https://nsgreg.nga.mil

Geospatial Intelligence Standards Working Group

Metadata Focus Group (MFG) and the implementation of ISO 19115-1:2014 for the National System for Geospatial Intelligence (NSG).

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Geospatial Intelligence Standards Working Group (GWG)

- **Established 2005**
- **Technical Working Group (TWG) under the JESC***
- **Performs two major roles:**
  - Coordinating body for the GEOINT community to address all aspects of GEOINT standards
  - Technical Working Group (TWG) - recommends adoption of standards to the DoD IT Standards Registry (DISR) to enable the discovery, access, integration, dissemination, exploitation and interoperability of GEOINT.
- **Primarily staffed by NGA, National Center for Geospatial Intelligence Standards (NCGIS)/NGA-TAES employees.**

**Originally chartered under DoD IT Standards Committee (ITSC), now under JESC*

Geospatial Intelligence Standards Working Group (GWG)

- **Includes Nine (9) Focus Groups aligned with major area of standardization and phenomenology**
  - NITF Technical Board (NTB)
  - Motion Imagery Standards Board (MISB)
  - Overhead Persistent Infrared (OPIR) Focus Group
  - Community Sensor Model Working Group (CSMWG)
  - Word Geodetic Systems and Grids (WGSG) Working Group
  - Portrayal Focus Group (PFG)
  - Geospatial Web Services (WGS) Focus Group
  - Application Schemas for Feature Encoding (ASFE) Focus Group*
  - Metadata Focus Group (MFG)*

**In Joint-Operation with a single chair*

NSG Community Standards Governance

GEOINT Functional Management

Joint Enterprise Standards Committee

Leadership, SMEs, Support

GWG

NCGIS National Center for Geospatial Intelligence Standards

CIO-T/TAES

Member SMEs

Work Items (Requirements)

GWG Core Members

GWG Guest Participants

GWG Associate Members

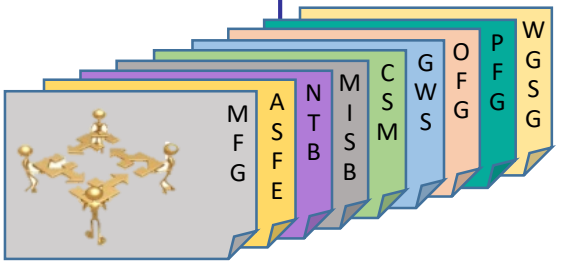
OGC Making location count.

ISO International Organization for Standardization

asprs

NATO OTAN

GWG Focus Groups



Metadata, Data Encoding, Geospatial Web Services, Portrayal, Motion Imagery…

GWG Metadata Focus Group (MFG)

- Chartered 31 October 2008 as a focus group of the GWG
- Coordinating body for the GEOINT community (IC/DoD/USG/ Industry/International) to address all aspects of GEOINT metadata.
- Technical advisory group (Focus Group) to the GWG
- Advocate for IT standardization activities for GEOINT Metadata
- Reviews and recommends metadata standards to GWG for **citation** in DISR.
- In Joint-Operations with Application Schemas for Feature Encoding (ASFE) Focus Group
- Current Chair – Nathan Babcook

GWG Metadata Focus Group (MFG) (Cont)

Participants

- American National Standards Institute - InterNational Committee for Information Technology Standardization/Geographic Information (ANSI - INCITS/L1)
- Digital Geographic Information Working Group (DGIWG)
- Distributed Common Ground Systems Multi-Service Execution Team Metadata Working Group (DCGS MET MWG)
- Federal Geospatial Data Committee (FGDC)
- Intelligence Community Metadata Working Group (IC MWG)
- International Organization for Standardization (ISO) Technical Committee 211 (TC 211)
- Multinational Geospatial Co-Production Group (MGCP)
- NATO Joint Intelligence, Surveillance and Reconnaissance Capability Group (JISRCG)
- Open Geospatial Consortium (OGC)
- Joint Interoperability Test Command (JITC)

