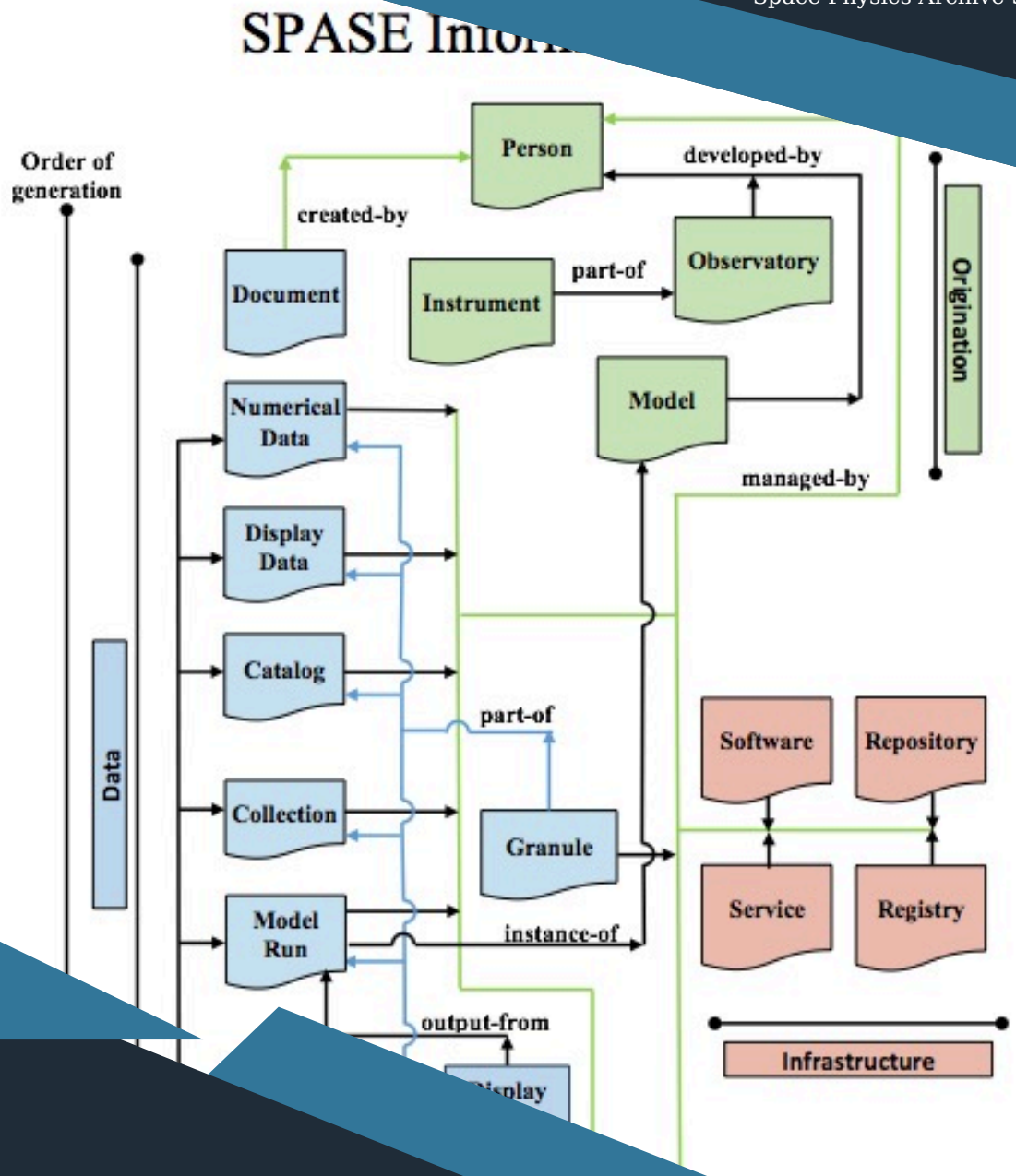
SPASE

Space Physics Archive Search and Extract



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1. Executive Summary

Research in Heliophysics requires information from multiple sources which includes data from and about spacecraft, ground-based 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 s resolution Geotail magnetic field data for 1992 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 https://spase-group.org/data/model/spase-latest.pdf.

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. Later versions of the data model, that is up until version 2.5.0, are each an extension of this earlier release.

Starting with version 2.5.0, the SPASE base model has been expanded by incorporation of the SPASE Simulation Extensions. The basis for the SPASE Simulation Extensions were originally developed by the Integrated Medium for Planetary Exploration (IMPEx) project, a European Union (EU) Seventh Framework Programme sponsored project. The SPASE Simulation Extensions, version 1.0.0, were released 2014-05-19 with no subsequent revisions. The Resource Types currently in the simulation extensions are:

SimulationRun - Description of a simulation run, including the code ID, the run spatial and temporal description, and all the relevant inputs.

SimulationModel - Descriptor of a simulation model: type of numerical scheme, model versions, etc.

NumericalOutput - Numerical data (i.e., NumericalData) generated from a model run.

DisplayOutput - A graphical representation of data (i.e., equivalent to DisplayData) generated from a model run.

The simulation extensions also override the following Granule and Particle in the base model. The elements within SimulationRun, SimulationModel, NumericalOutput, DisplayOutput are broken down into sub-elements that provide sufficient detail for adequate description of simulation models and of the data sets derived from simulation runs. The merging of the SPASE Base Model with the SPASE Simulation Extension allows greater interoperability and eases the development of tools such as the SPASE editor https://spase-editor.heliocloud.org/, which is a web-based editor for generating SPASE descriptions.

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 a "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 online, 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.

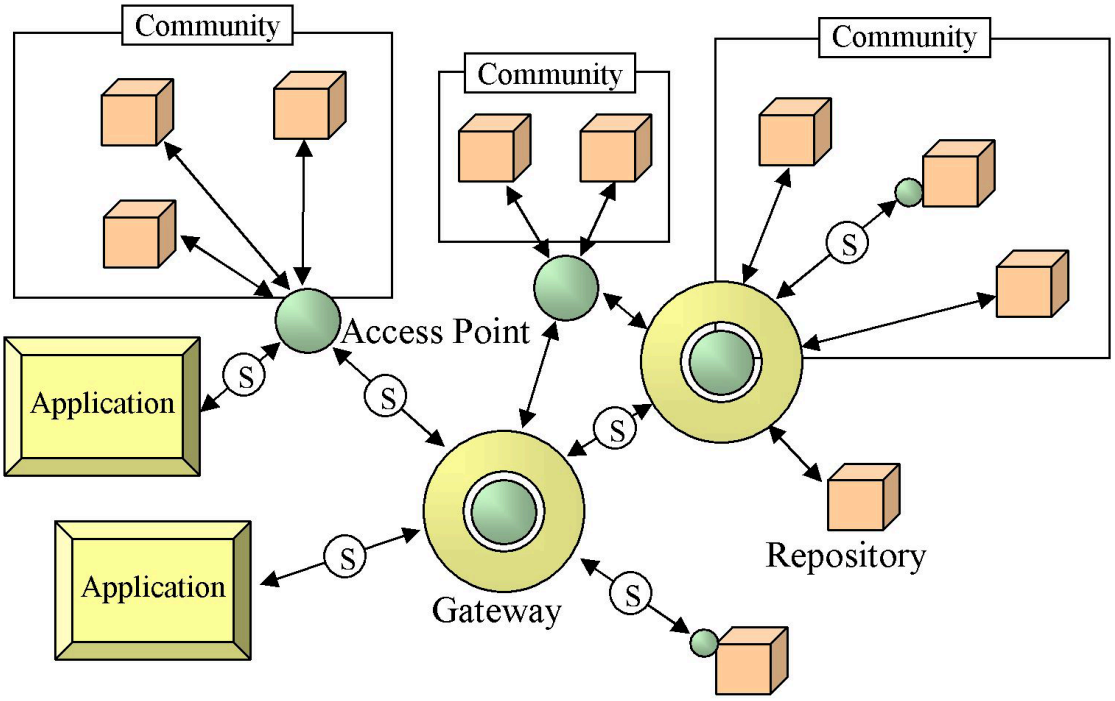


Figure 1: A possible data environment architecture. Information and data flows from Repositories to Applications through Access Points and Gateways. In this model, any Access Point or Gateway may be considered an instance of a Virtual Observatory. The portions of the system using SPASE-Data-Model-based messages are indicated with the Ⓢ.

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,
Annotation,
Document, and
Granule

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, and
Person

3.1.3. Infrastructure Resources

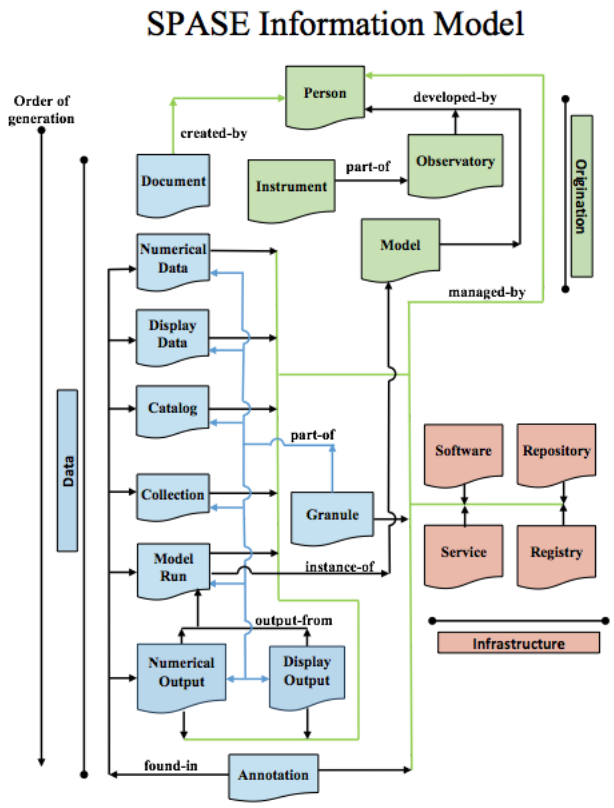
Infrastructure Resources describe system components that are part of the exchange and use of data. This includes storage locations for data (Repository), metadata (Registry) and functions (Service). The complete list of Infrastructure Resources is:

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.



The association between resources in the SPASE Simulation Extensions Information Model. Arrows point in the direction of association.

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.

A document entitled "Guidelines for Resource ID Formation" provides general recommendations for generating a Resource ID, see https://spase-group.org/docs/conventions/Resource-ID-Formation-Rule-v6.pdf). More specific recommendations are listed by SPASE resource type below:

```
Person:          spase://NamingAuthority/Person/GivenName.[MiddleName. or MI.]FamilyName

Observatory:     spase://NamingAuthority/Project/Observatory/ObservatoryName

Instrument:      spase://NamingAuthority/Instrument/Observatory/InstrumentName

Repository:      spase://NamingAuthority/Repository/RepositoryName

NumericalData:   spase://NamingAuthority/NumericalData/Project/Observatory/Instrument/
                        ProductName/Cadence

DisplayData:     spase://NamingAuthority/DisplayData/Project/Observatory/Instrument/
                        ProductName/Cadence

Catalog:         spase://NamingAuthority/Catalog/ResourceName
              or spase://NamingAuthority/Catalog/[Observatory]/[Instrument]/ResourceName

Collection:      spase://NamingAuthority/Collection/Project/Observatory/Instrument/Project/
                        Observatory/Instrument

Model:           spase://NamingAuthority/Model/ModelProvider/ModelName

Annotation:      spase://NamingAuthority/Annotation/AnnotationType/ResourceName
                 where AnnotationType: Anomaly, Event, Feature, Phenomenon

Document:        spase://NamingAuthority/Document/Project/DocumentProvider/DocumentName

ModelRun:        spase://NamingAuthority/ModelRun/ModelRunProvider/ResourceName
                 here ResourceName may take the form of model run name plus date of model
                 execution

NumericalOutput: spase://NamingAuthority/NumericalOutput/
```

```
DisplayOutput:    spase://NamingAuthority/DisplayOutput/

Registry:         spase://NamingAuthority/Registry/RegistryName

Service:          spase://NamingAuthority/Service/ServiceProvider/ServiceType/ResourceName

Software:         spase://NamingAuthority/Software/SoftwareProvider/SoftwareType/ResourceName

Community-produced products:
                  spase://NamingAuthority/ResourceType/CommunityProduct/ResourceProvider
                  for example: PI_Name/ResourceName

Granule:          Not used anymore
```

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 necessary. If so, create n Document resource and associate it with the data resource. An "InformationURL" 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 version="1.0" encoding="UTF-8" ?>
<Spase>
   <Version>2.7.0</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>
```

Now, let us consider a collection of observations from the magnetometer on the ACE spacecraft, which was placed into a Lissajous orbit about the L1 Lagrange point 2004-12-31). This data set has been averaged to produce a time series with 1 min resolution (cadence), which spans the time interval from the beginning of the mission to the end of 2004 (1997-09-01 to 2004-12-31). A data product such as this is best described by using the SPASE NumericalData resource type as recommended in section 3.1.1 above. This example NumericalData description XML format. And while the SPASE data model is implementation neutral, the XML representation is preferred. Note that the presented URLs are fictitious and will not direct you to the actual data.

```
<?xml version="1.0" encoding="UTF-8" ?>
<Spase>
   <Version>2.7.0</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 the instrument
                          principal investigator in any publication resulting from the
                          use of these data.</Acknowledgement>
         <Description>ACE MFI 1 min averaged magnetic-field data in GSE coordinates.
                      These data were derived from the 16 s observations that were linearly
                      interpolated to derive a time series with time stamps at second zero
                      of each minute.</Description>
         <Contact>
            <PersonID>spase://SMWG/Person/Norman.F.Ness</PersonID>
            <Role>PrincipalInvestigator</Role>
         </Contact>
         <Contact>
            <PersonID>spase://SMWG/Person/Charles.Smith</PersonID>
            <Role>Co-Investigator</Role>
         </Contact>
         <Contact>
            <PresonID>spase://SMWG/Person/James.M.Weygand</PresonID>
            <Role>DataProducer</Role>
         </Contact>
      </ResourceHeader>
      <AccessInformation>
         <AccessRights>Open</AccessRights>
         <AccessURL>
```

```
            <URL>http://www.igpp.ucla.edu/getResource?format=text&id=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>
            <SupportQuantity>Temporal</SupportQuantity>
         </Support>
      </Parameter>
      <Parameter>
         <Name>MAGNETIC_FIELD_VECTOR</Name>
         <Units>nT</Units>
         <CoordinateSystem>
            <CoordinateRepresentation>Cartesian</CoordinateRepresentation>
            <CoordinateSystemName>GSE</CoordinateSystemName>
         </CoordinateSystem>
         <Description>Magnetic field vector, 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>
         <Description>ACE spacecraft location, GSE coordinates (X,Y,Z)</Description>
         <Support>
            <SupportQuantity>Positional</SupportQuantity>
         </Support>
      </Parameter>
   </NumericalData>
</Spase>
```

6. DataCite rightsList Metadata Conventions

The DataCite "rightsList" container, along with most of its sub-properties, has been added to the SPASE Base model, version 2.7.1, in order allow SPASE better compliance with the F.A.I.R. principles: Findability, Accessibility, Interoperability, and Reusability. The DataCite description of Rights (DataCite capitalization) is as follows: "The Rights field is where you can include information about the data's content license (like CC0). When this information is in the metadata for the dataset, it helps researchers to quickly see at a glance whether the data being described is something they'll be able to use. This information is also important for harvesters who are trying to assemble lists of readily available datasets." The structure of DataCite's implementation for rights was slightly modified to better align with the use case for the heliophysics community. The SPASE Base model allows for both rights to the dataset and rights to the metadata to be described using the "Rights" container. Note that at least one or more Rights containers must appear within the RightsList and MetadataRightsList containers, if used. The declaration of multiple rights allows one to describe data resources with complex rights characteristics.

The rightsList definition and the definition of its sub-properties are listed below as lightly edited from the DataCite Metadata Schema, version 4.6 (see https://doi.org/10.14454/mzv1-5b55). The RightsList and MetadataRightsList containers are identical apart from their intended use.

MetadataRightsList

Obligation: Optional

Occurrences: 0-1

Definition: Wrapper element to allow multiple rights for the metadata. Thus, rights properties may be listed as needed to record complex rights characteristics.

Allowed values, examples, other constraints: Rights container.

RightsList

Obligation: Optional

Occurrences: 0-1

Definition: Wrapper element to allow multiple rights. Thus, rights properties may be listed as needed to record complex rights characteristics.

Allowed values, examples, other constraints: Rights container.

Rights

Obligation: Optional

Occurrences: 0-n

Definition: Any rights information for this item. This property may be repeated to record multiple complex rights characteristics for the same item. May be used for both metadata and dataset licenses.

Example XML: This example shows the metadata and dataset rights characteristics as called for by SMD-41a that have been adopted by Space Physics Data Facility (SPDF) for its data holdings. It also shows the dataset rights characteristics as recommended by the ESAC Initiative community.

