

# SPASE Data Model and Ontology Current Status and Overview

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# What is SPASE?

- Spase Physics Archive Search and Extract
- An organization to set community-based standards with the goals of:
  - Defining a data model for Space Physics
  - Demonstrating its viability
  - Enabling interoperability in a federated environment

# International Effort

- CNES/CNRS Plasma Physics (CDPP) Data Archive 
- NASA/Goddard Space Flight Center 
- NOAA/National Geophysical Data Center 
- Planetary Data System- UCLA Plasma Physics Interactions Node 
- Rutherford Appleton Laboratory 
- Southwest Research Institute 
- Applied Physics Laboratory 
- Jet Propulsion Laboratory 
- Augsburg College 
- European Grid of Solar Observations (EGSO) 
- Institute of Space and Astronautical Science (ISAS/JAXA) 

# A Brief History

- **1998 - ISTP**
  - The SPASE effort has its root in the data handling session of the ISTP workshop held at RAL in 1998, when on Sept 26 a resolution was passed calling on the "larger data centers" to "do something" to make data more accessible.
- **2001 - AISRP**
  - Early in 2001 a breadboard interoperability test bed was implemented between NSSDC and CDPP/CNES, and later that year, in response to an AO from NASA AISRP ROSS (Applied Information Systems Research Program, Research Opportunities in Space Science), a proposal entitled "A Space Physics Archive Search Engine (SPASE)" was submitted jointly by NSSDC, SwRI, RAL and CDPP.
- **2002 - Grassroots**
  - While this proposal was not funded a volunteer effort continued and attracted broader participation. It was recognized that a data model was needed to establish an "interlingua" to share resources across the entire space physics domain. The goals of this effort were defined in late 2002 and the new moniker of Space Physics Archive Search and Extract (SPASE) was adopted.
- **2003 - Open Community – NASA LWS**
  - In 2003 the effort was organized as an international consortium with an open invitation for anyone in the community to participate. U.S. participants in SPASE were funded by NASA in July 2005 which helped accelerate the effort.
- **2005 - Release 1.0**
  - In November 2005 SPASE released version 1.0 of its ontology (data model).
- **2006 - Release 1.1.0**
  - In response to community feedback, the data model was improved and in August 2006 version 1.1.0 was released. In that same year NASA solicited proposals to establish thematic virtual observatories for the heliophysics community and SPASE was adopted as the metadata standard to enable interoperability.
- **2007 – Release 1.2.0**
  - Based on feedback from the community and from the selected virtual observatories the data model was further refined and version 1.2.0 was released in May 2007.

## **And...**

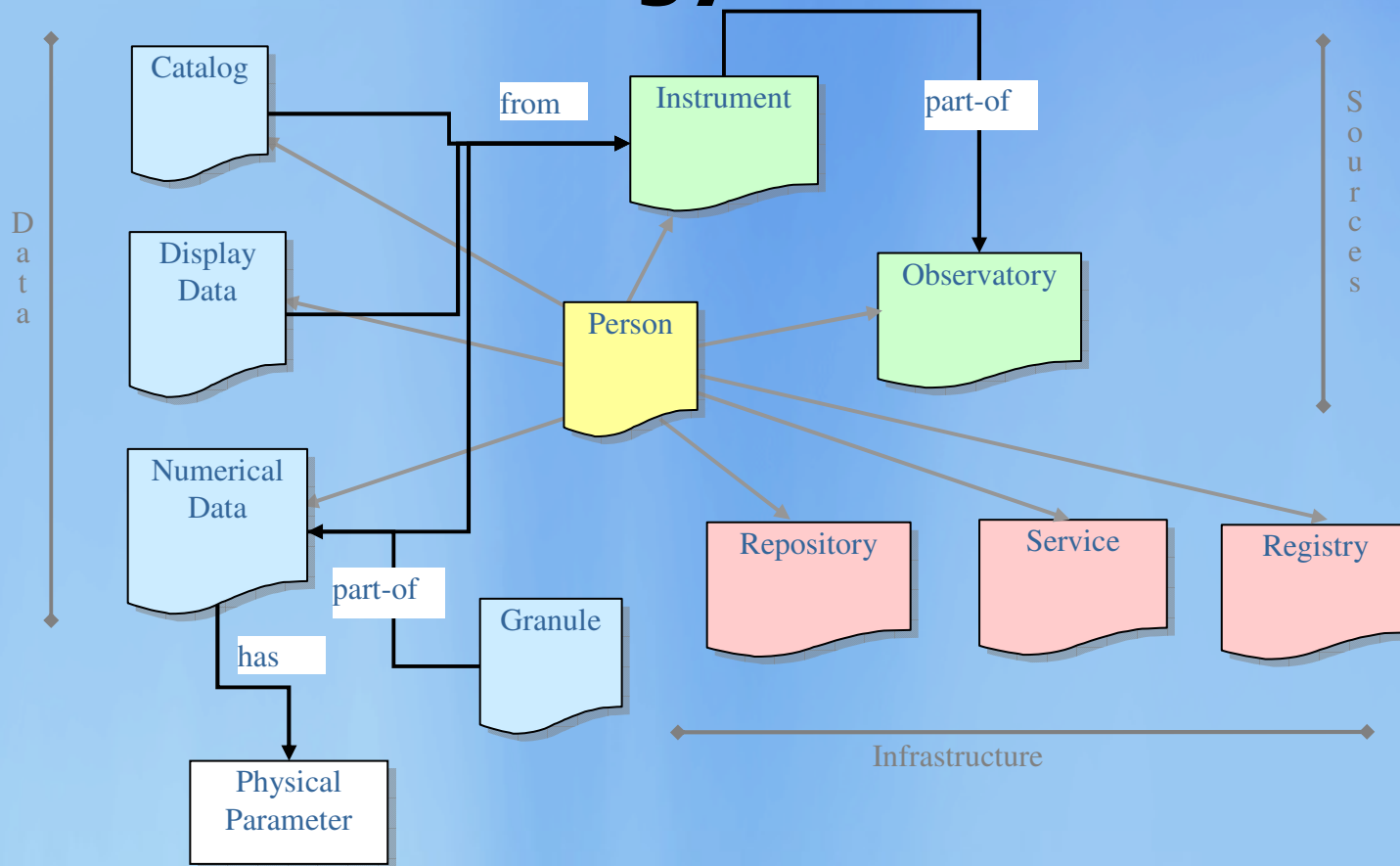
- Thousands of e-mails (3000+ since 2002)
- More than a hundred telecons (bi-weekly)
- A half-dozen face-to-face meetings

