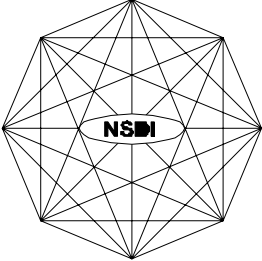


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National Spatial Data Infrastructure

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Content Standard for Digital Geospatial Metadata: Extensions for Remote Sensing Metadata (Public Review Draft)

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Standards Working Group
Federal Geographic Data Committee

December 21, 2000

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Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

For more information about the committee, or to be added to the committee's newsletter mailing list, please contact:

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101

102 Introductory Material

103

104 **1. Objective**

105 The purpose of these *Extensions for Remote Sensing Metadata* (hereafter *Remote Sensing Extensions*)
106 is to provide a common terminology and set of definitions for documenting geospatial data obtained
107 by remote sensing, within the framework of the *FGDC (1998) Content Standard for Digital*
108 *Geospatial Metadata* (hereafter *FGDC Metadata Content Standard* or simply base standard).
109 Creating these *Remote Sensing Extensions* will provide a means to use standard FGDC content to
110 describe geospatial data derived from remote sensing measurements

111

112 **2. Scope**

113 This standard is intended to support the collection and processing of geospatial metadata for data
114 derived from remote sensing. It is intended to be usable by all levels of government and the private
115 sector. The standard is not intended to reflect an implementation design. An implementation design
116 requires adapting the structure and form of the standard to meet application requirements.

117

118 The *FGDC Metadata Content Standard* was developed to define the information about a geophysical
119 dataset required by prospective users: its availability, its fitness for an intended use, and the means of
120 accessing and successfully transferring it. These *Remote Sensing Extensions* are to provide additional
121 information particularly relevant to remote sensing: the geometry of the measurement process, the
122 properties of the measuring instrument, the processing of raw readings into geospatial information,
123 and the distinction between metadata applicable to an entire collection of data and those applicable
124 only to component parts. For that purpose, these *Remote Sensing Extensions* establish the names,
125 definitions, and permissible values for new data elements and the compound elements of which they

126 are the components. These new elements are placed within the structure of the base standard,
127 allowing the combination of the original standard and the new extensions to be treated as a single
128 entity. These *Remote Sensing Extensions* do not specify either the means by which this information is
129 organized in a computer system for data transfer or the means by which this information is
130 transmitted, communicated, or presented to the user.

131

132 **3. Applicability**

133 This standard is for the documentation of geospatial data. Executive Order 12906, "Coordinating
134 Geographic Data Acquisition and Access: The National Spatial Data Infrastructure," was signed on
135 April 11, 1994, by President William J. Clinton. Section 3, Development of a National Geospatial
136 Data Clearinghouse, paragraph (b) states: "Standardized Documentation of Data. Beginning
137 nine months from the date of this order, each agency shall document all new geospatial data it collects
138 or produces, either directly or indirectly, using the standard under development by the FGDC, and
139 make that standardized documentation electronically accessible to the Clearinghouse network.
140 Within one year of the date of this order, agencies shall adopt a schedule, developed in consultation
141 with the FGDC, for documenting, to the extent practicable, geospatial data previously collected or
142 produced, either directly or indirectly, and making that data documentation electronically accessible
143 to the Clearinghouse network." These *Remote Sensing Extensions* are a data documentation standard
144 as described in the executive order, extending the applicability to geospatial data derived from remote
145 sensing.

146

147 The FGDC also invites and encourages organizations and individuals from State, local, and tribal
148 governments, the private sector, and non-profit organizations to use these *Remote Sensing Extensions*
149 in documenting their geospatial data. Lack of information for prospective users on what data exist,

150 the fitness of such data for planned applications, and the conditions for accessing or transferring data
151 to a user's system have been a major difficulty in the geospatial data community. These *Remote*
152 *Sensing Extensions*, developed with broad public participation, will expand the information already
153 provided by the base standard in a way particularly useful to recipients of remote sensing data and
154 thus contribute to developing the National Spatial Data Infrastructure.

155

156 **4. Related Standards**

157 The *FGDC Metadata Content Standard* was developed to identify and define the metadata elements
158 used to document digital geospatial datasets. These *Remote Sensing Extensions* are made to that
159 standard and fit within an overall structure following the rules for extended elements specified in its
160 Appendix D. The combination of the base standard and these *Remote Sensing Extensions* serves all
161 the purposes of the base standard but expands it to support data from remote sensing.

162

163 ISO/Technical Committee 211 (1998) is developing an international standard for metadata, which is
164 likely to be the basis of future versions of the *FGDC Metadata Content Standard*. The ISO standard
165 also has a recommended extension methodology, in its Appendix E. These *Remote Sensing*
166 *Extensions* have been constructed to be compatible with that methodology, insofar as it is consistent
167 with that of the FGDC standard. Extensions covering areas that are in the ISO standard but not in the
168 FGDC standard have been constructed to be compatible with the ISO standard.

169

170 The *Proposed EOSDIS Core System (ECS) Core Metadata Standard* (Hughes Applied Information
171 Systems, 1994) defined metadata in several areas: algorithm and processing packages, data sources,
172 references, data collections, spatial and temporal extent, and content. Much of the metadata specified
173 in that standard had corresponding content in FGDC's standard. However, there are a number of

174 areas in which the ECS standard described metadata not contained in the FGDC standard, in
175 particular, algorithm and processing metadata, instrument metadata, and collection and granule
176 metadata. In such areas, the ECS standard was used as a guide in the development of these *Remote*
177 *Sensing Extensions*. The current ECS Data model is described by Raytheon Information Technology
178 Systems (2000).

179

180 The *FGDC (1999) Content Standard for Remote Sensing Swath Data* specifies association of data
181 with its date, time, and geolocation. While geolocation information that varies from measurement to
182 measurement is included as part of the data, much of the descriptive information does not change,
183 such as the parameters of a satellite orbit or the orientation of the instruments and optical systems on
184 the platform. Such information is more appropriately stored as metadata than as data, and the
185 metadata necessary to derive the geolocation information essential to the swath standard are included
186 in these *Remote Sensing Extensions*.

187

188 **5. Standards Development Process**

189 This standard was developed by the Imagery Subgroup of the FGDC Standards Working Group
190 (SWG), with the participation of members of the FGDC Metadata Ad Hoc Working Group, and with
191 support from government, industry, and the academic community. Organizations represented include
192 the National Aeronautics and Space Administration (NASA), the United States Geological Survey,
193 the National Imagery and Mapping Agency, the International Society for Photogrammetry and
194 Remote Sensing (ISPRS), the University of California at Santa Barbara, Raytheon ITSS, SGT, Inc.,
195 Global Science and Technology, Inc, Computer Sciences Corporation, and Lockheed Martin. NASA
196 and NASA-supporting members of the imagery subgroup wrote an initial skeleton draft, drawing
197 heavily on the *Proposed ECS Core Metadata Standard* and on discussion of requirements for

198 deriving geographical positions in the *Moderate-Resolution Imaging Radiometer (MODIS) Level 1A*
199 *Earth Location: Algorithm Theoretical Basis Document* (MODIS Science Data Support Team, 1997).
200 This skeleton draft was then distributed to a review team for comment, revision, and amplification,
201 and members of the team met to discuss the review and suggest further revisions. This distribution
202 was followed by a series of revisions, reviews, and meetings to discuss the reviews and revisions.
203 Experts on instrument metadata were consulted. Scanning instrument metadata were added and
204 expanded based on a description of the Sensor Modeling Language being developed at the University
205 of Alabama at Huntsville. Frame camera metadata were contributed by photogrammetric experts
206 from ISPRS and leading companies, including ZI/Imaging, LH Systems, and Carl Zeiss Jena. The
207 draft so produced was reviewed by the Imagery Subgroup and approved for submittal to the
208 FGDC/SWG for public review in October 2000.

209

210 **6. Maintenance Authority**

211 The NASA Earth Science Data and Information System (ESDIS) Program maintains this standard for
212 the Federal Geographic Data Committee. Address questions concerning this standard to
213 NASA Goddard Space Flight Center
214 Code 423
215 Greenbelt, MD 20771.

216

217

218 Organization of This Document

219

220 These *Remote Sensing Extensions* are organized under the hierarchy of compound elements and data
221 elements of the *FGDC Content Standard for Digital Geospatial Metadata*. Where appropriate,
222 extended elements have been organized under existing compound elements in the base standard.
223 There are two completely new sections under Metadata. There is also a new section, Location
224 Information, which is never used alone but is called by other sections of the metadata standard, like
225 Citation Information in the base standard. The *Remote Sensing Extensions* begin with the production
226 rules for Metadata expanded to include the two new sections. Following are the production rules and
227 the Extension_Information definitions for the new elements for each component of Metadata in turn.
228 The production rules list all elements of the base standard that have a new element as a component at
229 any subordinate level, to clarify the relation of the new elements to the existing elements. If an
230 element of the existing standard is listed, all components immediately under it are provided in the
231 production rules expansion, but only those lower level components that have extended elements under
232 them are expanded further. For example, the Metadata element and all immediately subordinate
233 elements are listed. However, production rules are not provided for Distribution_Information and its
234 subordinate elements because none has been extended. New elements are in **boldface**. Existing
235 elements that have been extended either through the addition of subordinate elements or by extension
236 of the domain are in **boldface italic** when listed as components of other elements but in ordinary type
237 when being expanded into components. For example, Lineage is in bold italic when given as a
238 component of Data_Quality_Information, to show that there is some extension under it. When
239 Lineage is expanded into Source_Information and Process_Step, it is in ordinary type, but
240 Process_Step is in bold italic to show that it is an element of the original standard that has been
241 expanded.

242

243 Following the production rules for each Metadata section, the Extension_Information definitions for
244 the new extended elements are provided. The two new sections under Metadata and the utility
245 Location Information statement follow the expanded sections from the base standard: first the full
246 production rules, and then the Extension_Information definitions for each. The new sections and
247 elements have not been numbered, in contrast with the procedure followed in the base standard but
248 consistent with the procedure in the FGDC (1999) Biological Data Profile.

249

250 In some cases, elements that are optional or mandatory-if-applicable may have component elements
251 that are mandatory. Such component elements become mandatory only if the parent element is used.
252 For example, Mission_History, which is optional, has a mandatory element Mission_Start_Date. If
253 there is no Mission_History metadata, this element is not required. Similarly, Grid_First_Element
254 and its components, Grid_First_Element_Map_X_Coordinate and
255 Grid_First_Element_Map_Y_Coordinate, are mandatory. Grid_First_Element is, however, a
256 component of Georectified_Raster, one of two alternatives under Georeferencing_System/
257 Horizontal_Coordinate_System_Definition. If the other alternative is used, Grid_First_Element and
258 its components are not required.

259

260 Appendix C contains an index of definitions of extended elements.

261

262 The Citation_Information in the *FGDC Metadata Standard* is defined as the recommended reference
263 to be used for the dataset. In these extensions, the term *dataset* in that context is interpreted to mean
264 not only the particular dataset that the metadata describe, but also technical papers, data dictionaries,
265 users guides, and other documents that provide information about the data. It also is used to describe

266 metadata that are not usually considered citations but effectively contain the same information. For
267 example, in the description of an algorithm, the Originator corresponds to the developer of the
268 algorithm, Publication_Date is the date it was frozen in final form, Title is the name, Edition is the
269 version number; and Online_Linkage could be the on-line location of the implementing software.

270 Data Aggregation Terminology

271

272 The *FGDC Metadata Content Standard* provides "a hierarchy of data elements and compound
273 elements that define the information content for metadata to document a set of digital geospatial
274 data," as defined in its section *Organization of the Standard*. Many elements in the document refer to
275 such a dataset. However, the term *dataset* is not defined. Data may be organized in a hierarchical
276 structure, with a body of data being aggregated from smaller bodies. Different sets of terminology
277 are in use to describe the different levels of aggregation. For example, a *granule* is defined as the
278 smallest data unit in an archive that a user can order without requiring special processing to generate
279 it. An aggregation of multiple data granules from a single source is called a *single type collection*. In
280 a single type collection, metadata fields will be the same and at least one metadata field will have the
281 same value for all granules. For example the NOAA/NASA Pathfinder program compiles monthly
282 average land and sea surface temperatures. The collection of all monthly average land surface
283 temperatures is a single type collection. Another single type collection would be all the January
284 average surface temperatures. An aggregation from many different sources is called a *multitype*
285 collection. These sources may have different schemas, and the data from the different sources may
286 thus be described using different metadata fields. For example, a data set designed for studies of the
287 effects of El Niño and La Niña events on vegetation could contain TOPEX/Poseidon total monthly
288 average sea surface heights and values for the Pathfinder Normalized Difference Vegetation Index.
289 These terms are defined in the Raytheon Information Technology Systems (2000) description of the
290 implementation Earth science data model for the ECS project. Figure 1 shows possible relations
291 between different levels and kinds of data aggregations and their components.

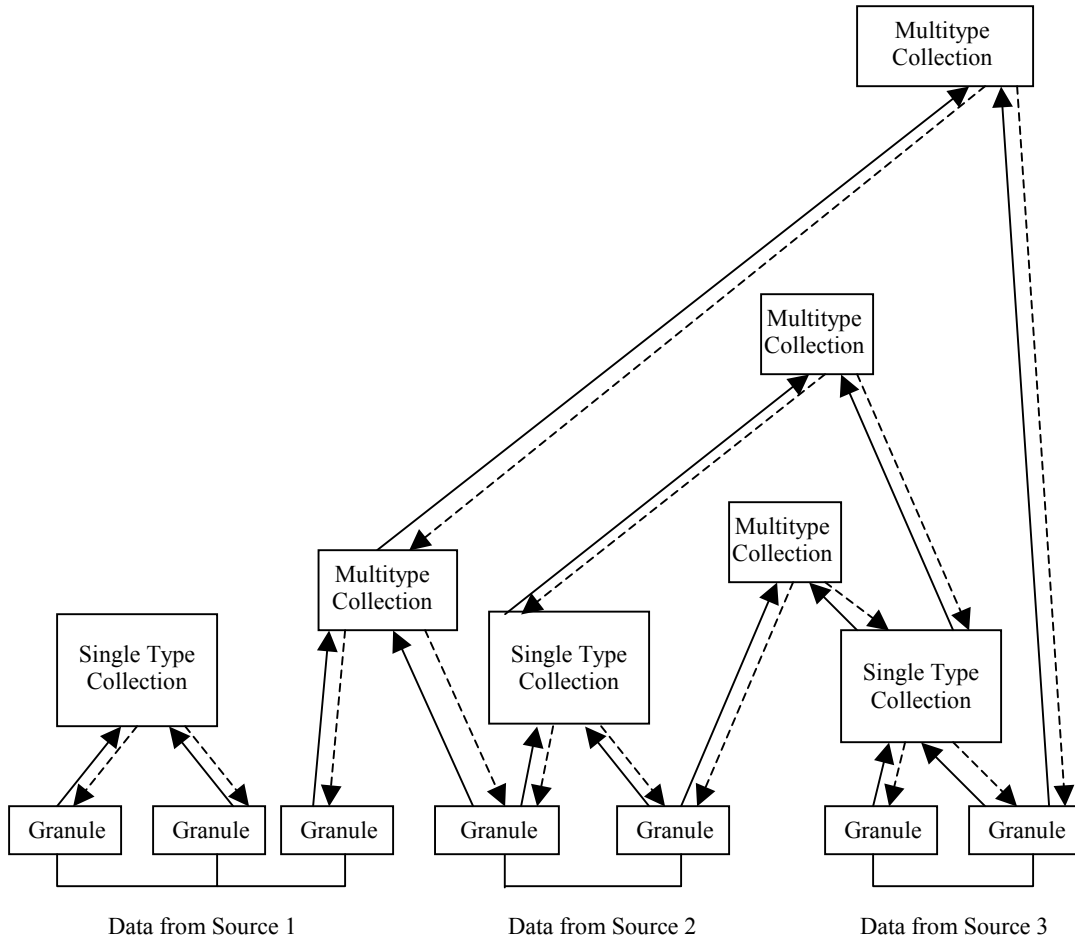
292

293 Other terms may be used to describe levels of aggregation. An alternative set of definitions uses
294 *dataset* for the basic unit, *dataset series* for an aggregation from a single source, and *dataset initiative*
295 or simply *initiative* for an aggregation of many sources. Figure 2 shows possible aggregation
296 relations using this terminology. The different levels of aggregation are also defined by calling the
297 basic unit a *product*, an aggregation of multiple products that have many or all attributes in common,
298 including a common range of some kind in time and space, an *archive collection*, and an aggregation
299 with a common semantic theme that is not necessarily homogeneous and may have few or no
300 attributes in common a *theme collection* (Committee on Earth Observation Satellites 1999).

301
302 In a collection, the metadata descriptions will have varied scope. Some will have values that apply to
303 the collection as a whole and are inherited by the individual granules; others will have different
304 values from one granule to the next. In these extensions, the term *dataset* is interpreted to refer to an
305 aggregation of data at any level, as appropriate to the context. Metadata definitions have been added
306 describing the component parts of an aggregation or describing the larger aggregation of which a data
307 unit or aggregation is a member, to allow the user to determine the level of aggregation to which a
308 metadata element applies.

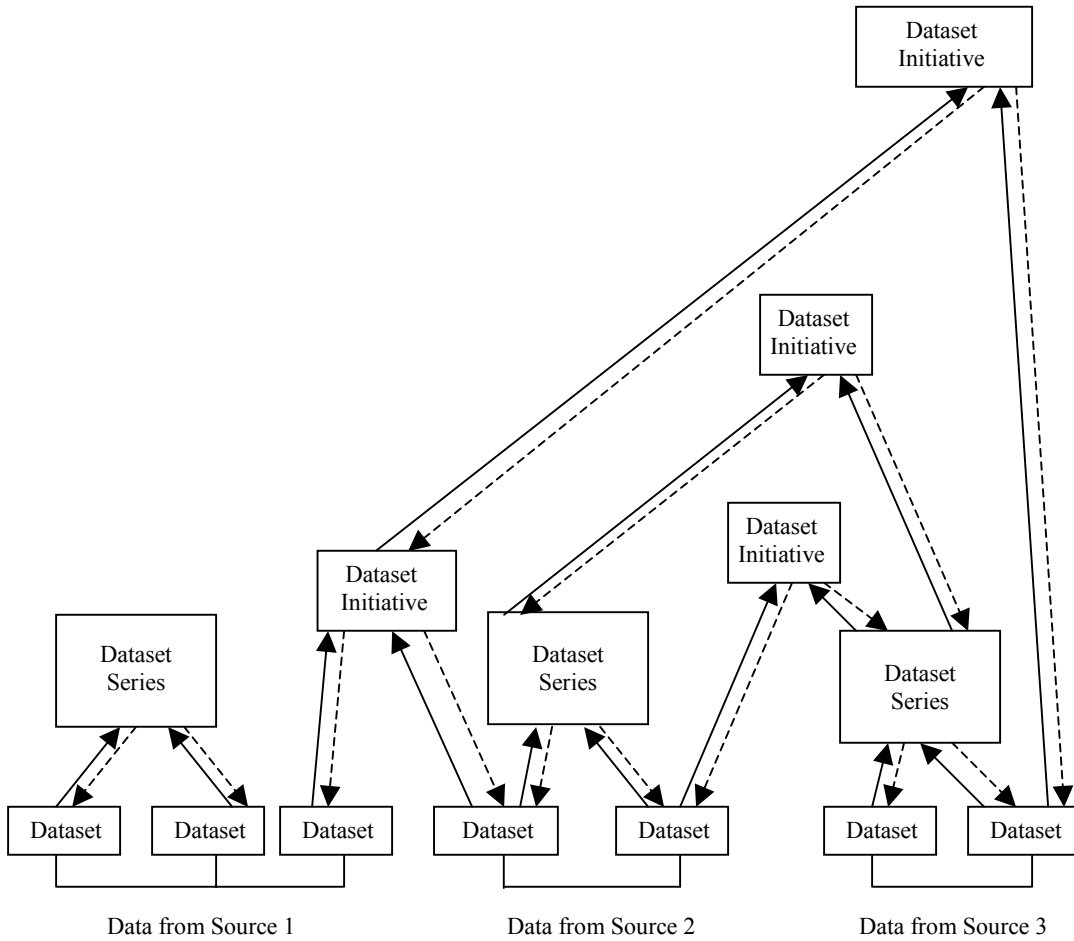
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337 Figure 1. Data Aggregation — Granules and Collections

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is a component of →
 contains - - - - - →

361 Figure 2. Data Aggregation — Datasets, Series, and Initiatives

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Metadata

0 Metadata -- data about the content, quality, condition, and other characteristics of data.

Type: compound

Short Name: metadata

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**}n +

Metadata_Reference_Information +

0{Platform_and_Mission_Information}1

0{Instrument_Information}n

378 Identification Information

379

380 1 Identification Information -- basic information about the dataset.

381 Type: compound

382 Short Name: idinfo

383

384 Identification_Information =

385 **Dataset_Identifier** +

386 Citation +

387 ***Description*** +

388 Time_Period_of_Content +

389 Status +

390 Spatial_Domain +

391 **0{Processing_Level}1**

392 Keywords +

393 **0{Platform_and_Instrument_Identification}n** +

394 **[Band_Identification]**

395 **Thematic_Layer_Identification]**

396 Access_Constraints +

397 Use_Constraints +

398 (Point_of_Contact) +

399 (1 {Browse_Graphic}n) +

400 (Data_Set_Credit) +

401 (Security_Information) +

402 (Native_Data_Set_Environment) +

403 (1{Cross_Reference}n) +

404 **0{Aggregation Information}n** +

405

406 Description =

407 Abstract +

408 Purpose +

409 **(1{Documentation}n)** +

410 (Supplemental_Information)

411

412 **Documentation =**

413 **(1{Data_Dictionary_Reference}n)** +

414 **(1{User's_Guide}n)** +

415 **(1{Science_Paper}n)**

416

417 **Data_Dictionary_Reference =**

418 Citation_Information (*see section 8 of base standard for*
419 *production rules*)

420

421 **User's_Guide =**

422 Citation_Information (*see section 8 of base standard for*
423 *production rules*)

424

425

426 **Science_Paper =**
427 Citation_Information (*see section 8 of base standard for*
428 *production rules*)

429
430 **Processing_Level =**
431 **Processing_Level_Identifier +**
432 **Processing_Level_Authority**

433
434 **Processing_Level_Authority =**
435 Citation_Information (*see section 8 of base standard for*
436 *production rules*)

437
438 **Platform_and_Instrument_Identification =**
439 **(Mission_Name) +**
440 **Platform_Full_Name +**
441 **(Platform_Short_Name) +**
442 **(Platform_Serial_Identifier)**
443 **Instrument_Full_Name +**
444 **0{Instrument_Short_Name}1 +**

445
446 **Band_Identification =**
447 **Number_of_Bands +**
448 **0{Individual_Band_Identification}n**

449

450 **Individual_Band_Identification =**
451 **Band_ID +**
452 **Band_Measurement_Mode_ID**
453
454 **Thematic_Layer_Identification =**
455 **Number_of_Thematic_Layers +**
456 **1{Layer_Name}n**
457
458 **Layer_Name =**
459 Theme (*see section 1 of base standard for production rules*)
460
461 **Aggregation_Information =**
462 **(1{Container_Packet_ID}n) +**
463 **0{Component_Information}1**
464
465 **Container_Packet_ID =**
466 **Dataset_Identifier**
467
468 **Component_Information =**
469 **1{Aggregation_Member_ID}n+**
470 **1{Aggregation_Criteria}n**
471
472 **Aggregation_Member_ID =**
473 **Dataset_Identifier**

474

475

476

477 Extension_Information

478 Name: Dataset_Identifier

479 Short Name: datasetid

480 Type: text

481 Domain: free text

482 Parent: Identification_Information

483 Optionality: Mandatory

484 Repeatability: =1

485 Definition: Unique string to identify a dataset.

486 Rationale: Provides a unique identifier for a dataset whenever it is referenced.

487 Source: ISO (1999) Geographic Information - Metadata Committee Draft, Hughes

488 Applied Information Systems (1994) Proposed ECS Core Metadata Standard -

489 ID of data object

490

491 Extension_Information

492 Name: Documentation

493 Short Name: documnts

494 Type: compound

495 Child: Data_Dictionary_Reference

496 Child: User's_Guide

497 Child: Science_Paper

498 Parent: Description
499 Optionality: Optional
500 Repeatability: >=1
501 Definition: Information about or relevant to the dataset.
502 Rationale: Not all useful information about the dataset accompanies the data.
503 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
504 Standard
505
506 Extension_Information
507 Name: Data_Dictionary_Reference
508 Short Name: datdicrf
509 Type: compound
510 Child: Citation_Information
511 Parent: Documentation
512 Optionality: Optional
513 Repeatability: >=1
514 Definition: Reference to a list of terms and their definitions, used in describing the
515 dataset.
516 Rationale: Users may need to know where to find definitions of dataset terminology.
517 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
518 Standard
519
520 Extension_Information
521 Name: User's_Guide

522 Short Name: userguid
523 Type: compound
524 Child: Citation_Information
525 Parent: Documentation
526 Optionality: Optional
527 Repeatability: >=1
528 Definition: Reference information for User's Guides.
529 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
530 Standard - DSS Guide Document elements
531
532 Extension_Information
533 Name: Science_Paper
534 Short Name: scipap
535 Type: compound
536 Child: Citation_Information
537 Parent: Documentation
538 Optionality: Optional
539 Repeatability: >=1
540 Definition: Reference information for scientific papers relevant to the dataset.
541 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
542 Standard
543
544 Extension_Information
545 Name: Processing_Level

546 Short Name: proclevl
547 Type: compound
548 Child: Processing_Level_Identifier
549 Child: Processing_Level_Authority
550 Parent: Identification_Information
551 Optionality: Mandatory-if-applicable
552 Repeatability: =1
553 Definition: Degree of data processing applied to the measurements.
554 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
555 Standard - DSS Processing Level ID (ECS F&PRS, CODMAC and ESADS
556 definitions; EOS Data Panel Report) , Kresse (2000)
557
558 Extension_Information
559 Name: Processing_Level_Identifier
560 Short Name: prolevid
561 Type: text
562 Domain: free text
563 Parent: Processing_Level
564 Optionality: Mandatory
565 Repeatability: =1
566 Definition: Data distributor's code that identifies the level of data processing applied to
567 the measurements, as defined in Processing_Level_Authority. Appendixes A
568 and B show examples.

569 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
570 Standard - DSS Processing Level ID (ECS F&PRS, CODMAC and ESADS
571 definitions; EOS Data Panel Report), Kresse (2000)

572

573 Extension_Information

574 Name: Processing_Level_Authority

575 Short Name: prolevau

576 Type: compound

577 Child: Citation_Information

578 Parent Processing_Level

579 Optionality: Mandatory

580 Repeatability: =1

581 Definition: Reference for the definition of the product level designations used

582 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
583 Standard - DSS Processing Level ID (ECS F&PRS, CODMAC and ESADS
584 definitions; EOS Data Panel Report), Kresse (2000)

585

586 Extension_Information

587 Name: Platform_and_Instrument_Identification

588 Short Name: plainsid

589 Type: compound

590 Child: Mission_Name

591 Child: Platform_Full_Name

592 Child: Platform_Short_Name

593 Child: Platform_Serial_Identifier

594 Child: Instrument_Full_Name

595 Child: Instrument_Short_Name

596 Parent: Identification_Information

597 Optionality: Mandatory-if-applicable

598 Repeatability: >=1

599 Definition: Designations for the measuring instruments and their bands, the platform

600 carrying them, and the mission to which the data contribute.

