HOMELAND SECURITY GEOSPATIAL ENTERPRISE ARCHITECTURE

ATTACHMENT G TECH 4
GEOSPATIAL STANDARDS

GEOSPATIAL MANAGEMENT OFFICE

DRAFT – VERSION 0.6.1

May 7, 2004

CONTENTS

EXHIBITS

1.0 INTRODUCTION

Geospatial information can be maintained and shared in a wide variety of formats depending on the type of data and its intended use. This geospatial data can be used for such purposes as to describe features on a map (such as roads, buildings, and lakes), to locate an image (such as a satellite weather photo) to a place in the world, or to indicate a location (such as a place name or street address). To facilitate exchange of geospatial information and other data with geospatial attributes, standards are required for the content and organization of the data. National, military, and international standards have been developed to support the broad range of uses of geospatial data. This document lists and briefly describes the standards that can be used to manage geospatial data.

2.0 GEOSPATIAL STANDARDS

Standards for describing geospatial data and that use geospatial data are developed by a number of organizations at the international and national level. Other organizations also develop standards or profiles of standards based on the work of the international and national organizations either independently or through direct or indirect participation. These standards and standard profiles are created to facilitate information management within a community of interest, but can be applicable to other communities and organizations as well.

2.1 National Standards

In addition to geospatial standards developed by ISO that are adopted as US National Standards, the Federal Geographic Data Committee is charged with developing standards for the storage and dissemination of US geospatial data assets. These standards are listed in the following tables. Exhibit 1 lists the FGDC standards that have been vetted through public review and adopted by the FGDC. Exhibit 2 lists FGDC standards that are currently in the draft stage and are available for review, but are subject to change in the future. Additional standards in the proposal and early draft stages are not listed here.

Exhibit 1 - Published FGDC Standards

Identifier	Title	Description
FGDC-STD-001-1998	Content Standard for Digital Geospatial Metadata (version 2.0)	Provides a common set of terminology and definitions for the documentation of digital geospatial data
FGDC-STD-001.1-1999	Content Standard for Digital Geospatial Metadata, Part 1: Biological Data Profile	Provides a user-defined or theme-specific profile of the FGDC Content Standard for Digital Geospatial Metadata to increase its utility for documenting biological resources data and

Identifier	Title	Description
		information
FGDC-STD-001.2-2001	Metadata Profile for Shoreline Data	Extension or profile to the existing Content Standards for Digital Geospatial Metadata (CSDGM) to capture the critical processes and conditions that revolve around creating and collecting shoreline data
FGDC-STD-002	Spatial Data Transfer Standard (SDTS)	Defines a non-proprietary format for packaging vector or raster spatial data with attributes, metadata, a data quality report and usually a data dictionary (modified version adopted as ANSI INCITS 320:1998)
FGDC-STD-002.5-1999	Spatial Data Transfer Standard (SDTS), Part 5: Raster Profile and Extensions	Specification of a profile for use with geo-referenced two dimensional raster data (intended to replace the existing Draft FIPS SDTS Part 5: Raster Profile). [The objective of this project is to develop a profile of SDTS, through the convergence of the Draft FIPS Part 5 Raster Profile of SDTS, the ISO/IEC Committee Draft 12087-5 Basic Image Interchange Format (BIIF) raster transmission standards, and the GeoTIFF version 1.0 specification.]
FGDC-STD-002.6-1998	Spatial Data Transfer Standard (SDTS), Part 6: Point Profile	Contains specifications for a SDTS profile for use with geographic point data only, with the option to carry high precision coordinates (by increasing the number of decimal places or significant figures) such as those required for geodetic network control points can be attained (This profile is a modification of Part 4, the Topological Vector Profile, and follows many of the conventions of that profile.)

