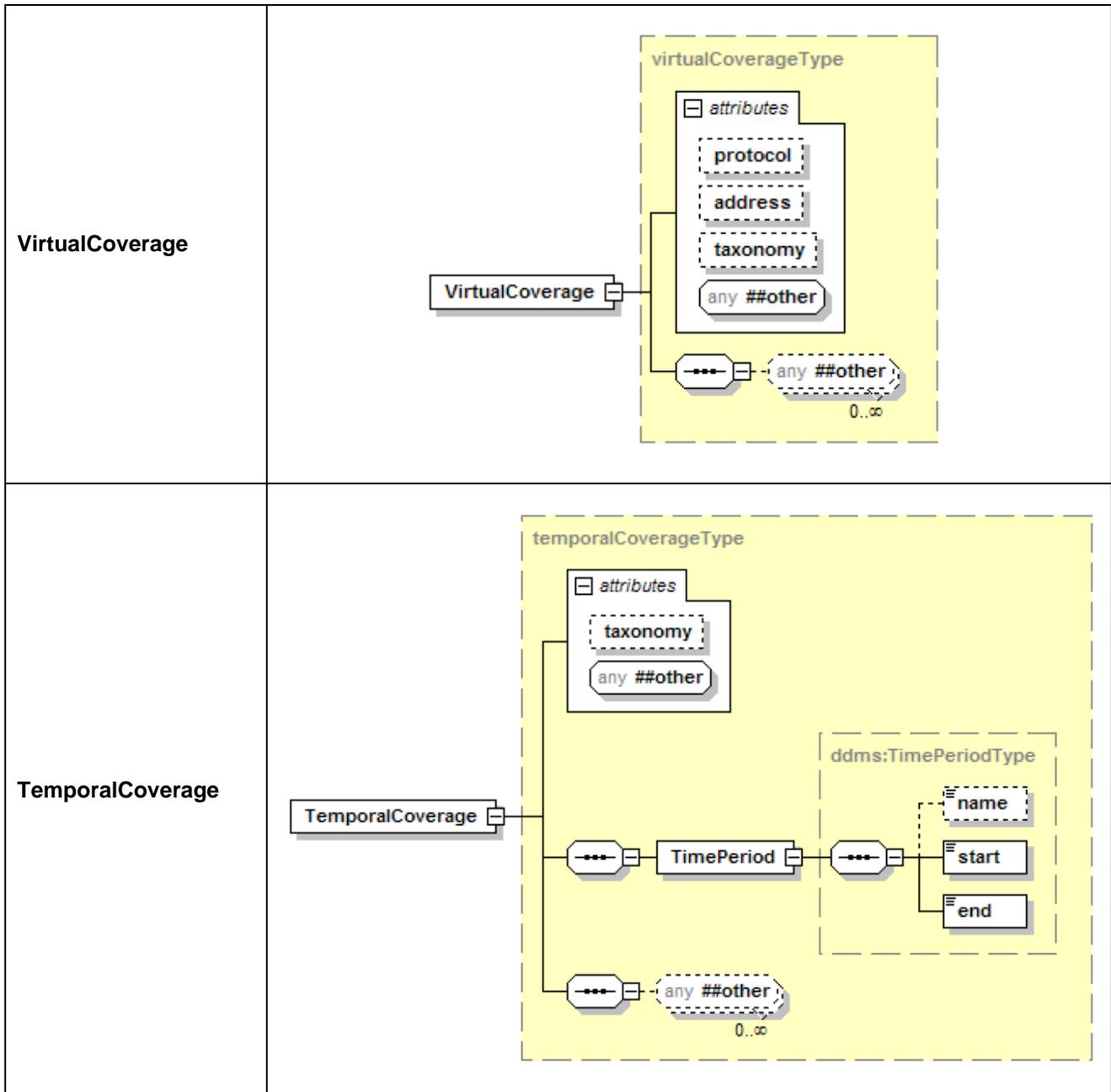
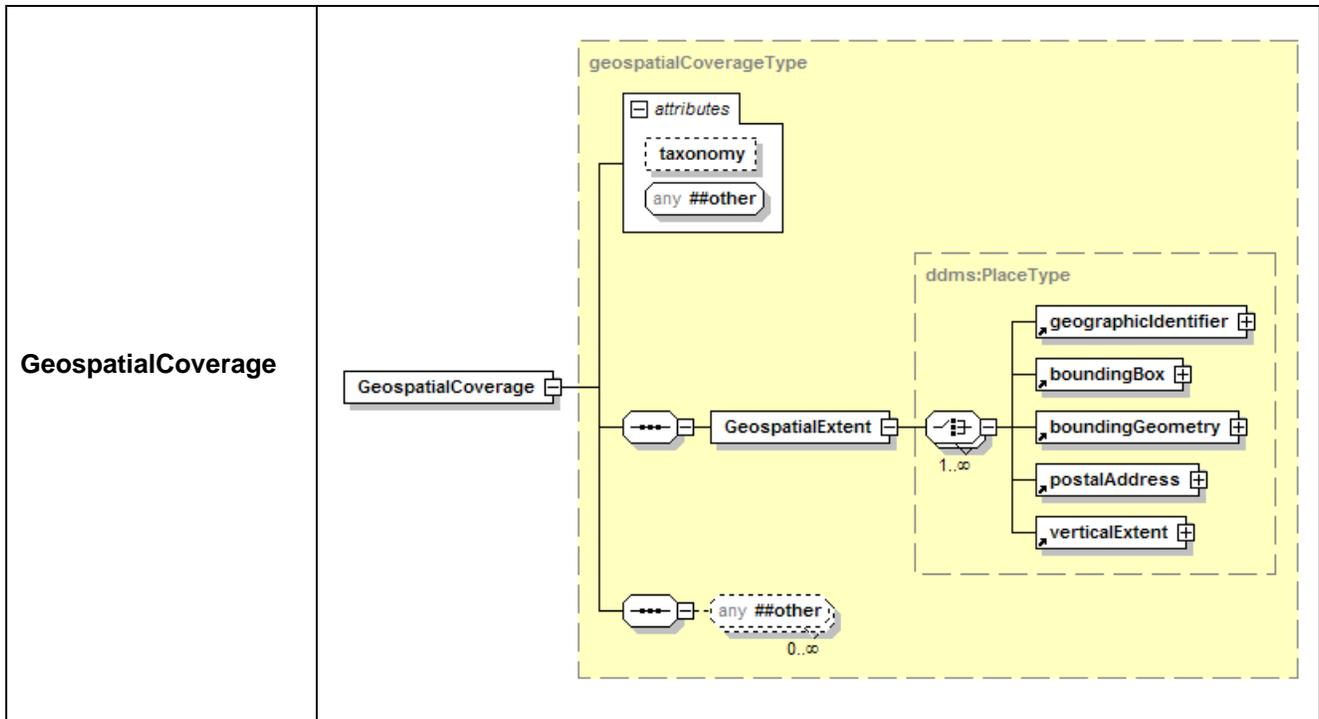