```
<SPASE>
...
   <Version>2.7.1</Version>
   <MetadataRightsList>
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         <RightsIdentifierScheme>SPDX</RightsIdentifierScheme>
         <RightsIdentifier>CC0-1.0</RightsIdentifier>
         <RightsURI>https://spdx.org/licenses/CC0-1.0.html</RightsURI>
         <RightsName> Creative Commons Zero v1.0 Universal</RightsName>
         <Note>CC0 1.0 Universal is the Creative Commons license applicable to all
               publicly available SPASE metadata descriptions</Note>
      </Rights>
   </MetadataRightsList>
...
   <AccessInformation>
   ...
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            <RightsIdentifier>CC0-1.0</RightsIdentifier>
            <RightsURI>https://spdx.org/licenses/CC0-1.0.html</RightsURI>
            <RightsName> Creative Commons Zero v1.0 Universal</RightsName>
            <Note>CC0 1.0 Universal is the Creative Commons license applicable
                  to all publicly available NASA Heliophysics data products</Note>
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            <RightsIdentifierScheme>SPDX</RightsIdentifierScheme>
            <RightsIdentifier>CC-BY-NC-3.0</RightsIdentifier>
            <RightsURI>https://spdx.org/licenses/CC-BY-NC-3.0.html</RightsURI>
            <RightsName>Creative Commons Attribution Non Commercial 3.0
                        Unported</RightsName>
            <Note>CC-BY-NC-3.0 is the Creative Commons license applicable to all
                  publically available ESA Heliophysics data products</Note>
         </Rights>
      </RightsList>
   ...
   </AccessInformation>
...
</SPASE>
```

Rights Sub-properties:

1. SchemeURI

Occurrences: 0-1

Definition: Rights URL namespace. Text value should be 'https://spdx.org/licenses/'.

Allowed values, examples, other constraints:
Free text, but should be https://spdx.org/licenses/

2. RightsIdentifierScheme

Occurrences: 0-1

Definition: Rights identifier scheme. Text value should be 'SPDX'.

Allowed values, examples, other constraints: Free text, but should be SPDX.

3. RightsIdentifier

Occurrences: 0-1

Definition: The identifier/short name of the license.

Allowed values, examples, other constraints: Example: CC-BY-4.0

4. RightsURI

Occurrences: 1

Definition: The SPDX URI of the license. Blueprint is typically (SchemeURI) + (RightsIdentifier) + '.html'.

Allowed values, examples, other constraints:

Example: https://spdx.org/licenses/CC-BY-4.0.html

A list of identifiers for commonly-used licenses may be found here: https://spdx.org/licenses/

5. RightsName

Occurrences: 0-1

Definition: The full name of the license.

Allowed values, examples, other constraints:

Example: Creative Commons Attribution 4.0 International

6. Note

Occurrences: 0-1

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

Allowed values, examples, other constraints:

Example: Creative Commons Attribution 4.0 International is the Creative Commons license applicable to this dataset.

7. 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) is not allowed. This allows the data model to be implemented in a wider range of metadata languages. Note that the SPASE DateTime and Duration type elements must be populated by text that complies with the ISO 8601 international standard for date and time representations (other ISO 8601 informational URLs appear in the Bibliography below. The following SPASE model data types are supported:

Boundary
Parameters that define a region in space.

Container
A "Container" of other elements including text fields and containers.

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. The SPASE element "Cadence" is an example of a Duration type SPASE element where cadence refers to the delta T or time between consecutive data points in a time series. A SPASE Duration text field is required to be formatted to comply with the ISO 8601 recommended primary standard notation. If a time duration is less that a day the PTHH:MM:SS.sss format applies where PT are tokens to indicate that the time value is a duration, HH is the number of complete hours, 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). If a time duration s longer than or equal to a day, then the ISO 8601 P format applies where for example P1D, P1M, and P1Y represent time cadences of one day, one month, and one year, respectively. Other examples of SPASE Duration-type elements includes DiagnosisTimeStep, DisplayCadence, Exposure, Per, RelativeStopDate, and TimeStep.

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.

FloatSequence
A list of floating point numbers where the order of the values is fixed. A space separates each value. For example, "1.2 3.4 5.6".

ID
SPASE Identifier

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".

StringSequence
A list of strings where the order of the values is fixed. A space separates each value. For example, "one two three".

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

Value
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 and for commonly derived units can be found by accessing links listed in the Bibliography below for the International System of Units (SI) hosted by the Bureau des Poids et Mesures (BIPM).

8. Enumerations

Enumeration lists are either "open" or "closed". The list members in a closed enumeration list are stipulated by the SPASE model and the definition for all closed list members are compiled in the SPASE data dictionary. The items in an open enumeration 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:
- BounceMotion
- DriftMotion
- MagneticMoment

AnnotationType
Identifiers for an classification of an annotation.

Allowed Values:
- Anomaly
- Event
- Feature

ApplicationInterface
Identifiers for the type of interface for the application.

Allowed Values:
- API
- CLI
- GUI

AssociationType
Identifiers for resource associations.

Allowed Values:
- ChildEventOf
- DerivedFrom
- ObservedBy
- Other
- PartOf
- RevisionOf
- SupersededBy
- Supersedes

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

Comet
Identifiers for cometary objects.

Allowed Values:
- 1P-Halley
- 26P-Grigg-Skjellerup
- 67P-Churyumov-Gerasimenko

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
LocalGeographic
LocalGeomagnetic
MAG
MFA
MSO
RTN
SC
SE
SensorCoordinates
SM
SpacecraftOrbitPlane
SR
SR2
SSE
SSE_L
StonyhurstHeliographic
TIIS
VSO
WGS84

Corona

Identifiers for 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.

Allowed Values:

InnerCorona
MiddleCorona
OuterCorona

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:
- Convention
- Other
- Policy
- Poster
- Presentation
- Report
- Specification
- TechnicalNote
- WhitePaper

Earth
Identifiers for the regions surrounding the Earth.

Allowed Values:
- Cusp
- InnerRadiationBelt
- Magnetosheath
- Magnetosphere
- Moon
- NearSurface
- OuterRadiationBelt
- 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
CurrentDensity
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
PDS3
PDS4
PNG
Postscript
QuickTime

RINEX2
RINEX3
Text
TFCat
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
Lidar
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:

Amalthea
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 the magnetic field of a planet, moon, or asteroid.

Allowed Values:

Magnetotail
Magnetopause
Main
Plasmasheet
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
NotProvided
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

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

Allowed Values:
Asteroid
Callisto
Comet
Earth
Enceladus
Europa
Ganymede
Heliosphere
Incident
Interstellar
Io
Jupiter
Mars
Mercury
Neptune
Planet
Pluto
Rhea
Saturn
Sun
Titan
Title
Uranus
Venus

ModelProduct
Identifiers for the type of products generated by a model.

Allowed Values:
- 2DCuts
- 3DCubes
- Lines
- SpatialSeries
- Spectra

ModelType
A characterization of the numerical scheme used in the model.

Allowed Values:
- AOGCM
- Electrohydrodynamic
- Empirical
- GCM
- Hybrid
- MHD
- NonHydrostatic
- Paraboloid
- PIC
- TestParticle

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
- Exosphere
- Ionosphere
- Mesosphere
- MidLatitudeRegion
- Plasmasphere
- PolarCap
- SouthAtlanticAnomalyRegion
- Stratosphere
- SubAuroralRegion
- Thermosphere
- Troposphere

Neptune
Identifiers for the regions surrounding the planet Neptune.

Allowed Values:
- Magnetosphere
- Proteus
- Triton

ParameterQuantity
Identifiers for all types of parameter quantities

Allowed Values:
- 2DCuts
- 3DCubes
- ACElectricField
- ACMagneticField
- Absorption

ActivityIndex
AdiabaticInvariant
Aerosol
AkasofuEpsilon
Albedo
AlfvenMachNumber
AlfvenVelocity
AlphaParticle
Antenna
ArrivalDirection
Atom
AtomicNumberDetected
AverageChargeState
AzimuthAngle
CaK
Channeltron
ChargeExchange
ChargeFlux
ChargeState
Coronograph
CountRate
Counts
CrossSection
Current
CurrentDensity
DataQuality
DissociativeRecombination
DopplerFrequency
Dopplergram
DoubleSphere
Dust
DustDetector
DynamicPressure
Electric
ElectricField
Electromagnetic
Electron
ElectronDriftInstrument
ElectronImpact
Electrostatic
ElectrostaticAnalyser
ElevationAngle
Emissivity
EnergeticParticleInstrument
EnergeticParticles
Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
Ephemeris
EquivalentWidth
Experiment
ExtremeUltraviolet
FarUltraviolet

FaradayCup
FlowSpeed
FlowVelocity
Fluence
FluxFeedback
FourierTransformSpectrograph
Frequency
FrequencyToGyrofrequencyRatio
GammaRays
GeigerMuellerTube
GeometricFactor
Gyrofrequency
Halpha
HardXRays
He10830
He304
HeatFlux
Housekeeping
Hydrodynamic
IMFClockAngle
ImageIntensity
Imager
ImagingSpectrometer
Infrared
InstrumentMode
InstrumentStatus
Intensity
Interferometer
Ion
IonChamber
IonComposition
IonDrift
IonGauge
Irradiance
K7699
LBHBand
LShell
LangmuirProbe
Lidar
LineDepth
Lines
LongWire
LowerHybridFrequency
MHD
Magnetic
MagneticField
Magnetogram
Magnetograph
Magnetometer
MagnetosonicMachNumber
Mass
MassDensity
MassNumber
MassPerCharge
MassSpectrometer

MicrochannelPlate
Microwave
ModeAmplitude
Molecule
MultispectralImager
Muon
NaD
NeutralAtomImager
NeutralAtomImages
NeutralGas
NeutralParticleDetector
Neutron
Ni6768
NotProvided
NumberDensity
NumberFlux
Optical
Orientation
Other
ParticleCorrelator
ParticleDetector
ParticleRadius
ParticleRigidity
PhaseSpaceDensity
PhotoIonization
Photometer
PhotomultiplierTube
Photon
Photopolarimeter
PlasmaBeta
PlasmaFrequency
PlasmaWaves
Platform
PolarAngle
Polarization
Positional
Positron
Potential
PoyntingFlux
Pressure
Profile
PropagationTime
ProportionalCounter
Proton
QuadrisphericalAnalyser
Radar
Radiance
RadioFrequency
Radiometer
Rate
Remark
ResonanceSounder
RetardingPotentialAnalyser
Riometer
RotationMatrix

SPICE
ScintillationDetector
SearchCoil
SoftXRays
SolarUVFlux
SolidStateDetector
SonicMachNumber
SoundSpeed
Sounder
SpacecraftPotentialControl
SpatialSeries
Spectra
SpectralPowerReceiver
Spectrometer
Spectrum
SpinPeriod
SpinPhase
SpinRate
StokesParameters
Telemetry
Temperature
Temporal
ThermalPlasma
ThermalSpeed
TimeOfFlight
TotalPressure
Ultraviolet
Unspecified
UpperHybridFrequency
VCrossB
Velocity
VolumeEmissionRate
WavePhase
WaveformReceiver
Wavelength
Waves
WebResource
WebService
WhiteLight
XRays

ParticleQuantity

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

Allowed Values:

AdiabaticInvariant
ArrivalDirection
AtomicNumberDetected
AverageChargeState
ChargeFlux
ChargeState
CountRate
Counts
Current
CurrentDensity
DynamicPressure

Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
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
Muon
Neutron
Positron
Proton

PhenomenonType

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

Allowed Values:

ActiveRegion
Aurora
BowShockCrossing
CoronalBrightPoint
CoronalDimming
CoronalHole

CoronalJet
CoronalMassEjection
EITWave
EUVWave
EnergeticSolarParticleEvent
ForbushDecrease
GeomagneticStorm
InterplanetaryCoronalMassEjection
InterplanetaryShock
MagneticCloud
MagneticFluxEmergence
MagnetopauseCrossing
RadioBurst
SectorBoundaryCrossing
SolarFilament
SolarFilamentEruption
SolarFlare
SolarProminence
SolarProminenceEruption
SolarWindExtreme
StreamInteractionRegion
Substorm

ProcessCoeffType

Whether the model results are obtained from a stationary solution or are dynamically computed.

Allowed Values:

CrossSection
Frequency
Other
Rate

ProcessingLevel

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

Allowed Values:

Calibrated
Derived
Raw
Uncalibrated
ValueAdded

ProcessType

Type of chemical process.

Allowed Values:

ChargeExchange
DissociativeRecombination
ElectronImpact
PhotoIonization

Projection

Identifiers to projections into a coordinate system.

Allowed Values:

IJ
IK

JK

Qualifier

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

Allowed Values:

Amplitude
Anisotropy
Array
AutoSpectrum
Average
Characteristic
Circular
Coherence
Column
Component
Confidence
Core
CrossSpectrum
Deviation
Differential
Direction
Directional
DirectionAngle
DirectionCosine
EncodedParameter
FieldAligned
Fit
Group
Halo
ImaginaryPart
Incident
Integral
Linear
LineOfSight
Magnitude
MassMixingRatio
Maximum
Median
Minimum
MixingRatio
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

ResourceType

Identifiers for all SPASE resource types.

Allowed Values:

Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Granule
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry

Repository
Service
Software

Role

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

Allowed Values:

ArchiveSpecialist
Author
CoInvestigator
Contributor
CoPI
DataProducer
DeputyPI
Developer
FormerPI
GeneralContact
HostContact
InstrumentLead
InstrumentScientist
MetadataContact
MissionManager
MissionPrincipalInvestigator
OperationsManager
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
Hyperion
Iapetus
Magnetosphere
Mimas
Phoebe
Rhea
Tethys
Titan

SavedQuantity

Quantities that are saved during a given diagnosis.

Allowed Values:

2DCuts

3DCubes
ACElectricField
ACMagneticField
Absorption
AdiabaticInvariant
AkasofuEpsilon
Albedo
AlfvenMachNumber
AlfvenVelocity
ArrivalDirection
AtomicNumberDetected
AverageChargeState
ChargeFlux
ChargeState
CountRate
Counts
Current
CurrentDensity
DopplerFrequency
DynamicPressure
Electric
Electromagnetic
Emissivity
Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
EquivalentWidth
FlowSpeed
FlowVelocity
Fluence
Frequency
FrequencyToGyrofrequencyRatio
GeometricFactor
Gyrofrequency
HeatFlux
IMFClockAngle
Intensity
LShell
LineDepth
Lines
LowerHybridFrequency
Magnetic
MagneticField
MagnetosonicMachNumber
Mass
MassDensity
MassNumber
MassPerCharge
ModeAmplitude
NumberDensity
NumberFlux
Other
ParticleRadius

ParticleRigidity
PhaseSpaceDensity
PlasmaBeta
PlasmaFrequency
Polarization
Potential
PoyntingFlux
Pressure
PropagationTime
SolarUVFlux
SonicMachNumber
SoundSpeed
SpatialSeries
Spectra
StokesParameters
Temperature
ThermalSpeed
TotalPressure
UpperHybridFrequency
VCrossB
Velocity
VolumeEmissionRate
WavePhase
Wavelength

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

SpecificModeledRegion

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

Allowed Values:

Callisto
Enceladus
Europa
Ganymede
Incident
Io
Planet
Rhea
Titan
Title

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

Status

Indicates the status of the resource.

Allowed Values:

- Completed
- Deprecated
- Ongoing
- Unavailable
- Withdrawn

Style

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

Allowed Values:

- EPNTAP
- File
- Git
- HAPI
- Listing
- Overview
- Search
- TAP
- Template
- 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
Remark
RotationMatrix
SpinPeriod
SpinPhase
SpinRate
Telemetry
Temporal
Velocity
WebResource
WebService

Symmetry
Symmetry of the model domain.

Allowed Values:
Axial
Central
None
Plane

Text
Identifiers for the encoding of sequences of characters.

Allowed Values:
ASCII
Unicode

UndefinedQuantity
Identifiers for the kind of undefined parameter.

Allowed Values:
NotProvided

Uranus
Identifiers for the regions surrounding the planet Uranus.

Allowed Values:
Ariel
Magnetosphere
Miranda
Oberon
Puck

Titania
Umbriel

Venus
Identifiers for the regions surrounding the planet Venus.

Allowed Values:
Magnetosphere

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
WavePhase

Waves
Identifiers for experimental and natural wave phenomena.

Allowed Values:
Active
Passive

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

Allowed Values:
Electromagnetic
Electrostatic
Hydrodynamic
MHD
Photon
PlasmaWaves

YN
Yes or No

Allowed Values:

- No
- Yes

9. Data Model Tree

A "big picture" of the SPASE information model can be visualized in the form of an information tree (ontology) that shows the inter-relationship of elements in the information model. The ontology is implementation neutral. Details for each element (SPASE term) are given in the SPASE data dictionary (next section of this document or online at https://spase-group.org/data/model/search/index.html).

9.1 SPASE information tree as a multi-level structure

The SPASE information model is simply a structure by which the information (metadata) about a heliophysics resource is organized so as to give a logical presentation and description of the resource. In addition to the underlying relationship structure, the SPASE schema also provides the occurrence specification of every element in the SPASE ontology in terms of its cardinality given in enclosed parenthesis as follows:

0 = optional, 1 = required, * = zero or more, + = 1 or more
Cardinality therefore expresses the nature of the relationship (e.g., one-to-one, one-to-many, etc.) between two elements that can both be either required or optional. The information structure below shows the six (6) levels of SPASE elements with the top level (far left) being the Name Space level for SPASE. Each subsequent vertical dashed line toward the right indicates a description level such that all the elements or terms at the same level are connected by the same vertical dashed line. The level in the far right is the last level of description listing where appropriate all the different items of information needed to describe the containers of information at the level just above (to the left).

+ Spase (1)
| + Version (1)
| + Status (0)
| + MetadataRightsList (0)
| | + Rights (+)
| | | + SchemeURI (0)
| | | + RightsIdentifierScheme (0)
| | | + RightsIdentifier (0)
| | | + RightsURI (1)
| | | + RightsName (0)
| | | + Note (0)
| + Catalog (+)
| | + ResourceID (1)
| | + NamingAuthority (0)
| | + ResourceType (0)
| | + ResourceHeader (1)
| | | + ResourceName (1)
| | | + AlternateName (*)
| | | + DOI (0)
| | | + ReleaseDate (1)
| | | + RevisionHistory (0)
| | | | + RevisionEvent (+)
| | | | | + ReleaseDate (1)

| | | | | | + Note (1)
| | | | + ExpirationDate (0)
| | | | + Description (1)
| | | | + PlainLanguageDescription (0)
| | | | + Acknowledgement (0)
| | | | + PublicationInfo (0)
| | | | | + Title (0)
| | | | | + Authors (1)
| | | | | + PublicationDate (1)
| | | | | + PublishedBy (1)
| | | | | + LandingPageURL (0)
| | | | + 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)
| | | | + RightsList (0)
| | | | | + Rights (+)
| | | | | | + SchemeURI (0)
| | | | | | + RightsIdentifierScheme (0)
| | | | | | + RightsIdentifier (0)
| | | | | | + RightsURI (1)
| | | | | | + RightsName (0)
| | | | | | + Note (0)
| | | | + AccessURL (+)
| | | | | + Name (0)
| | | | | + URL (1)
| | | | | + Style (0)
| | | | | + ProductKey (*)
| | | | | + Description (0)
| | | | | + Language (0)
| | | | + Format (+)
| | | | + Encoding (0)
| | | | + AccessDirectoryTemplate (0)
| | | | + AccessFilenameTemplate (0)
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| | | | | | + UnitsScheme (1)
| | | | | | + SchemeURI (1)
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| | | | | + Per (0)
| | | | + Acknowledgement (0)
| | | + ProviderName (0)
| | | + ProviderResourceName (0)
| | | + ProviderVersion (0)
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| | | + PhenomenonType (+)
| | | + TimeSpan (0)
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| | | | + StopDate (1)
| | | | + RelativeStopDate (1)
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| | | + Keyword (*)
| | | + InputResourceID (*)
| | | + Parameter (*)
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| | | | | + RenderingAxis (0)
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| | | | | | | + RenderingAxis (0)
| | | | | | | + Index (0)
| | | | | | | + ValueFormat (0)
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| | | | | | | + BandName (0)
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| | | | | + ParticleType (+)
| | | | | + Qualifier (*)
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| | | | | | + StandardUnits (0)
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| | | | | | | + BandName (0)
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| | | | | + SourceRegionExtent (*)
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| | | | | + ParticleType (*)
| | | | | + Qualifier (*)
| | | | + Support (1)
| | | | | + Qualifier (*)
| | | | | + SupportQuantity (1)
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| | | | | + UndefinedQuantity (1)
| | | | + SpatialCoverage (*)
| | | | | + CoordinateSystem (1)
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| | | | | | + CoordinateSystemName (1)
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| | | | | + NorthernmostLatitude (0)
| | | | | + SouthernmostLatitude (0)
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| | | | | + EasternmostLongitude (0)
| | | | | + WesternmostLongitude (0)
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| | | | | + MaximumElevation (0)
| | | | | + Acknowledgement (0)
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| | + DisplayData (+)
| | | + ResourceID (1)
| | | + NamingAuthority (0)
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| | | | + ResourceName (1)
| | | | + AlternateName (*)
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| | | | + ReleaseDate (1)
| | | | + RevisionHistory (0)
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| | | | | | + ReleaseDate (1)
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| | | + AccessInformation (+)
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| | | | + Format (+)
| | | | + Encoding (0)
| | | | + AccessDirectoryTemplate (0)
| | | | + AccessFilenameTemplate (0)
| | | | + DataExtent (0)
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| | | | | + StandardUnits (0)
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| | | | | + RelativeStopDate (1)
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| | | | + CadenceMax (0)
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| | | | + ExposureMax (0)
| | | + SpectralRange (*)
| | | + DisplayCadence (0)
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| | | + SpatialCoverage (*)
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| | | | | + CoordinateSystemName (1)
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| | | | + NorthernmostLatitude (0)
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| | | | + CenterLongitude (0)
| | | | + EasternmostLongitude (0)
| | | | + WesternmostLongitude (0)
| | | | + CenterElevation (0)
| | | | + MinimumElevation (0)
| | | | + MaximumElevation (0)
| | | | + Acknowledgement (0)
| | | | + Description (0)
| | | + Caveats (0)
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| | | + InputResourceID (*)
| | | + Parameter (*)
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| | | | + Description (0)
| | | | + UCD (0)
| | | | + Caveats (0)
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| | | | + CadenceMin (0)
| | | | + CadenceMax (0)

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| | | | + StandardUnits (0)
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| | | | | + UnitsScheme (1)
| | | | | + SchemeURI (1)
| | | | | + UnitsSchemeVersion (0)
| | | | | + UnitsURI (0)
| | | | + CoordinateSystem (0)
| | | | | + CoordinateRepresentation (1)
| | | | | + CoordinateSystemName (1)
| | | | + RenderingHints (*)
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| | | | | + AxisLabel (0)
| | | | | + RenderingAxis (0)
| | | | | + Index (0)
| | | | | + ValueFormat (0)
| | | | | + ScaleMin (0)
| | | | | + ScaleMax (0)
| | | | | + ScaleType (0)
| | | | + Structure (0)
| | | | | + Size (1)
| | | | | + Description (0)
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| | | | | | + Name (1)
| | | | | | + Qualifier (*)
| | | | | | + Index (1)
| | | | | | + ParameterKey (0)
| | | | | | + Units (0)
| | | | | | + UnitsConversion (0)
| | | | | | + StandardUnits (0)
| | | | | | | + UnitsString (1)
| | | | | | | + UnitsScheme (1)
| | | | | | | + SchemeURI (1)
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| | | | | | | + UnitsURI (0)
| | | | | | + ValidMin (0)
| | | | | | + ValidMax (0)
| | | | | | + FillValue (0)
| | | | | | + RenderingHints (0)
| | | | | | | + DisplayType (0)
| | | | | | | + AxisLabel (0)
| | | | | | | + RenderingAxis (0)
| | | | | | | + Index (0)
| | | | | | | + ValueFormat (0)
| | | | | | | + ScaleMin (0)
| | | | | | | + ScaleMax (0)
| | | | | | | + ScaleType (0)
| | | | + ValidMin (0)
| | | | + ValidMax (0)
| | | | + FillValue (0)
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| | | | | | + High (1)
| | | | | | + Units (1)
| | | | | | + StandardUnits (0)
| | | | | | | + UnitsString (1)
| | | | | | | + UnitsScheme (1)
| | | | | | | + SchemeURI (1)
| | | | | | | + UnitsSchemeVersion (0)
| | | | | | | + UnitsURI (0)
| | | | | | + Bin (*)
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| | | | | + ParticleQuantity (1)
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| | | | | + UndefinedQuantity (1)
| | | | + SpatialCoverage (*)
| | | | | + CoordinateSystem (1)
| | | | | | + CoordinateRepresentation (1)
| | | | | | + CoordinateSystemName (1)
| | | | | + CenterLatitude (0)
| | | | | + NorthernmostLatitude (0)
| | | | | + SouthernmostLatitude (0)
| | | | | + CenterLongitude (0)
| | | | | + EasternmostLongitude (0)
| | | | | + WesternmostLongitude (0)
| | | | | + CenterElevation (0)
| | | | | + MinimumElevation (0)
| | | | | + MaximumElevation (0)
| | | | | + Acknowledgement (0)
| | | | | + Description (0)
| | | + ModelProduct (0)
| | | + Property (*)
| | | | + Name (0)
| | | | + Description (0)
| | | | + Caveats (0)
| | | | + PropertyQuantity (1)
| | | | + Qualifier (*)
| | | | + Units (0)
| | | | + UnitsConversion (0)
| | | | + StandardUnits (0)
| | | | | + UnitsString (1)
| | | | | + UnitsScheme (1)
| | | | | + SchemeURI (1)
| | | | | + UnitsSchemeVersion (0)
| | | | | + UnitsURI (0)