Identifier	Title	Description
FGDC-STD-002.7-2000	Spatial Data Transfer Standard (SDTS), Part 7: Computer-Aided Design and Drafting (CADD) Profile	Specifications for an SDTS profile for use with vector-based geographic data as represented in CADD software
FGDC-STD-003	Cadastral Data Content Standard	Supports the automation and integration of publicly available land records information
FGDC-STD-004	Classification of Wetlands and Deepwater Habitats of the United States	Supports the use of ecological and hydrological information for the identification, classification, and mapping of wetlands in the United States and its territories
FGDC-STD-005	Vegetation Classification Standard	Supports the use of a consistent national vegetation classification system (NVCS) to produce uniform statistics in vegetation resources from vegetation cover data at the national level
FGDC-STD-006	Soil Geographic Data Standard	Proposes a set of data standards for the inventory, mapping, and reporting on the soil resources of the United States. It includes a description of the proposed data elements to be used when reporting and transferring data used to describe soil map units and their components
FGDC-STD-007.1-1998	Geospatial Positioning Accuracy Standard, Part 1: Reporting Methodology	Provides a common methodology for reporting the accuracy of horizontal coordinate values and vertical coordinate values for clearly defined features where the location is represented by a single point coordinate
FGDC-STD-007.2-1998	Geospatial Positioning Accuracy Standard, Part 2: Geodetic Control Networks	Provides a common methodology for determining and reporting the accuracy of horizontal coordinate values and vertical coordinate values for geodetic control points

Identifier	Title	Description
FGDC-STD-007.3-1998	Geospatial Positioning Accuracy Standard, Part 3: National Standard for Spatial Data Accuracy	Implements a statistical and testing methodology for estimating the positional accuracy of points on maps and in digital geospatial data, with respect to georeferenced ground positions of higher accuracy
FGDC-STD-007.4-2002	Geospatial Positioning Accuracy Standard, Part 4: Architecture, Engineering, Construction (A/E/C) and Facilities Management	Defines accuracy criteria, accuracy testing methodology, and accuracy reporting criteria for object features depicted on A/E/C spatial data products and related control surveys
FGDC-STD-008-1999	Content Standard for Digital Orthoimagery	Defines the orthoimagery theme of the digital geospatial data framework to provide a base on which to collect, register, and integrate digital geospatial information accurately
FGDC-STD-009-1999	Content Standard for Remote Sensing Swath Data	Defines the minimal content requirements for a remote sensing swath and the relationships among its individual components
FGDC-STD-010-2000	Utilities Data Content Standard	Specifies the names, definitions and domains for utility system components that can be geospatially depicted as feature types and their non-graphical attributes
FGDC-STD-011-2001	U.S. National Grid	Defines a preferred U.S. National Grid (USNG) for mapping applications at scales of approximately 1:1,000,000 and larger, how to present Universal Transverse Mercator (UTM) coordinates at various levels of precision, specifies the use of those coordinates with the grid system defined by the Military Grid Reference System (MGRS), and addresses specific presentation issues such as grid spacing
FGDC-STD-012-2002	Content Standard for Digital Geospatial Metadata: Extensions for Remote Sensing Metadata	Defines content standards for additional metadata, not defined in the Metadata Content Standard, that are needed to describe data obtained from remote sensing

Exhibit 2 - Draft FGDC Standards

Title	Description
Address Content Standard	Establishes the requirements for documenting the content of addresses applicable to entities having a spatial component
Content Standard for Framework Land Elevation Data	Describes processing, accuracy, reporting, and applications considerations for NSDI Framework digital elevation data
Digital Cartographic Standard for Geologic Map Symbolization	Provides descriptions, examples, cartographic specifications, and notes on usage for a wide variety of symbols that may be used on a typical digital geologic map or related product (includes symbol definitions)
Facility ID Data Standard	Provides a set of standardized data elements that support the location and identification of place-based objects that are generally known as facilities (a “facility” is defined in this standard as a distinct real property entity, including all objects managed by facility management and work management systems)
Geospatial Positioning Accuracy Standard, Part 5: Standard for Hydrographic Surveys and Nautical Charts	Provides minimum standards for the horizontal and vertical accuracy of features associated with hydrographic surveys that support nautical charting
Hydrographic Data Content Standard for Coastal and Inland Waterways	Nationally focused hydrographic data content standard for spatial data that supports safety of navigation that provides a consistent catalog of terms and definitions (semantics) to ensure uniform interpretation of information across a variety of organizations that develop and use hydrographic feature data and applications.
NDSI Framework Transportation Identification Standard	Provides a logical data model for identifying unique road segments which are independent of cartographic or analytic network representation

The National Spatial Data Infrastructure (NSDI) standards are being developed as part of the Geospatial One-Stop e-Gov initiative. These standards establish a framework for organizing geospatial data in themes. The standards listed in Exhibit 3 are in the process of being developed and are available for review, but are subject to change as the development of these documents progresses.