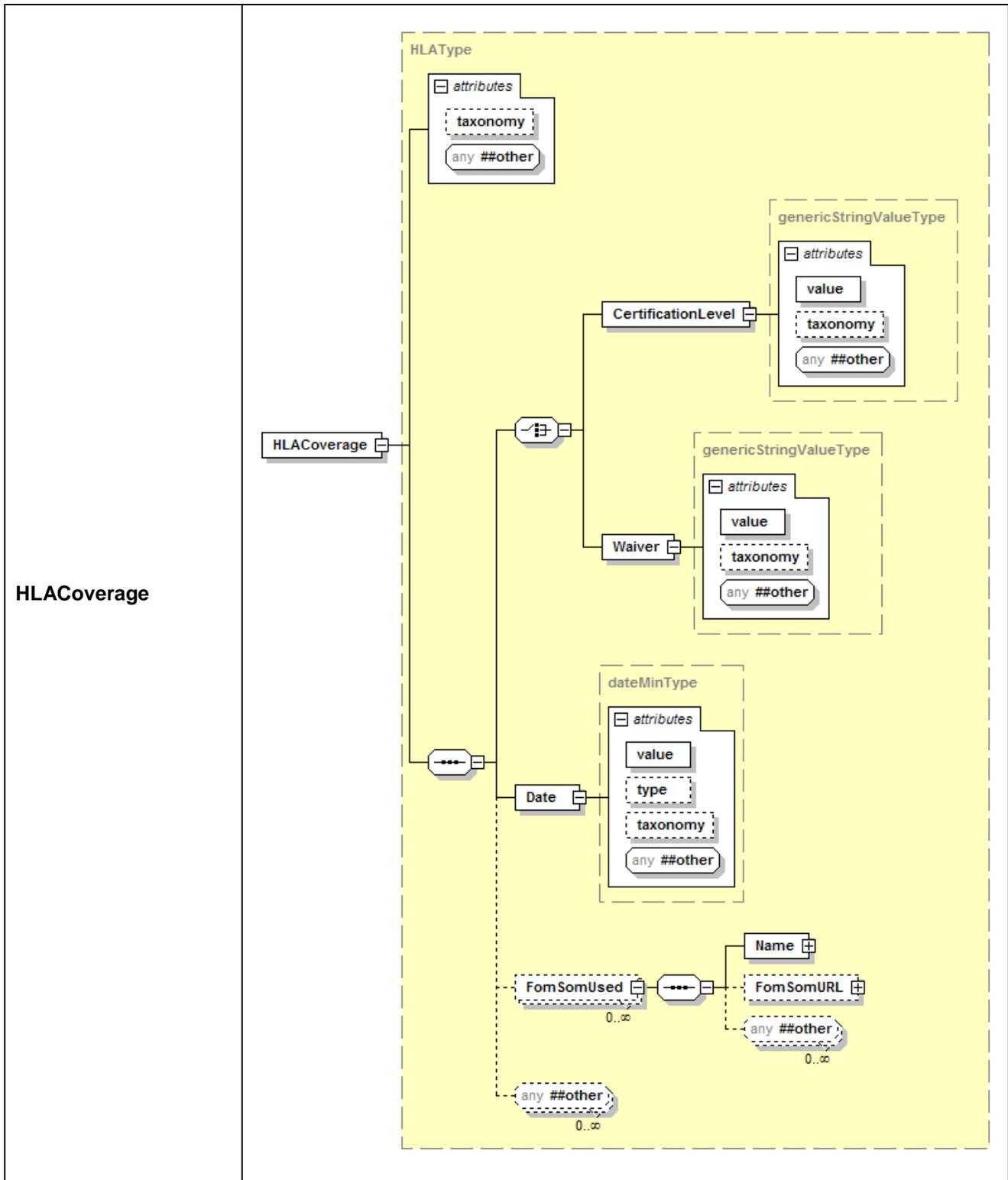
Table C-2 examines the elements identified in Figure C-1 that are part of the Supplemental Layer of the MSC Discovery Metadata DIF.