601 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

602 Development Team

603

604 Extension_Information

605 Name: Mission_Name

606 Short Name: misname

607 Type: text

608 Domain: free text

609 Parent: Platform_and_Instrument_Information

610 Optionality: Optional

611 Repeatability: =1

612 Definition: The character string by which the mission is known.

613 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

614 Development Team

615

616

617 Extension_Information

618 Name: Platform_Full_Name

619 Short Name: platflnm

620 Type: text

621 Domain: free text

622 Parent: Platform_and_Instrument_Identification

623 Optionality: Mandatory

624 Repeatability: =1

625 Definition: The complete name of the platform.

626 Rationale: The complete name is needed for clear identification of the platform.

627 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

628 Standard - DSS Satellite Long Name

629

630 Extension_Information

631 Name: Platform_Short_Name

632 Short Name: platfsnm

633 Type: text

634 Domain: free text

635 Parent: Platform_and_Instrument_Identification

636 Optionality: Optional

637 Repeatability: =1

638 Definition: An acronym or shorter form of the platform name, used to identify the
639 platform.

640 Rationale: The platform is often better known by its short name than by its full name.

641 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

642 Standard - DSS Satellite Short Name

643

644 Extension_Information

645 Name: Platform_Serial_Identifier

646 Short Name: platfser

647 Type: text

648 Domain: free text

649 Parent: Platform_and_Instrument_Identification

650 Optionality: Optional

651 Repeatability: =1

652 Definition: The serial letters and/or numbers applied to the platform.

653 Rationale: The platform identifier specifies the member of the series from which the
654 data come.

655 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

656 Standard - DSS Satellite Number

657

658 Extension_Information

659 Name: Instrument_Full_Name

660 Short Name: instflnm

661 Type: text

662 Domain: free text

663 Parent: Platform_and_Instrument_Identification

664 Optionality: Mandatory

665 Repeatability: =1

666 Definition: The complete name of the instrument.

667 Rationale: The complete name is needed for clear identification of the instrument.

668 Source: Raytheon Information Technology Systems (2000) Implementation Earth
669 Science Model for the ECS Project

670

671 Extension_Information

672 Name: Instrument_Short_Name

673 Short Name: instshnm

674 Type: text

675 Domain: free text

676 Parent: Platform_and_Instrument_Identification

677 Optionality: Mandatory-if-applicable

678 Repeatability: =1

679 Definition: The short name, acronym, or other identifier by which the instrument is
680 known.

681 Rationale: The instrument is often better known by its short name than by its full name.

682 Source: Raytheon Information Technology Systems (2000) Implementation Earth
683 Science Model for the ECS Project

684

685 Extension_Information

686 Name: Band_Identification

687 Short Name: bandidnt

688 Type: compound

689 Child: Number_of_Bands
690 Child: Individual_Band_Identification
691 Parent: Identification_Information
692 Optionality: Conditional - present and mandatory if and only if
693 Thematic_Layer_Identification is absent
694 Repeatability: =1
695 Definition: Complete information to identify instrument wavelengths or other channels.
696 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
697 Development Team
698
699 Extension_Information
700 Name: Number_of_Bands
701 Short Name: numbands
702 Type: integer
703 Domain: Number_of_Bands > 0
704 Parent: Band_Identification
705 Optionality: Mandatory
706 Repeatability: =1
707 Definition: The number of instrument bands.
708 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
709 Development Team
710
711 Extension_Information
712 Name: Individual_Band_Identification

-
- 713 Short Name: inbident
- 714 Type: compound
- 715 Child: Band_ID
- 716 Child: Individual_Band_Identification
- 717 Parent: Band_Measurement_Mode_ID
- 718 Optionality: Mandatory-if-applicable
- 719 Repeatability: =Number_of_Bands
- 720 Definition: Complete information to identify a single instrument band.
- 721 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 722 Development Team
- 723
- 724 Extension_Information
- 725 Name: Band_ID
- 726 Short Name: bandid
- 727 Type: text
- 728 Domain: free text
- 729 Parent: Individual_Band_Identification
- 730 Optionality: Mandatory
- 731 Repeatability: =1
- 732 Definition: Designation for individual measurement band.
- 733 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 734 Development Team
- 735
- 736

737 Extension_Information

738 Name: Band_Measurement_Mode_ID

739 Short Name: bmmoid

740 Type: text

741 Domain: free text

742 Parent: Individual_Band_Identification

743 Optionality: Mandatory

744 Repeatability: =1

745 Definition: Identifier designating channel, wavelength, and/or field of view of
746 measurement.

747 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

748 Development Team

749

750 Extension_Information

751 Name: Thematic_Layer_Identification

752 Short Name: thelayid

753 Type: compound

754 Child: Number_of_Thematic_Layers

755 Child: Layer Name

756 Parent: Identification_Information

757 Optionality: Conditional - present and mandatory if and only if Band_Identification is
758 absent

759 Repeatability: =1

760 Definition: Listing of the kinds of geospatial information represented by the dataset

761 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

762 Development Team

763

764 Extension_Information

765 Name: Number_of_Thematic_Layers

766 Short Name: numthlay

767 Type: integer

768 Domain: Number_Thematic_Layers > 0

769 Parent: Thematic_Layer_Identification

770 Optionality: Mandatory

771 Repeatability: =1

772 Definition: Number of kinds of geospatial information represented by the dataset.

773 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

774 Development Team

775

776 Extension_Information

777 Name: Layer_Name

778 Short Name: layrname

779 Type: compound

780 Child: Theme

781 Parent: Thematic_Layer_Identification

782 Optionality: Mandatory

783 Repeatability: =Number_of_Thematic_Layers

784 Definition: Description of one kind of geospatial information represented by the dataset.

785 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
786 Development Team
787
788 Extension_Information
789 Name: Aggregation_Information
790 Short Name: agginfo
791 Type: compound
792 Child: Container_Packet_ID
793 Child: Component_Information
794 Parent: Identification_Information
795 Optionality: Optional
796 Repeatability: >=1
797 Definition: Information relating a dataset to collections of which it is a component or
798 relating a collection dataset to its components.
799 Rationale: As noted in the introductory material, a dataset may be one component of a
800 larger aggregation or may itself be an aggregation of smaller components. This
801 information places the dataset in relation to its container or components.
802 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
803 Standard - DSS ECS Data Collection Class
804
805 Extension_Information
806 Name: Container_Packet_ID
807 Short Name: conpckid
808 Type: compound

809 Child: Dataset_Identifier
810 Parent: Aggregation_Information
811 Optionality: Optional
812 Repeatability: >=1
813 Definition: Identifier of an aggregation of which the dataset is a member.
814 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
815 Standard - Aggregation Relationship
816
817 Extension_Information
818 Name: Component_Information
819 Short Name: compinfo
820 Type: compound
821 Child: Aggregation_Member_ID
822 Child: Aggregation_Criteria
823 Parent: Aggregation_Information
824 Optionality: Mandatory-if-applicable
825 Repeatability: =1
826 Definition: Information about components aggregated into the dataset.
827 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
828 Standard
829
830 Extension_Information
831 Name: Aggregation_Member_ID
832 Short Name: aggmemid

833 Type: compound

834 Child: Dataset_Identifier

835 Parent: Component_Information

836 Optionality: Mandatory

837 Repeatability: >=1

838 Definition: Identifier of component of a dataset.

839 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

840 Standard

841

842 Extension_Information

843 Name: Aggregation_Criteria

844 Short Name: aggcrit

845 Type: text

846 Domain: free text

847 Parent: Component_Information

848 Optionality: Mandatory

849 Repeatability: >=1

850 Definition: Criteria by which components of a dataset are chosen for inclusion.

851 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

852 Standard - Aggregation Attribute

853

854

855 Data Quality Information

856

857 2 Data Quality Information -- a general assessment of the quality of the dataset.

858 (Recommendations on information to be reported and tests to be performed are found in

859 "Spatial Data Quality," which is chapter 3 of part 1 in Department of Commerce, 1992,

860 Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173):

861 Washington, Department of Commerce, National Institute of Standards and Technology.)

862 Type: compound

863 Short Name: dataqual

864

865 Data_Quality_Information =

866 0{Attribute_Accuracy}1 +

867 Logical_Consistency_Report +

868 Completeness_Report +

869 0{Positional_Accuracy}1 +

870 **Lineage** +

871 (Cloud_Cover)

872

873 **Lineage** =

874 0{Source_Information}n +

875 1{**Process_Step**}n

876

877 Process_Step =

878 Process_Description +

879 0{Source_Used_Citation_Abbreviation}n +
880 Process_Date +
881 (Process_Time) +
882 0{Source_Produced_Citation_Abbreviation}n +
883 (Process_Contact) +
884 **0{Algorithm_Information}1 +**
885 **0{Processing_Information}1**

886
887 **Algorithm_Information =**
888 **Algorithm_Identifiers +**
889 **Algorithm_Description +**
890 **0{Algorithm_Change_History}1 +**
891 **(1{Algorithm_Peer_Review_Information}n)**

892
893 **Algorithm_Identifiers =**
894 Citation_Information (*see section 8 of base standard for*
895 *production rules*)

896
897 **Algorithm_Description =**
898 **[Algorithm_Text_Description]**
899 **Algorithm_Reference]**

900
901
902

903 **Algorithm_Reference =**
904 Citation_Information (*see section 8 of base standard for*
905 *production rules*)

906
907 **Algorithm_Change_History =**
908 1{Process_Step}n (*see section 2 of base standard for*
909 *production rules*)

910
911 **Algorithm_Peer_Review_Information =**
912 Process_Step (*see section 2 of base standard for element*
913 *definitions*)

914
915 **Processing_Information =**
916 **Processing_Identifiers +**
917 **1{Processing_Input_Dataset}n+**
918 **Processing_Software +**
919 **Processing_Procedure +**
920 **0{Processing_Change_History}1 +**
921 **(1{Processing_Documentation}n)**

922
923 **Processing_Identifiers =**
924 Citation_Information (*see section 8 of base standard for*
925 *production rules*)

926

927 **Processing_Input_Dataset =**
928 **Input_Dataset_Identifier +**
929 **[Input_Description**
930 **Input_Reference] +**
931 **0{Input_Level}1**
932
933 **Input_Dataset_Identifier =**
934 **Dataset_Identifier** (see section 1 for production rules)
935
936 **Input_Description =**
937 **Input_Dataset_Description +**
938 **0{Command_Line_Processing_Parameter}n**
939
940 **Input_Reference =**
941 *Citation_Information (see section 8 of base standard for*
942 *production rules)*
943
944 **Input_Level =**
945 **Processing_Level** (*see Identification_Information for*
946 *production rules)*
947
948 **Processing_Software =**
949 **[Processing_Software_Description]**
950 **Processing_Software_Reference]**

951 **Processing_Software_Reference =**
952 *Citation_Information (see section 8 of base standard for*
953 *production rules)*

954
955 **Processing_Procedure =**
956 **Processing_Run_History +**
957 **Processing_Environment +**
958 **(Processing_Procedure_Description)**

959
960 **Processing_Run_History =**
961 *1 {Process_Step}n (see section 2 of base standard for*
962 *production rules)*

963
964 **Processing_Environment =**
965 *Native_Data_Set_Environment (see section 1 of base*
966 *standard for production rules)*

967
968 **Processing_Change_History =**
969 *1 {Process_Step}n (see section 2 of base standard for*
970 *production rules)*

971
972 **Processing_Documentation =**
973 *Citation_Information (see section 8 of base standard for*
974 *production rules)*

975

976

977

978 Extension_Information

979 Name: Algorithm_Information

980 Short Name: algoinfo

981 Type: compound

982 Child: Algorithm_Identifiers

983 Child: Algorithm_Description

984 Child: Algorithm_Change_History

985 Child: Algorithm_Peer_Review_Information

986 Parent: Process_Step

987 Optionality: Mandatory-if-applicable

988 Repeatability: =1

989 Definition: Details of the methodology by which geographic information was derived

990 from the instrument readings.

991 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

992 Standard

993

994 Extension_Information

995 Name: Algorithm_Identifiers

996 Short Name: algoid

997 Type: compound

998 Child: Citation_Information

999	Parent: Algorithm_Information
1000	Optionality: Mandatory
1001	Repeatability: =1
1002	Definition: Information identifying the algorithm and version or date.
1003	Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
1004	Standard
1005	
1006	Extension_Information
1007	Name: Algorithm_Description
1008	Short Name: algodesc
1009	Type: compound
1010	Child: Algorithm_Text_Description
1011	Child: Algorithm_Reference
1012	Parent: Algorithm_Information
1013	Optionality: Mandatory
1014	Repeatability: =1
1015	Definition: Kinds of material providing a description of the algorithm used to generate
1016	the data.
1017	Rationale: To assist users in understanding what features in their data may arise as a
1018	result of the properties of the processing algorithm.
1019	Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
1020	Standard
1021	
1022	

-
- 1023 Extension_Information
- 1024 Name: Algorithm_Text_Description
- 1025 Short Name: algotexd
- 1026 Type: text
- 1027 Domain: free text
- 1028 Parent: Algorithm_Description
- 1029 Optionality: Conditional - present and mandatory if and only if Algorithm_Reference is
- 1030 absent
- 1031 Repeatability: =1
- 1032 Definition: Text description of algorithm used to generate the data.
- 1033 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 1034 Standard
- 1035
- 1036 Extension_Information
- 1037 Name: Algorithm_Reference
- 1038 Short Name: algoref
- 1039 Type: compound
- 1040 Child: Citation_Information
- 1041 Parent: Algorithm_Description
- 1042 Optionality: Conditional - present and mandatory if and only if
- 1043 Algorithm_Text_Description is absent
- 1044 Repeatability: =1
- 1045 Definition: Reference to document containing description of algorithm.

-
- 1046 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
1047 Standard - DSS Guide Document Information
1048
1049 Extension_Information
1050 Name: Algorithm_Change_History
1051 Short Name: algochhi
1052 Type: compound
1053 Child: Process_Step
1054 Parent: Algorithm_Information
1055 Optionality: Mandatory-if-applicable
1056 Repeatability: =1
1057 Definition: Description of the modifications of the algorithm in its development from
1058 version to version.
1059 Rationale: Allows users to understand where differences in their data from previous
1060 versions may arise as a result of changes in the algorithm.
1061 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
1062 Standard
1063
1064 Extension_Information
1065 Name: Algorithm_Peer_Review_Information
1066 Short Name: algprevi
1067 Type: compound
1068 Child: Process_Step
1069 Parent: Algorithm_Information

-
- 1070 Optional: Optional
- 1071 Repeatability: >=1
- 1072 Definition: Description, including dates, of peer review of the algorithm for purposes of
- 1073 ensuring its quality.
- 1074 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 1075 Standard - DSS Review content
- 1076
- 1077 Extension_Information
- 1078 Name: Processing_Information
- 1079 Short Name: procinfo
- 1080 Type: compound
- 1081 Child: Processing_Identifiers
- 1082 Child: Processing_Input_Dataset
- 1083 Child: Processing_Software
- 1084 Child: Processing_Procedure
- 1085 Child: Processing_Change_History
- 1086 Child: Processing_Documentation
- 1087 Parent: Process_Step
- 1088 Optional: Mandatory-if-applicable
- 1089 Repeatability: =1
- 1090 Definition: Comprehensive information about the procedure by which the algorithm
- 1091 was applied to derive geographic data from the raw instrument measurements.
- 1092 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 1093 Standard

1094

1095 Extension_Information

1096 Name: Processing_Identifiers

1097 Short Name: procidfs

1098 Type: compound

1099 Child: Citation_Information

1100 Parent: Processing_Information

1101 Optionality: Mandatory

1102 Repeatability: =1

1103 Definition: Information to identify processing package that produced the data.

1104 Rationale: Allows users to distinguish data from different eras of processing.

1105 Source: Raytheon Information Technology Systems (2000) Implementation Earth

1106 Science Model for the ECS Project – PGE Identifier

1107

1108 Extension_Information

1109 Name: Processing_Input_Dataset

1110 Short Name: procinp

1111 Type: compound

1112 Child: Input_Dataset_Identifier

1113 Child: Input_Description

1114 Child: Input_Reference

1115 Child: Input_Level

1116 Parent: Processing_Information

1117 Optionality: Mandatory

-
- 1118 Repeatability: >=1
- 1119 Definition: The data on which a stage of processing operates.
- 1120 Rationale: This information tells the user about the stage of processing being described.
- 1121 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1122 Development Team
- 1123
- 1124 Extension_Information
- 1125 Name: Input_Dataset_Identifier
- 1126 Short Name: inpdatid
- 1127 Type: compound
- 1128 Child: Dataset_Identifier
- 1129 Parent: Processing_Input_Dataset
- 1130 Optionality: Mandatory
- 1131 Repeatability: =1
- 1132 Definition: Unique identifier for input dataset.
- 1133 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1134 Development Team
- 1135
- 1136 Extension_Information
- 1137 Name: Input_Description
- 1138 Short Name: prindesc
- 1139 Type: compound
- 1140 Child: Input_Dataset_Description
- 1141 Child: Command_Line_Processing_Parameter

-
- 1142 Parent: Processing_Input_Dataset
- 1143 Optionality: Conditional - present and mandatory if and only if Input_Reference is
- 1144 absent
- 1145 Repeatability: =1
- 1146 Definition: Description of data and descriptive parameters used in processing step.
- 1147 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1148 Development Team
- 1149
- 1150 Extension_Informatio
- 1151 Name: Input_Dataset_Description
- 1152 Short Name: prinddes
- 1153 Type: text
- 1154 Domain: free text
- 1155 Parent: Input_Description
- 1156 Optionality: Mandatory
- 1157 Repeatability: =1
- 1158 Definition: Description of input data sets for processing.
- 1159 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1160 Development Team
- 1161
- 1162 Extension_Information
- 1163 Name: Command_Line_Processing_Parameter
- 1164 Short Name: procpmcl
- 1165 Type: text

-
- 1166 Domain: free text
- 1167 Parent: Input_Description
- 1168 Optionality: Mandatory-if-applicable
- 1169 Repeatability: >=1
- 1170 Definition: Parameters to control processing operations, entered at run time.
- 1171 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1172 Development Team
- 1173
- 1174 Extension_Information
- 1175 Name: Input_Reference
- 1176 Short Name: prinref
- 1177 Type: compound
- 1178 Child: Citation_Information
- 1179 Parent: Processing_Input_Dataset
- 1180 Optionality: Conditional - present and mandatory if and only if Input_Description is
- 1181 absent
- 1182 Repeatability: =1
- 1183 Definition: Reference to document describing input to processing.
- 1184 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 1185 Standard - DSS Guide Dataset Information
- 1186
- 1187 Extension_Information
- 1188 Name: Input Level
- 1189 Short Name: prinlevl

-
- 1190 Type: compound
- 1191 Child: Processing_Level
- 1192 Parent: Processing_Input_Dataset
- 1193 Optionality: Mandatory-if-applicable
- 1194 Repeatability: =1
- 1195 Definition: Data distributor's code that identifies the degree of radiometric and
- 1196 geometric processing applied to the data defined in Processing_Input_Dataset.
- 1197 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 1198 Standard
- 1199
- 1200 Extension_Information
- 1201 Name: Processing_Software
- 1202 Short Name: procsoft
- 1203 Type: compound
- 1204 Child: Processing Software Description
- 1205 Child: Processing Software Reference
- 1206 Parent: Processing_Information
- 1207 Optionality: Mandatory
- 1208 Repeatability: =1
- 1209 Definition: The computer programs used to process data from one level to another. .
- 1210 Source: Raytheon Information Technology Systems (2000) Implementation Earth
- 1211 Science Model for the ECS Project
- 1212
- 1213

-
- 1214 Extension_Information
- 1215 Name: Processing_Software_Description
- 1216 Short Name: prsodesc
- 1217 Type: text
- 1218 Domain: free text
- 1219 Parent: Processing_Software
- 1220 Optionality: Conditional - present and mandatory if and only if
- 1221 Processing_Software_Reference is absent
- 1222 Repeatability: =1
- 1223 Definition: Text description of processing software.
- 1224 Source: Raytheon Information Technology Systems (2000) Implementation Earth
Science Model for the ECS Project – PGEDescription
- 1226
- 1227 Extension_Information
- 1228 Name: Processing_Software_Reference
- 1229 Short Name: prsoref
- 1230 Type: compound
- 1231 Child: Citation_Information
- 1232 Parent: Processing_Software
- 1233 Optionality: Conditional - present and mandatory if and only if
- 1234 Processing_Software_Description is absent
- 1235 Repeatability: =1
- 1236 Definition: Reference to document describing processing software.

1237 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata

1238 Standard - DSS Guide Algorithm Information

1239

1240 Extension_Information

1241 Name: Processing_Procedure

1242 Short Name: procpred

1243 Type: compound

1244 Child: Processing_Run_History

1245 Child: Processing_Environment

1246 Child: Processing_Procedure_Description

1247 Parent: Processing_Information

1248 Optionality: Mandatory

1249 Repeatability: =1

1250 Definition: Description of circumstances and methods of processing.

1251 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1252 Development Team

1253

1254 Extension_Information

1255 Name: Processing_Run_History

1256 Short Name: prunhist

1257 Type: compound

1258 Child: Process_Step

1259 Parent: Processing_Procedure

1260 Optionality: Mandatory

-
- 1261 Repeatability: =1
- 1262 Definition: Full history of all processing runs.
- 1263 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1264 Development Team
- 1265
- 1266 Extension_Information
- 1267 Name: Processing_Environment
- 1268 Short Name: procenv
- 1269 Type: compound
- 1270 Child: Native_Data_Set_Environment
- 1271 Parent: Processing_Procedure
- 1272 Optionality: Mandatory
- 1273 Repeatability: =1
- 1274 Definition: The environment in which the processing was carried out, including, but not
- 1275 limited to, the platform, the operating system name and version, and other
- 1276 configuration control information
- 1277 Source: ISO (1999) Geographic Information - Committee Draft, Hughes Applied
- 1278 Information Systems (1994) Proposed ECS Core Metadata Standard - Intended
- 1279 Operating System;
- 1280
- 1281 Extension_Information
- 1282 Name: Processing_Procedure_Description
- 1283 Short Name: procpdes
- 1284 Type: text

-
- 1285 Domain: free text
- 1286 Parent: Processing_Procedure
- 1287 Optionality: Optional
- 1288 Repeatability: =1
- 1289 Definition: Additional details about the processing procedure.
- 1290 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1291 Development Team
- 1292
- 1293 Extension_Information
- 1294 Name: Processing_Change_History
- 1295 Short Name: procchhi
- 1296 Type: compound
- 1297 Child: Process_Step
- 1298 Parent: Processing_Information
- 1299 Optionality: Mandatory-if-applicable
- 1300 Repeatability: =1
- 1301 Definition: Description of the changes in processing procedure from version to version.
- 1302 Rationale: Allows users to understand any differences that may arise from differences
- 1303 between the way the current version was processed and the way previous
- 1304 versions they used were processed.
- 1305 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1306 Development Team
- 1307
- 1308

1309 Extension_Information

1310 Name: Processing_Documentation

1311 Short Name: procdoc

1312 Type: compound

1313 Child: Citation_Information

1314 Parent: Processing_Information

1315 Optionality: Optional

1316 Repeatability: >=1

1317 Definition: Reference to documentation describing the processing.

1318 Rationale: A full description of all aspects of the processing may be too detailed for

1319 inclusion in accompanying metadata.

1320 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1321 Development Team

1322 Spatial Data Organization Information

1323

1324 3 Spatial Data Organization Information -- the mechanism used to represent spatial
1325 information in the data set.

1326 Type: compound

1327 Short Name: spdoinfo

1328

1329 Spatial_Data_Organization_Information =

1330 0{Indirect_Spatial_Reference}1 +

1331 0{Direct_Spatial_Reference_Method +

1332 ([Point_and_Vector_Object_Information |

1333 *Raster_Object_Information*])}1

1334

1335 Raster_Object_Information =

1336 Cell_Value_Type +

1337 [*Raster_Object_Type* +

1338 (Row_Count +

1339 Column_Count +

1340 0{Vertical_Count}1) |

1341 **Dimension_Description**]

1342

1343 **Dimension_Description** =

1344 Number_of_Data_Dimensions+

1345 1{Dimension_Properties}n

1346

1347 **Dimension_Properties =**

1348 **Name_of_Dimension +**

1349 **Dimension_Count**

1350

1351

1352

1353 Domain Extension

1354 Element: Raster_Object_Type

1355 Domain: "Point" "Pixel" "Grid Cell" " Voxel"

1356 Extended Domain: "Point" "Pixel" "Grid Cell" " Voxel" "Swath"

1357 Rationale: "Swath" is another kind of raster.

1358

1359 Extension_Information

1360 Name: Cell_Value_Type

1361 Short Name: cvaltype

1362 Type: text

1363 Domain: "unsigned integer" "signed integer" "single precision IEEE floating point"

1364 "double precision IEEE floating point" free text

1365 Parent: Raster_Object_Information

1366 Optionality: Mandatory

1367 Repeatability: =1

1368 Definition: Bit representation of data value in raster cell.

-
- 1369 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1370 Development Team
- 1371
- 1372 Extension_Information
- 1373 Name: Dimension_Description
- 1374 Short Name: dimdesc
- 1375 Type: compound
- 1376 Child: Number_of_Data_Dimensions
- 1377 Child: Dimension_Properties
- 1378 Parent: Raster_Object_Information
- 1379 Optionality: Conditional - present and mandatory if and only if Raster_Object_Type
- 1380 +Row_Count + Column_Count are absent.
- 1381 Repeatability: =1
- 1382 Definition: Specifications for the independent axes in the organization of spatial data.
- 1383 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1384 Development Team
- 1385
- 1386 Extension_Information
- 1387 Name: Number_of_Data_Dimensions
- 1388 Short Name: nodatdim
- 1389 Type: integer
- 1390 Domain: Number_of_Data_Dimensions > 0
- 1391 Parent: Dimension_Description
- 1392 Optionality: Mandatory

-
- 1393 Repeatability: =1
- 1394 Definition: Number of axes used in spatial data matrix.
- 1395 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1396 Development Team
- 1397
- 1398 Extension_Information
- 1399 Name: Dimension_Properties
- 1400 Short Name: dimprops
- 1401 Type: compound
- 1402 Child: Name_of_Dimension
- 1403 Child: Dimension_Count
- 1404 Parent: Dimension_Description
- 1405 Optionality: Mandatory
- 1406 Repeatability: =Number_of_Data_Dimensions
- 1407 Definition: Description of individual axis in spatial data matrix.
- 1408 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1409 Development Team
- 1410
- 1411 Extension_Information
- 1412 Name: Name of Dimension
- 1413 Short Name: namedim
- 1414 Type: text
- 1415 Domain: "row" "column" "vertical" "band" free text
- 1416 Parent: Dimension_Properties

-
- 1417 Optionality: Mandatory
- 1418 Repeatability: =1
- 1419 Definition: Designation assigned to an axis.
- 1420 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1421 Development Team
- 1422
- 1423 Extension_Information
- 1424 Name: Dimension_Count
- 1425 Short Name: dimcount
- 1426 Type: integer
- 1427 Domain: Dimension_Count >= 1
- 1428 Parent: Dimension_Properties
- 1429 Optionality: Mandatory
- 1430 Repeatability: =1
- 1431 Definition: The maximum number of data points along the corresponding axis.
- 1432 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1433 Development Team

1434 Spatial Reference Information
1435
1436 4 Spatial Reference Information -- the description of the reference frame for, and the means to
1437 encode, coordinates in the data set.