MFG Reviewed and Related Standards

- NSG Metadata Foundation (Multipart)
  - NMF Part 1 Core, v2.2 (Scheduled for Sunset 2018)
  - NMF Part 2 Quality, v1.1 (Scheduled for Sunset 2018)
  - NMF Part 3 Imagery, v1.0 (Scheduled for Sunset 2018)
  - NMF Part 4 Records, v1.0 (Retired in 2017)
  - NMF Part 5 Services, v1.0 (Retired in 2017)
- NSG Metadata Implementation Specification (NMIS) v2.2
  - XML Implementation of NMF Parts 1-3 only
- NSG Metadata Foundation (NMF) v3.0
- NSG Metadata Implementation Specification (NMIS) v3.0
- ISO 19115:2003/Cor.1:2006
- ISO 19139:2007
- ISO 3166-1:2013
- ISO 3166-2:2013
- ISO 639-2:1998
- ISO 639-3:2007
- ISO 639-5:2008

NSG Metadata Foundation (NMF)
-Multipart-

- Part 1 Core v2.2
  Subset of ISO 19115:2003/2006

- Part 2 Quality v1.1
  Subset of ISO 19115:2003/2006 and 19115-2:2009

- Part 3 Imagery v1.0
  subset of ISO 19115:2003/2006 and ISO 19115-2:2009

- *Part 4 Records v1.0*
  subset of ISO 19115:2003/2006 and ERM.ADD

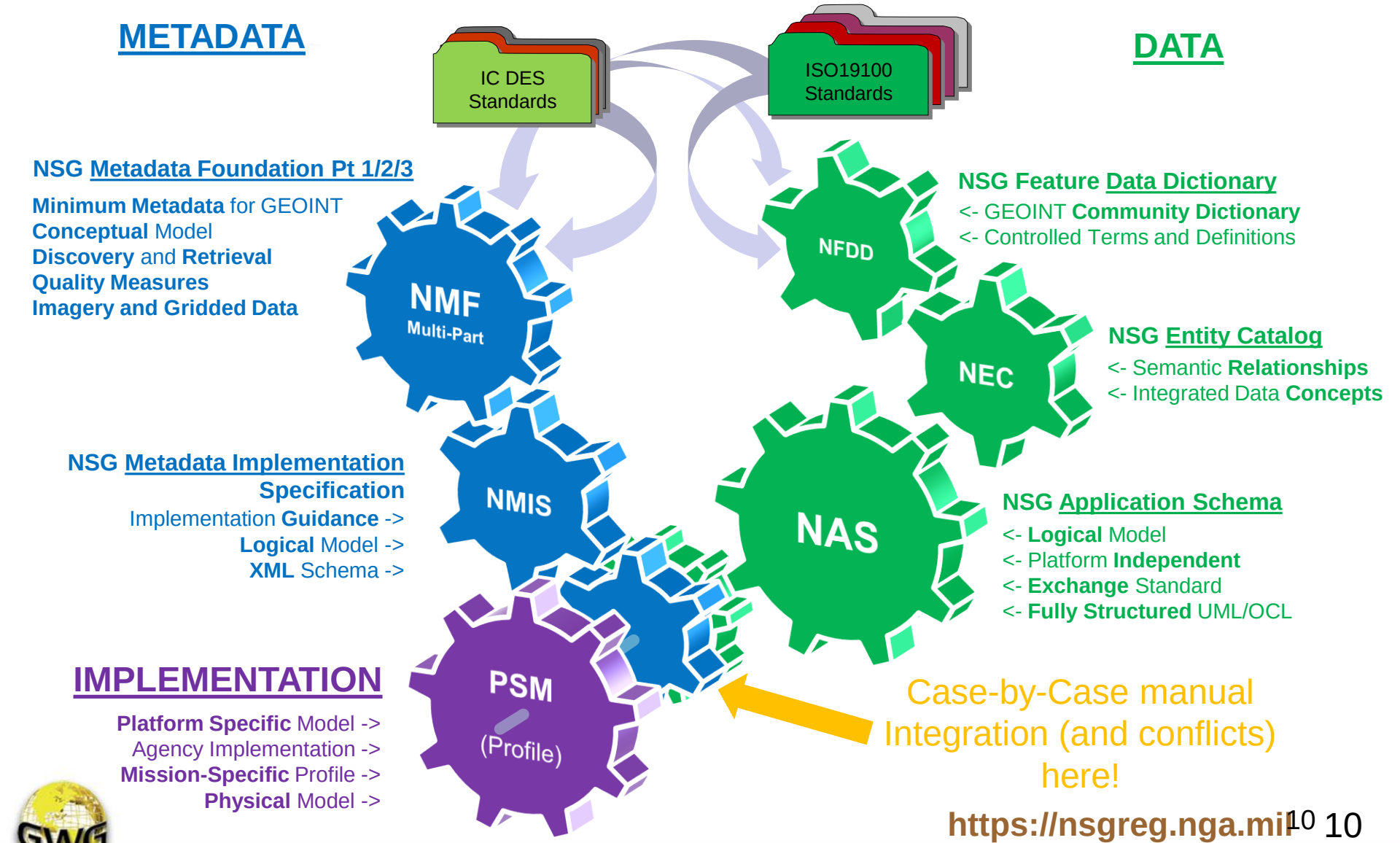
- *Part 5 Services v1.0*
  subset of ISO 19119:2005/2008