Exhibit 3 - Draft National Spatial Data Infrastructure (Geospatial One-Stop) Standards

Title	**Description**
American National Standard for Information Technology Geographic Information Framework Data Content Standards – (Base Standard)	Establishes common requirements for data exchange standards for seven themes of geospatial data identified as being required by many different Geographic Information Systems (GIS) applications [National Spatial Data Infrastructure (NSDI) Framework themes: geodetic control, elevation, orthoimagery, hydrography, transportation, cadastral, and digital government unit boundaries]
ANSI Geographic Information Framework Data Content Standards For Digital Orthoimagery (Part XXX)	Supports the exchange of digital orthoimagery data
ANSI Geographic Information Framework Draft Data Content Standards For Digital Elevation (Part XXX)	Defines the elements that permit collection and exchange of digital elevation data consistent with the National Spatial Data Infrastructure's (NSDI) framework for elevation data and includes a conceptual schema expressed in the Unified Modeling Language (UML) according to ISO 19109 – Rules for Application Schema
ANSI Geographic Information Framework - Data Content Standard (Part NNN) Government Unit Boundary Data Exchange Standard	Identifies and defines terminology, encoding scheme, and the data components required for describing the governmental unit or other legal entity and its boundary, along with the metadata needed for boundary data exchange
ANSI Geographic Information Framework Data Content Standards For Cadastral Data (Part XXX)	Provides necessary information to identify the existence of parcel level cadastral information and the source of that information - the geospatial metadata provided with the information will provide information on the contact, distribution, and access requirements for the data

Title	Description
ANSI Geographic Information Framework Data Content Standards For Hydrography (Part XXX)	Provides common definitions and syntax to enable collaborative development, use, and exchange of hydrography data
ANSI Geographic Information Framework - Data Content Standard For Geodetic Control	Provides a common methodology for creating data sets of horizontal coordinate values and vertical coordinate values for geodetic control points and provides a single data structure for relating coordinate values obtained by one geodetic survey method with coordinate values obtained by another geodetic survey method
Geographic Information Framework Data Content Standards For Transportation Networks: Base Transportation Standard (Part XXX)	Defines the components of transportation systems for five modes that compose the Transportation theme of the NSDI
Geographic Information Framework Data Content Standards For Transportation Networks: Air (Part XXX)	Supports the exchange of transportation data related to aviation
Geographic Information Framework Data Content Standards For Transportation Networks: Rail (Part XXX)	Defines components of the railway system,
Geographic Information Framework Data Content Standards For Transportation Networks: Roads (Part XXX)	Supports the exchange of transportation data related to road networks
Geographic Information Framework Data Content Standards For Transportation Networks: Transit (Part XXX)	Defines components of public transportation (transit) systems

Title	Description
Geographic Information Framework Data Content Standards For Transportation: Inland Waterways (Part XXX)	Supports the use and exchange of river (inland waterway) information

2.2 OGC Standards

The Open GIS Consortium (OGC) is a non-profit, international, voluntary consensus standards organization that is leading the development of standards for geospatial and location based services. The Types of OGC standards listed here are: Open GIS Implementation Specification (IS) and Discussion Paper (DP).

Exhibit 4 - OGC Standards

Type	Title	Description
IS	Styled Layer Descriptor (SLD 1.0)	The SLD is an encoding for how the Web Map Server (WMS 1.0 & 1.1) specification can be extended to allow user-defined symbolization of feature data.
IS	Web Map Service (WMS 1.1.1)	Provides four protocols (GetCapabilities, GetMap, GetFeatureInfo and DescribeLayer) in support of the creation and display of registered and superimposed map-like views of information that come simultaneously from multiple sources that are both remote and heterogeneous.
IS	Web Map Context Documents (WMC 1.0)	Create, store, and use "state" information from a WMS based client application.
IS	Web Feature Service (WFS 1.0)	The purpose of the Web Feature Server Interface Specification (WFS) is to describe data manipulation operations on OpenGIS® Simple Features (feature

