

ASTM Section D18.01.05 Draft Specification

Content Specification for Digital Geospatial Metadata

1. Scope

1.1. This specification describes the information content of metadata for a set of digital geospatial data. The purpose of the standard is to provide a common set of terminology and definitions for concepts related to these metadata

1.2. The use of the term “geographic information system” and its definition in this specification is not intended to introduce a standard definition.

1.3. This specification covers minimum content and processing requirements for geospatial metadata.

1.4. There are at least three categories of use for geospatial metadata: 1) to accompany data transfers as documentation, 2) internal, on-line documentation of processing steps and data lineage, and 3) as stand-alone data set synopses for use by spatial data catalogs, indexes, and referral services.

2. Related Documents

2.1. American National Standards Institute, 1975, Representations of universal time, local time differentials, and United States time zone reference for information interchange (ANSI X3.51-1975): New York, American National Standards Institute.

2.2. American National Standards Institute, 1986, Representation for calendar date and ordinal date for information interchange (ANSI X3.30-1985): New York, American National Standards Institute

2.3. Anglo-American Committee on Cataloging of Cartographic Materials, 1982, Cartographic materials: A manual of interpretation for AACR2: Chicago, American Library Association

2.4. Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology. Supportive Terminology.

2.5. Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office.

2.6. National Information Standards Organization, 1992, Information Retrieval Service Protocol for Open Systems Interconnection (ANSI Z39.50-1992): Bethesda, MD: National Information Standards Organization.

3. Definitions used in this specification

These definitions are provided to clarify terms used in the specification. Definitions are from the Spatial Data Transfer Standard (SDTS, FIPS 173 -- See Related Documents).

- 3.1. abscissa -- the coordinate of a point in a plane cartesian coordinate system obtained by measuring parallel to the x-axis (“the ‘x’ value”).
- 3.2. accuracy -- the degree of conformity of a measured or calculated value to some recognized standard or specified value. This concept involves the systematic and random error of an operation (ASTM).
- 3.3. altitude -- elevation above or below a reference datum, as defined in Federal Information Processing Standard 70-1. See also elevation.
- 3.4. area -- a generic term for a bounded, continuous, two-dimensional object that may or may not include its boundary.
- 3.5. area chain -- a chain that explicitly references left and right polygons and not start and end nodes. It is a component of a two-dimensional manifold.
- 3.6. area point -- a representative point within an area usually carrying attribute information about that area.
- 3.7. attribute -- a defined characteristic of an entity type (e.g. composition).
- 3.8. attribute value -- a specific quality or quantity assigned to an attribute (e.g., steel), for a specific entity instance.
- 3.9. chain -- a directed non-branching sequence of non-intersecting line segments and (or) arcs bounded by nodes, not necessarily distinct, at each end. Area chain, complete chain, and network chain are special cases of chain, and share all characteristics of the general case as defined above.
- 3.10. complete chain -- a chain that explicitly references left and right polygons and start and end nodes. It is a component of a two-dimensional manifold.
- 3.11. compound element -- a group of data elements and other compound elements. Compound elements represent higher-level concepts that cannot be represented by individual data elements.
- 3.12. coordinates -- pairs of numbers expressing horizontal distances along orthogonal axes; alternatively, triplets of numbers measuring horizontal and vertical distances.
- 3.13. data element -- a logically primitive item of data.
- 3.14. data set -- a file or files that contain related geometric and attribute information; a collection of related data.
- 3.15. depth -- perpendicular distance of an interior point from the surface of an object.
- 3.16. developable surface -- a surface that can be flattened to form a plane without compressing or stretching any part of it. Examples include cones and cylinders.
- 3.17. digital image -- a two-dimensional array of regularly spaced picture elements (pixels) constituting a picture.
- 3.18. digital volume -- a three-dimensional array of regularly spaced volume elements (voxels) constituting a volume.
- 3.19. domain -- in the definition of the elements in the metadata standard, the Domain identifies valid values for a data element.
- 3.20. elevation -- conforming to Federal Information Processing Standard 70-1, the term “altitude” is used in this standard, rather than the common term elevation.

3.21. entity instance -- a spatial phenomenon of a defined type that is embedded in one or more phenomena of different type, or that has at least one key attribute value different from the corresponding attribute values of surrounding phenomena (e.g., the 10th Street Bridge).

3.22. entity point -- a point used for identifying the location of point features (or areal features collapsed to a point), such as towers, buoys, buildings, places, etc.

3.23. entity type -- the definition and description of a set into which similar entity instances are classified (e.g., bridge).

3.24. explicit position -- method of identifying positions directly by pairs (for horizontal positions) or triplets (for horizontal and vertical positions) of numbers.

3.25. G-polygon -- an area consisting of an interior area, one outer G-ring and zero or more non-intersecting, non-nested inner G-rings. No ring, inner or outer, shall be collinear with or intersect any other ring of the same G-polygon.

3.26. G-ring -- a ring created from strings and (or) arcs.

3.27. geoid -- a mathematical representation of the surface of the Earth accounting for local geodetic and gravity measurements.

3.28. geospatial data -- information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth. This information may be derived from, among other things, remote sensing, mapping, and surveying technologies.

3.29. graph -- a set of topologically interrelated zero-dimensional (node), one-dimensional (link or chain), and sometimes two-dimensional (GT-polygon) objects that conform to a set of defined constraint rules. Numerous rule sets can be used to distinguish different types of graphs. Three such types, planar graph, network, and two-dimensional manifold, are used in this standard. All three share the following rules: each link or chain is bounded by an ordered pair of nodes, not necessarily distinct; a node may bound one or more links or chains; and links or chains may only intersect at nodes. Planar graphs and networks are two specialized types of graphs, and a two-dimensional manifold is an even more specific type of planar graph.

3.30. grid -- (1) a set of grid cells forming a regular, or nearly regular, tessellation of a surface; (2) a set of points arrayed in a pattern that forms a regular, or nearly regular, tessellation of a surface. The tessellation is regular if formed by repeating the pattern of a regular polygon, such as a square, equilateral triangle, or regular hexagon. The tessellation is nearly regular if formed by repeating the pattern of an "almost" regular polygon such as a rectangle, non-square parallelogram, or non-equilateral triangle.

3.31. grid cell -- a two-dimensional object that represents the smallest non-divisible element of a grid.

3.32. GT-polygon -- an area that is an atomic two-dimensional component of one and only one two-dimensional manifold. The boundary of a GT-polygon may be defined by GT-rings created from its bounding chains. A GT-polygon may also be associated with its chains (either the bounding set, or the complete set) by direct reference to these chains. The complete set of chains associated with a GT-polygon may also be found by examining the polygon references on the chains.

3.33. GT-ring -- a ring created from complete and (or) area chains.

3.34. horizontal -- tangent to the geoid or parallel to a plane that is tangent to the geoid.

3.35. implicit position -- method of identifying positions by a place in an array of values.

3.36. interior area -- an area not including its boundary.

3.37. label point -- a reference point used for displaying map and chart text (e.g., feature names) to assist in feature identification.

3.38. layer -- an integrated, areally distributed, set of spatial data usually representing entity instances within one theme, or having one common attribute or attribute value in an association of spatial objects. In the context of raster data, a layer is specifically a two-dimensional array of scalar values associated with all or part of a grid or image.

3.39. line segment -- a direct line between two points.

3.40. link -- a topological connection between two nodes. A link may be directed by ordering its nodes.

3.41. media -- the physical devices used to record, store, and (or) transmit data.

3.42. metadata -- data about the content, quality, condition, and other characteristics of data.

3.43. network -- a graph without two dimensional objects. If projected onto a two-dimensional surface, a network can have either more than one node at a point and (or) intersecting links or chains without corresponding nodes.

3.44. network chain -- a chain that explicitly references start and end nodes and not left and right polygons. It is a component of a network.

3.45. node -- a zero-dimensional object that is a topological junction of two or more links or chains, or an end point of a link or chain.

3.46. object -- a digital representation of all or part of an entity instance.

3.47. ordinate -- the coordinate of a point in a plane cartesian coordinate system obtained by measuring parallel to the y-axis ("the 'y' value").

3.48. phenomenon -- a fact, occurrence or circumstance. Route 10, George Washington National Forest, and Chesterfield County are all phenomena.

3.49. pixel -- two-dimensional picture element that is the smallest non-divisible element of a digital image.

3.50. planar graph -- the node and link or chain objects of the graph occur or can be represented as though they occur upon a planar surface. Not more than one node may exist at any given point on the surface. Links or chains may only intersect at nodes.

3.51. point -- a zero-dimensional object that specifies geometric location. One coordinate pair or triplet specifies the location. Area point, entity point, and label point are special implementations of the general case.

3.52. primitive -- the quality of not being subdivided; atomic.

3.53. processing step -- a discrete unit of processing that affects either the data or metadata in a data set (Note 1).

3.54. quality -- an essential or distinguishing characteristic necessary for cartographic data to be fit for use.

Note 1. Different GISs may discretize processes differently, and so the definition of processing step depends somewhat on the particular GIS. Processing steps shall include all steps followed to automate the data set, such as digitizing or scanning. Processing steps shall also include data-set reviews. A data set review typically will not alter the basic data, but the review with its results should be documented in the metadata.

- 3.55. raster -- one or more overlapping layers for the same grid or digital image.
- 3.56. raster object -- one or more images and/or grids, each grid or image representing a layer, such that corresponding grid cells and/or pixels between layers are congruent and registered.
- 3.57. resolution -- the minimum difference between two independently measured or computed values which can be distinguished by the measurement or analytical method being considered or used.
- 3.58. ring -- sequence of non-intersecting chains or strings and (or) arcs, with closure. A ring represents a closed boundary, but not the interior area inside the closed boundary.
- 3.59. schema -- the definition of table columns, relations, data, Domain, and other elements of a data base, often illustrated using an entity-relationship diagram.
- 3.60. SDTS -- the Spatial Data Transfer Standard -- see Related Documents.
- 3.61. spatial data -- see geospatial data.
- 3.62. stratum -- one of a series of layers, levels, or gradations in an ordered system. For this standard, the term is used in the sense of (1) a region of sea, atmosphere, or geology that is distinguished by natural or arbitrary limits; (2) a socioeconomic level of society comprised of persons of the same or similar status, especially with regard to education or culture; or (3) a layer of vegetation, usually of the same or similar height.
- 3.63. string -- a connected non-branching sequence of line segments specified as the ordered sequence of points between those line segments. Note: A string may intersect itself or other strings.
- 3.64. two-dimensional manifold -- a planar graph and its associated two dimensional objects. Each chain bounds two and only two, not necessarily distinct, GT-polygons. The GT-polygons are mutually exclusive and completely exhaust the surface.
- 3.65. type -- in the definition of the elements in the metadata standard, a compound element has the type "compound" to provide a unique way to identify compound elements. For a data element, the type identifies the kind of value that can be assigned to the data element. The choices are "integer" for integer numbers, "real" for real numbers, "text" for ASCII characters, "date" for day of the year, and "time" for time of the day.
- 3.66. universe polygon -- defines the part of the universe that is outside the perimeter of the area covered by other GT-polygons ("covered area") and completes the two-dimensional manifold. This polygon completes the adjacency relationships of the perimeter links. The boundary of the universe polygon is represented by one or more inner rings and no outer ring. Attribution of the universe polygon may not exist, or may be substantially different from the attribution of the covered area.
- 3.67. vector -- composed of directed lines.
- 3.68. vertical -- at right angles to the horizontal; includes altitude and depth.
- 3.69. VPF -- the Vector Product Format --see Related Documents.
- 3.70. void polygon -- defines a part of the two-dimensional manifold that is bounded by other GT-polygons, but otherwise has the same characteristics as the universe polygon. The geometry and topology of a void polygon are those of a GT-polygon. Attribution of a void polygon may not exist, or may be substantially different from the attribution of the covered area.
- 3.71. voxel -- a three-dimensional element that is the smallest non-divisible element of a digital volume.

4. Data Element Description

4.1. A data element is a logically primitive item of data. The entry for a data elements includes the name of the data element, the definition of the data element, a description of the values that can be assigned to the data element. The form for the definition of the data elements is:

Data element name -- definition.
Type:
Domain:
Tag Name:
Tag Value:

4.2. The information about the values for the data elements include a description of the type of the value, and a description of the, Domain of the valid values. The type of the data element describes the kind of value to be provided. The choices are “integer” for integer numbers, “real” for real numbers, “text” for ASCII characters, “date” for day of the year, and “time” for time of the day.

4.3. The, Domain describes valid values that can be assigned to the data element. The, Domain may specify a list of valid values, references to lists of valid values, or restrictions on the range of values that can be assigned to a data element.

4.4. The, Domain also may note that the, Domain is free from restrictions, and any values that can be represented by the “type” of the data element can be assigned. These unrestricted, Domains are represented by the use of the word “free” followed by the type of the data element (that is, free text, free date, free real, free time, free integer). Some, Domains can be partly, but not completely, specified. For example, there are several widely used data transfer formats, but there may be many more that are less well known. To allow a producer to describe its data in these circumstances, the convention of providing a list of values followed by the designation of a “free”, Domain is used. In these cases, assignments of values shall be made from the provided, Domain when possible. When not possible, providers may create and assign their own value. A created value shall not redefine a value provided by the standard.

