

The Heliophysics Data Environment, Virtual Observatories, NSSDC, and SPASE

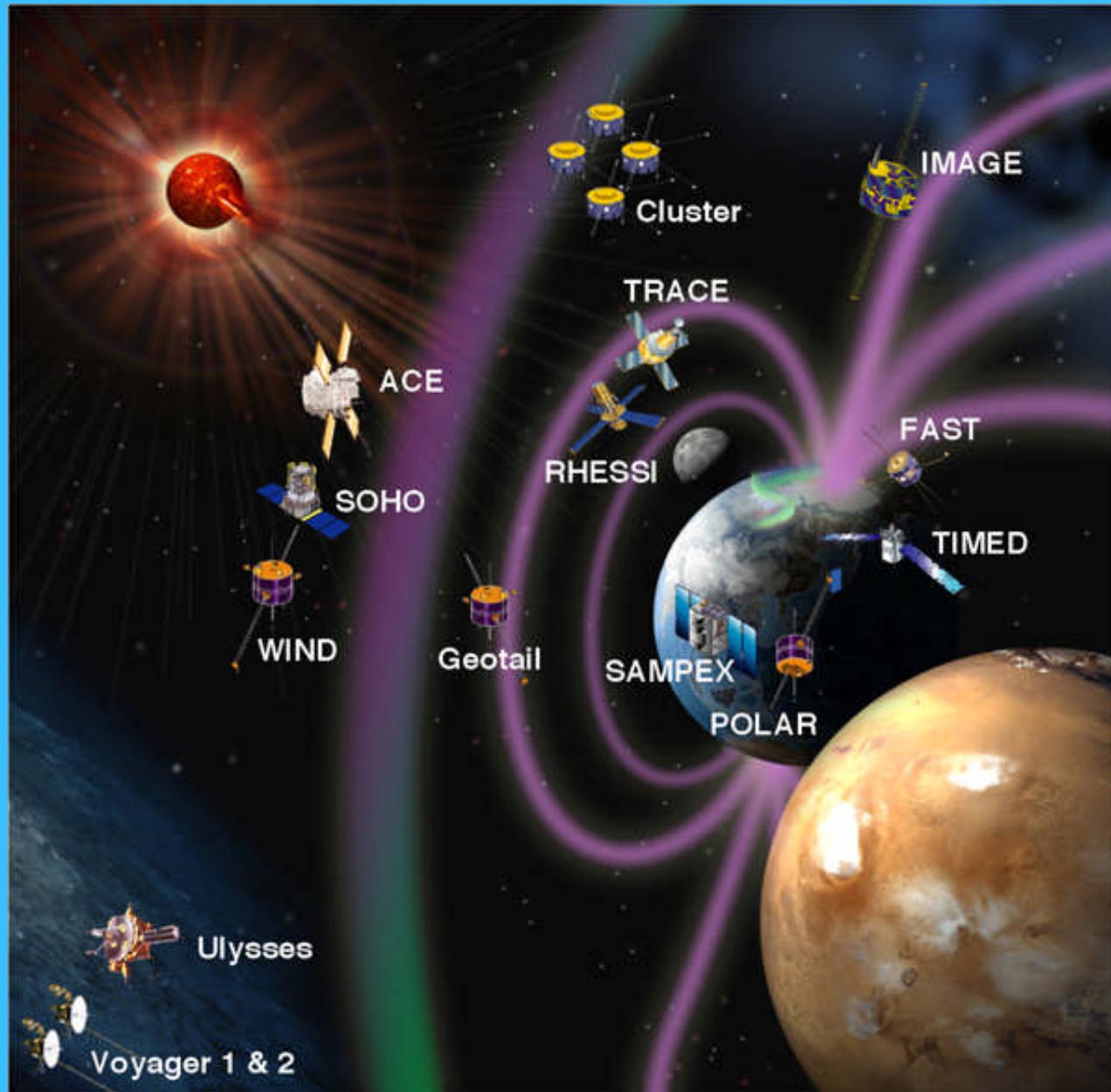
James Thieman, Edwin Grayzeck, Aaron Roberts, Todd King

