{#child toc @template.recipe=html}

1. Executive Summary

Research in Heliophysics requires information from multiple sources which includes data from and about spacecrafts, groundbased observatories, models, simulations and more. The results from research are also invaluable in building up a body of knowledge and need to be available. All the different sources and types of information are considered a "Resource". The Resources exist, are shared, exchanged and used in a framework called the "data environment". The SPASE (Space Physics Archive Search and Extract) group has defined a Data Model which is a set of terms and values along with the relationships between them that allow describing all the resources in a heliophysics data environment. It is the result of many years of effort by an international collaboration of heliophysicists and information scientists to unify and improve on existing Space and Solar Physics data models. The intent of this Data Model is to provide the means to describe resources, most importantly scientifically useful data products, in a uniform way so they may be easily registered, found, accessed, and used.

The Data Model provides enough detail to allow a scientist to understand the content of Data Products (e.g., a set of files for 3 second resolution Geotail magnetic field data for1992 to 2005), together with essential retrieval and contact information. It also allows for the incremental annotation of resources with expert assessments and the free association of resources to create bundles or networks of resources. Resource descriptions can be stored with the data or at remote locations. Sites can harvest the resource descriptions to enable services like a search engine or portal (Virtual Observatory). A typical use would be to have a collection of descriptions stored in one or more related internet-based registries of products; that can be queried with specifically designed search engines and ultimately link users to the data they need. The Data Model also provides constructs for describing components of such a data delivery system. This includes repositories, registries and services.

The SPASE group website is located at https://www.spase-group.org/

A PDF version of this document can be downloaded from the SPASE site.

2. Introduction

The SPASE (Space Physics Archive Search and Extract) Data Model is a set of terms and values along with the relationships between them that allow describing all the resources in a heliophysics data environment. It is the result of many years of effort by an international collaboration (see https://spase-group.org) to unify and improve on existing Space and Solar Physics data models. The intent of this Data Model is to provide the means to describe resources, most importantly scientifically useful data products, in a uniform way so they may be easily registered, found, accessed, and used.

The SPASE data model divides the heliophysics data environment into a limited set of resources types. A key resource type is Numerical Data. This type of resource typically consists of a set of files containing values of one or more physical variables and that differ from each other only by the time span. To fully describe a Numerical Data resource requires other types of Resources, namely Observatory, Instrument, Person, and Repository, whose names are self-explanatory, and each of which has its own set of attributes. Often, numerical data are presented in prepared images (gif or jpeg), and such presentations are referred to as Display Data resources. The other data related resource types are Catalog which are lists of events; Annotation which enable expert comments on data products; and Granule which describe individual files within another resource (i.e., Numerical Data, Display Data or Catalog). Other types of resources include Document which can contain narratives or supporting information; Service that provide software to use data resources; Repository for storage locations; and Registry for metadata collections. Resource descriptions and the links in them are intended to make the Resource useful to scientific users.

2.1. History of Development

The data model presented here has grown from the efforts begun in 2002 that became formalized in regular teleconferences of a group of interested data providers, including scientific and technical representatives of some of the largest data holdings in the US, Europe, and Japan. As the effort to provide seamless access to distributed data proceeded, it became clear that the data model efforts were central. The SPASE Data Model was developed with an iterative process where additions were made when unaddressed needs were discovered. The original impetus occurred at an ISTP meeting in 1998 where a resolution was passed calling to make data more accessible. Interoperability test beds were constructed in 2001 and in 2002 a grassroots effort was undertaken to define the needs of community. In March of 2003 a meeting of many of the people in the Contributors list at the beginning of this document was convened to begin the data model construction in earnest. The initial effort involved collecting terms from CDPP, SWRI, NSSDC, ISTP, and other sets to form a starting point. Two years of teleconferences, e-mailed revisions, and occasional face-to-face efforts, along with the application of the terms to specific cases, led to the release of version 1.0 of the data model in November 2005. Following the release of version 1.0 many existing data products were described and lead to further improvements of the data model. Version1.1 was released in August 2006. At this time NASA established the Heliophysics VxOs and after an extended period of use and improvements version 1.2.2 was released in August of 2008. The version of the data model described in this document is an extension of this earlier release.

2.2. Intended Purpose

The design of the SPASE data model is based on a core set of principles related to the intended purpose of descriptive information (metadata), the data environment, and the operational environment. The overall goal of the Data Model is to be able to describe resources using a taxonomy of terms familiar to the heliophysics domain. This taxonomy should provide sufficient scientific context and data content information for an individual to assess the applicability of the resource (data and metadata) to a research question. A data model is the cornerstone of an information system and one purpose for the SPASE Data Model to enable the creation of "Virtual Observatories" that will link the broad range of heliophysics resources which may be available in a loosely coupled distributed environment. Additional goals of the data model are to:

1. Provide a way of registering products using a standard set of terms that allow the products to be found with simple searches and described so that users can determine their utility for a specific purpose;

2. Allow searching for products containing particular physical quantities (e.g., magnetic field; spectral irradiance) that are variously represented in a diverse array of data products; and
3. Facilitate a means of mapping comparable variables from many products onto a common set of terms so that visualization, analysis, and higher-order query tools and services can be used on all of them without regard to the origin of the data.

The content of a resource description based on the data model should enable services (either at the provider or in a VxO) to discover and access individual resources. The service layer can contain services for a variety of purposes. The basic functionality of the service layer is to provide the links necessary to connect user applications and search- and-retrieval front ends to data repositories. Ultimately, the data environment based on the data model will involve a number of software tools and services linked together as an internet-based environment. The data along with software tools and documentation associated with products will be directly accessible using standard web protocols (http, ftp). This "system" has the potential to provide capabilities that can aid even expert users of a particular dataset (e.g., on-the-fly coordinate transformations, the ability to merge datasets from different instruments, easy reference to related indices or other data), in addition to providing the broad access needed to investigate emerging questions in heliophysics.

2.3. Design Principles

The design of the SPASE data model begins with a few basic principles. These principles are:

1. Data is self-documented.

Data resources have internal schema or structures for storing values. The physical structure is determined by the storage format. Each retrievable entity on the format is assigned a key or tag which can be used to retrieve the entity.

The SPASE Data Model does not attempt to describe the physical storage of the parameters, for example, the byte offsets, record format or data encoding in the data resource. Instead, the SPASE Data Model describes the scientific attributes of the parameter and links this to the parameter by a key or tag used by the storage format. Applications can use the SPASE descriptions to locate a parameter and the appropriate format-specific reader to extract parameters.

Not all data in the Heliophysics data environment is stored in self- documented formats. For example, data stored as ASCII tables. The method of assigning a key or tag name for each field in the ASCII table is external to the SPASE data model. This method must be part of an "format" specification which may be as simple as the first row of the table containing the tag name of the field.

2. Resources are distributed.

There are many providers of resources and these providers can be located anywhere in the world.

Each provider operates independently and activities are not necessarily coordinated. The SPASE data model assumes that providers have local autonomy and may operate under local rules or jurisdictions.

3. Online Resources have Universal Resource Locators (URL)

If a resource is on-line it can be accessed and retrieved using Universal Resource Locators (URL).

4. The data environment is continuously evolving.

New resources are actively generated either as part of an on-going experiment or as a result of analysis and assessment.

These new resources may be directly related to other resources. As new resources are generated or new associations defined the network or collections formed will expand over time.

2.4. Conceptual System Environment

The data model is intended to enable the sharing of knowledge through structured metadata (SPASE Descriptions) which can be exchanged in queries and responses between systems. The operational environment this occurs in is the current Internet where systems and users are loosely coupled and highly distributed. Special services or portals may harvest (collect) the SPASE descriptions from multiple sources to create an enriched capability for the user. For example, a search engine may provide a comprehensive search for a particular scientific discipline. The web site https://hpde.gsfc.nasa.gov gives a guide to many currently active projects and a great deal of background information. Of particular interest there is the document entitled, "A Framework for Space and Solar Physics Virtual Observatories."

Figure 1 illustrates a conceptual architecture in a distributed environment. In this environment multiple communities have resources to share. The storage location of a resource is called a repository. Some of these repositories (boxes) have local SPASE descriptions which are available through a local registry service (balls). The contents of other repositories are described at external, possibly independent, locations which make the descriptions available through remote registries. Gateways (rings) can harvest and aggregate the resources from multiple registries or perform federated searches which provide a single access point to multiple registries. Applications access the registries to discover resources, determine their location and retrieve them from the repositories.

3. SPASE Data Model

3.1. Resource Types

The top level entity in the SPASE data model is a Resource. There are 12 different types of resources. Each resource type consists of a set of attributes that characterize the resource. The resource types can be divided into three categories: Data Resources, Origination Resources and Infrastructure Resources.

This section provides an overview of the resource types. Complete details for each resource can be found in Section 4.

3.1.1. Data Resources

Data Resources describe one or more data products. A "data product" is a set of data that is uniformly processed and formatted, from one or more instruments, typically spanning the full duration of the observations of the relevant instrument(s). A data product may consist of a collection of granules of successive time spans, but may be high-level entities such as event catalogs. Data products can be images (Display Data), sample or observation values (Numerical Data), event lists (Catalog). Included in the Data Resource category are the resources used to describe individual files (Granule) which are part of data product sets and assessments of a resource (Annotations). The complete list of Data Resources is:

Numerical Data,
Display Data,
Catalog,
Granule, and
Annotation

3.1.2. Origination Resources

Origination Resources describe the generators or sources of data. Included in a Data Resource description is information about the origination of the data. A Data Resource will refer to one or more Origination Resource. The complete list of Origination Resources is:

Observatory,
Instrument,
Person, and
Document

3.1.3. Infrastructure Resources

Infrastructure Resources describe system components that are part of the exchange and use of data. This includes storage locations for data (Repository), metadata (Registry) and functions (Service). The complete list of Infrastructure Resources is:

Registry,
Repository, and
Service

3.1.4. Ontology

In the SPASE data model there can be associations between pairs of resources. Some associations are specific and are required in order to fully describe a resource. For example, an Instrument resource is always associated with an Observatory

resource. The specific associations form an ontology which is illustrated in Figure 2. The SPASE data model also allows associations of resources which are not explicitly defined in the ontology. These associations are described and assigned a relationship type using generic association attributes.

3.2. Resource Identifiers

Every resource has a unique identifier so that it can be tracked and referenced within a system. This identifier is defined by the naming authority for the resource. The entity which acts as the naming authority is determined by the agency or group who provides the resource. Each resource identifier is a URI that has the form

      scheme://authority/path

where "scheme" is "spase" for those resources administered through the SPASE framework, "authority" is the unique identifier for the naming authority within the data environment and "path" is the unique local identifier of the resource within the context of the "authority". The resource ID must be unique within the data environment.

To illustrate the definition of a resource identifier consider that there is a registered "authority" called "SMWG" which maintains information for spacecraft (Observatory) resources. One such spacecraft is GOES8. Now "SMWG" decides that the "path" to the GOES8 resource description should include the Resource Type as part of the path and that the observatory "name" will be "GOES8". So, the resource identifier would be:

      spase://SMWG/Observatory/GOES8

The Resource ID is used to formally or informally associate one resource with another. For example an Instrument resource must be formally associated with an Observatory. A Numerical Data resource may be formally associated with an Instrument resource and informally associated with other Numerical Data resources. The free association of resources allows networks or collections to be formed from distributed resources and allows for new associations to be formed as needed without affecting existing associations.

3.3. Core Attributes

With the exception of Granule and Person, every resource has a common set of core attributes. The core attributes provide textual descriptions of the resource and the capability to reference external sources of information (Information URL). It also describes the context of the resource in the larger data environment. This context consists of associations with other resources (Association) and with previous versions (Prior ID). These attributes are grouped in a Resource Header and consists of:

Resource Name
Alternate Name
Release Date
Expiration Date
Description
Acknowledgement
Contact
Information URL
Association
Prior ID

3.4. Text Mark-up

While descriptive text may be brief, some formatting of the text may be necessary to convey the necessary information, for example, multiple paragraphs or nested lists. To ensure system portability text values in SPASE are sequences of alphanumeric one byte UTF-8 (US_ASCII) characters with white space preserved. When text is displayed in some applications (a web browser is the best example) a strict preservation of white space may not result in a desirable presentation. Also, to make the metadata more human readable (for example in XML) additional white space may be introduced in the form of indentation. If strictly preserved, this could result in an undesirable presentation. To allow an author to express a preferred layout for the text, a special set of text "mark-up" rules are defined. The layout can then be determined by normalizing the text and applying a simple set of interpretation rules.

3.4.1 Normalization Rules

To aid in determining the layout or structural intent of the author the following rules are to be applied to text to create a normalized form:

1. All lines are to end with a newline character.
2. All text is left justified. No line has leading whitespace.

Text Interpretation Rules

After normalization of text the following rules can be used to interpret the layout intent of the author.

1. Blank lines indicate paragraph breaks.
2. Lists
    1. Must be preceded by a blank line.
    2. Items are indicated by a line beginning with a reserved character followed by a space. Three levels of lists are supported. The reserved characters are:
       * : First level list
       - : Second level list (must appear within a first level context)
       . : Third level list (must appear within a second level context)
    3. End with a blank line.
3. Tables
    1. Begin and end with a line that starts with "+--".
    2. The first "row" of a table is the field headings.
    3. Fields in a table are separated with a vertical bar ("|").
    4. Visual row separators are lines which begin with "|--".

3.5. Extensions

The SPASE Data Model allows for additional metadata to be embedded within a SPASE description. Every Resource Type has an "Extension" element which can contain metadata compliant with other data models. The "Extension" element has a SPASE data model type of "Text", but is not limited to alphanumeric characters and may contain tagged information.

4. Guidelines for Metadata Descriptions

The following sections describe the details of the SPASE Data Model, especially the metadata used to describe data. There is a richness in the available metadata that allows very detailed descriptions of products. Many of the types of metadata may not apply in your case or you may not need much detail to adequately describe your data holdings. But it must be remembered that the better data are described, the easier they will be to use.

To determine what level of detail is needed, we recommend considering not only what the user needs to find the correct data, but also what is necessary to know if the data will be useful for the requestor's purpose. The user might get this information by contacting you, but if the data were moved somewhere else and only the data description were available to determine the utility of the data, consider if the user would have sufficient information to know if this is the right data set and what problems might be associated with the use of these data. Also consider if additional documentation is neccesary and if so create an Document resource and associate it with the data resource. An "Information URL" may also be used to provide links to more detailed information.

In summary, products need not be described in minute detail, but users will need, at minimum, information for assessing what the data products represent and where to find them. Of course it is also useful to include information on how the data can be applied and common pitfalls in their use, but the first need is to make the products usefully visible.

5. Examples

As an example let us describe a person using SPASE metadata. This person is "John Smith" from Smith Foundation. While the SPASE data model is implementation neutral, XML representation is preferred. This example uses the SPASE XML form.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<Spase>
   <Version>2.0.0</Version>
    <Person>
      <ResourceID>spase://person/jsmith@smith.org</ResourceID>
      <PersonName>John Smith</PersonName>
      <OrganizationName>Smith Foundation</OrganizationName>
      <Address>1 Main St., Smithville, MA</Address>
      <Email>jsmith@smith.org</Email>
      <PhoneNumber>1-800-555-1212</PhoneNumber>
   </Person>
</Spase>
```

For a more extensive example let us consider a collection of numerical data from the magnetometer on the ACE spacecraft. This data set has been averaged to 1 minute intervals (cadence) and spans the beginning of the mission to the end of 2004 (1997-09-01 through 2004-12-31). The ACE spacecraft orbits the L1 point between the Earth and the Sun. While the SPASE data model is implementation neutral, XML representation is preferred. This example uses the SPASE XML form. The presented URLs are fictitious and will not direct you to the actual data.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<Spase>
   <Version>2.0.0</Version>
   <NumericalData>
      <ResourceID>spase://VMO/NumericalData/ACE/MAG/200301</ResourceID>
      <ResourceHeader>
         <ResourceName>ACEMAG200301</ResourceName>
         <ReleaseDate>2006-07-26T00:00:00.000</ReleaseDate>
         <Acknowledgement>
            User will acknowledge the data producer and instrument P.I. in any
            publication resulting from the use of these data.
         </Acknowledgement>
        <Description>
          ACE MFI 1-minute averaged magnetic-field data in GSE coordinates
          from Jan 2003. These data have been derived from the 16 second
          resolution ACE MFI which were linearly interpolated to a 1-minute
          time grid with time stamps at second zero of each minute.
        </Description>

        <Contact>
           <Role>PrincipalInvestigator</Role>
           <PersonID>spase://SMWG/Person/Norman.F.Ness</PersonID>
        </Contact>

        <Contact>
           <Role>Co-Investigator</Role>
           <PersonID>spase://SMWG/Person/Charles.Smith</PersonID>
        </Contact>

        <Contact>
           <Role>DataProducer</Role>
           <PresonID>spase://SMWG/Person/James.M.Weygand</PresonID>
        </Contact>
     </ResourceHeader>
```

```xml
<AccessInformation>
   <AccessRights>Open</AccessRights>
   <AccessURL>
      <URL>http://www.igpp.ucla.edu/getResource?format=text&id=spase://UCLA/ACEMAG200301</URL>
   </AccessURL>
   <Format>Text</Format>
   <Encoding>GZIP</Encoding>
</AccessInformation>

<InstrumentID>spase://SMWG/ACE/MAG</InstrumentID>
<MeasurementType>MagneticField</MeasurementType>

<TemporalDescription>
   <TimeSpan>
     <StartDate>1997-01-01T00:00</StartDate>
     <StopDate>2004-01-31T23:59</StopDate>
   </TimeSpan>
   <Cadence>PT1M</Cadence>
</TemporalDescription>

<InstrumentRegion>Heliosphere.NearEarth</InstrumentRegion>
<ObservedRegion>Heliosphere.NearEarth</ObservedRegion>

<Parameter>
   <Name>SAMPLE_TIME_UTC</Name>
   <ParameterKey>time</ParameterKey>
   <Description>
    Sample UTC in the form DD MM YYYY hh mm ss where
      DD   = day of month (01-31)
      MM   = month of year (01-12)
      YYYY = Gregorian Year AD
      hh   = hour of day     (00:23)
      mm   = minute of hour  (00-59)
      ss   = second of minute (00-60).
   </Description>
   <Support>
     <SuportQuantity>Temporal</SuportQuantity>
   </Support>
</Parameter>

<Parameter>
   <Name>MAGNETIC_FIELD_VECTOR</Name>
   <Units>nT</Units>
   <CoordinateSystem>
      <CoordinateRepresentation>Cartesian</CoordinateRepresentation>
      <CoordinateSystemName>GSE</CoordinateSystemName>
   </CoordinateSystem>
   <Description>
       Magnetic field vector in GSE Coordinates (Bx, By, Bz).
   </Description>
   <Field>
      <Qualifier>Vector</Qualifier>
      <FieldQuantity>Magnetic</FieldQuantity>
   </Field>
</Parameter>

<Parameter>
   <Name>SPACECRAFT_POSITION_VECTOR</Name>
   <CoordinateSystem>
      <CoordinateRepresentation>Cartesian</CoordinateRepresentation>
      <CoordinateSystemName>GSE</CoordinateSystemName>
   </CoordinateSystem>
   <Units>EARTH RADII</Units>
   <UnitsConversion>6378.16 km</UnitsConversion>
```

```xml
      <Description>
         ACE spacecraft location in GSE coordinates (X,Y,Z)."
      </Description>
      <Support>
        <SuportQuantity>Positional</SupportQuantity>
      </Support>
   </Parameter>

  </NumericalData>
</Spase>
```

6. Element Data Types

Each element in the SPASE Data Model has a data type. One design feature of the SPASE data model is that an element can contain either a value or other elements. Mixed content (elements and values) are not allowed. This allows the data model to be implemented in a wider range of metadata languages. The following data types are supported:

Container
A container of other elements. If "Container" is specified the element must have sub-elements specified.

Count
A whole number.

DateTime
A value is given in the ISO 8601 recommended primary standard notation: YYYY-MM-DD. where YYYY is the year in the usual Gregorian calendar, MM is the month of the year between 01 (January) and 12 (December), and DD is the day of the month between 01 and 31. It may also have an optional time portion given in the ISO 8601 recommended primary standard notation: HH:MM:SS.sss where HH is the number of complete hours that have passed since midnight (00-24), MM is the number of complete minutes that have passed since the start of the hour (00-59), and SS is the number of complete seconds since the start of the minute (00-60), and sss are milliseconds that have passed since the start of the second (000-999). Time zones are not allowed so all times are in Universal Time. The time portion must follow the date portion with both portions separated by a "T". For example, "2004-07-29" is July 29, 2004 and "2004-07-29T12:30:00" is precisely 12:30 on July 29, 2004.

Duration
A duration of time. A time value given in the ISO 8601 recommended primary standard notation: PTHH:MM:SS.sss where PT are tokens to indicate that the time value is a duration, HH is the number of complete hours that have passed since midnight (00-24), MM is the number of complete minutes that have passed since the start of the hour (00-59), and SS is the number of complete seconds since the start of the minute (00-60), and sss are milliseconds that have passed since the start of the second (000-999).

Enumeration
Value is selected from a list of allowed values. The name of list is an additional attribute of the element. Lists may be externally controlled in which case the location of the list is indicated in the textual definition of the element.

Item
An element which is a value for an enumerated list.

Numeric
A fractional number which can be expressed in scientific notation. The string "NaN" represents not-a-number (flag) values and the string "INF" represents an infinitely large value. The value "-INF" represents an infinitely small value.

Sequence
A list of whole number values where the order of the values is fixed. A space separates each value. For example, "1 2 3".

Text
A string of alphanumeric characters. A text based "markup" is supported. See the "Text Mark-up" section in specification document for complete details.

URL
Universal Resource Locator

ID
SPASE Identifier

7. Enumerations

Lists are either "open" or "closed". The items in a "closed" list are determined by the SPASE model and definitions of each item is in the SPASE data dictionary. The items in an "open" list are determined by an external control authority. The URL for the control authority is indicated in the definition of each "open" list.

AccessRights
Identifiers for permissions granted or denied by the host of a product to allow other users to access and use the resource.
Allowed Values:
Open
PartiallyRestricted
Restricted
AdiabaticInvariant
Identifiers for properties of a physical system related to periodic phenomena that remains constant under slowly varying conditions.
Allowed Values:
MagneticMoment
BounceMotion
DriftMotion
AnnotationType
Identifiers for an classification of an annotation.
Allowed Values:
Anomaly
Event
Feature
AssociationType
Identifiers for resource associations.
Allowed Values:
ChildEventOf
DerivedFrom
ObservedBy
Other
PartOf
RevisionOf
Availability
Identifiers for indicating the method or service which may be used to access the resource.
Allowed Values:
Offline
Online
ClassificationMethod
Identifiers for the technique used to determine the characteristics of an object.
Allowed Values:
Automatic
Inferred
Inspection
Component
Identifiers for the axis of coordinate systems.
Allowed Values:
I
J
K
ConfidenceRating

Identifiers for the classification of the certainty of an assertion.
Allowed Values:
[Probable](#)
[Strong](#)
[Unlikely](#)
[Weak](#)
CoordinateRepresentation
Identifiers of the method or form for specifying a given point or vector in a given coordinate system.
Allowed Values:
[Cartesian](#)
[Cylindrical](#)
[Spherical](#)
CoordinateSystemName
Identifiers of the origin and orientation of a set of typically orthogonal axes.
Allowed Values:
[Carrington](#)
[CGM](#)
[CSO](#)
[DM](#)
[ECD](#)
[ECEF](#)
[ENP](#)
[GEI](#)
[GEO](#)
[GPHIO](#)
[GSE](#)
[GSEQ](#)
[GSM](#)
[HAE](#)
[HCC](#)
[HCI](#)
[HCR](#)
[HEE](#)
[HEEQ](#)
[HERTN](#)
[HG](#)
[HGI](#)
[HGRTN](#)
[HPC](#)
[HPR](#)
[HSM](#)
[J2000](#)
[JSM](#)
[JSO](#)
[KSM](#)
[KSO](#)
[LGM](#)
[MAG](#)
[MFA](#)
[MSO](#)
[RTN](#)
[SC](#)
[SE](#)

SM
SpacecraftOrbitPlane
SR
SR2
SSE
SSE_L
TIIS
VSO
WGS84

DirectionAngle
Identifiers for the angle between a vector and a base axis.
Allowed Values:
AzimuthAngle
ElevationAngle
PolarAngle

DirectionCosine
Identifiers for the cosine of the angle between two vectors in a three dimensional Euclidean space.
Allowed Values:
I
J
K

DisplayType
Identifiers for types or classes of rendered data.
Allowed Values:
Image
Plasmagram
Spectrogram
StackPlot
TimeSeries
WaveForm

DocumentType
Identifiers for the characterization of the content or purpose of a document.
Allowed Values:
Other
Poster
Presentation
Report
Specification
TechnicalNote
WhitePaper

Earth
Identifiers for the regions surrounding the Earth.
Allowed Values:
Magnetosheath
Magnetosphere
Moon
NearSurface
Surface

Encoding
Identifiers for unambiguous rules that establishes the representation of information within a file.
Allowed Values:
ASCII
Base64

[BZIP2](#)
[GZIP](#)
[None](#)
[S3_BUCKET](#)
[TAR](#)
[Unicode](#)
[ZIP](#)

FieldQuantity

Identifiers for the physical attribute of the field.

Allowed Values:

[Current](#)
[Electric](#)
[Electromagnetic](#)
[Gyrofrequency](#)
[Magnetic](#)
[PlasmaFrequency](#)
[Potential](#)
[PoyntingFlux](#)

Format

Identifiers for data organized according to preset specifications.

Allowed Values:

[AVI](#)
[Binary](#)
[CDF](#)
[CEF](#)
[CEF1](#)
[CEF2](#)
[CSV](#)
[Excel](#)
[FITS](#)
[GIF](#)
[Hardcopy](#)
[HDF](#)
[HDF4](#)
[HDF5](#)
[HTML](#)
[IDFS](#)
[IDL](#)
[JPEG](#)
[JSON](#)
[MATLAB_4](#)
[MATLAB_6](#)
[MATLAB_7](#)
[MPEG](#)
[NCAR](#)
[NetCDF](#)
[PDF](#)
[PDS4](#)
[PDS3](#)
[PNG](#)
[Postscript](#)
[QuickTime](#)
[Text](#)

[TIFF](#)
[UDF](#)
[VOTable](#)
[XML](#)

Hardcopy

Identifiers for permanent reproductions, or copy in the form of a physical object, of any media suitable for direct use by a person.

Allowed Values:

[Film](#)
[Microfiche](#)
[Microfilm](#)
[Photograph](#)
[PhotographicPlate](#)
[Print](#)

HashFunction

Identifiers for functions or algorithms that convert a digital data object into a hash value.

Allowed Values:

[MD5](#)
[SHA1](#)
[SHA256](#)

Heliosphere

Identifiers for regions of the solar atmosphere which extends roughly from the inner corona to the edge of the solar plasma at the heliopause separating primarily solar plasma from interstellar plasma.

Allowed Values:

[Heliosheath](#)
[Inner](#)
[NearEarth](#)
[Outer](#)
[Remote1AU](#)

InstrumentType

Identifiers for the type of experiment the instrument performs. This is the technique of observation.