4.5. The descriptor “Tag Name” contains a character string tag for the specified data element whose maximum length is 10 characters. This descriptor may be used by implementors to internally name data elements within a database or software system where long text of the data element name would not be feasible. For reporting and display purposes, the full data element name is the preferred form of presentation., Tag name will also be used by metadata management software to declare the format tags in both Standard Graphics Markup Language (SGML) and Hyper Text Markup Language (HTML). Metadata may be exchanged between software systems using ASCII text files in which all metadata elements are encoded using the markup tags using the following example:

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<TAGNAME> metadata entry value text </TAGNAME>
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4.6. The descriptor “Tag Value” contains a unique integer tag value to be used to describe and manipulate these data elements within the Information Retrieval Service Protocol, ANSI/NISO Z39.50 Version 3.

5. Data Format

5.1. Introduction: This specification does not require specific internal formats for data elements but does specify the data types required for data exchange. Internal data formats are a design issue for GIS developers. A compliant GIS must provide access to the required metadata for interactive query and update, where appropriate, for use in data processing procedures, and for transfer via the Spatial Data Transfer Standard (SDTS) and via a spatial metadata transfer file, formatted using Standard Graphics Markup Language (SGML) using the provided, Tag Names as text markers.

5.2. This specification specifies only that data elements are one of numeric, date, code, or text for ease in data transfer between software systems. In addition, data elements may be described as coordinates or coordinate pairs, in which case a pair of numeric elements is indicated.

5.2.1. Numeric elements shall be made available for data exchange as a character representation, conforming to ISO 6093 with the provision that FULL STOP (i.e. period) shall be used for the decimal mark. A compliant GIS would store numeric elements internally using numeric or character format, but the data must be made available for standard numeric processing, preserving the precision of the data values. Numeric elements may be further characterized as real or integer.

5.2.2. Date elements shall be expressed for access and transfer in the format YYYYMMDD, where Y is year, M is month, and D is day (ANSI X3.30-1985).(adopted as Federal Information Processing Standard 4-1). Time elements are to be represented using hours, minutes, seconds, and decimal fractions of a second (to the precision desired) without separators convention, with the general form of HHMMSSSS (ANSI X3.43-1986). Information with a differential factor is to be represented using the general form HHMMSSSSshhmm, where HHMMSSSS is the local time using 24-hour timekeeping (expressed to the precision desired), 's' is the plus or minus sign for the time differential factor, and hhmm is the time differential factor (ANSI X3.51-1975)

5.2.3. Text elements are used for non-numeric elements such as names, descriptions, keywords, and commentary. This specification does not require specific lengths for text elements. Ideally, unlimited-length strings should be supported by a compliant GIS. In practice, however, a compliant GIS could implement these elements with fixed sizes providing enough space for reasonable use of the elements.

5.2.4. Code elements are used for referencing a limited set of valid attribute values. Codes may be expanded into full text for display. Code values (domain) are described in Section 11 of this standard. Additions to these attribute, Domains may be made as required by the user community and this standard will be amended by the ASTM Mapping and GIS Section to include them.

5.2.5. Values for latitude and longitude shall be expressed as decimal fractions of degrees. Whole degrees of latitude shall be represented by a two-digit decimal number ranging from 0 through 90. Whole degrees of longitude shall be represented by a three-digit decimal number ranging from 0 through 180. When a decimal fraction of a degree is specified, it shall be separated from the whole number of degrees by a decimal point. Decimal fractions of a degree may be expressed to the precision desired. Latitudes north of the equator shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the two digits designating degrees. Latitudes south of the Equator shall be designated by a minus sign (-) preceding the two digits designating degrees. Coordinate elements are used to store positional information with respect to the earth's surface.

5.2.6. For purposes of data transfer, this specification requires that a compliant GIS be able to automatically transfer full or subsets of metadata in conformance with the SDTS and using SGML formatting.

6. Integration of Metadata and Data Set

6.1. The metadata for a data set shall be treated by a compliant GIS as an integral part of the data. Operations performed on a data set by GIS software shall not render the data set's metadata invalid and shall update the metadata where possible. Metadata shall be retained when a data set is copied, imported or exported. Software should also support the extraction and transmission of metadata from a spatial data set, independent from the data set, for purposes of data indexing and information exchange.

7. Level 1 Metadata Contents

Section 7 describes the individual metadata elements to be included in this specification. Major headings (7.1, 7.2, etc.) denote major groupings of elements which are conceptually associated at a high level. Dependencies and optionality of data elements are described in Section 8.

7.1. Identification Information -- basic information about the data set. Type: compound, Tag Name: IDENTINFO, Tag Value: 3100

7.1.1. Citation -- information to be used to reference the data set. Type: compound, Tag Name: CITATION, Tag Value: 3101

7.1.2. Description -- a characterization of the data set, including its intended use and limitations. Type: compound, Tag Name: DESCR, Tag Value: 3102

7.1.2.1. Abstract -- a brief narrative summary of the data set. Type: text, Domain: free text, Tag Name: ABSTRACT, Tag Value: 62 (bib1)

7.1.2.2. Purpose -- a summary of the intentions with which the data set was developed. Type: text, Domain: free text, Tag Name: PURPOSE, Tag Value: 3104

7.1.2.3. Supplemental Information -- other descriptive information about the data set. Type: text, Domain: free text, Tag Name: SUPPLINFO, Tag Value: 3105

7.1.3. Time Period of Content -- time period(s) for which the data set corresponds to the ground. Type: compound, Tag Name: TIMEPDCTNT, Tag Value: 3103

7.1.3.1. Currentness Reference -- the basis on which the time period of content information is determined. Type: text, Domain: "ground condition" "publication date" free text, Tag Name: CURRENTREF, Tag Value: 3106

7.1.4. Status -- the state of and maintenance information for the data set. Type: compound, Tag Name: STATUS, Tag Value: 3107

7.1.4.1. Progress -- the state of the data set. Type: text, Domain: "Complete" "In work" "Planned", Tag Name: PROGRESS, Tag Value: 3108

7.1.4.2. Maintenance and Update Frequency -- the frequency with which changes and additions are made to the data set after the initial data set. Type: text, Domain: "Unknown" "As needed" "Irregular" "None planned" "Continually" "Daily" "Weekly" "Monthly" "Annually", Tag Name: MNTUPDFREQ, Tag Value: 3109

7.1.5. Spatial, Domain - the geographic areal, Domain of the data set. Type: compound, Tag Name: SPTLDOMAIN, Tag Value: 3110

7.1.5.1. Bounding Coordinates - the limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding Coordinate shall be assigned the value 180.0 Type: compound, Tag Name: BNDGCOORDS, Tag Value: 3111

7.1.5.1.1. West Bounding Coordinate -- western-most coordinate of the limit of coverage expressed in longitude. Type: real, Domain: -180.0 <= West Bounding Coordinate < 180.0, Tag Name: WBNDGCOORD, Tag Value: 3112

7.1.5.1.2. East Bounding Coordinate -- eastern-most coordinate of the limit of coverage expressed in longitude. Type: real, Domain: -180.0 <= East Bounding Coordinate <= 180.0, Tag Name: EBNDGCOORD, Tag Value: 3113

7.1.5.1.3. North Bounding Coordinate -- northern-most coordinate of the limit of coverage expressed in latitude. Type: real, Domain: -90.0 <= North Bounding Coordinate <= 90.0; North Bounding Coordinate >= South Bounding Coordinate, Tag Name: NBNDGCOORD, Tag Value: 3114

7.1.5.1.4. South Bounding Coordinate -- southern-most coordinate of the limit of coverage expressed in latitude. Type: real, Domain:-90.0 <= South Bounding Coordinate <= 90.0; South Bounding Coordinate <= North Bounding Coordinate, Tag Name: SBNDGCOORD, Tag Value: 3115

7.1.5.2. Data Set G-Polygon -- coordinates defining the outline of an area covered by a data set. Type: compound, Tag Name: DSGPOLYGON, Tag Value: 3116

7.1.5.2.1. Data Set G-Polygon Outer G-Ring -- the closed non-intersecting boundary of an interior area. Type: compound, Tag Name: DSGPOGRING, Tag Value: 3117

7.1.5.2.1.1. G-Ring Latitude -- the latitude of a point of the g-ring. Type: real, Domain:-90.0 <= G-Ring Latitude <= 90.0, Tag Name: GRINGLAT, Tag Value: 3118

7.1.5.2.1.2. G-Ring Longitude -- the longitude of a point of the g-ring. Type: real, Domain:-180.0 <= G-Ring Longitude < 180.0, Tag Name: GRINGLONG, Tag Value: 3119

7.1.5.2.2. Data Set G-Polygon Exclusion G-Ring -- the closed non-intersecting boundary of a void area (or "hole") in an interior area. Type: compound, Tag Name: DSGPEGRING, Tag Value: 3120

7.1.6. Keywords -- words or phrases summarizing an aspect of the data set. Type: compound, Tag Name: KEYWORDS, Tag Value: 3121

7.1.6.1. Theme -- subjects covered by the data set (for a list of some commonly-used thesauri, see Part IV: Subject/index term sources in Network Development and MARC Standards Office, 1988, USMARC code list for relators, sources, and description conventions: Washington, Library of Congress). Type: compound, Tag Name: THEME, Tag Value: 3122

7.1.6.1.1. Theme Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of theme keywords. Type: text, Domain: "None" free text, Tag Name: THMKWTHSRS, Tag Value: 3123

7.1.6.1.2. Theme Keyword -- common-use word or phrase used to describe the subject of the data set. Type: text, Domain: free text, Tag Name: THMKEYWORD, Tag Value: 3124

7.1.6.2. Place -- geographic locations characterized by the data set. Type: compound, Tag Name: GEOGPLACE, Tag Value: 58 (bib1)

7.1.6.2.1. Place Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of place keywords. Type: text, Domain: "None" "Geographic Names Information System" free text, Tag Name: PLCKWTHSRS, Tag Value: 3126

7.1.6.2.2. Place Keyword -- the geographic name of a location covered by a data set. Type: text, Domain: free text, Tag Name: PLCKEYWORD, Tag Value: 3127

7.1.6.3. Stratum -- layered, vertical locations characterized by the data set. Type: compound, Tag Name: STRATUM, Tag Value: 3128

7.1.6.3.1. Stratum Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of stratum keywords. Type: text, Domain: "None" free text, Tag Name: STRKWTHSRS, Tag Value: 3129

7.1.6.3.2. Stratum Keyword -- the name of a vertical location used to describe the locations covered by a data set. Type: text, Domain: free text, Tag Name: STRKEYWORD, Tag Value: 3130

7.1.6.4. Temporal -- time period(s) characterized by the data set. Type: compound, Tag Name: TEMPORAL, Tag Value: 3131

7.1.6.4.1. Temporal Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of temporal keywords. Type: text, Domain: "None" free text, Tag Name: TMPKWTHSRS, Tag Value: 3132

7.1.6.4.2. Temporal Keyword -- the name of a time period covered by a data set. Type: text, Domain: free text, Tag Name: TMPKEYWORD, Tag Value: 3133

7.1.7. Access Constraints -- restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set. Type: text, Domain: "None" free text, Tag Name: ACCESSCONS, Tag Value: 3134

7.1.8. Use Constraints -- restrictions and legal prerequisites for using the data set after access is granted. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set. Type: text, Domain: "None" free text, Tag Name: USECONSTR, Tag Value: 3135

7.1.9. Point of Contact -- contact information for an individual or organization that is knowledgeable about the data set. Type: compound, Tag Name: PTOFCNTACT, Tag Value: 3136

7.1.10. Browse Graphic -- a graphic that provides an illustration of the data set. The graphic should include a legend for interpreting the graphic. Type: compound, Tag Name: BRWSEGRPHC, Tag Value: 3137

7.1.10.1. Browse Graphic File Name -- name of a related graphic file that provides an illustration of the data set. Type: text, Domain: free text, Tag Name: BRWSEFNAME, Tag Value: 3138

7.1.10.2. Browse Graphic File Description -- a text description of the illustration. Type: text, Domain: free text, Tag Name: BRWSEFNDSC, Tag Value: 3139

7.1.10.3. Browse Graphic File Type -- graphic file type of a related graphic file. Type: text, Domain:., Domain values in the table below; free text, Tag Name: BRWSEFNFTP, Tag Value: 3140, Domain: "CGM" Computer Graphics Metafile "EPS" Encapsulated Postscript format "GIF" Graphic Interchange Format "JPEG" Joint Photographic Experts Group format "PBM" Portable Bit Map format "PS" Postscript format "TIFF", Tagged Image File Format "XWD" X-Windows Dump

7.1.11. Data Set Credit -- recognition of those who contributed to the data set. Type: text, Domain: free text, Tag Name: DATAACREDIT, Tag Value: 3141

7.1.12. Security Information -- handling restrictions imposed on the data set because of national security, privacy, or other concerns. Type: compound, Tag Name: SECRTYINFO, Tag Value: 3142

7.1.12.1. Security Classification System -- name of the classification system Type: text, Domain: free text, Tag Name: SECRTYCSYS, Tag Value: 3143

7.1.12.2. Security Classification -- name of the handling restrictions on the data set. Type: text, Domain: "Top secret" "Secret" "Confidential" "Restricted" "Unclassified" "Sensitive" free text, Tag Name: SECRTYCLAS, Tag Value: 3144

7.1.12.3. Security Handling Description -- additional information about the restrictions on handling the data set. Type: text, Domain: free text, Tag Name: SECHNDLDSC, Tag Value: 3145