Presentation at the 22nd International CODATA Conference
October 26, 2010

OUTLINE

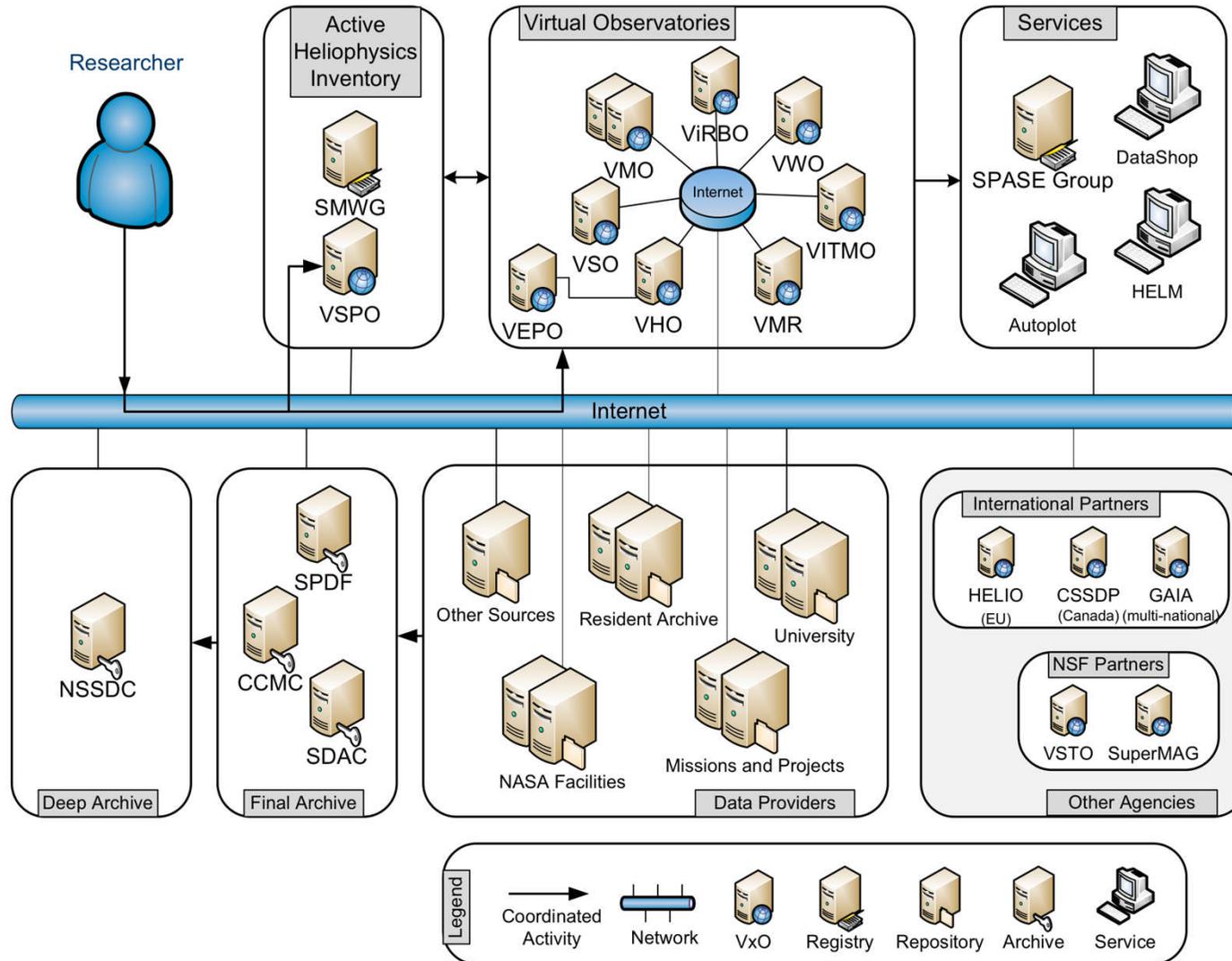
- **Heliophysics Data Environment**
- **Heliophysics Virtual Observatories (VO's)**
- **SPASE – VO Shared Metadata Approach**
- **SPASE Data Model**
- **Data Search within VO's and SPASE**
- **NSSDC and SPASE**
- **NSSDC as a World Data Center**
- **Trusted Digital Repositories**

Heliophysics Great Observatory

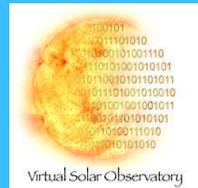


Heliophysics Data Environment

Heliophysics Data Environment
2009

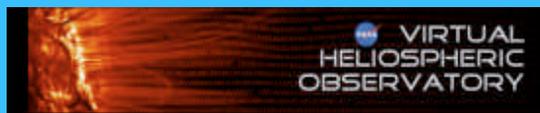


Heliophysics Virtual Observatories (VOs)



NASA-Funded

- VSO - Virtual Solar Observatory
- VSPO - Virtual Space Physics Observatory
- VMO - Virtual Magnetospheric Observatory
- VITMO - Virtual Ionosphere, Thermosphere, Mesosphere Observatory
- VHO - Virtual Heliophysics Observatory
- ViRBO - Virtual Radiation Belt Observatory
- VEPO - Virtual Energetic Particle Observatory
- VWO - Virtual Wave Observatory
- VMR - Virtual Model Repository



Non-NASA-Funded

- CAA - Cluster Active Archive
- CDPP - Centre de Données de la Physique des Plasmas
- CSSDP - Canadian Space Science Data Portal
- EGSO - European Grid of Solar Observations
- GAIA - Global Auroral Imaging Access
- VSTO - Virtual Solar Terrestrial Observatory
- ??
- ??