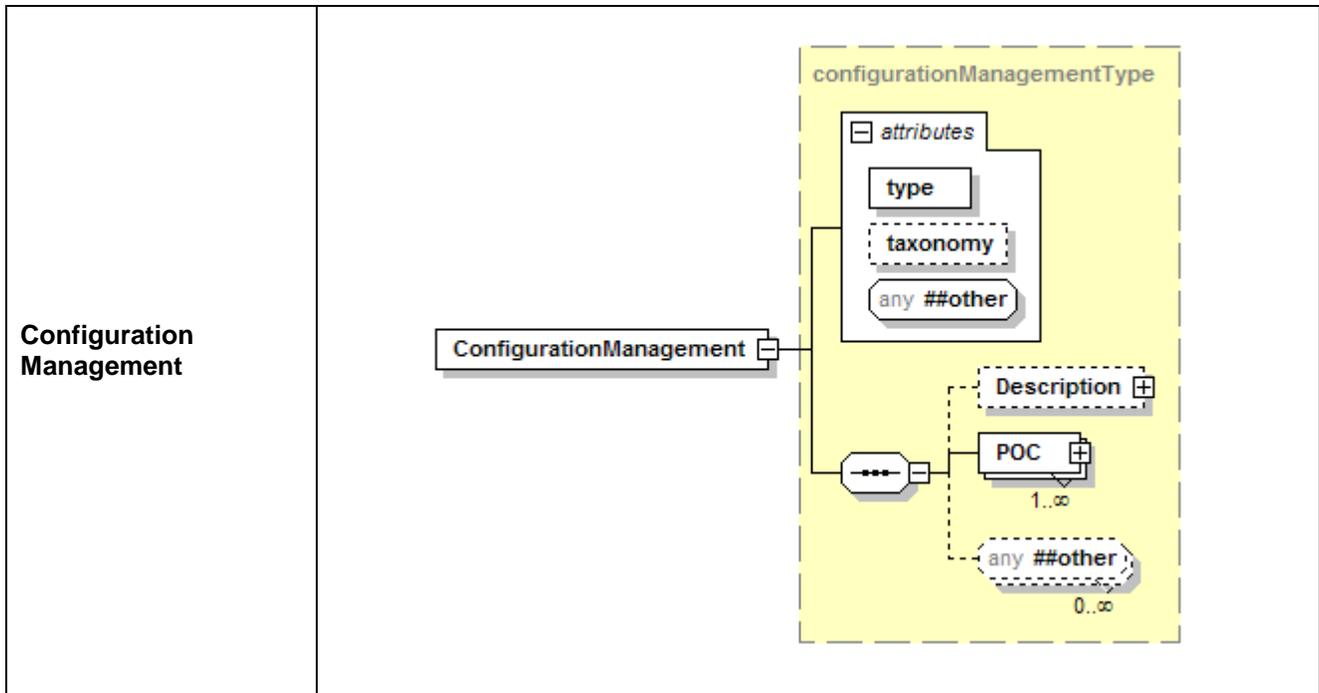
Table C-2 Supplemental Layer DIF Components