7.1.13. Native Data Set Environment -- a description of the data set in the producer's processing environment, including items such as the name of the software (including version), the computer operating system, file name (including host-, path-, and file names), and the data set size. Type: text, Domain: free text, Tag Name: NATIVEDENV, Tag Value: 3146

7.1.14. Cross Reference -- information about other, related data sets that are likely to be of interest. Type: compound, Tag Name: CROSSREF, Tag Value: 3147

7.2. Data Quality Information -- a general assessment of the quality of the data set. (Recommendations on information to be reported and tests to be performed are found in "Spatial Data Quality," which is chapter 3 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology.) Type: compound, Tag Name: DATAQINFO, Tag Value: 3200

7.2.1. Attribute Accuracy -- an assessment of the accuracy of the identification of entities and assignment of attribute values in the data set. Type: compound, Tag Name: ATTRIBACCY, Tag Value: 3201

7.2.1.1. Attribute Accuracy Report -- an explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the tests used. Type: text, Domain: free text, Tag Name: ATTRACCYRP, Tag Value: 3202

7.2.1.2. Quantitative Attribute Accuracy Assessment -- a value assigned to summarize the accuracy of the identification of the entities and assignments of values in the data set and the identification of the test that yielded the value. Type: compound, Tag Name: QUANATACAS, Tag Value: 3203

7.2.1.2.1. Attribute Accuracy Value -- an estimate of the accuracy of the identification of the entities and assignments of attribute values in the data set. Type: text, Domain: "Unknown" free text, Tag Name: ATTRACCVAL, Tag Value: 3204

7.2.1.2.2. Attribute Accuracy Explanation -- the identification of the test that yielded the Attribute Accuracy Value. Type: text, Domain: free text, Tag Name: ATTRACCXP, Tag Value: 3205

7.2.2. Logical Consistency Report -- an explanation of the fidelity of the relationships in the data set and the tests used. Type: text, Domain: free text, Tag Name: LOGCONSIST, Tag Value: 3206

7.2.3. Completeness Report -- information about omissions, selection criteria, generalization, definitions used, and other rules used to derive the data set. Type: text, Domain: free text, Tag Name: CMPLETEREP, Tag Value: 3207

7.2.4. Positional Accuracy -- an assessment of the accuracy of the positions of spatial objects. Type: compound, Tag Name: POSITACCY, Tag Value: 3208

7.2.4.1. Horizontal Positional Accuracy -- an estimate of accuracy of the horizontal positions of the spatial objects. Type: compound, Tag Name: HORPOSACCY, Tag Value: 3209

7.2.4.1.1. Horizontal Positional Accuracy Report -- an explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used. Type: text, Domain: free text, Tag Name: HORPOSACRP, Tag Value: 3210

7.2.4.1.2. Quantitative Horizontal Positional Accuracy Assessment -- numeric value assigned to summarize the accuracy of the horizontal coordinate measurements and the identification of the test that yielded the value. Type: compound, Tag Name: QUANTHPAA, Tag Value: 3211

7.2.4.1.2.1. Horizontal Positional Accuracy Value -- an estimate of the accuracy of the horizontal coordinate measurements in the data set expressed in (ground) meters. Type: real, Domain: free real, Tag Name: HORPOSACCV, Tag Value: 3212

7.2.4.1.2.2. Horizontal Positional Accuracy Explanation -- the identification of the test that yielded the Horizontal Positional Accuracy Value. Type: text, Domain: free text, Tag Name: HORPOSACCE, Tag Value: 3213

7.2.4.2. Vertical Positional Accuracy -- an estimate of accuracy of the vertical positions in the data set. Type: compound, Tag Name: VERTPOSACC, Tag Value: 3214

7.2.4.2.1. Vertical Positional Accuracy Report -- an explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Type: text, Domain: free text, Tag Name: VERTPOSARP, Tag Value: 3215

7.2.4.2.2. Quantitative Vertical Positional Accuracy Assessment -- numeric value assigned to summarize the accuracy of vertical coordinate measurements and the identification of the test that yielded the value. Type: compound, Tag Name: QUANTVPAA, Tag Value: 3216

7.2.4.2.2.1. Vertical Positional Accuracy Value -- an estimate of the accuracy of the vertical coordinate measurement in the data set expressed in (ground) meters. Type: real, Domain: free real, Tag Name: VPOSACCV, Tag Value: 3217

7.2.4.2.2.2. Vertical Positional Accuracy Explanation -- the identification of the test that yielded the Vertical Positional Accuracy Value. Type: text, Domain: free text, Tag Name: VPOSACCE, Tag Value: 3218

7.2.5. Lineage -- information about the events, parameters, and source data which constructed the data set, and information about the responsible parties. Type: compound, Tag Name: LINEAGE, Tag Value: 3219

7.2.5.1. Source Information -- list of sources and a short discussion of the information contributed by each. Type: compound, Tag Name: SOURCEINFO, Tag Value: 3220

7.2.5.1.1. Source Citation -- reference for a source data set. Type: compound, Tag Name: SOURCECIT, Tag Value: 3221

7.2.5.1.2. Source Scale Denominator -- the denominator of the representative fraction on a map (for example, on a 1:24,000-scale map, the Source Scale Denominator is 24000). Type: integer, Domain: Source Scale Denominator > 1, Tag Name: SRCSCLDNOM, Tag Value: 1024 (bib1)

7.2.5.1.3. Type of Source Media -- the medium of the source data set. Type: text, Domain: "paper" "stable-base material" "microfiche" "microfilm" "audiocassette" "chart" "filmstrip" "transparency" "videocassette" "videodisc" "videotape" "physical model" "computer program" "disc" "cartridge tape" "magnetic tape" "online" "CD-ROM" "electronic bulletin board" "electronic mail system" free text, Tag Name: SRCMEDIA, Tag Value: 1031 (bib1)

7.2.5.1.4. Source Time Period of Content -- time period(s) for which the source data set corresponds to the ground. Type: compound, Tag Name: SRCTIMEPD, Tag Value: 3223

7.2.5.1.4.1. Source Currentness Reference -- the basis on which the source time period of content information of the source data set is determined. Type: text, Domain: "ground condition" "publication date" free text, Tag Name: SRCCURREF, Tag Value: 3224

7.2.5.1.5. Source Citation Abbreviation -- short-form alias for the source citation. Type: text, Domain: free text, Tag Name: SRCCITABBR, Tag Value: 3225

7.2.5.1.6. Source Contribution -- brief statement identifying the information contributed by the source to the data set. Type: text, Domain: free text, Tag Name: SRCCONTRIB, Tag Value: 3226

7.2.5.2. Process Step -- information about a single event. Type: compound, Tag Name: PROCESSTEP, Tag Value: 3227

7.2.5.2.1. Process Description -- an explanation of the event and related parameters or tolerances. Type: text, Domain: free text, Tag Name: PROCDESCR, Tag Value: 3228

7.2.5.2.2. Source Used Citation Abbreviation -- the Source Citation Abbreviation of a data set used in the processing step. Type: text, Domain:Source Citation Abbreviations from the Source Information entries for the data set., Tag Name: SRCCTABBR, Tag Value: 3229

7.2.5.2.3. Process Date -- the date when the event was completed. Type: date, Domain: "Unknown" "Not complete" free date, Tag Name: PROCDATE, Tag Value: 3230

7.2.5.2.4. Process Time -- the time when the event was completed. Type: time, Domain: free time, Tag Name: PROCTIME, Tag Value: 3231

7.2.5.2.5. Source Produced Citation Abbreviation -- the Source Citation Abbreviation of an intermediate data set that (1) is significant in the opinion of the data producer, (2) is generated in the processing step, and (3) is used in later processing steps. Type: text, Domain:Source Citation Abbreviations from the Source Information entries for the data set., Tag Name: SRCPRODCAB, Tag Value: 3232

7.2.5.2.6. Process Contact -- the party responsible for the processing step information. Type: compound, Tag Name: PROCCONTACT, Tag Value: 3233

7.2.6. Cloud Cover -- area of a data set obstructed by clouds, expressed as a percentage of the spatial extent. Type: integer, Domain:0 <= Cloud Cover <= 100 "Unknown", Tag Name: CLOUDCOVER, Tag Value: 3234

7.3. Spatial Data Organization Information -- the mechanism used to represent spatial information in the data set. Type: compound, Tag Name: SDORGINFO, Tag Value: 3300

7.3.1. Indirect Spatial Reference -- name of types of geographic features, addressing schemes, or other means through which locations are referenced in the data set. Type: text, Domain: free text, Tag Name: INDIRSPREF, Tag Value: 3301

7.3.2. Direct Spatial Reference Method -- the system of objects used to represent space in the data set. Type: text, Domain: "Point" "Vector" "Raster", Tag Name: DIRSPREF, Tag Value: 3302

7.3.3. Point and Vector Object Information -- the types and numbers of vector or non-gridded point spatial objects in the data set. Type: compound, Tag Name: PTVCTROINF, Tag Value: 3314

7.3.3.1. SDTS Terms Description -- point and vector object information using the terminology and concepts from "Spatial Data Concepts," which is chapter 2 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology. (Note that this reference to the SDTS is used ONLY to provide a set of terminology for the point and vector objects.) Type: compound, Tag Name: SDTSTERMS, Tag Value: 3303

7.3.3.1.1. SDTS Point and Vector Object Type -- name of point and vector spatial objects used to locate zero-, one-, and two-dimensional spatial locations in the data set. Type: text, Domain:(The, Domain is from "Spatial Data Concepts," which is chapter 2 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology): "Point" "Entity point" "Label point" "Area point" "Node, planar graph" "Node, network" "String" "Link" "Complete chain" "Area chain" "Network chain, planar graph" "Network chain, nonplanar graph" "Circular arc, three point center" "Elliptical arc" "Uniform B-spline" "Piecewise Bezier" "Ring with mixed composition" "Ring composed of strings" "Ring composed of chains" "Ring composed of arcs" "G-polygon" "GT-polygon composed of rings" "GT-polygon composed of chains" "Universe polygon composed of rings" "Universe polygon composed of chains" "Void polygon composed of rings" "Void polygon composed of chains", Tag Name: SDTSPAVOT, Tag Value: 3304

7.3.3.1.2. Point and Vector Object Count -- the total number of the point or vector object type occurring in the data set. Type: integer, Domain:Point and Vector Object Count > 0, Tag Name: PAVOCOUNT, Tag Value: 3305

7.3.3.2. VPF Terms Description -- point and vector object information using the terminology and concepts from Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office. (Note that this reference to the VPF is used ONLY to provide a set of terminology for the point and vector objects.) Type: compound, Tag Name: VPFTERMDSC, Tag Value: 3306

7.3.3.2.1. VPF Topology Level -- the completeness of the topology carried by the data set. The levels of completeness are defined in Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office. Type: integer, Domain:0 <= VPF Topology Level <= 3, Tag Name: VPFTOPOLEV, Tag Value: 3307

7.3.3.2.2. VPF Point and Vector Object Type -- name of point and vector spatial objects used to locate zero-, one-, and two-dimensional spatial locations in the data set. Type: text, Domain:(The, Domain is from Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office): "Node" "Edge" "Face" "Text", Tag Name: VPFPVOT, Tag Value: 3308

7.3.4. Raster Object Information -- the types and numbers of raster spatial objects in the data set. Type: compound, Tag Name: RASOBJINFO, Tag Value: 3309

7.3.4.1. Raster Object Type -- raster spatial objects used to locate zero-, two-, or three- dimensional locations in the data set. Type: text, Domain:(With the exception of "voxel", the, Domain is from "Spatial Data Concepts," which is chapter 2 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology): "Point" "Pixel" "Grid Cell" "Voxel", Tag Name: RASTOBJTP, Tag Value: 3310

7.3.4.2. Row Count -- the maximum number of raster objects along the ordinate (y) axis. For use with rectangular raster objects. Type: Integer, Domain:Row Count > 0, Tag Name: ROWCOUNT, Tag Value: 3311

7.3.4.3. Column Count -- the maximum number of raster objects along the abscissa (x) axis. For use with rectangular raster objects. Type: Integer, Domain:Column Count > 0, Tag Name: COLCOUNT, Tag Value: 3312

7.3.4.4. Vertical Count -- the maximum number of raster objects along the vertical (z) axis. For use with rectangular volumetric raster objects (voxels). Type: Integer, Domain:Depth Count > 0, Tag Name: VERTCOUNT, Tag Value: 3313

7.4. Spatial Reference Information -- the description of the reference frame for, and the means to encode, coordinates in the data set. Type: compound, Tag Name: SPREFINFO, Tag Value: 3400

7.4.1. Horizontal Coordinate System Definition -- the reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies. Type: compound, Tag Name: HORCORSDEF, Tag Value: 3401

7.4.1.1. Geographic -- the quantities of latitude and longitude which define the position of a point on the Earth's surface with respect to a reference spheroid. Type: compound, Tag Name: GEOGRAPHIC, Tag Value: 3402

7.4.1.1.1. Latitude Resolution -- the minimum difference between two adjacent latitude values expressed in Geographic Coordinate Units of measure. Type: real, Domain: Latitude Resolution > 0.0, Tag Name: LATRESOL, Tag Value: 3403