| | | | + PropertyLabel (0)
| | | | + PropertyValue (0)
| | | | + PropertyTableURL (0)
| | | | + ValidMin (0)
| | | | + ValidMax (0)
| | | | + PropertyModel (0)
| | | | + ModelURL (0)
| | | + Extension (0)

9.2 SPASE information tree in HTML

The SPASE information tree can also be presented in HTML form (https://spase-group.org/data/model/spase-latest/index.html') so that it is viewable online from a web browser. For better understanding of the HTML form of the SPASE schema

tree, it is important to bear in mind the meaning of various symbols and conventions used in the HTML display:



This symbol indicates that the element at the current level (connected to the left) is a container containing all the information elements listed on the right.



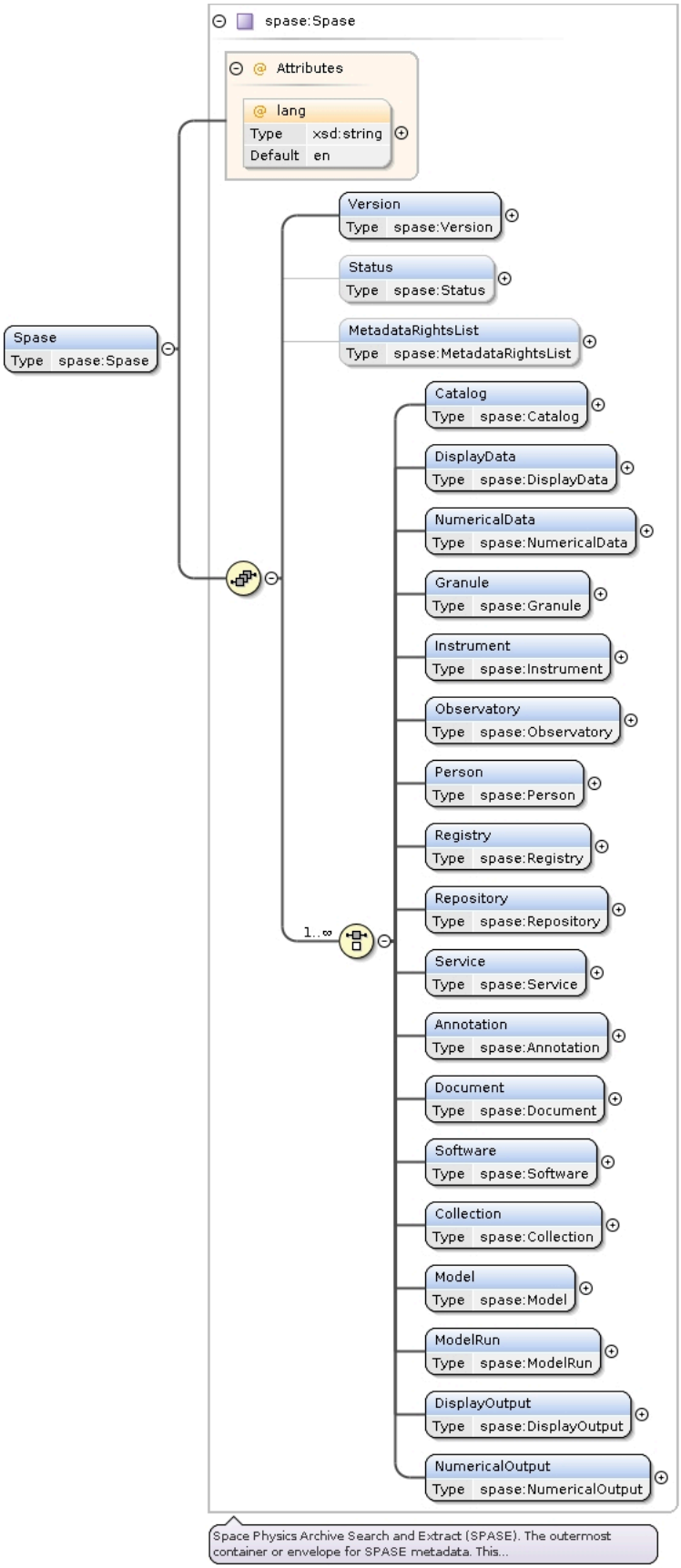
This symbol indicates that a choice can be or needs to be made from the elements listed on the right to give a complete description of the element connected on the left.

This symbol indicates that the element on the immediate right is an enumeration list from which the selection of **at least one value** is required (as indicated by the linkage of black/dark solid line).

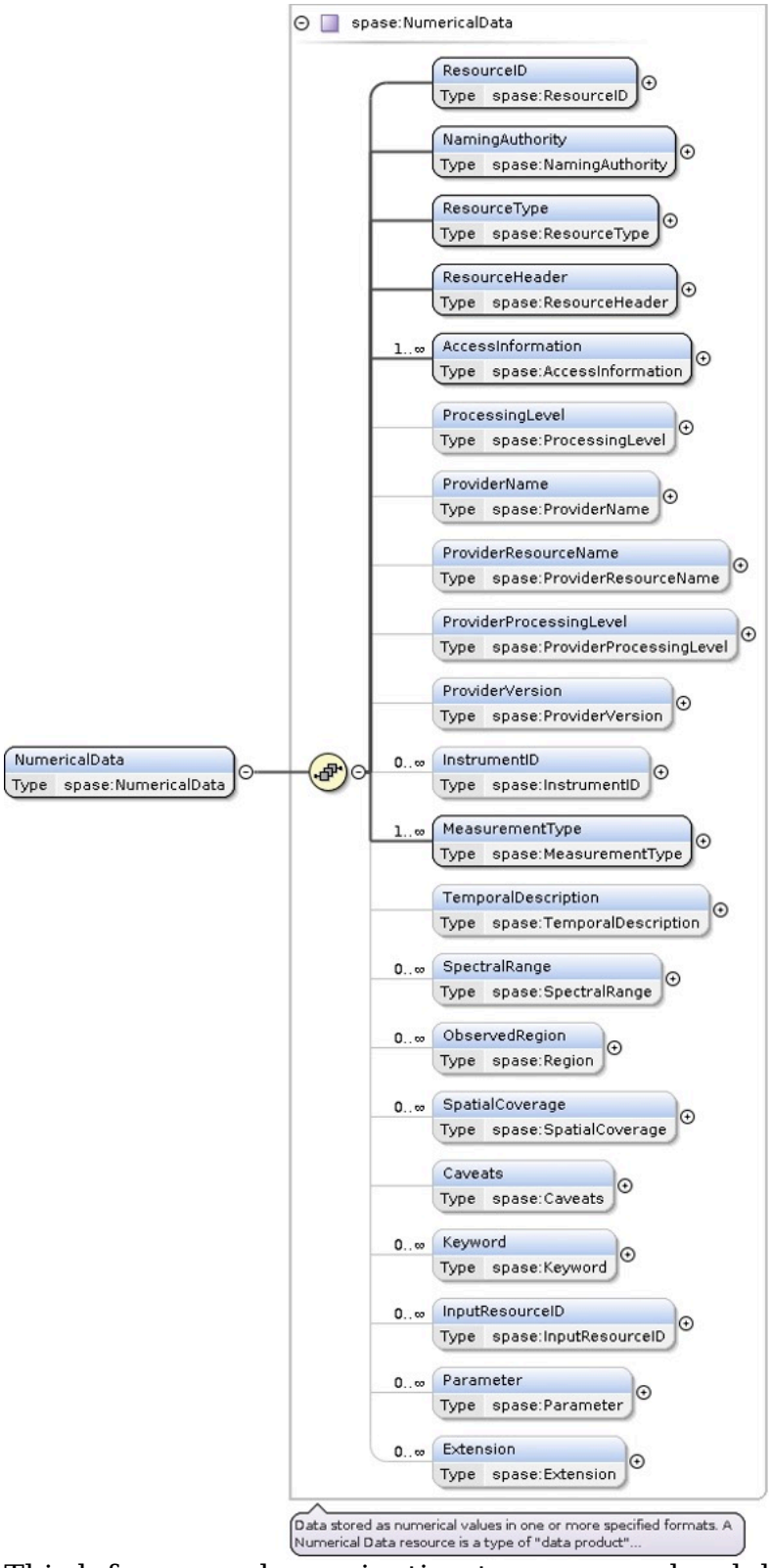


This symbol indicates that the element on the immediate right is an enumeration list from which the selection of any number of values (from zero to many) is **optional** (as indicated by the linkage of a grey/light solid line).

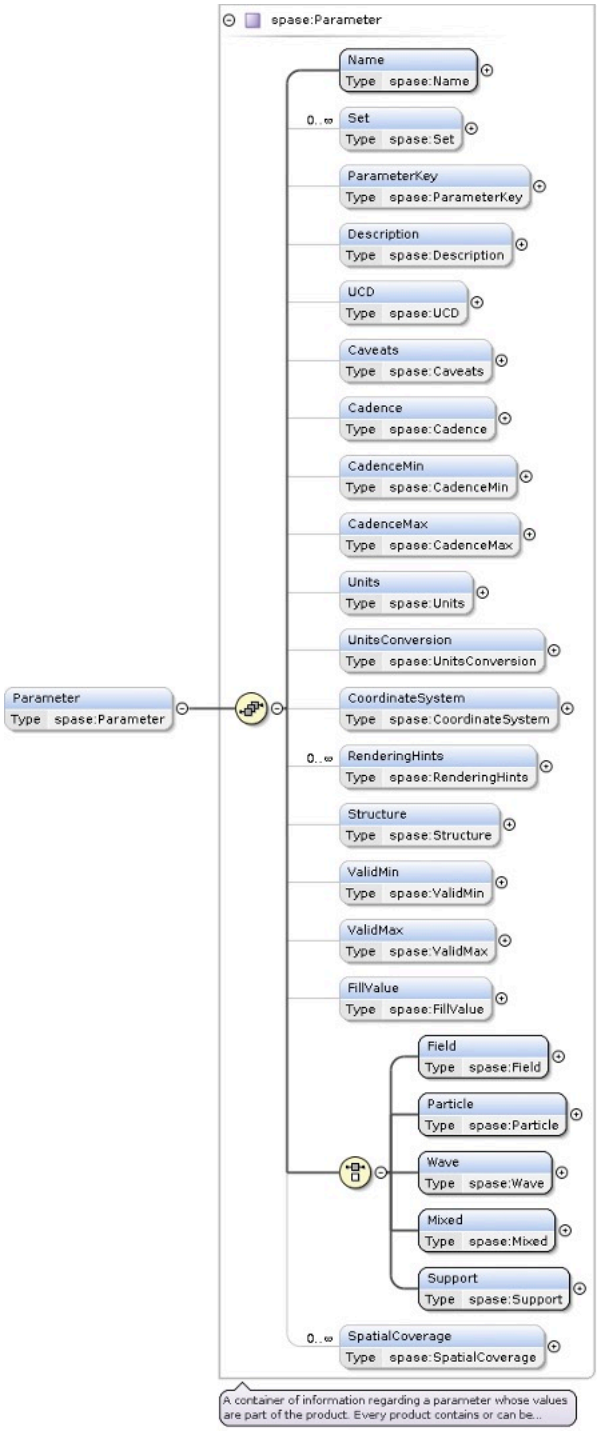
The three figures below show the SPASE schema tree in three successive levels of description. First, the top-level display of the SPASE schema tree shows that a SPASE document is a Container. After declaration of the namespace, language, and model version, at least one resource type is required to be chosen from an enumeration list of different resource types (describable by SPASE) for making a description.



Second, clicking on NumericalData, for example, yields the display of the schema for NumericalData also as a Container with only five required and fifteen optional fields.

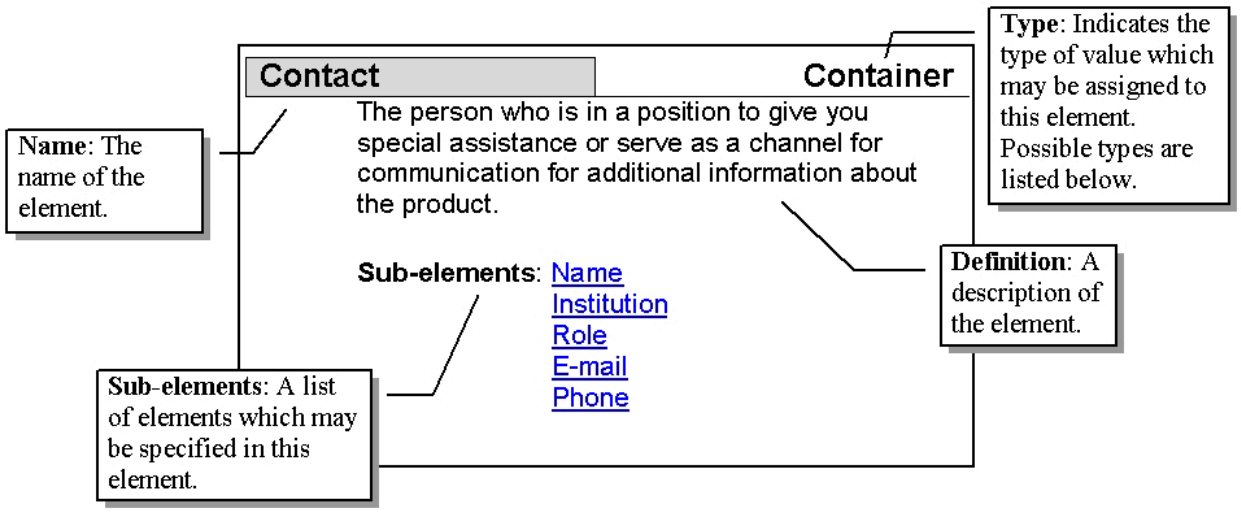


Third, for example, navigating to one more level down to Parameter description (which is optional), we can see that Parameter is also a Container with different description elements. If the parameter description option is exercised, however, only the parameter name and one choice of parameter type are required.


spase:Parameter
Name
Type spase:Name
0..∞
Set
Type spase:Set
ParameterKey
Type spase:ParameterKey
Description
Type spase:Description
UCD
Type spase:UCD
Caveats
Type spase:Caveats
Cadence
Type spase:Cadence
CadenceMin
Type spase:CadenceMin
CadenceMax
Type spase:CadenceMax
Units
Type spase:Units
UnitsConversion
Type spase:UnitsConversion
Parameter
Type spase:Parameter
CoordinateSystem
Type spase:CoordinateSystem
0..∞
RenderingHints
Type spase:RenderingHints
Structure
Type spase:Structure
ValidMin
Type spase:ValidMin
ValidMax
Type spase:ValidMax
FillValue
Type spase:FillValue
Field
Type spase:Field
Particle
Type spase:Particle
Wave
Type spase:Wave
Mixed
Type spase:Mixed
Support
Type spase:Support
0..∞
SpatialCoverage
Type spase:SpatialCoverage
A container of information regarding a parameter whose values are part of the product. Every product contains or can be...

10. Dictionary

How to Read a Definition Each element has certain attributes and context that set how they should be used. The details for each element are presented in the following form:



1P-Halley Item

1P/Halley, is a short-period comet visible from Earth every 75 to 79 years. The comet was visited by the Halley Armada comprised of the ESA Giotto, Japanese Suisei and Sekigake, and Soviet Union Vega 1 and Vega 2 spacecraft in 1986.

Since:2.6.0

26P-Grigg-Skjellerup Item

26P/Grigg-Skjellerup is a periodic comet. It was visited by the ESA Giotto spacecraft in July 1992.

Since:2.6.0

2DCuts Item

A set of 2-D arrays that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at the grid points located in a planar slice of a model volume.

Since:2.6.0

3DCubes Item

A set of 3-D arrays that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at grid points in a model volume.

Since:2.6.0

67P-Churyumov-Gerasimenko Item

67P/Churyumov-Gerasimenko is a Jupiter-family comet originally from the Kuiper belt. The ESA Rosetta spacecraft rendezvoused with Comet 67P on August 6, 2014 and then orbited the comet from September 10, 2014 to September 30, 2016. Philae, a lander carried by Rosetta, touched down on the comet surface on November 12, 2014.

Since:2.6.0

Absorption Item

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

Since:1.3.5

AccessDirectoryTemplate Text

Directory hierarchy templates to store the patterns for the data directory structure, using the URI template specification https://github.com/hapi-server/uri-templates/wiki/Specification. This will enable automated search of files matching a time range. For example, the ACE definitive orbit dataset at NASA SPDF has yearly subdirectories for the data files following the naming pattern $Y. See links for access templates in the Bibliography.

Since:2.6.0

Used by: AccessInformation
AccessInformationOptional

AccessFilenameTemplate Text

Filenaming templates to store the patterns for the data filename structure, using the URI template specification https://github.com/hapi-server/uri-templates/wiki/Specification. This will enable automated search of files matching a time range. For example, the ACE definitive orbit dataset at NASA SPDF has files following the naming pattern "ac_or_def_Ymd_vv.cdf", where $Y is the year, $m is the month, $d is the day, and $v is the version number. See links for access templates in the Bibliography.

Since:2.6.0

Used by: AccessInformation
AccessInformationOptional

AccessInformation Container

Attributes which specify how to access a resource, its availability, storage format, etc.

Since:1.0.0

Sub-elements: RepositoryID
Availability
AccessRights
RightsList
AccessURL
Format
Encoding
AccessDirectoryTemplate
AccessFilenameTemplate
DataExtent
Acknowledgement

Used by: Catalog
Collection
DisplayData
DisplayOutput
Document
ModelRun
NumericalData
NumericalOutput
Software

AccessInformationOptional Container

Attributes of the resource which pertain to how to accessing the resource, availability and storage format. This resource class is an exact copy of the AccessInformation container. However, as its name suggests, AccessInformationOptional is not a required element.

Since:2.6.0

Sub-elements RepositoryID
Availability
AccessRights
AccessURL
Format
Encoding
AccessDirectoryTemplate
AccessFilenameTemplate
DataExtent
Acknowledgement

Used by: Model

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
AccessInformationOptional
Installer

AccessURL Container

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

Since:1.0.0

Sub-elements Name
URL
Style
ProductKey
Description

Language

Used by: AccessInformation
AccessInformationOptional
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 are used in or contributes to a presentation or publication.

Since:1.0.0

Used by: AccessInformation
AccessInformationOptional
Installer
ResourceHeader
SpatialCoverage

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: BounceMotion, DriftMotion, MagneticMoment

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 R_E, 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 (μ₀).

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

Amalthea Item

The fifth largest moon of Jupiter.

Since:2.7.1

Amplitude Item

The maximum extent of a vibration or oscillation, measured from equilibrium.

Since:2.7.0

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
NamingAuthority
ResourceType
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

AOGCM Item

Coupled atmosphere-ocean-sea ice global climate models solve the full equations for mass and energy transfer and radiant exchange.

Since:2.6.1

API Item

An application programming interface (API) is a form of interface that allows applications to access the features or data of an operating system, application, or other service. An API may have a required protocol or set of principles. Some examples of protocols are SOAP, XML-RPC and JSON-RPC. An example of an API with a set of principles is REST.

Since:2.4.0

ApplicationInterface Enumeration

The type of interface for the application.

Since:2.4.0

Allowed Values API
CLI
GUI

Used by: Software

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 a 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 ID

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 the resource being described in relationship to the resource with the AssociationID being referenced.

Since:1.3.3

Allowed Values ChildEventOf
DerivedFrom
ObservedBy
Other
PartOf
RevisionOf
SupersededBy
Supersedes

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: InputPopulation
Particle

AtomicNumberDetected Item

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

Since:1.1.0

Aurora Item

A natural electrical phenomenon characterized by the appearance of streamers of reddish or greenish light in the sky, especially near the northern or southern magnetic pole. The effect is caused by the interaction of charged particles from the sun with atoms in the upper atmosphere. In northern and southern regions, it is respectively called aurora borealis or Northern Lights and aurora australis or Southern Lights.

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

Author Item

The composer or creator of an artifact. This can include presentations, articles, books, white papers, data products or any similar published work. In SPASE, Author is a Role under Person resource description.

Since:1.1.0

Authors Text

The individuals or organizations who defined or specified a resource (document, data, images or other types of resources). Separate multiple names with a semicolon. When an author is a person use the "last, first [, middle]" name format. Including a middle name is optional (Since 2.6.1).

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, AccessInformationOptional, Installer

Average — Item

The statistical mean equal to 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

Axial — Item

Axial symmetry.

Since:2.5.0

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
StandardUnits
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, i.e., the IMF clock angle defined as arctan(|By|/Bz).

Since:1.3.4

BackWall Text

Back wall of the model domain by which the plasma flow may exit the model.

Since:2.5.0

Used by: ElementBoundary

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-case and lower-case Roman alphabet characters (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

BoundaryConditions Container

Parameters associated to the model boundaries.

Since:2.5.0

Sub-elements: ParticleBoundary, FieldBoundary

Used by: ModelDomain

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. Similar to NASA Level 2.

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 deg 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
- NamingAuthority
- ResourceType
- 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
- DisplayOutput
- ElementBoundary
- InputField
- InputParameter
- InputPopulation
- InputProcess
- InputProperty
- Instrument
- ModelDomain
- ModelRun
- ModelTime
- ModelVersion
- NumericalData
- NumericalOutput

OutputProperty
Parameter
Property
RegionParameter

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

CenterElevation Text

The elevation in the center of a region above a surface (such as sea level or land) of a planet or natural satellite.

Since:2.4.2

Used by: SpatialCoverage

CenterLatitude Text

The latitude in the center of a region in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

CenterLongitude Text

The longitude in the center of a region in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

Central Item

Central Symmetry.

Since:2.5.0

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 ultraviolet 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

ChargeExchange Item

Chemical process involving a charge transfer from an ion (which becomes neutral) to a neutral (which becomes ionized).

Since:2.5.0

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 is equal to one.

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

ChemicalFormula Text

Chemical formula representing a population of particle.

Since:2.5.0

Used by: InputPopulation
Particle

ChildEventOf Item

A descendant or caused by another resource.

Since:1.3.6

Chromosphere Item

The region of the solar (or stellar) 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 that range from 4500 K to 28000 K.

Since:1.0.0

Circular Item

Relative to polarization, right-handed 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-handed 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-handed 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

CLI Item

A command-line interface (CLI) is a form of interface where input to an application is provided as lines of text typically within a shell.

Since:2.4.0

CodeLanguage Text

A formal language, which comprises a set of instructions that produce various kinds of output.

Since:2.4.0

Used by: Model
Software

Coherence

Item

The coherence between two signals x(t) and y(t), C_{xy}, is a real-valued function. The square of the coherence is defined by using:
Cxy^2=|Gxy(f)|^2/Gxx(f)Gyy(f) where Gxy(f) is equal to the cross-spectral density between two time series denoted as x and y, respectively, and Gxx(f) and Gyy(f) are equal to the auto-spectral densities of the same two time series. Values of Cxy^2 always lie in the range between zero and one, 0<=Cxy^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

Collection

Container

An aggregation of resources, which may encompass collections of one resource type as well as those of mixed types. A collection is described as a group. Its parts may also be separately described. An example is an experiment which uses the data from multiple instruments (or sensors). Another example is a research effort that uses a set of display images of the Sun and Energetic particle data from the corresponding times for the images, and FITS files of AIA images, etc. All the resources that are part of the research effort can be described as a Collection. Yet another example is a coordinated set of time series used for determining an index.

Since:2.5.0

Sub-elements ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
Member
Extension

Used by: Spase

ColorBar

Item

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

Since:2.2.0

Column

Item

A 2-D 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

Completed — Item

Static dataset (current version).

Since:2.7.1

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

Convention — Item

A set of agreed, stipulated, or generally accepted approaches or methods of adopting a standard or implementing an approach.

Since:2.4.0

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

CoordinatesLabel — Text

A string list of the labels of each dimension of the spatial domain.

Since:2.5.0

Used by: ModelDomain, SpatialDescription

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: InputField, ModelDomain, Parameter, SpatialCoverage, SpatialDescription

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
LocalGeographic
LocalGeomagnetic
MAG
MFA
MSO
RTN
SC
SE
SensorCoordinates
SM
SpacecraftOrbitPlane
SR
SR2
SSE
SSE_L
StonyhurstHeliographic
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

Cores Numeric

An application processor that is part of a CPU.

Since:2.4.0

Used by: ExecutionEnvironment

Corona Enumeration

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

Allowed Values InnerCorona
MiddleCorona
OuterCorona

CoronalBrightPoint Item

A localized, small-scale loop system in the low solar corona that exhibits enhanced emission in extreme-ultraviolet or X-ray observations and is generally associated with compact magnetic flux concentrations of opposite polarity. This term includes features commonly referred to as EUV bright points and X-ray bright points.

Since:2.8.0

CoronalDimming Item

A transient decrease in extreme-ultraviolet or soft X-ray emission from a region of the solar corona, generally associated with plasma expansion or depletion during a solar eruption.

Since:2.8.0

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 solar wind outflow velocity. A region of lower than quiet coronal ion densities and electron densities in the corona or a coronal region with lower peak electron temperature than that found under quiet coronal conditions.

Since:1.3.0

CoronalJet Item

A transient, collimated outflow of plasma in the solar corona, generally guided by the magnetic field and originating from localized energy release.

Since:2.8.0

CoronalMassEjection Item

A solar event (CME) that involves a burst of plasma ejected into the interplanetary medium. CMEs may be observed remotely relatively near the Sun or in situ in the interplanetary medium. Note that CMEs are often referred to as Interplanetary CMEs (ICMEs).

Since:1.0.0

Coronograph Item

An instrument which can image things very close to the Sun by using a disk to block the bright surface of the sun or a star that reveals the faint corona of the Sun or 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

CrossSection Item

Cross section of the reaction, when the reaction implies the collision of two particles.

Since:2.5.0

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-axis is anti-sunward and the y-axis points in 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

CubesDescription Text

A description of the configuration of the set of 3-D arrays that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at grid points in a model volume.

Since:2.6.0

Used by: SpatialDescription

Current Item

It is the scalar quantity giving the net charge (summed over charged particle species) per unit time flowing across a given surface.

Since:1.2.1

CurrentDensity Item

It is the vector quantity giving the net charge (summed over charged particle species) per unit cross-sectional area per unit time flowing through a given point. Measurements of current density are often provided in terms of the magnetic perturbations (superposed upon a background magnetic field, if present) associated with the current density.

Since:2.6.0

Cusp Item

An area in the Earth's magnetosphere, where the magnetosheath plasma has direct access to the ionosphere. (reference: ontoportal-astro thesaurus https://ontoportal-astro.eu/ontologies/MDL/MDL-JH5TRZH2-1).

Since:2.7.2

CutsDescription Text

A description of the configuration of the set of 2-D array points that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at the grid points located in a planar slice of a model volume.

Since:2.6.0

Used by: SpatialDescription

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. By default, the data extent is expressed in bytes.

Since:1.2.0

Sub-elements: Quantity, Units, StandardUnits, Per

Used by: AccessInformation

AccessInformationOptional
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

DensityProfile Text

Density profile of the particles in a population.

Since:2.5.0

Used by: InputPopulation

Deprecated Item

Superseded dataset.

Since:2.7.1

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

Derived Item

Physical quantity derived from calibrated data (e.g., electron density derived from wave passive measurements).

Since:2.7.2

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
InputField
InputParameter
InputPopulation
InputProcess
InputProperty
Member
ModelDomain
ModelTime
ModelVersion
OutputProperty
Parameter
Property
RegionParameter
ResourceHeader
SpatialCoverage
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

DiagnosisTimeStep — Container

Time at which a diagnosis is performed and quantity saved.

Since:2.5.0

Sub-elements: TimeStart
Duration
SavedQuantity

Used by: ModelTime

Differential — Item

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

Since:1.1.0

Dimension — Count

The number of items along one axis.

Since:2.5.0

Used by: SpatialDescription

Dione — Item

The fourth 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

An enumeration list of angular measures for specifying the direction of an n-dimensional vector within the n-dimensional coordinate system in use or the angular deviation of an n-dimensional vector from an (n-1)-dimensional plane, depending on the application. [Note: DirectionAngle must be used with a sub enumeration term: DirectionAngle.AzimuthAngle; DirectionAngle.ElevationAngle; DirectionAngle.PolarAngle].

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 3-D 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
DisplayOutput

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
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
ProcessingLevel
ProviderName
ProviderResourceName
ProviderProcessingLevel
ProviderVersion
InstrumentID
MeasurementType
TemporalDescription
SpectralRange
DisplayCadence
ObservedRegion
SpatialCoverage
Caveats
Keyword
InputResourceID
Parameter
Extension

Used by: Spase

DisplayOutput Container

A graphical representation of data (i.e., equivalent to DisplayData) generated from a model run.

Since:2.5.0

Sub-elements ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
ProcessingLevel
ProviderResourceName
ProviderProcessingLevel
ProviderVersion
ModeledInstrumentID
MeasurementType
TemporalDescription
SpatialDescription
SpectralRange
DisplayCadence
ModeledRegion
Caveats
Keyword

InputResourceID
Parameter
ModelProduct
Property
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

DissociativeRecombination — Item

Chemical process by which an ion is neutralized by capturing an electron, and splits in two new neutral species.

Since:2.5.0

Distribution — Text

Velocity distribution of the particles in a population.

Since:2.5.0

Used by: InputPopulation

DM — Item

Dipole Meridian - A coordinate system centered at the observation point. The z-axis is parallel to the dipole axis of the Earth, positive northward. x-axis is in the plane defined by the z-axis and the line linking the observation point with the center of the Earth. The y-axis 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, NamingAuthority, ResourceType, 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: Convention, Other, Policy, 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 km 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, J₂, is equal to qφ where q is the particle charge and φ is the magnetic flux enclosed within the particle drift path.

Since:2.3.1

Duration Duration

Duration of the model run.

Since:2.5.0

Used by: DiagnosisTimeStep
ModelTime

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 V² where m_p is the proton mass, n is the proton number density, and V is 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 Cusp
InnerRadiationBelt
Magnetosheath
Magnetosphere
Magnetosphere.Magnetotail
Magnetosphere.Magnetopause
Magnetosphere.Main
Magnetosphere.Plasmasheet
Magnetosphere.Plasmasphere
Magnetosphere.Polar
Magnetosphere.RadiationBelt
Magnetosphere.RingCurrent
Moon
NearSurface
NearSurface.Atmosphere

NearSurface.AuroralRegion
NearSurface.EquatorialRegion
NearSurface.Exosphere
NearSurface.Ionosphere
NearSurface.Ionosphere.DRegion
NearSurface.Ionosphere.ERegion
NearSurface.Ionosphere.FRegion
NearSurface.Ionosphere.Topside
NearSurface.Mesosphere
NearSurface.MidLatitudeRegion
NearSurface.Plasmasphere
NearSurface.PolarCap
NearSurface.SouthAtlanticAnomalyRegion
NearSurface.Stratosphere
NearSurface.SubAuroralRegion
NearSurface.Thermosphere
NearSurface.Troposphere
OuterRadiationBelt
Surface

EasternmostLongitude Text

The longitude furthest to the east in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

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 latitude: -64.28, longitude: 136.59, North geometric pole latitude: 80.37, longitude: -72.63, South geomagnetic pole latitude: -80.37, longitude: 107.37. ECD 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 deg latitude (Equator) and 0 deg longitude (Greenwich). The z-axis points north. The y-axis completes the right-handed coordinate system.

Since:2.2.3

EITWave Item

A legacy term for an EUVWave, originally named for observations made with the Extreme-ultraviolet Imaging Telescope, EIT, on the Solar and Heliospheric Observatory, SOHO. Use EUVWave for newly created resource descriptions.

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

Electrohydrodynamic Item

The study of the motions of ionized particles or molecules and their interactions with electric fields and the surrounding fluid [https://en.wikipedia.org/wiki/Electrohydrodynamics].

Since:2.6.1

Electromagnetic Item

Electric and magnetic field variations in time and space that propagate through a medium or a vacuum. The wave propagation direction, electric field vector, and magnetic field vector form an orthogonal triad. Waves in this category are detected by having their field quantities measured.

Since:1.3.5

Electron Item

An elementary particle that has a negative charge equal to about 1.60218*10^-19 C and a rest mass equal to about 9.10938*10^-31 kg.

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

ElectronImpact Item

Chemical process by which a neutral is ionized thanks to the energy from the impact of an electron.

Since:2.5.0

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, StandardUnits, ValidMin, ValidMax, FillValue, RenderingHints

Used by: Structure

ElementBoundary — Container

Parameters associated to the model boundaries.

Since:2.5.0

Sub-elements: Caveats, FrontWall, BackWall, SideWall, Obstacle

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

Empirical Item

Information obtained through observation, experiment, or experience.

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 multi-bit 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

File encoding format.

Since:1.0.0

Allowed Values
- ASCII
- Base64
- BZIP2
- GZIP
- None
- S3_BUCKET
- TAR
- Unicode
- ZIP

Used by: AccessInformation
AccessInformationOptional

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, StandardUnits, Bin

Used by: Particle, Wave

ENP Item

ENP (also called PEN) - The P-axis points northward, perpendicular to orbital plane. For an orbit with zero inclination, the P-axis is parallel to spin axis of the Earth. The

E-axis is perpendicular to the P and N directions and points earthward. The N-axis 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

