

Technical Note: GSIP Governance Namespace Description

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1 Introduction

This paper briefly describes the organization of the GEOINT Structure Implementation Profile (GSIP) governance namespace on the Department of Defense (DoD) Metadata Registry and Clearinghouse (MDR). The purpose of the GSIP governance namespace is to provide metadata for identifying and encoding Geospatial Intelligence (GEOINT) data in the National System for Geospatial Intelligence (NSG) and related DoD and Intelligence Community (IC) systems. This metadata includes platform independent application schemas, platform specific schemas, data exchange encodings, data models, data dictionaries, content specifications, entity catalogues, extraction guides, and profiles of these for specific application areas within the NSG.

By providing these documents on the MDR, operations which otherwise do not have access to the Internet (e.g., Disconnected, Intermittent, and Low-bandwidth (DIL) or enclave environments) will be able to access these code list dictionaries through copies of the MDR hosted locally or on [Internet] disconnected networks.

2 GSIP Governance Namespace

The GSIP namespace is governed as part of the GEOINT (Geospatial Intelligence) namespace under the DODENT (DoD Enterprise) governance namespace. Access to the content of the GSIP governance namespace through the MDR web-browser interface is through the path:

Governance Namespace → DODENT → GEOINT → GSIP

The GSIP governance namespace is generally organized as a set of geospatial metadata catalogues – information resources that identify and describe standardized concepts that may be used when encoding GEOINT. Catalogues support the implementation of geospatial encoding by providing registered, discoverable, and referable sets of identifiable concepts. The GSIP governance namespace includes general purpose geospatial catalogues such as those listed in Table 1.

Table 1 – Sample GSIP Information Types

Information Types	Description
Unit of Measure Dictionary	A collection of physical quantity dictionaries; a physical quantity is a property of a phenomenon, body, or substance, where the property has a magnitude that can be expressed as a number (physical value) and a reference quantity - referred to as a "unit of measure". A unit of measure is a predefined amount of the concerned physical quantity (e.g.: a metre "of length" or kilogram "of mass"). Units of measure that may be used with the same physical quantity are mutually comparable; a physical value expressed in terms of one unit of measure may be converted to a different physical value in terms of a different unit of measure - both expressing the same physical quantity.
Reference System Dictionaries	A collection of reference system component dictionaries including: coordinate systems, coordinate system axes, datums, ellipsoids, prime meridians and coordinate operations.

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Information Types	Description
Coordinate Reference System Dictionary	A collection of coordinate reference systems; a coordinate reference system is a coordinate system (e.g.: geodetic) that is related to an object (e.g.: the Earth) by a datum (e.g.: WGS84). The coordinate system specifies a set of mathematical rules for determining how coordinates are to be assigned to points. The datum specifies a set of parameters that define the position of the origin, the scale, and the orientation of the coordinate system with respect to the object. The result is that the value of a coordinate (a sequence of n numbers designating the position of a point in n-dimensional space) thereby specifies the position of a point in relationship to the object.
Code List Item	Identifiers and definitions of common, related terms used to normalize the value of one or more data elements.
Feature Data Dictionary	A structured collection of feature information (features, attributes, and ancillary data) whose schema conforms to the conceptual model of a feature concept dictionary as specified in ISO FDIS19126.
Entity Catalog	A structured collection of feature information (features, attributes, associations, and ancillary data) whose schema conforms to the conceptual model of a feature catalog as specified in ISO 19110:2005 Annex B.
Application Schema	A structured collection of feature information (features, attributes, associations, and ancillary data) whose metamodel conforms to the general feature model as specified in ISO 19109.
Data Content Specification	A specification of a semantic information (data) model and associated information collection conditions for geospatially-located information.
Extraction Guide	A specification of the conditions for which information specified by an entity catalog shall be collected.

3 NSG Standards Registry

The GSIP governance namespace is designed to be used in conjunction with GEOINT Standards and standards-content specified in the NSG Standards Registry:

<https://nsgreg.nga.mil/>

GEOINT Standards consist of technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics of GEOINT to ensure that materials, products, processes, or services are fit for the analysis and visual representations of physical features and geographically referenced activities on the Earth.

The NSG Standards Registry supports the discovery, traceability, and lifecycle management of GEOINT Standards that may be used in the development and operation of data- and net-centric GEOINT applications.

The NSG Standards Registry includes specifications of a variety of schemas and their item content (see Figure 1). These include the NSG Application Schema (NAS) and a series of its profiles:

- **NSG Application Schema** – An NSG-wide, platform-independent, application schema establishing the structural and content metadata necessary to support consistent and effective representation, discovery, and retrieval of geospatial intelligence holdings for the NSG.
- **NAS Profiles** – Community-specific profiles of the NAS such as the Topographic Data AS (TDAS), an NSG-wide profile of the NAS that is used to manage multi-scale, multi-store topographic data.