What is SPASE ?

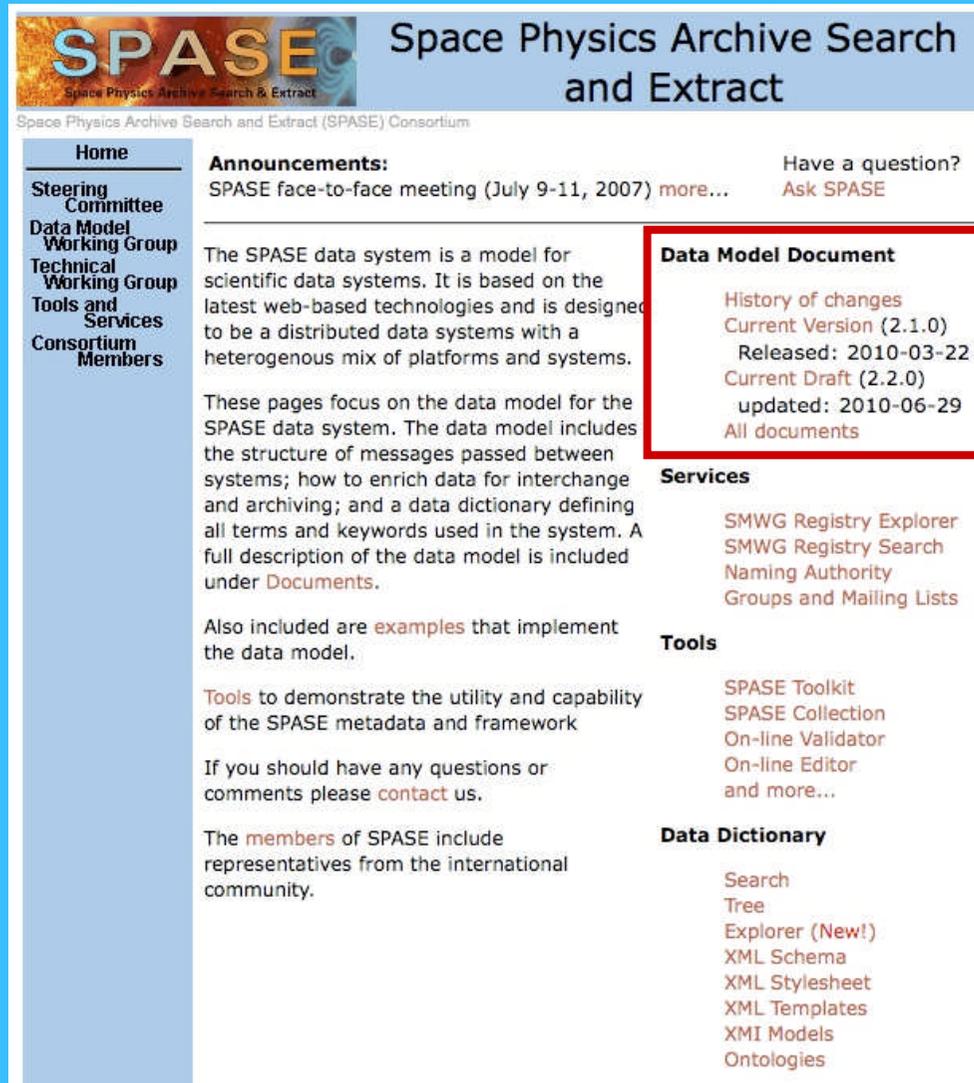
The **Space Physics Archive Search and Extract (SPASE)** effort is a heliophysics community based project with the goals of:

- Facilitating data search and retrieval across the Space and Solar Physics data environment with a **common metadata language**
- Defining and maintaining a standard **Data Model** for Space and Solar Physics interoperability, especially among **Heliophysics Virtual Observatories**
- Demonstrating the Model's viability
- Providing tools and services to assist SPASE users
- Working with other groups for other heliophysics data management and services coordination as needed

The Space Physics Archive Search and Extract (SPASE) effort is implemented by the SPASE Working Group composed of representatives of the heliophysics data community

The SPASE Working Group is the only international group supporting global data management for Solar and Space Physics

ACCESS TO THE SPASE DATA MODEL



The screenshot shows the SPASE website interface. At the top, the logo "SPASE" is displayed next to the text "Space Physics Archive Search and Extract". Below the logo, the text "Space Physics Archive Search and Extract (SPASE) Consortium" is visible. The main content area is divided into several sections: "Announcements" (with a link to a meeting from July 9-11, 2007), "Data Model Document" (highlighted with a red box and a red arrow), "Services" (including links to SMWG Registry Explorer, SMWG Registry Search, Naming Authority, and Groups and Mailing Lists), "Tools" (including SPASE Toolkit, SPASE Collection, On-line Validator, On-line Editor, and more), and "Data Dictionary" (including Search, Tree, Explorer (New!), XML Schema, XML Stylesheet, XML Templates, XMI Models, and Ontologies). A left sidebar contains navigation links: Home, Steering Committee, Data Model Working Group, Technical Working Group, Tools and Services, and Consortium Members.