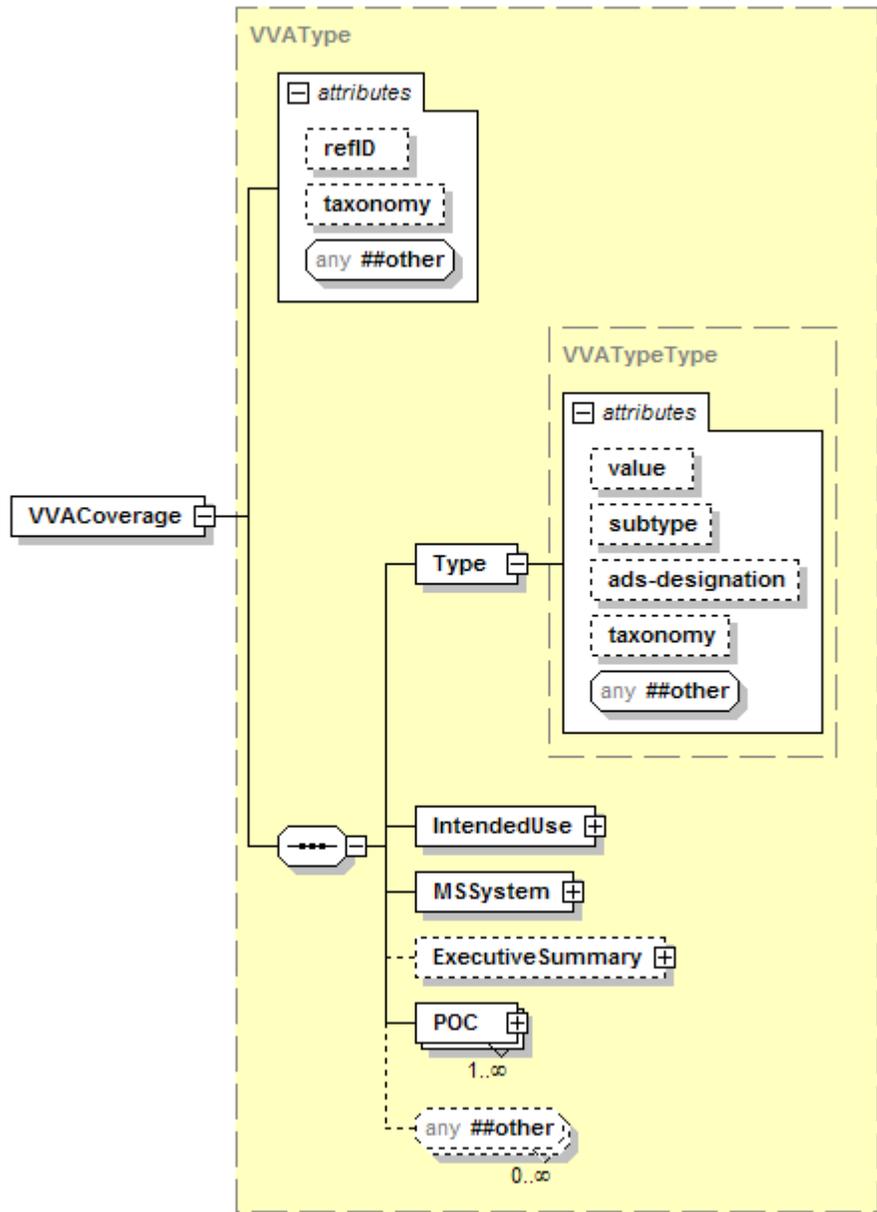








VV&A



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Appendix D – MSC Discovery Metadata Schema Set