EPNTAP Item

Europlanet (EPN) Table Access Protocol (TAP) is a framework, which is using TAP with the EPNcore metadata dictionary. The EPNcore metadata dictionary defines the core components that are necessary to perform data discovery in the Solar System related science fields, see https://github.com/ivoa-std/EPNTAP.

Since:2.4.1

EquatorialRegion Item

A region centered on the equator and limited in latitude by approximately 23 deg 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 ionized gas occurring at 90 km to 150 km above the ground. One of several layers in the ionosphere. Also called the Kennelly-Heaviside layer.

Since:1.2.0

Europa Item

The sixth closest round moon of Jupiter.

Since:2.2.5

EUVWave Item

A large-scale propagating disturbance observed in extreme-ultraviolet emission in the solar corona, typically expanding outward from the source region of a solar

eruption.

Since:2.8.0

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

ExecutionEnvironment — Container

An execution platform for software which includes an operating system and necessary hardware.

Since:2.4.0

Sub-elements: OperatingSystem, Installer, Cores, Storage, Memory

Used by: Software

Exosphere — Item

The region of the upper atmosphere where, for the low number of collisions between constituents, the neutral gas can no longer be described as a fluid, but rather as separate populations of atoms or molecules that are either on ballistic trajectories, in orbit around the planet, or escaping.

Since:2.8.0

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 such as a "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
Collection
DisplayData
DisplayOutput
Instrument
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry
Repository
Service

ExtremeUltraviolet Item

A spectrum with a wavelength range of 10 nm to 125 nm. VSO nickname: EUV image with a range of 10 nm to 125 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 nm. VSO nickname: FUV image with a range of 122 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

FieldBoundary — Text

Parameters associated with the field boundaries of the model.

Since:2.5.0

Used by: BoundaryConditions

FieldDimension — Count

Number of field dimensions in the model domain.

Since:2.5.0

Used by: ModelDomain

FieldModel — Text

Field model imposed in the model run.

Since:2.5.0

Used by: InputField

FieldQuantity — Enumeration

The physical attribute of the field.

Since:1.1.0

Allowed Values Current
CurrentDensity
Electric
Electromagnetic
Gyrofrequency
Magnetic
PlasmaFrequency
Potential
PoyntingFlux

Used by: Field
InputField

FieldValue Text

A string list of the values of the input parameter.

Since:2.5.0

Used by: InputField

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 analog 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 a 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-D tables containing rows and columns of data.

Since:1.0.0

FlowSpeed Item

The magnitude of the flow velocity.

Since:1.2.1

FlowVelocity Item

The mean velocity of all particles in the flow, also referred to as bulk velocity or average flow velocity.

Since:1.3.1

Fluence Item

The time integral of a flux. A fluence is a not a measurement of flux per unit time.

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 CMEs, that sweep some galactic cosmic rays away from Earth.

Since:1.0.0

Format Enumeration

The file format specification. The value is selected from a list of accepted names for known, well documented formats.

Since:1.0.0

Allowed Values
- AVI
- Binary
- CDF
- CEF
- CEF1
- CEF2
- CSV
- Excel
- FITS
- GIF
- Hardcopy
- Hardcopy.Film
- Hardcopy.Microfiche
- Hardcopy.Microfilm
- Hardcopy.Photograph
- Hardcopy.PhotographicPlate
- Hardcopy.Print
- HDF
- HDF4

HDF5
HTML
IDFS
IDL
JPEG
JSON
MATLAB_4
MATLAB_6
MATLAB_7
MPEG
NCAR
NetCDF
PDF
PDS3
PDS4
PNG
Postscript
QuickTime
RINEX2
RINEX3
Text
Text.ASCII
Text.Unicode
TFCat
TIFF
UDF
VOTable
XML

Used by: AccessInformation
AccessInformationOptional

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 layer and F2 layer. 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
Units
StandardUnits
Bin

Used by: Field
Wave

FrequencyToGyrofrequencyRatio Item

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

Since:1.3.6

FrontWall Text

Front wall of the model domain by which the plasma flow may be injected.

Since:2.5.0

Used by: ElementBoundary

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 nm to 0.001 nm.

Since:1.0.0

Ganymede Item

The biggest moon of Jupiter and in the solar system.

Since:2.2.5

GCM Item

A Global Circulation Model (GCM) is a type of climate model, which employs mathematical equations to simulate the motion of a planetary atmosphere or ocean.

Since:2.6.1

GEI Item

GEI Geocentric Equatorial Inertial - A coordinate system where the z-axis is along spin axis of the Earth, positive northward. The 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 spin axis of the Earth, positive northward. The 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 surface magnetic field on the Earth. 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 the source particles is 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 colors.

Since:1.0.0

Git Item

Git is a version control system for tracking changes in any set of files. It is known for its speed, data integrity, and support for distributed, non-linear workflows.

Since:2.4.1

GPHIO Item

Kronian Solar Orbital - A coordinate system related to Saturn where the x-axis is anti-sunward and the y-axis points in 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
NamingAuthority
ResourceType
ReleaseDate
ExpirationDate
ParentID
PriorID
StartDate
StopDate
SpatialCoverage
Source
RegionBegin
RegionEnd

Used by: Spase

GridCellSize Text

A string list of the cell sizes in each dimension.

Since:2.5.0

Used by: ModelDomain

GridStructure Text

Structure of the model grid.

Since:2.5.0

Used by: ModelDomain

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. The 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. The y-axis is parallel to solar equatorial plane. The 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

GUI Item

A graphical user interface (GUI) is a form of user interface that allows users to interact with an application through graphical icons, forms and other elements with both a keyboard and a pointing device.

Since:2.4.0

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. The 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 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 nm 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
- SHA1
- 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 is positive northward. The x-axis is perpendicular to the y-axis and z-axis, positive toward solar west. Standard representation for this system is based on (x,y) position of the point of interest 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-axis and z-axis, positive toward solar west. Standard representation for this system is based on distance rho from the z-axis (sqrt(x**2+y**2)) and the phase angle psi measured counterclockwise from the positive y-axis (arctan(-y/x)) of the point of interest.

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: an 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 ionized 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. The 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. The 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-Ecliptic 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. The x-axis and y-axis rotate with a period of 25.38 days. 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. The 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 January 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 (also known as 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-axis and z-axis, 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 latitude (arctan(y/d)) and longitude (arctan (x/d)) of the point of interest.

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-axis and z-axis, 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 latitude angle theta (arctan(sqrt(x**2+y**2)/d))) or equivalent declination parameter delta (theta-90 deg) and the phase angle psi as measured counterclockwise from the positive y-axis (psi=arctan(-y/x)) of the point of interest.

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

Hybrid Item

A numerical scheme modeling ions as particles and electrons as a fluid.

Since:2.5.0

Hydrodynamic Item

Periodic or quasi-periodic oscillations of fluid quantities.

Since:1.3.5

Hyperion Item

The eighth-largest moon of Saturn.

Since:2.7.1

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 metadata. 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 2-D 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 2-D 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

Used by: Annotation

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 (typically from 64 channels up to 256 channels) with very narrow bandwidths.

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

Incident Item

Direction-dependent property.

Since:2.5.0

Index Sequence

The location of an item in an array or vector. An index can be multivalued to represent the location in a multi-dimensional 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, whereas "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 nm to 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

InnerCorona Item

The region of the solar atmosphere immediately above the transition region, extending from the coronal base to approximately 1.5 solar radii from the center of the Sun, where the plasma is strongly organized by magnetic structures rooted at the Sun.

Since:2.8.0

InnerRadiationBelt Item

The inner Van Allen Belt extends typically from an altitude of 0.2 to 2 Earth radii (L values of 1 to 3) or 1,000 km (620 mi) to 12,000 km (7,500 mi) above the Earth. In certain cases, when solar activity is stronger or in geographical areas such as the South Atlantic Anomaly, the inner boundary may decline to roughly 200 km above the Earth's surface. The inner belt contains high concentrations of electrons in the range of hundreds of keV and energetic protons with energies exceeding 100 MeV -- trapped by the relatively strong magnetic fields in the region (as compared to the outer belt). It is believed that proton energies exceeding 50 MeV in the lower belts at lower altitudes are the result of the beta decay of neutrons created by cosmic ray collisions with nuclei of the upper atmosphere. The source of lower energy protons is believed to be proton diffusion, due to changes in the magnetic field during geomagnetic storms (reference: ontoportal-astro thesaurus https://ontoportal-astro.eu/ontologies/MDL/MDL-ZT7HNM44-G).

Since:2.7.2

InputField Container

Parameters associated to a field imposed in the model.

Since:2.5.0

Sub-elements Name
Set
ParameterKey
Description
Caveats
ModeledRegion
CoordinateSystem
Qualifier
FieldQuantity
Units
UnitsConversion
StandardUnits
InputLabel
FieldValue
InputTableURL
ValidMin
ValidMax
FieldModel
ModelURL

Used by: ModelRun

InputLabel Text

A string list of the labels of each dimension of the input parameter.

Since:2.5.0

Used by: InputField

InputParameter Container

A container of information regarding an input parameter of the model run.

Since:2.5.0

Sub-elements Name
Description
Caveats
ModeledRegion
Qualifier
InputTableURL
ParameterQuantity
Property

Used by: ModelRun

InputPopulation Container

A container element that specifies the characteristics of a particle population used as input to a model.

Since:2.6.0

Sub-elements [Name](#)
[Set](#)
[ParameterKey](#)
[Description](#)
[Caveats](#)
[ModeledRegion](#)
[Qualifier](#)
[ParticleType](#)
[ChemicalFormula](#)
[AtomicNumber](#)
[PopulationMassNumber](#)
[PopulationChargeState](#)
[PopulationDensity](#)
[PopulationTemperature](#)
[PopulationFlowSpeed](#)
[Distribution](#)
[ProductionRate](#)
[TotalProductionRate](#)
[InputTableURL](#)
[DensityProfile](#)
[ModelURL](#)

Used by: [ModelRun](#)

InputProcess [Container](#)

Parameters associated to a chemical process happening in the model.

Since:2.5.0

Sub-elements [Name](#)
[Set](#)
[ParameterKey](#)
[Description](#)
[Caveats](#)
[ModeledRegion](#)
[ProcessType](#)
[Units](#)
[UnitsConversion](#)
[StandardUnits](#)
[ProcessCoefficient](#)
[ProcessCoeffType](#)
[ProcessModel](#)
[ModelURL](#)

Used by: [ModelRun](#)

InputProperties [Container](#)

Properties.

Since:2.5.0

Sub-elements [Property](#)

Used by: [Model](#)

InputProperty — Container

A container of attributes regarding an input property of an application.

Since:2.4.0

Sub-elements: Name, Description, Caveats, Units, StandardUnits, ValidMin, ValidMax

Used by: Software

InputResourceID — ID

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

Since:1.0.0

Used by: Catalog, DisplayData, DisplayOutput, Document, ModelRun, NumericalData, NumericalOutput

InputTableURL — URL

A URL to a table containing input parameters.

Since:2.5.0

Used by: InputField, InputParameter, InputPopulation, RegionParameter

Inspection — Item

Determined by the analysis or assessment performed by a person.

Since:1.3.6

Installer — Container

A piece of software that installs a program or package on a system.

Since:2.4.0

Sub-elements: Availability, AccessRights, Acknowledgement, URL

Used by: ExecutionEnvironment

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, NamingAuthority, ResourceType, ResourceHeader, InstrumentType, InstrumentGroupID, InvestigationName, OperatingSpan, ObservatoryID, ObservedRegion, MeasurementType, Caveats, RORIdentifier, Keyword, Extension

Used by: Spase

InstrumentGroupID — ID

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

Since:2.3.2

Used by: Instrument

InstrumentID — ID

The identifier of an Instrument resource.

Since:1.0.0

Used by: Catalog, DisplayData, NumericalData

InstrumentLead — Item

An individual who is the designated leader of an instrument or instrument package.

Since:2.3.2

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

InstrumentScientist — Item

A scientist associated with a science instrument team with special familiarity and expertise on specific aspects of the design and operations of the instrument and the responsibility of ensuring the measurement capabilities of the instrument.

Since:2.4.1

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
- Lidar
- 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

InterplanetaryCoronalMassEjection Item

An Interplanetary Coronal Mass Ejection (ICME) is a Coronal Mass Ejection (CME) observed in the solar wind far away from the Sun.

Since:2.6.1

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 any stellar 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 principal investigator 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 10^-3 Torr to 10^-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

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 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-axis is anti-sunward and the y-axis points in 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
- Amalthea
- Callisto
- Europa
- Ganymede
- Io
- Magnetosphere
- Magnetosphere.Magnetotail
- Magnetosphere.Magnetopause
- Magnetosphere.Main
- Magnetosphere.Plasmasheet
- Magnetosphere.Plasmasphere
- Magnetosphere.Polar
- Magnetosphere.RadiationBelt
- Magnetosphere.RingCurrent

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 centered 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
- DisplayOutput
- Document

Instrument
ModelRun
NumericalData
NumericalOutput
Observatory

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-axis is anti-sunward and the y-axis points in the orbital velocity direction.

Since:2.2.4

LandingPageURL — URL

A Uniform Resource Locator (URL) to a page that provides a way to access the resource. A landing page should contain a full bibliographic citation so that a human can tell they have arrived at the correct resource, and additional information about the resource that might not be easily retrievable from the resource itself.

Since:2.4.2

Used by: PublicationInfo

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

LaunchDate — DateTime

The date and time when the resource was launched. This could be different from the StartDate of the OperatingSpan.

Since:2.7.2

Used by: Observatory

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 140 nm 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. The x-axis northward from observation point in a geographic meridian. The z-axis downward towards center of the Earth. In this system, the total horizontal component, H, is equal to sqrt(Bx^2+By^2) and declination angle, D is equal to arctan(By/Bx).

Since:1.0.0

Lidar Item

Lidar (Light Detection and Ranging) is a class of instruments that uses laser light to study atmospheric properties from the ground up to the top of the atmosphere. Such instruments have been used to study atmospheric gases, aerosols, clouds, and temperature.

Since:2.6.1

LikelihoodRating Enumeration

The probability that something is true or possible.

Since:2.5.0

Allowed Values Probable
Strong
Unlikely
Weak

Used by: ModelRun

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

Lines Item

A set of 1-D arrays that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at the grid points along a line though a model volume. For instance, the points of the line may correspond to the trajectory of a spacecraft through model space.

Since:2.6.0

Listing Item

A listing of files either through FTP or HTTP.

Since:2.3.0

LocalGeographic Item

A coordinate system used mainly for Earth surface or near-Earth surface magnetic field or other vector measurements. The X-axis points northward from observation point in a geographic meridian in the horizontal plane. The Y-axis points eastward from observation point in a geographic latitude in the horizontal plane. The Z-axis points downward towards center of the Earth.

Since:2.6.1

LocalGeomagnetic Item

A coordinate system used mainly for Earth surface or near-Earth surface magnetic field data. The H-axis points northward toward the north magnetic pole from observation point in a geomagnetic meridian in the horizontal plane. The D-axis points eastward from observation point in a geomagnetic latitude in the horizontal plane. The Z-axis points downward towards center of the Earth.

Since:2.6.1

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 (negative) or east (positive) from a north-south line called the Prime Meridian.

Since:1.2.0

Used by: Location

LongWire Item

A dipole antenna constructed by two active sensing elements that are wires deployed in the equatorial plane on opposite sides of a spinning spacecraft. The, wire length is usually several times 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 φ_{LH}=[(ω_{ce}ω_{ci})⁻¹+φ_{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. The z-axis is parallel to the geomagnetic dipole axis, positive north. The x-axis is in the plane defined by the z-axis and the rotation axis of the Earth. If N is a unit vector from the center of the Earth to the north geographic pole, the signs of the y-axis and x-axis are given by the vector cross products N cross z and y cross z, respectively, 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 and large-scale rotation of the magnetic field vector, low proton temperature, and low plasma beta.

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

MagneticFluxEmergence Item

The appearance and increase of magnetic flux at the solar photosphere as magnetic field rises from below the visible solar surface into the solar atmosphere.

Since:2.8.0

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 and can be calculated by using mu equal to 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.

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

Magnetopause Item

A magnetopause is the boundary between a planet's magnetosphere and the magnetic field of the solar wind. It forms at a distance where the solar wind dynamic pressure equals the magnetic pressure of the planet's field. In the case of Earth, this is typically 8 to 11 Earth radii upwind, depending on solar wind conditions. (reference: ontoportal-astro thesaurus https://ontoportal-astro.eu/ontologies/MDL/MDL-ZB65HCCB-T).

Since:2.7.2

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 magnetic field of a planetary body.

Since:1.0.0

Allowed Values
- Magnetotail
- Magnetopause
- Main
- Plasmasheet

Plasmasphere
Polar
RadiationBelt
RingCurrent

Magnetotail Item

The region of space within the magnetosphere of a magnetized planetary body where the nightside magnetic field is stretched out in the anti-stellar direction by stellar wind interaction into a windsock-like shape. For Earth, solar wind-magnetosphere interaction produces a magnetotail that extends tailward from a distance of about 10 R_E on the nightside to downstream distances beyond 1000 R_E.

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 fourth planet from the Sun in our solar system.

Since:1.2.0

Allowed Values
Deimos
Magnetosphere
Magnetosphere.Magnetotail
Magnetosphere.Magnetopause
Magnetosphere.Main
Magnetosphere.Plasmasheet
Magnetosphere.Plasmasphere
Magnetosphere.Polar
Magnetosphere.RadiationBelt
Magnetosphere.RingCurrent
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

MassMixingRatio Item

The ratio of the mass of one atomic or compound species to the total mass of all species in a given volume.

Since:2.7.0

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
StandardUnits
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.

Since:1.1.0

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

MaximumElevation Text

The highest vertical elevation of region above a surface (such as sea level or land) of a planet or natural satellite.

Since:2.4.2

Used by: SpatialCoverage

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

The enumeration of the specific measurement target (e.g., EnergeticParticles or IonComposition), method of measurement (e.g., Interferometry), or the particular compilation of measurements (e.g., a composite dataset consisting of measurements from multiple instruments or platforms, such as Dopplergram, Keogram, and ElectronColumnDensity (TEC)) that reflect a richer context (e.g., structure or dynamics) of the observational target.

Since:1.0.0

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

Waves
Waves.Active
Waves.Passive

Used by: DisplayData
DisplayOutput
Instrument
NumericalData
NumericalOutput

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

Member — Container

A constituent part of a collection. A Member is of a one of the supported resource types and in referenced by an identifier. Details about the member are part of its respective resource description.

Since:2.5.0

Sub-elements: ResourceName
Description
MemberID
StartDate
StopDate
SpatialCoverage

Used by: Collection

MemberID — ID

The identifier of a resource.

Since:2.5.0

Used by: Member

Memory — Text

The component of your computer that allows you to store and access data on a short-term basis, typically the amount of RAM. Indicate units with standard byte scales such as KB, MB, GB, TB and PB.

Since:2.4.0

Used by: ExecutionEnvironment

Mercury — Enumeration

The first planet from the Sun in our solar system.

Since:1.2.0

Allowed Values: Magnetosphere
Magnetosphere.Magnetotail
Magnetosphere.Magnetopause
Magnetosphere.Main
Magnetosphere.Plasmasheet

Magnetosphere.Plasmasphere
Magnetosphere.Polar
Magnetosphere.RadiationBelt
Magnetosphere.RingCurrent

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

MetadataRightsList Container

Wrapper element to allow multiple rights for the metadata. Thus, rights properties may be listed as needed to record complex rights characteristics.

Since:2.7.1

Sub-elements Rights

Used by: Spase

MFA Item

Magnetic Field Aligned - A coordinate system spacecraft-centered system with the z-axis in the direction of the ambient magnetic field vector. The x-axis is in the plane defined by the z-axis 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: 10^6 nm to 1.5*10^7 nm.

Since:1.0.0

MiddleCorona Item

The region of the solar corona extending approximately from 1.5 to 6 solar radii from the center of the Sun, where the magnetically structured inner corona transitions toward the expanding solar wind (reference: West et al. 2023 https://doi.org/10.1007/s11207-023-02170-1).

Since:2.8.0

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 deg to 50 deg. 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 defined in RFC memorandum number 2046 (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

MinimumElevation Text

The lowest vertical elevation of region above a surface (such as sea level or land) of a planet or natural satellite.

Since:2.4.2

Used by: SpatialCoverage

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 role name 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 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

MixingRatio Item

The ratio of the abundance of one atomic or compound species to the total abundance of all species in a given volume.

Since:2.7.0

ModeAmplitude Item

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

Since:1.0.0

Model Container

Attributes of a model.

Since:2.5.0

Sub-elements ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessInformationOptional
Versions
ModelType
CodeLanguage
TemporalDependence
SpatialDescription
ModeledRegion
InputProperties
OutputParameters
ModelURL

Used by: Spase

ModelDomain Container

Parameters associated to the model spatial domain.

Since:2.5.0

Sub-elements CoordinateSystem
Description
Caveats
SpatialDimension
VelocityDimension
FieldDimension
Units
UnitsConversion

StandardUnits
CoordinatesLabel
ValidMin
ValidMax
GridStructure
GridCellSize
Symmetry
BoundaryConditions

Used by: ModelRun

ModeledInstrumentID — ID

The identifier of a modeled instrument description.

Since:2.5.0

Used by: DisplayOutput
NumericalOutput

ModeledRegion — Enumeration

The portion of space modeled by the code at the time of a diagnosis. 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:2.5.0

Allowed Values
Asteroid
Callisto
Comet
Comet.1P-Halley
Comet.26P-Grigg-Skjellerup
Comet.67P-Churyumov-Gerasimenko
Earth
Earth.Cusp
Earth.InnerRadiationBelt
Earth.Magnetosheath