7.4.1.1.2. Longitude Resolution -- the minimum difference between two adjacent longitude values expressed in Geographic Coordinate Units of measure. Type: real, Domain: Longitude Resolution > 0.0, Tag Name: LONGRESOL, Tag Value: 3404

7.4.1.1.3. Geographic Coordinate Units -- units of measure used for the latitude and longitude values. Type: text, Domain: "Decimal degrees" "Decimal minutes" "Decimal seconds" "Degrees and decimal minutes" "Degrees, minutes, and decimal seconds" "Radians" "Grads", Tag Name: GEOCOORDUN, Tag Value: 3405

7.4.1.2. Planar -- the quantities of distances, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected. Type: compound, Tag Name: PLANAR, Tag Value: 3406

7.4.1.2.1. Map Projection -- the systematic representation of all or part of the surface of the Earth on a plane or developable surface. Type: compound, Tag Name: MAPPROJECT, Tag Value: 3407

7.4.1.2.1.1. Map Projection Name -- name of the map projection. Type: text, Tag Name: MAPPRJNAME, Tag Value: 3408, Domain: "Albers Conical Equal Area" "Azimuthal Equidistant" "Equidistant Conic" "Equirectangular" "General Vertical Near-sided Projection" "Gnomonic" "Lambert Azimuthal Equal Area" "Lambert Conformal Conic" "Mercator" "Modified Stereographic for Alaska" "Miller Cylindrical" "Oblique Mercator" "Orthographic" "Polar Stereographic" "Polyconic" "Robinson" "Sinusoidal" "Space Oblique Mercator" "Stereographic" "Transverse Mercator" "van der Grinten" "other projection"

7.4.1.2.1.2. Map Projection Parameters -- parameters required for a specific map projection, each having a unique mathematical relationship between the earth and the plane or developable surface. Type: compound, Tag Name: MAPPRJPARM, Tag Value: 3409

7.4.1.2.1.2.1. Standard Parallel -- line of constant latitude at which the surface of the Earth and the plane or developable surface intersect. Type: real, Domain: $-90.0 \leq \text{Standard Parallel} \leq 90.0$, Tag Name: STDPARALL, Tag Value: 3410

7.4.1.2.1.2.2. Longitude of Central Meridian -- the line of longitude at the center of a map projection generally used as the basis for constructing the projection. Type: real, Domain: $-180.0 \leq \text{Longitude of Central Meridian} < 180.0$, Tag Name: LONGCNTMER, Tag Value: 3411

7.4.1.2.1.2.3. Latitude of Projection Origin -- latitude chosen as the origin of rectangular coordinates for a map projection. Type: real, Domain: $-90.0 \leq \text{Latitude of Projection Origin} \leq 90.0$, Tag Name: LATPRJORIG, Tag Value: 3412

7.4.1.2.1.2.4. False Easting -- the value added to all "x" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in Planar Coordinate Units. Type: real, Domain: free real, Tag Name: FALSEEASTG, Tag Value: 3413

7.4.1.2.1.2.5. False Northing -- the value added to all "y" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in Planar Coordinate Units. Type: real, Domain: free real, Tag Name: FALSENORTG, Tag Value: 3414

7.4.1.2.1.2.6. Scale Factor at Equator -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the equator. Type: real, Domain: Scale Factor at Equator > 0.0 , Tag Name: SCALEATEQT, Tag Value: 3415

7.4.1.2.1.2.7. Height of Perspective Point Above Surface -- height of viewpoint above the Earth, expressed in meters. Type: real, Domain: Height of Perspective Point Above Surface > 0.0 , Tag Name: HTOFPERSP, Tag Value: 3416

7.4.1.2.1.2.8. Longitude of Projection Center -- longitude of the point of projection for azimuthal projections. Type: real, Domain: $-180.0 \leq \text{Longitude of Projection Center} < 180.0$, Tag Name: LONGOFPCTR, Tag Value: 3417

7.4.1.2.1.2.9. Latitude of Projection Center -- latitude of the point of projection for azimuthal projections. Type: real, Domain: -90.0 <= Latitude of Projection Center <= 90.0, Tag Name: LATOFPCTR, Tag Value: 3418

7.4.1.2.1.2.10. Scale Factor at Center Line -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the center line. Type: real, Domain: Scale Factor at Center Line > 0.0, Tag Name: SCALEATCTR, Tag Value: 3419

7.4.1.2.1.2.11. Oblique Line Azimuth -- method used to describe the line along which an oblique mercator map projection is centered using the map projection origin and an azimuth. Type: compound, Tag Name: OBLLINEAZM, Tag Value: 3420

7.4.1.2.1.2.11.1. Azimuthal Angle -- angle measured clockwise from north, and expressed in degrees. Type: real, Domain: 0.0 <= Azimuthal Angle < 360.0, Tag Name: AZIMLANGLE, Tag Value: 3421

7.4.1.2.1.2.11.2. Azimuth Measure Point Longitude -- longitude of the map projection origin. Type: real, Domain: -180.0 <= Azimuth Measure Point Longitude < 180.0, Tag Name: AZIMMPLONG, Tag Value: 3422

7.4.1.2.1.2.12. Oblique Line Point -- method used to describe the line along which an oblique mercator map projection is centered using two points near the limits of the mapped region that define the center line. Type: compound, Tag Name: OBLLINEPT, Tag Value: 3423

7.4.1.2.1.2.12.1. Oblique Line Latitude -- latitude of a point defining the oblique line. Type: real, Domain: -90.0 <= Oblique Line Latitude <= 90.0, Tag Name: OBLLINELAT, Tag Value: 3424

7.4.1.2.1.2.12.2. Oblique Line Longitude -- longitude of a point defining the oblique line. Type: real, Domain: -180.0 <= Oblique Line Longitude < 180.0, Tag Name: OBLLINELON, Tag Value: 3425

7.4.1.2.1.2.13. Straight Vertical Longitude from Pole -- longitude to be oriented straight up from the North or South Pole. Type: real, Domain: -180.0 <= Straight Vertical Longitude from Pole < 180.0, Tag Name: STVLONGFPL, Tag Value: 3426

7.4.1.2.1.2.14. Scale Factor at Projection Origin -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance at the projection origin. Type: real, Domain: Scale Factor at Projection Origin > 0.0, Tag Name: SCALEATPORI, Tag Value: 3427

7.4.1.2.1.2.15. Landsat Number -- number of the Landsat satellite. (Note: This data element exists solely to provide a parameter needed to define the space oblique mercator projection. It is not used to identify data originating from a remote sensing vehicle.) Type: Integer, Domain: 0 < Landsat Number < 5, Tag Name: LANDSATNUM, Tag Value: 3428

7.4.1.2.1.2.16. Path Number -- number of the orbit of the Landsat satellite. (Note: This data element exists solely to provide a parameter needed to define the space oblique mercator projection. It is not used to identify data originating from a remote sensing vehicle.) Type: integer, Domain: 0 < Path Number < 251 for Landsats 1, 2, or 3 0 < Path Number < 233 for Landsats 4 or 5, Tag Name: PATHNUMBER, Tag Value: 3429

7.4.1.2.1.2.17. Scale Factor at Central Meridian -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the central meridian. Type: real, Domain: Scale Factor at Central Meridian > 0.0, Tag Name: SCALEATCM, Tag Value: 3430

7.4.1.2.1.3. Other Projection's Definition -- a complete description of a projection, not defined elsewhere in this standard, that was used for the data set. The information provided shall include the name of the projection, the names of the parameters and values used for the data set, and the citation of the specification for the algorithms that describe the mathematical relationship between the Earth and the plane or developable surface for the projection. Type: text, Domain: free text, Tag Name: OTHERPJDEF, Tag Value: 3431

7.4.1.2.2. Grid Coordinate System -- a plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates. Type: compound, Tag Name: GRIDCRDSYS, Tag Value: 3432

7.4.1.2.2.1. Grid Coordinate System Name -- name of the grid coordinate system. Type: text, Domain: "Universal Transverse Mercator" "Universal Polar Stereographic" "State Plane Coordinate System 1927" "State Plane Coordinate System 1983" "ARC Coordinate System" "other grid system", Tag Name: GRIDCSYSNM, Tag Value: 3433

7.4.1.2.2.2. Universal Transverse Mercator (UTM) -- a grid system based on the transverse mercator projection, applied between latitudes 84 degrees north and 80 degrees south on the Earth's surface. Type: compound, Tag Name: UTMGRDINFO, Tag Value: 3434

7.4.1.2.2.2.1. UTM Zone Number -- identifier for the UTM zone. Type: integer, Domain: $1 \leq \text{UTM Zone Number} \leq 60$ for the northern hemisphere; $-60 \leq \text{UTM Zone Number} \leq -1$ for the southern hemisphere, Tag Name: UTMZONENUM, Tag Value: 3435

7.4.1.2.2.3. Universal Polar Stereographic (UPS) -- a grid system based on the polar stereographic projection, applied to the Earth's polar regions north of 84 degrees north and south of 80 degrees south. Type: compound, Tag Name: UPSGRDINFO, Tag Value: 3436

7.4.1.2.2.3.1. UPS Zone Identifier -- identifier for the UPS zone. Type: text, Domain: "A" "B" "Y" "Z", Tag Name: UPSZONEID, Tag Value: 3437

7.4.1.2.2.4. State Plane Coordinate System (SPSC) -- a plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey. Type: compound, Tag Name: SPCSINFO, Tag Value: 3438

7.4.1.2.2.4.1. SPCS Zone Identifier -- identifier for the SPCS zone. Type: text, Domain: Four-digit numeric codes for the State Plane Coordinate Systems based on the North American Datum of 1927 are found in Department of Commerce, 1986, Representation of geographic point locations for information interchange (Federal Information Processing Standard 70-1): Washington: Department of Commerce, National Institute of Standards and Technology. Codes for the State Plane Coordinate Systems based on the North American Datum of 1983 are found in Department of Commerce, 1989 (January), State Plane Coordinate System of 1983 (National Oceanic and Atmospheric Administration Manual NOS NGS 5): Silver Spring, Maryland, National Oceanic and Atmospheric Administration, National Ocean Service, Coast and Geodetic Survey., Tag Name: SPCSZONEID, Tag Value: 3439

7.4.1.2.2.5. ARC Coordinate System -- the Equal Arc-second Coordinate System, a plane-rectangular coordinate system established in Department of Defense, 1990, Military specification ARC Digitized Raster Graphics (ADRG) (MIL-A-89007): Philadelphia, Department of Defense, Defense Printing Service Detachment Office. Type: compound, Tag Name: ADRGCSYS, Tag Value: 3440

7.4.1.2.2.5.1. ARC System Zone Identifier -- identifier for the ARC Coordinate System Zone. Type: integer, Domain: $1 \leq \text{ARC System Zone Identifier} \leq 18$, Tag Name: ADRGZONEID, Tag Value: 3441

7.4.1.2.2.6. Other Grid System's Definition -- a complete description of a grid system, not defined elsewhere in this standard, that was used for the data set. The information provided shall include the name of the grid system, the names of the parameters and values used for the data set, and the citation of the specification for the algorithms that describe the mathematical relationship between the Earth and the coordinates of the grid system. Type: text, Domain: free text, Tag Name: OTHRGRDDEF, Tag Value: 3442

7.4.1.2.3. Local Planar -- any right-handed planar coordinate system of which the z-axis coincides with a plumb line through the origin that locally is aligned with the surface of the Earth. Type: compound, Tag Name: LOCALPLANR, Tag Value: 3443

7.4.1.2.3.1. Local Planar Description -- a description of the local planar system. Type: text, Domain: free text, Tag Name: LCLPLNRDES, Tag Value: 3444

7.4.1.2.3.2. Local Planar Georeference Information -- a description of the information provided to register the local planar system to the Earth (e.g. control points, satellite ephemeral data, inertial navigation data). Type: text, Domain: free text, Tag Name: LCLPLNRGEO, Tag Value: 3445

7.4.1.2.4. Planar Coordinate Information -- information about the coordinate system developed on the planar surface Type: compound, Tag Name: PLNRCDINFO, Tag Value: 3446

7.4.1.2.4.1. Planar Coordinate Encoding Method -- the means used to represent horizontal positions. Type: text, Domain: "coordinate pair" "distance and bearing" "row and column", Tag Name: PLNRENCMTH, Tag Value: 3447

7.4.1.2.4.2. Coordinate Representation -- the method of encoding the position of a point by measuring its distance from perpendicular reference axes (the "coordinate pair" and "row and column" methods). Type: compound, Tag Name: COORDREPRS, Tag Value: 3448

7.4.1.2.4.2.1. Abscissa Resolution -- the (nominal) minimum distance between the "x" or column values of two adjacent points, expressed in Planar Distance Units of measure. Type: real, Domain: Abscissa Resolution > 0.0, Tag Name: ABSCARESOL, Tag Value: 3449

7.4.1.2.4.2.2. Ordinate Resolution -- the (nominal) minimum distance between the "y" or row values of two adjacent points, expressed in Planar Distance Units of measure. Type: real, Domain: Ordinate Resolution > 0.0, Tag Name: ORDINRESOL, Tag Value: 3450

7.4.1.2.4.3. Distance and Bearing Representation -- a method of encoding the position of a point by measuring its distance and direction (azimuth angle) from another point. Type: compound, Tag Name: DSTBRGREPR, Tag Value: 3451

