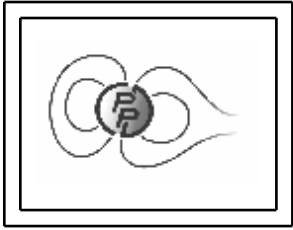


SPASE

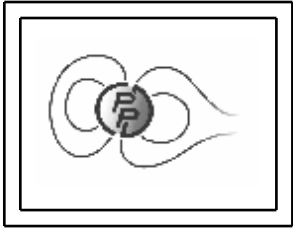
**Centre de Données de la Physique des Plasmas
CNRS/CESR**



What is SPASE ?

Space Physics Archive Search and Extract is

- An open international consortium formalized in 2003 with the goals of:
 - Facilitating data search and retrieval across the Space and Solar Physics data environment(Virtual Observatories and major data holdings)
 - Defining and maintaining a standard Data Model as a common language for Space and Solar Physics interoperability
 - Initially intend a level of description that allows to use the data retrieved
 - Add later a set of terms for specific access methods for direct retrieval
- U.S. participants funded by NASA since July 2005 until end of 2007. SPASE will receive "permanent support" from NSSDC after 2007.

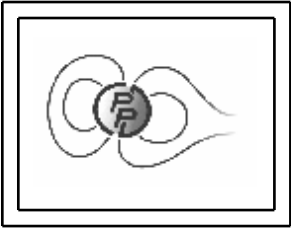


SPASE Goals

- Conceptualize the domain of space physics data and resources to provide a model to be used for describing resources

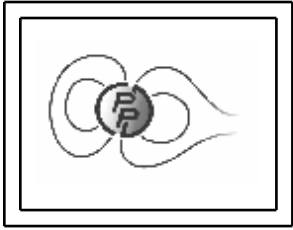
To enable:

- Searching of data in multiple repositories
- Retrieving of data from multiple repositories
- Comparing physical quantities from different data centers with a common vocabulary



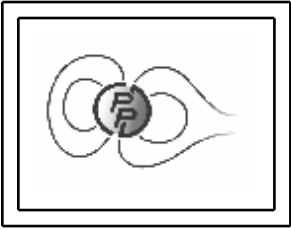
The Space Physics Data Environment

- Thousands of relatively small datasets as well as several large datasets (of time-series)
- Tens to hundreds of data centers or data providers (repositories), scattered worldwide
- Very diverse metadata terminology and data formats



SPASE Activities

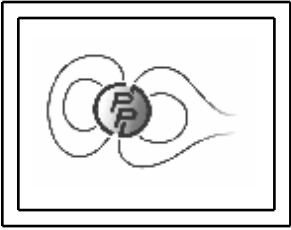
- team of space physics scientists, information specialists to establish standards.
- Write a specification document for the Space Physics Data Model
- e-mail + bi-weekly teleconferences to update the model (minor changes).
- Face to face meetings (twice a year) to release stable versions of the data model. (next meeting at RAL,UK, July 9-11,2007)
- Test data model and its representation (XML) with descriptions of real world resources.
- Modify or extend the data model in response to community needs.
- Provide tools to facilitate usage of the model (e.g. Resource editor)



Who will use the Spase Model

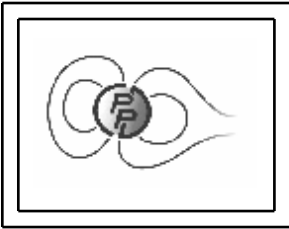
Who will provide descriptions of their holdings compliant with SPASE:

- Virtual Observatories supported by NASA :
 - VHO (Heliospheric)
 - ViRBO (Radiation Belt)
 - VITMO (Ionosphere, Thermosphere and Mesosphere)
 - VMO/G (Magnetospheres)
 - VMO/U (Magnetospheres)
 - VSPO (Space Physics)
- ESA Cluster Data Archive
- Centre de Données de la Physique des Plasmas (CDPP)



Inside the SPASE Data Model

- Spase model = set of terms and their relationships that represent the essential concepts of solar & space physics
- Philosophy of the model : describe products using a classification of data sources and of physical world as represented in actual or potential datasets
- The SPASE Model Describes the scientific relevance of *products* resulting from observations [or modeling] in solar & space physics
- Types of *products*: numerical datasets containing physical quantities (e.g. magnetic field), plots, images, software, documentation, event lists
- Resource = spacecraft, instrument, repository, service, registry, people