Earth.Magnetosphere
Earth.Magnetosphere.Magnetotail
Earth.Magnetosphere.Magnetopause
Earth.Magnetosphere.Main
Earth.Magnetosphere.Plasmasheet
Earth.Magnetosphere.Plasmasphere
Earth.Magnetosphere.Polar
Earth.Magnetosphere.RadiationBelt
Earth.Magnetosphere.RingCurrent
Earth.Moon
Earth.NearSurface
Earth.NearSurface.Atmosphere
Earth.NearSurface.AuroralRegion
Earth.NearSurface.EquatorialRegion
Earth.NearSurface.Exosphere

Earth.NearSurface.Ionosphere
Earth.NearSurface.Ionosphere.DRegion
Earth.NearSurface.Ionosphere.ERegion
Earth.NearSurface.Ionosphere.FRegion
Earth.NearSurface.Ionosphere.Topside
Earth.NearSurface.Mesosphere
Earth.NearSurface.MidLatitudeRegion
Earth.NearSurface.Plasmasphere
Earth.NearSurface.PolarCap
Earth.NearSurface.SouthAtlanticAnomalyRegion
Earth.NearSurface.Stratosphere
Earth.NearSurface.SubAuroralRegion
Earth.NearSurface.Thermosphere
Earth.NearSurface.Troposphere
Earth.OuterRadiationBelt
Earth.Surface
Enceladus
Europa
Ganymede
Heliosphere
Heliosphere.Heliosheath
Heliosphere.Inner
Heliosphere.NearEarth
Heliosphere.Outer
Heliosphere.Remote1AU
Incident
Interstellar
Io
Jupiter
Jupiter.Amalthea
Jupiter.Callisto
Jupiter.Europa
Jupiter.Ganymede
Jupiter.Io
Jupiter.Magnetosphere
Jupiter.Magnetosphere.Magnetotail
Jupiter.Magnetosphere.Magnetopause
Jupiter.Magnetosphere.Main
Jupiter.Magnetosphere.Plasmasheet
Jupiter.Magnetosphere.Plasmasphere
Jupiter.Magnetosphere.Polar
Jupiter.Magnetosphere.RadiationBelt
Jupiter.Magnetosphere.RingCurrent
Mars
Mars.Deimos
Mars.Magnetosphere
Mars.Magnetosphere.Magnetotail
Mars.Magnetosphere.Magnetopause

Mars.Magnetosphere.Main
Mars.Magnetosphere.Plasmasheet
Mars.Magnetosphere.Plasmasphere
Mars.Magnetosphere.Polar
Mars.Magnetosphere.RadiationBelt
Mars.Magnetosphere.RingCurrent
Mars.Phobos
Mercury
Mercury.Magnetosphere
Mercury.Magnetosphere.Magnetotail
Mercury.Magnetosphere.Magnetopause
Mercury.Magnetosphere.Main
Mercury.Magnetosphere.Plasmasheet
Mercury.Magnetosphere.Plasmasphere
Mercury.Magnetosphere.Polar
Mercury.Magnetosphere.RadiationBelt
Mercury.Magnetosphere.RingCurrent
Neptune
Neptune.Magnetosphere
Neptune.Magnetosphere.Magnetotail
Neptune.Magnetosphere.Magnetopause
Neptune.Magnetosphere.Main
Neptune.Magnetosphere.Plasmasheet
Neptune.Magnetosphere.Plasmasphere
Neptune.Magnetosphere.Polar
Neptune.Magnetosphere.RadiationBelt
Neptune.Magnetosphere.RingCurrent
Neptune.Proteus
Neptune.Triton
Planet
Pluto
Rhea
Saturn
Saturn.Dione
Saturn.Enceladus
Saturn.Hyperion
Saturn.Iapetus
Saturn.Magnetosphere
Saturn.Magnetosphere.Magnetotail
Saturn.Magnetosphere.Magnetopause
Saturn.Magnetosphere.Main
Saturn.Magnetosphere.Plasmasheet
Saturn.Magnetosphere.Plasmasphere
Saturn.Magnetosphere.Polar
Saturn.Magnetosphere.RadiationBelt
Saturn.Magnetosphere.RingCurrent
Saturn.Mimas
Saturn.Phoebe

Saturn.Rhea
Saturn.Tethys
Saturn.Titan
Sun
Sun.Chromosphere
Sun.Corona
Sun.Corona.InnerCorona
Sun.Corona.MiddleCorona
Sun.Corona.OuterCorona
Sun.Interior
Sun.Photosphere
Sun.TransitionRegion
Titan
Title
Uranus
Uranus.Ariel
Uranus.Magnetosphere
Uranus.Magnetosphere.Magnetotail
Uranus.Magnetosphere.Magnetopause
Uranus.Magnetosphere.Main
Uranus.Magnetosphere.Plasmasheet
Uranus.Magnetosphere.Plasmasphere
Uranus.Magnetosphere.Polar
Uranus.Magnetosphere.RadiationBelt
Uranus.Magnetosphere.RingCurrent
Uranus.Miranda
Uranus.Oberon
Uranus.Puck
Uranus.Titania
Uranus.Umbriel
Venus
Venus.Magnetosphere
Venus.Magnetosphere.Magnetotail
Venus.Magnetosphere.Magnetopause
Venus.Magnetosphere.Main
Venus.Magnetosphere.Plasmasheet
Venus.Magnetosphere.Plasmasphere
Venus.Magnetosphere.Polar
Venus.Magnetosphere.RadiationBelt
Venus.Magnetosphere.RingCurrent

Used by: DisplayOutput
InputField
InputParameter
InputPopulation
InputProcess
Model
ModelRun

NumericalOutput
RegionParameter

ModelID — ID

A string defining the ID of the model.

Since:2.5.0

Used by: ModelSpecification

ModelProduct — Enumeration

The type of products generated by a model.

Since:2.5.0

Allowed Values: 2DCuts, 3DCubes, Lines, SpatialSeries, Spectra

Used by: DisplayOutput, NumericalOutput

ModelRun — Container

Description of a model run, including the code ID, the run spatial and temporal description, and all the relevant inputs.

Since:2.5.0

Sub-elements: ResourceID, NamingAuthority, ResourceType, ResourceHeader, AccessInformation, ProviderResourceName, ProviderProcessingLevel, ProviderVersion, ModelSpecification, TemporalDependence, ModeledRegion, LikelihoodRating, Caveats, Keyword, InputResourceID, ModelTime, ModelDomain, RegionParameter, InputParameter, InputPopulation, InputField, InputProcess, Extension

Used by: Spase

ModelSpecification Container

Descriptor of model specifications: type of numerical scheme, versions, etc.

Since:2.5.0

Sub-elements ModelID
VersionTag

Used by: ModelRun

ModelTime Container

Parameters associated to the model time.

Since:2.5.0

Sub-elements Description
Caveats
Duration
TimeStart
TimeStop
TimeStep
DiagnosisTimeStep

Used by: ModelRun

ModelType Enumeration

A characterization of the numerical scheme used in the model.

Since:2.5.0

Allowed Values AOGCM
Electrohydrodynamic
Empirical
GCM
Hybrid
MHD
NonHydrostatic
Paraboloid
PIC
TestParticle

Used by: Model

ModelURL URL

URL pointing toward the description of a model used in the definition of a property or an input.

Since:2.5.0

Used by: InputField
InputPopulation
InputProcess
Model
Property

ModelVersion Container

The version number of the model.

Since:2.5.0

Sub-elements VersionTag
ReleaseDate
Description
Caveats

Used by: Versions

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), the x-axis is anti-sunward and the y-axis points in the orbital velocity direction.

Since:2.2.4

MultispectralImager Item

An instrument which captures images at multiple spectral ranges.

Since:1.2.1

Muon Item

An elementary particle similar to the electron, with an electric charge equal to -1 elementary charge, -e, and spin -1/2 h-bar with a much mass -206.7682827(46) times that of the electron rest mass, m sub e.

Since:2.6.1

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
InputField
InputParameter
InputPopulation
InputProcess
InputProperty
OutputProperty
Parameter
Property

NamingAuthority Text

The entity or group of organizations that commissioned the creation of the resource being described (see https://spase-group.org/services/naming-authority.html for more detail).

Since:2.7.0

Used by: Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Granule
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry
Repository
Service
Software

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 1984-08-23, 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
- Exosphere
- Ionosphere
- Ionosphere.DRegion
- Ionosphere.ERegion
- Ionosphere.FRegion
- Ionosphere.Topside
- 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
- Magnetosphere.Magnetotail
- Magnetosphere.Magnetopause
- Magnetosphere.Main
- Magnetosphere.Plasmasheet
- Magnetosphere.Plasmasphere
- Magnetosphere.Polar
- Magnetosphere.RadiationBelt
- Magnetosphere.RingCurrent
- Proteus
- Triton

NetCDF Item

The Network Common Data Form (NetCDF) supported and maintained by the Unidata Program Center. 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 with neutral charge that is a constituent of atomic nuclei. Neutrons have a rest mass slightly large than that of a proton equal to about 1.67493*10^-24 kg.

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 676.7 nm to 676.9 nm.

Since:1.2.1

No Item

The negative response to a yes or no question.

Since:2.6.0

None Item

A lack or absence of anything.

Since:1.0.0

NonHydrostatic Item

An atmospheric in which the vertical momentum equation must be solved because the hydrostatic approximation is not satisfied.

Since:2.6.1

NorthernmostLatitude — Text

The latitude furthest to the north in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

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
Rights
TimeSpan

NotProvided — Item

The categorization or kind is not known or not provided.

Since:2.7.2

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
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
ProcessingLevel

ProviderName
ProviderResourceName
ProviderProcessingLevel
ProviderVersion
InstrumentID
MeasurementType
TemporalDescription
SpectralRange
ObservedRegion
SpatialCoverage
Caveats
Keyword
InputResourceID
Parameter
Extension

Used by: Spase

NumericalOutput Container

Numerical data (i.e., NumericalData) generated from a model run.

Since:2.5.0

Sub-elements ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
ProcessingLevel
ProviderResourceName
ProviderProcessingLevel
ProviderVersion
ModeledInstrumentID
MeasurementType
TemporalDescription
SpatialDescription
SpectralRange
ModeledRegion
Caveats
Keyword
InputResourceID
Parameter
ModelProduct
Property
Extension

Used by: Spase

Oberon Item

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

Since:2.2.5

ObjectMass — Text

Mass of an object referenced as a modeled region.

Since:2.5.0

Used by: RegionParameter

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, NamingAuthority, ResourceType, ResourceHeader, ObservatoryGroupID, Location, LaunchDate, OperatingSpan, RORIdentifier, Keyword, Extension

Used by: Spase

ObservatoryGroupID — ID

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

Since:2.2.0

Used by: Observatory

ObservatoryID — ID

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
Comet.1P-Halley
Comet.26P-Grigg-Skjellerup
Comet.67P-Churyumov-Gerasimenko
Earth
Earth.Cusp
Earth.InnerRadiationBelt
Earth.Magnetosheath
Earth.Magnetosphere
Earth.Magnetosphere.Magnetotail
Earth.Magnetosphere.Magnetopause
Earth.Magnetosphere.Main
Earth.Magnetosphere.Plasmasheet
Earth.Magnetosphere.Plasmasphere
Earth.Magnetosphere.Polar
Earth.Magnetosphere.RadiationBelt
Earth.Magnetosphere.RingCurrent
Earth.Moon
Earth.NearSurface
Earth.NearSurface.Atmosphere
Earth.NearSurface.AuroralRegion
Earth.NearSurface.EquatorialRegion
Earth.NearSurface.Exosphere
Earth.NearSurface.Ionosphere
Earth.NearSurface.Ionosphere.DRegion
Earth.NearSurface.Ionosphere.ERegion
Earth.NearSurface.Ionosphere.FRegion
Earth.NearSurface.Ionosphere.Topside
Earth.NearSurface.Mesosphere
Earth.NearSurface.MidLatitudeRegion
Earth.NearSurface.Plasmasphere
Earth.NearSurface.PolarCap
Earth.NearSurface.SouthAtlanticAnomalyRegion
Earth.NearSurface.Stratosphere
Earth.NearSurface.SubAuroralRegion
Earth.NearSurface.Thermosphere
Earth.NearSurface.Troposphere
Earth.OuterRadiationBelt
Earth.Surface
Heliosphere
Heliosphere.Heliosheath
Heliosphere.Inner
Heliosphere.NearEarth
Heliosphere.Outer
Heliosphere.Remote1AU
Interstellar
Jupiter
Jupiter.Amalthea

Jupiter.Callisto
Jupiter.Europa
Jupiter.Ganymede
Jupiter.Io
Jupiter.Magnetosphere
Jupiter.Magnetosphere.Magnetotail
Jupiter.Magnetosphere.Magnetopause
Jupiter.Magnetosphere.Main
Jupiter.Magnetosphere.Plasmasheet
Jupiter.Magnetosphere.Plasmasphere
Jupiter.Magnetosphere.Polar
Jupiter.Magnetosphere.RadiationBelt
Jupiter.Magnetosphere.RingCurrent
Mars
Mars.Deimos
Mars.Magnetosphere
Mars.Magnetosphere.Magnetotail
Mars.Magnetosphere.Magnetopause
Mars.Magnetosphere.Main
Mars.Magnetosphere.Plasmasheet
Mars.Magnetosphere.Plasmasphere
Mars.Magnetosphere.Polar
Mars.Magnetosphere.RadiationBelt
Mars.Magnetosphere.RingCurrent
Mars.Phobos
Mercury
Mercury.Magnetosphere
Mercury.Magnetosphere.Magnetotail
Mercury.Magnetosphere.Magnetopause
Mercury.Magnetosphere.Main
Mercury.Magnetosphere.Plasmasheet
Mercury.Magnetosphere.Plasmasphere
Mercury.Magnetosphere.Polar
Mercury.Magnetosphere.RadiationBelt
Mercury.Magnetosphere.RingCurrent
Neptune
Neptune.Magnetosphere
Neptune.Magnetosphere.Magnetotail
Neptune.Magnetosphere.Magnetopause
Neptune.Magnetosphere.Main
Neptune.Magnetosphere.Plasmasheet
Neptune.Magnetosphere.Plasmasphere
Neptune.Magnetosphere.Polar
Neptune.Magnetosphere.RadiationBelt
Neptune.Magnetosphere.RingCurrent
Neptune.Proteus
Neptune.Triton
Pluto

Saturn
Saturn.Dione
Saturn.Enceladus
Saturn.Hyperion
Saturn.Iapetus
Saturn.Magnetosphere
Saturn.Magnetosphere.Magnetotail
Saturn.Magnetosphere.Magnetopause
Saturn.Magnetosphere.Main
Saturn.Magnetosphere.Plasmasheet
Saturn.Magnetosphere.Plasmasphere
Saturn.Magnetosphere.Polar
Saturn.Magnetosphere.RadiationBelt
Saturn.Magnetosphere.RingCurrent
Saturn.Mimas
Saturn.Phoebe
Saturn.Rhea
Saturn.Tethys
Saturn.Titan
Sun
Sun.Chromosphere
Sun.Corona
Sun.Corona.InnerCorona
Sun.Corona.MiddleCorona
Sun.Corona.OuterCorona
Sun.Interior
Sun.Photosphere
Sun.TransitionRegion
Uranus
Uranus.Ariel
Uranus.Magnetosphere
Uranus.Magnetosphere.Magnetotail
Uranus.Magnetosphere.Magnetopause
Uranus.Magnetosphere.Main
Uranus.Magnetosphere.Plasmasheet
Uranus.Magnetosphere.Plasmasphere
Uranus.Magnetosphere.Polar
Uranus.Magnetosphere.RadiationBelt
Uranus.Magnetosphere.RingCurrent
Uranus.Miranda
Uranus.Oberon
Uranus.Puck
Uranus.Titania
Uranus.Umbriel
Venus
Venus.Magnetosphere
Venus.Magnetosphere.Magnetotail
Venus.Magnetosphere.Magnetopause

Venus.Magnetosphere.Main
Venus.Magnetosphere.Plasmasheet
Venus.Magnetosphere.Plasmasphere
Venus.Magnetosphere.Polar
Venus.Magnetosphere.RadiationBelt
Venus.Magnetosphere.RingCurrent

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
Comet.1P-Halley
Comet.26P-Grigg-Skjellerup
Comet.67P-Churyumov-Gerasimenko
Earth
Earth.Cusp
Earth.InnerRadiationBelt
Earth.Magnetosheath
Earth.Magnetosphere
Earth.Magnetosphere.Magnetotail
Earth.Magnetosphere.Magnetopause
Earth.Magnetosphere.Main
Earth.Magnetosphere.Plasmasheet
Earth.Magnetosphere.Plasmasphere
Earth.Magnetosphere.Polar
Earth.Magnetosphere.RadiationBelt
Earth.Magnetosphere.RingCurrent
Earth.Moon
Earth.NearSurface
Earth.NearSurface.Atmosphere
Earth.NearSurface.AuroralRegion
Earth.NearSurface.EquatorialRegion
Earth.NearSurface.Exosphere
Earth.NearSurface.Ionosphere
Earth.NearSurface.Ionosphere.DRegion
Earth.NearSurface.Ionosphere.ERegion
Earth.NearSurface.Ionosphere.FRegion

Earth.NearSurface.Ionosphere.Topside
Earth.NearSurface.Mesosphere
Earth.NearSurface.MidLatitudeRegion
Earth.NearSurface.Plasmasphere
Earth.NearSurface.PolarCap
Earth.NearSurface.SouthAtlanticAnomalyRegion
Earth.NearSurface.Stratosphere
Earth.NearSurface.SubAuroralRegion
Earth.NearSurface.Thermosphere
Earth.NearSurface.Troposphere
Earth.OuterRadiationBelt
Earth.Surface
Heliosphere
Heliosphere.Heliosheath
Heliosphere.Inner
Heliosphere.NearEarth
Heliosphere.Outer
Heliosphere.Remote1AU
Interstellar
Jupiter
Jupiter.Amalthea
Jupiter.Callisto
Jupiter.Europa
Jupiter.Ganymede
Jupiter.Io
Jupiter.Magnetosphere
Jupiter.Magnetosphere.Magnetotail
Jupiter.Magnetosphere.Magnetopause
Jupiter.Magnetosphere.Main
Jupiter.Magnetosphere.Plasmasheet
Jupiter.Magnetosphere.Plasmasphere
Jupiter.Magnetosphere.Polar
Jupiter.Magnetosphere.RadiationBelt
Jupiter.Magnetosphere.RingCurrent
Mars
Mars.Deimos
Mars.Magnetosphere
Mars.Magnetosphere.Magnetotail
Mars.Magnetosphere.Magnetopause
Mars.Magnetosphere.Main
Mars.Magnetosphere.Plasmasheet
Mars.Magnetosphere.Plasmasphere
Mars.Magnetosphere.Polar
Mars.Magnetosphere.RadiationBelt
Mars.Magnetosphere.RingCurrent
Mars.Phobos
Mercury
Mercury.Magnetosphere

Mercury.Magnetosphere.Magnetotail
Mercury.Magnetosphere.Magnetopause
Mercury.Magnetosphere.Main
Mercury.Magnetosphere.Plasmasheet
Mercury.Magnetosphere.Plasmasphere
Mercury.Magnetosphere.Polar
Mercury.Magnetosphere.RadiationBelt
Mercury.Magnetosphere.RingCurrent
Neptune
Neptune.Magnetosphere
Neptune.Magnetosphere.Magnetotail
Neptune.Magnetosphere.Magnetopause
Neptune.Magnetosphere.Main
Neptune.Magnetosphere.Plasmasheet
Neptune.Magnetosphere.Plasmasphere
Neptune.Magnetosphere.Polar
Neptune.Magnetosphere.RadiationBelt
Neptune.Magnetosphere.RingCurrent
Neptune.Proteus
Neptune.Triton
Pluto
Saturn
Saturn.Dione
Saturn.Enceladus
Saturn.Hyperion
Saturn.Iapetus
Saturn.Magnetosphere
Saturn.Magnetosphere.Magnetotail
Saturn.Magnetosphere.Magnetopause
Saturn.Magnetosphere.Main
Saturn.Magnetosphere.Plasmasheet
Saturn.Magnetosphere.Plasmasphere
Saturn.Magnetosphere.Polar
Saturn.Magnetosphere.RadiationBelt
Saturn.Magnetosphere.RingCurrent
Saturn.Mimas
Saturn.Phoebe
Saturn.Rhea
Saturn.Tethys
Saturn.Titan
Sun
Sun.Chromosphere
Sun.Corona
Sun.Corona.InnerCorona
Sun.Corona.MiddleCorona
Sun.Corona.OuterCorona
Sun.Interior
Sun.Photosphere

Sun.TransitionRegion
Uranus
Uranus.Ariel
Uranus.Magnetosphere
Uranus.Magnetosphere.Magnetotail
Uranus.Magnetosphere.Magnetopause
Uranus.Magnetosphere.Main
Uranus.Magnetosphere.Plasmasheet
Uranus.Magnetosphere.Plasmasphere
Uranus.Magnetosphere.Polar
Uranus.Magnetosphere.RadiationBelt
Uranus.Magnetosphere.RingCurrent
Uranus.Miranda
Uranus.Oberon
Uranus.Puck
Uranus.Titania
Uranus.Umbriel
Venus
Venus.Magnetosphere
Venus.Magnetosphere.Magnetotail
Venus.Magnetosphere.Magnetopause
Venus.Magnetosphere.Main
Venus.Magnetosphere.Plasmasheet
Venus.Magnetosphere.Plasmasphere
Venus.Magnetosphere.Polar
Venus.Magnetosphere.RadiationBelt
Venus.Magnetosphere.RingCurrent

Used by: DisplayData
Instrument
NumericalData
ObservationExtent

Obstacle Text

Obstacle in the model domain.

Since:2.5.0

Used by: ElementBoundary

Offline Item

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

Since:1.0.0

Ongoing Item

Dynamic (constantly updating) dataset.

Since:2.7.1

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

OperatingSystem — Text

The software that supports the basic functions of a computer, such as scheduling tasks, executing applications, and controlling peripherals.

Since:2.4.0

Used by: ExecutionEnvironment

OperationsManager — Item

The person who manages the instrument operation plans.

Since:2.7.0

Optical — Item

Photons with a wavelength range: 380 nm to 760 nm.

Since:1.0.0

ORCIdentifier — Text

An 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

OuterCorona Item

The region of the solar corona extending outward from approximately 6 solar radii from the center of the Sun, where outward-flowing solar-wind plasma is the dominant large-scale regime and the corona gradually merges into the inner heliosphere.

Since:2.8.0

OuterRadiationBelt Item

The outer belt consists mainly of high-energy (0.1-10 MeV) electrons trapped by the Earth's magnetosphere. It is more variable than the inner belt, as it is more easily influenced by solar activity. It is almost toroidal in shape, beginning at an altitude of 3 Earth radii and extending to 10 Earth radii (RE)-13,000 to 60,000 kilometres (8,100 to 37,300 mi) above the Earth's surface. Its greatest intensity is usually around 4 to 5 Re (reference: ontoportal-astro thesaurus https://ontoportal-astro.eu/ontologies/MDL/MDL-LF7SZTGX-X).

Since:2.7.2

OutputParameters Container

A container of information regarding the output parameters of the model run.

Since:2.5.0

Sub-elements Parameter

Used by: Model

OutputProperty Container

A container of attributes regarding an output property of an application.

Since:2.4.0

Sub-elements Name
Description
Caveats
Units
StandardUnits
ValidMin

ValidMax

Used by: Software

Overview Item

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

Since:2.3.0

Paraboloid Item

A shape generated by the rotation of a parabola around its axis of symmetry.

Since:2.5.0

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
StandardUnits
CoordinateSystem
RenderingHints
Structure
ValidMin
ValidMax
FillValue
Field
Particle
Wave
Mixed
Support
Undefined
SpatialCoverage

Used by: Catalog
DisplayData

DisplayOutput
NumericalData
NumericalOutput
OutputParameters

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 indices. The first column index is 1.

Since:1.1.0

Used by: Element
InputField
InputPopulation
InputProcess
Parameter

ParameterQuantity — Enumeration

The value associated with a parameter.

Since:2.5.0

Allowed Values 2DCuts
3DCubes
ACElectricField
ACMagneticField
Absorption
ActivityIndex
AdiabaticInvariant
AdiabaticInvariant.BounceMotion
AdiabaticInvariant.DriftMotion
AdiabaticInvariant.MagneticMoment
Aerosol
AkasofuEpsilon
Albedo
AlfvenMachNumber
AlfvenVelocity
AlphaParticle
Antenna
ArrivalDirection
Atom
AtomicNumberDetected
AverageChargeState
AzimuthAngle
CaK
Channeltron
ChargeExchange
ChargeFlux
ChargeState
Coronograph

CountRate
Counts
CrossSection
Current
CurrentDensity
DataQuality
DissociativeRecombination
DopplerFrequency
Dopplergram
DoubleSphere
Dust
DustDetector
DynamicPressure
Electric
ElectricField
Electromagnetic
Electron
ElectronDriftInstrument
ElectronImpact
Electrostatic
ElectrostaticAnalyser
ElevationAngle
Emissivity
EnergeticParticleInstrument
EnergeticParticles
Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
Ephemeris
EquivalentWidth
Experiment
ExtremeUltraviolet
FarUltraviolet
FaradayCup
FlowSpeed
FlowVelocity
Fluence
FluxFeedback
FourierTransformSpectrograph
Frequency
FrequencyToGyrofrequencyRatio
GammaRays
GeigerMuellerTube
GeometricFactor
Gyrofrequency
Halpha

HardXRays
He10830
He304
HeatFlux
Housekeeping
Hydrodynamic
IMFClockAngle
ImageIntensity
Imager
ImagingSpectrometer
Infrared
InstrumentMode
InstrumentStatus
Intensity
Interferometer
Ion
IonChamber
IonComposition
IonDrift
IonGauge
Irradiance
K7699
LBHBand
LShell
LangmuirProbe
Lidar
LineDepth
Lines
LongWire
LowerHybridFrequency
MHD
Magnetic
MagneticField
Magnetogram
Magnetograph
Magnetometer
MagnetosonicMachNumber
Mass
MassDensity
MassNumber
MassPerCharge
MassSpectrometer
MicrochannelPlate
Microwave
ModeAmplitude
Molecule
MultispectralImager
Muon

NaD
NeutralAtomImager
NeutralAtomImages
NeutralGas
NeutralParticleDetector
Neutron
Ni6768
NotProvided
NumberDensity
NumberFlux
Optical
Orientation
Other
ParticleCorrelator
ParticleDetector
ParticleRadius
ParticleRigidity
PhaseSpaceDensity
PhotoIonization
Photometer
PhotomultiplierTube
Photon
Photopolarimeter
PlasmaBeta
PlasmaFrequency
PlasmaWaves
Platform
PolarAngle
Polarization
Positional
Positron
Potential
PoyntingFlux
Pressure
Profile
PropagationTime
ProportionalCounter
Proton
QuadrisphericalAnalyser
Radar
Radiance
RadioFrequency
Radiometer
Rate
Remark
ResonanceSounder
RetardingPotentialAnalyser
Riometer

RotationMatrix
SPICE
ScintillationDetector
SearchCoil
SoftXRays
SolarUVFlux
SolidStateDetector
SonicMachNumber
SoundSpeed
Sounder
SpacecraftPotentialControl
SpatialSeries
Spectra
SpectralPowerReceiver
Spectrometer
Spectrum
SpinPeriod
SpinPhase
SpinRate
StokesParameters
Telemetry
Temperature
Temporal
ThermalPlasma
ThermalSpeed
TimeOfFlight
TotalPressure
Ultraviolet
Unspecified
UpperHybridFrequency
VCrossB
Velocity
VolumeEmissionRate
WavePhase
WaveformReceiver
Wavelength
Waves
Waves.Active
Waves.Passive
WebResource
WebService
WhiteLight
XRays

Used by: InputParameter

ParentID ID

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, ChemicalFormula, Population, PopulationMassNumber, PopulationChargeState, SourceRegion, SourceRegionExtent

Used by: Parameter

ParticleBoundary — Text

Parameters associated with the particles at the boundaries of the model.

Since:2.5.0

Used by: BoundaryConditions

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
- AdiabaticInvariant.BounceMotion
- AdiabaticInvariant.DriftMotion
- AdiabaticInvariant.MagneticMoment
- ArrivalDirection
- AtomicNumberDetected
- AverageChargeState
- ChargeFlux
- ChargeState
- CountRate
- Counts
- Current
- CurrentDensity
- DynamicPressure
- Energy
- EnergyDensity
- EnergyFlux
- EnergyPerCharge
- Entropy
- 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
- Muon
- Neutron
- Positron
- Proton

Used by:
- InputPopulation
- 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 labeled 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, parse-able 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

Period Text

A length or era of time.

Since:2.5.0

Used by: RegionParameter

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
NamingAuthority
ResourceType
ReleaseDate
PersonName
OrganizationName
Address
Email
PhoneNumber
FaxNumber
ORCIdentifier
Note
RORIdentifier
Extension

Used by: Spase

PersonID — ID

The identifier assigned to a Person description. This is a ResourceID that has the form "spase://NamingAuthority/Person/FirstName.MiddleInitial.LastName.GenSuffix". MiddleInitial and LastName are both optional and may take on multiple values as needed. Furthermore, in the case of multiple identical PersonIDs, you may provide the full middle name instead of the initial for proper identification. GenSuffix is also optional and represents generational suffixes such as "Jr", "III", etc.

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
- CoronalBrightPoint
- CoronalDimming
- CoronalHole
- CoronalJet
- CoronalMassEjection
- EITWave
- EUVWave
- EnergeticSolarParticleEvent
- ForbushDecrease
- GeomagneticStorm
- InterplanetaryCoronalMassEjection
- InterplanetaryShock
- MagneticCloud
- MagneticFluxEmergence
- MagnetopauseCrossing
- RadioBurst
- SectorBoundaryCrossing
- SolarFilament
- SolarFilamentEruption
- SolarFlare
- SolarProminence
- SolarProminenceEruption
- SolarWindExtreme
- StreamInteractionRegion
- Substorm

Used by: Annotation, Catalog

Phobos — Item

The larger and inner most moon of Mars.

Since:2.2.5

Phoebe — Item

The ninth-largest moon of Saturn.

Since:2.7.1

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

PhotoIonization Item

Chemical process by which a neutral is ionized thanks to the energy from a photon.

Since:2.5.0

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, or Photomultiplier).

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

PIC — Item

A numerical scheme modeling ions and electrons as macroparticles.

Since:2.5.0

PitchAngleRange — Container

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

Since:2.2.9

Sub-elements: Low, High, Units, StandardUnits, Bin

Used by: Particle

PlainLanguageDescription — Text

A plain language description of the record item.

Since:2.8.0

Used by: ResourceHeader

Plane — Item

Symmetry across a plane.

Since:2.5.0

PlaneNormalVector — Text

A list of the component in each dimension of the vector normal to a plane.

Since:2.5.0

Used by: SpatialDescription

PlanePoint — Text

A list of the component in each dimension of a point in plane.

Since:2.5.0

Used by: SpatialDescription

Planet — Item

A planet is a large, rounded astronomical body that is neither a star nor a stellar remnant. In August 2006 the International Astronomical Union (IAU) defined that in the Solar System a planet is a celestial body that satisfies the following criteria (1) is in orbit around the Sun, (2) has sufficient mass to assume hydrostatic equilibrium (a nearly round shape), and (3) has "cleared the neighborhood" around its orbit. This definition is still controversial to this day. Many members of the community believe that Pluto, which was demoted to the status dwarf planet, should maintain its planet status.

Since:2.6.0