The Problem with NMF Multipart

- Subset and extended profile of ISO metadata standards
  - Based on ISO 19115:2003/2006, ISO 19115-2:2009, ISO 19119:2005/2008
  - Includes now-superseded IC Data Encoding Specifications (e.g. Records Management)
- Customers: “too much/little” and “not clear enough”
- Multiple parts and multiple versions - confusing
- Conceptual model only, XML required for implementation
- No longer in sync (and sometimes in conflict) with other NSG content standards (NFDD, NAS, NCV, NEO, etc.)

Bottom Line: Out-of-Date
Time to Update the Standard

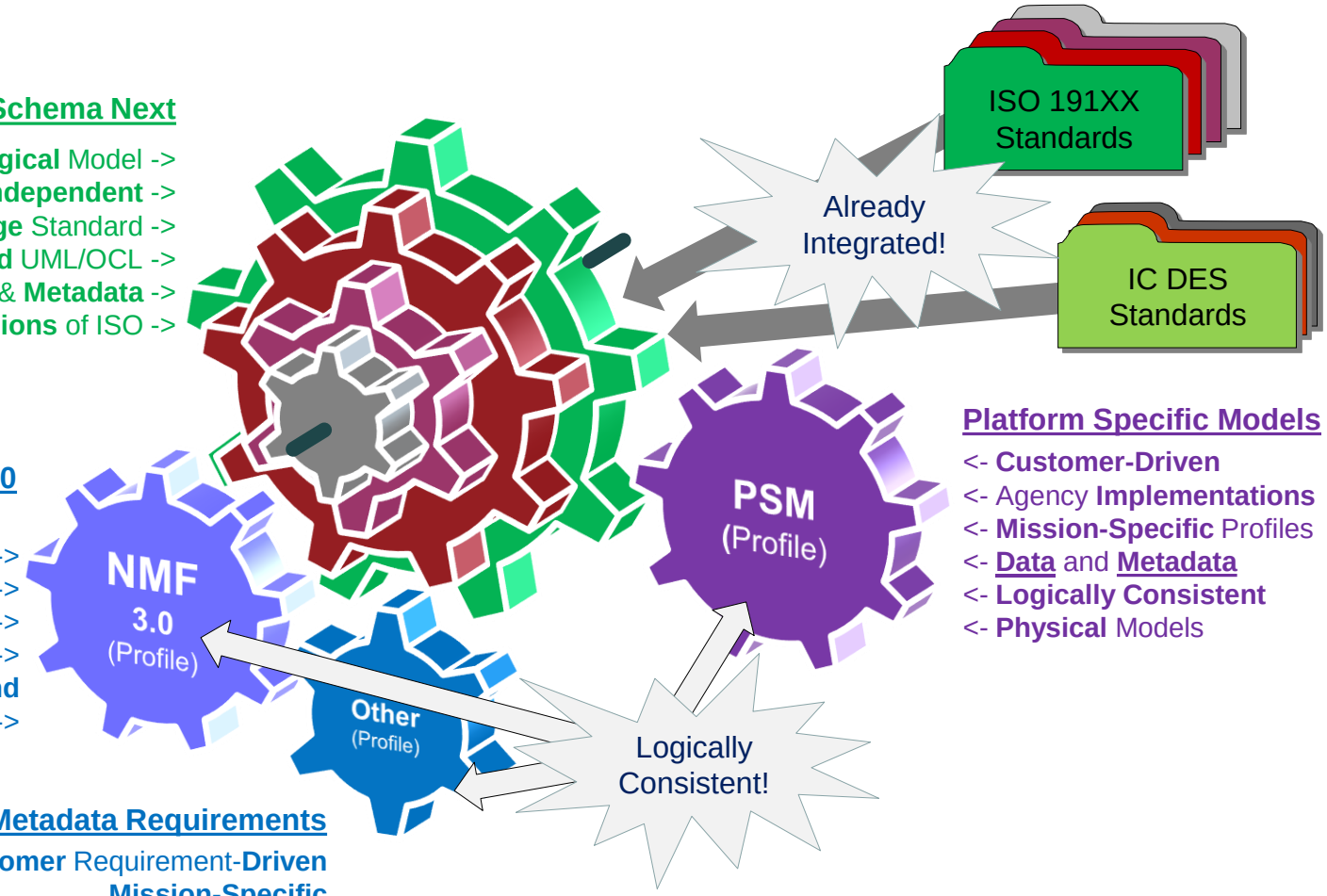
GEOINT Standards for Metadata & Data



Standards for GEOINT Content

NSG Application Schema Next

Comprehensive Logical Model ->
Platform **Independent** ->
GEOINT **Exchange** Standard ->
Fully **Structured** UML/OCL ->
Deep **Integration** of **Data** & **Metadata** ->
NSG-Specific Extensions of ISO ->



NSG Metadata Foundation 3.0

GEOINT Metadata
..for **Cloud Migration** ->
…**Identification** and **Access** ->
Logical Model ->
Explicit **Conformance** Criteria ->
Applies to **Datasets, Series, and Services** ->

Platform Specific Models

<- **Customer-Driven**
<- Agency **Implementations**
<- **Mission-Specific** Profiles
<- **Data** and **Metadata**
<- **Logically Consistent**
<- **Physical** Models

Other Metadata Requirements

Customer Requirement-**Driven**
Mission-Specific
Clear **Conformance Criteria**
Traceable to **Requirements**

NMF v3.0 - ISO Integration Process

Standards Selection

- **Integrate most current version of authoritative standards**
  - ISO19115-1:2014
  - ISO19157:2013
  - IC DES ERM ADD V2 (22 Dec 2014)
  - IC DES ERM (01 Jul 2016)
  - IC DES ISM ADD (09 Aug 2011)
  - IC DES ISM V13 (09 May 2014)
  - IC DES NTK V10 (06 Sept 2013)
  - IC DES RevRecall (09 May 2014)
- **Divided into approximately 12 parts for integration**