Type	Title	Description
		instances) such that servers and clients can “communicate” at the feature level.
IS	Web Coverage Service (WCS 1.0)	Extends the Web Map Server (WMS) interface to allow access to geospatial "coverages" that represent values or properties of geographic locations, rather than WMS generated maps (pictures).
IS	OpenGIS Location Services (OpenLS): Core Services [Parts 1-5] (OLS Core 1.0)	OpenGIS Location Services (OpenLS): Core Services, Parts 1-5, which consists of the composite set of basic services comprising the OpenLS Platform. This platform is also referred to as the GeoMobility Server (GMS), an open location services platform.
IS	Geography Markup Language (GML 3.0)	The Geography Markup Language (GML) is an XML encoding for the transport and storage of geographic information, including both the geometry and properties of geographic features.
IS	Catalog Interface (CAT 1.1.1)	Defines a common interface that enables diverse but conformant applications to perform discovery, browse and query operations against distributed and potentially heterogeneous catalog servers.
IS	Filter Encoding (Filter 1.0)	A filter is a construct used to describe constraints on properties of a feature class for the purpose of identifying a subset of feature instances to be operated upon in some way.
IS	Grid Coverages (GC 1.0)	This specification was designed to promote interoperability between software implementations by data vendors and software vendors providing grid analysis and processing capabilities.
IS	Coordinate Transformation Services (CT 1.0)	Provides interfaces for general positioning, coordinate systems, and coordinate transformations.

Type	Title	Description
IS	Simple Features – COBRA (SFC 1.0)	The Simple Feature Specification application programming interfaces (APIs) provide for publishing, storage, access, and simple operations on Simple Features (point, line, polygon, multi-point, etc).
IS	Simple Features – OLE/COM (SFO 1.1)	The Simple Feature Specification application programming interfaces (APIs) provide for publishing, storage, access, and simple operations on Simple Features (point, line, polygon, multi-point, etc).
IS	Simple Features – SQL (SFS 1.1)	The Simple Feature Specification application programming interfaces (APIs) provide for publishing, storage, access, and simple operations on Simple Features (point, line, polygon, multi-point, etc).
DP	XML for Image and map Annotation (XIMA 0.4)	Defines an XML vocabulary to encode annotations on imagery, maps, and other geospatial data. This vocabulary draws on the Geography Markup Language (OpenGIS® GML Recommendation Paper, Revision 2.0.)
DP	Location Organizer Folder (LOF 1.0)	The Location Organizer Folder (LOF) is a GML document that provides a structure for organizing the information related to a particular event or events of interest.
DP	Web Notification Service (WNS 0.1.0)	The Web Notification Service (WNS) is the first asynchronous messaging service specified by OGC. At the moment, the WNS message schema is optimized to fulfil the needs of services supporting the use of sensors, like “Sensor Planning Service”. Future work activities should include the adaptation of the message schema to the needs of other services.
DP	Style Management Service (SMS 0.0.9)	This document describes the proposed system design for the OGC Style Management Service (SMS). The SMS must manage distinct objects that represent styles and symbols and provide the means to discover, query, insert, update, and delete these objects. Styles provide the mapping from feature types and feature properties and constraints to parameterized Symbols used in drawing maps. Symbols are bundles of predefined graphical parameters and predefined fixed graphic "images".

Type	Title	Description
DP	Geoparser (GeoP 0.7.1)	Geoparsing refers to the capability to process a textual document and identify key words and phrases that have a spatial context.
DP	Gazetteer Service Profile of a WFS (Gaz 0.0.9)	Provides web access to an authority for place names. Returns their associated feature representations
DP	Web Registry Server (WRS 0.0.2)	A Registry Service defines a common mechanism to classify, register, describe, search, maintain and access information about OGC Web resources. The OGC Service Registry provides the methods for managing a repository; a Registry Client is an application used to access the Registry.
DP	Sensor Model Language (SensorML) for In-situ and Remote Sensors (SensorML 0.7)	The Sensor Model Language work proposes an XML schema for describing the geometric, dynamic, and observational characteristics of sensor types and instances.

2.3 Military Standards

Many military standards are used to manage geospatial data or data with geospatial attributes (such as imagery). The following exhibit lists several US military and NATO standards that are used to manage geospatial information.