The semantic content of the NAS and its profiles are expressed as the NSG Entity Catalog (NEC) and a set of corresponding NEC profiles:

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- **NSG Entity Catalog and its Profiles** – An NSG-wide semantic model for geospatial data that includes: feature information concepts with their allowed geometric representations and related constraints, attributes with their domain types, associations with their roles, and accompanying metadata.

Profiles of the NAS may be established as Data Content Specifications:

- **Base Documents** – A set of NAS-conformant data content specification capstone documents individually establishing standardized GEOINT content and associated extraction guidance.
- **Entity Catalogs (EC)** – A set of NAS-conformant data content specifications individually establishing standardized GEOINT content.
- **Extraction Guides (EG)** – A set of NAS-conformant extraction guidance's individually establishing conditions under which standardized GEOINT content will be collected.

The NAS, its profiles, and other platform-independent application schemas may be transformed into technology-specific models for "data at rest":

- **Platform Specific Models (PSM)** – Models of data sets and/or software applications that include technology-specific constraints (e.g., specific programming languages, operating systems, or physical formats).

The NAS, its profiles, and other application schemas may be transformed into information exchange models for "data in motion":

- **Information Exchange Models (IEM)** – Technology-specific models of data (e.g., an XML Schema Document) that are used as the basis for the unambiguous exchange of data between among heterogeneous software applications.

The NSG supports a broader range of application schemas than those based on the NAS:

- **Reference Schemas** – A set of reference conceptual schemas, specifically including those from the ISO 19100-series of International Standards, which may be used in the specification of application schemas.
- **Aeronautical Safety of Navigation** – A set of models and application schemas specifying information components for the exchange of civil and military aeronautical data with flight planning systems, onboard flight navigation systems, and aeronautical provider database structures. For example: AIXM Version 5.0 and extensions, and DAFIF Edition 8.
- **Maritime Safety of Navigation** – A set of models and application schemas specifying feature data relating to or adjacent to the sea, including the ocean's environment, maritime limits, ports and harbors, maritime aids to navigation and bathymetry.
- **MGCP Technical Requirements Document** – The feature catalogue component of the Multinational Geospatial Co-Production Program (MGCP) schema documenting the structure of geospatial data sets intended for producer-to-producer data exchange.
- **Metadata and Profiles** – Geospatial metadata specified by either direct use of ISO 19115 or by a conformant profile of ISO 19115. For example: GSIP Discovery and Access Metadata, Hydrographic Discovery Metadata, DGIWG Discovery and Use Metadata, and MGCP Use Metadata.

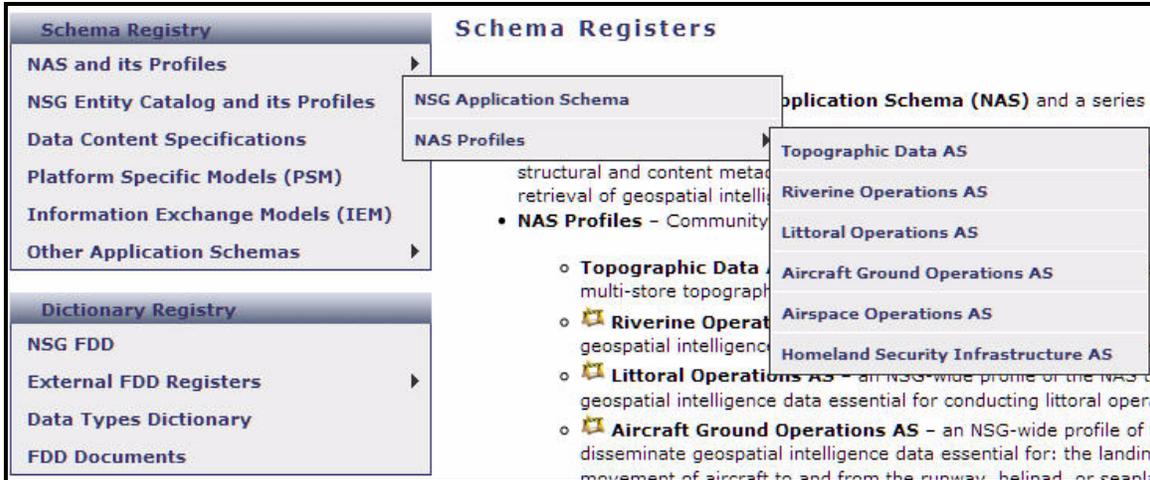


Figure 1 – NSG Standards Registry Schemas

The NSG Standards Registry includes specifications of a variety of schemas and their item content (see Figure 2). These include the NSG Feature Data Dictionary (NFDD) and related content:

- **NSG FDD** – Concepts shared by the National System for Geospatial Intelligence (NSG) community.