Listings of the following MSC Discovery Metadata related-schemas are provided in this Appendix:

Note: the `<any>` and `<anyAttribute>` XML elements are used to make the MSC Discovery Metadata more extensible. They allow documents to contain additional elements 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 elements are not allowed) may be used.

D.1 MSC-DMS-v1_3.xsd

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2007 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions, Inc.) -->
<!-- version 1.3 - 2/10/2010 -->
<!-- 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/1.3/" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ms_taxonomy="http://metadata.dod.mil/mdr/ns/MSCDMS/1.3/taxonomies/" 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/1.3/" elementFormDefault="qualified" attributeFormDefault="qualified"
version="1.3">
  <xs:include schemaLocation="MSC-DMS-Core.xsd"/>
  <xs:include schemaLocation="MSC-DMS-Supplemental.xsd"/>
  <xs:annotation>
    <xs:documentation>CHANGE LOG:
      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"/>
  <!-- COMPLEX TYPES -->
  <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 MSCDM 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"/>
      <xs:element ref="Keywords"/>
      <xs:element ref="Usages" minOccurs="0"/>
      <xs:element ref="Media" minOccurs="0"/>
      <xs:element ref="Glyph" 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:complexType>

```

```
</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>
```

D.2 MSC-DMS-Core.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions, Inc.) -->
<!-- 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/1.3/" 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/1.3/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.3/" elementFormDefault="qualified" attributeFormDefault="qualified"
version="1.3">
  <!-- 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:
    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="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="POCs" type="pocsType"/>

```

```
<xs:element name="POC" type="pocType"/>  
<xs:element name="Person" type="personType"/>  
<xs:element name="Organization" type="organizationType"/>  
<xs:element name="Keywords" type="keywordsType"/>  
<xs:element name="Usages" type="usagesType"/>  
<xs:element name="History" type="historyType"/>  
<xs:element name="Media" type="mediaType"/>  
<xs:element name="Glyph" type="glyphType"/>  
<xs:element name="TaxonomiesCited" type="taxonomiesCitedType"/>  
</xs:schema>
```

D.3 MSC-DMS-Supplemental.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2007 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions, Inc.) -->
<!-- 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/1.3/" 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/1.3/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.3/" elementFormDefault="qualified" attributeFormDefault="qualified"
version="1.3">
  <!-- 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:
      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 GeospatialCoverage 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="GeospatialCoverage" type="geospatialCoverageType"/>
  <xs:element name="HLACoverage" type="HLAType"/>
  <xs:element name="ConfigurationManagement" type="configurationManagementType"/>
  <xs:element name="VVACoverage" type="VVAType"/>
  <!-- COMPLEX TYPES -->
  <xs:complexType name="HLAType">
    <xs:sequence>
      <xs:choice>
        <xs:element name="CertificationLevel" type="genericStringValue"/>
        <xs:element name="Waiver" type="genericStringValue"/>
      </xs:choice>
      <!-- xs:element name="Date" type="ddms:CombinedDateType"/ -->
      <xs:element name="Date" type="dateMinType"/>
      <xs:element name="FomSomUsed" minOccurs="0" maxOccurs="unbounded">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Name" type="genericStringValue"/>
            <xs:element name="FomSomURL" type="genericStringValue"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:element name="HLAType" type="HLAType" minOccurs="0"/>
  <xs:sequence>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:sequence>
</xs:complexType>

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<xs:complexType name="VVAType">
  <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:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<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: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>
<xs:complexType name="accreditationType">
  <xs:sequence>
    <xs:element name="Status" type="genericStringValue"/>
    <xs:element name="Exemption" type="genericStringValue"/>
    <xs:element name="Applicability" type="genericStringValue"/>
    <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="acquisitionType">
  <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:complexType>
<xs:complexType name="analysisType">
  <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:complexType>
<xs:complexType name="TEType">
  <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:complexType>
<xs:complexType name="virtualCoverageType">
  <xs:complexContent>
    <xs:extension base="ddms:VirtualCoverageType">
      <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="temporalCoverageType">
  <xs:complexContent>
    <xs:extension base="ddms:TemporalCoverageType">
      <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>