Exhibit 5 - Military Geospatial Standards

Identifier	Title	Description
MIL-STD-188-196	Bi-Level Image Compression for the National Imagery Transmission Format Standard, 18 June 1993 with Notice 1, 27 June 1996	Establishes the requirements to be met by NITFS systems when image data are compressed using the bi-level facsimile compression specified by the International Telecommunications Union (ITU) International Telegraph and Telephone Consultative Committee (CCITT) Recommendation T.4 and MIL-STD-188-161C for Group 3 facsimile devices
MIL-STD-188-199	Vector Quantization Decompression for the National Imagery Transmission Format Standard, 27 June 1994 with Notice 1, 27 June 1996	Establishes the requirements to be met by NITFS compliant systems when image data are decompressed using the vector quantization (VQ) compression algorithm
MIL-STD-2045-44500	Tactical Communications Protocol 2 (TACO2) for the National Imagery Transmission Format Standard	Establishes the requirements to be met by systems complying with NITFS when using the TACO2 protocol
MIL-STD-2401	Department of Defense Standard Practice, World Geodetic System (WGS), 11 January 1994, as implemented by NIMA TR 8350.2, Department of Defense World Geodetic System 1984: Its Definitions and Relationships with Local Geodetic Systems, Third Edition, 4 July 1997, as modified by Amendment 1, 3 January 2000	Defines the technical content of WGS 84

Identifier	Title	Description
MIL-STD-2500B	National Imagery Transmission Format (Version 2.1) for the National Imagery Transmission Format Standard, 22 August 1997 with Notice 1, 2 October 1998, and Notice 2, 1 March 2001	Establishes the requirements for the National Imagery Transmission Format Version 2.1 (NITF 2.1) developed to keep the imagery format consistent with the emerging ISO Basic Imagery Interchange Format (BIIF) and the NATO Secondary Imagery Format (NSIF)
STANAG 4545	NATO Secondary Imagery Format (NSIF)	Standard for formatting digital imagery and imagery-related products and exchanging them among members of NATO
STDI-0002	National Support Data Extensions (SDE) (Version 1.3) for the National Imagery Transmission Format Standard (NITFS).	Provides the approved CE specifications to be used with the National Imagery Transmission Format (NITF) versions 2.0 (NITF2.0) or 2.1 (NITF2.1)
None	The Compendium of Controlled Extensions (CE) for the National Imagery Transmission Format (NITF) VERSION 2.1, 16 November 2000	Provides the approved CE specifications to be used with the National Imagery Transmission Format (NITF) versions 2.0 (NITF2.0) or 2.1 (NITF2.1). This compendium is an unclassified companion to STDI-0002
MIL-STD-2407	Interface Standard for Vector Product Format (VPF), 28 June 1996, with Notice of Change, Notice 1, 26 October 1999	Defines a common format, structure, and organization for data objects in large geographic databases based on a georelational data model and intended for direct use [products: Vector Map (VMap) Levels 0-2, Urban Vector Map (UVMap), Digital Nautical Chart (DNC), VPF Interim Terrain Data (VITD), Digital Topographic Data (DTOP), and World Vector Shoreline Plus (WVSPLUS)]
MIL-STD-2411	Raster Product Format, 6 October 1994; with Notice of Change, Notice 1, 17 January 1995, and Notice of Change, Notice 2, 16 August 2001	Common format for the interchange of raster-formatted digital geospatial data among DoD components [products: Compressed ARC Digitized Raster Graphics (CADRG), Controlled Image Base (CIB), and Digital Point Positioning Data Base (DPPDB)]

Identifier	Title	Description
MIL-STD-2525B	Common Warfighting Symbology, 30 January 1999	Warfighting symbology to convey information about objects in the warfighter battlespace

2.4 International Standards

At the international level, Technical Committee 211 (TC211) of the International Organization for Standardization (ISO) is chartered with developing international standards dealing with geographic information. At the US National level, the International Committee for Information Technology Standards (INCITS) L1 Committee (Geographic Information Systems) is the US Technical Advisory Group representing the US on ISO/TC211. The American National Standards Institute (ANSI) accredits INCITS, which adopts many ISO standards in whole or part (as profiles) as US National Standards.

The following table lists the International Standards published or under development. The Status indicates if the standard is an International Standard (IS), Draft International Standard (DIS), Preliminary Draft Technical Specification (PDTS), Committee Draft (CD), or Working Draft (WD).