1438 Type: compound
1439 Short Name: spref

1440

1441 Spatial_Reference_Information =

1442 0{Horizontal_Coordinate_System_Definition}1 +

1443 0{*Vertical_Coordinate_System_Definition*}1 +

1444 0{**Georeferencing_Information**}1

1445

1446 Vertical_Coordinate_System_Definition =

1447 0{*Altitude_System_Definition*}1 +

1448 0{Depth_System_Definition}1

1449

1450 Altitude_System_Definition =

1451 Altitude_Datum_Name +

1452 1{Altitude_Resolution}n +

1453 *Altitude_Distance_Units* +

1454 Altitude_Encoding_Method

1455

1456 **Georeferencing_Information** =

1457 [**Georectified_Raster** |

1458 **Georeferenceable_Raster**]

1459

1460

Georectified_Raster =

1461

Pixel_Resolution +

1462

Grid_First_Element +

1463

Grid_Orientation +

1464

Point_Position_In_Pixel +

1465

Storage_Order

1466

1467

Pixel_Resolution =

1468

Coordinate_Representation (*see section 4 of base standard for
production rules*) +

1469

1470

Planar_Distance_Units (*see section 4 of base standard for
production rules*)

1471

1472

1473

Grid_First_Element =

1474

Grid_First_Element_Map_X_Coordinate +

1475

Grid_First_Element_Map_Y_Coordinate

1476

1477

Grid_Orientation =

1478

Row_Delta_X +

1479

Row_Delta_Y +

1480

Column_Delta_X +

1481

Column_Delta_Y

1482

Georeferenceable_Raster =

1483

1{Georeferencing_Description}n +

1484 (1{Aerotriangulation_Reference}n) +
1485 0{Swath_Track_Information}1
1486
1487 **Georeferencing_Description**
1488 [Ground_Control_Point_Information |
1489 Instrument_Specific_Georeferencing |
1490 Referencing_Polynomial |
1491 Other_Georeferencing_Description]
1492
1493 **Ground_Control_Point_Information =**
1494 **Ground_Control_Point_Organization +**
1495 **[Ground_Control_Point_Description +**
1496 **1{Ground_Control_Point_Position}n |**
1497 **1{Ground_Control_Point_Description +**
1498 **Ground_Control_Point_Position}n**
1499
1500 **Ground_Control_Point_Description =**
1501 **Control_Point_Type +**
1502 **(Control_Point_Origin) +**
1503 **(Control_Point_Use_Flag) +**
1504 **(Control_Point_Horizontal_X_Accuracy) +**
1505 **(Control_Point_Horizontal_Y_Accuracy) +**
1506 **(Control_Point_Vertical_Accuracy)**
1507
1508 **Ground_Control_Point_Position =**

1509 **Control_Point_Raster_Position +**
1510 **[Control_Point_Earth_Location |**
1511 **Control_Point_Identification]**
1512
1513 **Control_Point_Raster_Position**
1514 **Control_Point_Row +**
1515 **Control_Point_Column**
1516
1517 **Control_Point_Earth Location =**
1518 **Control_Point_x_Value +**
1519 **Control_Point_y_Value +**
1520 **(Control_Point_z_Value)**
1521
1522 **Control_Point_Identification =**
1523 **Control_Point_ID +**
1524 **Control_Point_Authority**
1525
1526 **Control_Point_Authority =**
1527 *Contact_Information (see section 10 of base standard for*
1528 *production rules)*
1529
1530 **Instrument_Specific_Georeferencing =**
1531 **1{Positional_Information}n +**
1532 **(Exterior_Orientation_Accuracy) +**
1533 **Rotation_Sequence +**

- 1534 **Axis_Rotation_Convention +**
- 1535
- 1536 **Positional_Information =**
- 1537 **Projection_Center_X_Position +**
- 1538 **Projection_Center_Y_Position +**
- 1539 **Projection_Center_Z_Position +**
- 1540 **Roll +**
- 1541 **Pitch +**
- 1542 **Yaw+**
- 1543 **Attitude_Angular_Units**
- 1544
- 1545 **Exterior_Orientation_Accuracy =**
- 1546 **X_Position_Accuracy +**
- 1547 **Y_Position_Accuracy +**
- 1548 **Z_Position_Accuracy +**
- 1549 **Roll_Accuracy +**
- 1550 **Pitch_Accuracy +**
- 1551 **Yaw_Accuracy**
- 1552
- 1553 **Referencing_Polynomial =**
- 1554 **Polynomial_Function** *(see section 5 for production rules)*
- 1555
- 1556 **Aerotriangulation_Reference =**
- 1557 **Citation_Information** *(see section 8 of base standard for*
- 1558 *production rules)*

1559

1560

Swath_Track_Information

1561

Ground_Shape +

1562

Cross_Track_Motion

1563

1564

1565

1566 Domain Extension

1567 Element: Altitude_Distance_Units

1568 Domain: "meters" "feet" free text

1569 Extended Domain: "meters" "feet" "millibars" "theta value" "cloud layer" "atmosphere layer" free

1570 text

1571 Rationale: The added units are standard for describing atmospheric datasets and should be specifically

1572 identified among those preferred.

1573

1574 Extension_Information

1575 Name: Georeferencing_Information

1576 Short Name: georefin

1577 Type: compound

1578 Child: Georectified_Raster

1579 Child: Georeferenceable_Raster

1580 Parent: Spatial_Reference_Information

1581 Optionality: Mandatory-if-applicable

1582 Repeatability: =1

1583 Definition: Information that will allow determination of geographical location of raster
1584 points.
1585 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
1586 Development Team
1587
1588 Extension_Information
1589 Name: Georectified_Raster
1590 Short Name: georecra
1591 Type: compound
1592 Child: Pixel_Resolution
1593 Child: Grid_First_Element
1594 Child: Grid_Orientation
1595 Child: Point_Position_In_Pixel
1596 Child: Storage_Order
1597 Parent: Georeferencing_Information
1598 Optionality: Conditional - present and mandatory if and only if Georeferenceable_Raster is
1599 absent
1600 Repeatability: =1
1601 Definition: Raster whose cells are regularly spaced in a geographic or map coordinate
1602 system defined in some Spatial_Referencing_System, such that any cell can be
1603 geolocated given its raster coordinate and the raster origin, cell spacing, and
1604 orientation. *(Let a_{mn} be the pixel grid point in the m^{th} row and the n^{th} column, with*
1605 *(x,y) the position of that grid point in map coordinates. Let the map position*
1606 *corresponding to the first element of the grid a_{11} be (x_0,y_0) . Then $x = x_0 + (m-1)\Delta x_m$*
1607 *$+ (n-1)\Delta y_m$ and $y = y_0 + (m-1)\Delta x_n + (n-1)\Delta y_n$, where the Δ terms are defined in the*

1608 *elements below. The overlay is shown in Figure 3, with definitions of the individual*
1609 *pixels.)*

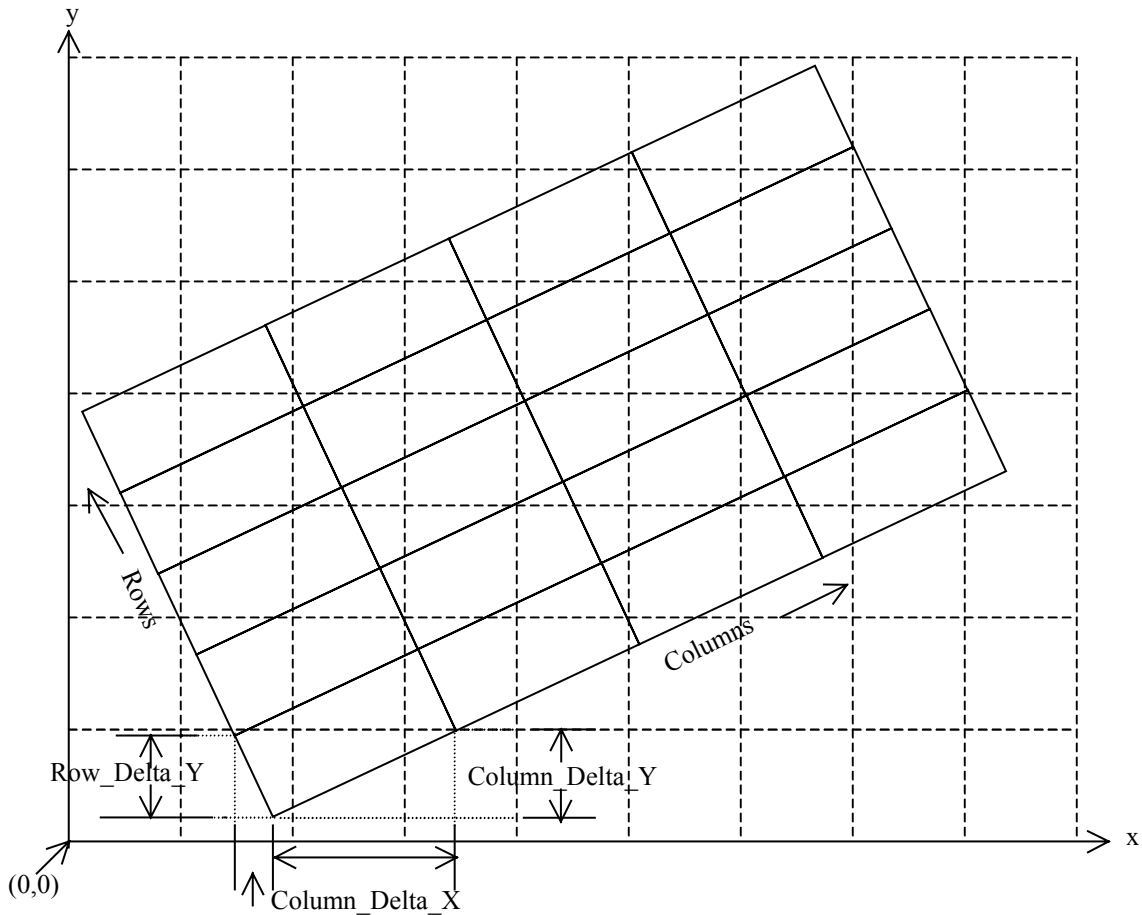
1610 Rationale: Provides user geographic locations of all points in the case of a regular
1611 georectified grid.

1612 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1613 Development Team

1614

1615



1616

1617

1618 Figure 3. Row-column pixel grid (solid lines) superimposed on map x-y grid (broken lines)

- 1619
- 1620 Extension_Information
- 1621 Name: Pixel_Resolution
- 1622 Short Name: pixlreso
- 1623 Type: compound
- 1624 Child: Coordinate_Representation
- 1625 Child: Planar_Distance_Units
- 1626 Parent: Georectified_Raster
- 1627 Optionality: Mandatory
- 1628 Repeatability: =1
- 1629 Definition: Geographic dimensions corresponding to one pixel of processed data.
- 1630 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1631 Development Team
- 1632
- 1633 Extension_Information
- 1634 Name: Grid_First_Element
- 1635 Short Name: gridinit
- 1636 Type: compound
- 1637 Child: Grid_First_Element_Map_X_Coordinate
- 1638 Child: Grid_First_Element_Map_Y_Coordinate
- 1639 Parent: Georectified_Raster
- 1640 Optionality: Mandatory
- 1641 Repeatability: =1
- 1642 Definition: Point on map (x_0, y_0) corresponding to first element of the pixel array.

-
- 1643 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1644 Development Team
- 1645
- 1646 Extension_Information
- 1647 Name: Grid_First_Element_Map_X_Coordinate
- 1648 Short Name: grinitx
- 1649 Type: real
- 1650 Domain: free real
- 1651 Parent: Grid_First_Element
- 1652 Optionality: Mandatory
- 1653 Repeatability: =1
- 1654 Definition: Value x_0 of x-coordinate on map at point corresponding to first element of pixel
- 1655 system.
- 1656 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1657 Development Team
- 1658
- 1659 Extension_Information
- 1660 Name: Grid_First_Element_Map_Y_Coordinate
- 1661 Short Name: grinity
- 1662 Type: real
- 1663 Domain: free real
- 1664 Parent: Grid_First_Element
- 1665 Optionality: Mandatory
- 1666 Repeatability: =1

1667 Definition: Value y_0 of y-coordinate on map at point corresponding to first element of pixel
1668 system.

1669 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
1670 Development Team

1671
1672 Extension_Information

1673 Name: Grid_Orientation

1674 Short Name: gridori

1675 Type: compound

1676 Child: Row_Delta_X

1677 Child: Row_Delta_Y

1678 Child: Column_Delta_X

1679 Child: Column_Delta_Y

1680 Parent: Georectified_Raster

1681 Optionality: Mandatory

1682 Repeatability: =1

1683 Definition: Orientation of image pixel grid relative to map on which it is overlaid.

1684 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1685 Development Team

1686
1687 Extension_Information

1688 Name: Row_Delta_X

1689 Short Name: rowdeltx

1690 Type: real

1691 Domain: free real

-
- 1692 Parent: Grid_Orientation
- 1693 Optionality: Mandatory
- 1694 Repeatability: =1
- 1695 Definition: Increment Δx_m in map x-coordinates corresponding to increment of one grid
- 1696 row; a negative value means that map x-coordinate decreases with increasing row
- 1697 number.
- 1698 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1699 Development Team
- 1700
- 1701 Extension_Information
- 1702 Name: Row_Delta_Y
- 1703 Short Name: rowdelty
- 1704 Type: real
- 1705 Domain: free real
- 1706 Parent: Grid_Orientation
- 1707 Optionality: Mandatory
- 1708 Repeatability: =1
- 1709 Definition: Increment Δy_m in map y-coordinates corresponding to increment of one grid
- 1710 row; a negative value means that map y-coordinate decreases with increasing row
- 1711 number.
- 1712 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1713 Development Team
- 1714
- 1715 Extension_Information
- 1716 Name: Column_Delta_X

- 1717 Short Name: coldeltx
- 1718 Type: real
- 1719 Domain: free real
- 1720 Parent: Grid_Orientation
- 1721 Optionality: Mandatory
- 1722 Repeatability: =1
- 1723 Definition: Increment Δx_n in map x-coordinates corresponding to increment of one grid
- 1724 column; a negative value means that map x-coordinate decreases with increasing
- 1725 column number.
- 1726 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1727 Development Team
- 1728
- 1729 Extension_Information
- 1730 Name: Column_Delta_Y
- 1731 Short Name: coldelty
- 1732 Type: real
- 1733 Domain: free real
- 1734 Parent: Grid_Orientation
- 1735 Optionality: Mandatory
- 1736 Repeatability: =1
- 1737 Definition: Increment Δy_n in map y-coordinates corresponding to increment of one grid
- 1738 column; a negative value means that map y-coordinate decreases with increasing
- 1739 column number.
- 1740 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1741 Development Team

- 1742
- 1743 Extension_Information
- 1744 Name: Point_Position_in_Pixel
- 1745 Short Name: ptpos
- 1746 Type: text
- 1747 Domain: "center" "lower left corner" "lower right corner" "upper left corner" "upper right
- 1748 corner" free text
- 1749 Parent: Georectified_Raster
- 1750 Optionality: Mandatory
- 1751 Repeatability: =1
- 1752 Definition: The point in the pixel corresponding to the earth location of the pixel.
- 1753 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1754 Development Team
- 1755
- 1756 Extension_Information
- 1757 Name: Storage_Order
- 1758 Short Name: storord
- 1759 Type: text
- 1760 Domain: "row major" "column major" free text
- 1761 Parent: Georectified_Raster
- 1762 Optionality: Mandatory
- 1763 Repeatability: =1
- 1764 Definition: Description of which index varies most rapidly in the sequential storage of raster
- 1765 elements — row index (row major) or column index (column major).

- 1766 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1767 Development Team
- 1768
- 1769 Extension_Information
- 1770 Name: Georeferenceable_Raster
- 1771 Short Name: georbler
- 1772 Type: compound
- 1773 Child: Georeferencing_Description
- 1774 Child: Aerotriangulation_Reference
- 1775 Child: Swath_Track_Information
- 1776 Parent: Georeferencing_Information
- 1777 Optionality: Conditional - present and mandatory if and only if Georectified_Raster is
- 1778 absent.
- 1779 Repeatability: =1
- 1780 Definition: Raster whose cells may be irregularly spaced in any geographic or map
- 1781 projection coordinate system, whose cells can be geolocated using geolocateion
- 1782 information supplied with the data but not from the raster properties alone.
- 1783 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1784 Development Team
- 1785
- 1786 Extension_Information
- 1787 Name: Georeferencing_Description
- 1788 Short Name: georefde
- 1789 Type: compound
- 1790 Child: Ground_Control_Point_Information

- 1791 Child: Instrument_Specific_Georeferencing
- 1792 Child: Referencing_Polynomial
- 1793 Child: Other_Georeferencing_Description
- 1794 Parent: Georeferenceable_Raster
- 1795 Optionality: Mandatory
- 1796 Repeatability: >=1
- 1797 Definition: Description of information, provided in metadata,. that allows the geographic or
- 1798 map location of raster points to be located.
- 1799 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1800 Development Team
- 1801
- 1802 Extension_Information
- 1803 Name: Ground_Control_Point_Information
- 1804 Short Name: gcptinfo
- 1805 Type: compound
- 1806 Child: Ground_Control_Point_Organization
- 1807 Child: Ground_Control_Point_Description
- 1808 Child: Ground_Control_Point_Position
- 1809 Parent: Georeferencing_Description
- 1810 Optionality: Conditional - mandatory if neither Instrument_Specific_Georeferencing,
- 1811 Referencing_Polynomial, nor Other_Georeferencing_Description is present;
- 1812 otherwise optional
- 1813 Repeatability: =1

1814 Definition: Information describing data points for which both raster and geographic location
1815 are available and that can be used to relate raster and geographic coordinates at
1816 other points.

1817 Rationale: If ground control points are used to geolocate data, information on them must be
1818 supplied to help the user understand how the process was carried out.

1819 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1820 Development Team

1821

1822 Extension_Information

1823 Name: Ground_Control_Point_Organization

1824 Short Name: gcporg

1825 Type: text

1826 Domain: "location" "library"

1827 Parent: Ground_Control_Point_Information

1828 Optionality: Mandatory

1829 Repeatability: =1

1830 Definition: Specification as to whether geographic locations of control points are supplied
1831 together with raster points or are in separate library.

1832 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

1833 Development Team

1834

1835 Extension_Information

1836 Name: Ground_Control_Point_Description

1837 Short Name: gcptdesc

1838 Type: compound

- 1839 Child: Control_Point_Type
- 1840 Child: Control_Point_Origin
- 1841 Child: Control_Point_Use_Flag
- 1842 Child: Control_Point_Horizontal_X_Accuracy
- 1843 Child: Control_Point_Horizontal_Y_Accuracy
- 1844 Child: Control_Point_Vertical_Accuracy
- 1845 Parent: Ground_Control_Point_Information
- 1846 Optionality: Mandatory
- 1847 Repeatability: >=1
- 1848 Definition: Lineage and applicability of ground control points.
- 1849 Source: ISPRS WG II/4
- 1850
- 1851 Extension_Information
- 1852 Name: Control_Point_Type
- 1853 Short Name: gcptype
- 1854 Type: text
- 1855 Domain: “full” “horizontal” “vertical”
- 1856 Parent: Ground_Control_Point_Description
- 1857 Optionality: Mandatory
- 1858 Repeatability: =1
- 1859 Definition: Direction or directions for which control point provides georeference
- 1860 information.
- 1861 Source: ISPRS WG II/4
- 1862
- 1863

- 1864 Extension_Information
- 1865 Name: Control_Point_Origin
- 1866 Short Name: gcpori
- 1867 Type: text
- 1868 Domain: "terrestrial" "global positioning system" "aerotriangulation" "tie point" free text
- 1869 Parent: Ground_Control_Point_Description
- 1870 Optionality: Optional
- 1871 Repeatability: =1
- 1872 Definition: The source of the ground control point measurement.
- 1873 Source: ISPRS WG II/4
- 1874
- 1875 Extension_Information
- 1876 Name: Control_Point_Use_Flag
- 1877 Short Name: gcpusefl
- 1878 Type: text
- 1879 Domain: "new" "used" "verified" "not verified" "used and verified" free text
- 1880 Parent: Ground_Control_Point_Description
- 1881 Optionality: Optional
- 1882 Repeatability: =1
- 1883 Definition: Whether the ground control point has previously been used and verified.
- 1884 Source: ISPRS WG II/4
- 1885
- 1886 Extension_Information
- 1887 Name: Control_Point_Horizontal_X_Accuracy
- 1888 Short Name: gcpxaccu

-
- 1889 Type: real
- 1890 Domain: Control_Point_Horizontal_X_Accuracy >= 0
- 1891 Parent: Ground_Control_Point_Description
- 1892 Optionality: Optional
- 1893 Repeatability: =1
- 1894 Definition: *A priori* standard deviation of the horizontal coordinates of the ground control
- 1895 point, in coordinate units specified under
- 1896 Horizontal_Coordinate_System_Definition.
- 1897 Source: ISPRS WG II/4
- 1898
- 1899 Extension_Information
- 1900 Name: Control_Point_Horizontal_Y_Accuracy
- 1901 Short Name: gcpyaccu
- 1902 Type: real
- 1903 Domain: Control_Point_Horizontal_Y_Accuracy >= 0
- 1904 Parent: Ground_Control_Point_Description
- 1905 Optionality: Optional
- 1906 Repeatability: =1
- 1907 Definition: *A priori* standard deviation of the horizontal coordinates of the ground control
- 1908 point, in coordinate units specified under
- 1909 Horizontal_Coordinate_System_Definition.
- 1910 Source: ISPRS WG II/4
- 1911
- 1912 Extension_Information
- 1913 Name: Control_Point_Vertical_Accuracy

1914	Short Name: gcpzaccu
1915	Type: real
1916	Domain: Control_Point_Vertical_Accuracy >= 0
1917	Parent: Ground_Control_Point_Description
1918	Optionality: Optional
1919	Repeatability: =1
1920	Definition: <i>A priori</i> standard deviation of the vertical coordinate of the ground control
1921	point, in units specified by Altitude_Distance_Units.
1922	Source: ISPRS WG II/4
1923	
1924	Extension_Information
1925	Name: Ground_Control_Point_Position
1926	Short Name: gcptpos
1927	Type: compound
1928	Child: Control_Point_Raster_Position
1929	Child: Control_Point_Earth_Location
1930	Child: Control_Point_Identification
1931	Parent: Ground_Control_Point_Information
1932	Optionality: Mandatory
1933	Repeatability: >=1
1934	Definition: Location of individual control points, defined separately for every point, in both
1935	raster and geographic or map coordinate systems.
1936	Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
1937	Development Team
1938	

- 1939 Extension_Information
- 1940 Name: Control_Point_Raster_Position
- 1941 Short Name: conptrpo
- 1942 Type: compound
- 1943 Child: Control_Point_Row
- 1944 Child: Control_Point_Column
- 1945 Parent: Ground_Control_Point_Position
- 1946 Optionality: Mandatory
- 1947 Repeatability: = 1
- 1948 Definition: Position in raster array of individual ground control point used in geolocating
- 1949 data.
- 1950 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1951 Development Team
- 1952
- 1953 Extension_Information
- 1954 Name: Control_Point_Row
- 1955 Short Name: gcpro
- 1956 Type: real
- 1957 Domain: Control_Point_Row ≥ 0
- 1958 Parent: Control_Point_Raster_Position
- 1959 Optionality: Mandatory
- 1960 Repeatability: =1
- 1961 Definition: Value of row coordinate at ground control point position in raster grid.
- 1962 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1963 Development Team

- 1964
- 1965 Extension_Information
- 1966 Name: Control_Point_Column
- 1967 Short Name: gcpcolum
- 1968 Type: real
- 1969 Domain: Control_Point_Column >= 0
- 1970 Parent: Control_Point_Raster_Position
- 1971 Optionality: Mandatory
- 1972 Repeatability: =1
- 1973 Definition: Value of column coordinate at ground control point position in raster grid.
- 1974 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 1975 Development Team
- 1976
- 1977 Extension_Information
- 1978 Name: Control_Point_Earth_Location
- 1979 Short Name: gcpearlc
- 1980 Type: compound
- 1981 Child: Control_Point_x_Value
- 1982 Child: Control_Point_y_Value
- 1983 Child: Control_Point_z_Value
- 1984 Parent: Ground_Control_Point_Information
- 1985 Optionality: Conditional - present and mandatory if and only if value of
- 1986 Ground_Control_Point_Organization is "location"
- 1987 Repeatability: =1
- 1988 Definition: Geographic or map location of ground control point.

1989	Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
1990	Development Team
1991	
1992	Extension_Information
1993	Name: Control_Point_x_Value
1994	Short Name: gcpxval
1995	Type: real
1996	Domain: free real
1997	Parent: Control_Point_Earth_Location
1998	Optionality: Mandatory
1999	Repeatability: =1
2000	Definition: Value of map x-coordinate at control point location.
2001	Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
2002	Development Team
2003	
2004	Extension_Information
2005	Name: Control_Point_y_Value
2006	Short Name: gcpyval
2007	Type: real
2008	Domain: free real
2009	Parent: Control_Point_Earth_Location
2010	Optionality: Mandatory
2011	Repeatability: =1
2012	Definition: Value of map y-coordinate at control point location.