Allowed Values:

[Antenna](#)
[Channeltron](#)
[Coronograph](#)
[DoubleSphere](#)
[DustDetector](#)
[ElectronDriftInstrument](#)
[ElectrostaticAnalyser](#)
[EnergeticParticleInstrument](#)
[Experiment](#)
[FaradayCup](#)
[FluxFeedback](#)
[FourierTransformSpectrograph](#)
[GeigerMuellerTube](#)
[Imager](#)
[ImagingSpectrometer](#)
[Interferometer](#)
[IonChamber](#)
[IonDrift](#)
[IonGauge](#)
[LangmuirProbe](#)
[LongWire](#)

[Magnetograph](#)
[Magnetometer](#)
[MassSpectrometer](#)
[MicrochannelPlate](#)
[MultispectralImager](#)
[NeutralAtomImager](#)
[NeutralParticleDetector](#)
[ParticleCorrelator](#)
[ParticleDetector](#)
[Photometer](#)
[PhotomultiplierTube](#)
[Photopolarimeter](#)
[Platform](#)
[ProportionalCounter](#)
[QuadrisphericalAnalyser](#)
[Radar](#)
[Radiometer](#)
[ResonanceSounder](#)
[RetardingPotentialAnalyser](#)
[Riometer](#)
[ScintillationDetector](#)
[SearchCoil](#)
[SolidStateDetector](#)
[Sounder](#)
[SpacecraftPotentialControl](#)
[SpectralPowerReceiver](#)
[Spectrometer](#)
[TimeOfFlight](#)
[Unspecified](#)
[WaveformReceiver](#)

Integral
Identifiers for values above a given threshold and over area or solid-angle range.
Allowed Values:
[Area](#)
[Bandwidth](#)
[SolidAngle](#)

Ionosphere
Identifiers for ionospheric regions.
Allowed Values:
[DRegion](#)
[ERegion](#)
[FRegion](#)
[Topside](#)

Jupiter
Identifiers for the regions surrounding the planet Jupiter.
Allowed Values:
[Callisto](#)
[Europa](#)
[Ganymede](#)
[Io](#)
[Magnetosphere](#)

Magnetosphere

Identifiers for the region of space above the atmosphere or surface of the planet, and bounded by the magnetopause, that is under the direct influence of planet's magnetic field.
Allowed Values:
Magnetotail
Main
Plasmasphere
Polar
RadiationBelt
RingCurrent
Mars
Identifiers for the regions surrounding the planet Mars.
Allowed Values:
Deimos
Magnetosphere
Phobos
MeasurementType
Identifiers for the method of making an estimated value of a quantity that forms the basis of an observation.
Allowed Values:
ActivityIndex
Dopplergram
Dust
ElectricField
EnergeticParticles
Ephemeris
ImageIntensity
InstrumentStatus
IonComposition
Irradiance
MagneticField
Magnetogram
NeutralAtomImages
NeutralGas
Profile
Radiance
Spectrum
SPICE
ThermalPlasma
Waves
Mercury
Identifiers for the regions surrounding the planet Mercury.
Allowed Values:
Magnetosphere
MixedQuantity
Identifiers for the combined attributes of a mixed parameter quantity.
Allowed Values:
AkasofuEpsilon
AlfvenMachNumber
AlfvenVelocity
FrequencyToGyrofrequencyRatio
IMFClockAngle
MagnetosonicMachNumber
Other
PlasmaBeta

[SolarUVFlux](#)
[TotalPressure](#)
[VCrossB](#)

NearSurface

Identifiers for regions of the gaseous and possibly ionized environment of a body extending from the surface to some specified altitude.

Allowed Values:

[Atmosphere](#)
[AuroralRegion](#)
[EquatorialRegion](#)
[Ionosphere](#)
[Mesosphere](#)
[MidLatitudeRegion](#)
[Plasmasphere](#)
[PolarCap](#)
[SouthAtlanticAnomalyRegion](#)
[Stratosphere](#)
[SubAuroralRegion](#)
[Thermosphere](#)
[Troposphere](#)

Neptune

Identifiers for the regions surrounding the planet Neptune.

Allowed Values:

[Magnetosphere](#)
[Proteus](#)
[Triton](#)

ParticleQuantity

Identifiers for the characterization of the physical properties of the particle.

Allowed Values:

[AdiabaticInvariant](#)
[ArrivalDirection](#)
[AtomicNumberDetected](#)
[AverageChargeState](#)
[ChargeFlux](#)
[ChargeState](#)
[CountRate](#)
[Counts](#)
[DynamicPressure](#)
[Energy](#)
[Entropy](#)
[EnergyDensity](#)
[EnergyFlux](#)
[EnergyPerCharge](#)
[FlowSpeed](#)
[FlowVelocity](#)
[Fluence](#)
[GeometricFactor](#)
[Gyrofrequency](#)
[HeatFlux](#)
[LShell](#)
[Mass](#)
[MassDensity](#)
[MassNumber](#)

MassPerCharge
NumberDensity
NumberFlux
ParticleRadius
ParticleRigidity
PhaseSpaceDensity
PlasmaFrequency
Pressure
SonicMachNumber
SoundSpeed
Temperature
ThermalSpeed
Velocity

ParticleType

Identifiers for the characterization of the kind of particle observed by the measurement.

Allowed Values:

Aerosol
AlphaParticle
Atom
Dust
Electron
Ion
Molecule
Neutron
Proton
Positron

PhenomenonType

Identifiers for the characteristics or categorization of an observation. Note: Joe King to provide.

Allowed Values:

ActiveRegion
Aurora
BowShockCrossing
CoronalHole
CoronalMassEjection
EITWave
EnergeticSolarParticleEvent
ForbushDecrease
GeomagneticStorm
InterplanetaryShock
MagneticCloud
MagnetopauseCrossing
RadioBurst
SectorBoundaryCrossing
SolarFlare
SolarWindExtreme
StreamInteractionRegion
Substorm

ProcessingLevel

Identifiers to characterize the amount and type of manipulation which has been applied to the sampled data.

Allowed Values:

Calibrated
Raw
Uncalibrated

Projection

Identifiers to projections into a coordinate system.

Allowed Values:

IJ

IK

JK

Venus

Identifiers for the regions surrounding the planet Venus.

Allowed Values:

Magnetosphere

Qualifier

Identifiers for terms which refine the type or attribute of a quantity.

Allowed Values:

Anisotropy

Array

AutoSpectrum

Average

Characteristic

Circular

Coherence

Column

Component

Confidence

Core

CrossSpectrum

Deviation

Differential

Direction

Directional

DirectionAngle

DirectionCosine

EncodedParameter

FieldAligned

Fit

Group

Halo

ImaginaryPart

Integral

Linear

LineOfSight

Magnitude

Maximum

Median

Minimum

Moment

Parallel

Peak

Perpendicular

Perturbation

Phase

PhaseAngle

PowerSpectralDensity

Projection

[Pseudo](#)
[Ratio](#)
[RealPart](#)
[Scalar](#)
[Spectral](#)
[StandardDeviation](#)
[StokesParameters](#)
[Strahl](#)
[Superhalo](#)
[Symmetric](#)
[Tensor](#)
[Total](#)
[Trace](#)
[Uncertainty](#)
[Variance](#)
[Vector](#)

Region

Identifiers for areas of the physical world which may be occupied or observed.

Allowed Values:

[Asteroid](#)
[Comet](#)
[Earth](#)
[Heliosphere](#)
[Interstellar](#)
[Jupiter](#)
[Mars](#)
[Mercury](#)
[Neptune](#)
[Pluto](#)
[Saturn](#)
[Sun](#)
[Uranus](#)
[Venus](#)

RenderingAxis

Identifiers for the reference component of a plot or rendering of data.

Allowed Values:

[ColorBar](#)
[Horizontal](#)
[Vertical](#)

Role

Identifiers for the assigned or assumed function or position of an individual.

Allowed Values:

[ArchiveSpecialist](#)
[CoInvestigator](#)
[CoPI](#)
[Contributor](#)
[DataProducer](#)
[DeputyPI](#)
[Developer](#)
[FormerPI](#)
[GeneralContact](#)
[HostContact](#)
[MetadataContact](#)

MissionManager
MissionPrincipalInvestigator
PrincipalInvestigator
ProgramManager
ProgramScientist
ProjectEngineer
ProjectManager
ProjectScientist
Publisher
Scientist
TeamLeader
TeamMember
TechnicalContact
User

Saturn

Identifiers for the regions surrounding the planet Saturn.

Allowed Values:

Dione
Enceladus
Iapetus
Magnetosphere
Mimas
Rhea
Tethys
Titan

ScaleType

Identifiers for scaling applied to a set of numbers.

Allowed Values:

LinearScale
LogScale

SourceType

Identifiers for the characterization of the function or purpose of a source.

Allowed Values:

Ancillary
Browse
Data
Layout
Thumbnail

SpectralRange

Identifiers for names associated with wavelengths. Based on the ISO 21348 Solar Irradiance Standard. Additions have been made to extend the frequency ranges to include those used in space physics. Those additions are indicated in blue text. The "Total Solar Irradiance" category has not been included since it is a type of measurement and not a specific spectral range. See Appendix A - Comparison of Spectrum Domains for a comparison of the spectral ranges with other systems.

Allowed Values:

CaK
ExtremeUltraviolet
FarUltraviolet
GammaRays
Halpha
HardXrays
He10830
He304
Infrared

[K7699](#)
[LBHBand](#)
[Microwave](#)
[NaD](#)
[Ni6768](#)
[Optical](#)
[RadioFrequency](#)
[SoftXRays](#)
[Ultraviolet](#)
[WhiteLight](#)
[XRays](#)

Style

Identifiers for the manner in which a response from a URL is presented.

Allowed Values:

[File](#)
[HAPI](#)
[Listing](#)
[Search](#)
[Template](#)
[Overview](#)
[WebService](#)

Sun

Identifiers for regions of the star upon which our solar system is centered.

Allowed Values:

[Chromosphere](#)
[Corona](#)
[Interior](#)
[Photosphere](#)
[TransitionRegion](#)

SupportQuantity

Identifiers for the information useful in understanding the context of an observation, typically observed or measured coincidentally with a physical observation.

Allowed Values:

[DataQuality](#)
[Housekeeping](#)
[InstrumentMode](#)
[Orientation](#)
[Other](#)
[Positional](#)
[RotationMatrix](#)
[SpinPeriod](#)
[SpinPhase](#)
[SpinRate](#)
[Telemetry](#)
[Temporal](#)
[Velocity](#)

Text

Identifiers for the encoding of sequences of characters.

Allowed Values:

[ASCII](#)
[Unicode](#)

WaveQuantity

Identifiers for the characterization of the physical properties of a wave.

Allowed Values:
[Absorption](#)
[ACElectricField](#)
[ACMagneticField](#)
[Albedo](#)
[DopplerFrequency](#)
[Emissivity](#)
[EnergyFlux](#)
[EquivalentWidth](#)
[Frequency](#)
[Gyrofrequency](#)
[Intensity](#)
[LineDepth](#)
[LowerHybridFrequency](#)
[MagneticField](#)
[ModeAmplitude](#)
[PlasmaFrequency](#)
[Polarization](#)
[PoyntingFlux](#)
[PropagationTime](#)
[StokesParameters](#)
[UpperHybridFrequency](#)
[Velocity](#)
[VolumeEmissionRate](#)
[Wavelength](#)

WaveType

Identifiers for the carrier or phenomenum of wave information observed by the measurement.

Allowed Values:
[Electromagnetic](#)
[Electrostatic](#)
[Hydrodynamic](#)
[MHD](#)
[Photon](#)
[PlasmaWaves](#)

Waves

Identifiers for experimental and natural wave phenomena.

Allowed Values:
[Active](#)
[Passive](#)

8. Data Model Tree

The taxonomy tree shows the inter-relationship of elements in the data model. This provides a "big picture" view of the SPASE data model. This taxonomy is implementation neutral. Details for each element are contained in the data dictionary. Notes: Occurence specifications are enclosed in parenthesis: 0 = optional, 1 = required, * = zero or more, + = 1 or more

+ Spase (1)
| + Version (1)
| + Catalog (+)
| | + ResourceID (1)
| | + ResourceHeader (1)
| | | + ResourceName (1)
| | | + AlternateName (*)
| | | + DOI (0)
| | | + ReleaseDate (1)
| | | + RevisionHistory (0)
| | | | + RevisionEvent (+)
| | | | | + ReleaseDate (1)
| | | | | + Note (1)
| | | + ExpirationDate (0)
| | | + Description (1)
| | | + Acknowledgement (0)
| | | + PublicationInfo (0)
| | | | + Authors (1)
| | | | + PublicationDate (1)
| | | | + PublishedBy (1)
| | | + Funding (*)
| | | | + Agency (1)
| | | | + Project (1)
| | | | + AwardNumber (0)
| | | + Contact (+)
| | | | + PersonID (1)
| | | | + Role (+)
| | | | + StartDate (0)
| | | | + StopDate (0)
| | | | + Note (0)
| | | + InformationURL (*)
| | | | + Name (0)
| | | | + URL (1)
| | | | + Description (0)
| | | | + Language (0)
| | | + Association (*)
| | | | + AssociationID (1)
| | | | + AssociationType (1)
| | | | + Note (0)
| | | + PriorID (*)
| + AccessInformation (+)
| | | + RepositoryID (1)
| | | + Availability (0)
| | | + AccessRights (0)
| | | + AccessURL (+)
| | | | + Name (0)
| | | | + URL (1)

| | | | + [Style](#) (0)
| | | | + [ProductKey](#) (*)
| | | | + [Description](#) (0)
| | | | + [Language](#) (0)
| | | + [Format](#) (1)
| | | + [Encoding](#) (0)
| | | + [DataExtent](#) (0)
| | | | + [Quantity](#) (1)
| | | | + [Units](#) (0)
| | | | + [Per](#) (0)
| | | + [Acknowledgement](#) (0)
| | + [ProviderName](#) (0)
| | + [ProviderResourceName](#) (0)
| | + [ProviderVersion](#) (0)
| | + [InstrumentID](#) (*)
| | + [PhenomenonType](#) (+)
| | + [TimeSpan](#) (0)
| | | + [StartDate](#) (1)
| | | + [StopDate](#) (1)
| | | + [RelativeStopDate](#) (1)
| | | + [Note](#) (*)
| | + [Caveats](#) (0)
| | + [Keyword](#) (*)
| | + [InputResourceID](#) (*)
| | + [Parameter](#) (*)
| | | + [Name](#) (1)
| | | + [Set](#) (*)
| | | + [ParameterKey](#) (0)
| | | + [Description](#) (0)
| | | + [UCD](#) (0)
| | | + [Caveats](#) (0)
| | | + [Cadence](#) (0)
| | | + [CadenceMin](#) (0)
| | | + [CadenceMax](#) (0)
| | | + [Units](#) (0)
| | | + [UnitsConversion](#) (0)
| | | + [CoordinateSystem](#) (0)
| | | | + [CoordinateRepresentation](#) (1)
| | | | + [CoordinateSystemName](#) (1)
| | | + [RenderingHints](#) (*)
| | | | + [DisplayType](#) (0)
| | | | + [AxisLabel](#) (0)
| | | | + [RenderingAxis](#) (0)
| | | | + [Index](#) (0)
| | | | + [ValueFormat](#) (0)
| | | | + [ScaleMin](#) (0)
| | | | + [ScaleMax](#) (0)
| | | | + [ScaleType](#) (0)
| | | + [Structure](#) (0)
| | | | + [Size](#) (1)
| | | | + [Description](#) (0)
| | | | + [Element](#) (*)
| | | | | + [Name](#) (1)

| | | | | | + [Qualifier](#) (*)
| | | | | | + [Index](#) (1)
| | | | | | + [ParameterKey](#) (0)
| | | | | | + [Units](#) (0)
| | | | | | + [UnitsConversion](#) (0)
| | | | | | + [ValidMin](#) (0)
| | | | | | + [ValidMax](#) (0)
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| | | | | | + [RenderingHints](#) (0)
| | | | | | + [DisplayType](#) (0)
| | | | | | + [AxisLabel](#) (0)
| | | | | | + [RenderingAxis](#) (0)
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| | | | | + [SpectralRange](#) (0)
| | | | | + [Low](#) (1)
| | | | | + [High](#) (1)
| | | | | + [Units](#) (1)
| | | | | + [Bin](#) (*)
| | | | | | + [BandName](#) (0)
| | | | | | + [Low](#) (1)
| | | | | | + [High](#) (1)
| | | + [Particle](#) (1)
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| | | | + [Qualifier](#) (*)
| | | | + [ParticleQuantity](#) (1)
| | | | + [AtomicNumber](#) (*)
| | | | + [EnergyRange](#) (0)
| | | | | + [Low](#) (1)
| | | | | + [High](#) (1)
| | | | | + [Units](#) (1)
| | | | | + [Bin](#) (*)
| | | | | | + [BandName](#) (0)
| | | | | | + [Low](#) (1)
| | | | | | + [High](#) (1)
| | | | + [AzimuthalAngleRange](#) (0)
| | | | | + [Low](#) (1)
| | | | | + [High](#) (1)
| | | | | + [Units](#) (1)
| | | | | + [Bin](#) (*)
| | | | | | + [BandName](#) (0)
| | | | | | + [Low](#) (1)
| | | | | | + [High](#) (1)

30

| | | | + PolarAngleRange (0)
| | | | | + Low (1)
| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
| | | | | | + BandName (0)
| | | | | | + Low (1)
| | | | | | + High (1)
| | | | + MassRange (0)
| | | | | + Low (1)
| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
| | | | | | + BandName (0)
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| | | | | | + High (1)
| | | | + PitchAngleRange (0)
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| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
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| | | | | | + High (1)
| | | + Wave (1)
| | | | + WaveType (0)
| | | | + Qualifier (*)
| | | | + WaveQuantity (1)
| | | | + EnergyRange (0)
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| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
| | | | | | + BandName (0)
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| | | | | | + High (1)
| | | | + FrequencyRange (0)
| | | | | + SpectralRange (0)
| | | | | + Low (1)
| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
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| | | | | | + High (1)
| | | | + WavelengthRange (0)
| | | | | + SpectralRange (0)
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| | | | | + High (1)
| | | | | + Units (1)
| | | | | + Bin (*)
| | | | | | + BandName (0)
| | | | | | + Low (1)

| | | | | | + [High](#) (1)
| | | + [Mixed](#) (1)
| | | | + [MixedQuantity](#) (1)
| | | | + [ParticleType](#) (*)
| | | | + [Qualifier](#) (*)
| | | + [Support](#) (1)
| | | | + [Qualifier](#) (*)
| | | | + [SupportQuantity](#) (1)
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| | + [ResourceHeader](#) (1)
| | | + [ResourceName](#) (1)
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| | | + [RevisionHistory](#) (0)
| | | | + [RevisionEvent](#) (+)
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| | | | + [StartDate](#) (0)
| | | | + [StopDate](#) (0)
| | | | + [Note](#) (0)
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| | | | + [AssociationType](#) (1)
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| | | + [PriorID](#) (*)
| | + [AccessInformation](#) (+)
| | | + [RepositoryID](#) (1)
| | | + [Availability](#) (0)
| | | + [AccessRights](#) (0)
| | | + [AccessURL](#) (+)
| | | | + [Name](#) (0)

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| | | | + [Language](0) (0)
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| | | | + [Quantity](1) (1)
| | | | + [Units](0) (0)
| | | | + [Per](0) (0)
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| | + [ProviderResourceName](0) (0)
| | + [ProviderProcessingLevel](0) (0)
| | + [ProviderVersion](0) (0)
| | + [InstrumentID](*) (*)
| | + [MeasurementType](+) (+)
| | + [TemporalDescription](0) (0)
| | | + [TimeSpan](1) (1)
| | | | + [StartDate](1) (1)
| | | | + [StopDate](1) (1)
| | | | + [RelativeStopDate](1) (1)
| | | | + [Note](*) (*)
| | | + [Cadence](0) (0)
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| | | + [CadenceMax](0) (0)
| | | + [Exposure](0) (0)
| | | + [ExposureMin](0) (0)
| | | + [ExposureMax](0) (0)
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| | + [DisplayCadence](0) (0)
| | + [ObservedRegion](*) (*)
| | + [Caveats](0) (0)
| | + [Keyword](*) (*)
| | + [InputResourceID](*) (*)
| | + [Parameter](*) (*)
| | | + [Name](1) (1)
| | | + [Set](*) (*)
| | | + [ParameterKey](0) (0)
| | | + [Description](0) (0)
| | | + [UCD](0) (0)
| | | + [Caveats](0) (0)
| | | + [Cadence](0) (0)
| | | + [CadenceMin](0) (0)
| | | + [CadenceMax](0) (0)
| | | + [Units](0) (0)
| | | + [UnitsConversion](0) (0)
| | | + [CoordinateSystem](0) (0)
| | | | + [CoordinateRepresentation](1) (1)
| | | | + [CoordinateSystemName](1) (1)
| | | + [RenderingHints](*) (*)

| | | | + DisplayType (0)
| | | | + AxisLabel (0)
| | | | + RenderingAxis (0)
| | | | + Index (0)
| | | | + ValueFormat (0)
| | | | + ScaleMin (0)
| | | | + ScaleMax (0)
| | | | + ScaleType (0)
| | | + Structure (0)
| | | | + Size (1)
| | | | + Description (0)
| | | | + Element (*)
| | | | | + Name (1)
| | | | | + Qualifier (*)
| | | | | + Index (1)
| | | | | + ParameterKey (0)
| | | | | + Units (0)
| | | | | + UnitsConversion (0)
| | | | | + ValidMin (0)
| | | | | + ValidMax (0)
| | | | | + FillValue (0)
| | | | | + RenderingHints (0)
| | | | | | + DisplayType (0)
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| | | | + Name (0)
| | | | + URL (1)
| | | | + Description (0)
| | | | + Language (0)
| | | + Association (*)
| | | | + AssociationID (1)
| | | | + AssociationType (1)
| | | | + Note (0)
| | | + PriorID (*)
| | + AccessURL (1)
| | | + Name (0)
| | | + URL (1)
| | | + Style (0)
| | | + ProductKey (*)
| | | + Description (0)
| | | + Language (0)
| | + Extension (*)
| + Service (+)
| | + ResourceID (1)
| | + ResourceHeader (1)

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| | | + <u>ResourceName</u> (1)
| | | + <u>AlternateName</u> (*)
| | | + <u>DOI</u> (0)
| | | + <u>ReleaseDate</u> (1)
| | | + <u>RevisionHistory</u> (0)
| | | | + <u>RevisionEvent</u> (+)
| | | | | + <u>ReleaseDate</u> (1)
| | | | | + <u>Note</u> (1)
| | | + <u>ExpirationDate</u> (0)
| | | + <u>Description</u> (1)
| | | + <u>Acknowledgement</u> (0)
| | | + <u>PublicationInfo</u> (0)
| | | | + <u>Authors</u> (1)
| | | | + <u>PublicationDate</u> (1)
| | | | + <u>PublishedBy</u> (1)
| | | + <u>Funding</u> (*)
| | | | + <u>Agency</u> (1)
| | | | + <u>Project</u> (1)
| | | | + <u>AwardNumber</u> (0)
| | | + <u>Contact</u> (+)
| | | | + <u>PersonID</u> (1)
| | | | + <u>Role</u> (+)
| | | | + <u>StartDate</u> (0)
| | | | + <u>StopDate</u> (0)
| | | | + <u>Note</u> (0)
| | | + <u>InformationURL</u> (*)
| | | | + <u>Name</u> (0)
| | | | + <u>URL</u> (1)
| | | | + <u>Description</u> (0)
| | | | + <u>Language</u> (0)
| | | + <u>Association</u> (*)
| | | | + <u>AssociationID</u> (1)
| | | | + <u>AssociationType</u> (1)
| | | | + <u>Note</u> (0)
| | | + <u>PriorID</u> (*)
| | + <u>AccessURL</u> (1)
| | | + <u>Name</u> (0)
| | | + <u>URL</u> (1)
| | | + <u>Style</u> (0)
| | | + <u>ProductKey</u> (*)
| | | + <u>Description</u> (0)
| | | + <u>Language</u> (0)
| | + <u>Extension</u> (*)
| + <u>Annotation</u> (+)
| | + <u>ResourceID</u> (1)
| | + <u>ResourceHeader</u> (1)
| | | + <u>ResourceName</u> (1)
| | | + <u>AlternateName</u> (*)
| | | + <u>DOI</u> (0)
| | | + <u>ReleaseDate</u> (1)
| | | + <u>RevisionHistory</u> (0)
| | | | + <u>RevisionEvent</u> (+)
| | | | | + <u>ReleaseDate</u> (1)

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| | | | | + Note (1)
| | | + ExpirationDate (0)
| | | + Description (1)
| | | + Acknowledgement (0)
| | | + PublicationInfo (0)
| | | | + Authors (1)
| | | | + PublicationDate (1)
| | | | + PublishedBy (1)
| | | + Funding (*)
| | | | + Agency (1)
| | | | + Project (1)
| | | | + AwardNumber (0)
| | | + Contact (+)
| | | | + PersonID (1)
| | | | + Role (+)
| | | | + StartDate (0)
| | | | + StopDate (0)
| | | | + Note (0)
| | | + InformationURL (*)
| | | | + Name (0)
| | | | + URL (1)
| | | | + Description (0)
| | | | + Language (0)
| | | + Association (*)
| | | | + AssociationID (1)
| | | | + AssociationType (1)
| | | | + Note (0)
| | | + PriorID (*)
| | + ImageURL (0)
| | + AnnotationType (1)
| | + PhenomenonType (0)
| | + ClassificationMethod (0)
| | + ConfidenceRating (0)
| | + TimeSpan (*)
| | | + StartDate (1)
| | | + StopDate (1)
| | | + RelativeStopDate (1)
| | | + Note (*)
| | + ObservationExtent (*)
| | | + ObservedRegion (0)
| | | + StartLocation (1)
| | | + StopLocation (1)
| | | + Note (*)
| | + Extension (*)

9. Dictionary

How to Read a Definition Each element has certain attributes and context for use. The details for each element are presented in the following form:

Absorption   Item
 Decrease of radiant energy (relative to the background continuum spectrum).

      Since:1.3.5

AccessInformation   Container
 Attributes of the resource which pertain to how to accessing the resource, availability and storage format.

      Since:1.0.0

      Sub-elements RepositoryID
                 Availability
                 AccessRights
                 AccessURL
                 Format
                 Encoding
                 DataExtent
                 Acknowledgement

      Used by: Catalog
            DisplayData
            Document
            NumericalData

AccessRights   Enumeration
 Permissions granted or denied by the host of a product to allow other users to access and use the resource.

      Since:1.0.0

      Allowed Values Open
                 PartiallyRestricted
                 Restricted

      Used by: AccessInformation

AccessURL   Container
 Attributes of the method for accessing a resource including a URL, name and description.

      Since:1.0.0

      Sub-elements Name
                 [URL](URL)
                 Style
                 ProductKey
                 Description
                 Language

Used by: AccessInformation
Registry
Repository
Service

ACElectricField   Item

Alternating electric field component of a wave.

Since:1.3.5

Acknowledgement   Text

The individual, group or organization which should be acknowledged when the data is used in or contributes to a presentation or publication.

Since:1.0.0

Used by: AccessInformation
ResourceHeader

ACMagneticField   Item

Alternating magnetic field component of a wave.

Since:1.3.5

Active   Item

Exerting an influence or producing a change or effect. An active measurement is one which produces a transmission or excitation as a part of the measurement cycle.

Since:1.3.0

ActiveRegion   Item

A localized, transient volume of the solar atmosphere in which PLAGEs, SUNSPOTS, FACULAe, FLAREs, etc. may be observed.

Since:1.3.0

ActivityIndex   Item

An indication, derived from one or more measurements, of the level of activity of an object or region, such as sunspot number, F10.7 flux, Dst, or the Polar Cap Indices.

Since:1.0.0

Address   Text

Directions for finding some location; written on letters or packages that are to be delivered to that location.

Since:1.0.0

Used by: Person

AdiabaticInvariant   Enumeration

A property of a physical system usually related to periodic phenomena that remains constant under slowly varying conditions.

    Since:2.3.1

    Allowed Values MagneticMoment
                       BounceMotion
                       DriftMotion

Aerosol   Item

A suspension of fine solid or liquid particles in a gas.

    Since:1.0.0

Agency   Text

The name of an organization that provides a service or funding for specific projects.

    Since:2.3.0

    Used by: Funding

AkasofuEpsilon   Item

A measure of the magnetopause energy flux and an indicator of the solar wind power available for subsequent magnetospheric energization. Defined as: V*B^2*l^2sin(theta/2)^4 where B is the IMF, l is an empirical scaling parameter equal to 7 RE, and theta = tan(BY /BZ)^-1 the IMF clock angle.

    Since:1.3.5

Albedo   Item

The ratio of reflected radiation from the surface to incident radiation upon it.

    Since:2.2.2

AlfvenMachNumber   Item

The ratio of the bulk flow speed to the Alfven speed.

    Since:1.0.0

AlfvenVelocity   Item

Phase velocity of the Alfven wave; In SI units it is the velocity of the magnetic field divided by the square root of the mass density times the permeability of free space (mu).

    Since:1.3.5

AlphaParticle   Item

A positively charged nuclear particle that consists of two protons and two neutrons.

    Since:1.0.0

AlternateName   Text

An alternative or shortened name used to refer to a resource. This includes acronyms, expanded names or a synonym for a resource.

     Since:1.1.0

     Used by: ResourceHeader

Ancillary   Item

A complementary item which can be subordinate, subsidiary, auxiliary, supplementary to the primary item.