Version 2.2 of the Data Model is imminent and will be “frozen” for community usage.

<http://spase-group.org>

DATA MODEL DOCUMENT

A Space and Solar Physics Data Model

from the SPASE Consortium

Version: 2.1.0

Release Date: 2009-03-19

Document Generated: 2010-Mar-22

6. 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>
  <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>
```

4. The Data Model presented hierarchically

The taxonomy tree shows the inter-relationship of elements in a "picture" view of the SPASE data model. This taxonomy tree and its elements are contained in the data dictionary.

Notes: Occurrence specifications are enclosed in parentheses. 1 or more, + = 1 or more

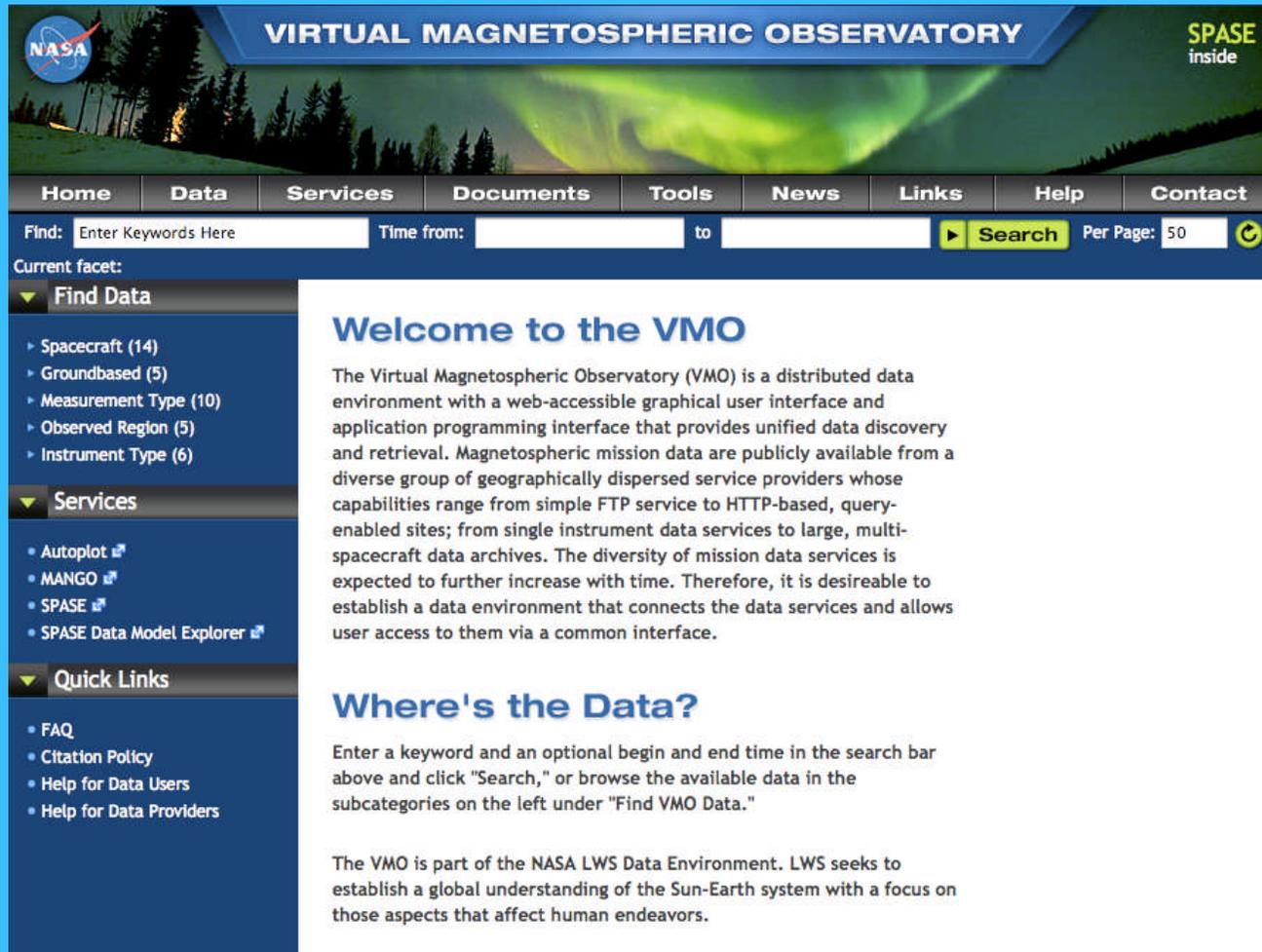
```
+ Spase (1)
|   + Version (1)
|   + Catalog (* of A)
|   |   + Resource ID (1)
|   |   + Resource Header (1)
|   |   |   + Resource Name (1)
|   |   |   + Alternate Name (*)
|   |   |   + Release Date (1)
|   |   |   + Expiration Date (0)
|   |   |   + Description (1)
|   |   |   + Acknowledgement (0)
|   |   |   + Contact (+)
|   |   |   |   + Person ID (1)
|   |   |   |   + Role (+)
|   |   |   + Information URL (*)
|   |   |   |   + Name (0)
|   |   |   |   + URL (1)
|   |   |   |   + Description (0)
```

SPASE-Based Searching

Searches across VOs based on the SPASE Data Model can be done by several methods:

- Any of the VOs can harvest and store all SPASE Data Descriptions and provide a cross-disciplinary search through their search interface.
- Registries can collect SPASE Resource Types and support searches
 - SPASE Resource Types:
 - Catalog
 - Display Data
 - Numerical Data
 - Granule
 - Instrument
 - Observatory
 - Person
 - Registry
 - Repository
 - Service
- SPASE Query Language can be used to search generically across the VOs, - assuming use of or mapping of SPASE metadata

Virtual Magnetospheric Observatory



Home **Data** **Services** **Documents** **Tools** **News** **Links** **Help** **Contact**

Find: Time from: to Per Page: 50

Current facet:

- Find Data
 - Spacecraft (14)
 - Groundbased (5)
 - Measurement Type (10)
 - Observed Region (5)
 - Instrument Type (6)
- Services
 - Autoplot
 - MANGO
 - SPASE
 - SPASE Data Model Explorer
- Quick Links
 - FAQ
 - Citation Policy
 - Help for Data Users
 - Help for Data Providers

Welcome to the VMO

The Virtual Magnetospheric Observatory (VMO) is a distributed data environment with a web-accessible graphical user interface and application programming interface that provides unified data discovery and retrieval. Magnetospheric mission data are publicly available from a diverse group of geographically dispersed service providers whose capabilities range from simple FTP service to HTTP-based, query-enabled sites; from single instrument data services to large, multi-spacecraft data archives. The diversity of mission data services is expected to further increase with time. Therefore, it is desirable to establish a data environment that connects the data services and allows user access to them via a common interface.

Where's the Data?

Enter a keyword and an optional begin and end time in the search bar above and click "Search," or browse the available data in the subcategories on the left under "Find VMO Data."

The VMO is part of the NASA LWS Data Environment. LWS seeks to establish a global understanding of the Sun-Earth system with a focus on those aspects that affect human endeavors.