SPASE Data Model Hierarchy

JavaScript SPASE Tree Menu - (Frames Targeting) - Mozilla Firefox

file:///C:/Documents%20and%20Settings/Michel%20Gangloff/Mes%20documents/SPASE/SpaseTree1.1.0/index.html

Centre de Données de la Physique des Plasmas

Spase Dictionary Tree Version 1.1.0

Rq: Required Op: Optional *: 0 or more +: 1 or more

- Spase[Rq]
 - Version[Rq]
 - Catalog[*]
 - Display Data[*]
 - Numerical Data[*]
 - Resource ID[Rq]
 - Resource Header[Rq]
 - Access Information[Rq]
 - Provider Resource Name[Op]
 - Provider Processing Level[Op]
 - Provider Version[Op]
 - Instrument ID[Rq]
 - Measurement Type[+]
 - Temporal Description[Op]
 - Spectral Range[*]
 - Instrument Region[Op]
 - Observed Region[Op]**
 - Physical Parameter[+]
 - Name[Op]
 - Parameter Key[Rq]
 - Description[Op]
 - Caveats[Op]
 - Cadence[Op]
 - Units[Op]
 - Units Conversion[Op]
 - Coordinate System[Op]
 - Dimension[Op]
 - Measured[Op]
 - Field[Op]
 - Particle[Op]
 - Photon[Op]
 - Mixed[Op]
 - Support[Op]
 - Caveats[Op]
 - Keyword[*]
 - Input Resource ID[+]
 - Granule[*]
 - Instrument[*]
 - Observatory[*]
 - Person[*]
 - Registry[*]
 - Repository[*]
 - Service[*]

Observed Region

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.

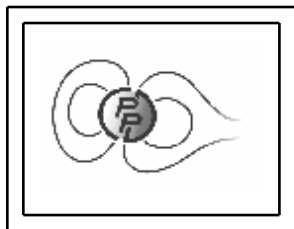
Allowed Values:

Earth	The third planet from the sun in our solar system.
Earth.Magnetosheath	The region between the bow shock and the magnetopause, characterized by very turbulent plasma.
Earth.Magnetosphere	The region of space above the atmosphere or surface of the planet, and bounded by the magnetopause, that is under the direct influence of the planet's magnetic field.
Earth.Magnetosphere.Magnetotail	The region on the night side of the body where the magnetic field is stretched backwards by the force of the solar wind. For Earth, the magnetotail begins at a night-side radial distance of 10 Re ($X < -10R_e$).
Earth.Magnetosphere.Main	The region of the magnetosphere where the magnetic field lines are closed. It does not include the gaseous region gravitationally bound to the body.
Earth.Magnetosphere.Polar	The region near the pole of a body. For a magnetosphere, it is the region where magnetic field lines are open and includes the aurora.
Earth.Magnetosphere.Radiation Belt	The region within a magnetosphere where high-energy particles could potentially be trapped in a magnetic field.
Earth.Near Surface	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.
Earth.Near Surface.Atmosphere	The neutral gases surrounding a body that extends from the surface and is bound to the body by virtue of the gravitational attraction.

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SPASE Dictionary : an example

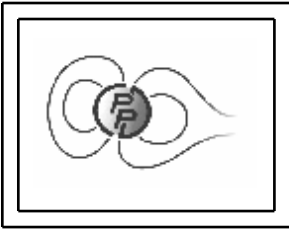
Instrument Region

Enumeration

The portion of space occupied by the instrument at the time of an observation. A region is distinguished by certain natural features or physical characteristics.