     Since:1.3.1

Anisotropy   Item

Direction-dependent property.

     Since:1.2.1

Annotation   Container

Information which is explanatory or descriptive which is associated with another resource.

     Since:1.3.4

     Sub-elements ResourceID
                 ResourceHeader
                 ImageURL
                 AnnotationType
                 PhenomenonType
                 ClassificationMethod
                 ConfidenceRating
                 TimeSpan
                 ObservationExtent
                 Extension

     Used by: Spase

AnnotationType   Enumeration

A classification for an annotation.

     Since:1.3.4

     Allowed Values Anomaly
                 Event
                 Feature

     Used by: Annotation

Anomaly   Item

An interval where measurements or observations may be adversely affected.

     Since:1.3.4

Antenna   Item

A sensor used to measure electric potential.

       Since:1.0.0

ArchiveSpecialist   Item

An individual who is an expert on a collection of resources and may also be knowledgeable of the phenomenon and related physics represented by the resources. This includes librarians, curators, archive scientists and other experts.

       Since:1.2.1

Area   Item

Integration over the extent of a planar region, or of the surface of a solid.

       Since:1.3.6

Ariel   Item

The fourth-largest moon of Uranus.

       Since:2.2.5

Array   Item

A sequence of values corresponding to the elements in a rectilinear, n-dimension matrix. Each value can be referenced by a unique index.

       Since:1.2.0

ArrivalDirection   Item

An angular measure of the direction from which an energetic particle or photon was incident on a detector. The angles may be measured in any coordinate system.

       Since:2.0.2

ASCII   Item

A sequence of characters that adheres to American Standard Code for Information Interchange (ASCII) which is an 7-bit character-coding scheme.

       Since:1.0.0

Association   Container

Attributes of a relationship a resource has with another resource.

       Since:1.3.3

     Sub-elements AssociationID
                AssociationType
                Note

Used by: ResourceHeader

AssociationID   Text

The resource identifier for a resource with which this resource is closely associated.

Since:1.1.0

Used by: Association

AssociationType   Enumeration

A characterization of the role or purpose of an associated resource.

Since:1.3.3

Allowed Values ChildEventOf
DerivedFrom
ObservedBy
Other
PartOf
RevisionOf

Used by: Association

Asteroid   Item

A small extraterrestrial body consisting mostly of rock and metal that is in orbit around the sun.

Since:1.2.0

Atmosphere   Item

The neutral gases surrounding a body that extends from the surface and is bound to the body by virtue of the gravitational attraction.

Since:1.1.0

Atom   Item

Matter consisting of a nucleus surrounded by electrons which has no net charge.

Since:1.3.6

AtomicNumber   Numeric

The number of protons in the nucleus of an atom.

Since:1.1.0

Used by: Particle

AtomicNumberDetected   Item

The number of protons in the nucleus of an atom as determined by a detector.

Since:1.1.0

Aurora   Item

An atmospheric phenomenon consisting of bands of light caused by charged solar particles following the earth's magnetic lines of force.

Since:1.2.0

AuroralRegion   Item

The region in the atmospheric where electrically-charged particles bombarding the upper atmosphere of a planet in the presence of a magnetic field produce an optical phenomenon.

Since:1.1.0

Authors   Text

A list of individuals or organizations who prepared a work for publication. Separate multiple names with "";"". When an author is a persons use ""last,first[,middle]"" format. Including a middle name is optional.

Since:2.3.0

Used by: PublicationInfo

Automatic   Item

Determined by the analysis or assessment performed by a program or server.

Since:1.3.6

AutoSpectrum   Item

The Fourier transform of the auto correlation function for physical or empirical observations, which describes the general dependence of the time series data values at one instant on the time series data values at another instant.

Since:2.3.2

Availability   Enumeration

An indication of the method or service which may be used to access the resource.

Since:1.0.0

Allowed Values Offline
Online

Used by: AccessInformation

Average   Item

The statistical mean; the sum of a set of values divided by the number of values in the set.

Since:1.0.0

AverageChargeState   Item

A measure of the composite deficit (positive) or excess (negative) of electrons with respect to protons.

Since:1.0.0

AVI   Item

Audio Video Interleave (AVI) a digital format for movies that conforms to the Microsoft Windows Resource Interchange File Format (RIFF).

Since:1.0.0

AwardNumber   Text

The identifying information assigned to the financial support (funding) of a project.

Since:2.3.0

Used by: Funding

AxisLabel   Text

A short character string (approximately 10 characters, but preferably 6 characters - more only if absolutely required for clarity) which can be used to label a y-axis for a plot or to provide a heading for a data listing.

Since:1.3.1

Used by: RenderingHints

AzimuthalAngleRange   Container

The range of possible azimuthal angles for a group of energy observations. Default units are degrees.

Since:1.1.0

Sub-elements Low
              High
              Units
              Bin

Used by: Particle

AzimuthAngle   Item

The angle between the projection into the i-j plane of a position or measured vector and the i-axis of the coordinate system. Mathematically defined as arctan(j/i). This term could be also applied to angles measured in different planes, for example the IMF clock angle defined as arctan(|By|/Bz).

Since:1.3.4

BandName   Text

A common or provider assigned name for a range of values.

Since:1.3.0

Used by: Bin

Bandwidth   Item

Integration over the width a frequency band.

Since:1.3.6

Base64   Item

A data encoding scheme whereby binary-encoded data is converted to printable ASCII characters. It is defined as a MIME content transfer encoding for use in Internet e-mail. The only characters used are the upper- and lower-case Roman

alphabet characters (A-Z, a-z), the numerals (0-9), and the ""+"" and ""/"" symbols, with the ""="" symbol as a special suffix (padding) code.

Since:1.1.0

Bin   Container

A grouping of observations according to a band or window of a common attribute.

Since:1.1.0

Sub-elements BandName
Low
High

Used by: AzimuthalAngleRange
EnergyRange
FrequencyRange
MassRange
PitchAngleRange
PolarAngleRange
WavelengthRange

Binary   Item

A direct representation of the bits which may be stored in memory on a computer.

Since:1.0.0

BounceMotion   Item

The second adiabatic invariant is associated with periodic bounce motion of charged particles trapped between two magnetic mirrors on a magnetic field line. The second invariant, termed J, is defined by using the integral J = m ∫ v|| * ds where m is the mass of the charged particle, v|| is the particle velocity along the field line, and ds represents elemental arc lengths along the field line. The second adiabatic invariant is conserved as long as changes in the background magnetic field occur at time scales much longer than the bounce time of the charged particles.

Since:2.3.1

BowShockCrossing   Item

A crossing of the boundary between the undisturbed (except for foreshock effects) solar wind and the shocked, decelerated solar wind of the magnetosheath.

Since:1.0.0

Browse   Item

A representation of an image which is suitable to reveal most or all of the details of the image.

Since:1.3.1

BZIP2   Item

An open standard algorithm by Julian Seward using Burrows-Wheeler block sorting and Huffman coding. See

\<http://www.bzip.org/\>

Since:1.0.0

Cadence   Duration

The nominal or most common time interval between the start of successive measurements.

Since:1.0.0

Used by: Parameter
                    TemporalDescription

CadenceMax   Duration

The largest time interval between the start of successive measurements.

Since:2.2.9

Used by: Parameter
                    TemporalDescription

CadenceMin   Duration

The smallest time interval between the start of successive measurements.

Since:2.2.9

Used by: Parameter
                    TemporalDescription

CaK   Item

A spectrum with a wavelength of range centered near 393.5 nm. VSO nickname: Ca-K image with range of 391.9 nm to 395.2 nm.

Since:1.2.1

Calibrated   Item

Data wherein sensor outputs have been convolved with instrument response function, often irreversibly, to yield data in physical units.

Since:1.0.0

Callisto   Item

A second largest moon of Jupiter and the third-largest moon in the solar system.

Since:2.2.5

Carrington   Item

A coordinate system which is centered at the Sun and is ""fixed"" with respect to the synodic rotation rate; the mean synodic value is about 27.2753 days. The Astronomical Almanac gives a value for Carrington longitude of 349.03 degrees at 0000 UT on 1 January 1995.

Since:1.2.1

Cartesian   Item

A representation in which a position vector or a measured vector (e.g., field or flow) is specified by its components along the base axes of the coordinate system.

Since:1.0.0

Catalog   Container

A tabular listing of events or observational notes, especially those that have utility in aiding a user in locating data. Catalogs include lists of events, files in a product, and data availability. A Catalog resource is a type of ""data product"" which is a set of data that is uniformly processed and formatted, from one or more instruments, typically spanning the full duration of the observations of the relevant instrument(s). A data product may consist of a collection of granules of successive time spans, but may be a single high-level entity.

Since:1.0.0

Sub-elements ResourceID
              ResourceHeader
              AccessInformation
              ProviderName
              ProviderResourceName
              ProviderVersion
              InstrumentID
              PhenomenonType
              TimeSpan
              Caveats
              Keyword
              InputResourceID
              Parameter
              Extension

Used by: Spase

Caveats   Text

Information which may be important in the avoidance of the misuse of the resource, for instance instrument maladies, corruption or contamination.

Since:1.0.0

Used by: Catalog
         DisplayData
         Instrument
         NumericalData
         Parameter

CDF   Item

Common Data Format (CDF). A binary storage format developed at Goddard Space Flight Center (GSFC).

Since:1.0.0

CEF   Item

Cluster Exchange Format (CEF) is a self-documenting ASCII format designed for the exchange of data. There are two versions of CEF which are not totally compatible.

Since:1.0.0

CEF1   [Item](#)

Cluster Exchange Format (CEF), version 1, is a self-documenting ASCII format designed for the exchange of data. The metadata contains information compatible with the ISTP recommendations for CDF.

Since:1.0.0

CEF2   [Item](#)

Cluster Exchange Format (CEF), version 2, is a self-documenting ASCII format designed for the exchange of data and introduced for Cluster Active Archive. Compared to version 1, the metadata description of vectors and tensors is different.

Since:1.0.0

CGM   [Item](#)

Corrected Geomagnetic - A coordinate system from a spatial point with GEO radial distance and geomagnetic latitude and longitude, follow the epoch-appropriate IGRF/DGRF model field vector through to the point where the field line crosses the geomagnetic dipole equatorial plane. Then trace the dipole magnetic field vector Earthward from that point on the equatorial plane, in the same hemisphere as the original point, until the initial radial distance is reached. Designate the dipole latitude and longitude at that point as the CGM latitude and longitude of the original point. See <http://nssdc.gsfc.nasa.gov/space/cgm/cgmm_des.html>

Since:1.0.0

Channeltron   [Item](#)

An instrument that detects electrons, ions, and UV-radiation, according to the principle of a secondary emission multiplier. It is typically used in electron spectroscopy and mass spectrometry.

Since:1.0.0

Characteristic   [Item](#)

A quantity which can be easily identified and measured in a given environment.

Since:1.2.1

ChargeFlux   [Item](#)

The number of ionized particles passing through a unit area per unit time, for instance as measured by a Faraday cup.

Since:2.3.2

ChargeState   [Item](#)

Charge of a fully or partially stripped ion, in units of the charge of a proton. Charge state of a bare proton = 1.

Since:2.0.2

Checksum   Container

A computed value that is dependent upon the contents of a digital data object. Primarily used to check whether errors or alterations have occurred during the transmission or storage of a data object.

    Since:1.2.0

  Sub-elements HashValue
                HashFunction

  Used by: Source

ChildEventOf   Item

A descendant or caused by another resource.

    Since:1.3.6

Chromosphere   Item

The region of the Sun's (or a star's) atmosphere above the temperature minimum and below the Transition Region. The solar chromosphere is approximately 400 km to 2100 km above the photosphere, and characterized by temperatures from 4500 - 28000 K.

    Since:1.0.0

Circular   Item

Relative to polarization, right-hand circularly polarized light is defined such that the electric field is rotating clockwise as seen by an observer towards whom the wave is moving. Left-hand circularly polarized light is defined such that the electric field is rotating counterclockwise as seen by an observer towards whom the wave is moving. The polarization of magnetohydrodynamic waves is specified with respect to the ambient mean magnetic field : right-hand polarized waves have a transverse electric field component which turns in a right-handed sense (that of the gyrating electrons) around the magnetic field.

    Since:1.0.0

ClassificationMethod   Enumeration

The technique used to determine the characteristics of an object.

    Since:1.3.6

  Allowed Values Automatic
                Inferred
                Inspection

  Used by: Annotation

Coherence   Item

The coherence, C_{xy}, between two signals $x(t)$ and $y(t)$ is a real-valued function. The square of the coherence is defined by using: $C_{xy}^2 = |G_{xy}(f)|^2 / G_{xx}(f)G_{yy}(f)$ where $G_{xy}(f)$ is equal to the cross-spectral density between two time series denoted as x and y, respectively, and $G_{xx}(f)$ and $G_{yy}(f)$ are equal to the auto-spectral densities of the same two time series. Values of C_{xy} 2 always lie in the range between zero and one, $0 = C_{xy}$ 2 $= 1$, in accordance with the Cauchy-Schwarz inequality.

    Since:2.3.2

CoInvestigator   [Item](#)

An individual who is a scientific peer and major participant in an investigation.

      Since:1.0.0

ColorBar   [Item](#)

A spectrum or set of colors used to represent data values.

      Since:2.2.0

Column   [Item](#)

A two-dimensional measure of a quantity. The column is the area over which the quantity is measured.

      Since:1.3.4

Comet   [Item](#)

A relatively small extraterrestrial body consisting of a frozen mass that travels around the sun in a highly elliptical orbit.

      Since:1.2.0

Component   [Enumeration](#)

Projection of a vector along one of the base axes of a coordinate system.

      Since:1.0.0

    Allowed Values [I](#)
                 [J](#)
                 [K](#)

Confidence   [Item](#)

An expression of how certain that a quantity is valid or accurate.

      Since:2.2.9

ConfidenceRating   [Enumeration](#)

A classification of the certainty of an assertion.

      Since:1.3.4

    Allowed Values [Probable](#)
                 [Strong](#)
                 [Unlikely](#)
                 [Weak](#)

    Used by: [Annotation](#)

Contact   [Container](#)

The person or organization who may be able to provide special assistance or serve as a channel for communication for additional information about a resource.

      Since:1.0.0

     Sub-elements PersonID
                    Role
                    StartDate
                    StopDate
                    Note

      Used by: ResourceHeader

Contributor   **Item**
An entity responsible for making contributions to the content of the resource.

      Since:1.3.0

CoordinateRepresentation   **Enumeration**
The method or form for specifying a given point or vector in a given coordinate system.

      Since:1.0.0

     Allowed Values Cartesian
                    Cylindrical
                    Spherical

      Used by: CoordinateSystem

CoordinateSystem   **Container**
The specification of the orientation of a set of (typically) orthogonal base axes.

      Since:1.0.0

     Sub-elements CoordinateRepresentation
                    CoordinateSystemName

      Used by: Parameter

CoordinateSystemName   **Enumeration**
Identifies the coordinate system in which the position, direction or observation has been expressed.

      Since:1.0.0

     Allowed Values Carrington
                    CGM
                    CSO
                    DM
                    ECD
                    ECEF
                    ENP
                    GEI
                    GEO

GPHIO
GSE
GSEQ
GSM
HAE
HCC
HCI
HCR
HEE
HEEQ
HERTN
HG
HGI
HGRTN
HPC
HPR
HSM
J2000
JSM
JSO
KSM
KSO
LGM
MAG
MFA
MSO
RTN
SC
SE
SM
SpacecraftOrbitPlane
SR
SR2
SSE
SSE_L
TIIS
VSO
WGS84

Used by: CoordinateSystem
Location

CoPI   Item

An individual who is peer of a principal investigator and is an administrative and scientific lead for an investigation.

Since:2.3.1

Core   [Item]

The central or main part of an object or calculated distribution. For example, the part of a distribution of particles at low energies that is a thermal (Maxwellian) population.

Since:2.2.1

Corona   [Item]

The outermost atmospheric region of the Sun or a star, characterized by ionization temperatures above 10^5 K. The solar corona starts at about 2100 km above the photosphere; there is no generally defined upper limit.

Since:1.0.0

CoronalHole   [Item]

An extended region of the corona, exceptionally low in density and associated with unipolar photospheric regions. A coronal hole can be an ""open"" magnetic field in the corona and (perhaps) inner heliosphere which has a faster than average outflow (wind); A region of lower than ""quiet"" ion and electron density in the corona; or a region of lower peak electron temperature in the corona than in the ""quiet"" corona.

Since:1.3.0

CoronalMassEjection   [Item]

A solar event (CME) that involves a burst of plasma ejected into the interplanetary medium. CME's may be observed remotely relatively near the sun or in situ in the interplanetary medium. The latter type of observations are often referred to as Interplanetary CME's (ICME's).

Since:1.0.0

Coronograph   [Item]

An instrument which can image things very close to the Sun by using a disk to block the Sun's bright surface which reveals the faint solar corona and other celestial objects.

Since:1.2.1

CountRate   [Item]

The number of events per unit time.

Since:1.3.1

Counts   [Item]

The number of detection events occurring in a detector over the detector accumulation time.

Since:1.0.0

CrossSpectrum   [Item]

The Fourier transform of the cross correlation of two physical or empirical observations.

Since:1.0.0

CSO   [Item](#)

Corrected Solar Orbital - A coordinate system related to Earth where X is anti-sunward, Y along the orbital velocity direction.

Since:2.2.5

CSV   [Item](#)

Comma Separated Value - A data exchange format defined by RFC 4180.

Since:2.2.7

Current   [Item](#)

The flow of electrons through a conductor caused by a potential difference.

Since:1.2.1

Cylindrical   [Item](#)

A coordinate representation of a position vector or measured vector (field or flow) by its k-component, the magnitude of its projection into the i-j plane, and the azimuthal angle of the i-j plane projection.

Since:1.0.0

Data   [Item](#)

A collection of organized information, usually the results of experience, observation or experiment, or a set of premises. This may consist of numbers, words, or images, particularly as measurements or observations of a set of variables.

Since:1.3.1

DataExtent   [Container](#)

The area of storage in a file system required to store the contents of a resource. The default units for data extent is bytes.

Since:1.2.0

  Sub-elements [Quantity](#)
           [Units](#)
           [Per](#)

  Used by: [AccessInformation](#)
        [Source](#)

DataProducer   [Item](#)

An individual who generated the resource and is familiar with its provenance.

Since:1.0.0

DataQuality   [Item](#)

An ancillary parameter that denotes the standard or degree of accuracy, trustworthiness, or usefulness of another parameter.

Since:2.3.1

Deimos   Item

The smaller and outermost of the two natural satellites of Mars.

Since:2.2.5

DeputyPI   Item

An individual who is an administrative or scientific leader for an investigation operating under the supervision of a Principal Investigator.

Since:1.2.0

DerivedFrom   Item

A transformed or altered version of a resource instance.

Since:1.3.3

Description   Text

A narrative explanation with detail appropriate for the item it describes. For example a description of data resource should include discussions of the main quantities in the resource, possible uses and search terms. A description should also include whether any corrections (i.e, geometry, inertial) have been applied to the resource.

Since:1.0.0

Used by: AccessURL
              InformationURL
              Parameter
              ResourceHeader
              Structure

Developer   Item

The developer of a system to imitate a situation or process.

Since:2.3.1

Deviation   Item

The difference between an observed value and the expected value of a quantity.

Since:1.0.0

Differential   Item

A measurement within a narrow range of energy and/or solid angle.

Since:1.1.0

Dione   [Item](#)

The forth-largest moon of Saturn.

      Since:2.2.5

Direction   [Item](#)

The spatial relation between an object and another object, the orientation of the object or the course along which the object points or moves.

      Since:1.3.5

Directional   [Item](#)

A measurement within a narrow range of solid angle.

      Since:2.2.0

DirectionAngle   [Enumeration](#)

The angle between a position vector or measured vector (or one of its projections onto a plane) and one of the base axes of the coordinate system.

      Since:2.3.1

     Allowed Values [AzimuthAngle](#)
                     [ElevationAngle](#)
                     [PolarAngle](#)

DirectionCosine   [Enumeration](#)

The cosine of the angle between two vectors usually between a vector and one of the basis axes defining a Cartesian coordinate system. Three angles and thus three direction cosines are required to define a vector direction in a three dimensional Euclidean space.

      Since:1.3.5

     Allowed Values [I](#)
                     [J](#)
                     [K](#)

DisplayCadence   [Duration](#)

The time interval between the successive display elements.

      Since:1.0.0

    Used by: [DisplayData](#)

DisplayData   [Container](#)

A graphical representation of data wherein the underlying numeric values are not (readily) accessible for analysis.. Examples are line plots and spectrograms. A Display Data resource is a type of ""data product"" which is a set of data that is uniformly processed and formatted, from one or more instruments, typically spanning the full duration of the observations of the relevant instrument(s). A data product may consist of a collection of granules of successive time spans, but may be a single high-level entity.

Since:1.0.0

Sub-elements ResourceID

ResourceHeader

AccessInformation

ProcessingLevel

ProviderName

ProviderResourceName

ProviderProcessingLevel

ProviderVersion

InstrumentID

MeasurementType

TemporalDescription

SpectralRange

DisplayCadence

ObservedRegion

Caveats

Keyword

InputResourceID

Parameter

Extension

Used by: Spase

DisplayType   Enumeration

The general styling or type of plot that is suitable for the variable.

Since:1.3.1

Allowed Values Image

Plasmagram

Spectrogram

StackPlot

TimeSeries

WaveForm

Used by: RenderingHints

DM   Item

Dipole Meridian - A coordinate system centered at the observation point. Z axis is parallel to the Earth's dipole axis, positive northward. X is in the plane defined by Z and the line linking the observation point with the Earth's center. Y is positive eastward. See <http://cdpp.cnes.fr/00428.pdf>

Since:1.0.0

Document   Container

A set of information designed and presented as an individual entity. A document may contain plain or formatted text, in-line graphics, sound, other multimedia data, or hypermedia references. A Document resource is intended for use on digital

objects that have no other identifier (e.g., DOI or ISBN).

Since:1.3.0

Sub-elements ResourceID
ResourceHeader
AccessInformation
Keyword
DocumentType
MIMEType
InputResourceID

Used by: Spase

DocumentType   Enumeration

A characterization of the content, purpose, or style of the document.

Since:1.3.0

Allowed Values Other
Poster
Presentation
Report
Specification
TechnicalNote
WhitePaper

Used by: Document

DOI   Text

A digital object identifier (DOI) is a unique alphanumeric string assigned by a registration agency (the International DOI Foundation) to identify content and provide a persistent link to its location on the Internet.

Since:2.3.0

Used by: ResourceHeader

DopplerFrequency   Item

Change in the frequency of a propagating wave due to motion of the source, the observer, the reflector, or the propagation medium.

Since:1.3.5

Dopplergram   Item

A map or image depicting the spatial distribution of line-of-sight velocities of the observed object.

Since:1.0.0

DoubleSphere   Item

A dipole antenna of which the active (sensor) elements are small spheres located at the ends of two wires deployed in the equatorial plane, on opposite sides of a spinning spacecraft.

Since:1.0.0

DRegion   Item

The layer of the ionosphere that exists approximately 50 to 95 km above the surface of the Earth. One of several layers in the ionosphere.

>   Since:1.2.0

DriftMotion   Item

The third invariant for charged particle motion in a dipolar magnetic field is associated with drift of its guiding center in the equatorial plane. The conserved quantity, J_2, is equal to $q\Phi$ where q is the particle charge and Φ is the magnetic flux enclosed within the particle drift path.

>   Since:2.3.1

Dust   Item

Free microscopic particles of solid material.

>   Since:1.0.0

DustDetector   Item

An instrument which determines the mass and speed of ambient dust particles.

>   Since:1.3.1

DynamicPressure   Item

Dynamic pressure is a measure of the kinetic energy per unit volume of a fluid. For instance, the solar wind dynamic pressure or ram pressure for a purely proton plasma is equal to m_p n V^2 where m_p is the proton mass, n the proton number density, and V the solar wind speed.

>   Since:2.3.2

Earth   Enumeration

The third planet from the sun in our solar system.

>   Since:1.1.0

>   Allowed Values Magnetosheath
>   Magnetosphere
>   Moon
>   NearSurface
>   Surface

ECD   Item

Eccentric Dipole (ECD) coordinate system that aligns with a dipole whose origin and orientation may be different from the physical center and spin axis of the containing body. The IGRF-12 coefficients for 2015 are used to determine the origin for the earth. The 2015 positions are North dip pole: latitude: 86.29, longitude -160.06. South dip pole latitide: -64.28,

longitude: 136.59, North geometric pole latitude: 80.37, longitude: -72.63, South geomagnetic pole latitude: -80.37, longitude: 107.37ECD is defined in doi:10.1186/s40623-015-0228-9.

Since:2.3.1

ECEF   [Item]

The Earth-Centered, Earth-Fixed (ECEF) coordinate system has point (0,0,0) defined as the center of mass of the Earth. Its axes are aligned with the International Reference Pole (IRP) and International Reference Meridian (IRM). The x-axis intersects the sphere of the Earth at 0 degree latitude (Equator) and 0 degree longitude (Greenwich). The z-axis points north. The y-axis completes the right handed coordinate system.

Since:2.2.3

EITWave   [Item]

A wave in the corona of the Sun which produce shock waves on the Sun's chromosphere (Moreton Waves). EIT Waves are produced by large solar flare and expand outward at about 1,000 km/s. It usually appears as a slowly moving diffuse arc of brightening in H-alpha, and may travel for several hundred thousand km.

Since:1.3.0

Electric   [Item]

The physical attribute that exerts an electrical force.

Since:1.0.0

ElectricField   [Item]

A region of space around a charged particle, or between two voltages within which a force is exerted on charged objects in its vicinity. An electric field is the electric force per unit charge.

Since:1.0.0

Electromagnetic   [Item]

Electric and magnetic field variations in time and space that propagate through a medium or a vacuum with the wave's propagation, electric field, and magnetic field vectors forming an orthogonal triad. Waves in this category are detected by having their field quantities measured.

Since:1.3.5

Electron   [Item]

An elementary particle consisting of a charge of negative electricity equal to about 1.602×10^{-19} Coulomb and having a mass when at rest of about 9.109534×10^{-28} gram.

Since:1.0.0

ElectronDriftInstrument   [Item]

An active experiment to measure the electron drift velocity based on sensing the displacement of a weak beam of electrons after one gyration in the ambient magnetic field.

Since:1.0.0

Electrostatic   [Item](#)

Collective longitudinal electric-field and plasma oscillations trapped within a body of plasma.

      Since:1.3.5

ElectrostaticAnalyser   [Item](#)

An instrument which uses charged plates to analyze the mass, charge and kinetic energies of charged particles which enter the instrument.

      Since:1.0.0

Element   [Container](#)

A component or individual unit of a multiple value quantity such as an array or vector.

      Since:1.2.0

      Sub-elements [Name](#)
                   [Qualifier](#)
                   [Index](#)
                   [ParameterKey](#)
                   [Units](#)
                   [UnitsConversion](#)
                   [ValidMin](#)
                   [ValidMax](#)
                   [FillValue](#)
                   [RenderingHints](#)

      Used by: [Structure](#)

Elevation   [Numeric](#)

The distance in meters above (positive) or below (negative) the ""zero elevation"" defined by the World Geodetic System reference frame (WGS84).

      Since:1.2.0

      Used by: [Location](#)

ElevationAngle   [Item](#)

The angle between the position or measured vector and the i-j plane of the coordinate system. Mathematically defined as arctan(k/SQRT(i^2+j^2)).

      Since:1.2.0

Email   [Text](#)

The electronic address at which the individual may be contacted expressed in the form ""local-part@domain"".

      Since:1.0.0

      Used by: [Person](#)

Emissivity   Item

The energy emitted spontaneously per unit bandwidth (typically frequency) per unit time per unit mass of source. Emissivity is usually integrated over all directions/solid angles.

      Since:1.0.0

Enceladus   Item

The sixth-largest moon of Saturn. It is currently endogenously active. The smallest known body in the Solar System that is geologically active today.

      Since:2.2.5

EncodedParameter   Item

A variable that uses successive bits to encode, this is bitwise encode, a set of conditions by using a composited multibit numeric value. A common example is a bitwise encoded flag that denotes whether various possible errors that may affect a particular measurement. For example, a bit value equal to zero may indicate the absence of a particular error condition while a value equal to one would indicate the possibility that the associated datum should be ignored or used with caution due to the same error categorization.