7.4.1.2.4.3.1. Distance Resolution -- the minimum distance measurable between two points, expressed Planar Distance Units of measure. Type: real, Domain: Distance Resolution > 0.0, Tag Name: DISTRESOL, Tag Value: 3452

7.4.1.2.4.3.2. Bearing Resolution -- the minimum angle measurable between two points, expressed in Bearing Units of measure. Type: real, Domain: Bearing Resolution > 0.0, Tag Name: BRNGRESOL, Tag Value: 3453

7.4.1.2.4.3.3. Bearing Units -- units of measure used for angles. Type: text, Domain: "Decimal degrees" "Decimal minutes" "Decimal seconds" "Degrees and decimal minutes" "Degrees, minutes, and decimal seconds" "Radians" "Grads", Tag Name: BRNGUNITS, Tag Value: 3454

7.4.1.2.4.3.4. Bearing Reference Direction -- direction from which the bearing is measured. Type: text, Domain: "North" "South", Tag Name: BRNGREFDIR, Tag Value: 3455

7.4.1.2.4.3.5. Bearing Reference Meridian -- axis from which the bearing is measured. Type: text, Domain: "Assumed" "Grid" "Magnetic" "Astronomic" "Geodetic", Tag Name: BRNGREFMER, Tag Value: 3456

7.4.1.2.4.4. Planar Distance Units -- units of measure used for distances. Type: text, Domain: "meters" "international feet" "survey feet" free text, Tag Name: PLNRDSTUNT, Tag Value: 3457

7.4.1.3. Local -- a description of any coordinate system that is not aligned with the surface of the Earth. Type: compound, Tag Name: LCLCRDSYS, Tag Value: 3458

7.4.1.3.1. Local Description -- a description of the coordinate system and its orientation to the surface of the Earth. Type: text, Domain: free text, Tag Name: LOCALDESCR, Tag Value: 3459

7.4.1.3.2. Local Georeference Information -- a description of the information provided to register the local system to the Earth (e.g. control points, satellite ephemeral data, inertial navigation data). Type: text, Domain: free text, Tag Name: LCLGEOINFO, Tag Value: 3460

7.4.1.4. Geodetic Model -- parameters for the shape of the earth. Type: compound, Tag Name: GEODMODEL, Tag Value: 3461

7.4.1.4.1. Horizontal Datum Name -- the identification given to the reference system used for defining the coordinates of points. Type: text, Domain: "North American Datum of 1927" "North American Datum of 1983" free text, Tag Name: HORDTMNAME, Tag Value: 3462

7.4.1.4.2. Ellipsoid Name -- identification given to established representations of the Earth's shape. Type: text, Domain: "Clarke 1866" "Geodetic Reference System 80" free text, Tag Name: ELLPSDNAME, Tag Value: 3463

7.4.1.4.3. Semi-major Axis -- radius of the equatorial axis of the ellipsoid. Type: real, Domain: Semi-major Axis > 0.0, Tag Name: SMIMJRAXIS, Tag Value: 3464

7.4.1.4.4. Denominator of Flattening Ratio -- the denominator of the ratio of the difference between the equatorial and polar radii of the ellipsoid when the numerator is set to 1. Type: real, Domain: Denominator of Flattening > 0.0, Tag Name: DENOMFLATR, Tag Value: 3465

7.4.2. Vertical Coordinate System Definition -- the reference frame or system from which vertical distances (altitudes or depths) are measured. Type: compound, Tag Name: VERTCSYSD, Tag Value: 3466

7.4.2.1. Altitude System Definition -- the reference frame or system from which altitudes (elevations) are measured. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173. Type: compound, Tag Name: ALTSYSDEF, Tag Value: 3467

7.4.2.1.1. Altitude Datum Name -- the identification given to the level surface taken as the surface of reference from which altitudes are measured. Type: text, Domain: "National Geodetic Vertical Datum of 1929" "North American Vertical Datum of 1988" free text, Tag Name: ALTDTMNAME, Tag Value: 3468

7.4.2.1.2. Altitude Resolution -- the minimum distance possible between two adjacent altitude values, expressed in Altitude Distance Units of measure. Type: real, Domain: Altitude Resolution > 0.0, Tag Name: ALTRESOL, Tag Value: 3469

7.4.2.1.3. Altitude Distance Units -- units in which altitudes are recorded. Type: text, Domain: "meters" "feet" free text, Tag Name: ALTDISTUNT, Tag Value: 3470

7.4.2.1.4. Altitude Encoding Method -- the means used to encode the altitudes. Type: text, Domain: "Explicit elevation coordinate included with horizontal coordinates" "Implicit coordinate" "Attribute values", Tag Name: ALTENCMTHD, Tag Value: 3471

7.4.2.2. Depth System Definition -- the reference frame or system from which depths are measured. Type: compound, Tag Name: DPTHYSYSD, Tag Value: 3472

7.4.2.2.1. Depth Datum Name -- the identification given to surface of reference from which depths are measured. Type: text, Domain: "Local surface" "Chart datum; datum for sounding reduction" "Lowest astronomical tide" "Highest astronomical tide" "Mean low water" "Mean high water" "Mean sea level" "Land survey datum" "Mean low water springs" "Mean high water springs" "Mean low water neap" "Mean high water neap" "Mean lower low water" "Mean lower low water springs" "Mean higher high water" "Mean higher low water" "Mean lower high water" "Spring tide" "Tropic lower low water" "Neap tide" "High water" "Higher high water" "Low water" "Low-water datum" "Lowest low water" "Lower low water" "Lowest normal low water" "Mean tide level" "Indian spring low water" "High-water full and charge" "Low-water full and charge" "Columbia River datum" "Gulf Coast low water datum" "Equatorial springs low water" "Approximate lowest astronomical tide" "No correction" free text, Tag Name: DPTHDTMNME, Tag Value: 3473

7.4.2.2.2. Depth Resolution -- the minimum distance possible between two adjacent depth values, expressed in Depth Distance Units of measure. Type: real, Domain: Depth Resolution > 0.0, Tag Name: DPTHRESOL, Tag Value: 3474

7.4.2.2.3. Depth Distance Units -- units in which depths are recorded. Type: text, Domain: "meters" "feet" free text, Tag Name: DPTHSTUNS, Tag Value: 3475

7.4.2.2.4. Depth Encoding Method -- the means used to encode depths. Type: text, Domain: "Explicit depth coordinate included with horizontal coordinates" "Implicit coordinate" "Attribute values", Tag Name: DPTHENCMTD, Tag Value: 3476

7.5. Entity and Attribute Information -- information about the information content of the data set, including the entities types, their attributes, and the, Domains from which attribute values may be assigned. Type: compound, Tag Name: ENTATTINFO, Tag Value: 3500

7.5.1. Detailed Description -- description of the entities, attributes, attribute values, and related characteristics encoded in the data set. Type: compound, Tag Name: ENTATTDESC, Tag Value: 3501

7.5.1.1. Entity Type -- the definition and description of a set into which similar entity instances are classified. Type: compound, Tag Name: ENTITYTYPE, Tag Value: 3502

7.5.1.1.1. Entity Type Label -- the name of the entity type. Type: text, Domain: free text, Tag Name: ENTTYPELAB, Tag Value: 3503

7.5.1.1.2. Entity Type Definition -- the description of the entity type. Type: text, Domain: free text, Tag Name: ENTTYPEDEF, Tag Value: 3504

7.5.1.1.3. Entity Type Definition Source -- the authority of the definition. Type: text, Domain: free text, Tag Name: ENTTPDFSRC, Tag Value: 3505

7.5.1.2. Attribute -- a defined characteristic of an entity. Type: compound, Tag Name: ATTRIBUTE, Tag Value: 3506

7.5.1.2.1. Attribute Label -- the name of the attribute. Type: text, Domain: free text, Tag Name: ATTRLABEL, Tag Value: 3507

7.5.1.2.2. Attribute Definition -- the description of the attribute. Type: text, Domain: free text, Tag Name: ATTRIBDEF, Tag Value: 3508

7.5.1.2.3. Attribute Definition Source -- the authority of the definition. Type: text, Domain: free text, Tag Name: ATTRDEFSRC, Tag Value: 3509

7.5.1.2.4. Attribute Domain Values -- the valid values that can be assigned for an attribute. Type: compound, Tag Name: ATTRDOMVAL, Tag Value: 3510

7.5.1.2.4.1. Enumerated Domain -- the members of an established set of valid values. Type: compound, Tag Name: ENUMDOMAIN, Tag Value: 3511

7.5.1.2.4.1.1. Enumerated Domain Value -- the name or label of a member of the set. Type: text, Domain: free text, Tag Name: ENUMDOMVAL, Tag Value: 3512

7.5.1.2.4.1.2. Enumerated Domain Value Definition -- the description of the value. Type: text, Domain: free text, Tag Name: ENUMDVDEF, Tag Value: 3513

7.5.1.2.4.1.3. Enumerated Domain Value Definition Source -- the authority of the definition. Type: text, Domain: free text, Tag Name: ENUMDVDSRC, Tag Value: 3514

7.5.1.2.4.2. Range Domain -- the minimum and maximum values of a continuum of valid values. Type: compound, Tag Name: RANGEDOM, Tag Value: 3515

7.5.1.2.4.2.1. Range Domain Minimum -- the least value that the attribute can be assigned. Type: text, Domain: free text, Tag Name: RANGEDMMIN, Tag Value: 3516

7.5.1.2.4.2.2. Range Domain Maximum -- the greatest value that the attribute can be assigned. Type: text, Domain: free text, Tag Name: RANGEDMMAX, Tag Value: 3517

7.5.1.2.4.3. Codeset Domain -- reference to a standard or list which contains the members of an established set of valid values. Type: compound, Tag Name: CODESETDOM, Tag Value: 3518

7.5.1.2.4.3.1. Codeset Name -- the title of the codeset. Type: text, Domain: free text, Tag Name: CODESETNAM, Tag Value: 3519

7.5.1.2.4.3.2. Codeset Source -- the authority for the codeset. Type: text, Domain: free text, Tag Name: CODESETSRC, Tag Value: 3520

7.5.1.2.4.4. Unrepresentable Domain -- description of the values and reasons why they cannot be represented. Type: text, Domain: free text, Tag Name: UNREPDMAIN, Tag Value: 3521

7.5.1.2.5. Attribute Units of Measurement -- the standard of measurement for an attribute value. Type: text, Domain: free text, Tag Name: ATTUNITMES, Tag Value: 3522

7.5.1.2.6. Attribute Measurement Resolution -- the smallest unit increment to which an attribute value is measured. Type: real, Domain: Attribute Measurement Resolution > 0.0, Tag Name: ATTMEASRES, Tag Value: 3523

7.5.1.2.7. Beginning Date of Attribute Values -- earliest or only date for which the attribute values are current. In cases when a range of dates are provided, this is the earliest date for which the information are valid. Type: date, Domain: free date, Tag Name: BEGDATEATT, Tag Value: 3524

7.5.1.2.8. Ending Date of Attribute Values -- latest date for which the information are current. Used in cases when a range of dates are provided. Type: date, Domain: free date, Tag Name: ENDDATEATT, Tag Value: 3525

7.5.1.2.9. Attribute Value Accuracy Information -- an assessment of the accuracy of the assignment of attribute values. Type: compound, Tag Name: ATTVLAINFO, Tag Value: 3526

7.5.1.2.9.1. Attribute Value Accuracy -- an estimate of the accuracy of the assignment of attribute values. Type: real, Domain: free real, Tag Name: ATTVVALACCY, Tag Value: 3527

7.5.1.2.9.2. Attribute Value Accuracy Explanation -- the definition of the Attribute Value Accuracy measure and units, and a description of how the estimate was derived. Type: text, Domain: free text, Tag Name: ATTVALACCE, Tag Value: 3528

7.5.1.2.10. Attribute Measurement Frequency -- the frequency with which attribute values are added. Type: real, Domain: "Unknown" "As needed" "Irregular" "None planned" free text, Tag Name: ATTMEASFRQ, Tag Value: 3529

7.5.2. Overview Description -- summary of, and citation to detailed description of, the information content of the data set. Type: compound, Tag Name: OVERVWDESC, Tag Value: 3530

7.5.2.1. Entity and Attribute Overview -- detailed summary of the information contained in a data set. Type: text, Domain: free text, Tag Name: ENTATTOVRV, Tag Value: 3531

7.5.2.2. Entity and Attribute Detail Citation -- reference to the complete description of the entity types, attributes, and attribute values for the data set. Type: text, Domain: free text, Tag Name: ENTATTDETC, Tag Value: 3532

7.6. Distribution Information -- information about the distributor of and options for obtaining the data set. Type: compound, Tag Name: DISTRBINFO, Tag Value: 3600

7.6.1. Distributor -- the party from whom the data set may be obtained. Type: compound, Tag Name: DISTRBUTOR, Tag Value: 3601

7.6.2. Resource Description -- the identifier by which the distributor knows the data set. Type: text, Domain: free text, Tag Name: RESRCDESCR, Tag Value: 3602

7.6.3. Distribution Liability -- statement of the liability assumed by the distributor. Type: text, Domain: free text, Tag Name: DISTRLIABL, Tag Value: 3603

7.6.4. Standard Order Process -- the common ways in which the data set may be obtained or received, and related instructions and fee information. Type: compound, Tag Name: STDORDPROC, Tag Value: 3604

7.6.4.1. Non-digital Form -- the description of options for obtaining the data set on non- computer-compatible media. Type: text, Domain: free text, Tag Name: NONDIGFORM, Tag Value: 3605