ISO Standard – Integration Challenges

- Conceptual model (vs logical model)
- No “concept names” (human-readable names)
- Name uniqueness

  (some ISO XML Names conflict with some NSG names)
- Definitions do not necessarily meet NSG requirements
- Changes to ISO model are not allowed…

  …BUT extensions are needed to meet NSG and IC requirements

ISO Standards – Integration Process (1)

- Integrate ISO content into NSG Logical Model (NSG Application Schema)

- Derived unique concept names from XML names containing reference to authority.

  For example:
  “MD_Metadata” gains concept name “Resource Metadata (ISO TC211)”

  - Original name is retained intact, but an additional NSG name is added
  - Approximately 100 instances during integration

ISO Standards – Integration Process (2)

- Added NSG Alphacode for use in NSG environments

  In most cases, NSG Alphacode is the same as the XML name

  In case of conflict, NSG Alphacode is in-addition to/alternate to XML name (XML name is used in XML implementations).

  For example:

  XML Name “MD_BrowseGraphic/linkage” (“linkage” already in use)
  NSG Alphacode becomes “MD_BrowseGraphic/graphicLink”

  - XML name always retained for interoperability purposes
  - Approximately 191 instances during integration (not *all* ISO)

ISO Standards – Integration Process (3)

- Definitions “enhanced” to meet NSG requirements while retaining meaning of the concept

  NSG concept definitions must be globally unique and not circular
  ISO (and IC) definitions are contextually unique and often circular

  For example:

  ISO MD_Keywords Definition
  “keywords, their type and reference source”

  NSG MD_Keywords Definition
  “A list of words or phrases describing a resource, and their context, as determined by ISO 19115-1:2015”

  - ALL ISO and IC concepts required enhancement (over 900 entities, attributes, associations, datatypes, codelist concepts).