PlasmaBeta — Item

The ratio of the plasma pressure (nkT) to the magnetic pressure (B^2/2μ₀) in a single component plasma or the ratio of the plasma pressure sum over i of (n_ikT_i) for all species i to the magnetic pressure (B^2/2μ₀) in a multi components plasma.

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

Plasmasheet Item

In the magnetosphere, the plasma sheet is a sheet-like region of dense, hot plasma and lower magnetic field near the equatorial plane, between the magnetosphere's north and south lobes. (reference: ontoportal-astro thesaurus https://ontoportal-astro.eu/ontologies/MDL/MDL-LSFB02GQ-C).

Since:2.7.2

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 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(B_x/B_t).

Since:1.3.4

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, StandardUnits, Bin

Used by: Particle

PolarCap Item

The areas of the globe surrounding the poles and consisting of the region north of 60 deg north latitude and the region south of 60 deg 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

Policy Item

A deliberate system of principles to guide decisions and achieve rational outcomes. A policy is a statement of intent, and is implemented as a procedure or protocol.

Since:2.4.0

Population Text

A concise description of a particle population, for references.

Since:2.5.0

Used by: Particle

PopulationChargeState Numeric

Charge of a particle in a population, in units of the charge of a proton. Charge state of a bare proton is equal to one.

Since:2.5.0

Used by: InputPopulation
Particle

PopulationDensity Text

The number of particles per unit volume.

Since:2.5.0

Used by: InputPopulation

PopulationFlowSpeed Text

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

Since:2.5.0

Used by: InputPopulation

PopulationMassNumber Text

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

Since:2.5.0

Used by: InputPopulation
Particle

PopulationTemperature Text

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:2.5.0

Used by: InputPopulation

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 that has a positive charge equal to about 1.60218*10^-19 C and a rest mass equal to about 9.10938*10^-31 kg.

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

Prerequisites Text

A thing that is required to be installed on your computer in order to run or compile the software.

Since:2.4.0

Used by: Software

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 — ID

The old/replaced resource identifier for a resource that has been given a new resource identifier which otherwise has not been changed. For example, this can be used when a resource has been moved to a different naming authority.

Since:1.2.0

Used by: Granule
ResourceHeader

Probable — Item

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

Since:1.3.4

ProcessCoefficient — Text

Coefficient associated to a chemical process.

Since:2.5.0

Used by: InputProcess

ProcessCoeffType — Enumeration

Whether the model results are obtained from a stationary solution or are dynamically computed.

Since:2.5.0

Allowed Values: CrossSection
Frequency
Other
Rate

Used by: InputProcess

ProcessingLevel — Enumeration

The standard classification of the processing performed on the product.

Since:1.2.0

Allowed Values: Calibrated
Derived
Raw
Uncalibrated
ValueAdded

Used by: DisplayData
DisplayOutput
NumericalData
NumericalOutput

ProcessModel — Text

Model used to describe a chemical process.

Since:2.5.0

Used by: InputProcess

ProcessType — Enumeration

Type of chemical process.

Since:2.5.0

Allowed Values: ChargeExchange, DissociativeRecombination, ElectronImpact, PhotoIonization

Used by: InputProcess

ProductionRate — Text

The number of items that can be produced during a given period of time.

Since:2.5.0

Used by: InputPopulation

ProductKey — Text

A string of characters used to uniquely identify a particular product within a Repository. The style or format of the identifier is determined by the Repository. The kinds of resources which can be accessed include, but are not limited to, numerical data, display data, documents and event lists. The method to access the product is determined by the attributes of an access service.

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 undergoes the transition from the requirements derivation and preliminary design phases to 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

Property Container

A container of attributes regarding the property of an application.

Since:2.4.0

Sub-elements Name
Description
Caveats

PropertyQuantity
Qualifier
Units
UnitsConversion
StandardUnits
PropertyLabel
PropertyValue
PropertyTableURL
ValidMin
ValidMax
PropertyModel
ModelURL

Used by: DisplayOutput
InputParameter
InputProperties
NumericalOutput
RegionParameter

PropertyLabel Text

A string list of the labels of each dimension of the property.

Since:2.5.0

Used by: Property

PropertyModel Text

Model used to define a property.

Since:2.5.0

Used by: Property

PropertyQuantity Enumeration

The value associated with a property.

Since:2.5.0

Allowed Values 2DCuts
3DCubes
ACElectricField
ACMagneticField
Absorption
ActivityIndex
AdiabaticInvariant
AdiabaticInvariant.BounceMotion
AdiabaticInvariant.DriftMotion
AdiabaticInvariant.MagneticMoment
Aerosol
AkasofuEpsilon
Albedo
AlfvenMachNumber
AlfvenVelocity
AlphaParticle
Antenna

ArrivalDirection
Atom
AtomicNumberDetected
AverageChargeState
AzimuthAngle
CaK
Channeltron
ChargeExchange
ChargeFlux
ChargeState
Coronograph
CountRate
Counts
CrossSection
Current
CurrentDensity
DataQuality
DissociativeRecombination
DopplerFrequency
Dopplergram
DoubleSphere
Dust
DustDetector
DynamicPressure
Electric
ElectricField
Electromagnetic
Electron
ElectronDriftInstrument
ElectronImpact
Electrostatic
ElectrostaticAnalyser
ElevationAngle
Emissivity
EnergeticParticleInstrument
EnergeticParticles
Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
Ephemeris
EquivalentWidth
Experiment
ExtremeUltraviolet
FarUltraviolet
FaradayCup
FlowSpeed

FlowVelocity
Fluence
FluxFeedback
FourierTransformSpectrograph
Frequency
FrequencyToGyrofrequencyRatio
GammaRays
GeigerMuellerTube
GeometricFactor
Gyrofrequency
Halpha
HardXRays
He10830
He304
HeatFlux
Housekeeping
Hydrodynamic
IMFClockAngle
ImageIntensity
Imager
ImagingSpectrometer
Infrared
InstrumentMode
InstrumentStatus
Intensity
Interferometer
Ion
IonChamber
IonComposition
IonDrift
IonGauge
Irradiance
K7699
LBHBand
LShell
LangmuirProbe
Lidar
LineDepth
Lines
LongWire
LowerHybridFrequency
MHD
Magnetic
MagneticField
Magnetogram
Magnetograph
Magnetometer
MagnetosonicMachNumber

Mass
MassDensity
MassNumber
MassPerCharge
MassSpectrometer
MicrochannelPlate
Microwave
ModeAmplitude
Molecule
MultispectralImager
Muon
NaD
NeutralAtomImager
NeutralAtomImages
NeutralGas
NeutralParticleDetector
Neutron
Ni6768
NotProvided
NumberDensity
NumberFlux
Optical
Orientation
Other
ParticleCorrelator
ParticleDetector
ParticleRadius
ParticleRigidity
PhaseSpaceDensity
PhotoIonization
Photometer
PhotomultiplierTube
Photon
Photopolarimeter
PlasmaBeta
PlasmaFrequency
PlasmaWaves
Platform
PolarAngle
Polarization
Positional
Positron
Potential
PoyntingFlux
Pressure
Profile
PropagationTime
ProportionalCounter

Proton
QuadrisphericalAnalyser
Radar
Radiance
RadioFrequency
Radiometer
Rate
Remark
ResonanceSounder
RetardingPotentialAnalyser
Riometer
RotationMatrix
SPICE
ScintillationDetector
SearchCoil
SoftXRays
SolarUVFlux
SolidStateDetector
SonicMachNumber
SoundSpeed
Sounder
SpacecraftPotentialControl
SpatialSeries
Spectra
SpectralPowerReceiver
Spectrometer
Spectrum
SpinPeriod
SpinPhase
SpinRate
StokesParameters
Telemetry
Temperature
Temporal
ThermalPlasma
ThermalSpeed
TimeOfFlight
TotalPressure
Ultraviolet
Unspecified
UpperHybridFrequency
VCrossB
Velocity
VolumeEmissionRate
WavePhase
WaveformReceiver
Wavelength
Waves

Waves.Active
Waves.Passive
WebResource
WebService
WhiteLight
XRays

Used by: Property

PropertyTableURL — URL

A URL to a table containing property values.

Since:2.5.0

Used by: Property

PropertyValue — Text

A string list of the values of the property.

Since:2.5.0

Used by: Property

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. Protons have a positive charge equal to about 1.60218*10^-19 C and a rest mass equal to about 1.67262*10^-27 kg.

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 information on the processing performed on the product. This should include the provider processing level designation and information about the intended use of the product. For example, if it is to be used for machine learning or other high-level applications.

Since:1.0.0

Used by: DisplayData

DisplayOutput
ModelRun
NumericalData
NumericalOutput

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
DisplayOutput
ModelRun
NumericalData
NumericalOutput

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
DisplayOutput
ModelRun
NumericalData
NumericalOutput

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 (document, data, images, DOI or other types of resources) was first issued.

Since:2.3.0

Used by: PublicationInfo

PublicationInfo Container

Information required to mint a DOI for the resource being described in SPASE.

Since:2.3.0

Sub-elements: Title
Authors
PublicationDate
PublishedBy
LandingPageURL

Used by: ResourceHeader

PublishedBy Text

The name of the company, organization or individual that issues the work (document, data, images or other types of resources). Separate multiple names with a semicolon.

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
- Amplitude
- Anisotropy
- Array
- AutoSpectrum
- Average
- Characteristic
- Circular
- Coherence
- Column
- Component
- Component.I
- Component.J
- Component.K
- Confidence
- Core
- CrossSpectrum
- Deviation
- Differential
- Direction
- Directional
- DirectionAngle
- DirectionAngle.AzimuthAngle

DirectionAngle.ElevationAngle
DirectionAngle.PolarAngle
DirectionCosine
DirectionCosine.I
DirectionCosine.J
DirectionCosine.K
EncodedParameter
FieldAligned
Fit
Group
Halo
ImaginaryPart
Incident
Integral
Integral.Area
Integral.Bandwidth
Integral.SolidAngle
Linear
LineOfSight
Magnitude
MassMixingRatio
Maximum
Median
Minimum
MixingRatio
Moment
Parallel
Peak
Perpendicular
Perturbation
Phase
PhaseAngle
PowerSpectralDensity
Projection
Projection.IJ
Projection.IK
Projection.JK
Pseudo
Ratio
RealPart
Scalar
Spectral
StandardDeviation
StokesParameters
Strahl
Superhalo
Symmetric
Tensor

Total
Trace
Uncertainty
Variance
Vector

Used by: Element
Field
InputField
InputParameter
InputPopulation
Mixed
Particle
Property
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 (80 MHz to 200 MHz). Type II

consisting of narrow-band emission that begins in the meter range (150 MHz) and sweeps slowly (tens of minutes) toward dekameter wavelengths (20 MHz). Type III consisting of narrow-band bursts that sweep rapidly (seconds) from decimeter to dekameter wavelengths (500 MHz to 20 MHz) and Type IV consisting of a smooth continuum of broadband bursts primarily in the meter range (10 MHz to 200 MHz).

Since:1.3.0

RadioFrequency Item

Photons with a wavelength range: 10^5 nm to 10^11 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

Radius Text

The length of a line segment from a center point to the perimeter.

Since:2.5.0

Used by: RegionParameter

Rate Item

Reaction rate: reaction production per unit of time.

Since:2.5.0

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. Similar to NASA Level 0.

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

Region Enumeration

The most general/highest level list of locations of interest in the context of heliophysics. The list contains the names of the planets found in the solar system, the Sun, the Heliosphere, Interstellar, and two catch all terms: Asteroid and Comet.

Since:2.2.0

Allowed Values
- Asteroid
- Comet
- Comet.1P-Halley
- Comet.26P-Grigg-Skjellerup
- Comet.67P-Churyumov-Gerasimenko
- Earth
- Earth.Cusp
- Earth.InnerRadiationBelt
- Earth.Magnetosheath
- Earth.Magnetosphere
- Earth.Magnetosphere.Magnetotail
- Earth.Magnetosphere.Magnetopause
- Earth.Magnetosphere.Main
- Earth.Magnetosphere.Plasmasheet
- Earth.Magnetosphere.Plasmasphere
- Earth.Magnetosphere.Polar
- Earth.Magnetosphere.RadiationBelt
- Earth.Magnetosphere.RingCurrent
- Earth.Moon
- Earth.NearSurface
- Earth.NearSurface.Atmosphere
- Earth.NearSurface.AuroralRegion
- Earth.NearSurface.EquatorialRegion
- Earth.NearSurface.Exosphere
- Earth.NearSurface.Ionosphere
- Earth.NearSurface.Ionosphere.DRegion
- Earth.NearSurface.Ionosphere.ERegion
- Earth.NearSurface.Ionosphere.FRegion
- Earth.NearSurface.Ionosphere.Topside
- Earth.NearSurface.Mesosphere
- Earth.NearSurface.MidLatitudeRegion
- Earth.NearSurface.Plasmasphere
- Earth.NearSurface.PolarCap
- Earth.NearSurface.SouthAtlanticAnomalyRegion
- Earth.NearSurface.Stratosphere
- Earth.NearSurface.SubAuroralRegion
- Earth.NearSurface.Thermosphere
- Earth.NearSurface.Troposphere
- Earth.OuterRadiationBelt
- Earth.Surface
- Heliosphere
- Heliosphere.Heliosheath
- Heliosphere.Inner
- Heliosphere.NearEarth
- Heliosphere.Outer
- Heliosphere.Remote1AU

Interstellar
Jupiter
Jupiter.Amalthea
Jupiter.Callisto
Jupiter.Europa
Jupiter.Ganymede
Jupiter.Io
Jupiter.Magnetosphere
Jupiter.Magnetosphere.Magnetotail
Jupiter.Magnetosphere.Magnetopause
Jupiter.Magnetosphere.Main
Jupiter.Magnetosphere.Plasmasheet
Jupiter.Magnetosphere.Plasmasphere
Jupiter.Magnetosphere.Polar
Jupiter.Magnetosphere.RadiationBelt
Jupiter.Magnetosphere.RingCurrent
Mars
Mars.Deimos
Mars.Magnetosphere
Mars.Magnetosphere.Magnetotail
Mars.Magnetosphere.Magnetopause
Mars.Magnetosphere.Main
Mars.Magnetosphere.Plasmasheet
Mars.Magnetosphere.Plasmasphere
Mars.Magnetosphere.Polar
Mars.Magnetosphere.RadiationBelt
Mars.Magnetosphere.RingCurrent
Mars.Phobos
Mercury
Mercury.Magnetosphere
Mercury.Magnetosphere.Magnetotail
Mercury.Magnetosphere.Magnetopause
Mercury.Magnetosphere.Main
Mercury.Magnetosphere.Plasmasheet
Mercury.Magnetosphere.Plasmasphere
Mercury.Magnetosphere.Polar
Mercury.Magnetosphere.RadiationBelt
Mercury.Magnetosphere.RingCurrent
Neptune
Neptune.Magnetosphere
Neptune.Magnetosphere.Magnetotail
Neptune.Magnetosphere.Magnetopause
Neptune.Magnetosphere.Main
Neptune.Magnetosphere.Plasmasheet
Neptune.Magnetosphere.Plasmasphere
Neptune.Magnetosphere.Polar
Neptune.Magnetosphere.RadiationBelt
Neptune.Magnetosphere.RingCurrent

Neptune.Proteus
Neptune.Triton
Pluto
Saturn
Saturn.Dione
Saturn.Enceladus
Saturn.Hyperion
Saturn.Iapetus
Saturn.Magnetosphere
Saturn.Magnetosphere.Magnetotail
Saturn.Magnetosphere.Magnetopause
Saturn.Magnetosphere.Main
Saturn.Magnetosphere.Plasmasheet
Saturn.Magnetosphere.Plasmasphere
Saturn.Magnetosphere.Polar
Saturn.Magnetosphere.RadiationBelt
Saturn.Magnetosphere.RingCurrent
Saturn.Mimas
Saturn.Phoebe
Saturn.Rhea
Saturn.Tethys
Saturn.Titan
Sun
Sun.Chromosphere
Sun.Corona
Sun.Corona.InnerCorona
Sun.Corona.MiddleCorona
Sun.Corona.OuterCorona
Sun.Interior
Sun.Photosphere
Sun.TransitionRegion
Uranus
Uranus.Ariel
Uranus.Magnetosphere
Uranus.Magnetosphere.Magnetotail
Uranus.Magnetosphere.Magnetopause
Uranus.Magnetosphere.Main
Uranus.Magnetosphere.Plasmasheet
Uranus.Magnetosphere.Plasmasphere
Uranus.Magnetosphere.Polar
Uranus.Magnetosphere.RadiationBelt
Uranus.Magnetosphere.RingCurrent
Uranus.Miranda
Uranus.Oberon
Uranus.Puck
Uranus.Titania
Uranus.Umbriel
Venus

Venus.Magnetosphere
Venus.Magnetosphere.Magnetotail
Venus.Magnetosphere.Magnetopause
Venus.Magnetosphere.Main
Venus.Magnetosphere.Plasmasheet
Venus.Magnetosphere.Plasmasphere
Venus.Magnetosphere.Polar
Venus.Magnetosphere.RadiationBelt
Venus.Magnetosphere.RingCurrent

RegionBegin — Text

The values that define the start point of a region.

Since:2.5.0

Used by: Granule
SpatialDescription

RegionEnd — Text

The values that define the ending point of a region.

Since:2.5.0

Used by: Granule
SpatialDescription

RegionParameter — Container

Radius of the Region in the model.

Since:2.5.0

Sub-elements: ModeledRegion
Description
Caveats
Radius
SubLongitude
Period
ObjectMass
InputTableURL
Property

Used by: ModelRun

Registry — Container

A location or facility where resources are cataloged.

Since:1.1.0

Sub-elements: ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessURL
RORIdentifier
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 SPASE 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
ModelVersion
Person
ResourceHeader
RevisionEvent

Remark — Item

A notice, comment, or observation.

Since:2.4.1

Remote1AU — Item

A roughly toroidal region that includes the orbit of the Earth, 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-D rendering with a horizontal axis and vertical 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
NamingAuthority
ResourceType
ResourceHeader
AccessURL
RORIdentifier
re3data
Extension

Used by: Spase

RepositoryID ID

The identifier of a Repository resource.

Since:1.0.0

Used by: AccessInformation
AccessInformationOptional

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

PlainLanguageDescription
Acknowledgement
PublicationInfo
Funding
Contact
InformationURL
Association
PriorID

Used by: Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Registry
Repository
Service
Software

ResourceID ID

A ResourceID 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". All ResourceIDs must be unique within the SPASE framework.

Since:1.0.0

Used by: Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Granule
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry

Repository
Service
Software

ResourceName — Text

A short textual resource description that is sufficient for identifying the resource. It should have a one-to-one correspondence to the ResourceID of the resource.

Since:1.0.0

Used by: Member
ResourceHeader

ResourceType — Enumeration

The enumerated list of all SPASE resource types.

Since:2.7.0

Allowed Values: Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Granule
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry
Repository
Service
Software

Used by: Annotation
Catalog
Collection
DisplayData
DisplayOutput
Document
Granule
Instrument
Model
ModelRun
NumericalData
NumericalOutput
Observatory
Person
Registry
Repository

Service
Software

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

re3data Text

The DOI registered with re3data for a given data repository. For re3data.org Schema 4.0 see DOI: http://doi.org/10.48440/re3.014

Since:2.7.0

Used by: Repository

Rhea Item

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

Since:2.2.5

Rights Container

Any rights information for this item. This property may be repeated to record complex rights characteristics for the same item. May be used for both metadata and dataset licenses.

Since:2.7.0

Sub-elements SchemeURI
RightsIdentifierScheme

RightsIdentifier
RightsURI
RightsName
Note

Used by: MetadataRightsList
RightsList

RightsIdentifier Text

Text value should be the identifier/short name of the license.

Since:2.7.0

Used by: Rights

RightsIdentifierScheme Text

Text value should be 'SPDX'

Since:2.7.0

Used by: Rights

RightsList Container

Wrapper element to allow multiple rights. Thus, rights properties may be listed as needed to record complex rights characteristics.

Since:2.7.0

Sub-elements Rights

Used by: AccessInformation

RightsName Text

Text value should be the full name of the license.

Since:2.7.1

Used by: Rights

RightsURI URL

Text value should be the SPDX URI of the license. Blueprint is typically (SchemeURI) + (RightsIdentifier) + '.html'.

Since:2.7.0

Used by: Rights

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 keV 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 measures 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

RINEX2 Item

Receiver Independent Exchange Format (RINEX) - version 2.*, is a data interchange format for raw satellite navigation system data.
https://files.igs.org/pub/data/format/rinex211.txt.

Since:2.4.1

RINEX3 Item

Receiver Independent Exchange Format (RINEX) - version 3.*, is a data interchange format for raw satellite navigation system data.
https://files.igs.org/pub/data/format/rinex300.pdf.

Since:2.4.1

Role Enumeration

The assigned or assumed function or position of an individual.

Since:1.0.0

Allowed Values
- ArchiveSpecialist
- Author
- CoInvestigator
- Contributor
- CoPI
- DataProducer
- DeputyPI
- Developer
- FormerPI
- GeneralContact
- HostContact
- InstrumentLead
- InstrumentScientist
- MetadataContact
- MissionManager
- MissionPrincipalInvestigator
- OperationsManager
- PrincipalInvestigator
- ProgramManager
- ProgramScientist
- ProjectEngineer
- ProjectManager
- ProjectScientist
- Publisher
- Scientist
- TeamLeader
- TeamMember
- TechnicalContact
- User

Used by: Contact

RORIdentifier Text

The assigned Research Organization Registry (ROR) identifier, see https://ror.org/.

Since:2.3.3

Used by: Instrument
Observatory
Person
Registry
Repository

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
Hyperion
Iapetus
Magnetosphere
Magnetosphere.Magnetotail
Magnetosphere.Magnetopause
Magnetosphere.Main
Magnetosphere.Plasmasheet
Magnetosphere.Plasmasphere
Magnetosphere.Polar
Magnetosphere.RadiationBelt
Magnetosphere.RingCurrent

Mimas
Phoebe
Rhea
Tethys
Titan

SavedQuantity Enumeration

Quantities that are saved during a given diagnosis.

Since:2.5.0

Allowed Values
2DCuts
3DCubes
ACElectricField
ACMagneticField
Absorption
AdiabaticInvariant
AdiabaticInvariant.BounceMotion
AdiabaticInvariant.DriftMotion
AdiabaticInvariant.MagneticMoment
AkasofuEpsilon
Albedo
AlfvenMachNumber
AlfvenVelocity
ArrivalDirection
AtomicNumberDetected
AverageChargeState
ChargeFlux
ChargeState
CountRate
Counts
Current
CurrentDensity
DopplerFrequency
DynamicPressure
Electric
Electromagnetic
Emissivity
Energy
EnergyDensity
EnergyFlux
EnergyPerCharge
Entropy
EquivalentWidth
FlowSpeed
FlowVelocity
Fluence
Frequency
FrequencyToGyrofrequencyRatio

GeometricFactor
Gyrofrequency
HeatFlux
IMFClockAngle
Intensity
LShell
LineDepth
Lines
LowerHybridFrequency
Magnetic
MagneticField
MagnetosonicMachNumber
Mass
MassDensity
MassNumber
MassPerCharge
ModeAmplitude
NumberDensity
NumberFlux
Other
ParticleRadius
ParticleRigidity
PhaseSpaceDensity
PlasmaBeta
PlasmaFrequency
Polarization
Potential
PoyntingFlux
Pressure
PropagationTime
SolarUVFlux
SonicMachNumber
SoundSpeed
SpatialSeries
Spectra
StokesParameters
Temperature
ThermalSpeed
TotalPressure
UpperHybridFrequency
VCrossB
Velocity
VolumeEmissionRate
WavePhase
Wavelength

Used by: DiagnosisTimeStep

SC	Item

Spacecraft - A coordinate system defined by the spacecraft geometry and/or spin. Often has z-axis parallel to spacecraft spin vector. The x-axis and y-axis 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

SchemeURI URL

The Uniform Resource Identifier (URI) of the scheme. For licenses, the best practice is to use 'https://spdx.org/licenses/', although any permanent scheme URI is acceptable.

Since:2.7.0

Used by: Rights
StandardUnits

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 fluorescence 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. The 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.htmlr.

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 (towards 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

SensorCoordinates Item

A coordinate system defined by the instrument or measuring geometry.

Since:2.6.1

Service Container

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

Since:1.1.0

Sub-elements: ResourceID, NamingAuthority, ResourceType, ResourceHeader, AccessURL, Extension

Used by: Spase

Set Text

A collection of items for a particular purpose.

Since:1.3.0

Used by: InputField, InputPopulation

InputProcess
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

SideWall Text

Side walls of the model domain.

Since:2.5.0

Used by: ElementBoundary

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 array 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 dipole axis of the Earth, x-axis is in plane of z-axis and Earth-Sun line, positive sunward, see Russell, 1971.

Since:1.0.0

Software Container

An application which can be installed, built or readily used.

Since:2.4.0

Sub-elements ResourceID
NamingAuthority
ResourceType
ResourceHeader
AccessInformation
SoftwareVersion
ApplicationInterface
CodeLanguage

Prerequisites
ExecutionEnvironment
InputProperty
OutputProperty

Used by: Spase

SoftwareVersion Text

Describes the edition of the software release. The formation rule for the version may vary between software packages. It is intended to aid in queries to the software provider regarding the software.

Since:1.0.0

Used by: Software

SoftXRays Item

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

Since:1.3.5

SolarFilament Item

A structure of cool, dense plasma suspended above the solar surface by the magnetic field that appears as a dark line when observed against the bright solar disk. The same type of structure is generally called a SolarProminence when observed above the solar limb.

Since:2.7.2

SolarFilamentEruption Item

An event in which a SolarFilament rises, expands, destabilizes, or is expelled from its pre-eruptive configuration when observed against the solar disk. The same type of event is generally called a SolarProminenceEruption when observed above the solar limb. The eruption may be partial or complete, confined, or associated with a coronal mass ejection.

Since:2.8.0

SolarFlare Item

An explosive event in the solar 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

SolarProminence Item

A structure of cool, dense plasma suspended above the solar surface by the magnetic field that appears bright when observed above the solar limb. The same type of structure is generally called a SolarFilament when observed against the bright solar disk.

Since:2.7.2

SolarProminenceEruption Item

An event in which a SolarProminence rises, expands, destabilizes, or is expelled from its pre-eruptive configuration when observed above the solar limb. The same type of event is generally called a SolarFilamentEruption when observed against the solar disk. The eruption may be partial or complete, confined, or associated with a coronal mass ejection.

Since:2.8.0

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 3-D 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

SourceRegion Text

The apparent region of space from which a particular type of observed electromagnetic or particle radiation appears to have originated.

Since:2.6.1

Used by: Particle
Wave

SourceRegionExtent Text