Exhibit 4 - ISO Geospatial Standards

Identifier	Title	Description	Status
ISO 6709:1983	Standard representation of latitude, longitude and altitude for geographic point locations	Specifies a variable-length format for the representation of latitude, longitude and altitude for use in data interchange	Review for revision
ISO/IEC 12087-5:1998	Information Technology - Computer graphics and image processing - Image Processing Interchange (IPI) - Functional specification - Part 5: Basic Image	Specification developed to provide a foundation for interoperability in the interchange of imagery and imagery-related data among applications	IS

Identifier	Title	Description	Status
	Interchange Format (BIIF)		
ISO/IEC 13249-3:2003	Information technology -- Database languages -- SQL multimedia and application packages -- Part 3: Spatial	Describes the requirements needed to store, manage and retrieve information based on aspects of spatial data such as geometry, location and topology	IS
ISO 19107:2003	Geographic information - Spatial schema	Provides a conceptual schema for describing aspects of the spatial characteristics of geographic features. Components of this schema may be specialized within an application schema to describe specific feature types.	IS
ISO 19108:2002	Geographic information - Temporal schema	Defines standard concepts needed to describe the temporal characteristics of geographic information	IS
ISO 19109	Geographic information - Rules for application schema	Shows how to develop schemas, which identify how the various parts of this standard shall be applied for particular application domains. The core of this process is the General Feature Model, which acts as a platform for the parts of this family of standards, particularly Metadata and Feature cataloguing.	DIS
ISO 19110	Geographic information - Methodology for feature cataloguing	Provides a standard framework for organizing and reporting the classification of real world phenomena in a set of geographic data. Geographic features are the representations of real world phenomena associated with a location relative to the Earth, about which data are collected, maintained and disseminated. Feature catalogues defining the types of features represented in geographic data enable the dissemination, sharing and use of geographic data through a better understanding of the contents and meaning of the data	DIS

Identifier	Title	Description	Status
ISO 19111:2003	Geographic information - Spatial referencing by coordinates	Establishes a common requirement for describing coordinate reference systems (CRSs) including the datum giving the relation to the Earth and the coordinate system used	IS
ISO 19113:2002	Geographic information - Quality principles	Provides guidelines to data producers for describing the quality of their data; the quality information may be used by data users attempting to determine whether or not specific data is of sufficient quality for their particular application	IS
ISO 19114:2003	Geographic information - Quality evaluation procedures	Establishes a framework of quality evaluation procedures for a dataset of geo-spatial data so that data producers can define how well their products meet their product specification and users can define their requirements and how well they are met	IS
ISO 19115:2003	Geographic information - Metadata	Provides a clear procedure for the description of digital geographic datasets so that users will be able to determine whether the data in a holding will be of use to them and how to access the data by establishing a common set of metadata terminology	IS
ISO 19115-2	Geographic information - Metadata - Part 2: Extensions for imagery and gridded data	Defines metadata elements to support imagery and gridded data and will extend the UML model for metadata to support the collection and processing of natural and synthetic imagery and define a data model for information describing geographic imagery and gridded data	WD
ISO 19116	Geographic information - Positioning services	Defines a standard interface data structure for use between positioning devices and geographic information application systems	DIS

Identifier	Title	Description	Status
ISO 19117	Geographic information - Portrayal	Provides applications with a common interface to supported standard symbol sets used to portray geographic information as an image understandable by humans, including the methodology for describing symbols	DIS
ISO 19118	Geographic information - Encoding	Specifies the encoding rules that shall be used for data interchange purposes to allow geographic information defined in an application schema to be coded into a system independent data structure suitable for transport or storage	DIS
ISO 19119	Geographic information - Services	Provides identification and definition of the service interfaces used for geographic information and definition of the relationships to the Open System Environment model	DIS
ISO 19123	Geographic information - Schema for coverage geometry and functions	A conceptual schema for the spatial characteristics of coverages	DIS
ISO 19125-1	Geographic information - Simple feature access - Part 1: Common architecture	Describes the common architecture for simple feature geometry	DIS
ISO 19125-2	Geographic information - Simple feature access - Part 2: SQL option	Specifies an SQL schema that supports storage, retrieval, query and update of simple geospatial feature collections; establishes an architecture for the implementation of feature tables; defines terms to use within the architecture; applies to both SQL Components and SQL with Geometry Types Components; describes a set of SQL Geometry Types together with the SQL functions on those types	DIS
ISO 19126	Geographic information - Profile - FACC Data Dictionary	Profile of ISO 19110 (in the context of DGIWG) that defines a Data Dictionary and includes the definition of Features and	CD