2013 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2014 Development Team

2015

2016 Extension_Information

2017 Name: Control_Point_z_Value

2018 Short Name: gcpzval

2019 Type: real

2020 Domain: free real

2021 Parent: Control_Point_Earth_Location

2022 Optionality: Optional

2023 Repeatability: =1

2024 Definition: Value of vertical coordinate at control point location.

2025 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2026 Development Team

2027

2028 Extension_Information

2029 Name: Control_Point_Identification

2030 Short Name: gcpidnt

2031 Type: compound

2032 Child: Control_Point_ID

2033 Child: Control_Point_Authority

2034 Parent: Ground_Control_Point_Information

2035 Optionality: Conditional - present and mandatory if and only if value of

2036 Ground_Control_Point_Organization is "library"

2037 Repeatability: =1

2038 Definition: Information allowing the user to find the location of a control point from a
2039 catalogue.

2040 Source: U. S. National Imagery and Mapping Agency

2041

2042 Extension_Information

2043 Name: Control_Point_ID

2044 Short Name: gcpid

2045 Type: text

2046 Domain: free text

2047 Parent: Control_Point_Identification

2048 Optionality: Mandatory

2049 Repeatability: =1

2050 Definition: Identifier assigned to control point in library.

2051 Source: U. S. National Imagery and Mapping Agency

2052

2053 Extension_Information

2054 Name: Control_Point_Authority

2055 Short Name: gcpauth

2056 Type: compound

2057 Child: Contact_Information

2058 Parent: Control_Point_Identification

2059 Optionality: Mandatory

2060 Repeatability: =1

2061 Definition: Contact who can supply ground control point coordinates given identifier.

2062 Source: U. S. National Imagery and Mapping Agency

- 2063
- 2064 Extension_Information
- 2065 Name: Instrument_Specific_Georeferencing
- 2066 Short Name: insspgeo
- 2067 Type: compound
- 2068 Child: Positional_Information
- 2069 Child: Exterior_Orientation_Accuracy
- 2070 Child: Rotation_Sequence
- 2071 Child: Axis_Rotation_Convention
- 2072 Parent: Georeferencing_Description
- 2073 Optionality: Conditional - mandatory if neither Ground_Control_Point_Information,
- 2074 Referencing_Polynomial, nor Other_Georeferencing_Description is present;
- 2075 otherwise optional
- 2076 Repeatability: =1
- 2077 Definition: Information relating coordinate system of a particular instrument to ground
- 2078 coordinate system.
- 2079 Source: ISPRS WG II/4.0
- 2080
- 2081 Extension_Information
- 2082 Name: Positional_Information
- 2083 Short Name: posiinfo
- 2084 Type: compound
- 2085 Child: Projection_Center_X_Position
- 2086 Child: Projection_Center_Y_Position
- 2087 Child: Projection_Center_Z_Position

- 2088 Child: Roll
- 2089 Child: Pitch
- 2090 Child: Yaw
- 2091 Child: Attitude_Angular_Units
- 2092 Parent: Instrument_Specific_Georeferencing
- 2093 Optionality: Mandatory
- 2094 Repeatability: >=1
- 2095 Definition: Orientation of instrument and detector projection.
- 2096 Source: ISPRS WG II/4
- 2097
- 2098 Extension_Information
- 2099 Name: Projection_Center_X_Position
- 2100 Short Name: prjcxpos
- 2101 Type: real
- 2102 Domain: free real
- 2103 Parent: Positional_Information
- 2104 Optionality: Mandatory
- 2105 Repeatability: =1
- 2106 Definition: X-component of the position of the projection center in the ground coordinate
- 2107 system defined under Horizontal_Coordinate_System_Definition.
- 2108 Source: ISPRS WG II/4
- 2109
- 2110 Extension_Information
- 2111 Name: Projection_Center_Y_Position
- 2112 Short Name: prjcypos

- 2113 Type: real
- 2114 Domain: free real
- 2115 Parent: Positional_Information
- 2116 Optionality: Mandatory
- 2117 Repeatability: =1
- 2118 Definition: Y-component of the position of the projection center in the ground coordinate
- 2119 system defined under Horizontal_Coordinate_System_Definition.
- 2120 Source: ISPRS WG II/4
- 2121
- 2122 Extension_Information
- 2123 Name: Projection_Center_Z_Position
- 2124 Short Name: prjczpos
- 2125 Type: real
- 2126 Domain: free real
- 2127 Parent: Positional_Information
- 2128 Optionality: Mandatory
- 2129 Repeatability: =1
- 2130 Definition: Z-component of the position of the projection center in the ground coordinate
- 2131 system defined under Vertical_Coordinate_System_Definition.
- 2132 Source: ISPRS WG II/4
- 2133
- 2134 Extension_Information
- 2135 Name: Roll
- 2136 Short Name: omegarll
- 2137 Type: real

-
- 2138 Domain: free real
- 2139 Parent: Positional_Information
- 2140 Optionality: Mandatory
- 2141 Repeatability: =1
- 2142 Definition: Roll angle omega of image coordinate system relative to ground coordinate
- 2143 system, in units defined by Attitude_Angular_Units, measured clockwise around
- 2144 the positive x-axis (the direction of motion).
- 2145 Source: ISPRS WG II/4
- 2146
- 2147 Extension_Information
- 2148 Name: Pitch
- 2149 Short Name: phipitch
- 2150 Type: real
- 2151 Domain: free real
- 2152 Parent: Positional_Information
- 2153 Optionality: Mandatory
- 2154 Repeatability: =1
- 2155 Definition: Pitch angle phi of image coordinate system relative to ground coordinate
- 2156 system, in units defined by Attitude_Angular_Units, measured clockwise around
- 2157 the positive y-axis ($z \times x$).
- 2158 Source: ISPRS WG II/4
- 2159
- 2160 Extension_Information
- 2161 Name: Yaw
- 2162 Short Name: kappayaw

- 2163 Type: real
- 2164 Domain: free real
- 2165 Parent: Positional_Information
- 2166 Optionality: Mandatory
- 2167 Repeatability: =1
- 2168 Definition: Yaw angle kappa of image coordinate system relative to ground coordinate
- 2169 system, in units defined by Attitude_Angular_Units, measured clockwise around
- 2170 the positive z-axis (vertical).
- 2171 Source: ISPRS WG II/4
- 2172
- 2173 Extension_Information
- 2174 Name: Attitude_Angular_Units
- 2175 Short Name: attanglu
- 2176 Type: text
- 2177 Domain: "degrees" "radians" free text
- 2178 Parent: Positional_Information
- 2179 Optionality: Mandatory
- 2180 Repeatability: =1
- 2181 Definition: Units of angular measure in which Roll, Pitch, and Yaw are expressed
- 2182 Source: ISPRS WG II/4
- 2183
- 2184 Extension_Information
- 2185 Name: Exterior_Orientation_Accuracy
- 2186 Short Name: accexori
- 2187 Type: compound

- 2188 Child: X_Position_Accuracy
- 2189 Child: Y_Position_Accuracy
- 2190 Child: Z_Position_Accuracy
- 2191 Child: Roll_Accuracy
- 2192 Child: Pitch_Accuracy
- 2193 Child: Yaw_Accuracy
- 2194 Parent: Instrument_Specific_Georeferencing
- 2195 Optionality: Optional
- 2196 Repeatability: =1
- 2197 Definition: Uncertainties in the parameters of exterior orientation.
- 2198 Source: ISPRS WG II/4
- 2199
- 2200 Extension_Information
- 2201 Name: X_Position_Accuracy
- 2202 Short Name: accxpos
- 2203 Type: real
- 2204 Domain: X_Position_Accuracy >= 0
- 2205 Parent: Exterior_Orientation_Accuracy
- 2206 Optionality: Mandatory
- 2207 Repeatability: =1
- 2208 Definition: Standard deviation of x coordinate of projection center.
- 2209 Source: ISPRS WG II/4
- 2210
- 2211 Extension_Information
- 2212 Name: Y_Position_Accuracy

- 2213 Short Name: accypos
- 2214 Type: real
- 2215 Domain: Y_Position_Accuracy ≥ 0
- 2216 Parent: Exterior_Orientation_Accuracy
- 2217 Optionality: Mandatory
- 2218 Repeatability: =1
- 2219 Definition: Standard deviation of y coordinate of projection center.
- 2220 Source: ISPRS WG II/4
- 2221
- 2222 Extension_Information
- 2223 Name: Z_Position_Accuracy
- 2224 Short Name: acczpos
- 2225 Type: real
- 2226 Domain: Z_Position_Accuracy ≥ 0
- 2227 Parent: Exterior_Orientation_Accuracy
- 2228 Optionality: Mandatory
- 2229 Repeatability: =1
- 2230 Definition: Standard deviation of z coordinate of projection center.
- 2231 Source: ISPRS WG II/4
- 2232
- 2233 Extension_Information
- 2234 Name: Roll_Accuracy
- 2235 Short Name: accomega
- 2236 Type: real
- 2237 Domain: Roll_Accuracy ≥ 0

- 2238 Parent: Exterior_Orientation_Accuracy
- 2239 Optionality: Mandatory
- 2240 Repeatability: =1
- 2241 Definition: Standard deviation of roll angle, omega, in same units as angle.
- 2242 Source: ISPRS WG II/4
- 2243
- 2244 Extension_Information
- 2245 Name: Pitch_Accuracy
- 2246 Short Name: accphi
- 2247 Type: real
- 2248 Domain: Pitch_Accuracy >= 0
- 2249 Parent: Exterior_Orientation_Accuracy
- 2250 Optionality: Mandatory
- 2251 Repeatability: =1
- 2252 Definition: Standard deviation of pitch angle, phi, in same units as angle.
- 2253 Source: ISPRS WG II/4
- 2254
- 2255 Extension_Information
- 2256 Name: Yaw_Accuracy
- 2257 Short Name: ackkappa
- 2258 Type: real
- 2259 Domain: Yaw_Accuracy >= 0
- 2260 Parent: Exterior_Orientation_Accuracy
- 2261 Optionality: Mandatory
- 2262 Repeatability: =1

- 2263 Definition: Standard deviation of yaw angle, kappa, in same units as angle.
- 2264 Source: ISPRS WG II/4
- 2265
- 2266 Extension_Information
- 2267 Name: Rotation_Sequence
- 2268 Short Name: pprotseq
- 2269 Type: text
- 2270 Domain: "123" "132" "213" "231" "312" "321"
- 2271 Parent: Instrument_Specific_Georeferencing
- 2272 Optionality: Mandatory
- 2273 Repeatability: =1
- 2274 Definition: Sequence of rotations in roll, pitch and yaw: 1 represents roll, 2 represents pitch,
2275 and 3 represents yaw, such that "132" would represent a rotation in the sequence
2276 roll, yaw, pitch.
- 2277 Source: ISPRS WG II/4
- 2278
- 2279 Extension_Information
- 2280 Name: Axis_Rotation_Convention
- 2281 Short Name: axrotcon
- 2282 Type: text
- 2283 Domain: "rotated" "fixed"
- 2284 Parent: Instrument_Specific_Georeferencing
- 2285 Optionality: Mandatory
- 2286 Repeatability: =1

-
- 2287 Definition: Description of whether the coordinate system axes are rotated or remain fixed
2288 with each step of application of the rotation matrix.
2289 Source: ISPRS WG II/4
2290
2291 Extension_Information
2292 Name: Referencing_Polynomial
2293 Short Name: refrpoly
2294 Type: compound
2295 Child: Polynomial_Function
2296 Parent: Georeferencing_Description
2297 Optionality: Conditional - mandatory if neither Ground_Control_Point_Information,
2298 Instrument_Specific_Georeferencing, nor Other_Georeferencing_Description is
2299 present; otherwise optional
2300 Repeatability: =1
2301 Definition: Polynomial function used to relate image and ground positions.
2302 Source: ISPRS WG II/4
2303
2304 Extension_Information
2305 Name: Other_Georeferencing_Description
2306 Short Name: othrefde
2307 Type: text
2308 Child: free text
2309 Parent: Georeferencing_Description

-
- 2310 Optionality: Conditional - mandatory if neither Ground_Control_Point_Information,
2311 Instrument_Specific_Georeferencing, nor Referencing_Polynomial is present;
2312 otherwise optional
- 2313 Repeatability: =1
- 2314 Definition: Text description of other method for georeferencing.
- 2315 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2316 Development Team
- 2317
- 2318 Extension_Information
- 2319 Name: Aerotriangulation_Reference
- 2320 Short Name: aerotref
- 2321 Type: compound
- 2322 Child: Citation_Information
- 2323 Parent: Georeferenceable_Raster
- 2324 Optionality: Optional
- 2325 Repeatability: >=1
- 2326 Definition: Reference containing information describing photogrammetric triangulation
2327 using aerial images.
- 2328 Source: Moffit, F., Mikhail, E. (1980): Photogrammetry, Harper & Row, Publishers, New
2329 York
- 2330
- 2331 Extension_Information
- 2332 Name: Swath_Track_Information
- 2333 Short Name: swtrkinf
- 2334 Type: compound

-
- 2335 Child: Ground_Shape
- 2336 Child: Cross_Track_Motion
- 2337 Parent: Name: Georeferenceable_Raster
- 2338 Optionality: Mandatory-if-applicable
- 2339 Repeatability: =1
- 2340 Definition: Properties of the swath track on the ground.
- 2341 Rationale: Aids the user in deriving coordinates of all image points.
- 2342 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2343 Development Team
- 2344
- 2345 Extension_Information
- 2346 Name: Ground_Shape
- 2347 Short Name: grndshpe
- 2348 Type: text
- 2349 Domain: free text
- 2350 Parent: Swath_Track_Information
- 2351 Optionality: Mandatory
- 2352 Repeatability: =1
- 2353 Definition: Shape of pixel on ground.
- 2354 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2355 Development Team
- 2356
- 2357 Extension_Information
- 2358 Name: Cross_Track_Motion
- 2359 Short Name: xtrckmot

-
- 2360 Type: text
- 2361 Domain: free text
- 2362 Parent: Swath_Track_Information
- 2363 Optionality: Mandatory
- 2364 Repeatability: =1
- 2365 Definition: Direction and pattern of measurements relative to track.
- 2366 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2367 Development Team
- 2368
- 2369
- 2370

2371

2371

Entity and Attribute Information

2372

2373 5 Entity and Attribute Information -- details about the information content of the dataset,
2374 including the entity types, their attributes, and the domains from which attribute values may be
2375 assigned.

2376 Type: compound

2377 Short Name: eainfo

2378

2379 Entity_and_Attribute_Information =

2380 [1 {*Detailed_Description*}n |

2381 1 {Overview_Description}n |

2382 1 {*Detailed_Description*}n +

2383 1 {Overview_Description}n]

2384

2385 Detailed_Description =

2386 Entity_Type +

2387 0 {*Attribute*}n

2388

2389 Attribute =

2390 Attribute_Label +

2391 Attribute_Definition +

2392 Attribute_Definition_Source +

2393 1 {*Attribute_Domain_Values*}n +

2394 0 {Beginning_Date_of_Attribute_Values +

2395 0{Ending_Date_of_Attribute_Values}1}n +

2396 (Attribute_Value_Accuracy_Information) +

2397 (Attribute_Measurement_Frequency)

2398

2399 Attribute_Domain_Values =

2400 [Enumerated_Domain |

2401 Range_Domain |

2402 Codeset_Domain |

2403 Unrepresentable_Domain] +

2404 0{Data_Scaling_Information}1

2405

2406 **Data_Scaling_Information =**

2407 [Polynomial|

2408 Non_Polynomial_Scaling]

2409

2410 **Polynomial =**

2411 **Polynomial_Numerator +**

2412 **0{Polynomial_Denominator}1**

2413

2414 **Polynomial_Numerator =**

2415 **1{Polynomial_Coefficient}n**

2416

2417 **Polynomial_Denominator =**

2418 **1{Polynomial_Coefficient}n**

2419

2420

2421

2422

2423 Extension_Information

2424 Name: Data_Scaling_Information

2425 Short Name: datascal

2426 Type: compound

2427 Child: Polynomial_Function

2428 Child: Non_Polynomial_Scaling

2429 Parent: Attribute_Domain_Values

2430 Optionality: Mandatory-if-applicable

2431 Repeatability: =1

2432 Definition: Function converting set of values on one scale to another.

2433 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2434 Development Team

2435

2436 Extension_Information

2437 Name: Polynomial_Function

2438 Short Name: polyfunc

2439 Type: compound

2440 Child: Polynomial_Numerator

2441 Child: Polynomial_Denominator

2442 Parent: Data_Scaling_Information

2443 Optionality: Conditional - present and mandatory if and only if Non_Polynomial_Scaling is

2444 absent

-
- 2445 Repeatability: =1
- 2446 Definition: A function in successive powers of the independent variable, or the ratio of such
- 2447 functions, used in a transoformation, for example, to derive a set of values on one
- 2448 scale or coordinate system from the value in another, in the sense derived value =
- 2449 polynomial (initial value).
- 2450 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2451 Development Team
- 2452
- 2453 Extension_Information
- 2454 Name: Polynomial_Numerator
- 2455 Short Name: polynume
- 2456 Type: compound
- 2457 Child: Polynomial_Coefficient
- 2458 Parent: Polynomial_Function
- 2459 Optionality: Mandatory
- 2460 Repeatability: =1
- 2461 Definition: The polynomial function when not a ratio, and the dividend of the ratio when it
- 2462 is.
- 2463 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2464 Development Team
- 2465 Extension_Information
- 2466 Name: Polynomial_Denominator
- 2467 Short Name: polydeno
- 2468 Type: compound
- 2469 Child: Polynomial_Coefficient

-
- 2470 Parent: Polynomial_Function
- 2471 Optionality: Mandatory if applicable
- 2472 Repeatability: =1
- 2473 Definition: The divisor of a polynomial function that is a ratio (*If absent, assumed equal to*
- 2474 *1*).
- 2475 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2476 Development Team
- 2477
- 2478 Extension_Information
- 2479 Name: Polynomial_Coefficient
- 2480 Short Name: polycoef
- 2481 Type: real
- 2482 Domain: free real
- 2483 Parent: Polynomial_Numerator
- 2484 Optionality: Mandatory
- 2485 Repeatability: >=1
- 2486 Definition: The coefficient of one term in the numerator or denominator of a polynomial
- 2487 function. (*For a polynomial numerator or denominator of order m , there will be*
- 2488 *$m+1$ coefficients. Any of these coefficients, except that of the m power term, may*
- 2489 *be zero. When the function is linear, the coefficient of the zero-power term is the*
- 2490 *offset and the coefficient of the first power term is the scale factor.)*
- 2491 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2492 Development Team
- 2493
- 2494

2495 Extension_Information

2496 Name: Non_Polynomial_Scaling

2497 Short Name: npolscal

2498 Type: text

2499 Domain: free text

2500 Parent: Data_Scaling_Information

2501 Optionality: Conditional - present and mandatory if and only if Polynomial_Function is

2502 absent

2503 Repeatability: =1

2504 Definition: Text description of the function used to derive derive a set of values on one

2505 scale from there value in another, using a function that is not a polynomial.

2506 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2507 Development Team

2508

2509 Platform and Mission Information

2510

2511 Extension Information

2512 Name: Platform_and_Mission_Information

2513 Short Name: plmiinfo

2514 Type: Compound

2515 Child: Mission_Information

2516 Child: Platform_Information

2517 Parent: Metadata

2518 Optionality: Mandatory-if-applicable

2519 Repeatability: =1

2520 Definition: Descriptive information about the platform from which the measurements that
2521 produced the data and about the program of which the data collection was a part.

2522 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2523 Development Team

2524

2525

2526 **Platform_and_Mission_Information =**

2527 **(Mission_Information) +**

2528 **(1{Platform_Information}n)**

2529

2530 **Mission_Information =**

2531 **(Mission_Description) +**

2532 **(Mission_History)**

2533

2534

Mission_History =

2535

Mission_Start_Date +

2536

(1{Mission_Significant_Event}n) +

2537

0{Mission_Completion}1

2538

2539

Mission_Start_Date =

2540

Single Date/Time (*see section 9 of base standard for production*

2541

rules)

2542

2543

Mission_Significant_Event =

2544

Process_Step (*see section 2 of base standard for production*

2545

rules)

2546

2547

Mission_Completion =

2548

Single Date/Time (*see section 9 of base standard for production*

2549

rules)

2550

2551

Platform_Information =

2552

(1{Platform_Sponsor}n) +

2553

(Platform_Description)

2554

(Platform_Orbit) +

2555

(Flight Protocol)

2556

2557

2558 **Platform_Orbit =**

2559 **[Keplerian_Orbit**

2560 **Nominal_Geostationary_Position]**

2561

2562 **Keplerian_Orbit =**

2563 **[[Semimajor_Axis |**

2564 **Orbit_Period] |**

2565 **Semimajor_Axis +**

2566 **Orbit_Period] +**

2567 **Eccentricity +**

2568 **Orbit_Angle_Units +**

2569 **Inclination +**

2570 **Right_Ascension_of_Ascending_Node +**

2571 **Argument_of_Perigee +**

2572 **Perigee_Passage_Time**

2573

2574 **Orbit_Period =**

2575 **Orbit_Period_Units +**

2576 **Orbit_Period_Value**

2577

2578 **Perigee_Passage_Time =**

2579 Single Date/Time (see section 9 of base standard for production

2580 rules)

2581

2582

2583 **Nominal_Geostationary_Position =**
2584 **Platform_Nominal_Longitude +**
2585 **Platform_Nominal_Altitude**
2586
2587 **Platform_Nominal_Altitude =**
2588 **Platform_Nominal_Altitude_Units +**
2589 **Platform_Nominal_Altitude_Value**
2590
2591 **Platform_Nominal_Altitude_Units =**
2592 *Altitude_Distance_Units (see section 4 of base standard for*
2593 *complete production rules)*
2594
2595 **Flight_Protocol =**
2596 **Flying_Height +**
2597 **(GPS_Information_Availability) +**
2598 **(INS_Reading_Availability)**
2599
2600
2601
2602 Extension_Information
2603 Name: Mission_Information
2604 Short Name: missinfo
2605 Type: compound
2606 Child: Mission_Description
2607 Child: Mission_History

- 2608 Parent: Platform_and_Mission_Information
- 2609 Optionality: Optional
- 2610 Repeatability: =1
- 2611 Definition: General information about the overall data gathering program to which the data
- 2612 contribute.
- 2613 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2614 Development Team
- 2615
- 2616 Extension_Information
- 2617 Name: Mission_Description
- 2618 Short Name: missdesc
- 2619 Type: text
- 2620 Domain: free text
- 2621 Parent: Mission_Information
- 2622 Optionality: Optional
- 2623 Repeatability: =1
- 2624 Definition: Description of the mission of which the platform observations are part and the
- 2625 objectives of that mission.
- 2626 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2627 Development Team
- 2628
- 2629 Extension_Information
- 2630 Name: Mission_History
- 2631 Short Name: misshist
- 2632 Type: compound

- 2633 Child: Mission_Start_Date
- 2634 Child: Mission_Significant_Event
- 2635 Child: Mission_Completion
- 2636 Parent: Mission_Information
- 2637 Optionality: Optional
- 2638 Repeatability: =1
- 2639 Definition: Significant events and dates over the history of the mission.
- 2640 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2641 Development Team
- 2642
- 2643 Extension_Information
- 2644 Name: Mission_Start_Date
- 2645 Short Name: missstdt
- 2646 Type: compound
- 2647 Child: Single_Date/Time
- 2648 Parent: Mission_History
- 2649 Optionality: Mandatory
- 2650 Repeatability: =1
- 2651 Definition: Date that mission during which data were taken began.
- 2652 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2653 Development Team
- 2654
- 2655 Extension_Information
- 2656 Name: Mission_Significant_Event
- 2657 Short Name: misssig

-
- 2658 Type: compound
- 2659 Child: Process_Step
- 2660 Parent: Mission_History
- 2661 Optionality: Optional
- 2662 Repeatability: >=1
- 2663 Definition: Date and description of a major occurrence during mission.
- 2664 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2665 Development Team
- 2666
- 2667 Extension_Information
- 2668 Name: Mission_Completion
- 2669 Short Name: misscomp
- 2670 Type: compound
- 2671 Child: Single_Date/Time
- 2672 Parent: Mission_History
- 2673 Optionality: Mandatory-if-applicable
- 2674 Repeatability: =1
- 2675 Definition: Scheduled or actual end date of mission during which data were taken.
- 2676 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2677 Development Team
- 2678
- 2679 Extension_Information
- 2680 Name: Platform_Information
- 2681 Short Name: platinfo
- 2682 Type: compound

- 2683 Child: Platform_Sponsor
- 2684 Child: Platform_Description
- 2685 Child: Platform_Orbit
- 2686 Child: Flight_Protocol
- 2687 Parent:: Platform_and_Mission_Information
- 2688 Optionality: Optional
- 2689 Repeatability: >=1
- 2690 Definition: General information about the platform from which the data were taken.
- 2691 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2692 Development Team
- 2693
- 2694 Extension_Information
- 2695 Name: Platform_Sponsor
- 2696 Short Name: platspon
- 2697 Type: text
- 2698 Domain: free text
- 2699 Parent: Platform_Information
- 2700 Optionality: Optional
- 2701 Repeatability: >=1
- 2702 Definition: An organization responsible for building, launch, or operation of the platform,
- 2703 and its role.
- 2704 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2705 Development Team
- 2706
- 2707

- 2708 Extension_Information
- 2709 Name: Platform_Description
- 2710 Short Name: platdesc
- 2711 Type: text
- 2712 Domain: free text
- 2713 Parent: Platform_Information
- 2714 Optionality: Optional
- 2715 Repeatability: =1
- 2716 Definition: Narrative description of the platform from which the data were taken.
- 2717 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2718 Development Team
- 2719
- 2720 Extension_Information
- 2721 Name: Platform_Orbit
- 2722 Short Name: platforb
- 2723 Type: compound
- 2724 Child: Keplerian_Orbit
- 2725 Child: Nominal_Geostationary_Position
- 2726 Parent: Platform_Information
- 2727 Optionality: Optional
- 2728 Repeatability: =1
- 2729 Definition: Orbital parameters of instrument platform.
- 2730 Rationale: Informs the user about potential spatial and temporal coverage of the data.
- 2731 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2732

- 2733 Extension_Information
- 2734 Name: Keplerian_Orbit
- 2735 Short Name: kepleror
- 2736 Type: compound
- 2737 Child: Semimajor_Axis
- 2738 Child: Orbit_Period
- 2739 Child: Eccentricity
- 2740 Child: Orbit_Angle_Units
- 2741 Child: Inclination
- 2742 Child: Right_Ascension_of_Ascending_Node
- 2743 Child: Argument_of_Perigee
- 2744 Child: Perigee_Passage_Time
- 2745 Parent: Platform_Orbit
- 2746 Optionality: Conditional - present and mandatory only if Nominal_Geostationary_Position
- 2747 is absent
- 2748 Repeatability: =1
- 2749 Definition: Keplerian elements of platform orbit.
- 2750 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2751
- 2752 Extension_Information
- 2753 Name: Semimajor_Axis
- 2754 Short Name: semimaax
- 2755 Type: real
- 2756 Domain: $6378.2 < \text{Semimajoraxis} < 2.61 \times 10^5$
- 2757 Parent: Keplerian_Orbit

-
- 2758 Optionality: Conditional - mandatory if Orbit_Period is absent; otherwise optional
- 2759 Repeatability: =1
- 2760 Definition: Semimajor axis of platform orbit, in kilometers.
- 2761 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2762
- 2763 Extension_Information
- 2764 Name: Orbit_Period
- 2765 Short Name: orbitpd
- 2766 Type: compound
- 2767 Child: Orbit_Period_Units
- 2768 Child: Orbit_Period_Value
- 2769 Parent: Keplerian_Orbit
- 2770 Optionality: Conditional - mandatory if Semimajor_Axis is absent; otherwise optional
- 2771 Repeatability: =1
- 2772 Definition: Time from one perigee to the next. (*The orbit period is related to the semimajor*
- 2773 *axis of the orbit by $P^2 = 4\pi^2 a^3 / [G(M+m)]$, where P is the orbit period, a is the*
- 2774 *semimajor axis, G the universal gravitational constant, M the mass of the Earth,*
- 2775 *and m the mass of the satellite. In practice, because the product GM is easier to*
- 2776 *obtain than G or M , and because $m \ll M$, the form $P^2 = 4\pi^2 a^3 / GM$ is often used.)*
- 2777 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2778
- 2779 Extension_Information
- 2780 Name: Orbit_Period_Units
- 2781 Short Name: orpdunit
- 2782 Type: text

- 2783 Domain: "seconds" "minutes" "hours" "days" free text
- 2784 Parent: Orbit_Period
- 2785 Optionality: Mandatory
- 2786 Repeatability: =1
- 2787 Definition: Unit of measure used to express orbit period.
- 2788 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2789 Development Team
- 2790
- 2791 Extension_Information
- 2792 Name: Orbit_Period_Value
- 2793 Short Name: orpdval
- 2794 Type: real
- 2795 Domain: Orbit_Period_Value > 0
- 2796 Parent: Orbit_Period
- 2797 Optionality: Mandatory
- 2798 Repeatability: =1
- 2799 Definition: Time required for one platform orbit, in units given by Orbit_Period_Units.
- 2800 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2801
- 2802 Extension_Information
- 2803 Name: Eccentricity
- 2804 Short Name: eccentry
- 2805 Type: real
- 2806 Domain: 0 <= Eccentricity < 1
- 2807 Parent: Keplerian_Orbit

- 2808 Optionality: Mandatory
- 2809 Repeatability: =1
- 2810 Definition: Eccentricity of orbit, equal to $(1-b/a)^{1/2}$, where a is the length of the major axis
- 2811 and b is the length of the minor axis of the orbit.
- 2812 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2813
- 2814 Extension_Information
- 2815 Name: Orbit_Angle_Units
- 2816 Short Name: orbangun
- 2817 Type: text
- 2818 Domain: "degrees" "radians" free text
- 2819 Parent: Keplerian_Orbit
- 2820 Optionality: Mandatory
- 2821 Repeatability: =1
- 2822 Definition: Unit of measure used to express orbital angles.
- 2823 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2824 Development Team
- 2825
- 2826 Extension_Information
- 2827 Name: Inclination
- 2828 Short Name: inclinat
- 2829 Type: real
- 2830 Domain: $0 \leq \text{Inclination} \leq 180$
- 2831 Parent: Keplerian_Orbit
- 2832 Optionality: Mandatory

- 2833 Repeatability: =1
- 2834 Definition: Angle between orbit and equator, in units given by Orbit_Angle_Units.
- 2835 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2836
- 2837 Extension_Information
- 2838 Name: Right_Ascension_of_Ascending_Node
- 2839 Short Name: raascnod
- 2840 Type: real
- 2841 Domain: $0 \leq \text{Right_Ascension_of_Ascending_Node} < 360$
- 2842 Parent: Keplerian_Orbit
- 2843 Optionality: Mandatory
- 2844 Repeatability: =1
- 2845 Definition: The right ascension (angle eastward from the vernal equinox) where the satellite
- 2846 orbit crosses the equator, moving northward, in units given by Orbit_Angle_Units.
- 2847 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision
- 2848
- 2849 Extension_Information
- 2850 Name: Argument_of_Perigee
- 2851 Short Name: argupgee
- 2852 Type: real
- 2853 Domain: $0 \leq \text{Argument_of_Perigee} < 360$
- 2854 Parent: Keplerian_Orbit
- 2855 Optionality: Mandatory
- 2856 Repeatability: =1

2857 Definition: The angle between the ascending node and perigee, measured from the
2858 ascending node in the direction of the platform's motion along the plane of the orbit,
2859 in units given by Orbit_Angle_Units.