ISO Standards – Integration Process (4)

- NSG has specific needs above and beyond ISO content, but cannot add new attributes to existing ISO-defined concepts. Solution?

  NSG Extensions were added as subclasses of existing ISO classes to support additional attribution

  For example:

  ISO **"MD_DataIdentification"** gained NSG subclass **"Data Identification"**

  ISO **"MD_DigitalTransferOptions"** gained NSG subclass **"Digital Transfer Options"**

  ISO **"MD_Constraints"** gained NSG subclass **"ResouceConstraints"**

  - Allowed NSG to extend/add 9 additional attributes & 1 datatype to new subclasses

Sample Integration Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	CR Nam	Ind	Item Typ	NFDD alphaCode	NAS Primary alpha	XML Name	Entity Name	Property Name	Proper	Multipl	Listed	Stereo	Definiti	Descrip	Notes	Domair	Physica	Rec
2	ERM	2	assocRole	-na-	electronicRecordsMana	-na-	*Data Identification*	Electronic Records Managem	0..1	Aggregation			Information	A records manageme		Electronic Records Manage		
3	**ERM**	**3**	**entity**	**ElectronicRecordsMa**	**ElectronicRecordsMa**	*NoVariance*	**Electronic Records Management Information (IC DES)**					**[none]**	**Informatic**	**A records management system systematic**				
4	ERM	4	attribute	foiaOpsIndicator	foiaOpsIndicator	*NoVariance*	Electronic Records Managem	FOIA Operations Indicator	0..1				An indicatic	For example, the U.S.		Boolean		
5	ERM	5	attribute	officeOfRecord	officeOfRecord	*NoVariance*	Electronic Records Managem	Office of Record	1				The party a	The specification of th		Responsibility (ISO TC211)		
6	ERM	6	attribute	recordDesignationDate	recordDesignationDate	*NoVariance*	Electronic Records Managem	Record Designation Date	0..1				The date a	Examples of dates for		Date and Time		
7	ERM	7	attribute	vitalRecordsIndicator	vitalRecordsIndicator	*NoVariance*	Electronic Records Managem	Vital Record Indicator	0..1				An indicatic	Also known as an Ess		Boolean		
8	ERM	8	assocRole	-na-	disposition	-na-	Electronic Records Managem	Record Dispostion Informatior	1	Aggregation			Information	Disposition is the final		Record Disposition (IC DES)		
9	ERM	9	assocRole	-na-	recordManagedResourc	-na-	Electronic Records Managem	Record-managed Resource	0..1				Information			Data Identification		
10	**ERM**	**10**	**entity**	**RecordDisposition**	**RecordDisposition**	*NoVariance*	**Record Disposition (IC DES)**					**[none]**	**An action**	**Disposition is the final action that puts into e**				
11	ERM	11	attribute	appliedBy	appliedBy	*NoVariance*	Record Disposition (IC DES)	Record Disposition Applied By	0..1				The party acting in a role of respo			Responsibility (ISO TC211)		
12	ERM	12	attribute	recDispDateApplied	recDispDateApplied	dateApplied	Record Disposition (IC DES)	Record Disposition Date Appli	1				The date, and optionally, time that			Date and Time		
13	ERM	13	attribute	dateEligible	dateEligible	*NoVariance*	Record Disposition (IC DES)	Record Disposition Date Eligib	0..1				The date , and optionally, time that			Date and Time		
14	ERM	14	attribute	dateLimit	dateLimit	*NoVariance*	Record Disposition (IC DES)	Record Disposition Date Limit	0..1				The date, and optionally, time by v			Date and Time		
15	ERM	15	attribute	recordControl	recordControl	*NoVariance*	Record Disposition (IC DES)	Record Disposition Record Co	0..1				A unique id	The identifer is determ		Identifier (ISO TC211)		
16	ERM	16	attribute	reviewIndicator	reviewIndicator	*NoVariance*	Record Disposition (IC DES)	Record Disposition Review In	1				An indication that a record has be			Boolean		
17	ERM	17	assocRole	-na-	hold	-na-	Record Disposition (IC DES)	Record Disposition Hold	0..*	Composition			Information	about a suspension o		Disposition Hold (IC DES)		