Identifier	Title	Description	Status
		Attributes	
ISO 19127	Geographic information - Geodetic codes and parameters	Defines rules for the population of tables of geodetic codes and parameters and identifies the data elements required within these tables, in compliance with ISO 19111, and makes recommendations for use of the tables	PDTS
ISO 19128	Geographic information - Web Map server interface	Describes a Web Map Server that can produce a map (as a picture, as a series of graphical elements, or as a packaged set of geographic feature data); answer basic queries about the content of the map; and tell other programs what maps it can produce and which of those can be queried further	DIS
ISO 19129	Geographic information - Imagery, gridded and coverage data framework	Standardizes concepts for the description and representation of imagery, gridded and coverage data in the context of the ISO 19100 suite of standards	WD
ISO 19130	Geographic information - Sensor and data models for imagery and gridded data	Specifies a sensor model describing the physical and geometrical properties of each kind of photogrammetric, remote sensing and other sensors that produce imagery data	CD
ISO 19131	Geographic information - Data product specifications	Describes requirements for the specification of geographic data products, based upon the concepts of other ISO 19100 standards	CD
ISO 19133	Geographic information - Location based services tracking and navigation	Addresses the modeling and definition of types and interfaces needed to support the specification of web services and applications in the field of tracking and navigation within a linear network	DIS

Identifier	Title	Description	Status
ISO 19134	Geographic information - Multimodal location based services for routing and navigation	Specifies the data types and associated operations for the implementation of multi-modal location based services for routing and navigation services. This standard is designed to specify web services that may be made available to wireless devices through web-resident proxy applications, but is not restricted to that environment.	CD
ISO 19135	Geographic information - Procedures for registration of geographical information items	Specifies procedures to be followed in preparing, maintaining, and publishing a register or registers of unique unambiguous and permanent identifiers, and meanings that, under the direction of ISO/TC 211, are assigned to geographic information items	CD
ISO 19136	Geographic information - Geography Markup Language	Specifies an XML encoding in compliance with ISO 19118 for the transport and storage of geographic information modeled according to the conceptual modeling framework used in the ISO 19100 series and including both the spatial and nonspatial properties of geographic features	CD
ISO 19137	Geographic information - Generally used profiles of the spatial schema and of similar important other schemas	Specifies a minimal set of geometric elements necessary for an efficient creation of geospatial application schemata	CD
ISO 19138	Geographic information - Data quality measures	Defines a set of measures for the data quality sub-elements identified in ISO 19113 and establish a registry of data quality measures to include, for each measure, an identifier and a code	WD
ISO 19139	Geographic information - Metadata - Implementation specification	Provides a comprehensive metadata implementation specification for digital geographic datasets	WD

2.5 Miscellaneous Geospatial-related Standards

Other organizations have developed standards that are not specifically geospatial, but contain geospatial attributes and can be used in HLS business processes. Exhibit 5 lists some of the standards identified so far.

Exhibit 5 - Other Geospatial Standards

Organization	Identifier	Title	Description
WMO	FM 94-X Ext. BUFR WMO No. 306	Manual on Codes, International Codes, Volume 1.2 (Annex II to WMO Technical Regulations) Parts B and C	Used for interchange, online storage, and data-archiving of atmospheric and oceanographic data
WMO	FM 92-X Ext. GRIB WMO No. 306	Manual on Codes, International Codes, Volume 1.2 (Annex II to WMO Technical Regulations) Parts B and C	Developed for the transfer of gridded data fields (including spectral model coefficients) and of satellite images
	GeoTIFF	GeoTIFF Format Specification	Metadata format, which provides geographic information to associate with the image data

3.0 ACRONYMS

Acronym	Definition
CONOPS	**Concept of Operations**
COP	**Common Operating Picture**
DHS	**Department of Homeland Security**
DRM	**Digital Rights Management**
FGDC	**Federal Geographic Data Committee**
GDR	**Geospatial Data Rollup**
GEA	**Geospatial Enterprise Architecture**
GML	**Geographic Markup Language**
HLS	**Homeland Security**
ISO	**International Organization for Standardization**
OGC	**Open GIS Consortium**
SLD	**Styled Layer Descriptors**
STANAG	**Standards Agreement (NATO)**
TRM	**Technical Reference Model**
WFS	**Web Feature Service**
WFS-T	**Transactional Web Feature Service**
WMS	**Web Map Service**
WMO	**World Meteorological Organization**
XrML	**eXtensible rights Markup Language**

3.0 LIST OF REFERENCES