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        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="geospatialCoverageType">
      <xs:complexContent>
        <xs:extension base="ddms:GeospatialCoverageType">
          <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="configurationManagementType">
      <xs:sequence>
        <!-- xs:element name="Type" type="configurationManagementTypeUnion"/ -->
        <xs:element name="Description" type="descriptionGenericType" minOccurs="0"/>
        <xs:element name="POC" type="pocReferenceType" maxOccurs="unbounded"/>
        <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:attribute name="taxonomy" type="nonEmptyString"/>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <!-- ENUMERATIONS (i.e. Pick List Types)-->
    <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>

```

D.4 MSC-DMS-Types.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp2 (http://www.altova.com) by Paul Gustavson (SimVentions, Inc.) -->
<!-- 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/1.3/" 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/1.3/"
targetNamespace="http://metadata.dod.mil/mdr/ns/MSCDMS/1.3/" elementFormDefault="qualified" attributeFormDefault="qualified"
version="1.3">
  <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:annotation>
    <xs:documentation>CHANGE LOG:
      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 across 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:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="applicationDomainType">
    <xs:attribute name="value" type="applicationDomainTypeUnion" use="required"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <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:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="associationType">
    <xs:complexContent>
      <xs:extension base="ddms: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:extension>
    </xs:complexContent>
  </xs:complexType>

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        <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>
<xs:complexType name="dateMaxType">
    <xs:attribute name="value" type="xs:date" use="required"/>
    <xs:attribute name="type" type="dateTypeUnion" use="required"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <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:attribute name="taxonomy" type="nonEmptyString"/>
    <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:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="descriptionGenericType">
    <xs:sequence>
        <xs:element name="Text" type="stringType"/>
        <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="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:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!-- due to change of DDMS 2.0, "any" subelement no longer supported for format Type -->
<xs:complexType name="formatType">
    <xs:complexContent>
        <xs:extension base="ddms:MediaType">
            <xs:attribute name="taxonomy" type="nonEmptyString"/>
            <xs:anyAttribute namespace="##other" processContents="lax"/>
        </xs:extension>
    </xs:complexContent>
    <!--xs:sequence>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence -->
</xs:complexType>
<xs:complexType name="genericStringValueType">
    <xs:attribute name="value" type="xs:string" use="required"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>

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<!--xs:complexType name="genericType">
  <xs:attribute name="taxonomy" type="taxonomyType"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType-->
<xs:complexType name="glyphType">
  <xs:sequence>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:sequence>
    <xs:attribute name="src" type="xs:anyURI" use="required"/>
    <xs:attribute name="type" type="glyphTypeUnion" use="required"/>
    <xs:attribute name="height" type="xs:short"/>
    <xs:attribute name="width" type="xs:short"/>
    <xs:attribute name="alt" type="xs:string"/>
    <xs:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:sequence>
</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="POC" 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: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:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<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:attribute name="taxonomy" type="nonEmptyString"/>
      <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>
<xs:complexType name="mediaType">
  <xs:sequence>
    <xs:element name="Format" type="formatType" minOccurs="0" maxOccurs="unbounded"/>
    <!-- xs:element name="Format" type="ddms:MediaType" 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>

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<xs:complexType name="organizationType">
  <xs:sequence>
    <xs:element name="Name" type="genericStringValue"/>
    <xs:element name="Type" type="organizationTypeType"/>
    <xs:element name="AddressInfo" type="addressInfoType" maxOccurs="unbounded"/>
    <xs:element name="Phone" type="phoneType" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Email" type="emailType" minOccurs="0"/>
    <xs:element name="URL" type="genericStringValue" minOccurs="0"/>
    <xs:element name="ContactInstruction" type="genericStringValue" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="ID" type="xs:string"/>
  <xs:attribute name="sponsorID" type="xs:string"/>
  <xs:attribute name="parentID" type="xs:string"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="organizationTypeType">
  <xs:attribute name="value" type="organizationTypeUnion" use="required"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="orgReferenceType">
  <xs:sequence>
    <xs:element name="Name" type="genericStringValue"/>
  </xs:sequence>
  <xs:attribute name="organizationID" type="xs:string" use="optional"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
  <!--xs:attribute name="value" type="xs:string" use="optional"-->
</xs:complexType>
<xs:complexType name="personNameType">
  <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="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="personPositionType">
  <xs:sequence>
    <xs:element name="Org" type="orgReferenceType" maxOccurs="unbounded"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="value" type="xs:string" use="required"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <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:string" use="optional"/>
  <xs:attribute name="taxonomy" type="nonEmptyString"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:complexType name="personType">
  <xs:sequence>
    <xs:element name="Title" type="genericStringValue" minOccurs="0"/>
    <xs:element name="Name" type="personNameType"/>
    <xs:element name="Position" type="personPositionType" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="AddressInfo" type="addressInfoType" maxOccurs="unbounded"/>
    <xs:element name="Phone" type="phoneType" maxOccurs="unbounded"/>
    <xs:element name="Email" type="emailType" maxOccurs="unbounded"/>
    <xs:element name="URL" type="genericStringValue" minOccurs="0"/>
    <xs:element name="ContactInstruction" type="genericStringValue" minOccurs="0"/>
    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="ID" type="xs:string"/>
  <xs:attribute name="supervisorID" type="xs:string"/>
  <xs:attribute name="sponsorID" type="xs:string"/>