      Since:2.3.2

Encoding   Enumeration

A set of unambiguous rules that establishes the representation of information within a file.

      Since:1.0.0

      Allowed Values ASCII
                   Base64
                   BZIP2
                   GZIP
                   None
                   S3_BUCKET
                   [TAR](TAR)
                   Unicode
                   [ZIP](ZIP)

      Used by: AccessInformation

EnergeticParticleInstrument   Item

An instrument that measures fluxes of charged particles as a function of time, direction of motion, mass, charge and/or species.

      Since:1.0.0

EnergeticParticles   Item

Pieces of matter that are moving very fast. Energetic particles include protons, electrons, neutrons, neutrinos, the nuclei of atoms, and other sub-atomic particles.

      Since:1.0.0

EnergeticSolarParticleEvent   Item

An enhancement of interplanetary fluxes of energetic ions accelerated by interplanetary shocks and/or solar flares.

     Since:1.0.0

Energy   Item

The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy)

     Since:1.0.0

EnergyDensity   Item

The amount of energy per unit volume.

     Since:1.2.1

EnergyFlux   Item

The amount of energy passing through a unit area in a unit time.

     Since:1.2.1

EnergyPerCharge   Item

The kinetic energy, E, per unit net charge, q, that is E/q, for an electron or an ionized atom, molecule, or dust particle.

     Since:2.3.2

EnergyRange   Container

The minimum and maximum energy values of the particles represented by a given ""physical parameter"" description.

     Since:1.1.0

    Sub-elements Low
               High
               Units
               Bin

    Used by: Particle
            Wave

ENP   Item

ENP (also called PEN) - The P vector component points northward, perpendicular to orbit plane which for a zero degree inclination orbit is parallel to Earth's spin axis. The E vector component is perpendicular to P and N and points earthward. The N component is perpendicular to P and E and is positive eastward.

     Since:2.2.3

Entropy   Item

A function of thermodynamic quantity, such as temperature, pressure, or composition, that is a measure of the energy that is not available for work during a thermodynamic process. It is often interpreted as the degree of disorder or randomness in the system.

Since:2.2.9

Ephemeris   [Item](#)

The spatial coordinates of a body as a function of time. When used as an Instrument Type it represents the process or methods used to generate spatial coordinates.

Since:1.2.0

EquatorialRegion   [Item](#)

A region centered on the equator and limited in latitude by approximately 23 degrees north and south of the equator.

Since:1.2.0

EquivalentWidth   [Item](#)

The spectral width of a total absorption line having the amount of absorbed radiant energy being equivalent to that in an observed absorption line.

Since:1.0.0

ERegion   [Item](#)

A layer of ionised gas occurring at 90-150km above the ground. One of several layers in the ionosphere. Also called the The Kennelly-Heaviside layer.

Since:1.2.0

Europa   [Item](#)

The sixth-closest round moon of Jupiter.

Since:2.2.5

Event   [Item](#)

An action or observation which occurs at a point in time.

Since:1.3.4

Excel   [Item](#)

A Microsoft spreadsheet format used to hold a variety of data in tables which can include calculations.

Since:2.2.0

Experiment   [Item](#)

A collection of components which are designed to make coordinated observations of a phenomenon or object. Projects and missions may refer to an 'experiment' by other names like 'suite'.

Since:2.3.2

ExpirationDate   DateTime

The date and time when a resource is no longer available. If the Expiration Date is specified then it indicates that resource should not be made available after that time. However, this is only advisory and in practice a resource description should be unpublished to eliminate access to a resource.

Since:1.2.0

Used by: Granule
ResourceHeader

Exposure   Duration

The time interval over which an individual measurement is taken.

Since:1.0.0

Used by: TemporalDescription

ExposureMax   Duration

The largest interval over which an individual measurement is taken.

Since:2.2.9

Used by: TemporalDescription

ExposureMin   Duration

The smallest time interval over which an individual measurement is taken.

Since:2.2.9

Used by: TemporalDescription

Extension   Text

A container of other metadata which is not part of the SPASE data model. The contents of this element are defined by individual usage. The organization and content are constrained by the implementation. For example, in an XML representation of the SPASE metadata the content must conform to the XML specifications.

Since:1.2.0

Used by: Annotation
Catalog
DisplayData
Instrument
NumericalData
Observatory
Person
Registry
Repository
Service

ExtremeUltraviolet   Item

A spectrum with a wavelength range of 10.0 nm to 125.0nm. VSO nickname: EUV image with a range of of 10.0 nm to 125.0 nm

Since:1.2.1

FaradayCup   [Item](#)

An instrument consisting of an electrode from which electrical current is measured while a charged particle beam (electrons or ions) impinges on it. Used to determine energy spectrum and sometimes ion composition of the impinging particles.

Since:1.0.0

FarUltraviolet   [Item](#)

A spectrum with a wavelength range of 122 nm to 200.0nm. VSO nickname: FUV image with a range of 122.0 nm to 200 nm

Since:1.3.5

FaxNumber   [Text](#)

The symbols and numerals required to send a facsimile (FAX) to an individual by telephone. The string may contain punctuation marks such as dash (-) or dot (.) to separate fields within the string.

Since:1.2.1

Used by: [Person](#)

Feature   [Item](#)

A prominent or distinctive characteristic that occurs at a location or persists over a period of time.

Since:1.3.4

Field   [Container](#)

The space around a radiating body within which its electromagnetic attributes can exert force on another similar body that is not in direct contact.

Since:1.0.0

Sub-elements [Qualifier](#)
[FieldQuantity](#)
[FrequencyRange](#)

Used by: [Parameter](#)

FieldAligned   [Item](#)

The component of a quantity which is oriented in the same direction of a field.

Since:1.3.6

FieldQuantity   [Enumeration](#)

The physical attribute of the field.

Since:1.1.0

Allowed Values [Current](#)
[Electric](#)

[Electromagnetic](#)
[Gyrofrequency](#)
[Magnetic](#)
[PlasmaFrequency](#)
[Potential](#)
[PoyntingFlux](#)

Used by: [Field](#)

File   [Item](#)

Access to a file containing the data.

Since:2.3.0

FillValue   [Text](#)

A value that indicates that a quantity is undefined.

Since:1.2.0

Used by: [Element](#)
[Parameter](#)

Film   [Item](#)

An image recording medium on which usually a ""negative"" analog image is registered. A ""positive"" image can be recovered or reproduced from film, which is usually made of flexible materials for ease of storage and transportation.

Since:2.2.0

Fit   [Item](#)

Values that make an model agree with the data.

Since:1.0.0

FITS   [Item](#)

Flexible Image Transport System (FITS) is a digital format primarily designed to store scientific data sets consisting of multi-dimensional arrays (1-D spectra, 2-D images or 3-D data cubes) and 2-dimensional tables containing rows and columns of data.

Since:1.0.0

FlowSpeed   [Item](#)

The rate at which particles or energy is passing through a unit area in a unit time.

Since:1.2.1

FlowVelocity   [Item](#)

The volume of matter passing through a unit area perpendicular to the direction of flow in a unit of time.

Since:1.3.1

Fluence   Item

The time integral of a flux. A fluence does not have any ""per unit time"" in its units.

     Since:2.2.0

FluxFeedback   Item

A search coil whose bandwidth and signal/noise ratio are increased by the application of negative feedback at the sensor (flux) level by driving a collocated coil with a signal from the preamplifier.

     Since:1.0.0

ForbushDecrease   Item

A rapid decrease in the observed galactic cosmic ray intensity following the passage of an outwardly convecting interplanetary magnetic field disturbance, such as those associated with large CME's, that sweep some galactic cosmic rays away from Earth.

     Since:1.0.0

Format   Enumeration

The organization of data according to preset specifications. The value is selected from a list of accepted names for known, well documented formats.

     Since:1.0.0

    Allowed Values [AVI](AVI)
           Binary
           [CDF](CDF)
           [CEF](CEF)
           [CEF1](CEF1)
           [CEF2](CEF2)
           [CSV](CSV)
           Excel
           FITS
           [GIF](GIF)
           Hardcopy
           [HDF](HDF)
           [HDF4](HDF4)
           [HDF5](HDF5)
           HTML
           IDFS
           [IDL](IDL)
           JPEG
           JSON
           MATLAB_4
           MATLAB_6

MATLAB_7
MPEG
NCAR
NetCDF
PDF
PDS4
PDS3
PNG
Postscript
QuickTime
Text
TIFF
UDF
VOTable
XML

Used by: AccessInformation

FormerPI   Item
An individual who had served as the administrative and scientific lead for an investigation, but no longer assumes that role.

Since:2.0.3

FourierTransformSpectrograph   Item
An instrument that determines the spectra of a radiative source, using time-domain measurements and a Fourier transform.

Since:1.0.0

FRegion   Item
A layer that contains ionized gases at a height of around 150-800 km above sea level, placing it in the thermosphere. the F region has the highest concentration of free electrons and ions anywhere in the atmosphere. It may be thought of as comprising two layers, the F1-and F2-layers. One of several layers in the ionosphere. Also known as the Appleton layer.

Since:1.2.0

Frequency   Item
The number of occurrences of a repeating event per unit time.

Since:1.3.5

FrequencyRange   Container
The range of possible values for the observed frequency.

Since:1.1.0

Sub-elements SpectralRange
              Low
              High

Used by: Field
Wave

FrequencyToGyrofrequencyRatio   Item

The ratio of the characteristic frequency of a medium to gyrofrequency of a particle.

Since:1.3.6

Funding   Container

The source of financial support (funding) for the resource.

Since:2.3.0

Sub-elements Agency
Project
AwardNumber

Used by: ResourceHeader

GammaRays   Item

Photons with a wavelength range: 0.00001 to 0.001 nm

Since:1.0.0

Ganymede   Item

The biggest moon of Jupiter and in the solar system.

Since:2.2.5

GEI   Item

GEI Geocentric Equatorial Inertial - A coordinate system where the Z axis is along Earth's spin vector, positive northward. X axis points towards the first point of Aries (from the Earth towards the Sun at the vernal equinox). See Russell, 1971. When the X axis is the direction of the mean vernal equinox of J2000, the coordinate system is also called GCI. Then the Z axis is also defined as being normal to the mean Earth equator of J2000.

Since:1.0.0

GeigerMuellerTube   Item

An instrument which measures density of ionizing radiation based on interactions with a gas.

Since:1.2.1

GeneralContact   Item

An individual who can provide information on a range of subjects or who can direct you to a domain expert.

Since:1.0.0

GEO   Item

Geographic - geocentric corotating - A coordinate system where the Z axis is along Earth's spin vector, positive northward. X axis lies in Greenwich meridian, positive towards Greenwich. See Russell, 1971.

    Since:1.0.0

GeomagneticStorm   Item

A magnetospheric disturbance typically defined by variations in the horizontal component of the Earth's surface magnetic field. The variation typically starts with a field enhancement associated with a solar wind pressure pulse and continues with a field depression associated with an enhancement of the diamagnetic magnetospheric ring current.

    Since:1.0.0

GeometricFactor   Item

A measure of the gathering power of a particle detector. The geometric factor can be used to correct particle measurements by accounting for the fact that only a fraction of source particles are able to gain entry through the aperture of a detector. For an isotopic source distribution, the geometric factor corresponds to the solid angle subtended by the aperture. In practice, determination of the geometric factor requires numerical modeling and depends on detector design and the characteristics of the source.

    Since:2.3.1

GIF   Item

Graphic Interchange Format (GIF) first introduced in 1987 by CompuServe. GIF uses LZW compression and images are limited to 256 colours.

    Since:1.0.0

GPHIO   Item

Kronian Solar Orbital - A coordinate system related to Saturn where X is anti-sunward, Y along the orbital velocity direction.

    Since:2.2.5

Granule   Container

An accessible portion of another resource. A Granule may be composed of one or more physical pieces (files) which are considered inseparable. For example, a data storage format that maintains metadata and binary data in separate, but tightly coupled files. Granules should not be used to group files that have simple relationships or which are associated through a parent resource. For example, each file containing a time interval data for a Numerical Data resource would each be considered a Granule. The ParentID of a Granule resource must be a NumericalData resource. The attributes of a Granule supersede the corresponding attributes in the NumericalData resource.

    Since:1.1.0

  Sub-elements ResourceID
              ReleaseDate
              ExpirationDate
              ParentID
              PriorID

StartDate
StopDate
Source

Used by: Spase

Group   Item

An assemblage of values that a certain relation or common characteristic.

Since:1.3.6

GSE   Item

Geocentric Solar Ecliptic - A coordinate system where the X axis is from Earth to Sun. Z axis is normal to the ecliptic, positive northward. See Russell, 1971.

Since:1.0.0

GSEQ   Item

Geocentric Solar Equatorial - A coordinate system where the X axis is from Earth to Sun. Y axis is parallel to solar equatorial plane. Z axis is positive northward. See Russell, 1971

Since:1.0.0

GSM   Item

Geocentric Solar Magnetospheric - A coordinate system where the X axis is from Earth to Sun, Z axis is northward in a plane containing the X axis and the geomagnetic dipole axis. See Russell, 1971

Since:1.0.0

Gyrofrequency   Item

The number of gyrations around a magnetic guiding center (field line) a charged particle makes per unit time due to the Lorentz force.

Since:1.2.1

GZIP   Item

An open standard algorithm distributed by GHU based on LZ77 and Huffman coding. See <http://www.gnu.org/software/gzip/gzip.html> or <http://www.gzip.org/>

Since:1.0.0

HAE   Item

Heliocentric Aries Ecliptic - A coordinate system where the Z axis is normal to the ecliptic plane, positive northward. X axis is positive towards the first point of Aries (from Earth to Sun at vernal equinox). Same as SE below. See Hapgood, 1992.

Since:1.0.0

Halo   Item

The part of an object or distribution surrounding some central body or distribution. For example, the particles above the core energies that show enhancements above the thermal population. Typically, a ""power law tail"" shows a break from the core Maxwellian at a particular energy.

     Since:2.2.1

Halpha   Item

A spectrum with a wavelength range centered at 656.3 nm. VSO nickname: H-alpha image with a spectrum range of of 655.8 nm to 656.8 nm.

     Since:1.2.1

HAPI   Item

A Heliophysics Application Programmer Interface (HAPI) specification compliant access point.

     Since:2.3.0

Hardcopy   Enumeration

A permanent reproduction, or copy in the form of a physical object, of any media suitable for direct use by a person.

     Since:2.2.0

    Allowed Values Film
                Microfiche
                Microfilm
                Photograph
                PhotographicPlate
                Print

HardXrays   Item

Photons with a wavelength range: 0.001 to 0.1 nm and an energy range of 12 keV to 120 keV

     Since:1.0.0

HashFunction   Enumeration

A function or algorithm that converts a digital data object into a hash value. Typically the hash value is small and concise when compared to the digital data object.

     Since:1.2.0

    Allowed Values [MD5](MD5)
                [SHA1](SHA1)
                [SHA256](SHA256)

     Used by: Checksum

HashValue   Text

The value calculated by a hash function, e.g. the message digest of a digital data object.

Since:1.2.0

Used by: [Checksum](#)

HCC   [Item](#)

Heliocentric Cartesian - A 3-D orthonormal coordinate system that is primarily intended to specify with two dimensions a point on the solar disk. The Z axis points toward the observer. The Y axis lies in the plane defined by the solar spin vector and the Z axis, positive northward. The X axis is perpendicular to the Y and Z axes, positive toward solar west. Standard representation for this system is via the point's x and y values, expressed either as physical distances or as fractions of the solar disk radius.

Since:2.2.0

HCI   [Item](#)

Heliographic Carrington Inertial.

Since:1.2.1

HCR   [Item](#)

Heliocentric Radial - A 3-D orthonormal coordinate system that is primarily intended to specify with two dimensions a point on the solar disk. The Z axis points toward the observer. The Y axis lies in the plane defined by the solar spin vector and the Z axis, positive northward. The X axis is perpendicular to the Y and Z axes, positive toward solar west. Standard representation for this system is via the point's distance rho from the Z axis [Rho = SQRT(x**2 + y**2)] and its phase angle psi measured counterclockwise from the +Y axis [psi = arctan (-y/x)]

Since:2.2.0

HDF   [Item](#)

Hierarchical Data Format

Since:1.0.0

HDF4   [Item](#)

Hierarchical Data Format, Version 4

Since:1.0.0

HDF5   [Item](#)

Hierarchical Data Format, Version 5

Since:1.0.0

He10830   [Item](#)

A spectrum with a wavelength range centered at 1082.9 nm. VSO nickname: He 10830 image with a range of 1082.5 nm to 1083.3 nm.

Since:1.2.1

He304   [Item](#)

A spectrum centered around the resonance line of ionised helium at 304 Angstrom (30.4 nm).

Since:1.3.5

HeatFlux   Item

Flow of thermal energy through a gas or plasma; typically computed as third moment of a distribution function.

Since:1.0.0

HEE   Item

Heliocentric Earth Ecliptic - A coordinate system where the Z axis is normal to the ecliptic plane, positive northward. X axis points from Sun to Earth. See Hapgood, 1992

Since:1.0.0

HEEQ   Item

Heliocentric Earth Equatorial - A coordinate system where the Z axis is normal to the solar equatorial plane, positive northward. X axis is generally Earthward in the plane defined by the Z axis and the Sun-Earth direction. See Hapgood, 1992.

Since:1.0.0

Heliosheath   Item

The region extending radially outward from the heliospheric termination shock and in which the decelerated solar wind plasma is still significant.

Since:2.2.0

Heliosphere   Enumeration

The solar atmosphere extending roughly from the outer corona to the edge of the solar plasma at the heliopause separating primarily solar plasma from interstellar plasma.

Since:1.0.0

Allowed Values Heliosheath
               Inner
               NearEarth
               Outer
               Remote1AU

HERTN   Item

Helio-Eclipitic Radial Tangential Normal coordinate system. Typically centered at a spacecraft. The X axis (radial) is set as the primary axis, and is defined as the axis pointing from the spacecraft to the Sun. The Z axis (tangential) is set as the secondary axis, and is defined as that portion of the ecliptic rotational axis which is perpendicular to the primary axis. The Y axis (Normal) is defined as Z cross X.

Since:2.2.9

HG   [Item]

Heliographic - A heliocentric rotating coordinate system where the Z axis is normal to the solar equatorial plane, positive northward. X, Y axes rotate with a 25.38 day period. The zero longitude (X axis) is defined as the longitude that passed through the ascending node of the solar equator on the ecliptic plane on 1 January, 1854 at 12 UT. See <http://nssdc.gsfc.nasa.gov/space/helios/coor_des.html>

      Since:1.0.0

HGI   [Item]

Heliographic Inertial - A heliocentric coordinate system where the Z axis is normal to the solar equatorial plane, positive northward. X axis is along the intersection line between solar equatorial and ecliptic planes. The X axis was positive at SE longitude of 74.367 deg on Jan 1, 1900. (See SE below.) See <http://nssdc.gsfc.nasa.gov/space/helios/coor_des.html>

      Since:1.0.0

HGRTN   [Item]

Heliocentric Radial Tangential Normal coordinate system (aka RTN). Typically centered at a spacecraft. Used for IMF and plasma V vectors. The X axis (radial) is set as the primary axis, and is defined as the axis pointing from the spacecraft to the Sun. The Z axis (tangential) is set as the secondary axis, and is defined as that portion of the solar North rotational axis which is perpendicular to the primary axis. The Y axis (normal) is defined as Z cross X.

      Since:2.2.9

High   [Numeric]
The largest value within a range of possible values.

      Since:1.1.0

     Used by: [AzimuthalAngleRange]
              [Bin]
              [EnergyRange]
              [FrequencyRange]
              [MassRange]
              [PitchAngleRange]
              [PolarAngleRange]
              [WavelengthRange]

Horizontal   [Item]
Parallel to or in the plane of the horizon or a base line.

      Since:2.2.0

HostContact   [Item]
An individual who can provide specific information with regard the hosting of a resource or supporting software.

      Since:2.3.1

Housekeeping   [Item]
Parameters that indicate the status or health state of instruments or monitoring devices as measured in physical units such as

that for current, voltage, or temperature. Housekeeping data can be analyzed to determine whether instruments are working correctly and the knowledge of their values may be used to avoid errors or even device failures.

Since:2.3.2

HPC   [Item]

Helioprojective Cartesian = A 3-D orthonormal (left-handed) coordinate system that is primarily intended to specify with two dimensions a point on the solar disk. The Z axis points from the observer to the center of the solar disk. The Y axis lies in the plane defined by the solar spin vector and the Z axis, positive northward. The X axis is perpendicular to the Y and Z axes, positive toward solar west. Given as the distance between the observer and the center of the solar disk, the standard representation of an (x,y) point on the solar disk is via the point's longitude angle [arctan (x/d)] and latitude angle [arctan y/d].

Since:2.2.0

HPR   [Item]

Helioprojective Radial - A 3-D orthonormal (left-handed) coordinate system that is primarily intended to specify with two dimensions a point on the solar disk. The Z axis points from the observer to the center of the solar disk. The Y axis lies in the plane defined by the solar spin vector and the Z axis, positive northward. The X axis is perpendicular to the Y and Z axes, positive toward solar west. Given as the distance between the observer and the center of the solar disk, the standard representation for this system of an (x,y) point on the solar disk is via the point's latitude angle theta {= arctan [SQRT(x**2 + y**2)]/d]} or equivalent declination parameter delta (= theta - 90 deg), and its phase angle psi as measured counter-clockwise from the +Y axis [psi = arctan (-y/x)].

Since:2.2.0

HSM   [Item]

Heliospheric Solar Magnetospheric - A coordinate system where the X axis is from Earth to Sun, Z axis is northward in a plane containing the X axis and the geomagnetic dipole axis.

Since:2.2.5

HTML   [Item]

A text file containing structured information represented in the HyperText Mark-up Language (HTML). See <http://www.w3.org/MarkUp/>

Since:1.0.0

Hydrodynamic   [Item]

Periodic or quasi-periodic oscillations of fluid quantities.

Since:1.3.5

I   [Item]

Projection of a vector along the first named axis of a coordinate system. Typically the X axis, but could be the R axis for an RTN coordinate system.

Since:1.3.4

Iapetus   [Item](#)

The third-largest moon of Saturn and the eleventh-largest in the Solar System.

      Since:2.2.5

IDFS   [Item](#)

Instrument Data File Set (IDFS) is a set of files written in a prescribed format which contain data, timing data, and meta-data. IDFS was developed at Southwest Research Institute (SwRI).

      Since:1.0.0

IDL   [Item](#)

Interactive Data Language (IDL) save set. IDL is a proprietary format.

      Since:1.0.0

IJ   [Item](#)

A measure of the length of a position or measured vector projected into the i-j (typically X-Y) plane of the coordinate system.

      Since:1.3.4

IK   [Item](#)

A measure of the length of a position or measured vector projected into the i-k (typically X-Z) plane of the coordinate system.

      Since:1.3.4

Image   [Item](#)

A two-dimensional representation of data with values at each element of the array related to an intensity or a color.

      Since:1.3.1

ImageIntensity   [Item](#)

Measurements of the two-dimensional distribution of the intensity of photons from some region or object such as the Sun or the polar auroral regions; can be in any wavelength band, and polarized, etc.

      Since:1.0.0

Imager   [Item](#)

An instrument which samples the radiation from an area at one or more spectral ranges emitted or reflected by an object.

      Since:1.0.0

ImageURL   [URL](#)

A URL to graphic, image or movie.

      Since:1.3.5

ImaginaryPart   [Item](#)

Any number z can in general be represented by its complex form with $z = a + ib$ where i, which is defined as the square root of -1, signifies the imaginary component of the number z. The coefficient b is called the imaginary part of the complex number z.

Since:2.3.2

ImagingSpectrometer   [Item](#)

An instrument which is a multispectral scanner with a very large number of channels (64-256 channels) with very narrow band widths.

Since:1.2.1

IMFClockAngle   [Item](#)

The clockwise angle of the direction of interplanetary magnetic field (IMF) measured in the plane of the body pole perpendicular to the line between the body and the Sun.

Since:2.2.4

Index   [Sequence](#)

The location of an item in an array or vector. An index can be multivalued to represent the location in a multidimensional object. The index of the first item is ""1"". A value of ""0"" is a wild card for all elements at the location in an array. A value of ""-1"" is a reference to the dimension at the location in the array. A ""-1"" is used when describing the attributes of the dimension, where as ""0"" or a positive integer is used to describe attributes of individual elements.

Since:1.2.0

Used by: [Element](#)
[RenderingHints](#)

Inferred   [Item](#)

Determined by the analysis of other information or resources.

Since:1.3.6

InformationURL   [Container](#)

Attributes of the method of acquiring additional information.

Since:1.0.0

Sub-elements [Name](#)
[URL](#)
[Description](#)
[Language](#)

Used by: [ResourceHeader](#)

Infrared   [Item](#)

Photons with a wavelength range: 760 to 1.00×10^6 nm

Since:1.0.0

Inner   [Item](#)

The region of the heliosphere extending radially outward from the solar coronal base to just inside 1 AU.

Since:1.0.0

InputResourceID   [Text](#)

The resource identifier for a resource which was used to generate this resource.

Since:1.0.0

Used by: [Catalog](#)
[DisplayData](#)
[Document](#)
[NumericalData](#)

Inspection   [Item](#)

Determined by the analysis or assessment performed by a person.

Since:1.3.6

Instrument   [Container](#)

A device that makes measurements used to characterize a physical phenomenon, or a family of like devices.

Since:1.0.0

Sub-elements [ResourceID](#)
[ResourceHeader](#)
[InstrumentType](#)
[InstrumentGroupID](#)
[InvestigationName](#)
[OperatingSpan](#)
[ObservatoryID](#)
[Caveats](#)
[Extension](#)

Used by: [Spase](#)

InstrumentGroupID   [Text](#)

The identifier of an Instrument resource which the referring resource is a member of.

Since:2.3.2

Used by: [Instrument](#)

InstrumentID   [Text](#)

The identifier of an Instrument resource.

Since:1.0.0

Used by: [Catalog](#)

DisplayData

NumericalData

InstrumentMode   Item

An indication of a state (mode) in which the instrument is operating. How a mode influences the interpretation and representation of data is described in instrument related documentation.

   Since:2.0.2

InstrumentStatus   Item

A quantity directly related to the operation or function of an instrument.

   Since:1.2.0

InstrumentType   Enumeration

A characterization of an integrated collection of software and hardware containing one or more sensors and associated controls used to produce data on an environment.

   Since:1.0.0

   Allowed Values Antenna

                   Channeltron

                   Coronograph

                   DoubleSphere

                   DustDetector

                   ElectronDriftInstrument

                   ElectrostaticAnalyser

                   EnergeticParticleInstrument

                   Experiment

                   FaradayCup

                   FluxFeedback

                   FourierTransformSpectrograph

                   GeigerMuellerTube

                   Imager

                   ImagingSpectrometer

                   Interferometer

                   IonChamber

                   IonDrift

                   IonGauge

                   LangmuirProbe

                   LongWire

                   Magnetograph

                   Magnetometer

                   MassSpectrometer

                   MicrochannelPlate

                   MultispectralImager

NeutralAtomImager
NeutralParticleDetector
ParticleCorrelator
ParticleDetector
Photometer
PhotomultiplierTube
Photopolarimeter
Platform
ProportionalCounter
QuadrisphericalAnalyser
Radar
Radiometer
ResonanceSounder
RetardingPotentialAnalyser
Riometer
ScintillationDetector
SearchCoil
SolidStateDetector
Sounder
SpacecraftPotentialControl
SpectralPowerReceiver
Spectrometer
TimeOfFlight
Unspecified
WaveformReceiver

Used by: Instrument

Integral   Enumeration
A flux measurement in a broad range of energy and solid angle.

Since:1.1.0

Allowed Values Area
Bandwidth
SolidAngle

Intensity   Item
The measurement of radiant or wave energy per unit detector area per unit bandwidth per unit solid angle per unit time.

Since:1.0.0

Interferometer   Item
An instrument to study the properties of two or more waves from the pattern of interference created by their superposition.

Since:1.2.1

Interior   Item

The region inside the body which is not visible from outside the body.

      Since:1.0.0

InterplanetaryShock   Item

A shock propagating generally anti-sunward through the slower solar wind, often seen in front of CME-associated plasma clouds.

      Since:1.0.0

Interstellar   Item

The region between stars outside of the star's heliopause.