2860 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision

2861

2862 Extension_Information

2863 Name: Perigee_Passage_Time

2864 Short Name: peripass

2865 Type: compound

2866 Child: Single Date/Time

2867 Parent: Keplerian_Orbit

2868 Optionality: Mandatory

2869 Repeatability: =1

2870 Definition: One date and time where platform was at closest point to earth in its orbit.

2871 Source: EOS Handbook: NOAA Polar Orbiter Data Users Guide, Dec. 88 revision

2872

2873 Extension_Information

2874 Name: Nominal_Geostationary_Position

2875 Short Name: ngeopos

2876 Type: compound

2877 Child: Platform_Nominal_Longitude

2878 Child: Platform_Nominal_Altitude

2879 Parent: Platform_Orbit

2880 Optionality: Conditional - present and mandatory only if Keplerian_Orbit is absent

2881 Repeatability: =1

2882 Definition: Nominal location of platform designed to remain stationary over one point on
2883 earth.

2884 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
2885 Development Team

2886

2887 Extension_Information

2888 Name: Platform_Nominal_Longitude

2889 Short Name: pnomlong

2890 Type: real

2891 Domain: $-180 < \text{Platform_Nominal_Longitude} \leq 180$

2892 Parent: Nominal_Geostationary_Position

2893 Optionality: Mandatory

2894 Repeatability: =1

2895 Definition: Nominal value for longitude of subsatellite point.

2896 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2897 Development Team

2898

2899 Extension_Information

2900 Name: Platform_Nominal_Altitude

2901 Short Name: gpnalti

2902 Type: compound

2903 Child: Platform_Nominal_Altitude_Units

2904 Child: Platform_Nominal_Altitude_Value

2905 Optionality: Mandatory

2906 Repeatability: =1

2907 Definition: Nominal altitude of satellite above the surface given by Altitude_Datum_Name
2908 defined in base standard.

2909 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
2910 Development Team

2911

2912 Extension_Information

2913 Name: Platform_Nominal_Altitude_Units

2914 Short Name: gpnaltun

2915 Type: compound

2916 Child: Altitude_Distance_Units

2917 Parent: Platform_Nominal_Altitude

2918 Optionality: Mandatory

2919 Repeatability: =1

2920 Definition: Units of measure in which nominal altitude for platform is expressed.

2921 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

2922 Development Team

2923

2924 Extension_Information

2925 Name: Platform_Nominal_Altitude_Value

2926 Short Name: gpnaltva

2927 Type real

2928 Domain: free real

2929 Parent: Platform_Nominal_Altitude

2930 Optionality: Mandatory

2931 Repeatability: =1

- 2932 Definition: Value for nominal altitude of platform, in units given by
- 2933 Platform_Nominal_Altitude_Units.
- 2934 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 2935 Development Team
- 2936
- 2937 Extension_Information
- 2938 Name: Flight_Protocol
- 2939 Short Name: fltprot
- 2940 Type: compound
- 2941 Child: Flying_Height
- 2942 Child: GPS_Information_System_Availability
- 2943 Child: INS_Reading_Availability
- 2944 Parent: Platform_Information
- 2945 Optionality: Optional
- 2946 Repeatability: =1
- 2947 Definition: Description of circumstances and properties of the flight track relevant to use of
- 2948 the images and data.
- 2949 Source: ISPRS WG II/4
- 2950
- 2951 Extension_Information
- 2952 Name: Flying_Height
- 2953 Short Name: flyhite
- 2954 Type: real
- 2955 Domain: Flying_Height > 0
- 2956 Parent: Flight_Protocol

- 2957 Optionality: Mandatory
- 2958 Repeatability: =1
- 2959 Definition: Height of platform above ground in meters, with an uncertainty of 10-100
- 2960 meters.
- 2961 Rationale: This value is used for planning purposes or photo interpretation.
- 2962 Source: ISPRS/WG-II/4
- 2963
- 2964 Extension_Information
- 2965 Name: GPS_Information_System_Availability
- 2966 Short Name: gpsavail
- 2967 Type: text
- 2968 Domain: "available" "not available"
- 2969 Parent: Flight Protocol
- 2970 Optionality: Optional
- 2971 Repeatability: =1
- 2972 Definition: Availability of three-dimensional Global Positioning System (GPS) positions.
- 2973 Source: ISPRS/WG-II/4
- 2974
- 2975 Extension_Information
- 2976 Name: INS_Reading_Availability
- 2977 Short Name: insavail
- 2978 Type: text
- 2979 Domain: "available" "not available"
- 2980 Parent: Flight_Protocol
- 2981 Optionality: Optional

- 2982 Repeatability: =1
- 2983 Definition: Availability of Inertial Navigation System (INS) readings along the flight line.
- 2984 Source: ISPRS/WG-II/4
- 2985

2986 Instrument Information

2987

2988 Extension_Information

2989 Name: Instrument_Information

2990 Short Name: instinfo

2991 Type: compound

2992 Child: Instrument_Description

2993 Child: Instrument_Reference

2994 Parent: Metadata

2995 Optionality: Mandatory-if-applicable

2996 Repeatability: >=1

2997 Definition: Instrument properties and behavior.

2998 Rationale: The properties of the instrument must be known in order to interpret the readings

2999 as geographic information.

3000 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

3001 Development Team

3002

3003 **Instrument_Information =**

3004 **[[1{Instrument_Description}n |**

3005 **1{Instrument_Reference}n]]**

3006 **1{Instrument_Description}n +**

3007 **1{Instrument_Reference}n]**

3008

3009 **Instrument_Description =**

3010 **Instrument Type +**

3011 **0{Operational_Mode}1 +**
3012 **Collection_Type +**
3013 **(Orientation_Information) +**
3014 **[Frame_Camera]**
3015 **Scan|Other_Collector_Description] +**
3016 **(Instrument_Properties_Description)**
3017
3018 **Orientation_Information =**
3019 **Axes +**
3020 **(Rotation_Description) +**
3021 **(Translation_Description) +**
3022
3023 **Axes =**
3024 **X_Axis_Definition +**
3025 **Y_Axis_Definition +**
3026 **Z_Axis_Definition**
3027
3028 **Frame_Camera =**
3029 **(Frame_Hardware) +**
3030 **Frame_Optics +**
3031 **Frame_Geometric_Properties +**
3032 **(Frame_Operation) +**
3033 **(Frame_Radiometric_Properties) +**
3034 **(Frame_Spectral_Properties)**
3035

- 3036 **Frame_Hardware =**
- 3037 **(Camera_Type) +**
- 3038 **(Camera_Identifier) +**
- 3039 **(Lens) +**
- 3040 **(Magazine_Identifier) +**
- 3041 **(Film_Type) +**
- 3042 **(Aerial_Film_Speed) +**
- 3043 **(Effective_Aerial_Film_Speed) +**
- 3044 **(Developing_Institution)**
- 3045
- 3046 **Developing_Institution =**
- 3047 *Contact_Information (see section 10 of base standard for*
- 3048 *production rules)*
- 3049
- 3050 **Lens =**
- 3051 **Lens_Type +**
- 3052 **Lens_Identifier**
- 3053
- 3054 **Frame_Optics =**
- 3055 **(Photographic_Resolving_Power) +**
- 3056 **(Relative_Aperture) +**
- 3057 **(Exposure_Time)**
- 3058 **Calibrated_Focal_Length +**
- 3059 **(Quality_of_Focal_Length) +**
- 3060 **(Last_Calibration)**

3061

3062

Photographic_Resolving_Power =

3063

Number_of_Resolution_Values +

3064

1{Resolution_Value_Set}n +

3065

(Area_Weighted_Average_Resolution)

3066

3067

Resolution_Value_Set =

3068

Resolving_Angle +

3069

Resolving_Value_Radial +

3070

Resolving_Value_Tangential

3071

3072

Last_Calibration =

3073

Date_of_Last_Calibration +

3074

(Method_of_Last_Calibration) +

3075

(Institution_of_Last_Calibration)

3076

3077

Frame_Geometric_Properties =

3078

(Image_Size) +

3079

[Fiducial |

3080

Reseau |

3081

Sensor_System] +

3082

(Principal_Point_of_Autocollimation) +

3083

(Quality_of_Principal_Point_of_Autocollimation) +

3084

(Principal_Point_of_Symmetry) +

3085

(Quality_of_Principal_Point_of_Symmetry) +

3086 **(Fiducial_Center) +**
3087 **(Sensor_Element_Location) +**
3088 **(Distortion)**
3089
3090 **Image_Size =**
3091 **Image_Size_x_Value +**
3092 **Image_Size_y_Value**
3093
3094 **Fiducial =**
3095 **Location_Information** *(see separate section for production*
3096 *rules)*
3097
3098 **Reseau =**
3099 **Location_Information** *(see separate section for production*
3100 *rules)*
3101
3102 **Sensor_System =**
3103 **Sensor_Grid +**
3104 **Calibrated_Detector_Positions**
3105
3106 **Sensor_Grid =**
3107 **Raster_Object_Type** *(see section 3 for production rules)*
3108
3109
3110

3111 **Calibrated_Detector_Positions =**

3112 **Location_Information** (*see separate section for production*

3113 *rules*)

3114

3115 **Principal_Point_of_Autocollimation =**

3116 **Location_Information** (*see separate section for production*

3117 *rules*)

3118

3119 **Quality_of_Principal_Point_of_Autocollimation =**

3120 **Quality_of_Autocollimation_Principal_Point_x_Value +**

3121 **Quality_of_Autocollimation_Principal_Point_y_Value**

3122

3123 **Principal_Point_of_Symmetry =**

3124 **Location_Information** (*see separate section for production*

3125 *rules*)

3126

3127 **Quality_of_Principal_Point_of_Symmetry =**

3128 **Quality_of_Symmetry_Principal_Point_x_Value +**

3129 **Quality_of_Symmetry_Principal_Point_y_Value**

3130

3131 **Fiducial_Center =**

3132 **Location_Information** (*see separate section for production*

3133 *rules*)

3134

3135

3136 **Sensor_Element_Location =**

3137 **Availability_of_Element_Locations +**

3138 **(Source_of_Element_Locations)**

3139

3140 **Source_of_Element_Locations =**

3141 Citation_Information (*see section 8 of base standard for*

3142 *production rules*)

3143

3144 **Distortion =**

3145 **[Distortion_Type_Radial_Symmetrical |**

3146 **Distortion_Type_Radial_Asymmetrical |**

3147 **Distortion_Type_Affine]**

3148

3149 **Distortion_Type_Radial_Symmetrical =**

3150 **[Distance_Dependent_Distortion |**

3151 **Angle_Dependent_Distortion |**

3152 **Radial_Symmetrical_Distortion_Polynomial]**

3153

3154 **Distance_Dependent_Distortion =**

3155 **Radial_Symmetrical_Distance_Interval +**

3156 **Number_of_Distance_Distortion_Values +**

3157 **1{Distance_Distortion_Value}n**

3158

3159 **Angle_Dependent_Distortion =**

3160 **Radial_Symmetrical_Angle_Interval +**

3161 **Number_of_Angle_Distortion_Values +**
3162 **1{Angle_Distortion_Value}n**

3163

3164 **Radial_Symmetrical_Distortion_Polynomial =**
3165 **Polynomial_Function** (*see section 5 for production rules*)

3166

3167 **Distortion_Type_Radial_Asymmetrical =**
3168 **Radial_Asymmetrical_Coefficient_B1 +**
3169 **Radial_Asymmetrical_Coefficient_B2**

3170

3171 **Distortion_Type_Affine =**
3172 **Affine_Distortion_X_Prime_Coefficient +**
3173 **Affine_Distortion_Y_Prime_Coefficient**

3174

3175 **Frame_Operation =**
3176 **(Stabilized_Mount) +**
3177 **(Forward_Motion_Compensation)**

3178

3179 **Frame_Radiometric_Properties =**
3180 **0{Frame_Radiometric_Calibration}1 +**
3181 **(Light_Drop)**

3182

3183 **Frame_Radiometric_Calibration =**
3184 **Data_Scaling_Information** (*see Entity and Attribute Information*
3185 *for production rules*)

3186

3187

Frame_Spectral_Properties =

3188

(Frame_Spectral_Information) +

3189

(Filter_on_Camera) +

3190

(Spectral_Limit)

3191

3192

Frame_Spectral_Information =

3193

Spectral_Information (*see elsewhere in this section for*

3194

production rules)

3195

3196

Filter_on_Camera =

3197

Filter_on_Camera_Indicator +

3198

0{Filter_Type}1 +

3199

3200

Scan =

3201

1{Scan_Geometric_Properties}n +

3202

Sample_Properties +

3203

Scan_Radiometric_Properties +

3204

0{Scan_Spectral_Properties}1

3205

3206

Scan_Geometric_Properties =

3207

Scan_Angle_Units +

3208

Scan_Time_Units +

3209

Scan_Distance_Units +

3210

0{Scan_Cross_Track_Properties}1 +

3211 **0{Scan_Elevation_Properties}1 +**

3212 **0{Profile_Properties}1 +**

3213 **(Scan_Timing) +**

3214 **Instantaneous_Field_of_View**

3215

3216 **Scan_Cross_Track_Properties =**

3217 **Cross_Track_Zero +**

3218 **[Cross_Track_Sweep |**

3219 **Cross_Track_Fixed_Angle] +**

3220 **(Cross_Track_Description)**

3221

3222 **Cross_Track_Zero =**

3223 **Cross_Track_Axis +**

3224 **Cross_Track_Direction**

3225

3226 **Cross_Track_Sweep =**

3227 **Number_of_Cross_Track_Samples +**

3228 **Cross_Track_Start_Angle +**

3229 **[Cross_Track_Extent_Angle |**

3230 **Cross_Track_Step_Angle]**

3231

3232 **Scan_Elevation_Properties =**

3233 **Elevation_Zero +**

3234 **[Elevation_Sweep |**

3235 **Elevation_Fixed_Angle]**

3236 (Elevation_Description)

3237

3238 Elevation_Zero =

3239 Elevation_Axis +

3240 Elevation_Direction

3241

3242 Elevation_Sweep =

3243 Number_of_Elevation_Samples +

3244 Elevation_Start_Angle +

3245 [Elevation_Extent_Angle |

3246 Elevation_Step_Angle]

3247

3248 Profile_Properties =

3249 [Profile_Sounding |

3250 Profile_Fixed] +

3251 (Profile_Description)

3252

3253 Profile_Sounding =

3254 Number_of_Profile_Samples +

3255 Profiling_Direction +

3256 Profile_Start +

3257 [Profile_Extent |

3258 Profile_Step]

3259

3260

3261 **Scan_Timing =**

3262 **Scan_Start_Time +**

3263 **[Scan_Duration |**

3264 **Scan_Step_Time] +**

3265 **Scan_Repeat_Time +**

3266

3267 **Scan_Start_Time =**

3268 **Single Date/Time** (*see section 9 of base standard for production*

3269 *rules*)

3270

3271 **Sample_Properties =**

3272 **Sample_Description_Units +**

3273 **1{Pixel_Description}n**

3274

3275 **Sample_Description_Units =**

3276 **0{Sample_Angle_Units}1 +**

3277 **0{Sample_Profile_Units}1**

3278

3279 **Pixel_Description =**

3280 **0{Pixel_Cross_Track_Size}1 +**

3281 **0{Pixel_Elevation_Size}1 +**

3282 **0{Pixel_Profile_Size}1 +**

3283 **(Pixel_Height_Above_Ellipsoid) +**

3284 **(Pixel_Point_Spread_Function)**

3285

3286 **Sample_Profile_Units =**

3287 *Altitude_Distance_Units (see Spatial_Reference_Information*

3288 *for production rules)*

3289

3290 **Scan_Radiometric_Properties =**

3291 **Data_Scaling_Information** *(see Entity and Attribute*

3292 *Information for production rules)*

3293

3294 **Scan_Spectral_Properties =**

3295 **Spectral_Information**

3296

3297 **Spectral_Information =**

3298 **Number_of_Wavelength_Bands +**

3299 **1{Wavelength_Band_Properties}n**

3300

3301 **Number_of_Wavelength_Bands =**

3302 **Number_of_Bands** *(see section 1 for production rules)*

3303

3304 **Wavelength_Band_Properties**

3305 **Wavelength_Units +**

3306 **(Band_Boundary_Definition) +**

3307 **Minimum_Wavelength +**

3308 **Maximum_Wavelength +**

3309 **(Peak_Wavelength) +**

3310 **(Nominal_Spatial_Resolution) +**

3311	(Band_Quality) +
3312	0{Polarization_Characteristics}n +
3313	(Band_Description)
3314	
3315	Nominal_Spatial_Resolution =
3316	Spatial_Resolution_Units +
3317	Spatial_Resolution_Value
3318	
3319	Polarization Characteristics =
3320	Receiver_Polarization +
3321	0{Sender_Polarization}1
3322	
3323	Instrument_Reference =
3324	Citation_Information (<i>see section 8 of base standard for</i>
3325	<i>production rules</i>)
3326	
3327	Extension_Information
3328	Name: Instrument_Description
3329	Short Name: instdesc
3330	Type: compound
3331	Child: Instrument_Type
3332	Child: Operational_Mode
3333	Child: Collection_Type
3334	Child: Orientation_Information
3335	Child: Frame_Camera

- 3336 Child: Scan
- 3337 Child: Other_Collector_Description
- 3338 Child: Instrument_Properties_Description
- 3339 Parent: Instrument_Information
- 3340 Optionality: Conditional - mandatory if no instances of Instrument_Reference present,
3341 otherwise optional.
- 3342 Repeatability: >=1
- 3343 Definition: Characteristics and behavior of instrument.
- 3344 Rationale: Descriptive information about the instrument may be in metadata accompanying
3345 the data.
- 3346 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
3347 Development Team
- 3348
- 3349 Extension_Information
- 3350 Name: Instrument_Type
- 3351 Short Name: insttyp
- 3352 Type: text
- 3353 Domain: "imager" "sounder" free text
- 3354 Parent: Instrument_Description
- 3355 Optionality: Mandatory
- 3356 Repeatability: =1
- 3357 Definition: Class of data measuring instrument.
- 3358 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
3359 Standard - Instrument Data Collection Type
- 3360

- 3361 Extension_Information
- 3362 Name: Operational_Mode
- 3363 Short Name: opmode
- 3364 Type: text
- 3365 Domain: "launch" "survival" "initialization" "safe" "diagnostic" "standby" "crosstrack"
- 3366 "biaxial" "solar calibration" free text
- 3367 Parent: Instrument_Description
- 3368 Optionality: Mandatory-if-applicable
- 3369 Repeatability: =1
- 3370 Definition: The way in which the instrument is functioning.
- 3371 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 3372 Standard
- 3373
- 3374 Extension_Information
- 3375 Name: Collection_Type
- 3376 Short Name: colltype
- 3377 Type: text
- 3378 Domain: "frame" "pushbroom" "whiskbroom" "panoramic" "radar" "laser" free text
- 3379 Parent: Instrument_Description
- 3380 Optionality: Mandatory
- 3381 Repeatability: =1
- 3382 Definition: The way in which the instrument gathers data from the scene observed.
- 3383 Source: ISPRS/WG-II/4
- 3384
- 3385

- 3386 Extension_Information
- 3387 Name: Orientation_Information
- 3388 Short Name: orininfo
- 3389 Type: compound
- 3390 Child: Axes
- 3391 Child: Rotation_Description
- 3392 Child: Translation_Description
- 3393 Parent: Instrument_Description
- 3394 Optionality: Optional
- 3395 Repeatability: =1
- 3396 Definition: Positioning and direction of instrument components on platform.
- 3397 Rationale: This information is required in order to derive the direction of observation.
- 3398 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3399 Development Team
- 3400
- 3401 Extension_Information
- 3402 Name: Axes
- 3403 Short Name: axes
- 3404 Type: compound
- 3405 Child: X_Axis_Definition
- 3406 Child: Y_Axis_Definition
- 3407 Child: Z_Axis_Definition
- 3408 Parent: Orientation_Information
- 3409 Optionality: Mandatory
- 3410 Repeatability: =1

-
- 3411 Definition: Orientation of instrument axes.
- 3412 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3413 Development Team
- 3414
- 3415 Extension_Information
- 3416 Name: X_Axis_Definition
- 3417 Short Name: xaxisdef
- 3418 Type: text
- 3419 Domain: "up" "down" "forward" "backward" "left" "right" "north" "south" "east" "west"
- 3420 free text
- 3421 Parent: Axes
- 3422 Optionality: Mandatory
- 3423 Repeatability: =1
- 3424 Definition: Direction of instrument x-axis.
- 3425 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3426 Development Team
- 3427
- 3428 Extension_Information
- 3429 Name: Y_Axis_Definition
- 3430 Short Name: yaxisdef
- 3431 Type: text
- 3432 Domain: "up" "down" "forward" "backward" "left" "right" "north" "south" "east" "west"
- 3433 free text
- 3434 Parent: Axes
- 3435 Optionality: Mandatory

- 3436 Repeatability: =1
- 3437 Definition: Direction of instrument y-axis.
- 3438 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3439 Development Team
- 3440
- 3441 Extension_Information
- 3442 Name: Z_Axis_Definition
- 3443 Short Name: zaxisdef
- 3444 Type: text
- 3445 Domain: "up" "down" "forward" "backward" "left" "right" "north" "south" "east" "west"
- 3446 free text
- 3447 Parent: Axes
- 3448 Optionality: Mandatory
- 3449 Repeatability: =1
- 3450 Definition: Direction of instrument z-axis.
- 3451 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3452 Development Team
- 3453
- 3454 Extension_Information
- 3455 Name: Rotation_Description
- 3456 Short Name: rotdesc
- 3457 Type: text
- 3458 Domain: free text
- 3459 Parent: Orientation_Information
- 3460 Optionality: Optional

- 3461 Repeatability: =1
- 3462 Definition: Description of direction of instrument components relative to platform axes.
- 3463 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3464 Development Team
- 3465
- 3466 Extension_Information
- 3467 Name: Translation_Description
- 3468 Short Name: trandesc
- 3469 Type: text
- 3470 Domain: free text
- 3471 Parent: Orientation_Information
- 3472 Optionality: Optional
- 3473 Repeatability: =1
- 3474 Definition: Description of position of instrument components relative to platform axes.
- 3475 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 3476 Development Team
- 3477
- 3478 Extension_Information
- 3479 Name: Frame_Camera
- 3480 Short Name: frame
- 3481 Type: compound
- 3482 Child: Frame_Hardware
- 3483 Child: Frame_Optics
- 3484 Child: Frame_Geometric_Properties
- 3485 Child: Frame_Operation

- 3486 Child: Frame_Radiometric_Properties
- 3487 Child: Frame_Spectral_Properties
- 3488 Parent: Instrument_Description
- 3489 Optionality: Conditional - present and mandatory if and only if Scan and
- 3490 Other_Collector_Description are absent
- 3491 Repeatability: =1
- 3492 Definition: Description of photographic system using a central perspective projection, with
- 3493 the detector, normally film, pressed against a calibrated frame during the exposure.
- 3494 Source: ISPRS/WG-II/4
- 3495
- 3496 Extension_Information
- 3497 Name: Frame_Hardware
- 3498 Short Name: fcamhwar
- 3499 Type: compound
- 3500 Child: Camera_Type
- 3501 Child: Camera_Identifier
- 3502 Child: Lens
- 3503 Child: Magazine_Identifier
- 3504 Child: Film_Type
- 3505 Child: Aerial_Film_Speed
- 3506 Child: Effective_Aerial_Film_Speed
- 3507 Child: Developing_Institution
- 3508 Parent: Frame_Camera
- 3509 Optionality: Optional
- 3510 Repeatability: =1

-
- 3511 Definition: Physical description of camera and film.
- 3512 Source: ISPRS/WG-II/4
- 3513
- 3514 Extension_Information
- 3515 Name: Camera_Type
- 3516 Short Name: camtype
- 3517 Type: text
- 3518 Domain: "RMK 60/25" "RMK 30/23" "RMK 15/23" "RMK 11.5/18" "RMK 15/23"
- 3519 "RMK 8.5/23" "RMK TOP 15" "RMK TOP 30" "MRB 30/2323" "MRB 21"
- 3520 "MRB 15/2323" "MRB 9/2323" "LMK" "LMK1000" "LMK1009" "LMK1015"
- 3521 "LMK1021" "LMK1030" "LMK2000" "LMK2009" "LMK2015" "LMK2021"
- 3522 "LMK2030" "RC 8" "RC 9" "RC 10" "RC 10A" "RC 20" "RC 30" free text (*RMK*
- 3523 *camera types are manufactured by Zeiss Oberkochen, MRB and LMK Camera*
- 3524 *types by Zeiss Jena, RC8-RC10A by Wild, RC20 by Leica, and RC30 by Leica/LH*
- 3525 *systems*)
- 3526 Parent: Frame_Hardware
- 3527 Optionality: Optional
- 3528 Repeatability: =1
- 3529 Definition: Model of camera as defined by manufacturer.
- 3530 Source: ISPRS/WG-II/4
- 3531
- 3532 Extension_Information
- 3533 Name: Camera_Identifier
- 3534 Short Name: camident
- 3535 Type: text

-
- 3536 Domain: free text
- 3537 Parent: Frame_Hardware
- 3538 Optionality: Optional
- 3539 Repeatability: =1
- 3540 Definition: Manufacturer's unique alphanumeric code specifying the camera body.
- 3541 Source: ISPRS/WG-II/4
- 3542
- 3543 Extension_Information
- 3544 Name: Lens
- 3545 Short Name: lens
- 3546 Type: compound
- 3547 Child: Lens_Type
- 3548 Child: Lens_Identifier
- 3549 Parent: Frame_Hardware
- 3550 Optionality: Optional
- 3551 Repeatability: =1
- 3552 Definition: Optical component that uses refraction to focus light on the image plane.
- 3553 Source: ISPRS/WG-II/4
- 3554
- 3555 Extension_Information
- 3556 Name: Lens_Type
- 3557 Short Name: lenstype
- 3558 Type: text
- 3559 Domain: "Topogon" "Telikon" "Topar" "Pleogon" "S-Pleogon" "Aviogon" "Wide Angle
- 3560 15AG" "Orbigon" "Normal Aviogon" "Semi-wide-angle 21 NAG" "Semi-wide-

3561 angle 21 NAG II" "Semi-wide-angle 21-4 NAGA" "Semi-wide-angle NAGA-F"
 3562 "Super Aviogon" "Super-wide-angle 8.8 SAG" "Super-wide-angle 8.8
 3563 SAGII""Super-wide-angle 8.8/4 SAG-A""Super-wide-angle 8.8/4 SAGA-
 3564 F""Aviotar 30At" "Aviotar 30AtI" "Aviotar 30/4 NAT" "Aviotar 30/4 NAT-A"
 3565 "Aviotar 30/4 NATA-F" "Aviotar 30/4 NAT-S" "Universal Aviogon 15 UAG"
 3566 "Universal Aviogon 15 UAGI" "Universal Aviogon 15 UAGII" "Universal
 3567 Aviogon 15/4 UAG" "Universal Aviogon 15/4 UAG-A" "Universal Aviogon 15/4
 3568 UAGA-F" "Universal Aviogon 15/4 UAG-S" "Lamegor PI 5.6/300(A).B"
 3569 "Lamegoron PI 5.6/210A "Lamegon PI 4/150(A,B,C),D" "Superlamegon PI 5.6/90
 3570 (A,B),C" "Metrogon" "Geocon" free text (*List items Topogon through S-Pleogon
 3571 are manufactured by Zeiss, Aviogon thorough Orbigon by Wild, Normal Aviogon, all
 3572 the Semi-wide-angle models, Super Aviogon, and all the Super-wide angle models
 3573 by Wild/Leica, the Aviotar and Universal Aviogon models by Wild/Leica/LH
 3574 Systems, and the Lamegor through SuperLamegon by Zeiss, the Metrogon by
 3575 Bausch and Lomb, and the Geocon by Baker.*)