FEATURES

- VMO has basic keyword and time search
- Again based on SPASE data set descriptions
- Can search by major resource types
- Data quickly downloadable

<http://vmo.igpp.ucla.edu/search/>

Virtual Heliospheric Observatory

Database maintenance in progress, response time may be slow. Version: 2.2.4

Query Builder
Search Criteria: Expand | Reset

Time

▼ **Observatories**
All
Inner heliosphere
Near Earth heliosphere
Earth surface
Remote 1 AU
Outer heliosphere

▼ **Data Products**
All
Inner heliosphere
Near Earth heliosphere
Remote 1 AU
Outer heliosphere
Heliosheath

▼ **Measurement type**
Activity index
Energetic particles
Ephemeris
Instrument status
Ion composition
Magnetic field
Neutral atom images
Thermal plasma

▼ **Parameter values**
Magnetic field
Ion density
Temperature
Velocity

▼ **Position**
▼ GSE
▼ GSM
▼ HCI
▼ SM

Current Query

Submit Save Clear

Load Query From Browse...

Limit: 99

Query Name: ✓ ✓ ✕

Time

Query Component ✓ ✕

And Or At same time In the same product

Time

EXPRESSION: ✕

Near Earth heliospheric observatory:
 Change

EXPRESSION: ✕

Magnetic field measurement type

Report Problem

FEATURES

- VHO emphasizes query building
- Query categories based on SPASE terminology
- Can save custom-built query
- Data granules available in XML and plot form

<http://vho.nasa.gov/index.php/data-query-mainmenu-26>

or google “virtual heliospheric observatory” and look for “Data Search”

Virtual Space Physics Observatory

Virtual Space Physics Observatory

SEARCH NASA

SPASE inside

PRODUCT FINDER ABOUT HELP ACCESSING VSPO SERVICES FEEDBACK

Text Restriction

Current Product Restrictions

No restrictions are currently set.

#	Product Name	Access Links
1	ACE 27-day Survey Plots	· Polar-Wind-Geotail 'gif-walk' site
2	ACE CRIS 1-hr Z=3-28 flux data	· ACE Science Center · ACE/SIS L2 data in HDF via ftp
3	ACE Daily Survey Plots	· Polar-Wind-Geotail 'gif-walk' site
4	ACE EPAM 1-hour particle flux data	· ACE Science Center (ASC) · in HDF via ftp from ASC · CDAWeb · in CDF via ftp from CDAWeb · in ASCII via ftp from NSSDC get data
5	ACE EPAM 5-min particle flux data	· ACE Science Center (ASC) · in HDF via ftp from ASC
6	ACE GSE 12-min Position Data	· in CDF via ftp from CDAWeb · Satellite Situation Center · CDAWeb get data
7	ACE MAG 1-hr Key Parameter (recent) data	· in CDF via ftp from CDAWeb · CDAWeb
8	ACE MAG 1-hr magnetic field data	· ACE Science Center (ASC) · in HDF via ftp from ASC · CDAWeb · in CDF via ftp from CDAWeb · in ASCII via ftp from NSSDC get data
9	ACE MAG 16-s Key Parameter (recent) data	· in CDF via ftp from CDAWeb · CDAWeb get data

Element Restriction

Resource type

Measurement type

Project

Observatory name

Instrument

Observed region

Instrument region

Spectral range

Timespan

Cadence

Repository Name

Access rights

Format

FEATURES

- Contains all SPASE data set descriptions
- Uses SPASE terminology for search keywords
- Provides data access through “get data” links
- Queries easily modified
- Can ingest XML-based SPASE descriptions

<http://vspo.gsfc.nasa.gov/websearch/dispatcher>

or google “VSPO”

Application Tools

Tools for working with SPASE metadata and the SPASE framework.

Validator

Determines compliance with a version of the SPASE data model.

XML Validate

Parser