      Since:1.3.2

InvestigationName   Text

The name given to the contract or engagement which enabled the data to be produced. Each investigation is associated with a Principal Investigator or Guest Investigator who was responsible for the original proposal. For single PI missions each major subsystem having its own identified Team Leader may also be classed as an ""Investigation"" for the purposes of data archiving.

      Since:1.0.0

     Used by: Instrument

Io   Item

The innermost of the four round moons of the planet Jupiter.

      Since:2.2.5

Ion   Item

An atom that has acquired a net electric charge by gaining or losing one or more electrons.(Note: $Z>2$)

      Since:1.0.0

IonChamber   Item

A device in which the collected electrical charge from ionization in a gas-filled cavity is taken to be the proportion to some parameter (e.g. dose or exposure) of radiation field

      Since:1.3.4

IonComposition   Item

In situ measurements of the relative flux or density of electrically charged particles in the space environment. May give simple fluxes, but full distribution functions are sometimes measured.

      Since:1.0.0

IonDrift   [Item](#)

A device which measures the current produced by the displacement of ambient ions on a grid, thereby allowing the determination of the ion trajectory and velocity.

> Since:1.3.1

IonGauge   [Item](#)

A device which measures low-pressure or vacuum neutral gas with pressures ranging from 10e-3 Torr to 10e?10 Torr. An ion gauge is an electronic amplifying vacuum tube consisting of three electrodes inside an evacuated glass envelope, with the filament being the cathode.

> Since:2.3.1

Ionosphere   [Enumeration](#)

The charged or ionized gases surrounding a body that are nominally bound to the body by virtue of the gravitational attraction.

> Since:1.1.0

> Allowed Values [DRegion](#)
> [ERegion](#)
> [FRegion](#)
> [Topside](#)

Irradiance   [Item](#)

Irradiance - A radiometric term for the power of electromagnetic radiation at a surface, per unit area. ""Irradiance"" is used when the electromagnetic radiation is incident on the surface. Irradiance data may be reported in any units (i.e. counts/s) due to, for example, being at a particular wavelength, or to being a not-fully-calibrated relative measurement.

> Since:1.0.0

J   [Item](#)

Projection of a vector along the second named axis of a coordinate system. Typically the Y axis, but could be the T axis for an RTN coordinate system.

> Since:1.3.4

J2000   [Item](#)

An astronomical coordinate system which uses the mean equator and equinox of Julian date 2451545.0 TT (Terrestrial Time), or January 1, 2000, noon TT. (aka J2000) to define a celestial reference frame.

> Since:1.1.0

JK   [Item](#)

A measure of the length of a position or measured vector projected into the j-k (typically Y-Z) plane of the coordinate system.

> Since:1.3.4

JPEG   [Item](#)

A binary format for still images defined by the Joint Photographic Experts Group

> Since:1.0.0

JSM   [Item](#)

Jovian Solar Magnetospheric - A coordinate system related to Jupiter where the X axis is from Jupiter to Sun, Z axis is northward in a plane containing the X axis and the Jovian dipole axis.

> Since:2.2.4

JSO   [Item](#)

Jovian Solar Orbital - A coordinate system related to Jupiter where X anti-sunward, Y along the orbital velocity direction.

> Since:2.2.4

JSON   [Item](#)

Javascript Object Notation - A lightweight data-interchange format.

> Since:2.2.7

Jupiter   [Enumeration](#)

The fifth planet from the sun in our solar system.

> Since:1.2.0

> Allowed Values [Callisto](#)
> [Europa](#)
> [Ganymede](#)
> [Io](#)
> [Magnetosphere](#)

K   [Item](#)

Projection of a vector along the third named axis of a coordinate system. Typically the Z axis, but could be the N axis for an RTN coordinate system.

> Since:1.3.4

K7699   [Item](#)

A spectrum with a wavelength range centred at 769.9 nm. VSO nickname: K-7699 dopplergram with a range of 769.8 nm to 770.0 nm.

> Since:1.2.1

Keyword   [Text](#)

A word or phrase that is relevant to the resource but does not exist in other documentary information.

Since:1.0.0

Used by: [Catalog](#)
[DisplayData](#)
[Document](#)
[NumericalData](#)

KSM   [Item](#)

Kronian Solar Magnetospheric - A coordinate system related to Saturn where the X axis is anti-sunward, Z axis is northward in a plane containing the X axis and the Kronian dipole axis.

Since:2.2.4

KSO   [Item](#)

Kronian Solar Orbital - A coordinate system related to Saturn where X is anti-sunward, Y along the orbital velocity direction.

Since:2.2.4

LangmuirProbe   [Item](#)

A monopole antenna associated with an instrument. The instrument applies a potential to the antenna which is swept to determine the voltage/current characteristic. This provides information about the plasma surrounding the probe and spacecraft.

Since:1.0.0

Language   [Text](#)

The two character indicator of language selected from the ISO 639-1 codes for the representation of names of languages.

Since:1.3.0

Used by: [AccessURL](#)
[InformationURL](#)

Latitude   [Numeric](#)

The angular distance north (positive) or south (negative) from the equator, measured along the meridian passing through the point.

Since:1.2.0

Used by: [Location](#)

Layout   [Item](#)

The structured arrangement of items in a collection.

Since:1.3.1

LBHBand   [Item](#)

Lyman-Birge-Hopfield band in the far ultraviolet range with wavelength range of 140nm to 170 nm.

Since:1.3.5

LGM   Item

Local Geomagnetic - A coordinate system used mainly for Earth surface or near Earth surface magnetic field data. X axis northward from observation point in a geographic meridian. Z axis downward towards Earth's center. In this system, H (total horizontal component) = SQRT (Bx^2 + By^2) and D (declination angle) = arctan (By/Bx)

    Since:1.0.0

Linear   Item

Polarization where the E-field vector is confined to a given plane

    Since:1.0.0

LinearScale   Item

Intervals which are equally spaced.

    Since:1.3.4

LineDepth   Item

The measure of the amount of absorption below the continuum (depth) in a particular wavelength or frequency in an absorption spectrum.

    Since:1.0.0

LineOfSight   Item

The line of sight is the line that connects the observer with the observed object. This expression is often used with measurements of Doppler velocity and magnetic field in magnetograms, where only the component of the vector field directed along the line of sight is measured.

    Since:1.0.0

Listing   Item

A listing of files - either through FTP or HTTP.

    Since:2.3.0

Location   Container

A position in space definable by a regional referencing system and geographic coordinates.

    Since:1.2.0

    Sub-elements ObservatoryRegion
                CoordinateSystemName
                Latitude
                Longitude
                Elevation

    Used by: Observatory

LogScale   Item

Intervals which are spaced proportionally to the logarithms of the values being represented.

    Since:1.3.4

Longitude   Numeric

The angular distance measured west (positive) or east (negative) from a north-south line called the Prime Meridian.

    Since:1.2.0

     Used by: Location

LongWire   Item

A dipole antenna whose active (sensor) elements are two wires deployed in the equatorial plane on opposite sides of a spinning spacecraft, and whose length is several times greater than the spacecraft diameter.

    Since:1.0.0

Low   Numeric

The smallest value within a range of possible values.

    Since:1.1.0

     Used by: AzimuthalAngleRange
              Bin
              EnergyRange
              FrequencyRange
              MassRange
              PitchAngleRange
              PolarAngleRange
              WavelengthRange

LowerHybridFrequency   Item

Lower hybrid oscillations involve longitudinal motions of electrons and ions in a magnetized plasma. The propagation of lower hybrid waves must be close to perpendicular to the background magnetic field in so that electrons cannot move along field lines thus preventing wave growth. The lower hybrid frequency, Φ_{LH}, can be calculated by using $\Phi_{LH} = [(\Omega_{ce}\Omega_{ci})^{-1} + \Phi_{pi}^{-2}]^{-1/2}$ where Ω_{ce} and Ω_{ci} are the electron and ion cyclotron frequencies, respectively, and Phi_{LH} is the ion plasma frequency.

    Since:2.3.1

LShell   Item

The L-Shell is the magnetic equatorial radius (in units of planetary radii) of a dipole magnetic field line. For instance, if the L-shell value equals 6 say at Earth, the magnetic field lines cross the magnetic equator at six Earth radii. The L-shell concept can be applied generally to any magnetized planet or satellite with a dominant dipolar magnetic field moment.

    Since:2.3.2

MAG   Item

Geomagnetic - geocentric. Z axis is parallel to the geomagnetic dipole axis, positive north. X is in the plane defined by the Z axis and the Earth's rotation axis. If N is a unit vector from the Earth's center to the north geographic pole, the signs of the X and Y axes are given by Y = N x Z, X = Y x Z.. See Russell, 1971, and <http://cdpp.cnes.fr/00428.pdf>

      Since:1.0.0

Magnetic   [Item](#)

The physical attribute attributed to a magnet or its equivalent.

      Since:1.0.0

MagneticCloud   [Item](#)

A transient event observed in the solar wind characterized as a region of enhanced magnetic field strength, smooth rotation of the magnetic field vector and low proton density and temperature.

      Since:1.3.0

MagneticField   [Item](#)

A region of space near a magnetized body where magnetic forces can be detected (as measured by methods such as Zeeman splitting, etc.).

      Since:1.0.0

MagneticMoment   [Item](#)

A constant of motion related to the gyromotion of a particle in a magnetic field that is either static or slowly varying with respect to the gyroperiod. The magnetic moment is usually denoted by using the lower case Greek letter for mu, 5, and can be calculated by using $5 = m\, u^2/2B$ where m is the particle mass, u is the velocity of the particle perpendicular to the constant or average magnetic field direction, and B is the magnitude of the magnetic field strength.

      Since:2.3.1

Magnetogram   [Item](#)

Measurements of the vector or line-of-sight magnetic field determined from remote sensing measurements of the detailed structure of spectral lines, including their splitting and polarization. (""Magnetogram."")

      Since:1.0.0

Magnetograph   [Item](#)

A special type of magnetometer that records a time plot of the local magnetic field near the instrument; or a telescope capable of determining the magnetic field strength and/or direction on a distant object such as the Sun, using the Zeeman splitting or other spectral signatures of magnetization.

      Since:2.2.3

Magnetometer   [Item](#)

An instrument which measures the ambient magnetic field.

      Since:1.0.0

MagnetopauseCrossing   Item

A crossing of the interface between the shocked solar wind in the magnetosheath and the magnetic field and plasma in the magnetosphere.

> Since:1.0.0

Magnetosheath   Item

The region between the bow shock and the magnetopause, characterized by very turbulent plasma.

> Since:1.0.0

MagnetosonicMachNumber   Item

The ratio of the velocity of fast mode waves to the Alfven velocity.

> Since:1.3.5

Magnetosphere   Enumeration

The region of space above the atmosphere or surface of the planet, and bounded by the magnetopause, that is under the direct influence of the planet's magnetic field.

> Since:1.0.0

> Allowed Values Magnetotail
> Main
> Plasmasphere
> Polar
> RadiationBelt
> RingCurrent

Magnetotail   Item

The region on the night side of the body where the magnetic filed is stretched backwards by the force of the solar wind. For Earth, the magnetotail begins at a night-side radial distance of 10 Re (X > -10Re).

> Since:1.0.0

Magnitude   Item

A measure of the strength of a vector quantity or length of its representational vector.

> Since:1.0.0

Main   Item

The region of the magnetosphere where the magnetic field lines are closed, but does not include the gaseous region gravitationally bound to the body.

> Since:1.0.0

Mars   Enumeration
The forth planet from the sun in our solar system.

       Since:1.2.0

      Allowed Values Deimos
                      Magnetosphere
                      Phobos

Mass   Item
The measure of inertia (mass) of individual objects (e.g., aerosols).

       Since:1.0.0

MassDensity   Item
The mass of particles per unit volume.

       Since:1.0.0

MassNumber   Item
The total number of protons and neutrons (together known as nucleons) in an atomic nucleus.

       Since:2.0.2

MassPerCharge   Item
The mass, m, per unit net charge, q, that is m/q, for an electron or an ionized atom, molecule, or dust particle.

       Since:2.3.2

MassRange   Container
The range of possible mass for a group of particle observations.

       Since:2.2.9

      Sub-elements Low
                   High
                   Units
                   Bin

      Used by: Particle

MassSpectrometer   Item
An instrument which distinguishes chemical species in terms of their different isotopic masses.

       Since:1.0.0

MATLAB_4   Item
MATLAB Workspace save set, version 4. MAT-files are double-precision, binary, MATLAB format files. MATLAB is a proprietary product of The MathWorks.

MATLAB_6 [Item]

MATLAB Workspace save set, version 6. MAT-files are double-precision, binary, MATLAB format files. MATLAB is a proprietary product of The MathWorks.

Since:1.1.0

MATLAB_7 [Item]

MATLAB Workspace save set, version 7. MAT-files are double-precision, binary, MATLAB format files. Version 7 includes data compression and Unicode encoding. MATLAB is a proprietary product of The MathWorks.

Since:1.1.0

Maximum [Item]

The largest value of a batch or sample or the upper bound of a probability distribution.

Since:2.2.0

MD5 [Item]

Message Digest 5 (MD5) is a 128-bit message digest algorithm created in 1991 by Professor Ronald Rivest.

Since:1.2.0

MeasurementType [Enumeration]

A characterization of the quantitative assessment of a phenomenon.

Since:1.0.0

Allowed Values ActivityIndex
Dopplergram
Dust
ElectricField
EnergeticParticles
Ephemeris
ImageIntensity
InstrumentStatus
IonComposition
Irradiance
MagneticField
Magnetogram
NeutralAtomImages
NeutralGas
Profile
Radiance
Spectrum

[SPICE](#)
                    [ThermalPlasma](#)
                    [Waves](#)

   Used by: [DisplayData](#)
                    [NumericalData](#)

Median   [Item](#)
The measure of central tendency of a set of n. values computed by ordering the values and taking the value at position (n. + 1) / 2 when n. is odd or the arithmetic mean of the values at positions n. / 2 and (n. / 2) + 1 when n. is even.

   Since:2.2.0

Mercury   [Enumeration](#)
The first planet from the sun in our solar system.

   Since:1.2.0

   Allowed Values [Magnetosphere](#)

Mesosphere   [Item](#)
The layer of the atmosphere that extends from the Stratosphere to a range of 80 km to 85 km, temperature decreasing with height.

   Since:1.2.0

MetadataContact   [Item](#)
An individual who can affect a change in the metadata describing a resource.

   Since:1.2.0

MFA   [Item](#)
Magnetic Field Aligned - A coordinate system spacecraft-centered system with Z in the direction of the ambient magnetic field vector. X is in the plane defined by Z and the spacecraft-Sun line, positive sunward. See <http://cdpp.cnes.fr/00428.pdf>

   Since:1.0.0

MHD   [Item](#)
Hydrodynamic waves in a magnetized plasma in which the background magnetic field plays a key role in controlling the wave propagation characteristics.

   Since:1.3.5

MicrochannelPlate   [Item](#)
An instrument used for the detection of elementary particles, ions, ultraviolet rays and soft X-rays constructed from very thin conductive glass capillaries.

   Since:1.0.0

Microfiche   Item

A sheet of microfilm on which many pages of material have been photographed; a magnification system is used to read the material.

      Since:2.2.0

Microfilm   Item

Film rolls on which materials are photographed at greatly reduced size; a magnification system is used to read the material.

      Since:2.2.0

Microwave   Item

Photons with a wavelength range: 1.00x10^6 to 1.50x10^7 nm

      Since:1.0.0

MidLatitudeRegion   Item

When considering the case of the Earth, the mid-latitude region typically refers to two latitudinal bands, one in the northern hemisphere and the other in the southern hemisphere extending from about 23 degrees to 50 degrees. The concept of mid-latitude regions does not apply to all bodies in the solar system and different latitudinal ranges would apply for each body case by case. The mid-latitude regions may be defined by using either planetographic or magnetic coordinates if the magnetic dipole is closely aligned with the spin axis of a magnetized body. Ground magnetometers located at mid latitude on the Earth are well positioned to measure magnetic storm-time ring current variations.

      Since:2.3.1

Mimas   Item

The smallest and least massive of the round moons of Saturn.

      Since:2.2.5

MIMEType   Text

Multipurpose Internet Mail Extensions (MIME) type and sub-type which characterizes the format of a file. MIME media types are define in RFC memorandum RFC 2046. Current MIME types are maintained by Internet Assigned Numbers Authority (IANA) at http://www.iana.org/assignments/media-types/index.html. Commonly used MIME types are: application/vnd.ms-powerpoint (ppt, pptx), application/vnd.ms-excel (xls, xlsx), text/richtext (rtx), application/postscript (eps, ps), application/pdf (pdf), application/xml-dtd (dtd), text/html (htm, html), text/xml (xsl, xml, xsd), application/x-dvi (dvi). If a document is compressed the specified MIME type should be for the uncompressed document.

      Since:2.2.2

  Used by: Document

Minimum   Item

The smallest value of a batch or sample or the lower bound of a probability distribution.

      Since:2.2.0

Miranda   [Item](#)

The smallest and innermost round moon of Uranus.

      Since:2.2.5

MirrorURL   [URL](#)

A Uniform Resource Locator (URL) to an alternate location of a resource.

      Since:1.3.1

   Used by: [Source](#)

MissionManager   [Item](#)

A Mission Manager is a rolename used by the ESA. The Mission Manager corresponds to the Project Manager role used by NASA but the Mission Manager role only begins after the launch of the mission.

      Since:2.3.2

MissionPrincipalInvestigator   [Item](#)

An individual who is the administrative and scientific lead for a mission.

      Since:2.3.2

Mixed   [Container](#)

A parameter derived from more than one of the type of parameter. For example, plasma beta, the ratio of plasma particle energy density to the energy density of the magnetic field permeating the plasma, is ""mixed.""

      Since:1.0.0

   Sub-elements [MixedQuantity](#)
                  [ParticleType](#)
                  [Qualifier](#)

   Used by: [Parameter](#)

MixedQuantity   [Enumeration](#)

A characterization of the combined attributes of a quantity.

      Since:1.3.5

   Allowed Values [AkasofuEpsilon](#)
                  [AlfvenMachNumber](#)
                  [AlfvenVelocity](#)
                  [FrequencyToGyrofrequencyRatio](#)
                  [IMFClockAngle](#)
                  [MagnetosonicMachNumber](#)
                  [Other](#)
                  [PlasmaBeta](#)
                  [SolarUVFlux](#)
                  [TotalPressure](#)
                  [VCrossB](#)

Used by: [Mixed](#)

ModeAmplitude   [Item](#)

In helioseismology the magnitude of oscillation of waves of a particular geometry.

      Since:1.0.0

Molecule   [Item](#)

A group of atoms so united and combined by chemical affinity that they form a complete, integrated whole, being the smallest portion of any particular compound that can exist in a free state

      Since:1.0.0

Moment   [Item](#)

Parameters determined by integration over a distribution function convolved with a power of velocity.

      Since:1.0.0

Moon   [Item](#)

The only natural satellite of the Earth.

      Since:2.2.3

MPEG   [Item](#)

A digital format for movies defined by the Motion Picture Experts Group

      Since:1.0.0

MSO   [Item](#)

Mars/Mercury Solar Orbital A coordinate system related to Mars or Mercury. A coordinate system where, depending on the body (Mars or Mercury), X is anti-sunward, Y along the orbital velocity direction.

      Since:2.2.4

MultispectralImager   [Item](#)

An instrument which captures images at multiple spectral ranges.

      Since:1.2.1

NaD   [Item](#)

A spectrum with a wavelength range of centered at 589.3 nm. VSO nickname: Na-D image with a range of 588.8 nm to 589.8 nm.

      Since:1.2.1

Name   [Text](#)

A language unit by which a person or thing is known.

Since:1.0.0

Used by: [AccessURL](#)
[Element](#)
[InformationURL](#)
[Parameter](#)

NCAR   [Item](#)

The National Center for Atmospheric Research (NCAR) format. A complete description of that standard is given in appendix C of the ""Report on Establishment & Operation of the Incoherent- Scatter Data Base"", dated August 23, 1984, obtainable from NCAR, P.O. Box 3000 Boulder, Colorado 80307-3000.

Since:1.1.0

NearEarth   [Item](#)

The heliospheric region near the Earth which extends to and includes the area near the L1 and L2 Lagrange point.

Since:1.1.0

NearSurface   [Enumeration](#)

The gaseous and possibly ionized environment of a body extending from the surface to some specified altitude. For the Earth, this altitude is 2000 km.

Since:1.0.0

Allowed Values [Atmosphere](#)
[AuroralRegion](#)
[EquatorialRegion](#)
[Ionosphere](#)
[Mesosphere](#)
[MidLatitudeRegion](#)
[Plasmasphere](#)
[PolarCap](#)
[SouthAtlanticAnomalyRegion](#)
[Stratosphere](#)
[SubAuroralRegion](#)
[Thermosphere](#)
[Troposphere](#)

Neptune   [Enumeration](#)

The seventh planet from the sun in our solar system.

Since:1.2.0

Allowed Values [Magnetosphere](#)
[Proteus](#)
[Triton](#)

NetCDF   [Item]

Unidata Program Center's Network Common Data Form (NetCDF). A self-describing portable data format for array-oriented data access. See <http://my.unidata.ucar.edu/content/software/netcdf>

     Since:1.0.0

NeutralAtomImager   [Item]

An instrument which measures the quantity and properties of neutral particles over a range of angles. Measured properties can include mass and energy.

     Since:1.2.1

NeutralAtomImages   [Item]

Measurements of neutral atom fluxes as a function of look direction; often related to remote energetic charged particles that lose their charge through charge-exchange and then reach the detector on a line-of-sight trajectory.

     Since:1.0.0

NeutralGas   [Item]

Measurements of neutral atomic and molecular components of a gas.

     Since:1.0.0

NeutralParticleDetector   [Item]

An instrument which measures the quantity and properties of neutral particles. Measured properties can include mass and plasma bulk densities.

     Since:1.2.1

Neutron   [Item]

An elementary particle that has no net charge and is a constituent of atomic nuclei, and that has a mass slightly large than a proton (1.673 x 10^(-24) gram.)

     Since:1.3.6

Ni6768   [Item]

A spectrum with a wavelength range centered at 676.8 nm. VSO nickname: Ni-6768 dopplergram with a range of of 676.7 nm to 676.9 nm.

     Since:1.2.1

None   [Item]

A lack or absence of anything.

     Since:1.0.0

Note   [Text]

Information which is useful or important for the understanding of a value or parameter.

Since:1.2.0

Used by: Association
Contact
ObservationExtent
OperatingSpan
Person
RevisionEvent
TimeSpan

NumberDensity   Item

The number of particles per unit volume.

Since:1.0.0

NumberFlux   Item

The number of particles passing a unit area in unit time, possibly also per unit energy (or equivalent) and/or per unit look direction.

Since:1.2.1

NumericalData   Container

Data stored as numerical values in one or more specified formats. A Numerical Data resource is a type of ""data product"" which is a set of data that is uniformly processed and formatted, from one or more instruments, typically spanning the full duration of the observations of the relevant instrument(s). A data product may consist of Parameters stored in a collection of granules of successive time spans or a single data granule.

Since:1.0.0

Sub-elements ResourceID
ResourceHeader
AccessInformation
ProcessingLevel
ProviderName
ProviderResourceName
ProviderProcessingLevel
ProviderVersion
InstrumentID
MeasurementType
TemporalDescription
SpectralRange
ObservedRegion
Caveats
Keyword
InputResourceID
Parameter

Used by: Spase

Oberon   Item

The second-largest and second most massive mon of Uranus, and the ninth most massive moon in the Solar System.

Since:2.2.5

ObservationExtent   Container

The spatial area encompassed by an observation.

Since:1.3.6

Sub-elements ObservedRegion
StartLocation
StopLocation
Note

Used by: Annotation

Observatory   Container

The host (spacecraft, network, facility) for instruments making observations, or a family of closely related hosts.

Since:1.0.0

Sub-elements ResourceID
ResourceHeader
ObservatoryGroupID
Location
OperatingSpan
Extension

Used by: Spase

ObservatoryGroupID   Text

The identifier of an Observatory resource which the referring resource is a member of.

Since:2.2.0

Used by: Observatory

ObservatoryID   Text

The identifier of an Observatory resource.

Since:1.0.0

Used by: Instrument

ObservatoryRegion   Enumeration

A spatial location distinguished by certain natural features or physical characteristics where an observatory is located.

Since:1.2.0

Allowed Values Asteroid

Comet
Earth
Heliosphere
Interstellar
Jupiter
Mars
Mercury
Neptune
Pluto
Saturn
Sun
Uranus
Venus

Used by: Location

ObservedBy   Item

Detected or originating from another resource.

Since:1.3.6

ObservedRegion   Enumeration

The portion of space measured by the instrument at the time of an observation. A region is distinguished by certain natural features or physical characteristics. It is the location of the observatory for in situ data, the location or region sensed by remote sensing observatories and the location-of-relevance for parameters that are derived from observational data.

Since:1.0.0

Allowed Values Asteroid
Comet
Earth
Heliosphere
Interstellar
Jupiter
Mars
Mercury
Neptune
Pluto
Saturn
Sun
Uranus
Venus

Used by: DisplayData
NumericalData
ObservationExtent

Offline   Item

Not directly accessible electronically. This includes resources which may to be moved to an on-line status in response to a given request.

> Since:1.0.0

Online   [Item](#)
Directly accessible electronically.

> Since:1.0.0

Open   [Item](#)
Access is granted to everyone.

> Since:1.0.0

OperatingSpan   [Container](#)
The interval in time from the first point at which an instrument or spacecraft was producing and sending data until the last such time, ignoring possible gaps.

> Since:2.2.0

> Sub-elements [StartDate](#)
> [StopDate](#)
> [Note](#)

> Used by: [Instrument](#)
> [Observatory](#)

Optical   [Item](#)
Photons with a wavelength range: 380 to 760 nm

> Since:1.0.0

ORCIdentifier   [Text](#)
A Open Researcher Contributor (ORC) identifier which is a unique alphanumeric string assigned by a registration agency (https://orcid.org/) to identify an individual. It has the format xxxx-xxxx-xxxx-xxxx

> Since:2.3.0

> Used by: [Person](#)

OrganizationName   [Text](#)
A unit within a company or other entity (e.g., Government agency or branch of service) within which many projects are managed as a whole.

> Since:1.0.0

> Used by: [Person](#)

Orientation   [Item](#)
The specification of the directional alignment of an object or measurement in a reference coordinate system. The orientation such as a spacecraft spin axis attitude is usually expressed as one or more angles relative to the basis axes of some specified physical space usually together with the date/time of the observation.

Since:2.3.1

Other   [Item](#)

Not classified with more specific terms. The context of its usage may be described in related text.

     Since:1.0.0

Outer   [Item](#)

The region of the heliosphere extending radially outward from just outside 1 AU to the heliospheric termination shock.

     Since:1.0.0

Overview   [Item](#)

A web page that provides and overview of available data and links.

     Since:2.3.0

Parallel   [Item](#)

Having the same direction as a given direction

     Since:1.0.0

Parameter   [Container](#)

A container of information regarding a parameter whose values are part of the product. Every product contains or can be related to one or more parameters.

     Since:1.0.0

  Sub-elements [Name](#)
           [Set](#)
           [ParameterKey](#)
           [Description](#)
           [UCD](#)
           [Caveats](#)
           [Cadence](#)
           [CadenceMin](#)
           [CadenceMax](#)
           [Units](#)
           [UnitsConversion](#)
           [CoordinateSystem](#)
           [RenderingHints](#)
           [Structure](#)
           [ValidMin](#)
           [ValidMax](#)
           [FillValue](#)
           [Field](#)

Particle
Wave
Mixed
Support

Used by: Catalog
DisplayData
NumericalData

ParameterKey   Text

The name or identifier which can be used to access the parameter in the resource. The associated value is dependent on the service used to access the resource. For columnar ASCII data, use ""Column_X"" for a single-element parameter and ""Column_X-Column_Y"" for a multi-element parameter, where X and Y are the relevant column index. The first column index is 1.

Since:1.1.0

Used by: Element
Parameter

ParentID   Text

The resource identifier for a resource that a resource is a part of. The resource inherits the attributes of the referenced resource. Attributes defined in the resource override attributes of the parent in the manner prescribed by the containing resource.

Since:1.1.0

Used by: Granule

PartiallyRestricted   Item

Some portions of the resource have restricted access, the rest is open access. Typically this is for accumulating data collections where some data is under review before being publicly released.

Since:2.2.9

Particle   Container

A description of the types of particles observed in the measurement. This includes both direct observations and inferred observations.