7.6.4.2. Digital Form -- the description of options for obtaining the data set on computer- compatible media. Type: compound, Tag Name: DIGITLFORM, Tag Value: 3606

7.6.4.2.1. Digital Transfer Information - description of the form of the data to be distributed. Type: compound, Tag Name: DIGTFRINFO, Tag Value: 3607

7.6.4.2.1.1. Format Name -- the name of the data transfer format. Type: text, Domain: domain values from the table below; free text, Tag Name: FORMATNAME, Tag Value: 3608 "ARCE" ARC/INFO Export format "ARCG" ARC/INFO Generate format "ASCII" ASCII file, formatted for text attributes, declared format "BIL" Imagery, band interleaved by line "BIP" Imagery, band interleaved by pixel "BSQ" Imagery, band interleaved sequential "CDF" Common Data Format "CFF" Cartographic Feature File (U.S. Forest Service) "COORD" User-created coordinate file, declared format "DEM" Digital Elevation Model format (U.S. Geological Survey) "DFAD" Digital Feature Analysis Data (Defense Mapping Agency) "DGN" Microstation format (Intergraph Corporation) "DIGEST" Digital Geographic Information Exchange Standard "DLG" Digital Line Graph (U.S. Geological Survey) "DTED" Digital Terrain Elevation Data (MIL-D- 89020 "DWG" AutoCAD Drawing format "DX90" Data Exchange '90 "DXF" AutoCAD Drawing Exchange Format "ERDAS" ERDAS image files (ERDAS Corporation) "GRASS" Geographic Resources Analysis Support System "HDF" Hierarchical Data Format "IGDS" Interactive Graphic Design System format (Intergraph Corporation) "IGES" Initial Graphics Exchange Standard "MOSS" Multiple Overlay Statistical System export file "netCDF" network Common Data Format "NITF" National Imagery Transfer Format "RPF" Raster Product Format (Defense Mapping Agency) "RVC" Raster Vector Converted format (MicroImages) "RVF" Raster Vector Format (MicroImages) "SDTS" Spatial Data Transfer Standard (Federal Information Processing Standard 173) "SIF" Standard Interchange Format (DOD Project 2851) "SLF" Standard Linear Format (Defense Mapping Agency) "TIFF", Tagged Image File Format "TGRLN" Topologically Integrated Geographic Encoding and Referencing (TIGER) Line format (Bureau of the Census) "VFP" Vector Product Format (Defense Mapping Agency)

7.6.4.2.1.2. Format Version Number -- version number of the format. Type: text, Domain: free text, Tag Name: FMTVERSNUM, Tag Value: 3609

7.6.4.2.1.3. Format Version Date -- date of the version of the format. Type: date, Domain: free date, Tag Name: FMTVERDATE, Tag Value: 3610

7.6.4.2.1.4. Format Specification -- name of a subset, profile, or product specification of the format. Type: text, Domain: free text, Tag Name: FORMATSPEC, Tag Value: 3611

7.6.4.2.1.5. Format Information Content -- description of the content of the data encoded in a format. Type: text, Domain: free text, Tag Name: FMTINFOCON, Tag Value: 3612

7.6.4.2.1.6. File Decompression Technique -- recommendations of algorithms or processes (including means of obtaining these algorithms or processes) that can be applied to read or expand data sets to which data compression techniques have been applied. Type: text, Domain: "No compression applied" free text, Tag Name: FILEDECOMP, Tag Value: 3613

7.6.4.2.1.7. Transfer Size -- the size, or estimated size, of the transferred data set in megabytes. Type: real, Domain: Transfer Size > 0.0, Tag Name: TRNSFRSIZE, Tag Value: 3614

7.6.4.2.2. Digital Transfer Option -- the means and media by which a data set is obtained from the distributor. Type: compound, Tag Name: DIGTFROPTN, Tag Value: 3615

7.6.4.2.2.1. Online Option -- information required to directly obtain the data set electronically. Type: compound, Tag Name: ONLINEOPTN, Tag Value: 3616

7.6.4.2.2.1.1. Computer Contact Information -- instructions for establishing communications with the distribution computer. Type: compound, Tag Name: CMPCONINFO, Tag Value: 3617

7.6.4.2.2.1.1.1. Network Address -- the electronic address from which the data set can be obtained from the distribution computer. Type: compound, Tag Name: NETWRKADDR, Tag Value: 3618

7.6.4.2.2.1.1.1.1. Network Resource Name -- the name of the file or service from which the data set can be obtained. Type: text, Domain: free text, Tag Name: NETWRKRNAME, Tag Value: 3619

7.6.4.2.2.1.1.2. Dialup Instructions -- information required to access the distribution computer remotely through telephone lines. Type: compound, Tag Name: DIALUPINST, Tag Value: 3620

7.6.4.2.2.1.1.2.1. Lowest BPS -- lowest or only speed for the connection's communication, expressed in bits per second. Type: integer, Domain:Lowest BPS >= 110, Tag Name: LOWESTBPS, Tag Value: 3621

7.6.4.2.2.1.1.2.2. Highest BPS -- highest speed for the connection's communication, expressed in bits per second. Used in cases when a range of rates are provided. Type: integer, Domain:Highest BPS > Lowest BPS, Tag Name: HIGHESTBPS, Tag Value: 3622

7.6.4.2.2.1.1.2.3. Number DataBits -- number of data bits in each character exchanged in the communication. Type: integer, Domain:7 <= Number DataBits <= 8, Tag Name: DATABITS, Tag Value: 3623

7.6.4.2.2.1.1.2.4. Number StopBits -- number of stop bits in each character exchanged in the communication. Type: integer, Domain:1 <= Number StopBits <= 2, Tag Name: STOPBITS, Tag Value: 3624

7.6.4.2.2.1.1.2.5. Parity -- parity error checking used in each character exchanged in the communication. Type: text, Domain: "None" "Odd" "Even" "Mark" "Space", Tag Name: PARITY, Tag Value: 3625

7.6.4.2.2.1.1.2.6. Compression Support -- data compression available through the modem service to speed data transfer. Type: text, Domain: "V.32" "V.32bis" "V.42" "V.42bis" free text, Tag Name: COMPRAVAIL, Tag Value: 3626

7.6.4.2.2.1.1.2.7. Dialup Telephone -- the telephone number of the distribution computer. Type: text, Domain: free text, Tag Name: DUPHONENUM, Tag Value: 3627

7.6.4.2.2.1.1.2.8. Dialup File Name -- the name of a file containing the data set on the distribution computer. Type: text, Domain: free text, Tag Name: DUFILNAME, Tag Value: 3628

7.6.4.2.2.1.2. Access Instructions -- instructions on the steps required to access the data set. Type: text, Domain: free text, Tag Name: ACCESSINST, Tag Value: 3629

7.6.4.2.2.1.3. Online Computer and Operating System -- the brand of distribution computer and its operating system. Type: text, Domain: free text, Tag Name: ONLNCMPTOS, Tag Value: 3630

7.6.4.2.2.2. Offline Option -- information about media-specific options for receiving the data set. Type: compound, Tag Name: OFFLINEOPT, Tag Value: 3631

7.6.4.2.2.2.1. Offline Media -- name of the media on which the data set can be received. Type: text, Domain: "CD-ROM" "3-1/2 inch floppy disk" "5-1/4 inch floppy disk" "9-track tape" "4 mm cartridge tape" "8 mm cartridge tape" "1/4-inch cartridge tape" free text, Tag Name: OFFLNMEDIA, Tag Value: 3632

7.6.4.2.2.2.2. Recording Capacity -- the density of information to which data are written. Used in cases where different recording capacities are possible. Type: compound, Tag Name: RCRDGCAPAC, Tag Value: 3633

7.6.4.2.2.2.2.1. Recording Density -- the density in which the data set can be recorded. Type: real, Domain: Recording Density > 0.0, Tag Name: RCRDGDNSTY, Tag Value: 3634

7.6.4.2.2.2.2.2. Recording Density Units -- the units of measure for the recording density. Type: text, Domain: free text, Tag Name: RCRDGDNSUN, Tag Value: 3635

7.6.4.2.2.2.3. Recording Format -- the options available or method used to write the data set to the medium. Type: text, Domain: "cpio" "tar" "High Sierra" "ISO 9660" "ISO 9660 with Rock Ridge extensions" "ISO 9660 with Apple HFS extensions" free text, Tag Name: RCRDGFORMT, Tag Value: 3636

7.6.4.2.2.4. Compatibility Information --- description of other limitations or requirements for using the medium. Type: text, Domain: free text, Tag Name: COMPTBINFO, Tag Value: 3637

7.6.4.3. Fees -- the fees and terms for retrieving the data set. Type: text, Domain: free text, Tag Name: FEES, Tag Value: 3638

7.6.4.4. Ordering Instructions -- general instructions and advice about, and special terms and services provided for, the data set by the distributor. Type: text, Domain: free text, Tag Name: ORDERINSTR, Tag Value: 3639

7.6.4.5. Turnaround -- typical turnaround time for the filling of an order. Type: text, Domain: free text, Tag Name: TURNAROUND, Tag Value: 3640

7.6.5. Custom Order Process -- description of custom distribution services available, and the terms and conditions for obtaining these services. Type: text, Domain: free text, Tag Name: CUSTORDRPR, Tag Value: 3641

7.6.6. Technical Prerequisites -- description of any technical capabilities that the consumer must have to use the data set in the form(s) provided by the distributor. Type: text, Domain: free text, Tag Name: TECHPREREQ, Tag Value: 3642

7.6.7. Available Time Period -- the time period when the data set will be available from the distributor. Type: compound, Tag Name: AVAILTMPRD, Tag Value: 3643

7.7. Metadata Reference Information -- information on the currentness of the metadata information, and the responsible party. Type: compound, Tag Name: METAREFRNC, Tag Value: 3700

7.7.1. Metadata Date -- the date that the metadata were created or last updated. Type: date, Domain: free date, Tag Name: METADATE, Tag Value: 3701

7.7.2. Metadata Review Date -- the date of the latest review of the metadata entry. Type: date, Domain: free date; Metadata Review Date later than Metadata Date, Tag Name: METARVWDAT, Tag Value: 3702

7.7.3. Metadata Future Review Date -- the date by which the metadata entry should be reviewed. Type: date, Domain: free date; Metadata Future Review Date later than Metadata Review Date, Tag Name: METAFRVWDT, Tag Value: 3703

7.7.4. Metadata Contact -- the party responsible for the metadata information. Type: compound, Tag Name: METACONTCT, Tag Value: 3704

7.7.5. Metadata Standard Name -- the name of the metadata standard used to document the data set. Type: text, Domain: "FGDC Content Standards for Digital Geospatial Metadata" free text, Tag Name: METASTDNAM, Tag Value: 3705

7.7.6. Metadata Standard Version -- identification of the version of the metadata standard used to document the data set. Type: text, Domain: free text, Tag Name: METASTDVRN, Tag Value: 3706

7.7.7. Metadata Time Convention -- form used to convey time of day information in the metadata entry. Used if time of day information is included in the metadata for a data set. Type: text, Domain: "local time" "local time with time differential factor" "universal time", Tag Name: METADATECV, Tag Value: 3707

7.7.8. Metadata Access Constraints -- restrictions and legal prerequisites for accessing the metadata. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the metadata. Type: text, Domain: free text, Tag Name: METAACCCNS, Tag Value: 3708

7.7.9. Metadata Use Constraints -- restrictions and legal prerequisites for using the metadata after access is granted. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the metadata. Type: text, Domain: free text, Tag Name: METAUSECNS, Tag Value: 3709

7.7.10. Metadata Security Information -- handling restrictions imposed on the metadata because of national security, privacy, or other concerns. Type: compound, Tag Name: METASECINF, Tag Value: 3710

7.7.10.1. Metadata Security Classification System -- name of the classification system for the metadata. Type: text, Domain: free text, Tag Name: METASECSYS, Tag Value: 3711

7.7.10.2. Metadata Security Classification -- name of the handling restrictions on the metadata. Type: text, Domain: "Top secret" "Secret" "Confidential" "Restricted" "Unclassified" "Sensitive" free text, Tag Name: METASECCLS, Tag Value: 3712

7.7.10.3. Metadata Security Handling Description -- additional information about the restrictions on handling the metadata. Type: text, Domain: free text, Tag Name: METASECHND, Tag Value: 3713

7.8. Citation Information -- the recommended reference to be used for the data set. (Note: this section provides a means of stating the citation of a data set, and is used by other sections of the metadata standard. This section is never used alone.) Type: compound, Tag Name: CITATNINFO, Tag Value: 3800

7.8.1. Originator -- the name of the organization or individual that developed the data set. If the names of editors or compilers are provided, the names must be followed by "(ed.)" ("(eds.)" is the plural form) or "(comp.)" ("(comps.)" is the plural form) respectively. Type: text, Domain: "Unknown" free text, Tag Name: ORIGINATOR, Tag Value: 1003 (bib1)

7.8.2. Publication Date -- the date when the data set is published or otherwise made available for release. Type: date, Domain: "Unknown" "Unpublished material" free date, Tag Name: PUBLCONDATE, Tag Value: 31 (bib1)

7.8.3. Publication Time -- the time of day when the data set is published or otherwise made available for release. Type: time, Domain: "Unknown" free time, Tag Name: PUBLCNTIME, Tag Value: 3803