```

```

        <xs:attribute name="taxonomy" type="nonEmptyString"/>
        <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:attribute name="taxonomy" type="nonEmptyString"/>
        <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:attribute name="taxonomy" type="nonEmptyString"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="pocRoleType">
        <xs:attribute name="value" type="pocRoleUnion" use="required"/>
        <xs:attribute name="taxonomy" type="nonEmptyString"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="pocsType">
        <xs:sequence>
            <xs:element name="POC" type="pocType" maxOccurs="unbounded"/>
            <!--xs:element ref="POC" 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:complexType>
    <xs:complexType name="pocType">
        <xs:sequence>
            <xs:element name="Role" type="pocRoleType" maxOccurs="unbounded"/>
            <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="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="releasabilityType">
        <xs:attribute name="value" type="releasabilityValueUnion" use="required"/>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="rightsType">
        <xs:complexContent>
            <xs:extension base="ddms:RightsType">
                <xs:sequence>
                    <xs:element name="POC" type="pocReferenceType" 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>
    <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:attribute name="taxonomy" type="nonEmptyString"/>
            <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>
<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:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<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="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="typesType">
    <xs:sequence>
        <xs:element name="Type" type="typeType" 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: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:attribute name="taxonomy" type="nonEmptyString"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>

```

```

</xs:complexType>
<xs:complexType name="usageType">
  <xs:sequence>
    <xs:element name="Purpose" type="genericStringValue"/>
    <!-- xs:element name="ApplicationDomain" type="applicationDomainTypeUnion" minOccurs="0"/-->
    <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 ref="History" minOccurs="0"/ -->
    <!-- xs:element name="Language" type="ddms:CompoundLanguageIdentifierType" 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 typeValueEnumerations 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="infrastructure"/>
    <xs:enumeration value="supported_events"/>
  </xs:restriction>

```

```

        <xs:enumeration value="future_capabilities_requirements"/>
        <xs:enumeration value="related_documents"/>
        <xs:enumeration value="environment"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="associationTypeUnion">
    <xs:union memberTypes="typeValueEnumerations 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&amp;v"/>
        <xs:enumeration value="accreditation"/>
        <xs:enumeration value="retired"/>
        <xs:enumeration value="last verified"/>
    </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="glyphTypeEnumerations">
    <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="glyphTypeUnion">
    <xs:union memberTypes="glyphTypeEnumerations 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:restriction>

```

```

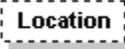
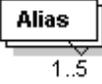
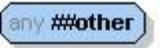
</xs:simpleType>
<xs:simpleType name="phoneTypeUnion">
  <xs:union memberTypes="phoneTypeEnumerations xs:string"/>
</xs:simpleType>
<xs:simpleType name="pocRoleEnumerations">
  <xs:restriction base="xs:string">
    <xs:enumeration value="primary author"/>
    <xs:enumeration value="contributor"/>
    <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: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 1.2 update - pick list updated to reflect style of typeValueEnumerations (underscores instead of spaces) -->
<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="services"/>
    <xs:enumeration value="data"/>
    <xs:enumeration value="data_models"/>
    <xs:enumeration value="interface_specification"/>
    <xs:enumeration value="software_design_document"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="typeValueUnion">
  <xs:union memberTypes="typeValueEnumerations xs:string"/>
</xs:simpleType>
</xs:schema>