3576 Parent: Lens

3577 Optionality: Mandatory

3578 Repeatability: =1

3579 Definition: Manufacturer's name specifying design of lens.

3580 Source: ISPRS/WG-II/4

3581

3582 Extension_Information

3583 Name: Lens_Identifier

3584 Short Name: lensidnt

3585 Type: text

- 3586 Domain: free text
- 3587 Parent: Lens
- 3588 Optionality: Mandatory
- 3589 Repeatability: =1
- 3590 Definition: Unique alphanumeric identifier assigned by camera manufacturer to individual
- 3591 lens.
- 3592 Source: ISPRS/WG-II/4
- 3593
- 3594 Extension_Information
- 3595 Name: Magazine_Identifier
- 3596 Short Name: magident
- 3597 Type: text
- 3598 Domain: free text
- 3599 Parent: Frame_Hardware
- 3600 Optionality: Optional
- 3601 Repeatability: =1
- 3602 Definition: Unique alphanumeric identifier of individual magazine as assigned by
- 3603 manufacturer.
- 3604 Source: ISPRS/WG-II/4
- 3605
- 3606 Extension_Information
- 3607 Name: Film_Type
- 3608 Short Name: filmtyp
- 3609 Type: text
- 3610 Domain: free text

- 3611 Parent: Frame_Hardware
- 3612 Optionality: Optional
- 3613 Repeatability: =1
- 3614 Definition: Manufacturer's name and specification of film
- 3615 Source: ISPRS/WG-II/4
- 3616
- 3617 Extension_Information
- 3618 Name: Aerial_Film_Speed
- 3619 Short Name: afspeed
- 3620 Type: real
- 3621 Domain: Aerial_Film_Speed > 0
- 3622 Parent: Frame_Hardware
- 3623 Optionality: Optional
- 3624 Repeatability: =1
- 3625 Definition: Two-thirds of the exposure in lux seconds at the point on the characteristic
- 3626 curve where the density is 0.3 above fog density, under processing conditions
- 3627 defined in ANSI PH2.34-1969.
- 3628 Source: Albertz, J. and Kreiling, W. (1989): Photogrammetric Guide, Wichmann,
- 3629 Karlsruhe, ISPRS/WG-II/4.
- 3630
- 3631 Extension_Information
- 3632 Name: Effective_Aerial_Film_Speed
- 3633 Short Name: eafspeed
- 3634 Type: real
- 3635 Domain: Effective_Aerial_Film_Speed > 0

-
- 3636 Parent: Frame_Hardware
- 3637 Optionality: Optional
- 3638 Repeatability: =1
- 3639 Definition: Two-thirds of the exposure in lux seconds at the point on the characteristic
- 3640 curve where the density is 0.3 above fog density, under processing conditions other
- 3641 than those defined in ANSI PH2.34-1969 or determined empirically for color and
- 3642 infrared-sensitive films not covered by ANSI Standard PH 2.34-1969.
- 3643 Source: Albertz, J. and Kreiling, W. (1989): Photogrammetric Guide, Wichmann,
- 3644 Karlsruhe, ISPRS/WG-II/4.
- 3645
- 3646 Extension_Information
- 3647 Name: Developing_Institution
- 3648 Short Name: develop
- 3649 Type: compound
- 3650 Child: Contact_Information
- 3651 Parent: Frame_Hardware
- 3652 Optionality: Optional
- 3653 Repeatability: =1
- 3654 Definition: Institution where the film was developed.
- 3655 Source: ISPRS/WG-II/4
- 3656
- 3657 Extension_Information
- 3658 Name: Frame_Optics
- 3659 Short Name: fcamoptc
- 3660 Type: compound

-
- 3661 Child: Photographic_Resolving_Power
- 3662 Child: Relative_Aperture
- 3663 Child: Exposure_Time
- 3664 Child: Calibrated_Focal_Length
- 3665 Child: Quality_of_Focal_Length
- 3666 Child: Last_Calibration
- 3667 Parent: Frame_Camera
- 3668 Optionality: Mandatory
- 3669 Repeatability: =1
- 3670 Definition: Physical description of the photographic system.
- 3671 Source: ISPRS/WG-II/4
- 3672
- 3673 Extension_Information
- 3674 Name: Photographic_Resolving_Power
- 3675 Short Name: phorespo
- 3676 Type: compound
- 3677 Child: Number_of_Resolution_Values
- 3678 Child: Resolution_Value_Set
- 3679 Child: Area_Weighted_Average_Resolution
- 3680 Parent: Frame_Optics
- 3681 Optionality: Optional
- 3682 Repeatability: =1
- 3683 Definition: Resolving power of the camera at different field angles.
- 3684 Source: ISPRS/WG-II/4
- 3685

- 3686 Extension_Information
- 3687 Name: Number_of_Resolution_Values
- 3688 Short Name: nresval
- 3689 Type: integer
- 3690 Domain: Number_of_Resolution_Values >= 1
- 3691 Parent: Photographic_Resolving_Power
- 3692 Optionality: Mandatory
- 3693 Repeatability: =1
- 3694 Definition: Number of angles at which values of resolving power are available.
- 3695 Source: ISPRS/WG-II/4
- 3696
- 3697 Extension_Information
- 3698 Name: Resolution_Value_Set
- 3699 Short Name: phoreset
- 3700 Type: compound
- 3701 Child: Resolving_Angle
- 3702 Child: Resolving_Value_Radial
- 3703 Child: Resolving_Value_Tangential
- 3704 Parent: Photographic_Resolving_Power
- 3705 Optionality: Mandatory
- 3706 Repeatability: > =1
- 3707 Definition: Resolving power of the camera at different field angles.
- 3708 Source: ISPRS/WG-II/4
- 3709
- 3710

3711 Extension_Information

3712 Name: Resolving_Angle

3713 Short Name: resangle

3714 Type: real

3715 Domain: Resolving_Angle ≥ 0

3716 Parent: Resolution_Value_Set

3717 Optionality: Mandatory

3718 Repeatability: =1

3719 Definition: A field angle at which values of the resolving power are available.

3720 Source: ISPRS/WG-II/4

3721

3722 Extension_Information

3723 Name: Resolving_Value_Radial

3724 Short Name: resrad

3725 Type: real

3726 Domain: Resolving_Value_Radial > 0

3727 Parent: Resolution_Value_Set

3728 Optionality: Mandatory

3729 Repeatability: =1

3730 Definition: Resolving power in radial direction, given in line pairs per millimeter.

3731 Source: ISPRS/WG-II/4

3732

3733 Extension_Information

3734 Name: Resolving_Value_Tangential

3735 Short Name: restang

- 3736 Type: real
- 3737 Domain: = 1
- 3738 Parent: Resolution_Value_Set
- 3739 Optionality: Mandatory
- 3740 Repeatability: =1
- 3741 Definition: Resolving power in tangential direction, given in line pairs per millimeter.
- 3742 Source: ISPRS/WG-II/4
- 3743
- 3744 Extension_Information
- 3745 Name: Area_Weighted_Average_Resolution
- 3746 Short Name: awar
- 3747 Type: real
- 3748 Domain: >0
- 3749 Parent: Photographic_Resolving_Power
- 3750 Optionality: Optional
- 3751 Repeatability: =1
- 3752 Definition: Area weighted average resolution, given in line pairs per millimeter.
- 3753 Source: ISPRS/WG-II/4
- 3754
- 3755 Extension_Information
- 3756 Name: Relative_Aperture
- 3757 Short Name: relaper
- 3758 Type: real
- 3759 Domain: Relative_Aperture > 0
- 3760 Parent: Frame_Optics

-
- 3761 Optionality: Optional
- 3762 Repeatability: =1
- 3763 Definition: Ratio of focal length of camera to diameter of opening through which camera
- 3764 gathers light.
- 3765 Source: ISPRS/WG-II/4
- 3766
- 3767 Extension_Information
- 3768 Name: Exposure_Time
- 3769 Short Name: expotime
- 3770 Type: real
- 3771 Domain: Exposure_Time > 0
- 3772 Parent: Frame_Optics
- 3773 Optionality: Optional
- 3774 Repeatability: =1
- 3775 Definition: Length of exposure, in seconds.
- 3776 Source: ISPRS/WG-II/4
- 3777
- 3778 Extension_Information
- 3779 Name: Calibrated_Focal_Length
- 3780 Short Name: calfocl
- 3781 Type: real
- 3782 Domain: Calibrated_Focal_Length > 0
- 3783 Parent: Frame_Optics
- 3784 Optionality: Mandatory
- 3785 Repeatability: =1

3786 Definition: Approximate distance between the projection center and the image plane in
3787 millimeters, measured in the laboratory before launch.

3788 Source: ISPRS/WG-II/4

3789

3790 Extension_Information

3791 Name: Quality_of_Focal_Length

3792 Short Name: quafocl

3793 Type: real

3794 Domain: Quality_of_Focal_Length > 0

3795 Parent: Frame_Optics

3796 Optionality: Optional

3797 Repeatability: =1

3798 Definition: The standard deviation in millimeters of the calibrated focal length.

3799 Source: ISPRS/WG-II/4

3800

3801 Extension_Information

3802 Name: Last_Calibration

3803 Short Name: lastcali

3804 Type: compound

3805 Parent: Frame_Optics

3806 Child: Date_of_Last_Calibration

3807 Child: Method_of_Last_Calibration

3808 Child: Institution_of_Last_Calibration

3809 Optionality: Optional

3810 Repeatability: =1

3811 Definition: Date of most recent camera calibration.

3812 Source: ISPRS/WG-II/4

3813

3814 Extension_Information

3815 Name: Date_of_Last_Calibration

3816 Short Name: datlcali

3817 Type: date

3818 Domain: free date

3819 Parent: Last_Calibration

3820 Optionality: Mandatory

3821 Repeatability: =1

3822 Definition: Date of most recent camera calibration.

3823 Source: ISPRS/WG-II/4

3824

3825 Extension_Information

3826 Name: Method_of_Last_Calibration

3827 Short Name: metlcali

3828 Type: text

3829 Domain: "optical" "photographic"

3830 Parent: Last_Calibration

3831 Optionality: Optional

3832 Repeatability: =1

3833 Definition: Method of most recent camera calibration.

3834 Source: ISPRS/WG-II/4

3835

- 3836 Extension_Information
- 3837 Name: Institution_of_Last_Calibration
- 3838 Short Name: inslcali
- 3839 Type: text
- 3840 Domain: free text
- 3841 Parent: Last_Calibration
- 3842 Optionality: Optional
- 3843 Repeatability: =1
- 3844 Definition: Institution that performed the camera calibration that occurred at
- 3845 Date_of_Last_Calibration.
- 3846 Source: ISPRS/WG-II/4
- 3847
- 3848 Extension_Information
- 3849 Name: Frame_Geometric_Properties
- 3850 Short Name: framegeo
- 3851 Type: compound
- 3852 Child: Image_Size
- 3853 Child: Fiducial
- 3854 Child: Reseau
- 3855 Child: Sensor_System
- 3856 Child: Principal_Point_of_Autocollimation
- 3857 Child: Quality_of_Principal_Point_of_Autocollimation
- 3858 Child: Principal_Point_of_Symmetry
- 3859 Child: Quality_of_Principal_Point_of_Symmetry
- 3860 Child: Fiducial_Center

- 3861 Child: Sensor_Element_Location
- 3862 Child: Distortion
- 3863 Parent: Frame_Camera
- 3864 Optionality: Mandatory
- 3865 Repeatability: =1
- 3866 Definition: Geometric characteristics of instrument used to derive single frame images.
- 3867 Source: ISPRS/WG-II/4
- 3868
- 3869 Extension_Information
- 3870 Name: Image_Size
- 3871 Short Name: imsize
- 3872 Type: compound
- 3873 Child: Image_Size_x_Value
- 3874 Child: Image_Size_y_Value
- 3875 Parent: Frame_Geometric_Properties
- 3876 Optionality: Optional
- 3877 Repeatability: =1
- 3878 Definition: Metric length and width of the image.
- 3879 Source: ISPRS/WG-II/4
- 3880
- 3881 Extension_Information
- 3882 Name: Image_Size_x_Value
- 3883 Short Name: imsize_x
- 3884 Type: real
- 3885 Domain: Image_Size_x_Value > 0

- 3886 Parent: Image_Size
- 3887 Optionality: Optional
- 3888 Repeatability: =1
- 3889 Definition: Image size, in millimeters, in the direction of the x-axis.
- 3890 Source: ISPRS/WG-II/4
- 3891
- 3892 Extension_Information
- 3893 Name: Image_Size_y_Value
- 3894 Short Name: imsizey
- 3895 Type: real
- 3896 Domain: Image_Size_y_Value > 0
- 3897 Parent: Image_Size
- 3898 Optionality: Optional
- 3899 Repeatability: =1
- 3900 Definition: Image size, in millimeters, in the direction of the y-axis.
- 3901 Source: ISPRS/WG-II/4
- 3902
- 3903 Extension_Information
- 3904 Name: Fiducial
- 3905 Short Name: fcfid
- 3906 Type: compound
- 3907 Child: Location_Information
- 3908 Parent: Frame_Geometric_Properties
- 3909 Optionality: Conditional - present and mandatory if and only if Reseau and Sensor_System
- 3910 are absent.

- 3911 Repeatability: =1
- 3912 Definition: Calibrated coordinates for four or more marks attached to the frame of the
- 3913 camera, in millimeters in the image coordinate system.
- 3914 Source: ISPRS/WG-II/4
- 3915
- 3916 Extension_Information
- 3917 Name: Reseau
- 3918 Short Name: feres
- 3919 Type: compound
- 3920 Child: Location_Information
- 3921 Parent: Frame_Geometric_Properties
- 3922 Optionality: Conditional - present and mandatory if and only if Fiducial and Sensor_System
- 3923 are absent
- 3924 Repeatability: =1
- 3925 Definition: Calibrated positions of engraved réseau-crosses that are located at known
- 3926 distance above the film during exposure, given in millimeters in the image
- 3927 coordinate system.
- 3928 Source: ISPRS/WG-II/4
- 3929
- 3930 Extension_Information
- 3931 Name: Sensor_System
- 3932 Short Name: fess
- 3933 Type: compound
- 3934 Child: Sensor_Grid
- 3935 Child: Calibrated_Detector_Positions

- 3936 Parent: Frame_Geometric_Properties
- 3937 Optionality: Conditional - present and mandatory if and only if Fiducial and Reseau are
3938 absent.
- 3939 Repeatability: =1
- 3940 Definition: Image coordinate system defined by the pixels of the sensor.
- 3941 Source: ISPRS/WG-II/4
- 3942
- 3943 Extension_Information
- 3944 Name: Sensor_Grid
- 3945 Short Name: fcsgrid
- 3946 Type: compound
- 3947 Child: Raster_Object_Type
- 3948 Parent: Sensor_System
- 3949 Optionality: Mandatory
- 3950 Repeatability: =1
- 3951 Definition: Number of cells along axes of sensor grid.
- 3952 Source: ISPRS/WG-II/4
- 3953
- 3954 Extension_Information
- 3955 Name: Calibrated_Detector_Positions
- 3956 Short Name: fcscapo
- 3957 Type: compound
- 3958 Child: Location_Information
- 3959 Parent: Sensor_System
- 3960 Optionality: Mandatory

-
- 3961 Repeatability: =1
- 3962 Definition: Position of detectors in sensor grid coordinate system.
- 3963 Source: ISPRS/WG-II/4
- 3964
- 3965 Extension_Information
- 3966 Name: Principal_Point_of_Autocollimation
- 3967 Short Name: pripoaut
- 3968 Type: compound
- 3969 Child: Location_Information
- 3970 Parent: Frame_Geometric_Properties
- 3971 Optionality: Optional
- 3972 Repeatability: =1
- 3973 Definition: The point (x_0' , y_0') where the plumb line coming from the projection center
- 3974 crosses the image plane, given in millimeters in the image coordinate system.
- 3975 Source: ISPRS/WG-II/4
- 3976
- 3977 Extension_Information
- 3978 Name: Quality_of_Principal_Point_of_Autocollimation
- 3979 Short Name: quappa
- 3980 Type: compound
- 3981 Child: Quality_of_Autocollimation_Principal_Point_x_Value
- 3982 Child: Quality_of_Autocollimation_Principal_Point_y_Value
- 3983 Parent: Frame_Geometric_Properties
- 3984 Optionality: Optional
- 3985 Repeatability: =1

-
- 3986 Definition: Uncertainty in the location of the principal point of autocollimation.
- 3987 Source: ISPRS/WG-II/4
- 3988
- 3989 Extension_Information
- 3990 Name: Quality_of_Autocollimation_Principal_Point_x_Value
- 3991 Short Name: quappax
- 3992 Type: real
- 3993 Domain: Quality_of_Autocollimation_Principal_Point_x_Value >= 0
- 3994 Parent: Quality_of_Principal_Point_of_Autocollimation
- 3995 Optionality: Mandatory
- 3996 Repeatability: =1
- 3997 Definition: Standard deviation, in millimeters, of the x-position of the principal point of
- 3998 autocollimation.
- 3999 Source: ISPRS/WG-II/4
- 4000
- 4001 Extension_Information
- 4002 Name: Quality_of_Autocollimation_Principal_Point_y_Value
- 4003 Short Name: quappay
- 4004 Type: real
- 4005 Domain: Quality_of_Autocollimation_Principal_Point_y_Value >= 0
- 4006 Parent: Quality_of_Principal_Point_of_Autocollimation
- 4007 Optionality: Mandatory
- 4008 Repeatability: =1
- 4009 Definition: Standard deviation, in millimeters, of the y-position of the principal point of
- 4010 autocollimation.

- 4011 Source: ISPRS/WG-II/4
- 4012
- 4013 Extension_Information
- 4014 Name: Principal_Point_of_Symmetry
- 4015 Short Name: priposym
- 4016 Type: compound
- 4017 Child: Location_Information
- 4018 Parent: Frame_Geometric_Properties
- 4019 Optionality: Optional
- 4020 Repeatability: =1
- 4021 Definition: The coordinate of the center of the circles of equal distortion of the lens (x_s', y_s')
- 4022 in millimeters in the image coordinate system.
- 4023 Source: ISPRS/WG-II/4
- 4024
- 4025 Extension_Information
- 4026 Name: Quality_of_Principal_Point_of_Symmetry
- 4027 Short Name: quapps
- 4028 Type: compound
- 4029 Child: Quality_of_Symmetry_Principal_Point_x_Value
- 4030 Child: Quality_of_Symmetry_Principal_Point_y_Value
- 4031 Parent: Frame_Geometric_Properties
- 4032 Optionality: Optional
- 4033 Repeatability: =1
- 4034 Definition: Uncertainty in the location of the principal point of symmetry.
- 4035 Source: ISPRS/WG-II/4

4036

4037 Extension_Information

4038 Name: Quality_of_Symmetry_Principal_Point_x_Value

4039 Short Name: quappsx

4040 Type: real

4041 Domain: Quality_of_Symmetry_Principal_Point_x_Value ≥ 0

4042 Parent: Quality_of_Principal_Point_of_Symmetry

4043 Optionality: Mandatory

4044 Repeatability: =1

4045 Definition: Standard deviation, in millimeters, of the x-position of the principal point of
4046 symmetry.

4047 Source: ISPRS/WG-II/4

4048

4049 Extension_Information

4050 Name: Quality_of_Symmetry_Principal_Point_y_Value

4051 Short Name: quappsy

4052 Type: real

4053 Domain: Quality_of_Symmetry_Principal_Point_y_Value > 0

4054 Parent: Quality_of_Principal_Point_of_Symmetry

4055 Optionality: Mandatory

4056 Repeatability: =1

4057 Definition: Standard deviation, in millimeters, of the y-position of the principal point of
4058 symmetry.

4059 Source: ISPRS/WG-II/4

4060

- 4061 Extension_Information
- 4062 Name: Fiducial_Center
- 4063 Short Name: fidcent
- 4064 Type: compound
- 4065 Child: Location_Information
- 4066 Parent: Frame_Geometric_Properties
- 4067 Optionality: Optional
- 4068 Repeatability: =1
- 4069 Definition: Coordinates in millimeters, in the image coordinate system, of center point
- 4070 where lines between the four or more fiducial marks meet.
- 4071 Source: ISPRS/WG-II/4
- 4072
- 4073 Extension_Information
- 4074 Name: Sensor_Element_Location
- 4075 Short Name: sensello
- 4076 Type: compound
- 4077 Child: Availability_of_Element_Locations
- 4078 Child: Source_of_Element_Locations
- 4079 Parent: Frame_Geometric_Properties
- 4080 Optionality: Optional
- 4081 Repeatability: =1
- 4082 Definition: Physical position of individual sensor pixels, in the image coordinate system.
- 4083 Source: ISPRS/WG-II/4
- 4084
- 4085

4086 Extension_Information

4087 Name: Availability_of_Element_Locations

4088 Short Name: senselav

4089 Type: text

4090 Domain: "available" "not available"

4091 Parent: Sensor_Element_Location

4092 Optionality: Mandatory

4093 Repeatability: =1

4094 Definition: Whether or not a reference providing sensor element location exists.

4095 Source: ISPRS/WG-II/4

4096

4097 Extension_Information

4098 Name: Source_of_Element_Locations

4099 Short Name: senselso

4100 Type: compound

4101 Child: Citation_Information

4102 Parent: Sensor_Element_Location

4103 Optionality: Optional

4104 Repeatability: =1

4105 Definition: Citation for reference providing sensor element location information.

4106 Source: ISPRS/WG-II/4

4107

4108 Extension_Information

4109 Name: Distortion

4110 Short Name: distort

- 4111 Type: compound
- 4112 Child: Distortion_Type_Radial_Symmetrical
- 4113 Child: Distortion_Type_Radial_Asymmetrical
- 4114 Child: Distortion_Type_Affine
- 4115 Parent: Frame_Geometric_Properties
- 4116 Optionality: Optional
- 4117 Repeatability: =1
- 4118 Definition: Departure of positions in image from those in scene imaged.
- 4119 Source: ISPRS/WG-II/4
- 4120
- 4121 Extension_Information
- 4122 Name: Distortion_Type_Radial_Symmetrical
- 4123 Short Name: dsttrs
- 4124 Type: compound
- 4125 Child: Distance_Dependent_Distortion
- 4126 Child: Angle_Dependent_Distortion
- 4127 Child: Radial_Symmetrical_Distortion_Polynomial
- 4128 Parent: Distortion
- 4129 Optionality: Conditional - present and mandatory if and only if
- 4130 Distortion_Type_Radial_Asymmetrical and Distortion_Type_Affine are absent.
- 4131 Repeatability: =1
- 4132 Definition: The shift of an image point towards the center (negative values) or border
- 4133 (positive values) of the image.
- 4134 Source: ISPRS/WG-II/4
- 4135

- 4136 Extension_Information
- 4137 Name: Distance_Dependent_Distortion
- 4138 Short Name: rsdisdis
- 4139 Type: compound
- 4140 Child: Radial_Symmetrical_Distance_Interval
- 4141 Child: Number_of_Distance_Distortion_Values
- 4142 Child: Distance_Distortion_Value
- 4143 Parent: Distortion_Type_Radial_Symmetrical
- 4144 Optionality: Conditional - present and mandatory if and only if
- 4145 Angle_Dependent_Distortion and Radial_Symmetrical_Distortion_Polynomial are
- 4146 absent.
- 4147 Repeatability: =1
- 4148 Definition: Lens distortion values provided as a function of linear distance to the principal
- 4149 point of best symmetry.
- 4150 Source: ISPRS/WG-II/4
- 4151
- 4152 Extension_Information
- 4153 Name: Radial_Symmetrical_Distance_Interval
- 4154 Short Name: rsdmdist
- 4155 Type: real
- 4156 Domain: Radial_Symmetrical_Distance_Interval > 0
- 4157 Parent: Distance_Dependent_Distortion
- 4158 Optionality: Mandatory
- 4159 Repeatability: =1
- 4160 Definition: Radial intervals at which distortion values are available, given in millimeters.

- 4161 Source: ISPRS/WG-II/4
- 4162
- 4163 Extension_Information
- 4164 Name: Number_of_Distance_Distortion_Values
- 4165 Short Name: rsdnumv
- 4166 Type: integer
- 4167 Domain: Number_of_Distance_Distortion_Values > 0
- 4168 Parent: Distance_Dependent_Distortion
- 4169 Optionality: Mandatory
- 4170 Repeatability: =1
- 4171 Definition: Number of radial points at which distance-dependent distortion values are
- 4172 provided.
- 4173 Source: ISPRS/WG-II/4
- 4174
- 4175 Extension_Information
- 4176 Name: Distance_Distortion_Value
- 4177 Short Name: rsddval
- 4178 Type: real
- 4179 Domain: free real
- 4180 Parent: Distance_Dependent_Distortion
- 4181 Optionality: Mandatory
- 4182 Repeatability: =Number_of_Distance_Distortion_Values
- 4183 Definition: Value of distortion at one of the radial distances specified by
- 4184 Radial_Distance_Interval, in micrometers.
- 4185 Source: ISPRS/WG-II/4

4186

4187 Extension_Information

4188 Name: Angle_Dependent_Distortion

4189 Short Name: rsaddist

4190 Type: compound

4191 Child: Radial_Symmetrical_Angle_Interval

4192 Child: Number_of_Angle_Distortion_Values

4193 Child: Angle_Distortion_Value

4194 Parent: Distortion_Type_Radial_Symmetrical

4195 Optionality: Conditional - present and mandatory if and only if

4196 Distance_Dependent_Distortion and Radial_Symmetrical_Distortion_Polynomial

4197 are absent.