7.8.4. Title -- the name by which the data set is known. Type: text, Domain: free text, Tag Name: THETITLE, Tag Value: 4 (bib1)

7.8.5. Edition -- the version of the title. Type: text., Domain: free text., Tag Name: EDITION., Tag Value: 3815

7.8.6. Geospatial Data Presentation Form -- the mode in which the geospatial data are represented. Type: text, Domain: (the, Domain is from pp. 88-91 in Anglo-American Committee on Cataloguing of Cartographic Materials, 1982.) "atlas" "diagram" "globe" "map" "model" "profile" "remote-sensing image" "section" "view", Tag Name: TYPEOFMAP, Tag Value: 3805

7.8.7. Series Information -- the identification of the serial publication of which the data set is a part. Type: compound, Tag Name: SERIESINFO, Tag Value: 3806

7.8.7.1. Series Name -- the name of the serial publication of which the data set is a part. Type: text, Domain: free text, Tag Name: SERIESNAME, Tag Value: 5 (bib1)

7.8.7.2. Issue Identification -- information identifying the issue of the serial publication of which the data set is a part. Type: text, Domain: free text, Tag Name: ISSUEIDENT, Tag Value: 3808

7.8.8. Publication Information -- publication details for published data sets. Type: compound, Tag Name: PUBLCNINFO, Tag Value: 3809

7.8.8.1. Publication Place -- the name of the city (and state or province, and country, if needed to identify the city) where the data set was published or released. Type: text, Domain: free text, Tag Name: PUBLPLACE, Tag Value: 59 (bib1)

7.8.8.2. Publisher -- the name of the individual or organization that published the data set. Type: text, Domain: free text, Tag Name: PUBLISHER, Tag Value: 1018 (bib1)

7.8.9. Other Citation Details -- other information required to complete the citation. Type: text, Domain: free text, Tag Name: OTHCITINFO, Tag Value: 3812

7.8.10. Online Linkage -- the name of an online computer resource that contains the data set. Entries should follow the Uniform Resource Locator convention of the Internet. Type: text, Domain: free text, Tag Name: ONLINELINK, Tag Value: 3813

7.8.11. Larger Work Citation -- the information identifying a larger work in which the data set is included. Type: compound, Tag Name: LGRWRKCITN, Tag Value: 3814

7.9. Time Period Information -- information about the date and time of an event. (Note: this section provides a means of stating temporal information, and is used by other sections of the metadata standard. This section is never used alone.) Type: compound, Tag Name: TIMEPDINFO, Tag Value: 3900

7.9.1. Single Date/Time -- means of encoding a single date and time. Type: compound, Tag Name: SNGLDETIME, Tag Value: 3902

7.9.1.1. Calendar Date -- the year (and optionally month, or month and day). Type: date, Domain: "Unknown" free date, Tag Name: CALNDRDATE, Tag Value: 3903

7.9.1.2. Time of Day -- the hour (and optionally minute, or minute and second) of the day. Type: time, Domain: "Unknown" free time, Tag Name: TIMEOFDAY, Tag Value: 3904

7.9.2. Multiple Dates/Times -- means of encoding multiple individual dates and times. Type: compound, Tag Name: MULTDETIME, Tag Value: 3905

7.9.3. Range of Dates/Times -- means of encoding a range of dates and times. Type: compound, Tag Name: RANGEDETIME, Tag Value: 3906

7.9.3.1. Beginning Date -- the first year (and optionally month, or month and day) of the event. Type: date, Domain: "Unknown" free date, Tag Name: BEGINDATE, Tag Value: 3907

7.9.3.2. Beginning Time -- the first hour (and optionally minute, or minute and second) of the day for the event. Type: time, Domain: "Unknown" free time, Tag Name: BEGINTIME, Tag Value: 3908

7.9.3.3. Ending Date -- the last year (and optionally month, or month and day) for the event. Type: date, Domain: "Unknown" "Present" free date, Tag Name: ENDINGDATE, Tag Value: 3909

7.9.3.4. Ending Time -- the last hour (and optionally minute, or minute and second) of the day for the event. Type: time, Domain: "Unknown" free time, Tag Name: ENDINGTIME, Tag Value: 3910

7.10. Contact Information -- Identity of, and means to communicate with, person(s) and organization(s) associated with the data set. (Note: this section provides a means of identifying individuals and organizations, and is used by other sections of the metadata standard. This section is never used alone.) Type: compound, Tag Name: CNTACTINFO, Tag Value: 3000

7.10.1. Contact Person Primary -- the person, and the affiliation of the person, associated with the data set. Used in cases where the association of the person to the data set is more significant than the association of the organization to the data set. Type: compound, Tag Name: CNTCTPERSP, Tag Value: 3001

7.10.1.1. Contact Person -- the name of the individual to which the contact type applies. Type: text, Domain: free text, Tag Name: CNTCTPERSN, Tag Value: 3002

7.10.1.2. Contact Organization -- the name of the organization to which the contact type applies. Type: text, Domain: free text, Tag Name: CONTACTORG, Tag Value: 3003

7.10.2. Contact Organization Primary -- the organization, and the member of the organization, associated with the data set. Used in cases where the association of the organization to the data set is more significant than the association of the person to the data set. Type: compound, Tag Name: CNTACTORGP, Tag Value: 3004

7.10.3. Contact Position -- the title of individual. Type: text, Domain: free text, Tag Name: CONTACTPOS, Tag Value: 3005

7.10.4. Contact Address -- the address for the organization or individual. Type: compound, Tag Name: CONTACTADD, Tag Value: 3006

7.10.4.1. Address Type -- the information provided by the address. Type: text, Domain: "mailing address" "physical address" "mailing and physical address", Tag Name: ADDRESTYPE, Tag Value: 3007

7.10.4.2. Address -- an address line for the address. Type: text, Domain: free text, Tag Name: ADDRESS, Tag Value: 3008

7.10.4.3. City -- the city of the address. Type: text, Domain: free text, Tag Name: CITY, Tag Value: 3009

7.10.4.4. State or Province -- the state or province of the address. Type: text, Domain: free text, Tag Name: STATEPRVNC, Tag Value: 3010

7.10.4.5. Postal Code -- the ZIP or other postal code of the address. Type: text, Domain: free text, Tag Name: POSTALCODE, Tag Value: 3011

7.10.4.6. Country -- the country of the address. Type: text, Domain: free text, Tag Name: COUNTRY, Tag Value: 3012

7.10.5. Contact Voice Telephone -- the telephone number by which individuals can speak to the organization or individual. Type: text, Domain: free text, Tag Name: CONTACTVPH, Tag Value: 3013

7.10.6. Contact TDD/TTY Telephone -- the telephone number by which hearing-impaired individuals can contact the organization or individual. Type: text, Domain: free text, Tag Name: CONTACTTPH, Tag Value: 3014

7.10.7. Contact Facsimile Telephone -- the telephone number of a facsimile machine of the organization or individual. Type: text, Domain: free text, Tag Name: CONTACTFPH, Tag Value: 3015

7.10.8. Contact Electronic Mail Address -- the address of the electronic mailbox of the organization or individual. Type: text, Domain: free text, Tag Name: CNTCTEMAIL, Tag Value: 3016

7.10.9. Hours of Service -- time period when individuals can speak to the organization or individual. Type: text, Domain: free text, Tag Name: HOURSOF SVC, Tag Value: 3017

7.10.10. Contact Instructions -- supplemental instructions on how or when to contact the individual or organization. Type: text, Domain: free text, Tag Name: CNTCTINSTR, Tag Value: 3018

8. Metadata Content Syntax

The dependencies and optionality of the geospatial metadata elements from Section 7 are described in this section using the following production rules using Yourdan syntax.

8.1. Production Rule Definitions

A production rule specifies the relationship between a compound element, and data elements and other (lower-level) compound elements. Each production rule has a left side (identifier) and a right side (expression) connected by the symbol “=”, meaning that the term on the left side is replaced by or produces the term on the right side. Terms on the right side are either other compound elements or individual data elements. By making substitutions using matching terms in the production rules, one can explain higher-level concepts using data elements.

The symbols used in the production rules have the following meaning:

<u>Symbol</u>	<u>Meaning</u>
=	is replaced by, produces, consists of
+	and
[]	selection - select one term from the list of enclosed terms (exclusive or). Terms are separated by “ ”.
m{ }n	iteration - the term(s) enclosed is(are) repeated from “m” to “n” times
()	optional - the term(s) enclosed is(are) optional

Examples:

a = b + c “a consists of b and c”

a = [b | c] “a consists of one of b or c”

a = 4{b}6 “a consists of four to six occurrences of b”

a = b + (c) “a consists of b and optionally c”

8.2. Interpreting the production rules

The terms bounded by parentheses, (“ and “”), are optional and are provided at the discretion of the data producer. If a producer chooses to provide information enclosed by parentheses, the producer shall follow the production rules for the enclosed information. For example, if the producer decides to provide the optional information described in the term:

(a + b + c)

the producer shall provide a and b and c.

Only for terms bounded by parentheses does the producer have the discretion of deciding whether or not to provide the information.

The variation among the ways in which geospatial data are produced and distributed, the fact that all geospatial data do not have the same characteristics, and the issue that all details of data sets that are in work or are planned may not be decided, caused the need to express the concept of “mandatory if applicable.” This concept means that if the data set exhibits (or, for data sets that are in work or planned, it is known that the data set will exhibit) a defined characteristic, then the producer shall provide the information needed to describe that characteristic. This concept is described by the production rule:

0{ term }1

8.3. Metadata Production Rules

Metadata =

Identification_Information +
0{Data_Quality_Information}1 +
0{Spatial_Data_Organization_Information}1 +
0{Spatial_Reference_Information}1 +
0{Entity_and_Attribute_Information}1 +
0{Distribution_Information}1 +
Metadata_Reference_Information

Identification_Information =

Citation +
Description +
Time_Period_of_Content +
Status +
Spatial_Domain +
Keywords +
Access_Constraints +
Use_Constraints +
(Point_of_Contact) +
(1{Browse_Graphic}n) +
(Data_Set_Credit) +
(Security_Information) +
(Native_Data_Set_Environment) +
(1{(Cross_Reference)}n)

Citation =

Citation_Information (see section for production rules)

Description =

Abstract +
Purpose +
(Supplemental_Information)

Time_Period_of_Content =

Time_Period_Information + (see section for production rules)
Currentness_Reference

Status =
 Progress +
 Maintenance_and_Update_Frequency

Spatial_Domain =
 Bounding_Coordinates +
 (1{Data_Set_G-Polygon}n)

Bounding_Coordinates =
 West_Bounding_Coordinate +
 East_Bounding_Coordinate +
 North_Bounding_Coordinate +
 South_Bounding_Coordinate

Data_Set_G-Polygon =
 Data_Set_G-Polygon_Outer_G-Ring +
 0{Data_Set_G-Polygon_Exclusion_G-Ring}n

Data_Set_G-Polygon_Outer_G-Ring =
 4{G-Ring_Latitude +
 G-Ring_Longitude}n

Data_Set_G-Polygon_Exclusion_G-Ring =
 4{G-Ring_Latitude +
 G-Ring_Longitude}n

Keywords =
 Theme +
 (Place) +
 (Stratum) +
 (Temporal)

Theme =
 1{Theme_Keyword_Thesaurus +
 1{Theme_Keyword}n }n

Place =
 1{Place_Keyword_Thesaurus +
 1{Place_Keyword}n }n

Stratum =
 1{Stratum_Keyword_Thesaurus +
 1{Stratum_Keyword}n }n

Temporal =
 1{Temporal_Keyword_Thesaurus +
 1{Temporal_Keyword}n }n

Point_of_Contact =
 Contact_Information (see section for production rules)

Browse_Graphic =
 Browse_Graphic_File_Name +

Browse_Graphic_File_Description +
 Browse_Graphic_File_Type

Security_Information =
 Security_Classification_System +
 Security_Classification +
 Security_Handling_Description

Cross_Reference =
 Citation_Information (see section for production rules)

Data_Quality_Information =
 0{Attribute_Accuracy}1 +
 Logical_Consistency_Report +
 Completeness_Report +
 0{Positional_Accuracy}1 +
 Lineage +
 (Cloud_Cover)

Attribute_Accuracy =
 Attribute_Accuracy_Report +
 (1{Quantitative_Attribute_Accuracy_Assessment}n)

Quantitative_Attribute_Accuracy_Assessment =
 Attribute_Accuracy_Value +
 Attribute_Accuracy_Explanation

Positional_Accuracy =
 0{Horizontal_Positional_Accuracy}1 +
 0{Vertical_Positional_Accuracy}1

Horizontal_Positional_Accuracy =
 Horizontal_Positional_Accuracy_Report +
 (1{Quantitative_Horizontal_Positional_Accuracy_Assessment}n)

Quantitative_Horizontal_Positional_Accuracy_Assessment =
 Horizontal_Positional_Accuracy_Value +
 Horizontal_Positional_Accuracy_Explanation

Vertical_Positional_Accuracy =
 Vertical_Positional_Accuracy_Report +
 (1{Quantitative_Vertical_Positional_Accuracy_Assessment}n)

Quantitative_Vertical_Positional_Accuracy_Assessment =
 Vertical_Positional_Accuracy_Value +
 Vertical_Positional_Accuracy_Explanation