Since:1.0.0

Sub-elements ParticleType
Qualifier
ParticleQuantity
AtomicNumber
EnergyRange
AzimuthalAngleRange
PolarAngleRange
MassRange
PitchAngleRange

Used by: Parameter

ParticleCorrelator   [Item](#)

An instrument which correlates particle flux to help identify wave/particle interactions.

      Since:1.0.0

ParticleDetector   [Item](#)

An instrument which detects particle flux!!!

      Since:1.0.0

ParticleQuantity   [Enumeration](#)

A characterization of the physical properties of the particle.

      Since:1.1.0

      Allowed Values [AdiabaticInvariant](#)
            [ArrivalDirection](#)
            [AtomicNumberDetected](#)
            [AverageChargeState](#)
            [ChargeFlux](#)
            [ChargeState](#)
            [CountRate](#)
            [Counts](#)
            [DynamicPressure](#)
            [Energy](#)
            [Entropy](#)
            [EnergyDensity](#)
            [EnergyFlux](#)
            [EnergyPerCharge](#)
            [FlowSpeed](#)
            [FlowVelocity](#)
            [Fluence](#)
            [GeometricFactor](#)
            [Gyrofrequency](#)
            [HeatFlux](#)
            [LShell](#)
            [Mass](#)
            [MassDensity](#)
            [MassNumber](#)
            [MassPerCharge](#)
            [NumberDensity](#)
            [NumberFlux](#)
            [ParticleRadius](#)
            [ParticleRigidity](#)
            [PhaseSpaceDensity](#)

PlasmaFrequency
Pressure
SonicMachNumber
SoundSpeed
Temperature
ThermalSpeed
Velocity

Used by: Particle

ParticleRadius   Item

The mean radius for a Gaussian distribution of particles with an axial ratio of 2 and a distribution width that varies as 0.5 radius. A value of zero means no cloud was detected.

Since:2.2.2

ParticleRigidity   Item

The particle momentum per unit charge. The particle Rigidity, R, is equal to pc/Ze.

Since:2.3.2

ParticleType   Enumeration

A characterization of the kind of particle observed by the measurement.

Since:1.0.0

Allowed Values Aerosol
AlphaParticle
Atom
Dust
Electron
Ion
Molecule
Neutron
Proton
Positron

Used by: Mixed
Particle

PartOf   Item

A portion of a larger resource.

Since:1.3.3

Passive   Item

Movement or effect produced by outside influence. A passive measurement is one which does not produce a transmission or excitation as a part of the measurement cycle.

Since:1.3.4

PDF   [Item](#)

A document expressed in the Portable Document Format (PDF) as defined by Adobe.

Since:1.0.0

PDS3   [Item](#)

The. Planetary Data System, version 3 (PDS3) standard provides guidelines on how a data producer should construct a data set suitable for long-term archiving. The standard contains a number of requirements in terms of dataset structure and documentation that should allow for any PDS compliant data set to be used and understood in the long term. Each PDS3 data product must be labelled in ASCII with full details on the structure and content of the product. The label can be attached to the data file itself or detached in a separate 'label' file with the suffix LBL. The PDS3 standard is described at: https://pds.jpl.nasa.gov/datastandards/pds3/standards/ Since 2011, PDS3 has superseded by the PDS4 archiving standard. However, many data files still exist that are stored by using the PDS3 standard.

Since:2.3.2

PDS4   [Item](#)

The Planetary Data System, version 4 (PDS4) standard provides guidelines on how a data producer should construct a data set suitable for long-term archiving. The standard contains a number of requirements in terms of dataset structure and documentation that should allow for any PDS compliant data set to be used and understood in the long term. Each PDS4 bundle consists of two files, one containing the data and the other an eXtensible Markup Language (XML) file containing the label. PDS4 recognises four □base' data structures, array, table, parsable byte stream and encoded byte stream with arrays and tables most commonly in use. The PDS4 standard is described at: https://pds.jpl.nasa.gov/datastandards/documents/current-version.shtml. The PDS4 archiving standard has been required for data archives from NASA-funded planetary missions and for small data archives since 2011.

Since:2.3.2

Peak   [Item](#)

The maximum value for the quantity in question, over a period of time which is usually equal to the cadence.

Since:1.0.0

Per   [Duration](#)

The time interval over which a characterization applies. For example, the number of bytes generated each day.

Since:1.2.0

Used by: [DataExtent](#)

Perpendicular   [Item](#)

At right angles to a given direction.

Since:1.0.0

Person   [Container](#)

An individual human being.

Since:1.0.0

Sub-elements [ResourceID](#)
[ReleaseDate](#)
[PersonName](#)
[OrganizationName](#)
[Address](#)
[Email](#)
[PhoneNumber](#)
[FaxNumber](#)
[ORCIdentifier](#)
[Note](#)
[Extension](#)

Used by: [Spase](#)

PersonID   [Text](#)
The identifier assigned to a Person description.

Since:1.0.0

Used by: [Contact](#)

PersonName   [Text](#)
The words used to address an individual.

Since:1.0.0

Used by: [Person](#)

Perturbation   [Item](#)
Variations in the state of a system.

Since:1.3.6

Phase   [Item](#)
A point or portion in a recurring series of changes.

Since:1.3.6

PhaseAngle   [Item](#)
Phase difference between two or more waves, normally expressed in degrees.

Since:1.2.1

PhaseSpaceDensity   [Item](#)
The number of particles per unit volume in the six-dimensional space of position and velocity.

Since:1.0.0

PhenomenonType   [Enumeration](#)

The characteristics or categorization of an event type.

Since:1.0.0

Allowed Values [ActiveRegion](#)
[Aurora](#)
[BowShockCrossing](#)
[CoronalHole](#)
[CoronalMassEjection](#)
[EITWave](#)
[EnergeticSolarParticleEvent](#)
[ForbushDecrease](#)
[GeomagneticStorm](#)
[InterplanetaryShock](#)
[MagneticCloud](#)
[MagnetopauseCrossing](#)
[RadioBurst](#)
[SectorBoundaryCrossing](#)
[SolarFlare](#)
[SolarWindExtreme](#)
[StreamInteractionRegion](#)
[Substorm](#)

Used by: [Annotation](#)
[Catalog](#)

Phobos   [Item](#)
The larger and inner most moon of Mars.

Since:2.2.5

PhoneNumber   [Text](#)
The symbols and numerals required to contact an individual by telephone. The string may contain punctuation marks such as dash (-) or dot (.) to separate fields within the string.

Since:1.0.0

Used by: [Person](#)

Photograph   [Item](#)
An image (positive or negative) registered on a piece of photo-sensitive paper

Since:2.2.0

PhotographicPlate   [Item](#)
A rigid (typically glass) medium that functions like film. Its rigidity is for guarding against image distortion due to medium deformation (caused by heat and humidity). Photographic plates are often used for astronomical photography.

Since:2.2.0

Photometer   Item

An instrument which measures the strength of electromagnetic radiation within a spectral band which can range from ultraviolet to infrared and includes the visible spectrum.

     Since:1.2.1

PhotomultiplierTube   Item

A vacuum phototube that is an extremely sensitive detector of light in the ultraviolet, visible, and near-infrared ranges of the electromagnetic spectrum.

     Since:2.2.3

Photon   Item

Electromagnetic waves detected by techniques that utilize their corpuscular character (e.g., CCD, CMOS, photomultipliers).

     Since:1.0.0

Photopolarimeter   Item

An instrument which measures the intensity and polarization or radiant energy. A photopolarimeter is a combination of a photometer and a polarimeter.

     Since:1.2.1

Photosphere   Item

The atmospheric layer of the Sun or a star from which continuum radiation, especially optical, is emitted to space. For the Sun, the photosphere is about 500 km thick.

     Since:1.0.0

PitchAngleRange   Container

The range of possible pitch angles for a group of particle observations.

     Since:2.2.9

    Sub-elements Low
              High
              Units
              Bin

    Used by: Particle

PlasmaBeta   Item

The ratio of the plasma pressure (nkT) to the magnetic pressure (B^2/2mu0) of the SUM(nkT)/(B^2/2mu0).

     Since:1.3.5

PlasmaFrequency   Item

A number-density-dependent characteristic frequency of a plasma.

Since:1.2.1

Plasmagram
Item

The characterization of signal strengths in active sounding measurements as a function of virtual range or signal delay time and sounding frequency. A Plasmagram is also referred to as an Ionogram.

Since:1.3.5

Plasmasphere
Item

A region of the magnetosphere consisting of low energy (cool) plasma. It is located above the ionosphere. The outer boundary of the plasmasphere is known as the plasmapause, which is defined by an order of magnitude drop in plasma density.

Since:1.2.0

PlasmaWaves
Item

Self-consistent collective oscillations of particles and fields (electric and magnetic) in a plasma.

Since:1.3.5

Platform
Item

A collection of components which can be positioned and oriented as a single unit. A platform may contain other platforms. For example, a spacecraft is a platform which may have components that can be articulated and are also considered platforms.

Since:1.3.1

Pluto
Item

The ninth (sub)planet from the sun in our solar system.

Since:1.2.0

PNG
Item

A digital format for still images. Portable Network Graphics (PNG)

Since:1.0.0

Polar
Item

The region near the pole of a body. For a magnetosphere the polar region is the area where magnetic field lines are open and includes the auroral zone.

Since:1.1.0

PolarAngle
Item

The angle between the position or measured vector and the k-axis of the coordinate system. Mathematically defined as arctan([SQRT(i^2+j^2)]/k). This term could be also applied to angles between the vector and other components, for example the IMF cone angle defined as arccos(Bx/Bt).

PolarAngleRange   Container

The range of possible polar angles for a group of energy observations. Defaults units are degrees.

      Since:1.1.0

    Sub-elements Low
                High
                Units
                Bin

     Used by: Particle

PolarCap   Item

The areas of the globe surrounding the poles and consisting of the region north of 60 degrees north latitude an the region south of 60 degrees south latitude.

      Since:1.2.0

Polarization   Item

Direction of the electric vector of an electromagnetic wave. The wave can be linearly polarized in any direction perpendicular to the direction of travel, circularly polarized (clockwise or counterclockwise), unpolarized, or mixtures of the above.

      Since:1.0.0

Positional   Item

The specification of the location of an object or measurement within a reference coordinate system. The position is usually expressed as a set of values corresponding to the location along a set of orthogonal axes together with the date/time of the observation.

      Since:1.0.0

Positron   Item

An elementary particle consisting of a charge of positive electricity equal to about 1.602×10^{-19} Coulomb and having a mass when at rest of about 9.109534×10^{-28} gram.

      Since:2.3.1

Poster   Item

A set of information arranged on a single page or sheet, typically in a large format.

      Since:2.2.2

Postscript   Item

A page description programming language created by Adobe Systems Inc. that is a device-independent industry standard for representing text and graphics.

Since:1.2.0

Potential   [Item]

The work required per unit charge to move a charge from a reference point to a point at infinity (electric potential is defined to be zero). The electric potential of a spacecraft is often referred to as the ""spacecraft potential"". The spacecraft potential is the electric potential of the spacecraft relative to the potential of the nearby plasma. The spacecraft potential is non-zero because the spacecraft charges to the level that the emitted photoelectron flux going to infinity is balanced by the plasma electron flux to the spacecraft.

Since:1.0.0

PowerSpectralDensity   [Item]

The Power Spectral Density, PSD, is the measure of signal power content versus frequency, energy, wave number, etc. A PSD is typically used to characterize broadband random signals. The amplitude of the PSD is normalized by the spectral resolution employed to digitize the signal.

Since:2.3.2

PoyntingFlux   [Item]

Electromagnetic energy flux transported by a wave characterized as the rate of energy transport per unit area per steradian.

Since:1.0.0

Presentation   [Item]

A set of information that is used when communicating to an audience.

Since:2.2.2

Pressure   [Item]

The force per unit area exerted by a particle distribution or field.

Since:1.1.0

PrincipalInvestigator   [Item]

An individual who is the administrative and scientific lead for an investigation.

Since:1.0.0

Print   [Item]

A sheet of any written or printed material which may include notes or graphics. Multiple printed pages may be bound into a manuscript or book.

Since:2.2.0

PriorID   [Text]

The resource identifier for a resource that is superseded or replaced by a resource.

Since:1.2.0

   Used by: [Granule](#)
          [ResourceHeader](#)

Probable   [Item](#)

Likely given the available evidence. Considered in the range of 4-7 on a scale of 0-10.

Since:1.3.4

ProcessingLevel   [Enumeration](#)

The standard classification of the processing performed on the product.

Since:1.2.0

  Allowed Values [Calibrated](#)
                   [Raw](#)
                   [Uncalibrated](#)

   Used by: [DisplayData](#)
          [NumericalData](#)

ProductKey   [Text](#)

The key (identifier) of the resource within a Repository. This is a local identifier which can be used to retrieve or locate the resource.

Since:2.2.2

  Used by: [AccessURL](#)

Profile   [Item](#)

Measurements of a quantity as a function of height above an object such as the limb of a body.

Since:1.0.0

ProgramManager   [Item](#)

An individual whose major task entails direction of program team members such that the full organization achieves the objectives and goals of a program. The Program Manager is expected to provide clear guidance and resolve conflicts and issues while maintaining focus on achieving program success.

Since:2.3.2

ProgramScientist   [Item](#)

A program scientist is someone who performs a range of scientific program planning duties, takes responsibility for the science content of flight mission programs or projects. A program scientist develops, reviews, and provides recommendations for proposed program requirements, expected results, budgetary estimates and also establishes methods and procedures to reduce program costs, provides expert advice to management on strategic planning and program development, develops and manages research program, and presents issues and proposes solutions to senior management.

Since:2.3.2

Project   [Text](#)

The name of an organized activity with a stated goal or objective.

> Since:2.3.0

> Used by: [Funding](#)

ProjectEngineer [Item](#)

An engineer tasked with the full suite of responsibilities as a project transitions through requirements derivation and preliminary design into controlled hardware development, assembly and environmental testing. The Project Engineer manages a team while developing the cadence of hardware manufacturing and assembly until instrument deployment and through the end of the mission.

> Since:2.3.1

Projection [Enumeration](#)

A measure of the length of a position or measured vector as projected into a plane of the coordinate system.

> Since:1.3.4

> Allowed Values [IJ](#)
> [IK](#)
> [JK](#)

ProjectManager [Item](#)

An individual whose major task entails direction of project team members such that the full organization achieves the objectives and goals of the mission. The Project Manager is expected to provide clear guidance and resolve conflicts and issues while maintaining focus on achieving mission success.

> Since:2.3.1

ProjectScientist [Item](#)

An individual who is an expert in the phenomenon and related physics explored by the project. A project scientist may also have a managerial role within the project.

> Since:1.1.0

PropagationTime [Item](#)

Time difference between transmission and reception of a wave in an active wave experiment.

> Since:1.3.5

ProportionalCounter [Item](#)

An instrument which measures energy of ionization radiation based on interactions with a gas.

> Since:1.2.1

Proteus [Item](#)

The second largest moon of Neptune.

> Since:2.2.5

Proton   [Item](#)

An elementary particle that is a constituent of all atomic nuclei, that carries a positive charge numerically equal to the charge of an electron, and that has a mass of 1.673 x 10^(-24) gram.

      Since:1.0.0

ProviderName   [Text](#)

The source, or original provider, of the data (for example, PDS PPI)

      Since:2.2.9

    Used by: [Catalog](#)
           [DisplayData](#)
           [NumericalData](#)

ProviderProcessingLevel   [Text](#)

The provider specific classification of the processing performed on the product.

      Since:1.0.0

    Used by: [DisplayData](#)
           [NumericalData](#)

ProviderResourceName   [Text](#)

A short textual description of a resource used by the provider which may be used to identify a resource.

      Since:1.0.0

    Used by: [Catalog](#)
           [DisplayData](#)
           [NumericalData](#)

ProviderVersion   [Text](#)

Describes the release or edition of the product used by the provider. The formation rule may vary between providers. It is intended to aid in queries to the provider regarding the product.

      Since:1.0.0

    Used by: [Catalog](#)
           [DisplayData](#)
           [NumericalData](#)

Pseudo   [Item](#)

Similar to or having the appearance of something else. Can be used to indicate an estimation or approximation of a particular quantity.

      Since:1.3.4

PublicationDate   [DateTime](#)

The date that the work was first published.

      Since:2.3.0

Used by: [PublicationInfo](#)

PublicationInfo   [Container](#)

Information related to the issuing of a book, journal, piece of music, or other work.

      Since:2.3.0

    Sub-elements [Authors](#)

                   [PublicationDate](#)

                   [PublishedBy](#)

    Used by: [ResourceHeader](#)

PublishedBy   [Text](#)

The name or the company, organization or individual that published the work.

      Since:2.3.0

    Used by: [PublicationInfo](#)

Publisher   [Item](#)

An individual, organization, institution or government department responsible for the production and dissemination of a document.

      Since:1.3.0

Puck   [Item](#)

The largest inner spherical moon of Uranus.

      Since:2.2.5

QuadrisphericalAnalyser   [Item](#)

An instrument used for the 3-D detection of plasma, energetic electrons and ions, and for positive-ion composition measurements.

      Since:1.0.0

Qualifier   [Enumeration](#)

Characterizes the refinement to apply to a type or attribute of a quantity.

      Since:1.3.1

    Allowed Values [Anisotropy](#)

                 [Array](#)

                 [AutoSpectrum](#)

                 [Average](#)

                 [Characteristic](#)

                 [Circular](#)

                 [Coherence](#)

                 [Column](#)

                 [Component](#)

Trace
        Uncertainty
        Variance
        Vector

    Used by: **Element**
              Field
              Mixed
              Particle
              Support
              Wave

Quantity   **Numeric**
A value that describes a characteristic of a system.

        Since:1.3.0

     Used by: **DataExtent**

QuickTime   **Item**
A format for digital movies, as defined by Apple Computer. See <http://developer.apple.com/quicktime/>

        Since:1.0.0

Radar   **Item**
An instrument that uses directional properties of returned power to infer spatial and/or other characteristics of a remote object.

        Since:1.0.0

Radiance   **Item**
A radiometric measurement that describes the amount of electromagnetic radiation that passes through or is emitted from a particular area, and falls within a given solid angle in a specified direction. They are used to characterize both emission from diffuse sources and reflection from diffuse surfaces.

        Since:1.0.0

RadiationBelt   **Item**
The region within a magnetosphere where high-energy particles could potentially be trapped in a magnetic field.

        Since:1.1.0

RadioBurst   **Item**
Emissions of the sun in radio wavelengths from centimeters to dekameters, under both quiet and disturbed conditions. Radio Bursts can be ""Type I"" consisting of many short, narrow-band bursts in the metric range (300 - 50 MHz).; ""Type II"" consisting of narrow-band emission that begins in the meter range (300 MHz) and sweeps slowly (tens of minutes) toward dekameter wavelengths (10 MHz).; ""Type III"" consisting of narrow-band bursts that sweep rapidly (seconds) from decimeter to dekameter wavelengths (500 - 0.5 MHz); and ""Type IV"" consisting of a smooth continuum of broad-band bursts primarily in the meter range (300 - 30 MHz).

Since:1.3.0

RadioFrequency   Item
Photons with a wavelength range: 100,000 to 1.00x10^11 nm
Since:1.0.0

Radiometer   Item
An instrument for detecting or measuring radiant energy. Radiometers are commonly limited to infrared radiation.
Since:1.2.1

Ratio   Item
The relative magnitudes of two quantities.
Since:1.1.0

Raw   Item
Data in its original state with no processing to account for calibration!!!
Since:1.0.0

RealPart   Item
Any number z can in general be represented by its complex form with $z = a + ib$ where i, which is defined as the square root of -1, signifies the imaginary component of the number z. The coefficient a is called the real part of the complex number z.
Since:2.3.2

Registry   Container
A location or facility where resources are cataloged.
Since:1.1.0

   Sub-elements ResourceID
                ResourceHeader
                AccessURL
                Extension

   Used by: Spase

RelativeStopDate   Duration
An indication of the nominal end date relative to the present.
Since:1.1.0

   Used by: TimeSpan

ReleaseDate   DateTime
The date and time when a resource is made available. The availability of a resource coincides with the release of a resource

description. If the Release Date is specified as a future date then it indicates that resource should not be made available until that time. However, this is only advisory and in practice the Release Date should be the actual date the resource description was published.

> Since:1.1.0

> Used by: Granule
>> Person
>> ResourceHeader
>> RevisionEvent

Remote1AU   Item

A roughly toroidal region that includes the Earth's orbit, but exclusive of the region near the Earth.

> Since:1.1.0

RenderingAxis   Enumeration

A reference component of a plot or rendering of data. A plot typically is a 2-dimensional rendering with a horizontal and verticle axis. A third dimension can be introduced with a color coding of the rendered data.

> Since:2.2.0

> Allowed Values ColorBar
>> Horizontal
>> Vertical

> Used by: RenderingHints

RenderingHints   Container

Attributes to aid in the rendering of parameter.

> Since:1.3.1

> Sub-elements DisplayType
>> AxisLabel
>> RenderingAxis
>> Index
>> ValueFormat
>> ScaleMin
>> ScaleMax
>> ScaleType

> Used by: Element
>> Parameter

Report   Item

A document which describes the findings of some individual or group.

> Since:2.2.2

Repository   Container

A location or facility where resources are stored.

Since:1.1.0

Sub-elements   ResourceID
                ResourceHeader
                AccessURL
                Extension

Used by: Spase

RepositoryID   Text
The identifier of an Repository resource.

Since:1.0.0

Used by: AccessInformation

ResonanceSounder   Item
A combination of a radio receiver and a pulsed transmitter used to study the plasma surrounding a spacecraft by identifying resonances or cut-offs (of the wave dispersion relation), whose frequencies are related to the ambient plasma density and magnetic field. When the transmitter is off it is essentially a high frequency-resolution spectral power receiver.

Since:1.0.0

ResourceHeader   Container
Attributes of a resource which pertain to the provider of the resource and descriptive information about the resource.

Since:1.0.0

Sub-elements   ResourceName
                AlternateName
                DOI
                ReleaseDate
                RevisionHistory
                ExpirationDate
                Description
                Acknowledgement
                PublicationInfo
                Funding
                Contact
                InformationURL
                Association
                PriorID

Used by: Annotation
             Catalog
             DisplayData
             Document
             Instrument
             NumericalData
             Observatory

Registry
Repository
Service

ResourceID   Text

A Resource ID is a URI that has the form ""scheme://authority/path"" where ""scheme"" is ""spase"" for those resources administered through the SPASE framework, ""authority"" is the unique identifier for the resource provider registered within the SPASE framework and ""path"" is the unique identifier of the resource within the context of the ""authority"". The resource ID must be unique within the SPASE framework.

Since:1.0.0

Used by: Annotation
Catalog
DisplayData
Document
Granule
Instrument
NumericalData
Observatory
Person
Registry
Repository
Service

ResourceName   Text

A short textual description of a resource which may be useful when read by a person.

Since:1.0.0

Used by: ResourceHeader

Restricted   Item

Access to the product is regulated and requires some form of identification.

Since:1.0.0

RetardingPotentialAnalyser   Item

An instrument which measures ion temperatures and ion concentrations using a planar ion trap.

Since:1.2.1

RevisionEvent   Container

A specific change that improves or upgrades.

Since:2.3.1

Sub-elements ReleaseDate
Note

Used by: RevisionHistory

RevisionHistory   Container

A history of changes that improve or upgrade.

      Since:2.3.1

     Sub-elements RevisionEvent

     Used by: ResourceHeader

RevisionOf   Item

A modified version of a resource instance.

      Since:1.3.3

Rhea   Item

The second-largest moon of Saturn and the ninth-largest moon in the Solar System.

      Since:2.2.5

RingCurrent   Item

One of the major current systems confined within planetary magnetospheres. The ring current circles in the magnetic equatorial plane of magnetospheres. It is generated by the longitudinal drift of energetic charged particles trapped on inner, dipole-like magnetospheric field lines. At the Earth, the ring current is carried by 10 to 200 keV charged particles typically located at L-shells between 3 and 6. The ring current is also the primary driver of the Sym H and Dst Indices of magnetic storm activity at the Earth.

      Since:2.3.1

Riometer   Item

An instrument which measure the signal strength in various directions of the galactic radio signals. Variations in these signals are influenced by solar flare activity and geomagnetic storm and substorm processes.

      Since:1.2.1

Role   Enumeration

The assigned or assumed function or position of an individual.

      Since:1.0.0

     Allowed Values ArchiveSpecialist
               CoInvestigator
               CoPI
               Contributor
               DataProducer
               DeputyPI
               Developer
               FormerPI
               GeneralContact
               HostContact
               MetadataContact

MissionManager
MissionPrincipalInvestigator
PrincipalInvestigator
ProgramManager
ProgramScientist
ProjectEngineer
ProjectManager
ProjectScientist
Publisher
Scientist
TeamLeader
TeamMember
TechnicalContact
User

Used by: Contact

RotationMatrix   Item

A tensor that is used to perform vector data transformation from one coordinate system to another.

Since:2.3.2

RTN   Item

Radial Tangential Normal. Typically centered at a spacecraft. Used for IMF and plasma V vectors. The X axis (radial) is set as the primary axis, and is defined as the axis pointing from the spacecraft to the Sun. The Z axis (tangential) is set as the secondary axis, and is defined as that portion of the solar North rotational axis which is perpendicular to the primary axis. The Y axis (normal) is defined as Z cross X.

Since:1.0.0

S3_BUCKET   Item

A container of objects that comply with the Amazon Simple Storage Service (S3) specifications. A bucket has a unique, user-assigned key (name). A bucket can contain any number of objects with an aggregate size of 5 gigabytes. A bucket may be accompanied by up to 2 kilobytes of metadata.

Since:2.2.0

Saturn   Enumeration

The sixth planet from the sun in our solar system.

Since:1.2.0

Allowed Values Dione
                Enceladus
                Iapetus
                Magnetosphere
                Mimas
                Rhea

[Tethys](#)
[Titan](#)

SC   [Item](#)

Spacecraft - A coordinate system defined by the spacecraft geometry and/or spin. Often has Z axis parallel to spacecraft spin vector. X and Y axes may or may not corotate with the spacecraft. See SR and SR2 below.

Since:1.0.0

Scalar   [Item](#)

A quantity that is completely specified by its magnitude and has no direction.

Since:1.2.0

ScaleMax   [Numeric](#)

The maximum value that the variable is expected to attain. Used, for example, by automated plotting software.

Since:1.3.1

Used by: [RenderingHints](#)

ScaleMin   [Numeric](#)

The minimum value that the variable is expected to attain. Used, for example, by automated plotting software.

Since:1.3.1

Used by: [RenderingHints](#)

ScaleType   [Enumeration](#)

The scaling to apply to an axis. If this attribute is not present, linear scale should be assumed.

Since:1.3.1

Allowed Values [LinearScale](#)
                 [LogScale](#)

Used by: [RenderingHints](#)

Scientist   [Item](#)

An individual who is an expert in the phenomenon and related physics represented by the resource.

Since:1.0.0

ScintillationDetector   [Item](#)

An instrument which detects flouresences of a material which is excited by high energy (ionizing) electromagnetic or charged particle radiation.

Since:1.2.1

SE   [Item](#)

Solar Ecliptic - A heliocentric coordinate system where the Z axis is normal to the ecliptic plane, positive northward. X axis

is positive towards the first point of Aries (from Earth to Sun at vernal equinox). Same as HAE above. See
<http://nssdc.gsfc.nasa.gov/space/helios/coor_des.html>

Since:1.0.0

Search   Item

A web search interface that requires additional input.

Since:2.3.0

SearchCoil   Item

An instrument which measures the time variation of the magnetic flux threading a loop by measurement of the electric potential difference induced between the ends of the wire.

Since:1.0.0

SectorBoundaryCrossing   Item

A sector boundary crossing is a transit by a spacecraft across the heliospheric current sheet separating the dominantly outward (away-from-the-sun) interplanetary magnetic field of one hemisphere of the heliosphere from the dominantly inward (toward-the-sun) polarity of the other hemisphere. Such crossings have multi-day intervals of opposite IMF dominant polarities on either side.

Since:2.2.2

Service   Container

A location or facility that can perform a well defined task.

Since:1.1.0

Sub-elements ResourceID
ResourceHeader
AccessURL
Extension

Used by: Spase

Set   Text

A collection of items for a particular purpose.

Since:1.3.0

Used by: Parameter

SHA1   Item

Secure Hash Algorithm (SHA), a 160-bit message digest algorithm developed by the NSA and described in Federal Information Processing Standard (FIPS) publication 180-1.