18	ERM	18	assocRole	-na-	applicableRecordsMana	-na-	Record Disposition (IC DES)	Applicable Records Managem	0..1				The record	A record is a resourc		Electronic Records Manage		
19	**ERM**	**19**	**entity**	**DispositionHold**	**DispositionHold**	*NoVariance*	**Disposition Hold (IC DES)**					**[none]**	**A suspen**	**Disposition is the final action that puts into e**				
20	ERM	20	attribute	authorizer	authorizer	*NoVariance*	Disposition Hold (IC DES)	Disposition Hold Authorizer	1				The party a	A hold is defined as a		Responsibility (ISO TC211)		
21	ERM	21	attribute	dispHoldDateApplied	dispHoldDateApplied	dateApplied	Disposition Hold (IC DES)	Disposition Hold Date Applied	1				The date th	A hold is defined as a		Date		
22	ERM	22	attribute	effectiveDate	effectiveDate	*NoVariance*	Disposition Hold (IC DES)	Disposition Hold Effective Dat	1				The date th	A hold is defined as a		Date		
23	ERM	23	attribute	dispHoldId	dispHoldId	identifier	Disposition Hold (IC DES)	Disposition Hold Identifier	0..1				A unique id	The identifier is unique		Identifier (ISO TC211)		
24	ERM	24	attribute	justification	justification	*NoVariance*	Disposition Hold (IC DES)	Disposition Hold Justification	0..1				A legal, pol	A hold is defined as a		Character String		
25	ERM	25	attribute	releasedDate	releasedDate	*NoVariance*	Disposition Hold (IC DES)	Disposition Hold Released Dat	0..1				The date th	A hold is defined as a		Date		
26	ERM	26	attribute	dispHoldType	dispHoldType	type	Disposition Hold (IC DES)	Disposition Hold Type	1				The type o	For example: financial		Records Hold Type Codelist		
27	ERM	27	assocRole	-na-	dispositionInformation	-na-	Disposition Hold (IC DES)	Record Disposition Informatio	0..1				The dispos	A disposition is an act		Record Disposition (IC DES)		
28	**ERM**	**28**	**datatype**	-na-	**RecordsHoldTypeCo**	-na-	**Records Hold Type Codelist**					**<<dataType>**	**A codelist**	**A hold is defined a**		http://api.nsgreg.nga.mil/co		
29	**Maint.**	**1**	**entity**	**MD_MaintenanceInfo**	**MD_MaintenanceInfo**	*NoVariance*	**Resource Maintenance Information (ISO TC211)**					**[none]**	**Information about the scope and update frequency of**					
30	Maint.	2	attribute	maintenanceAndUpdate	maintenanceAndUpdate	*NoVariance*	Resource Maintenance Inform	Resource Maintenance and U	0..1				The rate at	Resource maintenanc		Maintenance Frequency Co		
31	Maint.	3	attribute	maintenanceDate	maintenanceDate	*NoVariance*	Resource Maintenance Inform	Resource Maintenance Date	0..*				The date o	Maintenance includes		Date and Type		
32	Maint.	4	attribute	userDefinedMaintenanc	userDefinedMaintenanc	*NoVariance*	Resource Maintenance Inform	User-defined Resource Maint	0..1				A period of	Resource maintenanc		Time Duration Structured Te		
33	Maint.	5	attribute	maintenanceScope	maintenanceScope	*NoVariance*	Resource Maintenance Inform	Resource Maintenance Scope	0..*				A type and	Maintenance includes		Scope (ISO TC211)		
34	Maint.	6	attribute	maintenanceNote	maintenanceNote	*NoVariance*	Resource Maintenance Inform	Resource Maintenance Note	0..*				Specific re	For example, specific		Character String		
35	Maint.	7	attribute	resMaintContact	resMaintContact	contact	Resource Maintenance Inform	Resource Maintenance Conta	0..*				The party c	Maintenance includes		Responsibility (ISO TC211)		
36	Maint.	8	assocRole	-na-	resourceReference	-na-	Resource Maintenance Inform	Resource Reference	0..1	(Aggregation)			Information	that identifies the reso		Resource Metadata (ISO TC		
37	Maint.	9	assocRole	-na-	identifiedResource	-na-	Resource Maintenance Inform	Identified Resource	0..1	(Aggregation)			Information	that uniquely identifies		Resource Identification (ISO		