The observational size of a remote source of radiation (electromagnetic waves or particles). It is typically expressed in angular width (full or half width), or in solid angle, subtended at the observing point. SourceRegionExtent should be accompanied by the description of source direction (see Direction under Qualifier).

Since:2.6.1

Used by: Particle
Wave

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

Since:1.2.0

SouthernmostLatitude Text

The latitude furthest to the south in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

SpacecraftOrbitPlane Item

A coordinate system where x-axis lies in the plane normal to and in the direction of motion of the spacecraft, the z-axis is normal to this plane and the y-axis completes the triad to form 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
- Status
- MetadataRightsList
- Catalog
- DisplayData
- NumericalData
- Granule
- Instrument
- Observatory
- Person
- Registry
- Repository
- Service
- Annotation
- Document
- Software
- Collection
- Model
- ModelRun
- DisplayOutput
- NumericalOutput

SpatialCoverage Container

A region of space defined by the latitude, longitude and altitude in a geographic coordinate system.

Since:2.4.2

Sub-elements
- CoordinateSystem
- CenterLatitude
- NorthernmostLatitude
- SouthernmostLatitude
- CenterLongitude
- EasternmostLongitude
- WesternmostLongitude
- CenterElevation
- MinimumElevation
- MaximumElevation
- Acknowledgement

Description

Used by: DisplayData
Granule
Member
NumericalData
Parameter

SpatialDescription Container

A characterization of the spatial extent over which the measurement was taken.

Since:2.5.0

Sub-elements Dimension
CoordinateSystem
Units
UnitsConversion
StandardUnits
CoordinatesLabel
CutsDescription
CubesDescription
PlaneNormalVector
PlanePoint
RegionBegin
RegionEnd
Step

Used by: DisplayOutput
Model
NumericalOutput

SpatialDimension Count

Number of spatial dimensions in the model domain.

Since:2.5.0

Used by: ModelDomain

SpatialSeries Item

A set of 3-D arrays that contain the values of physical parameters, i.e., magnetic field vectors, particle densities, temperatures, etc., at grid points in a spacial volume.

Since:2.6.0

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

SpecificModeledRegion Enumeration

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

Since:2.5.0

Allowed Values Callisto

Enceladus
Europa
Ganymede
Incident
Io
Planet
Rhea
Titan
Title

Spectra Item

A term that applies to any signal that can be measured or decomposed along a continuous variable such as the electromagnetic radiation which can be decomposed as a function of wavelength or frequency.

Since:2.6.0

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.

Since:1.0.0

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
DisplayOutput
FrequencyRange
NumericalData
NumericalOutput
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. The z-axis is parallel to the spacecraft spin vector. The x-axis and y-axis 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. The z-axis is parallel to the spacecraft spin vector while the x-axis is in the plane defined by the z-axis 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, i.e., consider the Helios spacecraft with the x-axis from spacecraft to Sun, the z-axis normal to ecliptic plane positive northward. Note that the angle between the normal to ecliptic plane and the normal to the Helios orbital plane is ~0.25 deg.

Since:1.0.0

SSE_L Item

Selenocentric Solar Ecliptic - The x-axis points from the center of the 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

StandardUnits

A container describing a unit of measurement using a standard syntax, including the syntax st
definition. VOUnits
(https://ui.adsabs.harvard.edu/link_gateway/2023ivoa.spec.1215G/doi:10.5479/ADS/bib/2023iv
is the recommended syntax standard.

Since:2.7.2

Sub-elements: UnitsString, UnitsScheme, SchemeURI, UnitsSchemeVersion, UnitsURI

Used by: AzimuthalAngleRange, DataExtent, Element, EnergyRange, FrequencyRange, InputField, InputProcess, InputProperty, MassRange, ModelDomain, OutputProperty, Parameter, PitchAngleRange, PolarAngleRange, Property, SpatialDescription, WavelengthRange

StartDate — DateTime

The specification of a starting point in time.

Since:1.0.0

Used by: Contact, Granule, Member, OperatingSpan, TimeSpan

StartLocation — Text

The initial position in space.

Since:1.3.6

Used by: ObservationExtent

Status — Enumeration

Indicates the status of the resource.

Since:2.7.1

Allowed Values
- Completed
- Deprecated
- Ongoing
- Unavailable
- Withdrawn

Used by: Spase

Step — Text

Spatial step between two elements of the diagnosis.

Since:2.5.0

Used by: SpatialDescription

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

StonyhurstHeliographic — Item

The origin of the Stonyhurst heliographic coordinate system is at the intersection of the solar equator and the central meridian as seen from Earth. Thus, the coordinate system remains fixed with respect to Earth, while the Sun rotates (synodically) underneath it. The latitude and longitude angles, theta and phi, respectively, are given in degrees, with theta increasing towards solar North, and phi increasing towards the solar West limb. The distance r is either a physical distance in meters, or is relative to the solar photospheric radius R approximately equal to 6.96 x 10^8 m. This coordinate system is demonstrated in An alternative to the r coordinate is the height h = r - R relative to the solar surface, where h is positive above the surface and negative below the surface.

Since:2.6.1

StopDate — DateTime

The specification of a stopping point in time.

Since:1.0.0

Used by:
- Contact
- Granule
- Member
- OperatingSpan
- TimeSpan

StopLocation — Text

The final position in space.

Since:1.3.6

Used by: ObservationExtent

Storage — Text

The component of your computer that allows you to store and access data on a long-term basis. Indicate units with standard byte scales such as KB, MB, GB, TB and PB.

Since:2.4.0

Used by: ExecutionEnvironment

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 where two solar wind streams, typically having differing characteristics and solar sources, abut up against (and possibly partially interpenetrate) each other. The abbreviation SIR is commonly used in place of Stream Interaction Region.

Since:2.0.2

Strong — Item

Highly likely given the available evidence. Considered in the range of 7 to 10 on a scale of 0 to 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 or protocol with which resources can be accessed.

Since:2.3.0

Allowed Values: EPNTAP, File, Git, HAPI, Listing, Overview, Search, TAP, Template, 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 deg to low 60 deg latitude. 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

SubLongitude Text

The longitude on the surface of an object which is directly below another object.

Since:2.5.0

Used by: RegionParameter

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
- Corona.InnerCorona
- Corona.MiddleCorona
- Corona.OuterCorona
- 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 with energies higher than that of coexisting halo population.

Since:2.2.1

SupersededBy Item

Used to indicate that the current resource description has been replaced by another. The ResourceID of the replacement resource should be listed as the AssociationID.

Since:2.7.1

Supersedes — Item

Used to indicate that the current resource description replaces another. The ResourceID of the replaced resource should be listed as the AssociationID.

Since:2.7.1

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, Remark, RotationMatrix, SpinPeriod, SpinPhase, SpinRate, Telemetry, Temporal, Velocity, WebResource, WebService

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

Symmetry — Enumeration

Symmetry of the model domain.

Since:2.5.0

Allowed Values: Axial, Central, None, Plane

Used by: ModelDomain

TAP Item

The table access protocol (TAP) defines a service protocol for accessing general table data, including astronomical catalogs as well as general database tables. Access is provided for both database and table metadata as well as for actual table data. https://wiki.ivoa.net/twiki/bin/view/IVOA/TableAccess.

Since:2.4.1

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

TemporalDependence Enumeration

Whether the model results are obtained from a stationary solution or are dynamically computed.

Since:2.5.0

Allowed Values No
Yes

Used by: Model
ModelRun

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
DisplayOutput
NumericalData
NumericalOutput

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

TestParticle Item

A numerical scheme modeling the motion of charged particles in a prescribed field.

Since:2.6.0

Tethys Item

The fifth largest moon of Saturn and the sixteenth largest moon in the Solar System. The orbit Tethys is the third closest to Saturn of the major Cronian moons.

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

TFCat Item

Time-Frequency Catalogue (TFCat) is a catalogue model & transfer format for spectro-temporal features. https://gitlab.obspm.fr/maser/catalogues/catalogue-format.

Since:2.4.1

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

A characteristic fluctuation speed of a distribution of particles about the bulk flow speed of the distribution. The value of the thermal speed depends on the dimensions and temperature of the distribution. Specific quantitative definition of thermal speed must be provided by the provider of a resource to be described in SPASE. [Note: Its quantitative definition depends on the nature of the particle distribution and how the random speed is characterized or calculated and must be specified in the description of the quantity used in the product described by the SPASE document].

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 the x-axis is anti-sunward and the y-axis points in 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

TimeStart — DateTime

Time at which the coverage by the element begins.

Since:2.5.0

Used by: DiagnosisTimeStep, ModelTime

TimeStep — Duration

Time Step.

Since:2.5.0

Used by: ModelTime

TimeStop — DateTime

Time at which the coverage by the element ends.

Since:2.5.0

Used by: ModelTime

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

Title — Text

The name of a published composition, set or data, images or other work.

Since:2.4.2

Used by: PublicationInfo

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

TotalProductionRate — Text

The total number of items that can be produced during a given period of time.

Since:2.5.0

Used by: InputPopulation

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 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 nm to 400 nm.

Since:1.0.0

Umbriel Item

The third largest and fourth most massive moon of Uranus.

Since:2.2.5

Unavailable Item

No longer available dataset.

Since:2.7.1

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. Similar to NASA Level 1.

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

Undefined — Container

The parameter type is not provided.

Since:2.8.0

Sub-elements: UndefinedQuantity

Used by: Parameter

UndefinedQuantity — Enumeration

The kind of undefined parameter.

Since:2.8.0

Allowed Values: NotProvided

Used by: Undefined

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 links listed in the Bibliography) when appropriate or use tokens like R_E 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.

Since:1.0.0

Used by: AzimuthalAngleRange
DataExtent
Element
EnergyRange
FrequencyRange
InputField
InputProcess
InputProperty
MassRange
ModelDomain
OutputProperty
Parameter
PitchAngleRange
PolarAngleRange
Property
SpatialDescription

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: "1e-9>T" which converts the units of magnetic field data expressed in nT to Tesla. Another example is: "1e+3>m/s" which converts a velocity expressed in kilometers per second to meters per second.

Since:1.0.0

Used by: Element, InputField, InputProcess, ModelDomain, Parameter, Property, SpatialDescription

UnitsScheme — Text

The units scheme name (e.g., VOUnits).

Since:2.7.2

Used by: StandardUnits

UnitsSchemeVersion — Text

The units scheme version (e.g., 1.1).

Since:2.7.2

Used by: StandardUnits

UnitsString — Text

A string compliant with the syntax defined by UnitsScheme.

Since:2.7.2

Used by: StandardUnits

UnitsURI — Text

The unit URI (e.g., from QUDT or SI Digital Framework unit vocabularies).

Since:2.7.2

Used by: StandardUnits

Unlikely — Item

Not likely given the available evidence. Considered equal to 0 on a scale of 0 to 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 φ_{UH}^2=φ_{pe}^2+θ_{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
- Magnetosphere.Magnetotail
- Magnetosphere.Magnetopause
- Magnetosphere.Main
- Magnetosphere.Plasmasheet
- Magnetosphere.Plasmasphere
- Magnetosphere.Polar
- Magnetosphere.RadiationBelt
- Magnetosphere.RingCurrent
- 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
- Installer
- 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
InputField
InputProperty
ModelDomain
OutputProperty
Parameter
Property

ValidMin Text

The smallest legitimate value.

Since:1.2.0

Used by: Element
InputField
InputProperty
ModelDomain
OutputProperty
Parameter
Property

ValueAdded Item

Calibrated data that has been mapped on uniform space-time grid scales with gaps, flags and out-of-range values replaced with appropriate values. Similar to NASA Level 3.

Since:2.4.0

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

VelocityDimension — Count

Number of velocity dimensions in the model domain.

Since:2.5.0

Used by: ModelDomain

Venus — Enumeration

The second planet from the Sun in our solar system.

Since:1.2.0

Allowed Values: Magnetosphere, Magnetosphere.Magnetotail, Magnetosphere.Magnetopause, Magnetosphere.Main, Magnetosphere.Plasmasheet, Magnetosphere.Plasmasphere, Magnetosphere.Polar, Magnetosphere.RadiationBelt, Magnetosphere.RingCurrent

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 does not require documentation/external API changes. This number starts at 0 (zero).

Since:1.0.0

Used by: Spase

Versions — Container

A container of one or more sets of version information.

Since:2.5.0

Sub-elements: ModelVersion

Used by: Model

VersionTag — Text

The text string for a version indicator.

Since:2.5.0

Used by: ModelSpecification, ModelVersion

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 (photons/m^3/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-of-sight 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 the x-axis is anti-sunward and the y-axis point 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
SourceRegion
SourceRegionExtent

Used by: Parameter

WaveForm Item

Spatial or temporal variations of wave amplitude over wave period time scales.

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, StandardUnits, Bin

Used by: Wave

WavePhase — Item

Position of a wave within its cycle at a given point in time.

Since:2.7.0

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

WavePhase

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 to 4 on a scale of 0 to 10.

Since:1.3.6

WebResource — Item

A Web page or file-based resource accessible by a URL.

Since:2.4.1

WebService — Item

A Web-based service that uses SOAP, WSDL or UDDI open standards.

Since:2.3.0

WesternmostLongitude — Text

The longitude furthest to the west in a geographic coordinate system.

Since:2.4.2

Used by: SpatialCoverage

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

Withdrawn Item

Officially removed dataset.

Since:2.7.1

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 nm to 10 nm.

Since:1.0.0

Yes Item

The affirmative response to a yes or no question.

Since:2.6.0

YN Enumeration

The affirmative or negative response to a yes or no question.

Since:2.6.0

Allowed Values No
Yes

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

11. History

2.8.0	
2026-11-12	Add new PhenomenonTypes: "EUVWave", "SolarFilamentEruption", "SolarProminenceEruption", "CoronalDimming", "CoronalJet", "CoronalBrightPoint", "MagneticFluxEmergence". Update definitions for "NotProvided", "PersonID", "NumericalOutput", "DisplayOutput", and existing PhenomenonTypes: "EITWave", "SolarProminence", "SolarFilament". Add new ObservedRegions "Earth.NearSurface.Exosphere", "Sun.Corona.InnerCorona", "Sun.Corona.MiddleCorona", "Sun.Corona.OuterCorona". Add new "PlainLanguageDescription" element to ResourceHeader. Add new "Undefined" container to Parameter and add new "UndefinedQuantity" to it. Update NumericalOutput and DisplayOutput definitions and broken links in PDF. Update Resource-ID-Formation Guide to v6.
2.7.2	
2026-07-21	Add new StandardUnits container. Add new ObservedRegions: "Cusp", "Plasmasheet", "Magnetopause", "OuterRadiationBelt", "InnerRadiationBelt". Add new "NotProvided" to MeasurementType enumeration, "SolarFilament" and "SolarProminence" to PhenomenonType enumeration, and "Derived" to ProcessingLevel enumeration. Add versions from 2.2.1 on to Version enumeration. Add Keyword and LaunchDate elements to Observatory. Add ObservedRegion, MeasurementType, and Keyword to Instrument. Update PublishedBy definition to include formatting recommendations. Remove fixed values for SchemeURI and RightsIdentifierScheme.
2.7.1	
2025-11-26	Modified existing Rights object: renaming FullName to RightsName, adding Note, enclosing these properties within a Rights container to be used within both the RightsList and new MetadataRightsList. Added new moons to Jupiter and Saturn. Adding tombstone capability via the new Status element and additional AssociationTypes. Modifying the PriorID definition to more closely align with its current use.
2.7.0	
2025-02-03	Built out the Rights type; added SchemeURI, RightsIdentifier, RightsIdentifierScheme, RightsURI, FullName. Added FixedValue column to ontology.tab to hold schema-fixed values. Updated makexsd.js to format fixed values.
2025-02-03	Fixed typos in the DataCite rights and rightList Metadata Conventions section of the SPASE 2.7.0 Base Model PDF. Added OperationsManager to the Role enumeration list.
2024-12-04	Added DataCite equivalent container named rightsList to the AccessInformation container. The rightsList Container must include at least one text field elements called rights. Both rightsList and rights definitions have been added to the SPASE dictionary. Added new items to the Qualifier enumeration list: Amplitude, Magnitude, MassMixingRatio, and MixingRatio; definitions added to the SPASE Dictionary. Added NamingAuthority, a text field element, and

	ResourceType, an enumerated text field element, to all SPASE resource types (eighteen total). NamingAuthority and ResourceType have been inserted immediately following ResourceID and the both terms have been added to the dictionary. An enumeration list also called ResourceType has been added under list.tab. And, the ResourceType enumeration list items have been inserted into member.tab. Added the text field element re3data to the dictionary and to the Repository resource type container. Added the RORIdentifier text field under the Instrument, Observatory, Registry, and Repository resource type containers.
2.6.1	
2024-10-07	Added Dictionary listings for the terms Region and YN with assigned Enumeration List names. Changed Enumeration List name from Product to ModelProduct. Changed ProcCoeffType Enumeration List name to ProcessCoeffType. Correct duplicate History listing 329 to 330. Sort SPASE model Dictionary, List, and Member tab files alphabetically. The Member tab file was sorted alphabetically within each individual Enmeration List member sequence.
2024-09-05	Corrected the deletion error of PopulationChargeState in the Particle container. Added SPASE Dictionary definition for Muon added it to the ParticleType enumeration list.
2024-06-24	Updated SPASE Dictionary definitions for Acknowledgement, AssociationType, Author, Authors, DirectionAngle, Encoding, FlowSpeed, FlowVelocity, Format, MagneticCloud, PublicationDate, ReleaseDate, ResourceName, Style, and ThermalSpeed. Added SPASE Dictionary definitions for LocalGeographic, LocalGeomagnetic, and SensorCoordinates and added these terms to the CoordinateSystemName enumeration list. Added SPASE Dictionary definition for StonyhurstHeliographic and added this term to the CoordinateSystemName enumeration list per request of Masahito Nose-san. Added SPASE Dictionary definitions for AOGCM, GCM, and NonHydrostatic and added these terms to the ModelType enumeration list. Updated SPASE Dictionary definition for Electrohydrodynamics and revised the name of the term by deleting the last character, the terminal s, to maintain consistancy with other terms in ModelType enumeration list. Added SPASE Dictionary definition for InterplanetaryCoronalMassEjection and added this term to the PhenomenonType enumeration list. Corrected SPASE Ontology listing of the Cardinality for RepositoryID under AccessInformationOptional to replace the letter r with the number 1 (required). Updated the SPASE Ontology listing of the Cardinality for SpatialCoverage under DisplayData and Granule from + (1 or more) to * (0 or more). Updated the SPASE Ontology listing of the Cardinality for SpatialCoverage under Member and Parameter from 0 (optional) to * (0 or more). Updated the SPASE Ontology listing of the Cardinality for OperatingSpan under Observatory from + (1 or more) to * (0 or more). Updated the SPASE Ontology listing of the Cardinality for OperatingSpan under Instrument from 0 (optional) to * (0 or more). Updated the SPASE Ontology listing of the Cardinality for ModelType under Model from 1 (required) to + (1 or more). Added SPASE Dictionary definitions for SourceRegion and SourceRegionExtent and added these to text fields to the end of the Particle and the Wave containers each with * cardinality (0 or more).

	Added SPASE Dictionary definition for Lidar and added this term to the InstrumentType enumeration list.

2.6.0

2023-08-03	SPASE Version 2.6.0 Released.
2023-08-02	Changed SimulationModel to Model, SimulationRun to ModelRun, and other terms by replacing "Simulation" with "Model" and "Simulated" with "Modeled", The dictionary.tab file definitions wre similarly updated to a generic "model" form, Added Empirical under the ModelType enumeration list.
2023-07-16	Added AccessInformationOptional to the schema and under SimulationModel as simulation model code is not always accessible.
2023-07-09	Added AccessFilenameTemplate and AccessDirectoryTemplate to AccessInformation.
2023-06-15	Added AccessInformtion to the Software SPASE resource type.
2023-06-15	Added the Comet Enumeration List including three members.
2023-06-15	Updated the Description of Current under FieldQuantity and Added Current under ParticleQuantity; Added CurrentDensiity under both FieldQuantity and ParticleQuantity.
2023-06-15	Merged the Simulation 1.0.0 SPASE Model Extensions with the SPASE 2.5.0 Base Model; Four simulation related SPASE resource types added: SimulationModel, SimulationRun, DisplayOutput, and NumericalOutput; Merged Base and Simulation definitions.

2.5.0

2022-08-29	SPASE version 2.5.0 Released.
2022-08-29	Added AccessInformation to Collection.
2022-07-21	Added Collection, Member, and MemberID to the dictionary; Added Collection resource to model.

2.4.2

2022-07-21	SPASE version 2.4.2 Released.
2022-07-07	Revised the "SpatialCoverage" container.
2022-05-19	Added Title and LandingPageURL to the dictionary; Added Title and LandingPageURL to PublicationInfo.
2022-01-21	Added "SpatialCoverage", "NorthernmostLatitude", "SouthernmostLatitude", "EasternmostLongitude", "WesternmostLongitude", "CenterLatitude", "CenterLongitude", "MinimumAltitude", "MaximumAltitude" to the dictionary; Created "SpatialContainer" container; Added "SpatialCoverage" to "DisplayData", "Granule" and "NumericalData"; Decided during the telecon on 2022-01-20, but moved from 2.4.1 to 2.5.0.

2.4.1

2022-05-19	SPASE version 2.4.1 Released.
2022-05-05	Updated definitions of MeasurementType, PublicationDate, PublicationInfo and PublishedBy.
2022-04-28	Added Remark and WebResource to the dictionary; Added Remark, WebResource, WebService to SupportQuantity enumeration.
2022-04-20	Added InstrumentScientist to the dictionary and to Role enumeration; Fix definition of Longitude.
2022-02-24	Make Annotation.PhenomenomType zero or more occurrences (*); Make Observatory.Location one or more occurrences (+).

2021-10-14	Added Git, TAP, EPNTAP to the dictionary and to Style enumeration; Added TFCat, RINEX2 and RINEX3 to the dictionary and Format enumeration; Added Author to the dictionary and to Role enumeration.

2.4.0

2021-06-10	SPASE version 2.4.0 Released.
2021-04-29	Added ValueAdded to the dictionary; Added ValueAdded to ProcessingLevel.
2021-04-29	Changed Format in AccessInformation to have one or more occurrence.
2021-04-29	Added Policy and Convention to the dictionary and to DocumentType enumeration.
2021-02-04	Changed "Version" to "SoftwareVersion" under "Software"; Added elements to "InputProperty" and "OutputProperty".
2020-11-12	Added Software resource and related elements to the information model.

2.3.2

2020-10-15	SPASE version 2.3.2 Released.
2020-10-08	Added InstrumentLead to the dictionary and to Role.
2020-09-30	Added InstrumentGroupID and Experiment to the dictionary; Added InstrumentGroupID to Instrument and Experiment to InstrumentType.
2020-09-10	Added "Housekeeping", "Telemetry", "RotationMatrix", "EncodedParameter", "AutoSpectrum", "Coherence", "ImaginaryPart", "RealPart", "PowerSpectralDensity", "ChargeFlux", "DynamicPressure", "EnergyPerCharge", "ParticleRigidity", "MassPerCharge", "LShell", "MissionPrincipalInvestigator", "ProgramManager", "ProgramScientist", "VolumeEmissionRate", "SPICE", "MissionManager "to the dictionary and to appropriate "enumerations as suggested by L.F. Bargatze; Added "PDS4" and "PDS3" to "the "dictionary and to the "Format" enumeration as suggest by A. Masson.

2.3.1

2019-11-14	SPASE version 2.3.1 Released.
2019-10-31	Added CoPI, MidLatitudeRegion, SubAuroralRegion, ProjectEngineer, and ProjectManager to the dictionary; Added CoPI, ProjectEngineer, ProjectManager to Role enumeration; Added Plasmasphere, RingCurrent, and MidLatitudeRegion to Magnetosphere enumeration.; Added MidLatitudeRegion, and ProjectManager to NearSurface enumeration.; Fix typo with Role values with dashes.