Lineage =
 0{Source_Information}n +
 1{Process_Step}n

Source_Information =
 Source_Citation +
 0{Source_Scale_Denominator}1 +

Type_of_Source_Media +
 Source_Time_Period_of_Content +
 Source_Citation_Abbreviation +
 Source_Contribution

Source_Citation =
 Citation_Information (see section for production rules)

Source_Time_Period_of_Content =
 Time_Period_Information + (see section for production rules)
 Source_Currentness_Reference

Process_Step =
 Process_Description +
 0{Source_Used_Citation_Abbreviation}n +
 Process_Date +
 (Process_Time) +
 0{Source_Produced_Citation_Abbreviation}n +
 (Process_Contact)

Process_Contact =
 Contact_Information (see section for production rules)

Spatial_Data_Organization_Information =
 0{Indirect_Spatial_Reference}1 +
 0{Direct_Spatial_Reference_Method +
 ([Point_and_Vector_Object_Information |
 Raster_Object_Information])}1

Point_and_Vector_Object_Information =
 [SDTS_Terms_Description |
 VPF_Terms_Description]

SDTS_Terms_Description =
 1{SDTS_Point_and_Vector_Object_Type +
 (Point_and_Vector_Object_Count) }n

VPF_Terms_Description =
 VPF_Topology_Level +
 1{VPF_Point_and_Vector_Object_Type +
 (Point_and_Vector_Object_Count) }n

Raster_Object_Information =
 Raster_Object_Type +
 (Row_Count +
 Column_Count +
 0{Vertical_Count}1)

Spatial_Reference_Information =
 0{Horizontal_Coordinate_System_Definition}1 +
 0{Vertical_Coordinate_System_Definition}1

Horizontal_Coordinate_System_Definition =
 [Geographic |

1{Planar}n |
Local] +
0{Geodetic_Model}1

Geographic =
Latitude_Resolution +
Longitude_Resolution +
Geographic_Coordinate_Units

Planar =
[Map_Projection |
Grid_Coordinate_System |
Local_Planar] +
Planar_Coordinate_Information

Map_Projection =
Map_Projection_Name +
[Albers_Conical_Equal_Area |
Azimuthal_Equidistant |
Equidistant_Conic |
Equirectangular |
General_Vertical_Near-sided_Perspective |
Gnomonic |
Lambert_Azimuthal_Equal_Area |
Lambert_Conformal_Conic |
Mercator |
Modified_Stereographic_for_Alaska |
Miller_Cylindrical |
Oblique_Mercator |
Orthographic |
Polar_Stereographic |
Polyconic |
Robinson |
Sinusoidal |
Space_Oblique_Mercator_(Landsat) |
Stereographic |
Transverse_Mercator |
van_der_Grinten |
Other_Projection's_Definition]

Albers_Conical_Equal_Area =
1{Standard_Parallel}2 +
Longitude_of_Central_Meridian +
Latitude_of_Projection_Origin +
False_Easting +
False_Northing

Azimuthal_Equidistant =
Longitude_of_Central_Meridian +
Latitude_of_Projection_Origin +
False_Easting +
False_Northing

Equidistant_Conic =
1{Standard_Parallel}2 +
Longitude_of_Central_Meridian +
Latitude_of_Projection_Origin +
False_Easting +
False_Northing

Equirectangular =
Standard_Parallel +
Longitude_of_Central_Meridian +
False_Easting +
False_Northing

General_Vertical_Near-sided_Perspective =
Height_of_Perspective_Point_Above_Surface +
Longitude_of_Projection_Center +
Latitude_of_Projection_Center +
False_Easting +
False_Northing

Gnomonic =
Longitude_of_Projection_Center +
Latitude_of_Projection_Center +
False_Easting +
False_Northing

Lambert_Azimuthal_Equal_Area =
Longitude_of_Projection_Center +
Latitude_of_Projection_Center +
False_Easting +
False_Northing

Lambert_Conformal_Conic =
1{Standard_Parallel}2 +
Longitude_of_Central_Meridian +
Latitude_of_Projection_Origin +
False_Easting +
False_Northing

Mercator =
[Standard_Parallel |
Scale_Factor_at_Equator] +
Longitude_of_Central_Meridian +
False_Easting +
False_Northing

Modified_Stereographic_for_Alaska =
False_Easting +
False_Northing

Miller_Cylindrical =
Longitude_of_Central_Meridian +

False_Easting +
 False_Northing

Oblique_Mercator =
 Scale_Factor_at_Center_Line +
 [Oblique_Line_Azimuth |
 Oblique_Line_Point] +
 Latitude_of_Projection_Origin +
 False_Easting +
 False_Northing

Oblique_Line_Azimuth =
 Azimuthal_Angle +
 Azimuth_Measure_Point_Longitude

Oblique_Line_Point =
 2{Oblique_Line_Latitude +
 Oblique_Line_Longitude}2

Orthographic =
 Longitude_of_Projection_Center +
 Latitude_of_Projection_Center +
 False_Easting +
 False_Northing

Polar_Stereographic =
 Straight-Vertical_Longitude_from_Pole +
 [Standard_Parallel |
 Scale_Factor_at_Projection_Origin] +
 False_Easting +
 False_Northing

Polyconic =
 Longitude_of_Central_Meridian +
 Latitude_of_Projection_Origin +
 False_Easting +
 False_Northing

Robinson =
 Longitude_of_Projection_Center +
 False_Easting +
 False_Northing

Sinusoidal =
 Longitude_of_Central_Meridian +
 False_Easting +
 False_Northing

Space_Oblique_Mercator_(Landsat) =
 Landsat_Number +
 Path_Number +
 False_Easting +
 False_Northing

Stereographic =
Longitude_of_Projection_Center +
Latitude_of_Projection_Center +
False_Easting +
False_Northing

Transverse_Mercator =
Scale_Factor_at_Central_Meridian +
Longitude_of_Central_Meridian +
Latitude_of_Projection_Origin +
False_Easting +
False_Northing

van_der_Grinten =
Longitude_of_Central_Meridian +
False_Easting +
False_Northing

Grid_Coordinate_System =
Grid_Coordinate_System_Name +
[Universal_Transverse_Mercator |
Universal_Polar_Stereographic |
State_Plane_Coordinate_System |
ARC_Coordinate_System |
Other_Grid_System's_Definition]

Universal_Transverse_Mercator =
UTM_Zone_Number +
Transverse_Mercator

Universal_Polar_Stereographic =
UPS_Zone_Identifier +
Polar_Stereographic

State_Plane_Coordinate_System =
SPCS_Zone_Identifier +
[Lambert_Conformal_Conic |
Transverse_Mercator |
Oblique_Mercator |
Polyconic]

ARC_Coordinate_System =
ARC_System_Zone_Identifier +
[Equirectangular |
Azimuthal_Equidistant]

Local_Planar =
Local_Planar_Description +
Local_Planar_Georeference_Information

Planar_Coordinate_Information =
Planar_Coordinate_Encoding_Method +
[Coordinate_Representation |
Distance_and_Bearing_Representation] +

Planar_Distance_Units

Coordinate_Representation =
 Abscissa_Resolution +
 Ordinate_Resolution

Distance_and_Bearing_Representation =
 Distance_Resolution +
 Bearing_Resolution +
 Bearing_Units +
 Bearing_Reference_Direction +
 Bearing_Reference_Meridian

Local =
 Local_Description +
 Local_Georeference_Information

Geodetic_Model =
 0{Horizontal_Datum_Name}1 +
 Ellipsoid_Name +
 Semi-major_Axis +
 Denominator_of_Flattening_Ratio

Vertical_Coordinate_System_Definition =
 0{Altitude_System_Definition}1 +
 0{Depth_System_Definition}1

Altitude_System_Definition =
 Altitude_Datum_Name +
 1{Altitude_Resolution}n +
 Altitude_Distance_Units +
 Altitude_Encoding_Method

Depth_System_Definition =
 Depth_Datum_Name +
 1{Depth_Resolution}n +
 Depth_Distance_Units +
 Depth_Encoding_Method

Entity_and_Attribute_Information =
 [Detailed_Description |
 Overview_Description |
 Detailed_Description +
 Overview_Description]

Detailed_Description =
 1{Entity_Type +
 0{Attribute}n }n

Entity_Type =
 Entity_Type_Label +
 Entity_Type_Definition +
 Entity_Type_Definition_Source

Attribute =
Attribute_Label +
Attribute_Definition +
Attribute_Definition_Source
1{Attribute_Domain_Values}n +
0{Attribute_Units_of_Measure}1 +
(Attribute_Measurement_Resolution) +
(1{Beginning_Date_of_Attribute_Values +
0{Ending_Date_of_Attribute_Values}1 }n) +
(Attribute_Value_Accuracy_Information) +
(Attribute_Measurement_Frequency)

Attribute_Domain_Values =
[Enumerated_Domain |
Range_Domain |
Codeset_Domain |
Unrepresentable_Domain]

Enumerated_Domain =
1{Enumerated_Domain_Value +
Enumerated_Domain_Value_Definition +
Enumerated_Domain_Value_Definition_Source +
0{Attribute}n }n

Range_Domain =
Range_Domain_Minimum +
Range_Domain_Maximum +
0{Attribute}n

Codeset_Domain=
Codeset_Name +
Codeset_Source

Attribute_Value_Accuracy_Information =
Attribute_Value_Accuracy +
Attribute_Value_Accuracy_Explanation

Overview_Description =
1{Entity_and_Attribute_Overview +
1{Entity_and_Attribute_Detail_Citation}n }n

Distribution_Information =
1{Distributor +
0{Resource_Description}1 +
Distribution_Liability +
0{Standard_Order_Process}n +
0{Custom_Order_Process}1 +
(Technical_Prerequisites) +
(Available_Time_Period) }n

Distributor =
Contact_Information (see section for production rules)

Standard_Order_Process =
[Non-digital_Form |
1{Digital_Form}n] +
Fees +
(Ordering_Instructions) +
(Turnaround)

Digital_Form =
Digital_Transfer_Information +
Digital_Transfer_Option

Digital_Transfer_Information =
Format_Name +
([Format_Version_Number |
Format_Version_Date] +
(Format_Specification)) +
(Format_Information_Content) +
0{File-Decompression_Technique}1 +
(Transfer_Size)

Digital_Transfer_Option =
1{ [Online_Option |
Offline_Option] }n

Online_Option =
1{Computer_Contact_Information}n +
(Access_Instructions) +
(Online_Computer_and_Operating_System)

Computer_Contact_Information =
[Network_Address |
Dialup_Instructions]

Network_Address =
1{Network_Resource_Name}n

Dialup_Instructions =
Lowest_BPS +
0{Highest_BPS}1 +
Number_DataBits +
Number_StopBits +
Parity +
0{Compression_Support}1 +
1{Dialup_Telephone}n +
1{Dialup_File_Name}n

Offline_Option =
Offline_Media +
0{Recording_Capacity}1
1{Recording_Format}n +
0{Compatibility_Information}1

Recording_Capacity =
1{Recording_Density}n +
Recording_Density_Units

Available_Time_Period =
Time_Period_Information (see section for production rules)

Metadata_Reference_Information =
Metadata_Date +
(Metadata_Review_Date +
(Metadata_Future_Review_Date)) +
Metadata_Contact +
Metadata_Standard_Name +
Metadata_Standard_Version +
0{Metadata_Time_Convention}1 +
(Metadata_Access_Constraints) +
(Metadata_Use_Constraints) +
(Metadata_Security_Information)

Metadata_Contact =
Contact_Information (see section for production rules)

Metadata_Security_Information =
Metadata_Security_Classification_System +
Metadata_Security_Classification +
Metadata_Security_Handling_Description

Citation_Information =
1{Originator }n+
Publication_Date +
(Publication_Time) +
Title +
0{Edition}1 +
0{Geospatial_Data_Presentation_Form}1 +
0{Series_Information}1 +
0{Publication_Information}1 +
0{Other_Citation_Details}1 +
(1{Online_Linkage}n) +
0{Larger_Work_Citation}1

Series_Information =
Series_Name +
Issue_Identification

Publication_Information =
Publication_Place +
Publisher

Larger_Work_Citation =
Citation_Information

Time_Period_Information =
[Single_Date/Time |

Multiple_Dates/Times |
 Range_of_Dates/Times]

Single_Date/Time =
 Calendar_Date +
 (Time_of_Day)

Multiple_Dates/Times =
 2{Calendar_Date +
 (Time_of_Day) }n

Range_of_Dates/Times =
 Beginning_Date +
 (Beginning_Time) +
 Ending_Date +
 (Ending_Time)

Contact_Information =
 [Contact_Person_Primary |
 Contact_Organization_Primary] +
 (Contact_Position) +
 1{Contact_Address}n +
 1{Contact_Voice_Telephone}n +
 (1 {Contact_TDD/TTY_Telephone}n) +
 (1 {Contact_Facsimile_Telephone}n) +
 (1 {Contact_Electronic_Mail_Address}n) +
 (Hours_of_Service) +
 (Contact_Instructions)

Contact_Person_Primary =
 Contact_Person +
 (Contact_Organization)

Contact_Organization_Primary =
 Contact_Organization +
 (Contact_Person)

Contact_Address =
 Address_Type +
 0{Address}n +
 City +
 State_or_Province +
 Postal_Code +
 (Country)

9. Keywords

geographic information systems, GIS, metadata, geospatial, information management, data base, raster,vector, network, library, on-line access