Convert SPASE XML to internal structures

Parser

Editor

Web-based Editors

Web Editor

Standalone Editors

SPASE Assistant

Editors with Database Storage

Web+DB Editor

Generator

Create SPASE descriptions using external sources of information

Ruleset Description Generator

Harvester

Extracts information from SPASE resource descriptions (or registries)

SPASE Registry Server

SPASE Database Query

Wrapper

Converts or embeds SPASE metadata in other descriptions or forms (i.e., OAI)

Data Dictionary Lookup

SPASE-to-OAI mapping

Correlator

Divide an XML document into individual resource descriptions into a well organized file system

Correlator

Refcheck

Determine the validity of all references in a resource descriptions. Checks Resource IDs and URL

Refcheck

There are additional tools in development:

SPASE Query Language

Java-to-XML Binding Mechanism (JAXB)

SPASE Guidelines Document

NSSDC Role in SPASE

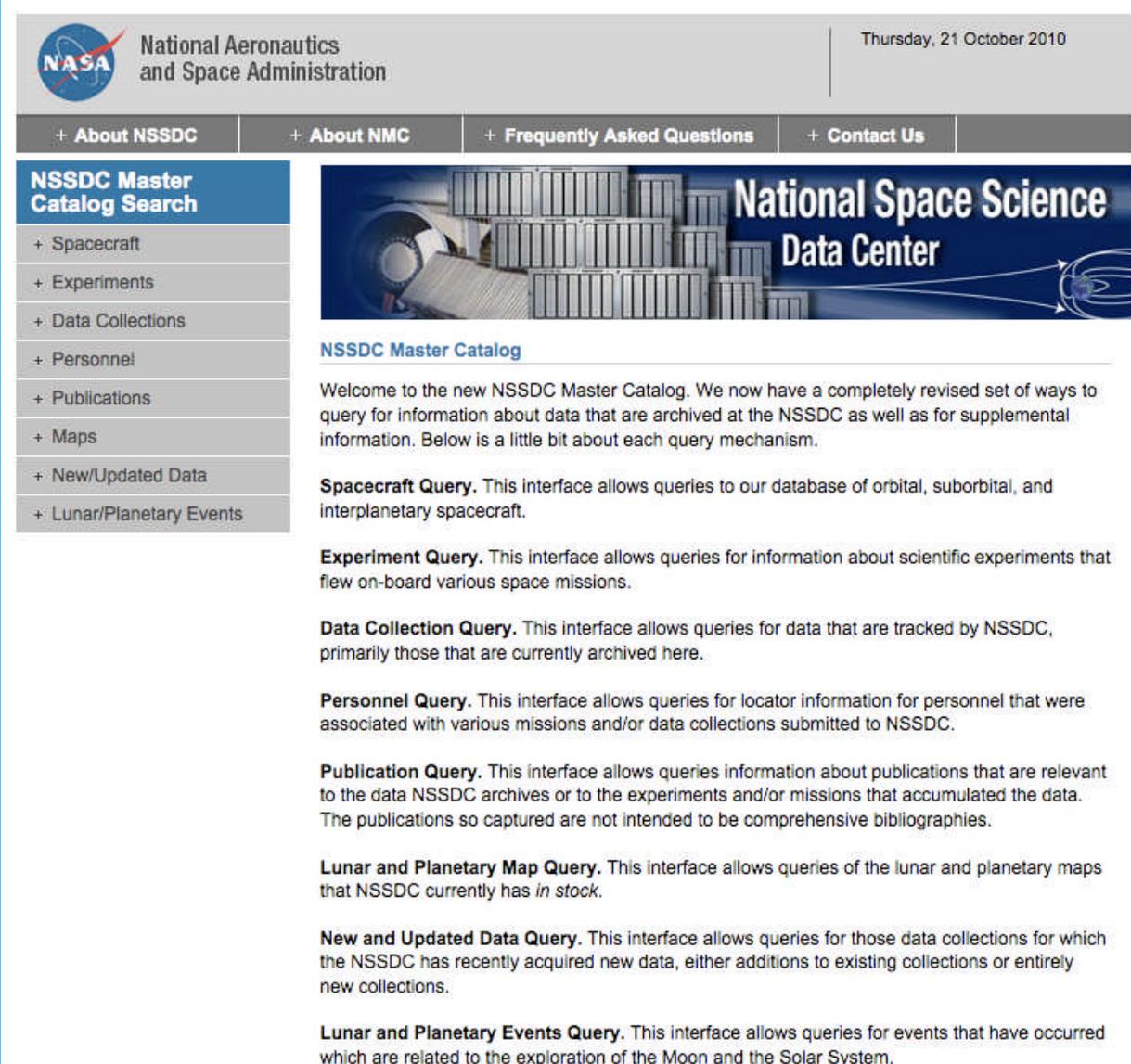
- The National Space Science Data Center (NSSDC) leads the SPASE effort (biweekly teleconferences, periodic face-to-face meetings, presentations at appropriate conferences, etc.)
- Maintaining the “deep archive” for heliophysics and planetary data
- Providing SPASE data set descriptions for popular NSSDC-requested data sets
- Enabling the SPASE Registry of spacecraft, instrument, and personnel information from the ***World Data Center for Satellite Information***

NSSDC – World Data Center

- The NSSDC is also the World Data Center for Satellite Information (WDC SI)
- The NSSDC/WDC SI **Master Catalog** holds information about rocket, satellite, and space probe launches; satellite orbit elements and ephemerides; descriptions of spacecraft and experiments
- WDC SI also publishes the **SPACEWARN** Bulletin which summarizes spacecraft launches monthly (<http://nssdc.gsfc.nasa.gov/spacewarn/>)

NSSDC – Master Catalog

- Provides searchable information on:
 - satellites
 - experiments
 - associated personnel
 - etc.
- Satellite ephemerides are often available
- Information is exportable for SPASE Registries



The screenshot shows the NASA National Aeronautics and Space Administration website. The header includes the NASA logo, the text "National Aeronautics and Space Administration", and the date "Thursday, 21 October 2010". Below the header is a navigation bar with links: "+ About NSSDC", "+ About NMC", "+ Frequently Asked Questions", and "+ Contact Us". The main content area features a "NSSDC Master Catalog Search" sidebar with a list of categories: "+ Spacecraft", "+ Experiments", "+ Data Collections", "+ Personnel", "+ Publications", "+ Maps", "+ New/Updated Data", and "+ Lunar/Planetary Events". The main content area has a banner for the "National Space Science Data Center" and a section titled "NSSDC Master Catalog" with a welcome message and several query mechanisms: "Spacecraft Query", "Experiment Query", "Data Collection Query", "Personnel Query", "Publication Query", "Lunar and Planetary Map Query", "New and Updated Data Query", and "Lunar and Planetary Events Query".

NASA National Aeronautics and Space Administration Thursday, 21 October 2010

+ About NSSDC + About NMC + Frequently Asked Questions + Contact Us

NSSDC Master Catalog Search

- + Spacecraft
- + Experiments
- + Data Collections
- + Personnel
- + Publications
- + Maps
- + New/Updated Data