Since:1.2.0

SHA256   Item

Secure Hash Algorithm (SHA), a 256-bit message digest algorithm developed by the NSA and described in Federal

Information Processing Standard (FIPS) publication 180-1.

    Since:1.2.0

Size   [Sequence]

The number of elements in each dimension of a multi-dimensional array. A scalar has a size of 1. A multi-dimensional vector will have a size for each dimension. Note that the number of elements in the size of an N-dimensional array conveys the array's dimensionality while the product of those numbers conveys the total number of elements in the array. When size is used to describe a tensor it is the number of elements in the tensor. As such it has a limited set of values. A tensor of rank 1 has a size of 3, rank 2 a size of 9, rank 3 a size of 27 and rank n a size of 3^n.

    Since:1.0.0

  Used by: [Structure]

SM   [Item]

Solar Magnetic - A geocentric coordinate system where the Z axis is northward along Earth's dipole axis, X axis is in plane of z axis and Earth-Sun line, positive sunward. See Russell, 1971.

    Since:1.0.0

SoftXRays   [Item]

X-Rays with an energy range of 0.12 keV to 12 keV.

    Since:1.3.5

SolarFlare   [Item]

An explosive event in the Sun's atmosphere which produces electromagnetic radiation across the electromagnetic spectrum at multiple wavelengths from long-wave radio to the shortest wavelength gamma rays.

    Since:1.0.0

SolarUVFlux   [Item]

The amount of Ultraviolet energy originating from the Sun passing through a unit area in a unit time.

    Since:2.2.4

SolarWindExtreme   [Item]

Intervals of unusually large or small values of solar wind attributes such as flow speed and ion density.

    Since:1.0.0

SolidAngle   [Item]

Integration over the angle in three-dimensional space that an object subtends at a point.

    Since:1.3.6

SolidStateDetector   [Item]

A detector of the charge carriers (electrons and holes) generated in semiconductors by energy deposited by gamma ray

photons. Also known as a ""semiconductor detector"".

Since:2.2.3

SonicMachNumber   [Item](#)

The ratio of the bulk flow speed to the speed of sound in the medium.

Since:1.0.0

Sounder   [Item](#)

An instrument which measures the radiances from an object. A sounder may measure radiances at multiple spectral ranges.

Since:1.2.1

SoundSpeed   [Item](#)

The speed at which sound travels through a medium.

Since:2.0.1

Source   [Container](#)

The location and attributes of an object.

Since:1.3.1

Sub-elements [SourceType](#)
[URL](#)
[MirrorURL](#)
[Checksum](#)
[DataExtent](#)

Used by: [Granule](#)

SourceType   [Enumeration](#)

A characterization of the function or purpose of the source.

Since:1.3.1

Allowed Values [Ancillary](#)
[Browse](#)
[Data](#)
[Layout](#)
[Thumbnail](#)

Used by: [Source](#)

SouthAtlanticAnomalyRegion   [Item](#)

The region where the Earth's inner van Allen radiation belt makes its closest approach to the planet's surface. The result is that, for a given altitude, the radiation intensity is higher over this region than elsewhere.

Since:1.2.0

SpacecraftOrbitPlane   Item

A coordinate system where X lies in the plane normal to and in the direction of motion of the spacecraft, Z is normal to this plane and Y completes the triad in a right-handed coordinate system.

> Since:1.2.1

SpacecraftPotentialControl   Item

An instrument to control the electric potential of a spacecraft with respect to the ambient plasma by emitting a variable current of positive ions.

> Since:1.0.0

Spase   Container

Space Physics Archive Search and Extract (SPASE). The outermost container or envelope for SPASE metadata. This indicates the start of the SPASE metadata.

> Since:1.0.0

> Sub-elements Version
>   Catalog
>   DisplayData
>   NumericalData
>   Document
>   Granule
>   Instrument
>   Observatory
>   Person
>   Registry
>   Repository
>   Service
>   Annotation

Specification   Item

A detailed description of the requirements and other aspects of an object or component that may be used to develop an implementation.

> Since:2.2.2

Spectral   Item

Characterized as a range or continuum of frequencies.

> Since:1.3.6

SpectralPowerReceiver   Item

A radio receiver which determines the power spectral density of the electric or magnetic field, or both, at one or more frequencies.

SpectralRange   [Enumeration](#)

The general term used to describe wavelengths or frequencies within a given span of values for those quantities.

Since:1.1.0

Allowed Values [CaK](#)

[ExtremeUltraviolet](#)

[FarUltraviolet](#)

[GammaRays](#)

[Halpha](#)

[HardXrays](#)

[He10830](#)

[He304](#)

[Infrared](#)

[K7699](#)

[LBHBand](#)

[Microwave](#)

[NaD](#)

[Ni6768](#)

[Optical](#)

[RadioFrequency](#)

[SoftXRays](#)

[Ultraviolet](#)

[WhiteLight](#)

[XRays](#)

Used by: [DisplayData](#)

[FrequencyRange](#)

[NumericalData](#)

[WavelengthRange](#)

Spectrogram   [Item](#)

The characterization of signal strengths as a function of frequency (or energy) and time.

Since:1.3.5

Spectrometer   [Item](#)

An instrument that measures the component wavelengths of light (or other electromagnetic radiation) by splitting the light up into its component wavelengths.

Since:1.0.0

Spectrum   [Item](#)

The distribution of a characteristic of a physical system or phenomenon, such as the energy emitted by a radiant source,

arranged in the order of wavelengths.

Since:1.0.0

Spherical   [Item]

A coordinate representation of a position vector or of a measured vector by its magnitude and two direction angles. The angles are relative to the base axes of the coordinate system used. Typically the angles are phi [azimuth angle, $=\arctan(j/i)$] and theta, where theta may be a polar angle, $\arctan\{[SQRT(i^2+j^2)]/k\}$, or an elevation angle, $\arctan[k/SQRT(i^2+j^2)]$.

Since:1.0.0

SPICE   [Item]

SPICE is an ancillary information system that provides scientists and engineers the capability to include space geometry and event data into mission design, science observation planning, and science data analysis software. The staff of the NASA Navigation and Ancillary Information Facility, NAIF, which is located at JPL provides SPICE support for planetary, heliophysics, and Earth science missions, see https://naif.jpl.nasa.gov/naif/index.html. This SPICE has been adapted from text on NAF hosted web pages.

Since:2.3.2

SpinPeriod   [Item]

The time required for an object such as a spacecraft or planet to perform one full rotation in a given frame of reference.

Since:2.3.1

SpinPhase   [Item]

An angular based or normalized parameter that specifies the spin state of an object such as a spacecraft or planet in a specific coordinate system usually together with the date/time of the observation.

Since:2.3.1

SpinRate   [Item]

The angular rate of change of the spin angle of an object such as a spacecraft or planet.

Since:2.3.1

SR   [Item]

Spin Reference - A special case of a Spacecraft (SC) coordinate system for a spinning spacecraft. Z is parallel to the spacecraft spin vector. X and Y rotate with the spacecraft. See <http://cdpp.cnes.fr/00428.pdf>

Since:1.0.0

SR2   [Item]

Spin Reference 2 - A special case of a Spacecraft (SC) coordinate system for a spinning spacecraft. Z is parallel to the spacecraft spin vector. X is in the plane defined by Z and the spacecraft-Sun line, positive sunward. See <http://cdpp.cnes.fr/00428.pdf>

Since:1.0.0

SSE   [Item](#)

Spacecraft Solar Ecliptic - A coordinate system used for deep space spacecraft, for example Helios. - X axis from spacecraft to Sun. Z axis normal to ecliptic plane, positive northward. Note: Angle between normals to ecliptic and to Helios orbit plane ~ 0.25 deg.

> Since:1.0.0

SSE_L   [Item](#)

Selenocentric Solar Ecliptic. The X axis points from the center of the Earth's moon to the sun, the Z axis is normal to the ecliptic plane, positive northward. And the Y axis completes the right-handed set of axes.

> Since:2.2.0

StackPlot   [Item](#)

A representation of data showing multiple sets of observations on a single plot, possibly offsetting each plot by some uniform amount.

> Since:1.3.1

StandardDeviation   [Item](#)

The square root of the average of the squares of deviations about the mean of a set of data. Standard deviation is a statistical measure of spread or variability.

> Since:1.2.0

StartDate   [DateTime](#)

The specification of a starting point in time.

> Since:1.0.0

> Used by: [Contact](#)
> [Granule](#)
> [OperatingSpan](#)
> [TimeSpan](#)

StartLocation   [Text](#)

The initial position in space.

> Since:1.3.6

> Used by: [ObservationExtent](#)

StokesParameters   [Item](#)

A set of four parameters (usually called I,Q, U and V) which describe the polarization state of an electromagnetic wave propagating through space.

> Since:1.0.0

StopDate   [DateTime](#)

The specification of a stopping point in time.

     Since:1.0.0

     Used by: [Contact](#)
             [Granule](#)
             [OperatingSpan](#)
             [TimeSpan](#)

StopLocation   [Text](#)

The final position in space.

     Since:1.3.6

     Used by: [ObservationExtent](#)

Strahl   [Item](#)

A distribution of particles concentrated in a narrow energy band. The band may be may be aligned with a secondary feature. For example, it may occur in a narrow cone aligned with the mean magnetic field direction.

     Since:2.2.1

Stratosphere   [Item](#)

The layer of the atmosphere that extends from the troposphere to about 30 km, temperature increases with height. The stratosphere contains the ozone layer.

     Since:1.2.0

StreamInteractionRegion   [Item](#)

The region (SIR) where two solar wind streams, typically having differing characteristics and solar sources, abut up against (and possibly partially interpenetrate) each other.

     Since:2.0.2

Strong   [Item](#)

Highly likely given the available evidence. Considered in the range of 7-10 on a scale of 0-10.

     Since:1.3.4

Structure   [Container](#)

The organization and relationship of individual values within a quantity.

     Since:1.2.0

     Sub-elements [Size](#)
             [Description](#)
             [Element](#)

     Used by: [Parameter](#)

Style   [Enumeration](#)

The manner in which a response from a URL is presented.

Since:2.3.0

Allowed Values [File](#)
[HAPI](#)
[Listing](#)
[Search](#)
[Template](#)
[Overview](#)
[WebService](#)

Used by: [AccessURL](#)

SubAuroralRegion [Item](#)

When considering the case of the Earth, the sub-auroral region typically refers to two latitudinal bands, one in the northern hemisphere and the other in the southern hemisphere extending from about 50 degrees to low 60 degrees. The concept sub-auroral regions does not apply to all bodies in the solar system and different latitudinal ranges would apply for each body case by case. The sub-auroral regions may be defined by using either planetographic or magnetic coordinates if the magnetic dipole is closely aligned with the spin axis of a magnetized body. Ground magnetometers located at sub-auroral latitudes on the Earth measure a mixture of activity driven by auroral zone currents and the ring current.

Since:2.3.1

Substorm [Item](#)

A process by which plasma in the magnetotail becomes energized at a fast rate.

Since:1.2.0

Sun [Enumeration](#)

The star upon which our solar system is centered.

Since:1.0.0

Allowed Values [Chromosphere](#)
[Corona](#)
[Interior](#)
[Photosphere](#)
[TransitionRegion](#)

Superhalo [Item](#)

The part of an object or distribution surrounding some central body or distribution evident in a second break in the distribution function (e.g., a different power law). It consists of a population at a higher energies than for a halo.

Since:2.2.1

Support [Container](#)

Information useful in understanding the context of an observation, typically observed or measured coincidentally with a physical observation.

Since:1.0.0

Sub-elements [Qualifier](#)

[SupportQuantity](#)

Used by: [Parameter](#)

SupportQuantity   [Enumeration](#)
A characterization of the support information.

Since:1.0.0

Allowed Values [DataQuality](#)

[Housekeeping](#)

[InstrumentMode](#)

[Orientation](#)

[Other](#)

[Positional](#)

[RotationMatrix](#)

[SpinPeriod](#)

[SpinPhase](#)

[SpinRate](#)

[Telemetry](#)

[Temporal](#)

[Velocity](#)

Used by: [Support](#)

Surface   [Item](#)
The outermost area of a solid object.

Since:1.0.0

Symmetric   [Item](#)
Equal distribution about one or more axes.

Since:1.3.1

TAR   [Item](#)
A file format used to collate collections of files into one larger file, for distribution or archiving, while preserving file system information such as user and group permissions, dates, and directory structures. The format was standardized by POSIX.1-1988 and later POSIX.1-2001.

Since:1.3.0

TeamLeader   [Item](#)
An individual who is the designated leader of an investigation.

Since:1.0.0

TeamMember   [Item](#)

An individual who is a major participant in an investigation.

>Since:1.0.0

TechnicalContact   [Item]

An individual who can provide specific information with regard to the resource or supporting software.

>Since:1.0.0

TechnicalNote   [Item]

A document summarizing the performance and other technical characteristics of a product, machine, component, subsystem or software in sufficient detail to be used by an engineer or researcher.

>Since:2.2.2

Telemetry   [Item]

Parameters that include full packets of data from monitoring devices or the memory addresses of datum within telemetry packets. The data comprising telemetry packets are typically expressed by using non-physical engineering units and may be used to express a variety of device operating conditions such as command acceptance/execution, housekeeping, event characterization, memory dumps, and science data. Telemetry packets may be raw or unpacked.

>Since:2.3.2

Temperature   [Item]

A measure of the kinetic energy of random motion with respect to the average. Temperature is properly defined only for an equilibrium particle distribution (Maxwellian distribution).

>Since:1.0.0

Template   [Item]

A URI template that contains special fields as defined in URI Template specification <http://tsds.org/uri_templates>.

>Since:2.3.0

Temporal   [Item]

Pertaining to time.

>Since:1.0.0

TemporalDescription   [Container]

A characterization of the time over which the measurement was taken.

>Since:1.0.0

>Sub-elements TimeSpan
>   Cadence
>   CadenceMin
>   CadenceMax

Exposure
ExposureMin
ExposureMax

Used by: DisplayData
NumericalData

Tensor   Item

A generalized linear ""quantity"" or ""geometrical entity"" that can be expressed as a multi-dimensional array relative to a choice of basis of the particular space on which it is defined.

Since:1.2.0

Tethys   Item

The third largest moon of Saturn.

Since:2.2.5

Text   Enumeration

A sequence of characters which may have an imposed structure or organization.

Since:1.0.0

Allowed Values ASCII
Unicode

ThermalPlasma   Item

Measurements of the plasma in the energy regime where the most of the plasma occurs. May be the basic fluxes in the form of distribution functions or the derived bulk parameters (density, flow velocity, etc.).

Since:1.0.0

ThermalSpeed   Item

For a Maxwellian distribution, the difference between the mean speed and the speed within which ~69% (one sigma) of all the members of the speed distribution occur.

Since:1.0.0

Thermosphere   Item

The layer of the atmosphere that extends from the Mesosphere to 640+ km, temperature increasing with height.

Since:1.2.0

Thumbnail   Item

A small representation of an image which is suitable to infer what the full-sized imaged is like.

Since:1.3.1

TIFF   [Item](#)

A binary format for still pictures. Tagged Image Format File (TIFF). Originally developed by Aldus and now controlled by Adobe.

      Since:1.0.0

TIIS   [Item](#)

Kronian Solar Orbital - A coordinate system related to Saturn where X is anti-sunward, Y along the orbital velocity direction.

      Since:2.2.5

TimeOfFlight   [Item](#)

An instrument which measures the time it takes for a particle to travel between two detectors.

      Since:1.2.1

TimeSeries   [Item](#)

A representation of data showing a set of observations taken at different points in time and charted as a time series.

      Since:1.3.1

TimeSpan   [Container](#)

The duration of an interval in time.

      Since:1.1.0

      Sub-elements [StartDate](#)
                [StopDate](#)
                [RelativeStopDate](#)
                [Note](#)

      Used by: [Annotation](#)
             [Catalog](#)
             [TemporalDescription](#)

Titan   [Item](#)

The largest moon of Saturn and the second-largest moon in the Solar System,

      Since:2.2.5

Titania   [Item](#)

The largest moon of Uranus and the eighth largest moon in the Solar System.

      Since:2.2.5

Topside   [Item](#)

The region at the upper most areas of the ionosphere.

Since:1.2.0

Total   [Item](#)

The summation of quantities over all possible species.

Since:1.3.6

TotalPressure   [Item](#)

In an MHD fluid it is the number density (N) times Boltzmann constant times the temperature in Kelvin.

Since:1.3.5

Trace   [Item](#)

The sum of the elements on the main diagonal (the diagonal from the upper left to the lower right) of a square matrix.

Since:1.3.1

TransitionRegion   [Item](#)

A very narrow (<100 km) layer between the chromosphere and the corona where the temperature rises abruptly from about 8000 to about 500,000 K.

Since:1.0.0

Triton   [Item](#)

The largest moon of Neptune.

Since:2.2.5

Troposphere   [Item](#)

The lowest layer of the atmosphere which begins at the surface and extends to between 7 km (4.4 mi) at the poles and 17 km (10.6 mi) at the equator, with some variation due to weather factors.

Since:1.2.0

UCD   [Text](#)

The nature of a physical parameter expressed using the IVOA UCD1+ controlled vocabulary.

Since:2.2.9

Used by: [Parameter](#)

UDF   [Item](#)

Universal Data Format (UDF). The Optical Technology Storage Association's Universal Disk Format, based on ISO 13346. See <http://www.osta.org/specs/index.htm>

Since:1.0.0

Ultraviolet   [Item](#)

Photons with a wavelength range: 10 to 400 nm.

Since:1.0.0

Umbriel   Item

The third largest and fourth most massive moon of Uranus.

Since:2.2.5

Uncalibrated   Item

Duplicate data are removed from the data stream and data are time ordered. Values are not adjusted for any potential biases or external factors.

Since:1.0.0

Uncertainty   Item

A statistically defined discrepancy between a measured quantity and the true value of that quantity that cannot be corrected by calculation or calibration.

Since:1.2.0

Unicode   Item

Text in multi-byte Unicode format.

Since:1.0.0

Units   Text

A description of the standardized measurement increments in which a value is specified. The description is represented as a mathematical phrase. Units should be represented by widely accepted representation. For example, units should conform to the International System of Units (SI) which is maintained by BIPM (Bureau International des Poids et Mesures (see <http://www.bipm.fr/>) when appropriate or use tokens like ""Re"" to represent units of the Radius of the Earth. Within a phrase the circumflex (^) is used to indicate a power, a star (*) is used to indicate multiplication and a slash (/) division. When symbols are not separated by a mathematical operator, multiplication is assumed. Symbols for base units can be found at: <http://www.bipm.fr/en/si/si_brochure/chapter2/2-1/#symbols> and those for common derived units can be found at: <http://www.bipm.fr/en/si/derived_units/2-2-2.html>

Since:1.0.0

Used by: AzimuthalAngleRange
DataExtent
Element
EnergyRange
FrequencyRange
MassRange
Parameter
PitchAngleRange
PolarAngleRange
WavelengthRange

UnitsConversion   [Text](#)

The multiplicative factor for converting a unit into International System of Units (SI) units. The factor is expressed in the form ""number > x"", where ""number"" is a numerical value and ""x"" is the appropriate SI units. The basic SI units are Enumerated: m (meter), N (newton), kg (kilogram), Pa (pascal), s (second), Hz (hertz), A (ampere), V (volt), K (kelvin), W (watt), rad (radian), J (joule), sr (steradian), C (coulomb), T (tesla), ohm (ohm), mho (mho or seimens), H (henry), and F (farad). Two useful units which are not SI units are: degree (angle), and unitless (no units). An example is: ""1.0E-9>T"" which converts the units, presumable nT, to Tesla. Another example is: ""1.0e+3>m/s"" which converts a velocity expressed in kilometers per second to meters per second.

      Since:1.0.0

  Used by: [Element](#)
          [Parameter](#)

Unlikely   [Item](#)

Not likely given the available evidence. Considered in the range of 0 on a scale of 0-10.

      Since:1.3.6

Unspecified   [Item](#)

A value which is not provided.

      Since:1.2.1

UpperHybridFrequency   [Item](#)

Upper hybrid oscillations involve longitudinal motions of electrons perpendicular to the magnetic field. The upper hybrid frequency, Φ_{UH}, is governed by the relationship $\Phi_{UH}^2 = \Phi_{pe}^2 + \Theta_{ce}^2$ where Φ_{pe} is electron plasma frequency and Θ_{ce} is the electron cyclotron frequency.

      Since:2.3.1

Uranus   [Enumeration](#)

The eighth planet from the sun in our solar system.

      Since:1.2.0

  Allowed Values [Ariel](#)
          [Magnetosphere](#)
          [Miranda](#)
          [Oberon](#)
          [Puck](#)
          [Titania](#)
          [Umbriel](#)

URL   [Text](#)

Uniform Resource Locator (URL) is the global address of documents and other resources on the World Wide Web. The first part of the address indicates what protocol to use, and the second part specifies the IP address or the domain name where the resource is located followed by the pathname of the resource. A URL is specified in the form

protocol://server.domain.name:port/pathname. Example protocols are HTTP or FTP, server domain name is the Internet name.

Since:1.0.0

Used by: AccessURL
InformationURL
Source

User   Item

An individual who utilizes a resource or service.

Since:2.3.1

ValidMax   Text

The largest legitimate value.

Since:1.2.0

Used by: Element
Parameter

ValidMin   Text

The smallest legitimate value.

Since:1.2.0

Used by: Element
Parameter

ValueFormat   Text

A string defining the output format used when extracting data values out to a file or screen. The magnitude and the number of significant figures needed should be carefully considered. The output format string can be in either Fortran or C syntax.

Since:1.3.1

Used by: RenderingHints

Variance   Item

A measure of dispersion of a set of data points around their mean value. The expectation value of the squared deviations from the mean.

Since:1.0.0

VCrossB   Item

The cross product of the charge velocity (V) and the magnetic field (B). It is the electric field exerted on a point charge by a magnetic field.

Since:1.3.5

Vector   Item

A set of parameter values each along some independent variable (e.g., components of a field in three orthogonal spatial directions; atmospheric temperature values at several altitudes, or at a given latitude and longitude;).

Since:1.0.0

Velocity   [Item](#)

Rate of change of position. Also used for the average velocity of a collection of particles, also referred to as ""bulk velocity"".

> Since:1.0.0

Venus   [Enumeration](#)

The second planet from the sun in our solar system.

> Since:1.2.0

> Allowed Values [Magnetosphere](#)

Version   [Text](#)

Indicates the release identifier. When used to indicate the release of the SPASE data model, it is a in the form Major.Minor.Fix where Major: A significant change in the architecture of the model or rewrite of the implementation. This includes major changes in design or implementation language. This number starts at 0 (zero). Minor: An addition of terms or features that require changes in documentation/external API. This number starts at 0 (zero). Fix: Any change that doesn't require documentation/external API changes. This number starts at 0 (zero).

> Since:1.0.0

> Used by: [Spase](#)

Vertical   [Item](#)

Perpendicular to the plane of the horizon or a base line.

> Since:2.2.0

VolumeEmissionRate   [Item](#)

The volume emission rate, e(r, t, l), is the number of photons emitted per unit source volume per second, i.e. photons/(m3 s), as measured along the line of sight between the source point and the observer. The Volume Emission Rate is in general a function of the line-ofsight distance, r, time, t, and wavelength, l. The Volume Emission Rate is actually not a directly measurable quantity. However, the term has been commonly used in both data product descriptions and research publications.

> Since:2.3.2

VOTable   [Item](#)

A proposed IVOA standard designed as a flexible storage and exchange format for tabular data.

> Since:1.1.0

VSO   [Item](#)

Venus Solar Orbital - A coordinate system related to Venus where X is anti-sunward, Y along the orbital velocity direction.

> Since:2.2.4

Wave   Container

Periodic or quasi-periodic (AC) variations of physical quantities in time and space, capable of propagating or being trapped within particular regimes.

Since:1.3.5

Sub-elements WaveType
              Qualifier
              WaveQuantity
              EnergyRange
              FrequencyRange
              WavelengthRange

Used by: Parameter

WaveForm   Item

Spatial or temporal variations of wave amplitude over wave-period timescales.

Since:1.3.5

WaveformReceiver   Item

A radio receiver which outputs the value of one or more components of the electric and/or magnetic field as a function of time.

Since:1.0.0

Wavelength   Item

The peak-to-peak distance over one wave period.

Since:1.3.5

WavelengthRange   Container

The range of possible values for the observed wavelength.

Since:1.3.0

Sub-elements SpectralRange
              Low
              High
              Units
              Bin

Used by: Wave

WaveQuantity   Enumeration

A characterization of the physical properties of a wave.

Since:1.3.5

Allowed Values Absorption
                ACElectricField

ACMagneticField

Albedo

DopplerFrequency

Emissivity

EnergyFlux

EquivalentWidth

Frequency

Gyrofrequency

Intensity

LineDepth

LowerHybridFrequency

MagneticField

ModeAmplitude

PlasmaFrequency

Polarization

PoyntingFlux

PropagationTime

StokesParameters

UpperHybridFrequency

Velocity

VolumeEmissionRate

Wavelength

Used by: Wave

Waves   Enumeration

Data resulting from observations of wave experiments and natural wave phenomena. Wave experiments are typically active and natural wave phenomena are passive. Examples of wave experiments include coherent/incoherent scatter radars, radio soundings, VLF propagation studies, ionospheric scintillation of beacon satellite signals, etc. Examples of natural wave phenomena include micropulsations, mesospheric gravity waves, auroral/plasmaspheric hiss, Langmuir waves, AKR, Jovian decametric radiation, solar radio bursts, etc.

Since:1.3.4

Allowed Values Active

Passive

WaveType   Enumeration

A characterization of the carrier or phenomenon of wave information observed by the measurement.

Since:1.3.5

Allowed Values Electromagnetic

Electrostatic

Hydrodynamic

MHD

Photon

[PlasmaWaves](#)

Used by: [Wave](#)

Weak [Item](#)

Slightly likely given the available evidence. Considered in the range of 1-4 on a scale of 0-10.

Since:1.3.6

WebService [Item](#)

A Web-based service that uses SOAP, WSDL or UDDI open standards.

Since:2.3.0

WGS84 [Item](#)

The World Geodetic System (WGS) defines a reference frame for the earth, for use in geodesy and navigation. The WGS84 uses the zero meridian as defined by the Bureau International de l'Heure.

Since:1.2.0

WhiteLight [Item](#)

Photons with a wavelength in the visible range for humans.

Since:1.0.0

WhitePaper [Item](#)

An authoritative report giving information or proposals on an issue.

Since:2.2.2

XML [Item](#)

eXtensible Mark-up Language (XML). A structured format for representing information. See <http://www.w3.org/XML/>

Since:1.0.0

XRays [Item](#)

Photons with a wavelength range: 0.001 <= x < 10 nm

Since:1.0.0

ZIP [Item](#)

An open standard for compression which is a variation of the LZW method and was originally used in the PKZIP utility.

Since:1.0.0

10. History

0.99.1

2005-06-23 Removed duplicate entries.

2005-06-23 Added Chris Harvey's definitions for Electron Drift.

2005-06-23 Particle Correlator and Spacecraft Potential Control.

2005-06-23 Released.

0.99.2

2005-07-07 Corrected "Numerical Data" entry under Product

2005-07-07 Released.

0.99.3

2005-08-03 Added definitions supplied by J. Thieman, C. Harvey and T.King; Significant revision of document as suggested by Joe Hourcle

0.99.4

2005-08-08 Restructured the taxonomy of elements to match the one suggested by A. Roberts.

2005-08-08 Added definitions for new elements introduced in the new taxonomy.

2005-08-08 Released.

0.99.5

2005-08-26 Clarified some definitions and corrected typographical errors based on comments from J. Thieman and J. Hourcle.

2005-08-26 Changed data types of "Integer" to "Count" and "Double" to "Numeric".

2005-08-26 Added document elements to product resources.

2005-08-26 Added catalog, display data to top list.

2005-08-26 Included region descriptions from J. King with additions suggested by K. Reardon.

2005-08-26 Add parameters loosely based on a model proposed by A.Roberts.

2005-08-26 Released.

0.99.6

2005-09-07 Corrected the inclusion of Atmosphere-Ionosphere regions into the Magnetosphere.

2005-09-07 Changed Surface to Ground.

2005-09-07 Removed Body and references to it.

2005-09-07 Added Spherical and Cartesian under Position.

2005-09-07 Remove Ratio (Numerator and Denominator).