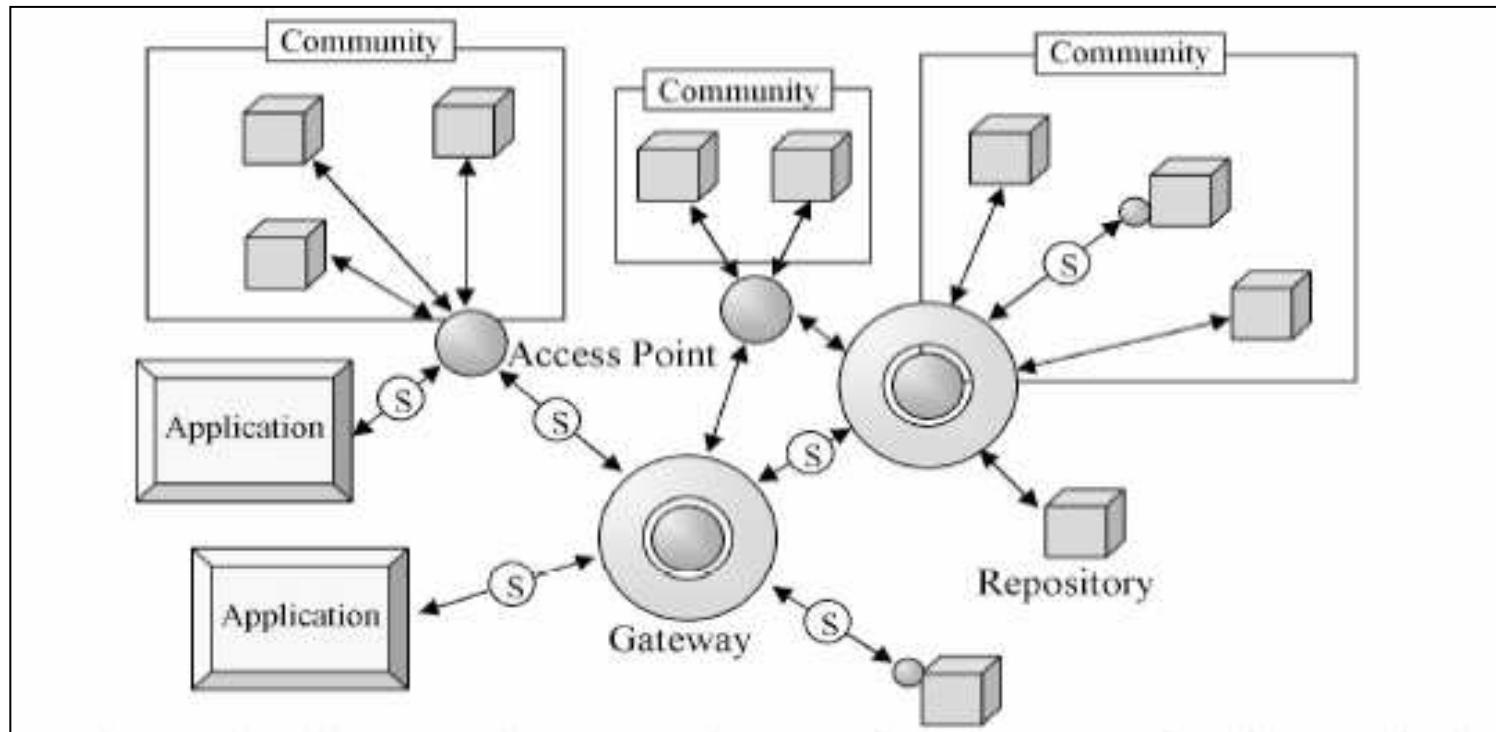
Allowed Values:

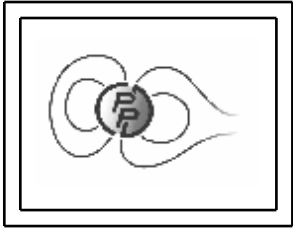
- Asteroid
- Comet
- Earth
- Earth.Magnetosheath
- Earth.Magnetosphere
- Earth.Magnetosphere.Magnetotail
- Earth.Magnetosphere.Main
- Earth.Magnetosphere.Polar
- Earth.Magnetosphere.Radiation Belt
- Earth.Near Surface
- Earth.Near Surface.Atmosphere
- Earth.Near Surface.Auroral Region
- Earth.Near Surface.Ionosphere
- Earth.Surface
- Heliosphere
- Heliosphere.Inner
- Heliosphere.Near Earth
- Heliosphere.Outer
- Heliosphere.Remote 1AU
- Jupiter
- Mars
- Mercury
- Neptune
- Pluto
- Saturn
- Sun
- Sun.Chromosphere
- Sun.Corona
- Sun.Interior
- Sun.Photosphere
- Sun.Transition Region
- Uranus
- Venus



A possible implementation

- “S” indicates SPASE Data Model messages
- Access Point : Discipline specific VO Gateway : registry of large numbers of products w pointers to VxOs, repositories
- “Virtual Observatories” may be Gateways or Access Points.
- Information and Data flows from Applications to Repositories through Access Points and Gateways





Spase ToolKit

- Validator : determines compliance with spase data model
- Parser : library to parse SPASE XML (Java)
- Web-based or standalone Editors : to ease to process of creating a descriptor compliant with SPASE
- Harvester : extracts information from resource descriptions compliant with SPASE