## **We have...**

# SPASE Today

- Data Model
  - Defined a standard data model for Space Physics
  - Current release version 1.2.0 (May 2007)
  - The data model is sufficiently rich to be considered an ontology.
  - The SPASE data model is a domain ontology.
- Services
  - Initial work on metadata sharing.
  - Distributed queries
  - Looking to adopters (VxO) to participate in defining service standards.

# SPASE Ontology



**The association map between resources in the SPASE model. Arrows point in the direction of association.**

# How We Update the model

1. Changes are proposed to the entire SPASE group.
2. Each proposed change is discussed in e-mail exchanges.
3. Further discussions of the change and "votes" occur during telecons.
4. Change is made to draft version of data model.
5. As needed a new version of the data model is released.

# SPASE in the Wild

## Clarity comes from usage

- The SPASE data model is implementation neutral.
- Chosen reference implementation is XML.
  - XML Schema
  - Numerous XML style sheets for converting metadata.
    - To HTML
    - To OAI
- Other mappings
  - Protégé (Steve Hughes)
  - OWL (Tom Narock)

# A Person Resource (XML)

```
<?xml version="1.0" ?>
<Spase xmlns="http://www.spase-group.org/data/schema">
<Person>
  <ResourceID>spase://VMO/Person/Todd.King</ResourceID>
  <ReleaseDate>2007-06-07</ReleaseDate>
  <PersonName>Todd King</PersonName>
  <OrganizationName>UCLA/IGPP</OrganizationName>
  <Address>3846 Slichter Hall
    Los Angeles, CA
    90095-1567
  </Address>
</Person>
</Spase>
```

# SPASE Tools

- To demonstrate the viability of the model and provide basic support for its adoption a set of tools have been developed:
  - **Validator** - Determines compliance with SPASE data model.
  - **Parser** – Convert SPASE XML to internal structures.
  - **Editor** – Create SPASE descriptions by hand.
  - **Generator** – Creates SPASE descriptions using external sources of information.
  - **Harvester** – Extracts information from SPASE resource descriptions (or registries)
  - **Wrapper** – Converts or embeds SPASE metadata in other descriptions or forms (i.e., OAI)
- **The VxO's are the real adopters and critical partners.**

# The Future

- Extend the data model to include:
  - Documents
  - Software
  - Models
- Define Service API
  - Query for resources
  - Parameter passing

# Conclusion

Domain specific data models and ontologies are enabling technologies. Making it possible for the seamless exchange of data across groups, agencies and international boundaries. With sufficient support (parsers, services, etc) adoption can be easy. SPASE is working towards this goal.

For more details:

[www.spase-group.org](http://www.spase-group.org)

# Cast of Characters

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