To support users of the NSG Dictionary Registry the following registers are presented but are managed by other authorities:

- **DGIWG FDD** – Concepts shared by the DGIWG community, based on the predecessor Feature and Attribute Coding Catalogue (FACC), a component of the Digital Geographic Information Exchange Standard (DIGEST).
- **US National Extensions FDD** – Concepts unique to the United States (US) member of the DGIWG and not currently recognized as concepts in the DGIWG FDD, although they may become so in the future.
- **Hydrographic FDD** – Concepts shared by the Hydrographic Safety of Navigation community as standardized by the Transfer Standard for Digital Hydrographic Data, Publication S-57, Edition 3.1, Appendix A, Chapter 1 - IHO Object Catalogue and Chapter 2 - IHO Attribute Catalogue.
- **S-57 Military Extensions FDD** – Concepts from the Additional Military Layers (AML) specification as incorporated into NATO standardization agreement (STANAG) - Number 7170 – and based on a carrier definition for Transfer Standard for Digital Hydrographic Data, Publication S-57, Edition 3.1.

To support the complete specification of items in the NSG Dictionary Registry the following registers are presented:

- **Data Types Dictionary** – Supporting concepts used to specify attribute concepts (e.g., datatypes and units of measure).

The NSG Dictionary Registry includes the following managed document registers:

- **FDD Documents** – Feature Data Dictionary documents shared by the National System for Geospatial Intelligence (NSG) community.

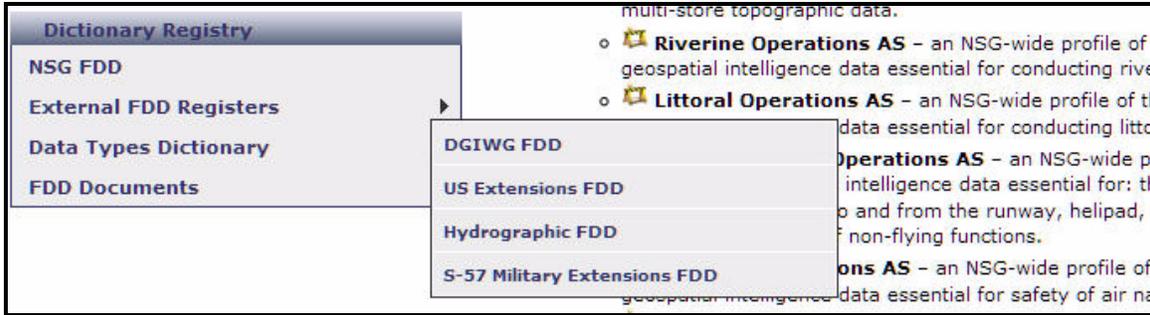


Figure 2 – NSG Standards Registry Dictionaries

4 Referencing GSIP Content

Extensible Markup Language (XML) provides an encoding format that allows information to be “tagged” to indicate its meaning. One set of specifications developed by the World Wide Web Consortium (W3C) deal with linking information in an XML instance document to other resources. These are specifications are: XML Linking Language (XLink), XML Base, and XML Pointer Language (XPointer).

XLink allows elements to be inserted into XML documents in order to create and describe links between resources. This specification provides a framework for creating basic unidirectional links similar to hyperlinks used in HTML.

XML Base describes a mechanism for providing base Uniform Resource Identifier (URI) services to XLink separate from XLink. The syntax of XML base is a single XML attribute named *xml:base* that identifies a base, or root, URI from which all relative XLinks within an instance document may be constructed.

XPointer is intended to be used as a basis for fragment identifiers for resources whose Internet media type is *text/xml*, *application/xml*, *text/xml-external-parsed-entity*, or *application/xml-external-parsed-entity*. This specification describes the processing of an XML fragment to locate information within an XML resource by the fragment’s identifier.

Taken together, these three specifications allow one XML resources (such as an instance document) to reference another XML resource (such as a service or another XML instance document). Content published in the GPAS governance namespace can be accessed through the MDR using the base Uniform Resource Locator (URL):

<http://metadata.ces.mil/mdr/ns/GSIP>

The information types described in Table 1 are identified through the URL for the resource. The path from the base URL to the resource is described in Table 2.

Table 2 - GSIP Information Type Relative URL Paths

Information Type	Relative Path
Units of Measure (organized by physical quantity)	uom (e.g.: uom/length)
Reference System Components (organized by component type)	rs (e.g.: rs/ellipsoid)
Coordinate Reference Systems (not specifically organized)	crs (e.g.: crs/WGS84E_2D)
Code Lists (not specifically organized)	codelist (e.g.: codelist/TopologyLevelCode)
NSG Application Schema (organized by version)	nas (e.g.: nas/2.0)
NSG Entity Catalog (organized by version)	nec (e.g.: nec/2.0)

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Information Type	Relative Path
Platform Specific Models (organized by type)	psm (e.g.: psm/tds)
Schemas (not specifically organized)	schema (e.g.: schema/dafif8)