- + Lunar/Planetary Events

National Space Science Data Center

NSSDC Master Catalog

Welcome to the new NSSDC Master Catalog. We now have a completely revised set of ways to query for information about data that are archived at the NSSDC as well as for supplemental information. Below is a little bit about each query mechanism.

Spacecraft Query. This interface allows queries to our database of orbital, suborbital, and interplanetary spacecraft.

Experiment Query. This interface allows queries for information about scientific experiments that flew on-board various space missions.

Data Collection Query. This interface allows queries for data that are tracked by NSSDC, primarily those that are currently archived here.

Personnel Query. This interface allows queries for locator information for personnel that were associated with various missions and/or data collections submitted to NSSDC.

Publication Query. This interface allows queries information about publications that are relevant to the data NSSDC archives or to the experiments and/or missions that accumulated the data. The publications so captured are not intended to be comprehensive bibliographies.

Lunar and Planetary Map Query. This interface allows queries of the lunar and planetary maps that NSSDC currently has *in stock*.

New and Updated Data Query. This interface allows queries for those data collections for which the NSSDC has recently acquired new data, either additions to existing collections or entirely new collections.

Lunar and Planetary Events Query. This interface allows queries for events that have occurred which are related to the exploration of the Moon and the Solar System.

Trusted Digital Repositories

... there is a demand for a standard against which Repositories of digital information may be audited and on which an international accreditation and certification process may be audited.

- Developing a standard with criteria that a repository archive must meet to be an ISO Trusted Digital Repository
- Being developed as a Consultative Committee for Space Data Systems (CCSDS) and ultimately an ISO standard
- Also includes requirements for groups providing audit and certification of TDRs

Audit and Certification of Trustworthy Digital Repositories (CCSDS/ISO Metrics Document)

- Provides a set of metrics to test an archives' compliance to OAIS archiving principles
- Archives can perform self-audits with this standard to identify their strong areas and areas where they may need improvement
- Certification requires an audit by an approved outside party with archives auditing experience

Summary

- **The Heliophysics Data Environment is historically diverse and widespread, but is being unified**
- **SPASE provides a unified metadata approach**
- **Testing of the utility of the system in finding and acquiring data is underway (Fall AGU)**
- **Creation of SPASE data descriptions is key to progress.**
- **Utility of SPASE tools can greatly influence success**
- **NSSDC/World Data Center for Satellite Information provides valuable information for SPASE descriptions**
- **Standard for auditing and certifying data repositories is in progress**

BACKUP

Search Scenario

Assume the user is interested in finding a wide variety of data relevant to a study of the major solar storms from Halloween Oct. 31, 2003.