2019-09-27	Added DirectionCosine, GeometricFactor, AdiabaticInvariant, MagneticMoment, BounceMotion, DriftMotion, DataQuality, Orientation, SpinPeriod, SpinPhase, SpinRate, LowerHybridFrequency and UpperHybridFrequency to the dictionary.; Create DirectionCosine enumeration with I,J,K as members; Create AdiabaticInvariant enumeration with MagneticMoment, BounceMotion and DriftMotion as members.; Added DirectionCosine to Qualifier list.; Added GeometricFactor, AdiabaticInvariant to ParticleQuantity; Added DataQuality, Orientation, SpinPeriod, SpinPhase and SpinRate to SupportQuantity.; Added LowerHybridFrequency and UpperHybridFrequency to WaveQuantity.
2019-06-13	Added RevisionHistory, RevisionEvent to the dictionary and Added RevisionHistory to ResourceHeader; Added IonGauge to the

	dictionary and to InstrumentType.
2019-06-13	Added StartDate, StopDate and Note to Contact.
2019-02-25	Added Developer, HostContact and User to the dictionary and Role list.
2018-11-01	Added Positron to the dictionary and ParticleType list.
2018-06-18	Added Eccentric Dipole (ECD) to the dictionary and CoordinateSystem list.
2.3.0	
2018-05-31	SPASE version 2.3.0 Released.
2018-05-08	Added File, HAPI, Listing, Search, Template, Overview, WebService to the dictionary and as values for Style enumeration.; Added Style to the dictionary and AccessURL.
2018-05-04	Added PublicationInfo, PublicationDate, Authors, Funding, Agency, Project, Award, ORCIdentifier to the dictionary and to the model.
2018-02-08	Added DOI to the dictionary and to ResourceHeader.
2.2.9	
2017-11-14	SPASE version 2.2.9 Released.
2017-09-07	Added HGRTN, HERTN to the dictionary and to CoordinateSystemName Added Entropy to the dictionary and ParticleQuantity.
2017-02-09	Added CadenceMin, CadenceMax, ExposureMin, ExposureMax, PartiallyRestricted, Confidence, ProviderName, MassRange, PitchAngleRange; Changed occurrence of Observatory/OperatingSpan from 1 to +.
2.2.8	
2016-07-21	SPASE version 2.2.8 Released.
2.2.7	
2016-07-21	Added JSON and CSV to the dictionary and to Format enumeration.
2016-07-21	Changed occurrence of "ParticleType" under "Particle" from + to * and "WaveType" under "Wave" from 1 to 0.
2.2.6	
2015-09-09	SPASE version 2.2.6 Released.
2.2.5	
2015-06-12	Added coordinate systems to enumeration.
2015-06-12	Added moons and magnetosphere to planets; Only the larger moons which are typically encountered or simulated were added.
2.2.4	
2015-05-31	SPASE version 2.2.4 Released.
2015-05-28	Added coordinate systems MSO, VSO, KSO, KSM, JSO, JSM to the dictionary and CoordinateSystemName, Added SolarUVFlux and IMFClockAngle to the dictionary and MixedQuantity.
2.2.3	
2014-05-22	SPASE version 2.2.3 Released.
2012-05-24	Added definition of "Moon" and Added to "Earth" enumeration as suggested by T. Narock.
2012-05-10	Modified definitions of "GEI", "AzimuthAngle", "ElevationAngle" and "PolarAngle" as suggested by J. Merka; Added definition for "ENP and Added to "CoordinateSystem ame" enumeration as suggested by J.

	Merka; Added definitions of "PhotomultiplierTube" and "SolidStateDetector" to the dictionary and "IntrumentType" as suggested by B. Weigel.
2012-03-15	Modified definition of "NumericalData" as suggested by R. Weigel and D.A. Roberts; Modified definition of "Potential" as suggested by F. Mozer, D.A. Roberts and S. Fung; Added "Magnetograph" to the dictionary and "Instrument Type" as suggested by J. King.

2.2.2

2012-02-27	SPASE version 2.2.2 Released.
2012-02-27	Added "Albedo" to the dictionary and to "WaveQuantity" list.; Added "ParticleRadius" to the dictionary and to the "ParticleQuantity" list.
2012-02-02	Added "Sector Boundary Crossing" to the dictionary and the "Phenomenon Type" list.; Added "Product Key" to the dictionary and under "Access Information".
2011-10-27	Updated definition of "Document"; Added "MIME Type" to the dictionary and "Document" structure; Added "Presentation", "Poster", "White Paper", "Technical Note", "Specification" and "Report" to the dictionary and to "Document Type" enumeration; Removed "Paper" from dictionary.
2011-09-26	Added "RenderingHints" under "Element"; Set occurrence for "CoordinateRepresentation" and "CoordinateSystemName" under "CoordinateSystem" to required (1); Set "Size" under "Structure" to required (1); Set "AssociationID" and "AssociationType" under "Association" to required (1).

2.2.1

2011-08-18	SPASE version 2.2.1 Released.
2011-06-16	Added "Core", "Halo", "Strahl" and "Superhalo" to the dictionary and to "Qualifier".
2011-05-12	Strike "product" from the definition of "Numerical Data".

2.2.0

2011-01-06	SPASE version 2.2.0 Released.
2011-01-06	Updated definition for "Irradiance".
2010-09-17	Added "SSE_L" to the dictionary and to "Coordinate System Name" list.
2010-09-15	Added "Excel" to the dictionary and to the "Format" list; Added "RenderingAxis", and "Index" to the dictionary and under "Rendering Hints"; Added "Vertical", "Horizontal", and "ColorBar" to the dictionary and to the "Rendering Hints" enumeration; Changed cardinality of "InvestigationName" from 1 to +; Added "Median, " Maximum" and "Minimum" to the dictionary and to "Qualifier" list.
2010-08-20	Updated definitions of "Outer", "Inner", "Heliosheath" and "Remote1AU".
2010-08-17	Added "S3_BUCKET" to the dictionary and "Encoding"; Added "Directional" to the dictionary and to "Qualifier"; updated the definitions for "EnergyFlux" and "Differential".
2010-06-25	Added "Fluence" to the dictionary and "ParticleQuantity"; Updated definitions for "NumberFlux", "CoordinateSystem" and "Counts"; Added "HCC" (Heliocentric Cartesian), "HCR" (Heliocentric Radial), HPC (Helioprojective Cartesian) and "HPR" (Helioprojective Radial) to the dictionary and under "CoordinateSystemName".

2010-05-21	Added "Heliosheath" to the dictionary and to "Heliosphere" enumeration.
2010-04-15	Added "Hardcopy" as an enumeration to the dictionary and to "Format"; Added "Film", "Photographic Plate", "Photograph", "Microfiche", "Microfilm", "Print" to the 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 the dictionary with elements "Start Date", "Stop Date" and "Note"; Added "Operating Span" to "Instrument" and "Observatory".

2.1.0

2010-03-19	SPASE version 2.1.0 Released.

2.0.3

2010-03-19	Updated definitions for "Number Flux", "Energy Flux", "Differential", and "Integral"; Added "Dust" to "Measurement Type" enumeration.
2010-02-04	Added "Former-PI" to the dictionary and to "Role" enumeration; Added "Note" to "Person".

2.0.2

2009-11-18	Modified definitions for "Observatory" and "Instrument".
2009-11-05	Added "StreamInteractionRegion" to the dictionary and to "PhenomenonType" enumeration; Updated the definition of "Coronal Mass Ejection".
2009-10-08	Added "ArrivalDirection" to the dictionary and to "ParticleQuantity" enumeration; Added "InstrumentMode" to the dictionary and to "SupportQuantity"; Updated definitions of "ChargeState" and "AtomicNumberDetected".
2009-09-24	Added "Atomic Number Detected", "MassNumber" and "ChargeState" to the dictionary and to the "ParticleQuantity" enumeration; Also added "DirectionAngle" to "ParticleQuantity".

2.0.1

2009-07-12	Updates to the definition "Access URL", "Data Extent", "Polar" and "Sonic Mach Number".
2009-07-12	Added "Sound Speed" to the dictionary and to "Particle Quantity".
2009-07-12	Updated the description of "Index" data type to explain wild cards.
2009-07-12	Under "Element" replaced "Component" with "Qualifier" and allow multiple occurrences.
2009-07-12	Changed "Rendering Hints" to 0-to-many occurrence.

2.0.0

2009-04-15	SPASE version 2.0.0 Released.

1.3.6

2009-04-09	Added "Area", "Bandwidth" and "Solid Angle" to "Integral", added "Field-Aligned", "Group", "Perturbation", "Phase" and "Spectral" to "Qualifier".
2009-04-09	Added "Child Event Of" and "Observed By" to "Association Type".
2009-04-09	Added "ObservationExtent" to "Annotation" with attributes of "Observed Region", "Start Location", "Stop Location" and "Note".
2009-04-09	Added "Classification Method" as a enumeration with allowed values of "Automatic", "Inspection", and "Inferred"; Added "ClassificationMethod" to "Annotation".

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 "Particle Type" to "Mixed".
2009-04-09	Added "Array" and "Total" to "Qualifier".
2009-04-09	Added "Atom" and "Neutron" to "Particle Type".

1.3.5

2009-04-06	Removed "Spectral Range" from under "Energy Range".
2009-03-26	Added "Far Ultraviolet", "HE-304", "LBH Band" and "Soft X-Rays" to the dictionary and "Spectral Range".
2009-03-26	Added "Absorption", "ACElectricField", "ACMagneticField", "DopplerFrequency", "Frequency", "PropagationTime", and "Wavelength" to the dictionary and "WaveQuantity"; Added "WaveType" with values of "Electromagnetic", "Electrostatic", "Photon", "PlasmaWaves", "Hydrodynamic", and "MHD".
2009-03-26	Updated definitions of "Emissivity", "EquivalentWidth", "Gyrofrequency", "Intensity", "LineDepth", "PlasmaFrequency", "PoyntingFlux"; Added "WaveType" with values of "Electromagnetic", "Electrostatic", "Photon", "PlasmaWaves", "Hydrodynamic", and "MHD".
2009-03-26	Changed the name of "Photon" to "Waves" and "PhotonQuantity" to "WaveQuantity"; Added "WaveType" with values of "Electromagnetic", "Electrostatic", "Photon", "PlasmaWaves", "Hydrodynamic", and "MHD".
2009-03-26	Added "Plasmagram", "Spectrogram" and "Wave Form" to the dictionary and to the "Display Type" list.
2009-03-26	Various editorial updates to definitions, spelling and typos.
2009-03-26	Added "ImageURL" to "Annotation" and dictionary.
2009-03-26	Added "Access URL" to "Repository" and "Registry".
2009-03-26	Changed "Mixed" to a container with "Qualifier" and "MixedQuantity" as attributes; Added "MixedQuantity" enumeration with allowed values of "AlfvenMachNumber", "Other", "PlasmaBeta", "ThermalPressure", "AlfvenVelocity", "MagnetosonicMachNumber", "PlasmaBeta", and "PlasmaFrequencyToGyrofrequencyRatio".
2009-03-25	Updated definitions for "Numeric" and "Text" data types.

1.3.4

2009-02-27	Changed "Wave" to "Waves".
2009-02-26	Added "Annotation" resource and "AnnotationType" and "ConfidenceRating" enumerations The terms "Anomaly", "Event", "Feature", "Probable", "Good", "High" were added to support the new enumerations.
2009-02-05	Added "Psuedo" and "Column" to the dictionary and to "Qualifier" list.
2009-02-05	Changed "Line-of-sight" to "Line Of Sight".
2009-02-05	Added (restored) "Intensity" to the dictionary and "Photon Quantity" list.
2009-01-23	Added "Ion Chamber" to the dictionary and "Instrument Type" list.
2009-01-22	Changed occurrence of "Particle" to one or more.
2009-01-22	Modified definition of "Mixed".
2009-01-14	Modified "Component" to consist of "I", "J", "K"; Added "DirectionAngle", and "Projection" to "Qualifier"; Removed "R", "Theta", "Phi", "X", "Y", and "Z"; Added "Direction Angle" as an

	enumeration with values of "AzimuthAngle", "PolarAngle" and "Elevation Angle"; Added "Projection" as an enumeration with value of "IJ", "IK", and "JK".
2009-01-14	Changed the definition of "Text" and converted "Text" to an enumeration with possible encoding types.
2009-01-14	Added "Language" under "Information URL".
2009-01-14	Added "Linear Scale" and "Log Scale" to the dictionary; Removed "Log" from the dictionary; Modified the definition of "Linear"; Removed reference scaled related usage; Updated the "Scale" enumeration with the name changes.
2009-01-14	Added "Wave", "Passive" and "Active" to the dictionary; Added "Wave" as an enumeration; Removed "Radio and Plasma Waves" and "Radio Soundings" from the "Measurement Type" enumeration; Added "Wave" to the enumeration.

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.

1.3.2

2008-10-15	Changed "Format" under "Rendering Hints" to "Value Format" to eliminate name conflict with "Format".
2008-10-07	Added "Interstellar" to the dictionary and Region.
2008-10-07	Removed "Charged Particle Flux" from Measurement Type and the dictionary.

1.3.1

2008-09-04	Added "Count Rate" to the dictionary and to "Particle Quantity".
2008-09-04	Added "Velocity" to "Support Quantity".
2008-09-04	Removed "Measured" and shifted containers under "Measured" up one level.
2008-09-04	Changed "Physical Parameter" to "Parameter".
2008-09-04	Added "Symmetric" to the dictionary and to Qualifier.
2008-09-04	Added "Rendering Hints" with elements Format, AxisLabel, DisplayType, ScaleMin, ScaleMax, ScaleType and related enumerated values.
2008-07-31	Added "Platform" to the dictionary and to the "Instrument Type" list, Removed "Ephemeris" from the "Instrument Type" list.
2008-07-31	Added "Ion Drift" and "Dust Detector" to the dictionary and to the "Instrument Type" list.
2008-07-31	Added "Trace" to the dictionary and to the "Qualifier" list.
2008-07-31	Added "Qualifier" as a unified list of all qualifiers; Removed "FieldQualifier", "PhotonQualifier" and "ParticleQualifier" from the dictionary; Replaced each with "Qualifier" in the ontology; Added "Qualifier" to "Support".
2008-07-31	Added "Source Type" as a list with possible values of Data, Layout, Ancillary, Browse and Thumbnail.
2008-07-31	Added "Source" to the dictionary and to "Granule", Removed "URL", "Checksum" and "DataExtent" from "Granule" and added them under "Source".
2008-07-31	Added "Set" to "PhysicalParameter".
2008-07-21	Updated description of duration type.

1.3.0

2008-11-22	SPASE version 1.3.0 Released.
2008-05-22	Removed "Array" from the Field, Photon and Particle qualifier lists.
2008-05-22	Fixed spelling of "Plasma Frequency" in the "Photon Qualifier" list.
2008-05-22	Added "EIT Waves" to the dictionary and "Phenomenon Type".
2008-05-22	Added "Radio Burst" to the dictionary and "Phenomenon Type".
2008-05-22	Added "Coronal Hole" to the dictionary and "Phenomenon Type".
2008-05-22	Added "Active Region" to the dictionary and "Phenomenon Type".
2008-05-22	Changed "End Date" to "Stop Date" and "Relative End Date" to "Relative Stop Date".
2008-05-22	Made "Encoding Type" multiple occurrence (*) in "Access Information".
2008-05-22	Added "TAR" to the dictionary and to "Encoding Type".
2008-04-24	Restored "Observatory Group" and made it multiple occurrence.
2008-05-20	Changed cardinality of "Phenomenon Type" to + in Catalog.
2008-05-20	Added "MagneticCloud" to the dictionary and "PhenomenonType".
2008-04-25	Removed "Provider Release Date" from dictionary.
2008-04-24	Removed "Observatory Group" from dictionary and Observatory.
2008-04-24	Removed "Structure Type" from dictionary and Structure.
2008-??-??	Added PhysicalParameter to Catalog and DisplayData.
2008-??-??	Added Electromagnetic to FieldQuantity.
2008-??-??	Moved CrossSpectrum from FieldQuantity to FieldQualifier.
2008-??-??	Added Number Flux to Particle Quantity.
2008-??-??	Added Document Type enumeration and Paper as an item.
2008-??-??	Introduced Document resource.
2007-??-??	Added Language to the dictionary.
2007-??-??	Added Contributor and Publisher to the dictionary and Role.
2007-??-??	Added Fax Number to Person.
2007-??-??	Added Units, UnitsConversion, ValidMin, ValidMax, FillValue to Element.
2007-??-??	Added SpectralRange to EnergyRange, FrequencyRange and WavelengthRange.
2007-??-??	Moved Extension into each resource class.
2007-??-??	Added SupportQuantity to Support.
2007-??-??	Added WavelengthRange to the dictionary; Added BandName to Bin.

1.2.2

2008-08-14	SPASE version 1.2.2 Released.
2008-07-31	Added Repository ID and Stop Date.
2008-07-31	AzimuthalAngle, Dayside, ElectricFieldInstrument, Frequency, HighLatitude, LowLatitude, Nightside, PolarAngle, ProviderID, ProviderReleaseDate, RTF, SGI, SoftXRays, SpatialRange, TeX, Wavelength, Wavenumber, XDR.
2008-07-31	Added "Ionosphere" as a list.
2008-07-31	Removed "Near Earth" as a list.
2008-07-31	Removed "Field Component" from lists.
2008-07-31	Removed "Offline" from "Medium".
2008-07-31	Changed "Observatory Group" to "Observatory Name".
2008-07-31	Changed "Time-of-flight" to "TimeOfFlight".

2008-07-31	Changed "RetardingPotentialAnalyser" to "RetardingPotentialAnalyzer".
2008-07-31	Changed "Plasmafrequency" to "PlasmaFrequency".

1.2.1

2008-03-20	SPASE version 1.2.1 Released.
2008-03-20	Removed Flux and Intensity.
2008-03-20	Updated definitions of Vector and Size.
2008-03-20	Added Carrington and HCI to Coordinate System.
2008-03-20	Added Anisotropy to Particle Qualifier.
2008-03-20	Added Energy Flux to Particle Quantity and Photon Quantity.
2008-03-20	Added Flow Speed, Number Flux to Particle Quantity.
2008-03-20	Added Archive Specialist to Role.
2008-03-20	Added TimeOfFlight, Interferometer, Photometer, Radiometer, Coronograph, ProportionalCounter, ScintillationDetector, Photopolarimeter, GeigerMuellerTube, NeutralParticleDetector, Sounder, NeutralAtomImager, RetardingPotentialAnalyser, MultispectralImager, ImagingSpectrometer, Riometer, Unspecified to Instrument Type.
2008-03-20	Added White-light, H-alpha, He-10830, Ca-K, Na-D, Extreme Ultraviolet, Ni-6768, K-7699 to the dictionary and to SpectralRange.
2008-03-20	Added EnergyRange and WavelengthRange to PhotonQuantity.
2008-03-20	Added Characteristic to ParticleQualifier.
2008-03-20	Added Current, Gyrofrequency, Energy, PlasmaFrequency to the appropriate ParticleQuantity, FieldQuantity, or PhotonQuantity.
2008-03-20	Added Parallel and PhaseAngle to FieldQualifier.
2008-03-20	Added SpacecraftOrbitPlane to CoordinateSystemName.

1.2.0

2007-05-22	SPASE version 1.2.0 Released.
2007-05-22	Added WGS84 as a Coordinate System Name.
2007-05-22	Removed Instrument Region from NumericalData.
2007-05-22	Added ITM regions under Near Surface.
2007-05-22	Added Location container under Observatory and added the elements Latitude, Longitude, Elevation, ObservatoryGroup.
2007-05-22	Added "Theta" and "Phi" to "Component".
2007-05-22	Removed D, H, T, N, Latitude, Longitude from the dictionary.
2007-05-22	Added "Spectrum" to "Measurement Type".
2007-05-22	Removed "Dynamic Spectra" from "Measurement Type".
2007-05-22	Under "Physical Parameter" made "Parameter Key" optional and "Name" required.
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	Made "URL" in "Granule" multi-valued.
2007-05-22	Added "Extension" as a container.
2007-05-22	Added Postscript as a Format.
2007-05-22	Added ProcessingLevel, Removed Theta and Phi.
2007-05-22	Converted Support to an enumeration with Other, Positional and Temporal as members.
2007-05-22	Added InstrumentStatus to MeasurementType.
2007-05-22	Made Component and enumeration with the values from Orientation.

2007-05-22	Removed Orientation.
2007-05-22	Added Element under Dimension.
2007-05-22	Added Element with members of Name, Index, ParameterKey and Component.
2007-05-22	Added Deputy-PI to Roles; Changed cardinality of Caveats under Instrument to optional.
2007-05-22	Cardinality of Access Information changed from 1 to + (1 or more).
2007-05-22	Modified definitions of H, Flux, Integral and Differential.
2007-05-22	Added Metadata Contact to Role.
2007-05-22	Changed InstrumentID in DisplayData and NumericalData to one or more occurrences.
2007-05-22	Defined PriorID and added PriorID to ResourceHeader and Granule.
2007-05-22	Added Sequence as a element type and changes Size to a Sequence.
2007-05-22	Added Ephemeris as an Instrument Type.
2007-05-22	Updated Phi and Theta definitions.
2007-05-22	Added Longitude and Latitude to Orientation.
2007-05-22	Added Expiration Date to Resource Header and Granule.
2007-05-22	Added Uncertainty and Standard Deviation to qualifiers.
2007-05-22	Added the ValidMin, ValidMax and FillValue to Physical Parameter.
2007-05-22	Added Data Extent to Access URL and Granule.
2007-05-22	Added Data Extent, Bytes and Per to describe the size of a resource.
2007-05-22	Added all planets, Comet and Asteroid as regions.
2007-05-22	Added Note as a term and added Note under Timespan.
2007-05-22	Added Checksum, Hash Value, Hash Function, MD5 and SHA1, SHA256.
2007-05-22	Added Aurora and Substorm under Phenomenon Type.

1.1.1

????-??-??	Changed AccessURL to type container.
????-??-??	Modified definition of Units.
????-??-??	Removed enumeration of Component.
????-??-??	Changed InstrumentID and Bin to multiple occurrence.

1.1.0

2006-08-31	SPASE version 1.1.0 Released.
2006-08-31	Added Statistics to Phenomenon Type.
2006-08-31	Added Field Component container.
2006-08-31	Added ChargeState to Particle Quantity.
2006-08-31	Removed "Instrument Name" and "Observatory Name".
2006-08-31	Changed "alias" to "alternate name".
2006-08-31	Added Release Date to Resource Header, Person, and Granule.
2006-08-31	Added Parameter Key under Physical Parameter.
2006-08-31	Added Granule.
2006-08-31	Changed Repository Name to Repository ID under Access Information.
2006-08-31	Removed Access Right from Display Data.
2006-08-31	Changed definition of Investigation Name.
2006-08-31	Removed Observatory ID from Numerical Data and Display Data.
2006-08-31	Added ObservatoryID under Instrument.
2006-08-31	Updated Pressure definition.
2006-08-31	Removed Coordinate System from Particle Physical Parameter.

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	Added Base64 as an Encoding.
2006-08-31	Added J2000 as a coordinate system.
2006-08-31	Added MAT_4, MAT_6, MAT_7 and VOTable as a Format.
2006-08-31	Updated description of "Resource ID".
2006-08-31	Added "Service" resource class.
2006-08-31	Made data type of "Mixed" text.
2006-08-31	Changed "Instrument type" to allow multiple occurrences.
2006-08-31	Modified definition of "Near Earth".
2006-08-31	Removed "Orbital".

1.0.3

2006-04-27	SPASE version 1.0.3 Released.
2006-04-27	Correct links to "Stokes Parameters".
2006-04-27	Changed "Spectral Range Name" to "Spectral Range" for consistency.
2006-04-27	Added "Near Earth" under "Heliosphere" and added "Outside Bowshock" and "Orbital" under "Near Earth".
2006-04-27	Moved Mass and Size under "Particle Physical Quantity" and changed to type item.
2006-04-27	Dropped N, Z, Q from dictionary.
2006-04-27	Added "NCAR" as a "Format".
2006-04-27	Changed "HF Radar" to "Radar".
2006-04-27	Made "Acknowledgement" options.
2006-04-27	Move "Access Rights" under "Access Information".
2006-04-27	Changed definition of "Item" to indicate it is a value of an enumeration.
2006-04-27	Changed "Observed Region" and "Instrument Region" to enumerations.
2006-04-27	Added "Earth" as a enumeration with "Magnetosphere" as a member.

1.0.2

2006-03-07	SPASE version 1.0.2 Released.
2006-03-07	Added the "Registry" resource class.
2006-03-07	Added the "Repository" resource class.
2006-03-07	Added "Caveats" under "Instrument".
2006-03-07	Added "ProjectScientist" to the dictionary and under "Role".

1.0.1

2006-01-03	SPASE version 1.0.1 Released.
2006-01-03	Added "Pressure" under "ParticleQuantity".
2006-01-03	Changes in value type for elements: "Exposure", "InputResourceID", "RepositoryName", and "Size".

1.0.0

2005-11-22	SPASE version 1.0.0 Released.
2005-11-22	Added "PhenomenonType" list and defined terms in the list.
2005-11-22	Incorporate comments from consortium members on the "final" draft before the release of version 1.0.

0.99.9

2005-11-18	SPASE version 0.99.9 Released.

2005-11-18	Incorporate comments from consortium members on the "final" draft before the release of version 1.0.

0.99.8

2005-11-03	SPASE version 0.99.8 Released.
2005-11-03	General clean-up and alignment with the schema.

0.99.7

2005-09-08	SPASE version 0.99.7 Released.
2005-09-08	Changed "AcceptableAbbreviation" to "ConventionalAbbreviation" since abbreviations are not supported in the model.
2005-09-08	Updated definition of "Magnetotail", etc. to be generic; Added "Earth" examples.
2005-09-08	Added all planets and the Moon under "Body".
2005-09-08	Added "Near1AU" under Heliosphere; Added "Body" under "Atmosphere-Ionosphere", "Magnetosphere" and "Ground".
2005-09-08	Added "WaveForm", "Spectra", etc. under "AnalysisMethod".
2005-09-08	Added "AnalysisMethod" under "Field" "Electric" and "Magnetic".
2005-09-08	Move Polar Angle under Particle "IndependentVariable".
2005-09-08	Drop Speed from Particle "IndependentVariable".
2005-09-08	Move Wavelength and Wave Number under Photon "IndependentVariable".
2005-09-08	Changed "PhotonContext" and "ParticleContext" to "IndependentVariable".
2005-09-08	Added "Description" and "TensorOrder" under "Parameter".

0.99.6

2005-09-07	Removed "Provider" and "Manufacture" resources and replaced with ID pointers.
2005-09-07	Introduced "PhotonContext" and "ParticleContext" as replacements for "IndependentVariable".
2005-09-07	Changed "UpperLatitude" to "HighLatitude" and "Lower" to "Low".
2005-09-07	Removed "Ratio" (Numerator and Denominator).
2005-09-07	Added "Spherical" and "Cartesian" under "Position".
2005-09-07	Removed "Body" and references to it.
2005-09-07	Changed "Surface" to "Ground".
2005-09-07	Corrected the inclusion of "Atmosphere-Ionosphere" regions into the "Magnetosphere".

0.99.5

2005-08-26	SPASE version 0.99.5 Released.
2005-08-26	Added "parameter" loosely based on a model proposed by D.A. Roberts.
2005-08-26	Included region descriptions from J. King with additions suggested by K. Reardon.
2005-08-26	Added "Catalog", "DisplayData" to the top list.
2005-08-26	Added document elements to product resources.
2005-08-26	Changed data types of "Integer" to "Count" and "Double" to "Numeric".
2005-08-26	Clarified some definitions and corrected typographical errors.

0.99.4

2005-08-08	SPASE version 0.99.4 Released.

2005-08-08	Added definitions for new elements introduced in the new taxonomy.
2005-08-08	Restructured the taxonomy of elements to match the one suggested by D.A. Roberts.

0.99.3

2005-08-03	Added definitions supplied by J. Thieman, C. Harvey and T. King; Significant revision of document as suggested by J. Hourcle.

0.99.2

2005-07-07	SPASE version 0.99.2 Released.
2005-07-07	Corrected "NumericalData" entry under "Product".

0.99.1

2005-06-23	SPASE version 0.99.1 Released.
2005-06-23	Added "ParticleCorrelator" and "SpacecraftPotentialControl" under "InstrumentType".
2005-06-23	Added C. Harvey definition for "Electron Drift".
2005-06-23	Removed duplicate entries.

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13. Appendix A - Comparison of Spectral Domains

Electromagnetic Spectrum Domains

(all wavelengths given in nanometers)

Band	Wavelength [ISO 21348]		Wavelength [EGSO]		Wavelength [VSO]	
	min	max	min	max	min	max
Gamma	0.00001	0.001	-	0.025		
X	0.001	10	0.025	10	0.02	15
HXR	0.001	0.1	0.025	0.25	0.02	1
SXR[1]	0.1	10	0.25	10	1	10
EUV	10	121	10	90	10	100
UV	100	400	90	320	90	380
Visible	380	760	320	700	350	1000
IR	760	10^6	700	10^6	700	$3.5*10^5$
Near IR	760	1400	700	$25*10^2$	700	
Mid IR	1400	3000	$25 \cdot 10^2$	$5 \cdot 10^4$		
Far IR	3000	10^6	$5 \cdot 10^4$	10^6	$3.5*10^5$	
Microwaves	10^6	$1.5*10^7$	10^6	10^9		
Radio	10^5	10^{11}	10^9	-	10^7	10^9

1 Also called “XUV” in ISO 21348