2005-09-07 Change Upper Latitude to High Latitude, Lower to Low.

2005-09-07 Introduced "Photon Context" and "Particle Context" as replacements for "Independent Variable".

2005-09-07 Removed "Provider" and "Manufacture" resources and replaced with ID pointers.

0.99.7

2005-09-08 Under Parameter add Description, Tensor Order.

2005-09-08 Change Photon Context and Particle Context to Independent Variable.

2005-09-08 Move Wavelength and Wave Number under Photon Independent Variable.

2005-09-08 Drop Speed from Particle Independent Variable.

2005-09-08 Move Polar Angle under Particle Independent Variable.

2005-09-08 Add Analysis Method under Field/Electric and Field/Magnetic.

2005-09-08 Add Wave Form, Spectra etc. under Analysis Method.

2005-09-08 Add Near 1AU under Heliosphere; Add Body under Atmosphere-Ionosphere, Magnetosphere and Ground.

2005-09-08 Add all planets + Moon under Body.

2005-09-08 Update definition of Magnetotail, etc. to be generic, add Earth examples.

2005-09-08 Change "Acceptable abbreviation" to "Conventional abbreviation" since abbreviations are not supported in the model.

2005-09-08 Released.

0.99.8

2005-11-03 General clean-up and alignment with the schema agreed upon at the APL meeting (Nov 2-4, 2005)

2005-11-03 Released.

0.99.9

2005-11-18 Incorporate comments from consortium members on the "final" draft before the release of version 1.0

2005-11-18 Released.

1.0.0

2005-11-22 Incorporate comments from consortium members on the "final" draft before the release of version 1.0.

2005-11-22 Added Phenomenon Type list and defined terms in the list.

2005-11-22 Released.

1.0.1

2006-01-03 Changes in value type for elements: Exposure, InputResourceID, RepositoryName, Size.

2006-01-03 Added elements: Pressure.

2006-01-03 Released.

1.0.2

2006-03-07 Added "Project Scientist" to dictionary and "Role".

2006-03-07 Added "Caveats" under "Instrument".

2006-03-07 Added "Repository" resource class.

2006-03-07 Added "Registry" resource class.

2006-03-07 Released.

1.0.3

2006-04-27 Added "Earth" as a enumeration with "Magnetosphere" as a member.

2006-04-27 Changed "Observed Region" and "Instrument Region" to enumerations.

2006-04-27 Changed definition of "Item" to indicate it is a value of an enumeration.

2006-04-27 Move "Access Rights" under "Access Information".

2006-04-27 Made "Acknowledgement" options.

2006-04-27 Change "HF Radar" to "Radar".

2006-04-27 Added "NCAR" as a "Format".

2006-04-27 Dropped N, Z, Q from dictionary.

2006-04-27 Moved Mass and Size under "Particle Physical Quantity" and changed to type item.

2006-04-27 Added "Near Earth" under "Heliosphere" and added "Outside Bowshock" and "Orbital" under "Near Earth".

2006-04-27 Changed "Spectral Range Name" to "Spectral Range" for consistency.

2006-04-27 Correct links to "Stoke's Parameters".

2006-04-27 Released.

1.1.0

2006-08-31 Removed "Orbital".

2006-08-31 Modified definition of "Near Earth".

2006-08-31 Changed "Instrument type" to allow multiple occurrences.

2006-08-31 Made data type of "Mixed" text.

2006-08-31 Added "Service" resource class.

2006-08-31 Updated description of "Resource ID".

2006-08-31 Added MAT_4, MAT_6, MAT_7 and VOTable as a Format.

2006-08-31 Added J2000 as a coordinate system.

2006-08-31 Added Base64 as an Encoding.

2006-08-31 Added Parent ID, Energy Range, Frequency Range, Azimuthal Angle Range, Polar Angle Range, Atomic Number Range, Integral, Differential, Low and High.

2006-08-31 Remove Coordinate System from Particle Physical Parameter.

2006-08-31 Updated Pressure definition.

2006-08-31 Add ObservatoryID under Instrument.

2006-08-31 Remove Observatory ID from Numerical Data and Display Data.

2006-08-31 Changed definition of Investigation Name.

2006-08-31 Remove Access Right from Display Data.

2006-08-31 Change Repository Name to Repository ID under Access Information.

2006-08-31 Added Granule.

2006-08-31 Added Parameter Key under Physical Parameter.

2006-08-31 Add Release Date to Resource Header, Person, and Granule.

2006-08-31 Changed "alias" to "alternate name".

2006-08-31 Removed "Instrument Name" and "Observatory Name".

2006-08-31 Added ChargeState to Particle Quantity.

2006-08-31 Add Field Component container.

2006-08-31 Add Statistics to Phenomenon Type.

2006-08-31 Released.

1.1.1

Changed InstrumentID and Bin to multiple occurrence.

Removed enumeration of Component.

Modified definition of Units.

Changed AccessURL to type container.

1.2.0

2007-05-22 Added Aurora and Substorm under Phenomenon Type.

2007-05-22 Added Checksum, Hash Value, Hash Function, MD5 and SHA1, SHA256.

2007-05-22 Added Note as a term and added Note under Timespan.

2007-05-22 Added all planets, Comet and Asteroid as regions.

2007-05-22 Added Data Extent, Bytes and Per to describe the size of a resource.

2007-05-22 Added Data Extent to Access URL and Granule.

2007-05-22 Added the ValidMin, ValidMax and FillValue to Physical Parameter.

2007-05-22 Added Uncertainty and Standard Deviation to qualifiers.

2007-05-22 Added Expiration Date to Resource Header and Granule.

2007-05-22 Added Longitude and Latitude to Orientation.

2007-05-22 Updated Phi and Theta definitions.

2007-05-22 Added Ephemeris as an Instrument Type.

2007-05-22 Added Sequence as a element type and changes Size to a Sequence.

2007-05-22 Defined PriorID and added PriorID to ResourceHeader and Granule.

2007-05-22 Changed InstrumentID in DisplayData and NumericalData to one or more occurrences.

2007-05-22 Added Metadata Contact to Role.

2007-05-22 Modified definitions of H, Flux, Integral and Differential.

2007-05-22 Cardinality of Access Information changed from 1 to + (1 or more).

2007-05-22 Added Deputy-PI to Roles;Changed cardinality of Caveats under Instrument to optional.

2007-05-22 Added Element with members of Name, Index, ParameterKey and Component.

2007-05-22 Added Element under Dimension.

2007-05-22 Removed Orientation.

2007-05-22 Made Component and enumeration with the values from Orientation.

2007-05-22 Added InstrumentStatus to MeasurementType.

2007-05-22 Converted Support to an enumeration with Other, Positional and Temporal as members.

2007-05-22 Added ProcessingLevel, Removed Theta and Phi.

2007-05-22 Added Postscript as a Format.

2007-05-22 Added "Extension" as a container.

2007-05-22 Made "URL" in "Granule" multi-valued.

2007-05-22 Changed name of "Date" data type to "DateTime" and "Time" data type to "Duration" to be consistent with conventional terminology.

2007-05-22 Under "Physical Parameter" made "Parameter Key" optional and "Name" required.

2007-05-22 Removed "Dynamic Spectra" from "Measurement Type".

2007-05-22 Added "Spectrum" to "Measurement Type".

2007-05-22 Removed D, H, T, N, Latitude, Longitude from the dictionary.

2007-05-22 Added "Theta" and "Phi" to "Component".

2007-05-22 Added Location container under Observatory and added the elements Latitude, Longitude, Elevation, ObservatoryGroup.

2007-05-22 Added ITM regions under Near Surface.

2007-05-22 Remove Instrument Region from NumericalData.

2007-05-22 Added WGS84 as a Coordinate System Name.

2007-05-22 Released.

1.2.1

2008-03-20 Added SpacecraftOrbitPlane to CoordinateSystemName.

2008-03-20 Added Parallel and PhaseAngle to FieldQualifier.

2008-03-20 Added Current, GyroFrequency, Energy, PlasmaFrequency to the appropriate ParticleQuantity, FieldQuantity, or PhotonQuantity.

2008-03-20 Added Characteristic to ParticleQualifier.

2008-03-20 Add EnergyRange and WavelengthRange to PhotonQuantity.

2008-03-20 Added White-light, H-alpha, He-10830, Ca-K, Na-D, Extreme Ultraviolet, Ni-6768, K-7699 to dictionary and to SpectralRange.

2008-03-20 Added Time Of Flight Interferometer, Photometer, Radiometer, Coronograph, ProportionalCounter, ScintillationDetector, Photopolarimeter, Geiger-MuellerTube, NeutralParticleDetector, Sounder,

NeutralAtomImager, RetardingPotentialAnalyser, MultispectralImager, ImagingSpectrometer, Riometer, Unspecified to Instrument Type.

2008-03-20 Added Archive Specialist to Role.

2008-03-20 Added Flow Speed, Number Flux to Particle Quantity.

2008-03-20 Added Energy Flux to Particle Quantity and Photon Quantity.

2008-03-20 Added Anisotropy to Particle Qualifier.

2008-03-20 Added Carrington and HCI to Coordinate System.

2008-03-20 Updated definitions of Vector and Size.

2008-03-20 Removed Flux and Intensity.

2008-03-20 Released.

1.2.2

2008-07-31 Change "Plasmafrequency" to "Plasma Frequency".

2008-07-31 Change "Plasmafrequency" to "Plasma Frequency".

2008-07-31 Change "Retarding Potential Analyser" to "Retarding Potential Analyzer"

2008-07-31 Change "Time-of-flight" to "Time of flight".

2008-07-31 Change "Observatory Group" to "Observatory Name".

2008-07-31 Removed "Offline" from "Medium".

2008-07-31 Remove "Field Component" from lists.

2008-07-31 Remove "Near Earth" as a list.

2008-07-31 Added "Ionosphere" as a list.

2008-07-31 Azimuthal Angle,Dayside,Electric Field Instrument,Frequency,High Latitude,Low Latitude,Nightside,Polar Angle,Provider ID,Provider Release Date,RTF,SGI,Soft X-rays,Spatial Range,TeX,Wavelength,Wavenumber,XDR

2008-07-31 Added Repository ID and Stop Date

2008-08-14 Released.

1.3.0

2007   Add WavelengthRange to dictionary; Add BandName to Bin.

2007   Added SupportQuantity to Support.

2007   Moved Extension into each resource class.

2007   Add SpectralRange to EnergyRange, FrequencyRange and WavelengthRange.

2007   Added Units, UnitsConversion, ValidMin, ValidMax, FillValue to Element

2007   Added Fax Number to Person.

2007   Added Contributor and Publisher to dictionary and Role.

2007   Added Language to dictionary.

2008   Introduced Document resource.

2008   Added Document Type enumeration and Paper as an item.

2008   Added Number Flux to Particle Quantity.

2008   Moved CrossSpectrum from FieldQuantity to FieldQualifier.

2008   Added Electromagnetic to FieldQuantity.

2008   Added PhysicalParameter to Catalog and DisplayData.

2008-04-24 Removed "Structure Type" from dictionary and Structure.

2008-04-24 Removed "Observatory Group" from dictionary and Observatory.

2008-04-25 Removed "Provider Release Date" from dictionary.

2008-05-20 Added "Magnetic Cloud" to dictionary and "Phenomenon Type"

2008-05-20 Changed cardinality of "Phenomenon Type" to + in Catalog.

2008-04-24 Restored "Observatory Group" and made it multiple occurrence.

2008-05-22 Added "TAR" to the dictionary and to "Encoding Type".

2008-05-22 Made "Encoding Type" multiple occurrence (*) in "Access Information".

2008-05-22 Changed "End Date" to "Stop Date" and "Relative End Date" to "Relative Stop Date".

2008-05-22 Added "Active Region" to dictionary and "Phenomenon Type".

2008-05-22 Added "Coronal Hole" to dictionary and "Phenomenon Type".

2008-05-22 Added "Radio Burst" to dictionary and "Phenomenon Type".

2008-05-22 Added "EIT Waves" to dictionary and "Phenomenon Type".

2008-05-22 Fixed spelling of "Plasma Frequency" in the "Photon Qualifier" list.

2008-05-22 Removed "Array" from the Field, Photon and Particle qualifier lists.

2008-11-22 Released.

1.3.1

2008-07-21 Updated description of duration type.

2008-07-31 Added "Set" to "Physical Parameter"

2008-07-31 Added "Source" dictionary and to "Granule", Removed URL, Checksum and Data Extent from Granule (now in Source)

2008-07-31 Added "Source Type" as a list with possible values of Data, Layout, Ancillary, Browse and Thumbnail.

2008-07-31 Added "Qualifier" as a unified list of all qualifiers. Removed "Field Qualifier", "Photon Qualifier" and "Particle Qualifier" from the dictionary. Replaced each with "Qualifier" in the ontology. Added "Qualifier" to "Support"

2008-07-31 Added "Trace" to the dictionary and to the "Qualifier" list.

2008-07-31 Added "Ion Drift" and "Dust Detector" to the dictionary and to the "Instrument Type" list.

2008-07-31 Added "Platform" to the dictionary and to the "Instrument Type" list, remove "Ephemeris" from the "Instrument Type" list.

2008-09-04 Added "Rendering Hints" with elements Format, AxisLabel, DisplayType, ScaleMin, ScaleMax, ScaleType and related enumerated values.

2008-09-04 Added "Symmetric" to the dictionary and to Qualifier.

2008-09-04 Changed "Physical Parameter" to "Parameter".

2008-09-04 Removed "Measured" and shifted containers under "Measured" up one level.

2008-09-04 Added "Velocity" to "Support Quantity".

2008-09-04 Added "Count Rate" to the dictionary and to "Particle Quantity".

1.3.2

2008-10-07 Removed "Charged Particle Flux" from Measurement Type and the dictionary.

2008-10-07 Added "Interstellar" to dictionary and Region.

2008-10-15 Changed "Format" under "Rendering Hints" to "Value Format" to eliminate name conflict with "Format".

1.3.3

2008-10-16 Added the "Association" container and "Association Type" enumeration to the dictionary. Modified the ontology to replace "Association Type" with the new "Association" container.

1.3.4

2009-01-14 Added "Wave", "Passive" and "Active" to the dictionary. Added "Wave" as an enumeration. Remove "Radio and Plasma Waves" and "Radio Soundings" from the "Measurement Type" enumeration and added "Wave" to the enumeration.

2009-01-14 Added "Linear Scale" and "Log Scale" to the dictionary. Removed "Log" from the dictionary. Modified the definition of "Linear" to remove reference scaled related usage. Updated the "Scale" enumeration with the name changes.

2009-01-14 Added "Language" under "Information URL".

2009-01-14 Changed the definition of "Text" and converted "Text" to an enumeration with possible encoding types.

2009-01-14 Modified "Component" to consist of "I", "J", "K". Added "Direction Angle", and "Projection" to "Qualifier". Removed "R", "Theta", "Phi", "X", "Y", and "Z". Added "Direction Angle" as an enumeration with values of "Azimuth Angle", "Polar Angle" and "Elevation Angle". Added "Projection" as an enumeration with value of "IJ", "IK", and "JK".

2009-01-22 Modified definition of "Mixed"

2009-01-22 Changed occurrence of "Particle" to one or more.

2009-01-23 Added "Ion Chamber" to dictionary and "Instrument Type" list.

2009-02-05 Added (restored) "Intensity" to dictionary and "Photon Quantity" list.

2009-02-05 Changed "Line-of-sight" to "Line Of Sight".

2009-02-05 Added "Psuedo" and "Column" to the dictionary and to "Qualifier" list.

2009-02-26 Added "Annotation" resource and "Annotation Type" and "Confidence Rating" enumerations. The terms "Anomaly", "Event", "Feature", "Probable", "Good", "High" were added to support the new enumerations.

2009-02-27 Change "Wave" to "Waves".

1.3.5

2009-03-25 Updated definitions for "Numeric" and "Text" data types.

2009-03-26 Changed "Mixed" to a container with "Qualifier" and "Mixed Quantity" as attributes. Added "Mixed Quantity" enumeration with allowed values of "Alfven Mach Number", "Other", "Plasma Beta", "Thermal Pressure", "Alfven Velocity", "Magnetosonic Mach Number", "Plasma Beta", and "Plasma Frequency-To-Gyrofrequency Ratio".

2009-03-26 Added "Access URL" to "Repository" and "Registry".

2009-03-26 Added "Image URL" to "Annotation" and dictionary

2009-03-26 Various editorial updates to definitions, spelling and typos

2009-03-26 Added "Plasmagram", "Spectrogram" and "Wave Form" to the dictionary and to the "Display Type" list.

2009-03-26 Changed the name of "Photon" to "Waves" and "PhotonQuantity" to "WaveQuantity". Added "Wave Type" with values of "Electromagnetic", "Electrostatic", "Photon", "Plasma Waves", "Hydrodynamic", and "MHD".

2009-03-26 Updated definitions of "Emissivity", "Equivalent Width", "Gyrofrequency", "Intensity", "Line Depth", "Plasma Frequency", "Poynting Flux". Added "Wave Type" with values of "Electromagnetic", "Electrostatic", "Photon", "Plasma Waves", "Hydrodynamic", and "MHD".

2009-03-26 Added "Absorption", "AC-Electric Field", "AC-Magnetic Field", "Doppler Frequency", "Frequency", "Propagation Time", and "Wavelength" to dictionary and "Wave Quantity". Added "Wave Type" with values of "Electromagnetic", "Electrostatic", "Photon", "Plasma Waves", "Hydrodynamic", and "MHD".

2009-03-26 Added "Far Ultraviolet", "HE-304", "LBH Band" and "Soft X-Rays" to dictionary and "Spectral Range".

2009-04-06 Removed "Spectral Range" from under "Energy Range".

1.3.6

2009-04-09 Added "Atom" and "Neutron" to "Particle Type".

2009-04-09 Added "Array" and "Total" to "Qualifier".

2009-04-09 Added "Particle Type" to "Mixed".

2009-04-09 Added "Unlikely" and "Weak" to the dictionary and modified "Confidence Rating" to have values "Unlikely", "Weak", "Probable", and "Strong".

2009-04-09 Added "Classification Method" as a enumeration with allowed values of "Automatic", "Inspection", and "Inferred". Added "Classification Method" to "Annotation".

2009-04-09 Added "Observation Extent" with attributes of "Observed Region", "Start Location", "Stop Location" and "Note". Added "Observation Extent" to "Annotation".

2009-04-09 Added "Child Event Of" and "Observed By" to "Association Type".

2009-04-09 Added "Area", "Bandwidth" and "Solid Angle" to "Integral", added "Field-Aligned", "Group", "Perturbation", "Phase" and "Spectral" to "Qualifier".

2.0.0

2009-04-15 Released.

2.0.1

2009-07-12 Changed "Rendering Hints" to 0-to-many occurrence.

2009-07-12 Under "Element" replaced "Component" with "Qualifier" and allow multiple occurrences.

2009-07-12 Update the description of "Index" data type to explain wild cards.

2009-07-12 Added "Sound Speed" to dictionary and to "Particle Quantity".

2009-07-12 Updates to the definition "Access URL", "Data Extent", "Polar" and "Sonic Mach Number".

2.0.2

2009-09-24 Added "Atomic Number Detected", "Mass Number" and "Charge State" to dictionary and to "Particle Quantity" enumeration. Also added "Direction Angle" to "Particle Quantity".

2009-10-08 Added "Arrival Direction" to dictionary and to "Particle Quantity" enumeration. Added "Instrument Mode" to dictionary and "Support Quantity". Updated definitions of "Charge State" and "Atomic Number Detected".

2009-11-05 Added "Stream Interaction Region" to dictionary and to "Phenomenon Type" enumeration. Updated definition of "Coronal Mass Ejection".

2009-11-18 Modified definitions for "Observatory" and "Instrument".

2.0.3

2010-02-04 Added "Former-PI" to dictionary and to "Role" enumeration; Added "Note" to "Person".

2010-03-19 Updated definitions for "Number Flux", "Energy Flux", "Differential", and "Integral"; Added "Dust" to "Measurement Type" enumeration;

2.1.0

2010-03-19 Released.

2.2.0

2010-04-15 Added "Hardcopy" as an enumeration to dictionary and to "Format"; Added "Film", "Photographic Plate", "Photograph", "Microfiche", "Microfilm", "Print" to dictionary and to "Hardcopy" enumeration; Changed "Observatory Group" to "Observatory Group ID"; Updated definition of "Observatory" to make it more suitable for creation of conceptual Observatories.; Added "Operating Span" to dictionary with elements "Start Date", "Stop Date" and "Note"; Added "Operating Span" to "Instrument" and "Observatory".;

2010-05-21 Added "Heliosheath" to dictionary and to "Heliosphere" enumeration;

2010-06-25 Added "Fluence" to dictionary and "Particle Quantity"; Updated definitions for "Number Flux", "Coordinate System" and "Counts"; Added "HCC" (Heliocentric Cartesian), "HCR" (Heliocentric Radial), HPC (Helioprojective Cartesian) and "HPR" (Helioprojective Radial) to dictionary and "Coordinate System Name"

2010-08-17 Added "S3_BUCKET" to dictionary and "Encoding"; Add "Directional" to dictionary and to "Qualifier"; updated definition for "Energy Flux" and "Differential"

2010-08-20 Updated definitions of "Outer", "Inner", "Heliosheath" and "Remote 1AU"

2010-09-15 Added "Excel" to dictionary and to "Format" list; Added "Rendering Axis", and "Index" to dictionary and under "Rendering Hints"; Add "Vertical", "Horizontal", and "Color Bar" to dictionary and to the "Rendering Hints" enumeration; Changed cardinality of "Investigation Name" from 1 to +; Add "Median, " Maximum" and "Minimum" to dictionary and to "Qualifer" list.;

2010-09-17 Added "SSE_L" to dictionary and to "Coordinate System Name" list;

2011-01-06 Updated definition for "irradence".

2011-01-06 Released.

2.2.1

2011-05-12 Strike "product" from the definition of "Numerical Data".;

2011-06-16 Added "core", "halo", "strahl" and "superhalo" to the dictionary and to "Qualifier";

2011-08-18 Released.

2.2.2

2011-09-26 Add "Rendering Hints" under "Element"; Set occurrence for "Coordinate Representation" and "Coordinate System Name" under "Coordinate Sytem" to required (1); Set "Size" under "Structure" to required (1); Set "Association ID" and "Association Type" under "Association" to required (1).

2011-10-27 Update definition of "Document"; Add "MIME Type" to dictionary and "Document" structure; Add "Presentation", "Poster", "White Paper", "Technical Note", "Specification" and "Report" to dictionary and to "Document Type" enumeration; Remove "Paper" from dictionary.

2012-02-02 Add "Sector Boundary Crossing" to the dictionary and the "Phenomenon Type" list.; Add "Product Key" to the dictionary and under "Access Information";

2012-02-27 Add "Albedo" to the dictionary and to "Wave Quantity" list.; Add "Partical Radius" to the dictionary and to the "Particle Quantity" list;

2012-02-27 Released.

2.2.3

2012-03-15 Modified definition of "Numerical Data" as suggested by R. Weigel and D.A. Roberts; Modified definition of "Potential" as suggested by F. Mozer, D.A. Roberts and S. Fung; Add "Magnetograph" to dictionary and "Instrument Type" as suggested by J. King

2012-05-10 Modified definitions of "GEI", "Azimuth Angle", "Elevation Angle" and "Polar Angle" as suggested by J.Merka; Add definition for "ENP and add to "Coordinate System Name" enumeration as suggested by J. Merka; Add definitions of "Photomultiplier Tube" and "Solid State Detector" to dictionary and "Intrument Type" as suggested by B. Weigel.

2012-05-24 Add definition of "Moon" and add to "Earth" enumeration as suggested by T. Narock.

2014-05-22 Released.

2.2.4

2015-05-28 Add coordinate systems MSO, VSO, KSO, KSM, JSO, JSM to dictionary and CoordinateSystemName, Add SolarUVFlux and IMFClockAngle to dictionary and MixedQuantity.

2015-05-31 Released.

2.2.5

2015-06-12 Add moons and magnetosphere to planets. Only the larger moons which are typically encountered or simulated were added.

2015-06-12 Add coordinate systems to enumeration.

2.2.6

2015-09-09 Released.

2.2.7

2016-07-21 Change occurrence of Particle->ParticalType from + to * and Wave->WaveType from 1 to 0.

2016-07-21 Add JSON and CSV to the dictionary and to Format enumeration.

2.2.8

2016-07-21 Released.

2.2.9

2017-02-09 Add CadenceMin, CadenceMax, ExposureMin, ExposureMax, PartiallyRestricted, Confidence, ProviderName, MassRange, PitchAngleRange; Change occurrence of Observatory/OperatingSpan from 1 to +.

2017-09-07 Add HGRTN, HERTN to dictionary and to CoordinateSystemName. Add Entropy to dictionary and ParticleQuantity.

2017-11-14 Released.

2.3.0

2018-02-08 Add DOI to dictionary and to ResourceHeader.

2018-05-04 Add PublicationInfo, PublicationDate, Authors, Funding, Agency, Project, Award, ORCIdentifier to dictionary and to the model.

2018-05-08 Add File, HAPI, Listing, Search, Template, Overview, WebService to dictionary and as values for Style enumeration.; Add Style to dictionary and AccessURL

2018-05-31 Released.

2.3.1

2018-06-18 Add Eccentric Dipole (ECD) to dictionary and CoordinateSystem list.

2018-11-01 Add Positron to dictionary and ParticleType list.

2019-02-25 Add Developer, HostContact and User to dictionary and Role list.

2019-06-13 Add StartDate, StopDate and Note to Contact.

2019-06-13 Add RevisionHistory, RevisionEvent to dictionary and add RevisionHistory to ResourceHeader; Add IonGauge to dictionary and to InstrumentType.

2019-09-27 Add DirectionCosine, GeometricFactor, AdiabaticInvariant, MagneticMoment, BounceMotion, DriftMotion, DataQuality, Orientation, SpinPeriod, SpinPhase, SpinRate, LowerHybridFrequency and UpperHybridFrequency to dictionary.; Create DirectionCosine enumeration with I,J,K as members; Create AdiabaticInvariant enumeration with MagneticMoment, BounceMotion and DriftMotion as members.; Add DirectionCosine to Qualifier list.;Add GeometericFactor, AdiabaticInvariant to ParticleQuantities; Add DataQuality, Orientation, SpinPeriod, SpinPhase and SpinRate to SupportQuantity.; Add LowerHybridFrequency and UpperHybridFrequency to WaveQuantity.

2019-10-31 Add CoPI, MidLatitudeRegion, SubAuroralRegion, ProjectEngineer, and ProjectManager to dictionary; Add CoPI, ProjectEngineer, ProjectManager to Role enumeration; Add Plasmasphere, RingCurrent, and MidLatitudeRegion to Magnetosphere enumeration.; Add MidLatitudeRegion, and ProjectManager to NearSurface enumeration.; Fix typo with Role values with dashes.

2019-11-14 Released.

2.3.2

2020-09-10 Add Housekeeping, Telemetry, RotationMatrix, EncodedParameter, AutoSpectrum, Coherence, ImaginaryPart, RealPart, PowerSpectralDensity, ChargeFlux, DynamicPressure, EnergyPerCharge, ParticleRigidity, MassPerCharge, LShell, MissionPrincipalInvestigator, ProgramManager, ProgramScientist, VolumeEmissionRate, SPICE, MissionManager to dictionary and to appropriate enumerations as suggested by L. Bargatze; Add PDS4 and PDS3 to dictionary and to FOrmat enumeration as suggest by A. Masson.

2020-09-30 Add InstrumentGroupID and Experiment to dictionary; Add InstrumentGroupID to Instrument and Experiment to InstrumentType.

11. Bibliography

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International System of Units (SI)
   http://www.bipm.fr/en/si
   Base units: http://www.bipm.fr/en/si/si_brochure/chapter2/2-1/#symbols
   and those for Common derived units: http://www.bipm.fr/en/si/derived_units/2-2-2.html
ISO 8601:2004 - Date Format
   http://en.wikipedia.org/wiki/ISO_8601
   - or -
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   - or -
   http://www.iso.org/iso/en/prods-services/popstds/datesandtime.html
RFC 3339 - Date and Time on the Internet
   The basis for the ISO 8601 standard. http://www.ietf.org/rfc/rfc3339.txt
RFC 1014 - XDR: External Data Representation standard
   http://www.faqs.org/rfcs/rfc1014.html

12. Appendix A - Comparison of Spectrum Domains