```

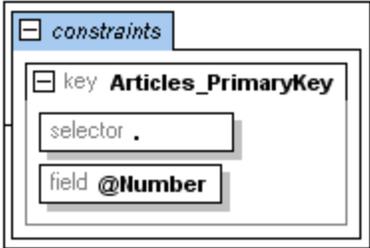
Appendix E – XMLSpy® Schema Design Content Model

Many of the XML schema related diagrams provided within this specification (see Appendix C) were generated using the Altova® XMLSpy® tool. This section describes the symbols and nomenclature found within these diagrams beginning with the Element Symbols identified in Table E-1.¹⁰

Table E-1 Element Symbols

Symbol	Name	Description
	Mandatory single element	A rectangle with a solid border identifies a required XML schema element. In this example, a mandatory element of <code>Country</code> is required to be identified within the XML instance data.
	Mandatory single element 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 element used to provide simple content (text node only) or mixed content (text and child elements). In this example, simple content is denoted because there is no plus sign; a mandatory element of <code>Name</code> containing simple content is defined. This <code>Name</code> element with simple content would be required to be identified within the XML instance data.
	Single optional element	A rectangle with a dashed border identifies an optional XML schema element. In this example, an optional element of <code>Location</code> may be identified within the XML instance data.
	Mandatory multiple element	An overlapping set of rectangles identifies a mandatory XML schema element represented by one or more instances. In this example, up to five <code>Alias</code> element values may be identified within the XML instance data.
	Mandatory multiple element containing child elements	A mandatory multiple element with a plus sign identifies an element value containing child elements. In this example, an unlimited number of <code>Division</code> element values may be defined with child elements within the XML instance data.
	Element referencing global element	The arrow in the bottom left indicates an element referencing a global element, which is defined elsewhere. In this example, an unlimited number of <code>xs:field</code> element values may be defined with child elements 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 an element, 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 element declarations. In this example, <code>Subsidiaries</code> is a global model group that can be used to define elements within the XML schema reuse element declarations.
	Wildcards	An irregular octagon with <code>any</code> at left indicates a wildcard, which can be used as placeholders to allow elements not specified in the schema or from other namespaces. The common wildcards used within an XML schema are identified below:

¹⁰ “Introduction to XMLSPY 2005 Enterprise Edition,” <http://www.altova.com/manual/>

		<p>##other = elements that can belong to any namespace other than the target namespace defined in the schema;</p> <p>##any = elements that can belong to any namespace;</p> <p>##targetNamespace = elements that must belong to the target namespace defined in the schema;</p> <p>##local = elements that cannot belong to any namespace;</p> <p>anyURI = elements 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 an element. In this example, a href is the only attribute defined and its owning element 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 elements, and with the unique element. 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>

E.1 Simple Types

A “simple type” element is defined as a data type that only contains values and no element or attributes. For instance, an element 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**.

E.2 Complex Types

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

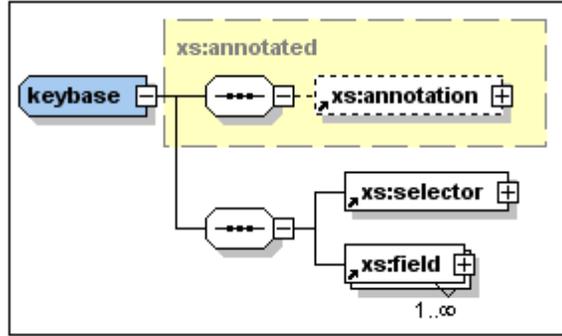


Figure E-1 Complex Types

The **keybase** complex type shown in Figure E-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 elements **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 elements reference global elements of those names.)

E.3 Compositors

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

Table E-2 Compositors

Compositor	Diagram	Description
Sequence		In this example, a sequence of elements is used for defining an Altova element instance. These sequences of elements 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 elements are offered for defining an Altova element 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 elements are used for defining an Altova element instance that may be in any order. These elements 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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