4198 Repeatability: =1

4199 Definition: Lens distortion values provided as a function of the angle from the optical axis.

4200 Source: ISPRS/WG-II/4

4201

4202 Extension_Information

4203 Name: Radial_Symmetrical_Angle_Interval

4204 Short Name: rsangint

4205 Type: real

4206 Domain: Radial_Symmetrical_Angle_Interval > 0

4207 Parent: Angle_Dependent_Distortion

4208 Optionality: Mandatory

4209 Repeatability: =1

4210 Definition: Interval in angle at which distortion values are available, given in degrees.

- 4211 Source: ISPRS/WG-II/4
- 4212
- 4213 Extension_Information
- 4214 Name: Number_of_Angle_Distortion_Values
- 4215 Short Name: rsanumv
- 4216 Type: integer
- 4217 Domain: Number_of_Angle_Distortion_Values > 0
- 4218 Parent: Angle_Dependent_Distortion
- 4219 Optionality: Mandatory
- 4220 Repeatability: =1
- 4221 Definition: Number of distortion values supplied as a function of angle.
- 4222 Source: ISPRS/WG-II/4
- 4223
- 4224 Extension_Information
- 4225 Name: Angle_Distortion_Value
- 4226 Short Name: rsadval
- 4227 Type: real
- 4228 Domain: free real
- 4229 Parent: Angle_Dependent_Distortion
- 4230 Optionality: Mandatory
- 4231 Repeatability: =Number_of_Angle_Distortion_Values
- 4232 Definition: Value of distortion at one of the angular distances specified by
- 4233 Radial_Symmetrical_Measurement_Angle, given in micrometers.
- 4234 Source: ISPRS/WG-II/4
- 4235

-
- 4236 Extension_Information
- 4237 Name: Radial_Symmetrical_Distortion_Polynomial
- 4238 Short Name: rsdispol
- 4239 Type: compound
- 4240 Child: Polynomial_Function
- 4241 Parent: Distortion_Type_Radial_Symmetrical
- 4242 Optionality: Conditional - present and mandatory if and only if
- 4243 Distance_Dependent_Distortion and Angle_Dependent_Distortion are absent.
- 4244 Repeatability: =1
- 4245 Definition: Lens distortion in micrometers that is a function of the distance to the principal
- 4246 point of best symmetry, presented in the form of an odd-power polynomial:
- 4247
$$\Delta r' = K_0 * r' + K_1 * r'^3 + K_2 * r'^5 + K_3 * r'^7 \dots$$
- 4248 Source: Moffit, F., Mikhail, E. (1980): Photogrammetry, Harper & Row, Publishers, New
- 4249 York
- 4250 Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4251
- 4252 Extension_Information
- 4253 Name: Distortion_Type_Radial_Asymmetrical
- 4254 Short Name: dsttrasy
- 4255 Type: compound
- 4256 Child: Radial_Asymmetrical_Coefficient_B1
- 4257 Child: Radial_Asymmetrical_Coefficient_B2
- 4258 Parent: Distortion
- 4259 Optionality: Conditional - present and mandatory if and only if
- 4260 Distortion_Type_Radial_Symmetrical and Distortion_Type_Affine are absent

-
- 4261 Repeatability: =1
- 4262 Definition: Distortion that can be expressed in the form
- 4263
$$\Delta x' = B_1 (r^2 + 2x'^2) + 2B_2 * x' * y'$$
- 4264
$$\Delta y' = B_2 (r^2 + 2x'^2) + 2B_1 * x' * y'$$
- 4265 Source: Brown, D.C. (1971): Close-range camera calibration. Photogrammetric
4266 Engineering, 37(8), pp. 855-866
- 4267 Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4268
- 4269 Extension_Information
- 4270 Name: Radial_Asymmetrical_Coefficient_B1
- 4271 Short Name: rab1
- 4272 Type: real
- 4273 Domain: free real
- 4274 Parent: Distortion_Type_Radial_Asymmetrical
- 4275 Optionality: Mandatory
- 4276 Repeatability: =1
- 4277 Definition: Value for B₁ to be used in the formula given in the definition of
4278 Distortion_Type_Radial_Asymmetrical.
- 4279 Source: Brown, D.C. (1971): Close-range camera calibration. Photogrammetric
4280 Engineering, 37(8), pp. 855-866
- 4281 Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4282
- 4283 Extension_Information
- 4284 Name: Radial_Asymmetrical_Coefficient_B2
- 4285 Short Name: rab2

- 4286 Type: real
- 4287 Domain: free real
- 4288 Parent: Distortion_Type_Radial_Asymmetrical
- 4289 Optionality: Mandatory
- 4290 Repeatability: =1
- 4291 Definition: Value to be used for B_2 in the formula given in the definition of
- 4292 Distortion_Type_Radial_Asymmetrical.
- 4293 Source: Brown, D.C. (1971): Close-range camera calibration. Photogrammetric
- 4294 Engineering, 37(8), pp. 855-866
- 4295 Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4296
- 4297 Extension_Information
- 4298 Name: Distortion_Type_Affine
- 4299 Short Name: dsttaf
- 4300 Type: compound
- 4301 Child: Affine_Distortion_X_Prime_Coefficient
- 4302 Child: Affine_Distortion_Y_Prime_Coefficient
- 4303 Parent: Distortion
- 4304 Optionality: Conditional - present and mandatory if and only if
- 4305 Distortion_Type_Radial_Symmetrical and Distortion_Type_Radial_Asymmetrical
- 4306 are absent
- 4307 Repeatability: =1
- 4308 Definition: Errors of the image coordinate system that can be described with an affine
- 4309 transformation of the following form:

- 4310 $\Delta x' = C_1 * x' + C_2 * y'$
- 4311 $\Delta y' = 0$
- 4312 Source: Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4313
- 4314 Extension_Information
- 4315 Name: Affine_Distortion_X_Prime_Coefficient
- 4316 Short Name: affc1
- 4317 Type: real
- 4318 Parent: Distortion_Type_Affine
- 4319 Optionality: Mandatory
- 4320 Repeatability: =1
- 4321 Definition: Coefficient of x' term in the formula given in the definition of
- 4322 Distortion_Type_Affine.
- 4323 Source: Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg
- 4324
- 4325 Extension_Information
- 4326 Name: Affine_Distortion_Y_Prime_Coefficient
- 4327 Short Name: affc2
- 4328 Type: real
- 4329 Parent: Distortion_Type_Affine
- 4330 Optionality: Mandatory
- 4331 Repeatability: =1
- 4332 Definition: Coefficient of y' term in the formula given in the definition of
- 4333 Distortion_Type_Affine.
- 4334 Source: Luhmann, T. (2000): Nahbereichsphotogrammetrie, Wichmann-Verlag, Heidelberg

- 4335
- 4336 Extension_Information
- 4337 Name: Frame_Operation
- 4338 Short Name: fcoper
- 4339 Type: compound
- 4340 Child: Stabilized_Mount
- 4341 Child: Forward_Motion_Compensation
- 4342 Parent: Frame_Camera
- 4343 Optionality: Optional
- 4344 Repeatability: =1
- 4345 Definition: Information describing the configuration or motion of the camera mounting.
- 4346 Source: ISPRS/WG-II/4
- 4347
- 4348 Extension_Information
- 4349 Name: Stabilized_Mount
- 4350 Short Name: stabmnt
- 4351 Type: text
- 4352 Domain: "T_AS" "CCNS4" free text
- 4353 Parent: Frame_Operation
- 4354 Optionality: Optional
- 4355 Repeatability: =1
- 4356 Definition: Type of stabilized mount used during the photo flight.
- 4357 Source: ISPRS/WG-II/4.
- 4358
- 4359

- 4360 Extension_Information
- 4361 Name: Forward_Motion_Compensation
- 4362 Short Name: fmc
- 4363 Type: text
- 4364 Domain: "yes" "no"
- 4365 Parent: Frame_Operation
- 4366 Optionality: Optional
- 4367 Repeatability: =1
- 4368 Definition: Whether or not image is moved in flying direction during exposure in order to
- 4369 compensate image motion for ground speed.
- 4370 Source: ISPRS/WG-II/4.
- 4371
- 4372 Extension_Information
- 4373 Name: Frame_Radiometric_Properties
- 4374 Short Name: fradprop
- 4375 Type: compound
- 4376 Child: Frame_Radiometric_Calibration
- 4377 Child: Light_Drop
- 4378 Parent: Frame_Camera
- 4379 Optionality: Optional
- 4380 Repeatability: =1
- 4381 Definition: Information on the relation between radiation received and measured by a
- 4382 detector system.
- 4383 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4384 Development Team

- 4385
- 4386 Extension_Information
- 4387 Name: Frame_Radiometric_Calibration
- 4388 Short Name: fcradcal
- 4389 Type: compound
- 4390 Child: Data_Scaling_Information
- 4391 Parent: Frame_Radiometric_Properties
- 4392 Optionality: Mandatory-if-applicable
- 4393 Repeatability: =1
- 4394 Definition: Transformation from units in which electronic detector measures to physical
- 4395 units.
- 4396 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4397 Development Team
- 4398
- 4399 Extension_Information
- 4400 Name: Light_Drop
- 4401 Short Name: lightdrp
- 4402 Type: real
- 4403 Domain: $0 \leq \text{Light_Drop} \leq 100$
- 4404 Parent: Frame_Radiometric_Properties
- 4405 Optionality: Optional
- 4406 Repeatability: =1
- 4407 Definition: The percentage of the light at the center reaching the border of the image.
- 4408 Source: ISPRS/WG-II/4
- 4409

- 4410 Extension_Information
- 4411 Name: Frame_Spectral_Properties
- 4412 Short Name: fspecpr
- 4413 Type: compound
- 4414 Child: Frame_Spectral_Information
- 4415 Child: Filter_on_Camera
- 4416 Child: Spectral_Limit
- 4417 Parent: Frame_Camera
- 4418 Optionality: Optional
- 4419 Repeatability: =1
- 4420 Definition: Wavelength-dependent characteristics of system.
- 4421 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4422 Development Team
- 4423
- 4424 Extension_Information
- 4425 Name: Frame_Spectral_Information
- 4426 Short Name: fspecin
- 4427 Type: compound
- 4428 Child: Spectral_Information
- 4429 Parent: Frame_Spectral_Properties
- 4430 Optionality: Optional
- 4431 Repeatability: =1
- 4432 Definition: Information about wavelength sensitivity of detector
- 4433 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4434 Development Team

- 4435
- 4436 Extension_Information
- 4437 Name: Filter_on_Camera
- 4438 Short Name: filtonca
- 4439 Type: compound
- 4440 Child: Filter_on_Camera_Indicator
- 4441 Child: Filter_Type
- 4442 Parent: Frame_Spectral_Properties
- 4443 Optionality: Optional
- 4444 Repeatability: =1
- 4445 Definition: Device placed in front of camera lens limiting the range of wavelengths that can
- 4446 pass through.
- 4447 Source: ISPRS/WG-II/4
- 4448
- 4449 ...Extension_Information
- 4450 Name: Filter_on_Camera_Indicator
- 4451 Short Name: filtcaim
- 4452 Type: text
- 4453 Domain: "yes" "no"
- 4454 Parent: Filter_on_Camera
- 4455 Optionality: Mandatory
- 4456 Repeatability: =1
- 4457 Definition: Indicator as to whether or not there is a filter in front of the camera.
- 4458 Source: ISPRS/WG-II/4
- 4459

- 4460 Extension_Information
- 4461 Name: Filter_Type
- 4462 Short Name: ftrtyp
- 4463 Type: text
- 4464 Domain: "CTO 1" "L453" "L477" "L510" "L599" "L731" "HF-3 (2B)" "No. 3(Aero 1)"
- 4465 "No. 8 (K2)" "No. 12 (Minus Blue)" "No. 15 (G)" "No. 25 (A)" "No. 89 B (IR)"
- 4466 "Sandwich Color" "Haze Filter" "Sandwich False Color" "Dark Yellow" "Light
- 4467 Red" "Infrared" "A2" "B" "D" "F" "H" "I" "K" free text
- 4468 Parent: Filter_on_Camera
- 4469 Optionality: Mandatory-if-applicable
- 4470 Repeatability: =1
- 4471 Definition: Manufacturers name for and/or description of filter used. *(CTO-1 and L filters*
- 4472 *are all manufactured by Agfa Gevaert, HF-3 to No. 89 are Kodak Wratten,*
- 4473 *Sandwich Color to Infrared" are Wild and A2 to K are Zeiss.)*
- 4474 Source: Albertz, J., Kreiling, W. (1989): Photogrammetric Guide, Wichmann, Karlsruhe.
- 4475
- 4476 Extension_Information
- 4477 Name: Spectral_Limit
- 4478 Short Name: spectlim
- 4479 Type: real
- 4480 Domain: Spectral_Limit > 0
- 4481 Parent: Frame_Spectral_Properties
- 4482 Optionality: Optional
- 4483 Repeatability: =1

4484 Definition: Maximum wavelength, in nanometers, at which focus of lens is judged accurate,
4485 errors due to chromatic aberration being too large at longer wavelengths.

4486 Source: ISPRS/WG-II/4

4487

4488 Extension_Information

4489 Name: Scan

4490 Short Name: scan

4491 Type: compound

4492 Child: Scan_Geometric_Properties

4493 Child: Sample_Properties

4494 Child: Scan_Radiometric_Properties

4495 Child: Scan_Spectral_Properties

4496 Parent: Instrument_Description

4497 Optionality: Conditional - present and mandatory if and only if Frame_Camera and

4498 Other_Collector_Description are absent.

4499 Repeatability: =1

4500 Definition: Properties of sensor whose detector view moves over the ground in a direction

4501 roughly perpendicular to the track of a moving point.

4502 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4503 Development Team

4504

4505 Extension_Information

4506 Name: Scan_Geometric_Properties

4507 Short Name: scangeom

4508 Type: compound

-
- 4509 Child: Scan_Angle_Units
- 4510 Child: Scan_Time_Units
- 4511 Child: Scan_Distance_Units
- 4512 Child: Scan_Cross_Track_Properties
- 4513 Child: Scan_Elevation_Properties
- 4514 Child: Profile_Properties
- 4515 Child: Scan_Timing
- 4516 Child: Instantaneous_Field_of_View
- 4517 Parent: Scan
- 4518 Optionality: Mandatory
- 4519 Repeatability: >=1
- 4520 Definition: Spatial and temporal description of scan.
- 4521 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4522 Development Team
- 4523
- 4524 Extension_Information
- 4525 Name: Scan_Angle_Units
- 4526 Short Name: scanangu
- 4527 Type: text
- 4528 Domain: "degrees" "radians" "arcminutes" "arcseconds" free text
- 4529 Parent: Scan_Geometric_Properties
- 4530 Optionality: Mandatory
- 4531 Repeatability: =1
- 4532 Definition: Units in which angles are measured in scan description.

4533 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4534 Development Team

4535

4536 Extension_Information

4537 Name: Scan_Time_Units

4538 Short Name: scantimu

4539 Type: text

4540 Domain: "seconds" "minutes" " microseconds" free text

4541 Parent: Scan_Geometric_Properties

4542 Optionality: Mandatory

4543 Repeatability: =1

4544 Definition: Units in which time is measured in scan description.

4545 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4546 Development Team

4547

4548 Extension_Information

4549 Name: Scan_Distance_Units

4550 Short Name: scandisu

4551 Type: text

4552 Domain: "meters" "kilometers" free text

4553 Parent: Scan_Geometric_Properties

4554 Optionality: Mandatory

4555 Repeatability: =1

4556 Definition: Units in which distance is measured in scan description.

-
- 4557 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4558 Development Team
- 4559
- 4560 Extension_Information
- 4561 Name: Scan_Cross_Track_Properties
- 4562 Short Name: xtrkprop
- 4563 Type: compound
- 4564 Child: Cross_Track_Zero
- 4565 Child: Cross_Track_Sweep
- 4566 Child: Cross_Track_Fixed_Angle
- 4567 Child: Cross_Track_Description
- 4568 Parent: Scan_Geometric_Properties
- 4569 Optionality: Mandatory-if-applicable
- 4570 Repeatability: =1
- 4571 Definition: Description of data sampling in direction approximately perpendicular to track
- 4572 in horizontal direction.
- 4573 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4574 Development Team
- 4575
- 4576 Extension_Information
- 4577 Name: Cross_Track_Zero
- 4578 Short Name: xtkzero
- 4579 Type: compound
- 4580 Child: Cross_Track_Axis
- 4581 Child: Cross_Track_Direction

-
- 4582 Parent: Scan_Cross_Track_Properties
- 4583 Optionality: Mandatory
- 4584 Repeatability: =1
- 4585 Definition: Direction relative to which cross-track angles are measured.
- 4586 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4587 Development Team
- 4588
- 4589 Extension_Information
- 4590 Name: Cross_Track_Axis
- 4591 Short Name: xtkaxis
- 4592 Type: text
- 4593 Domain: "x" "y" "z" free text
- 4594 Parent: Cross_Track_Zero
- 4595 Optionality: Mandatory
- 4596 Repeatability: =1
- 4597 Definition: Axis about which cross-track angles are measured.
- 4598 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4599 Development Team
- 4600
- 4601 Extension_Information
- 4602 Name: Cross_Track_Direction
- 4603 Short Name: xtkdir
- 4604 Type: text
- 4605 Domain: "positive" "negative"
- 4606 Parent: Cross_Track_Zero

- 4607 Optionality: Mandatory
- 4608 Repeatability: =1
- 4609 Definition: Direction on Cross_Track_Axis relative to which cross-track angles are
- 4610 measured.
- 4611 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4612 Development Team
- 4613
- 4614 Extension_Information
- 4615 Name: Cross_Track_Sweep
- 4616 Short Name: xtkswp
- 4617 Type: compound
- 4618 Child: Number_of_Cross_Track_Samples
- 4619 Child: Cross_Track_Start_Angle
- 4620 Child: Cross_Track_Extent_Angle
- 4621 Child: Cross_Track_Step_Angle
- 4622 Parent: Scan_Cross_Track_Properties
- 4623 Optionality: Conditional - present and mandatory if and only if Cross_Track_Fixed_Angle
- 4624 is absent.
- 4625 Repeatability: =1
- 4626 Definition: Description of angular properties of cross-track sweep.
- 4627 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4628 Development Team
- 4629
- 4630 Extension_Information
- 4631 Name: Number_of_Cross_Track_Samples

- 4632 Short Name: xtksamp
- 4633 Type: integer
- 4634 Domain: Number_of_Cross_Track_Samples > 0
- 4635 Parent: Cross_Track_Sweep
- 4636 Optionality: Mandatory
- 4637 Repeatability: =1
- 4638 Definition: Number of measurements in direction across the track in each scan.
- 4639 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4640 Development Team
- 4641
- 4642 Extension_Information
- 4643 Name: Cross_Track_Start_Angle
- 4644 Short Name: xtkstang
- 4645 Type: real
- 4646 Domain: free real
- 4647 Parent: Cross_Track_Sweep
- 4648 Optionality: Mandatory
- 4649 Repeatability: =1
- 4650 Definition: Angle of start of cross-track measurement from Cross_Track_Axis, in
- 4651 Scan_Angle_Units.
- 4652 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4653 Development Team
- 4654
- 4655 Extension_Information
- 4656 Name: Cross_Track_Extent_Angle

4657 Short Name: xtkexang

4658 Type: real

4659 Domain: Cross_Track_Extent_Angle > 0

4660 Parent: Cross_Track_Sweep

4661 Optionality: Conditional - present and mandatory if and only if Cross_Track_Step_Angle is

4662 absent

4663 Repeatability: =1

4664 Definition: Angle between end and start of cross-track range.

4665 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4666 Development Team

4667

4668 Extension_Information

4669 Name: Cross_Track_Step_Angle

4670 Short Name:xtstpang

4671 Type: real

4672 Domain: Cross_Track_Step_Angle > 0

4673 Parent: Cross_Track_Sweep

4674 Optionality: Conditional - present and mandatory if and only if Cross_Track_Extent_Angle

4675 is absent.

4676 Repeatability: =1

4677 Definition: Angle between cross-track steps, in Scan_Angle_Units.

4678 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4679 Development Team

4680

4681

- 4682 Extension_Information
- 4683 Name: Cross_Track_Fixed_Angle
- 4684 Short Name: xtfixang
- 4685 Type: real
- 4686 Domain: free real
- 4687 Parent: Scan_Cross_Track_Properties
- 4688 Optionality: Conditional - present and mandatory if and only if Cross_Track_Sweep is
- 4689 absent
- 4690 Repeatability: =1
- 4691 Definition: Constant angle relative to cross-track axis at which scanner is held while it scans
- 4692 in another direction.
- 4693 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4694 Development Team
- 4695
- 4696 Extension_Information
- 4697 Name: Cross_Track_Description
- 4698 Short Name: xtrkdesc
- 4699 Type: text
- 4700 Domain: free text
- 4701 Parent: Scan_Cross_Track_Properties
- 4702 Optionality: Optional
- 4703 Repeatability: =1
- 4704 Definition: Additional information about cross-track measurements, in text form.
- 4705 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4706 Development Team

- 4707
- 4708 Extension_Information
- 4709 Name: Scan_Elevation_Properties
- 4710 Short Name: elevprop
- 4711 Type: compound
- 4712 Child: Elevation_Zero
- 4713 Child: Elevation_Sweep
- 4714 Child: Elevation_Fixed_Angle
- 4715 Child: Elevation_Description
- 4716 Parent: Scan_Geometric_Properties
- 4717 Optionality: Mandatory-if-applicable
- 4718 Repeatability: =1
- 4719 Definition: Description of data sampling in direction approximately perpendicular to track
- 4720 and cross-track sweep direction.
- 4721 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4722 Development Team
- 4723
- 4724 Extension_Information
- 4725 Name: Elevation_Zero
- 4726 Short Name: elevzero
- 4727 Type: Compound
- 4728 Child: Elevation_Axis
- 4729 Child: Elevation_Direction
- 4730 Parent: Scan_Elevation_Properties
- 4731 Optionality: Mandatory

- 4732 Repeatability: =1
- 4733 Definition: Direction relative to which elevation angles are measured.
- 4734 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4735 Development Team
- 4736
- 4737 Extension_Information
- 4738 Name: Elevation_Axis
- 4739 Short Name: elevaxis
- 4740 Type: text
- 4741 Domain: "x" "y" "z" free text
- 4742 Parent: Elevation_Zero
- 4743 Optionality: Mandatory
- 4744 Repeatability: =1
- 4745 Definition: Axis about which elevation angles are measured.
- 4746 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4747 Development Team
- 4748
- 4749 Extension_Information
- 4750 Name: Elevation_Direction
- 4751 Short Name: elevdir
- 4752 Type: text
- 4753 Domain: "positive" "negative"
- 4754 Parent: Elevation_Zero
- 4755 Optionality: Mandatory
- 4756 Repeatability: =1

4757 Definition: Direction on Elevation_Axis relative to which elevation angles are measured.

4758 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4759 Development Team

4760

4761 Extension_Information

4762 Name: Elevation_Sweep

4763 Short Name: elevswp

4764 Type: compound

4765 Child: Number_of_Elevation_Samples

4766 Child: Elevation_Start_Angle

4767 Child: Elevation_Extent_Angle

4768 Child: Elevation_Step_Angle

4769 Parent: Scan_Elevation_Properties

4770 Optionality: Conditional - present and mandatory if and only if Elevation_Fixed_Angle is

4771 absent.

4772 Repeatability: =1

4773 Definition: Description of angular properties of elevation sweep.

4774 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4775 Development Team

4776

4777 Extension_Information

4778 Name: Number_of_Elevation_Samples

4779 Short Name: elevsamp

4780 Type: integer

4781 Domain: Number_of_Elevation_Samples > 0

- 4782 Parent: Elevation_Sweep
- 4783 Optionality: Mandatory
- 4784 Repeatability: =1
- 4785 Definition: Number of measurements in direction across the track in each scan.
- 4786 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4787 Development Team
- 4788
- 4789 Extension_Information
- 4790 Name: Elevation_Start_Angle
- 4791 Short Name: elestang
- 4792 Type: real
- 4793 Domain: free real
- 4794 Parent: Elevation_Sweep
- 4795 Optionality: Mandatory
- 4796 Repeatability: =1
- 4797 Definition: Angle of start of Elevation measurement from Elevation_Axis, in
- 4798 Scan_Angle_Units.
- 4799 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4800 Development Team
- 4801
- 4802 Extension_Information
- 4803 Name: Elevation_Extent_Angle
- 4804 Short Name: eleexang
- 4805 Type: real
- 4806 Domain: Elevation_Extent_Angle > 0

- 4807 Parent: Elevation_Sweep
- 4808 Optionality: Conditional - present and mandatory if and only if Elevation_Step_Angle is
- 4809 absent
- 4810 Repeatability: =1
- 4811 Definition: Angle between end and start of elevation range.
- 4812 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4813 Development Team
- 4814
- 4815 Extension_Information
- 4816 Name: Elevation_Step_Angle
- 4817 Short Name: elstpang
- 4818 Type: real
- 4819 Domain: Elevation_Step_Angle > 0
- 4820 Parent: Elevation_Sweep
- 4821 Optionality: Conditional - present and mandatory if and only if Elevation_Extent_Angle is
- 4822 absent.
- 4823 Repeatability: =1
- 4824 Definition: Angle between elevation steps, in Scan_Angle_Units.
- 4825 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4826 Development Team
- 4827
- 4828 Extension_Information
- 4829 Name: Elevation_Fixed_Angle
- 4830 Short Name: elfixang
- 4831 Type: real

- 4832 Domain: free real
- 4833 Parent: Scan_Elevation_Properties
- 4834 Optionality: Conditional - present and mandatory if and only if Elevation_Sweep is absent
- 4835 Repeatability: =1
- 4836 Definition: Constant angle relative to elevation axis at which scanner is held while it scans
- 4837 in another direction.
- 4838 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4839 Development Team
- 4840
- 4841 Extension_Information
- 4842 Name: Elevation_Description
- 4843 Short Name: elevdesc
- 4844 Type: text
- 4845 Domain: free text
- 4846 Parent: Scan_Elevation_Properties
- 4847 Optionality: Optional
- 4848 Repeatability: =1
- 4849 Definition: Additional information about elevation measurements, in text form.
- 4850 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4851 Development Team
- 4852
- 4853 Extension_Information
- 4854 Name: Profile_Properties
- 4855 Short Name: profprop
- 4856 Type: compound

4857 Child: Profile_Sounding

4858 Child: Profile_Fixed

4859 Child: Profile_Description

4860 Parent: Scan_Geometric_Properties

4861 Optionality: Mandatory-if-applicable

4862 Repeatability: =1

4863 Definition: Description of data sampling in vertical direction.

4864 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4865 Development Team

4866

4867 Extension_Information

4868 Name: Profile_Sounding

4869 Short Name: profsond

4870 Type: compound

4871 Child: Number_of_Profile_Samples

4872 Child: Profiling_Direction

4873 Child: Profile_Start

4874 Child: Profile_Extent

4875 Child: Profile_Step

4876 Parent: Profile_Properties

4877 Optionality: Conditional - present and mandatory if and only if Profile_Fixed is absent.

4878 Repeatability: =1

4879 Definition: Description of process of profile sampling.

4880 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4881 Development Team

4882

4883 Extension_Information

4884 Name: Number_of_Profile_Samples

4885 Short Name: profsamp

4886 Type: integer

4887 Domain: Number_of_Profile_Samples > 0

4888 Parent: Profile_Sounding

4889 Optionality: Mandatory

4890 Repeatability: =1

4891 Definition: Number of heights at which measurements are made.

4892 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4893 Development Team

4894

4895 Extension_Information

4896 Name: Profiling_Direction

4897 Short Name: profdir

4898 Type: text

4899 Domain: "upward" "downward"

4900 Parent: Profile_Sounding

4901 Optionality: Mandatory

4902 Repeatability: =1

4903 Definition: Direction of sequence of heights at which profile measurements are made.

4904 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

4905 Development Team

4906

- 4907 Extension_Information
- 4908 Name: Profile_Start
- 4909 Short Name: profst
- 4910 Type: real
- 4911 Domain: Profile_Start > 0
- 4912 Parent: Profile_Sounding
- 4913 Optionality: Mandatory
- 4914 Repeatability: =1
- 4915 Definition: Height of start of profile measurements.
- 4916 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4917 Development Team
- 4918
- 4919 Extension_Information
- 4920 Name: Profile_Extent
- 4921 Short Name: profext
- 4922 Type: real
- 4923 Domain: Profile_Extent > 0
- 4924 Parent: Profile_Sounding
- 4925 Optionality: Conditional - present and mandatory if and only if Profile_Step is absent
- 4926 Repeatability: =1
- 4927 Definition: Distance between end and start of profile range, in Scan_Distance_Units.
- 4928 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4929 Development Team
- 4930
- 4931

- 4932 Extension_Information
- 4933 Name: Profile_Step
- 4934 Short Name: profstep
- 4935 Type: real
- 4936 Domain: Profile_Step > 0
- 4937 Parent: Profile_Sounding
- 4938 Optionality: Conditional - present and mandatory if and only if Profile_Extent is absent.
- 4939 Repeatability: =1
- 4940 Definition: Distance between profile steps, in Scan_Distance_Units.
- 4941 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4942 Development Team
- 4943
- 4944 Extension_Information
- 4945 Name: Profile_Fixed
- 4946 Short Name: proffix
- 4947 Type: real
- 4948 Domain: Profile_Fixed > 0
- 4949 Parent: Profile_Properties
- 4950 Optionality: Conditional - present and mandatory if and only if Profile_Sounding is absent
- 4951 Repeatability: =1
- 4952 Definition: Fixed profile level at which scanning is taking place.
- 4953 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4954 Development Team
- 4955
- 4956

- 4957 Extension_Information
- 4958 Name: Profile_Description
- 4959 Short Name: profdesc
- 4960 Type: text
- 4961 Domain: free text
- 4962 Parent: Profile_Properties
- 4963 Optionality: Optional
- 4964 Repeatability: =1
- 4965 Definition: Additional information about profile measurements, in text form.
- 4966 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4967 Development Team
- 4968
- 4969 Extension_Information
- 4970 Name: Scan_Timing
- 4971 Short Name: scantime
- 4972 Type: compound
- 4973 Child: Scan_Start_Time
- 4974 Child: Scan_Duration
- 4975 Child: Scan_Step_Time
- 4976 Child: Scan_Repeat_Time
- 4977 Parent: Scan_Geometric_Properties
- 4978 Optionality: Optional
- 4979 Repeatability: =1
- 4980 Definition: Schedule for scans.