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NSG Metadata Foundation (NMF) Version 2.2 vs. 3.0

NMF v2.2 (2014)

- Discovery and Retrieval
- Conceptual Model
- Multi-part – mandatory and recommended
- Class 2 Profile of (subset and extended from) ISO 19115:2003/2006
- General profile
- New parts to provide new capabilities
- NAS independent

NMF v3.0 (2016)

- Identification and Access
- Logical Model
- Single-part – mandatory and conditional
- Class 2 Profile of (complete and extended from) ISO 19115-1:2014 and ISO 19157: 2013
- Core profile
- New profiles build from growing core
- NAS inter-dependent

NSG Application Schema v8.0

- Published Fall, 2016, enhanced and extended by GEOINT Content Standards Board (GCSB), NSG governance body
- “Emerging” Status in DISR, will replace mandated NAS v7.0
- Contains *all* of ISO 19115-1:2014, ISO 19157:2013
  - Recently enhanced with ISO 19115-2 (2017 FDIS)
- ALL NMF Multi-Part content enhanced, tailored to NSG mission, and logically integrated into NAS v8.0
  - Application Schema gained robust and synchronized metadata content
  - Metadata Foundation gained logical data model enhanced definitions

Future Work

- Integrate/Maintain
  - ISO 19115-2 (if there are changes from FDIS)
  - ISO 19115-1 (2017 Amendment)
  - IC Data Encoding Specification Updates
  - Develop NMF 3.x

- Continue development of purpose-specific profiles for user community

Questions?

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Backup Slides

NMF & NMIS v3.0

- **NMF v3.0 Identification and Access Profile (2016)**
  - *Replaces* all or part of NMF v2.2 Core Part 1, Part 3, Part 4, and Part 5*
  - Contains mandated and conditional metadata tags ONLY
  - Datasets, Series, and Services (formerly Part 5 content)
  - Based on updated ISO and IC specifications
    - ISO 19115-1:2014, ISO 19115-3:2016, ISO 19157:2013
    - Extends ISO with required IC and NSG-Specific tags
  - DISR *emerging* standard

- **NSG Metadata Implementation Specification v3.0 (2016)**
  - Replaces NMIS v2.2
  - Represents the NMF v3.0-subset of the NAS v8.0 XML
  - DISR *emerging* standard

NSG Metadata Foundation (NMF) Core Version History

- NSG Geospatial Core Metadata Profile 1.0 (Aug. 2007)
  - Minimum mandatory and recommended metadata
  - Subset profile of ISO 19115:2003.Cor. 1:2006 (and other ISO, IC, & DoD)
  - Cited as “emerging” but never “mandated” for use in IC & DoD acquisitions
- NMF Version 1.0 (April 2010)
  - Cited as an emerging standard for use in IC & DoD acquisitions
- NMF Version 2.0 (Dec. 2010)
  - First version “mandated” for use in IC & DoD acquisitions
- NMF Version 2.1 (Mar. 2012)
  - Revised to support data services
- NMF Version 2.2 (Sep. 2014)
  - Correction to version 2.1
  - Remains as “mandated” for use in IC & DoD acquisitions

NSG Metadata Foundation (NMF) Version History (cont)

- NMF Version 3.0 (Aug. 2016)
  - Minimum mandatory and conditional metadata *only*
  - Profiled from NSG Applications Schema (NAS) version 8.0
  - NAS v8.0 completely profiles ISO19115-1:2014 and ISO 19157:2013 and relevant IC Specifications
  - Cited as an “emerging” standard for IC and DoD acquisitions

Data and Metadata Convergence

- NMF (ISO + IC + NSG Extensions) integrated into Enterprise Logical Data Model (NSG Application Schema (NAS))

- ALL NMF Multi-Part content enhanced, tailored to NSG mission, and logically integrated into NAS v8.0
  - NAS content gained robust and synchronized metadata content
  - NMF gained enhanced definitions and logical data model

- NMF v3.0 became a subset profile of the NAS tailored to meet core mandatory metadata requirement to support cloud migration