-
- 4981 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4982 Development Team
- 4983
- 4984 Extension_Information
- 4985 Name: Scan_Start_Time
- 4986 Short Name: scanstart
- 4987 Type: compound
- 4988 Child: Single Date/Time
- 4989 Parent: Scan_Timing
- 4990 Optionality: Mandatory
- 4991 Repeatability: =1
- 4992 Definition: Time at start of scan.
- 4993 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 4994 Development Team
- 4995
- 4996 Extension_Information
- 4997 Name: Scan_Duration
- 4998 Short Name: scandur
- 4999 Type: real
- 5000 Domain: Scan_Duration > 0
- 5001 Parent: Scan_Timing
- 5002 Optionality: Conditional - present and mandatory if and only if Scan_Step_Time is absent
- 5003 Repeatability: =1
- 5004 Definition: Duration of a single scan, in Scan_Time_Units.

-
- 5005 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5006 Development Team
- 5007
- 5008 Extension_Information
- 5009 Name: Scan_Step_Time
- 5010 Short Name: scanstept
- 5011 Type: real
- 5012 Domain: Scan_Step_Time > 0
- 5013 Parent: Scan_Timing
- 5014 Optionality: Conditional - present and mandatory if and only if Scan_Duration is absent
- 5015 Repeatability: =1
- 5016 Definition: Time for one step in scan, in Scan_Time_Units.
- 5017 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5018 Development Team
- 5019
- 5020 Extension_Information
- 5021 Name: Scan_Repeat_Time
- 5022 Short Name: scanrptt
- 5023 Type: real
- 5024 Domain: Scan_Repeat_Time > 0
- 5025 Parent: Scan_Timing
- 5026 Optionality: Mandatory
- 5027 Repeatability: =1
- 5028 Definition: Time between the start of one scan and the next, in Scan_Time_Units.

5029 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5030 Development Team

5031

5032 Extension_Information

5033 Name: Sample_Properties

5034 Short Name: sampprop

5035 Type: compound

5036 Child: Sample_Description_Units

5037 Child: Pixel_Description

5038 Parent: Scan

5039 Optionality: Mandatory

5040 Repeatability: =1

5041 Definition: Description of pixel properties.

5042 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5043 Development Team

5044

5045 Extension_Information

5046 Name: Sample_Description_Units

5047 Short Name: sampdesu

5048 Type: compound

5049 Child: Sample_Angle_Units

5050 Child: Sample_Profile_Units

5051 Parent: Sample_Properties

5052 Optionality: Mandatory

5053 Repeatability: =1

-
- 5054 Definition: Units in which of pixel properties are provided.
- 5055 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5056 Development Team
- 5057
- 5058 Extension_Information
- 5059 Name: Sample_Angle_Units
- 5060 Short Name: sampangu
- 5061 Type: text
- 5062 Domain: "degrees" "radians" "arcminutes" "arcseconds" free text
- 5063 Parent: Sample_Description_Units
- 5064 Optionality: Mandatory_if_applicable
- 5065 Repeatability: =1
- 5066 Definition: Units in which angles are measured in pixel description.
- 5067 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5068 Development Team
- 5069
- 5070 Extension_Information
- 5071 Name: Sample_Profile_Units
- 5072 Short Name: samprofu
- 5073 Type: compound
- 5074 Child: Altitude_Distance_Units
- 5075 Parent: Sample_Description_Units
- 5076 Optionality: Mandatory_if_applicable
- 5077 Repeatability: =1
- 5078 Definition: Units used to measure profile heights and distances.

5079 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5080 Development Team

5081

5082 Extension_Information

5083 Name: Pixel_Description

5084 Short Name: pixldesc

5085 Type: compound

5086 Child: Pixel_Cross_Track_Size

5087 Child: Pixel_Elevation_Size

5088 Child: Pixel_Profile_Size

5089 Child: Pixel_Height_Above_Ellipsoid

5090 Child: Pixel_Point_Spread_Function

5091 Parent: Sample_Properties

5092 Optionality: Mandatory

5093 Repeatability: >=1

5094 Definition: Description of pixel dimensions and location.

5095 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5096 Development Team

5097

5098 Extension_Information

5099 Name: Pixel_Cross_Track_Size

5100 Short Name: pixxtksz

5101 Type: real

5102 Domain: Pixel_Cross_Track_Size > 0

5103 Parent: Pixel_Description

- 5104 Optionality: Mandatory-if-applicable
- 5105 Repeatability: =1
- 5106 Definition: Angular extent of pixel in cross-track direction, in units specified in
- 5107 Sample_Angle_Units.
- 5108 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5109 Standard -Detector FOV Resolution
- 5110
- 5111 Extension_Information
- 5112 Name: Pixel_Elevation_Size
- 5113 Short Name pixelvsz
- 5114 Type: real
- 5115 Domain: Pixel_Elevation_Size > 0
- 5116 Parent: Pixel_Description
- 5117 Optionality: Mandatory-if-applicable
- 5118 Repeatability: =1
- 5119 Definition: Size of pixel in elevation direction, in units specified in Sample_Angle_Units.
- 5120 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5121 Standard -Detector FOV Resolution
- 5122
- 5123 Extension_Information
- 5124 Name: Pixel_Profile_Size
- 5125 Short Name: pixprfsz
- 5126 Type: real
- 5127 Domain: Pixel_Profile_Size > 0
- 5128 Parent: Pixel_Description

- 5129 Optionality: Mandatory-if-applicable
- 5130 Repeatability: =1
- 5131 Definition: Size of pixel in profile direction, in units specified in Sample_Profile_Units.
- 5132 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5133 Standard - Detector FOV Resolution
- 5134
- 5135 Extension_Information
- 5136 Name: Pixel_Height_Above_Ellipsoid
- 5137 Short Name: pixelhgt
- 5138 Type: real
- 5139 Domain: Pixel_Height_Above_Ellipsoid > 0
- 5140 Parent: Pixel_Description
- 5141 Optionality: Optional
- 5142 Repeatability: =1
- 5143 Definition: Height of pixel above ellipsoid defined as part of spatial representation
- 5144 information, in units specified in Sample_Profile_Units.
- 5145 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5146 Development Team
- 5147
- 5148 Extension_Information
- 5149 Name: Pixel_Point_Spread_Function
- 5150 Short Name: pixelpsf
- 5151 Type: text
- 5152 Domain: free text
- 5153 Parent: Pixel_Description

- 5154 Optional: Optional
- 5155 Repeatability: =1
- 5156 Definition: Pixel image distribution that would be produced by a single point.
- 5157 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5158 Development Team
- 5159
- 5160 Extension_Information
- 5161 Name: Scan_Radiometric_Properties
- 5162 Short Name: sradprop
- 5163 Type: compound
- 5164 Child: Data_Scaling_Information
- 5165 Parent: Scan
- 5166 Optional: Mandatory
- 5167 Repeatability: =1
- 5168 Definition: Function used to convert quantity in detector units to physical units.
- 5169 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5170 Development Team
- 5171
- 5172 Extension_Information
- 5173 Name: Scan_Spectral_Properties
- 5174 Short Name: scspprop
- 5175 Type: compound
- 5176 Child: Spectral_Information
- 5177 Parent: Scan
- 5178 Optional: Mandatory-if-applicable

- 5179 Repeatability: =1
- 5180 Definition: Design specifications for wavelength-dependent scanner properties.
- 5181 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5182 Development Team
- 5183
- 5184 Extension_Information
- 5185 Name: Spectral_Information
- 5186 Short Name: specinfo
- 5187 Type: compound
- 5188 Child: Number_of_Wavelength_Bands
- 5189 Child: Wavelength_Band_Properties
- 5190 Parent: Scan_Spectral_Properties
- 5191 Optionality: Mandatory
- 5192 Repeatability: =1
- 5193 Definition: Wavelength-dependent properties of optical systems.
- 5194 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5195 Development Team
- 5196
- 5197 Extension_Information
- 5198 Name: Number_of_Wavelength_Bands
- 5199 Short Name: nowvband
- 5200 Type: compound
- 5201 Child: Number_of_Bands
- 5202 Parent: Spectral_Information
- 5203 Optionality: Mandatory

-
- 5204 Repeatability: =1
- 5205 Definition: Number of separate wavelength ranges at which system measures.
- 5206 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5207 Development Team
- 5208
- 5209 Extension_Information
- 5210 Name: Wavelength_Band_Properties
- 5211 Short Name: wvbandpr
- 5212 Type: compound
- 5213 Child: Wavelength_Units
- 5214 Child: Band_Boundary_Definition
- 5215 Child: Minimum_Wavelength
- 5216 Child: Maximum_Wavelength
- 5217 Child: Peak_Wavelength
- 5218 Child: Nominal_Spatial_Resolution
- 5219 Child: Band_Quality
- 5220 Child: Polarization_Characteristics
- 5221 Child: Band_Description
- 5222 Parent: Spectral_Information
- 5223 Optionality: Mandatory-if-applicable
- 5224 Repeatability: >=1
- 5225 Definition: Design specifications for properties an individual wavelength range.
- 5226 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5227 Development Team
- 5228

- 5229 Extension_Information
- 5230 Name: Wavelength_Units
- 5231 Short Name: waveunit
- 5232 Type: text
- 5233 Domain: "m" "cm" "mm" "µm" "nm" free text
- 5234 Parent: Wavelength_Band_Properties
- 5235 Optionality: Mandatory
- 5236 Repeatability: =1
- 5237 Definition: Units in which band wavelengths are expressed.
- 5238 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5239 Development Team
- 5240
- 5241 Extension_Information
- 5242 Name: Band_Boundary_Definition
- 5243 Short Name: bbnddef
- 5244 Type: text
- 5245 Domain: "3db" "half maximum" "50 %""1/e" "equivalent width" free text
- 5246 Parent: Wavelength_Band_Properties
- 5247 Optionality: Optional
- 5248 Repeatability: =1
- 5249 Definition: Designation of criterion for defining maximum and minimum wavelengths for a
- 5250 spectral band.
- 5251 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5252 Development Team
- 5253

-
- 5254 Extension_Information
- 5255 Name: Minimum_Wavelength
- 5256 Short Name: lambdmin
- 5257 Type: real
- 5258 Domain: Minimum_Wavelength > 0
- 5259 Parent: Wavelength_Band_Properties
- 5260 Optionality: Mandatory
- 5261 Repeatability: =1
- 5262 Definition: Minimum wavelength boundary of the spectral range of the band using the
- 5263 criterion in Band_Boundary_Definition, in units specified by Wavelength_Units.
- 5264 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5265 Standard – DSS Channel Spectrum Start
- 5266
- 5267 Extension_Information
- 5268 Name: Maximum_Wavelength
- 5269 Short Name: lambdmax
- 5270 Type: real
- 5271 Domain: Maximum_Wavelength >= Minimum_Wavelength
- 5272 Parent: Wavelength_Band_Properties
- 5273 Optionality: Mandatory
- 5274 Repeatability: =1
- 5275 Definition: Maximum wavelength boundary of the spectral range of the band using the
- 5276 criterion in Band_Boundary_Definition, in units specified by Wavelength_Units.
- 5277 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5278 Standard – DSS Channel Spectrum End

5279

5280 Extension_Information

5281 Name: Peak_Wavelength

5282 Short Name: pkwavlen

5283 Type: real

5284 Domain: Minimum_Wavelength <= Peak Wavelength <= Maximum_Wavelength

5285 Parent: Wavelength_Band_Properties

5286 Optionality: Optional

5287 Repeatability: =1

5288 Definition: Wavelength of maximum sensitivity within the band, in units specified by

5289 Wavelength_Units.

5290 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5291 Development Team

5292

5293 Extension_Information

5294 Name: Nominal_Spatial_Resolution

5295 Short Name: nomspres

5296 Type: compound

5297 Child: Spatial_Resolution_Units

5298 Child: Spatial_Resolution_Value

5299 Parent: Wavelength_Band_Properties

5300 Optionality: Optional

5301 Repeatability: =1

5302 Definition: Smallest distance between which separate points can be distinguished, as

5303 specified in instrument design.

-
- 5304 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5305 Development Team
- 5306
- 5307 Extension_Information
- 5308 Name: Spatial_Resolution_Units
- 5309 Short Name: spatresu
- 5310 Type: text
- 5311 Domain: "meters" "kilometers" "degrees" free text
- 5312 Parent: Nominal_Spatial_Resolution
- 5313 Optionality: Mandatory
- 5314 Repeatability: =1
- 5315 Definition: Units in which spatial resolution is expressed.
- 5316 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5317 Development Team
- 5318
- 5319 Extension_Information
- 5320 Name: Spatial_Resolution_Value
- 5321 Short Name: spatresv
- 5322 Type: real
- 5323 Domain: Spatial_Resolution_Value > 0
- 5324 Parent: Nominal_Spatial_Resolution
- 5325 Optionality: Mandatory
- 5326 Repeatability: =1
- 5327 Definition: Quantitative measure of designed instrument spatial resolution, in units given by
- 5328 Spatial_Resolution_Units.

-
- 5329 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5330 Development Team
- 5331
- 5332 Extension_Information
- 5333 Name: Band_Quality
- 5334 Short Name: bandqual
- 5335 Type: text
- 5336 Domain: free text
- 5337 Parent: Wavelength_Band_Properties
- 5338 Optionality: Optional
- 5339 Repeatability: =1
- 5340 Definition: Description of state of band, including degree of degradation and impact on
- 5341 resolution and measurement accuracy.
- 5342 Source: Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
- 5343 Standard – DSS Channel Quality
- 5344
- 5345 Extension_Information
- 5346 Name: Polarization_Characteristics
- 5347 Short Name: polrzcha
- 5348 Type: compound
- 5349 Child: Receiver_Polarization
- 5350 Child: Sender_Polarization
- 5351 Parent: Wavelength_Band_Properties
- 5352 Optionality: Mandatory-if-applicable
- 5353 Repeatability: >=1

-
- 5354 Definition: Degree of polarization of band.
- 5355 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5356 Development Team
- 5357
- 5358 Extension_Information
- 5359 Name: Receiver_Polarization
- 5360 Short Name: revrpolr
- 5361 Type: text
- 5362 Domain: "horizontal" "vertical" "left circular" "right circular" free text
- 5363 Parent: Polarization_Characteristics
- 5364 Optionality: Mandatory
- 5365 Repeatability: =1
- 5366 Definition: Polarization direction that a receiver is designed to accept.
- 5367 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5368 Development Team
- 5369
- 5370 Extension_Information
- 5371 Name: Sender_Polarization
- 5372 Short Name: sendpolr
- 5373 Type: text
- 5374 Domain: "horizontal" "vertical" "left circular" "right circular" free text
- 5375 Parent: Polarization_Characteristics
- 5376 Optionality: Mandatory-if-applicable
- 5377 Repeatability: =1
- 5378 Definition: Polarization of radiation emitted as part of a measurement system

-
- 5379 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5380 Development Team
- 5381
- 5382 Extension_Information
- 5383 Name: Band_Description
- 5384 Short Name: banddesc
- 5385 Type: text
- 5386 Domain: free text
- 5387 Parent: Wavelength_Band_Properties
- 5388 Optionality: Optional
- 5389 Repeatability: =1
- 5390 Definition: Additional descriptive material about band properties.
- 5391 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5392 Development Team
- 5393
- 5394 Extension_Information
- 5395 Name: Other_Collector_Description
- 5396 Short Name: othcolde
- 5397 Type: text
- 5398 Domain: free text
- 5399 Parent: Instrument_Description
- 5400 Optionality: Conditional - present and mandatory if and only if Frame_Camera and Scan are
- 5401 absent.
- 5402 Repeatability: =1

- 5403 Definition: Description of properties of data collection system other than frame camera or
5404 whiskbroom scanner.
- 5405 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
5406 Development Team
5407
- 5408 Extension_Information
- 5409 Name: Instrument_Properties_Description
5410 Short Name: instpdes
5411 Type: text
5412 Domain: free text
5413 Parent: Instrument_Information
5414 Optionality: Optional
5415 Repeatability: =1
5416 Definition: Textual information on instrument properties, in areas not otherwise specified in
5417 this standard.
5418 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
5419 Development Team
5420
- 5421 Extension_Information
- 5422 Name: Instrument_Reference
5423 Short Name: instref
5424 Type: compound
5425 Child: Citation_Information
5426 Parent: Instrument_Information

-
- 5427 Optionality: Conditional - mandatory if Instrument_Description is absent; otherwise
5428 optional.
- 5429 Repeatability: >=1
- 5430 Definition: Reference providing description of instrument properties and behavior.
- 5431 Rationale: Descriptive information about the instrument may be in a document separate
5432 from the data
- 5433 Source: Hughes Applied Information Systems (1994) Proposed ECS Core Metadata
5434 Standard - DSS Guide Instrument Information

5435	Location Information
5436	Extension_Information
5437	Name: Location_Information
5438	Short Name: locainfo
5439	Type: compound
5440	Child: Number_of_Points
5441	Child: Coordinate_System
5442	Child: Coordinate_XY_Units
5443	Child: Coordinate_Z_Units
5444	Parent: <i>Called by many elements throughout the document.</i>
5445	Optionality: <i>Specified by referencing element.</i>
5446	Repeatability: <i>Specified by referencing element.</i>
5447	Definition: Information about the location of a set of one or more points. <i>(Note: this</i>
5448	<i>section provides a means of providing the location of positions and is used by other</i>
5449	<i>sections of the metadata extensions. This section is never used alone.)</i>
5450	Rationale: There are numerous metadata elements that consist of one or more coordinate
5451	points. Since the concept appears so frequently, creating one standard compound
5452	element is preferable to repeating the same structure at many points throughout the
5453	standard.
5454	.Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
5455	Development Team
5456	
5457	
5458	
5459	

5460 **Location_Information =**

5461 **Number_of_Points +**

5462 **0{Coordinate_System}1 +**

5463 **0{Coordinate_XY_Units}1 +**

5464 **(Coordinate_Z_Units)**

5465 **1{Coordinate_Point}n**

5466

5467 **Coordinate_System =**

5468 **[Unreferenced_Coordinate_System]**

5469 **Referenced_Coordinate_System]**

5470

5471 **Referenced_Coordinate_System =**

5472 Spatial_Reference_Information (*see section 4 of base standard*

5473 *for production rules*)

5474

5475 **Coordinate_Point =**

5476 **Coordinate_x_Value +**

5477 **Coordinate_y_Value +**

5478 **(Coordinate_z_Value)**

5479

5480

5481

5482 Extension_Information

5483 Name: Number_of_Points

5484 Short Name: numpoint

5485 Type: integer

5486 Domain: Number_of_Points > 0

5487 Parent: Location_Information

5488 Optionality: Mandatory

5489 Repeatability: =1

5490 Definition: Number of coordinate positions.

5491 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5492 Development Team

5493

5494 Extension_Information

5495 Name: Coordinate_System

5496 Short Name: coordsys

5497 Type: compound

5498 Child: Unreferenced_Coordinate_System

5499 Child: Referenced_Coordinate_System

5500 Parent: Location_Information

5501 Optionality: Conditional - present and mandatory if and only if not defined in referencing

5502 element

5503 Repeatability: =1

5504 Definition: Definition of axes of coordinate system in which location of positions is

5505 provided.

5506 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions

5507 Development Team

5508

5509

- 5510 Extension_Information
- 5511 Name: Unreferenced_Coordinate_System
- 5512 Short Name: unrefsys
- 5513 Type: text
- 5514 Domain: free_text
- 5515 Parent: Coordinate_System
- 5516 Optionality: conditional - present and mandatory if and only if
- 5517 Referenced_Coordinate_System is not present.
- 5518 Repeatability: =1
- 5519 Definition: Coordinate system which is not georeferenced and for which georeferencing
- 5520 information is unavailable or irrelevant.
- 5521 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5522 Development Team
- 5523
- 5524 Extension_Information
- 5525 Name: Referenced_Coordinate_System
- 5526 Short Name: refsys
- 5527 Type: Compound
- 5528 Child: Spatial_Reference_Information
- 5529 Parent: Coordinate_System
- 5530 Optionality: conditional - present and mandatory if and only if
- 5531 Unreferenced_Coordinate_System is not present.
- 5532 Repeatability: =1
- 5533 Definition: Coordinate system which can be georeferenced..

-
- 5534 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5535 Development Team
- 5536
- 5537 Extension_Information
- 5538 Name: Coordinate_XY_Units
- 5539 Short Name: coordxyu
- 5540 Type: text
- 5541 Domain: "micrometers" "millimeters" "meters" "kilometers" free text
- 5542 Parent: Location_Information
- 5543 Optionality: Conditional - present and mandatory if and only if the coordinates correspond
- 5544 to physical dimensions and are not specified elsewhere.
- 5545 Repeatability: =1
- 5546 Definition: Physical dimension corresponding to value of unity in x and y coordinate
- 5547 directions as defined in Coordinate_System or referencing element, where the
- 5548 coordinates correspond to physical dimensions.
- 5549 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5550 Development Team
- 5551
- 5552 Extension_Information
- 5553 Name: Coordinate_Z_Units
- 5554 Short Name: coordzu
- 5555 Type: text
- 5556 Domain: "meters" "feet" "millibars" free text
- 5557 Parent: Location_Information
- 5558 Optionality: Optional

- 5559 Repeatability: =1
- 5560 Definition: Physical dimension corresponding to value of unity in z coordinate directions
- 5561 Coordinate_System or referencing element, where the coordinates correspond to
- 5562 physical dimensions.
- 5563 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5564 Development Team
- 5565
- 5566 Extension_Information
- 5567 Name: Coordinate_Point
- 5568 Short Name: coordpt
- 5569 Type: compound
- 5570 Child: Coordinate_x_Value
- 5571 Child: Coordinate_y_Value
- 5572 Child: Coordinate_z_Value
- 5573 Parent: Location_Information
- 5574 Optionality: Mandatory
- 5575 Repeatability: =Number_of_Points
- 5576 Definition: Location of a coordinate point described by the referencing element.
- 5577 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5578 Development Team
- 5579
- 5580 Extension_Information
- 5581 Name: Coordinate_x_Value
- 5582 Short Name: coorxval
- 5583 Type: real

5584	Child: free real
5585	Parent: Coordinate_Point
5586	Optionality: Mandatory
5587	Repeatability: =1
5588	Definition: Location of point along x-axis.
5589	Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
5590	Development Team
5591	
5592	Extension_Information
5593	Name: Coordinate_y_Value
5594	Short Name: cooryval
5595	Type: real
5596	Child: free real
5597	Parent: Coordinate_Point
5598	Optionality: Mandatory
5599	Repeatability: =1
5600	Definition: Location of point along y-axis.
5601	Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
5602	Development Team
5603	
5604	Extension_Information
5605	Name: Coordinate_z_Value
5606	Short Name: coorzval
5607	Type: real
5608	Child: free real

- 5609 Parent: Coordinate_Point
- 5610 Optionality: Optional
- 5611 Repeatability: =1
- 5612 Definition: Location of point along z axis.
- 5613 Source: FGDC/SWG Imagery Subgroup Remote Sensing Metadata Extensions
- 5614 Development Team
- 5615
- 5616

5642

5643 NOAA, 1988, NOAA Polar Orbiter Data Users Guide (Revised, January 1988, K.B. Kidwell,

5644 NOAA/NESDIS/SCDC Satellite Data Services Division: Washington D. C.

5645

5646 Raytheon Information Technology Systems, 2000, Release 6A, Implementation Earth Science Data

5647 Model for the ECS project, 420-TP-022-001: Upper Marlboro, Maryland

5648

5649

Appendix A - NASA Data Product Levels

5650

5651 This set of Data Product Levels, defined by NASA (1995) range from Level 0 to Level 4. Level 0
5652 data products are raw instrument data at full instrument resolution. At higher levels, raw instrument
5653 data are converted into more usable parameters and formats that are of interest to the users. At Level
5654 4, parameters are further refined through the use of models. The levels of data are shown below.

5655

5656 Level 0

5657 Level 0 data products are reconstructed, unprocessed instrument/payload data at full resolution; any
5658 and all communications artifacts, e.g. synchronization frames, communications headers, duplicate
5659 data removed.

5660

5661 Level 1A

5662 Level 1A data products are reconstructed, unprocessed instrument data at full resolution, time-
5663 referenced and annotated with ancillary information, including radiometric and geometric calibration
5664 coefficients and georeferencing parameters, e.g., platform ephemeris. Ancillary information is
5665 computed and appended but not applied to the Level 0 data.

5666

5667 Level 1B

5668 Level 1B data products are Level 1A data that have been processed to sensor units. Not all
5669 instruments will have data equivalent to Level 1B.

5670

5671 Level 2

5672 Level 2 data products are derived geophysical variables at the same resolution and locations as the

5673 Level 1 source data.

5674

5675 Level 3

5676 Level 3 data products are variables mapped on uniform space-time grid scales, usually with some
5677 completeness and consistency.

5678

5679 Level 4

5680 Level 4 data products are model output or results from analyses of lower level data, e.g. variables
5681 derived from multiple measurements.

5682

5683

5684

Appendix B - ISPRS Data Product Levels

5685

5686 This set of Data Product Levels, defined by ISPRS, ranges from Level 0 to Level 4. As with the
5687 NASA data levels, Level 0 data products are raw instrument data at full instrument resolution, and
5688 data products at higher levels contain more usable parameters and formats that are of interest to the
5689 users. The highest ISPRS product level corresponds to a geographically located orthophoto.

5690

5691 Level 0

5692 Level 0 describes the original or raw data coming from the sensor without any georeferencing or sensor
5693 information.

5694

5695 Level 1

5696 Level 1 contains information that allows determination of the location of the image on
5697 the raster grid system. It does not contain any geolocation information

5698

5699 Level 2

5700 Ancillary information is computed and appended but not applied to the Level 0 data.

5701

5702 Level 3

5703 Level 3 describes image data which were originally acquired by a line sensor and which have been
5704 processed to a common plane. This generates a readily visible image similar to an image taken by a
5705 frame camera

5706

5707 Level 4

5708 Level 4 describes processed image data which are directly related to the object coordinate system

5709 (orthophoto)

5710

5711

5712 Alternative Level Structure

5713

5714 The alternative levels are only based on geometric properties. Geophysical variables and results from

5715 analyses using the same geometry create a sublevel only

5716 (level 2c = level 3 in “Level-Structure”).

5717

5718	Alternative Level	Above explained Level
------	-------------------	-----------------------

5719	Level 0	Level 0
------	---------	---------

5720

5721	Level 1	Level 1
------	---------	---------

5722

5723	Level 2a	Level 2a
------	----------	----------

5724	Level 2b	Level 2b
------	----------	----------

5725	Level 2c	Level 3
------	----------	---------

5726

5727	Level 3	Level 4
------	---------	---------

5728

5729

5730

5731

5732

Appendix C - Index of Definitions of Extended Elements

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