- Time span of search - 2003-10-30 00:00:00 to 2003-11-01 23:59:59

How easily can this presently be done?

Approaches:

- Search archive by archive --> impractical!
- Use Virtual Observatories one-by-one (sample searches follow)
- Use a SPASE-related search across VOs

VO Searches

Virtual Solar Observatory

Search VSO Help or enter Cart Id:

Search for Solar Physics Data Products:

If you're new to the VSO, see [How To Search](#), the [FAQ](#) or click the  icons for online help.

Please select which values you wish to use to search for data products:

Time
Search by time interval.
[Derive time intervals from event catalogs](#)

Observable
Search based on physical observables 

Instrument / Source / Provider
Search based on instruments  or data archives 
 Compact listing
 Instrument / Source (not provider dependent)
 Instrument Only (not source or provider dependent)

Spectral Range
Search based on a spectral range

Nicknames
Search based on common terms used to describe data products
Note: Nicknames generate an intersection with other search terms, so searching for a nickname, and a physical observable (or other parameter) when a nickname defines other physical observables will result in no matches.
 Show Nickname Definitions

Searching against current VSO instances

VSO Documentation

Documentation for Scientists, Programmers and Data Providers, including Changes, [FAQs](#), and [contact info](#).

Help us improve VSO

- Tell us what features you would like to see.
- Other suggestions / comments / criticism
- Contact information for VSO team members

VSO @ Home | [NSO](#) | [Stanford](#)



FEATURES

- Predated SPASE Data Model
- Assumes reasonable knowledge of solar physics observables
- Retrieval of data can be ordered

Search Strategy: Use Time and Observable Search to find Halloween, 2003 Data- Time search alone returned 4878 items, having both narrow and broad time range (just in Halloween time frame or a time span of years)

VO Searches

Virtual Ionosphere, Thermosphere, Mesosphere Observatory

Virtual ITM Observatory

HOME | SEARCH

HELP

- Build VITMO Query

Coverages Time periods, spatial locations, specific resources for search

Add Coverage

Coverage C1
Halloween Storm October 2003 (10/24/2003 0000UTC - 11/02/2003 0000UTC)

All

Parameters Physical parameters or keywords for search

Add Parameters

Parameter Set P1 Is Covered by C1 Environments(Near-Earth)

Aurora
Near Earth Energetic Particles
Electron Density
Electron Temperature

Restrictions Limits on the search

Add Restrictions

Search for Products

Search for Related Models

Start Over

Virtual ITM Observatory Welcome Page
Version v1_3_20080403
This system allows you to search for data from multiple providers in a single search.

Select one or more coverages and parameters associated with those coverages to initiate a query of space science resources. The query can then be modified manually by editing selected coverages and parameters and by adding restrictions.

Coverages Defines the temporal and/or spatial coverage ranges for the query. It can be used to limit the query to selected resources.

Parameters Defines the physical parameters or keywords that VITMO matches to selected resources and coverages. Parameter sets can be associated with any one or all sets of coverages.

Restrictions Limits a query to only those time periods when solar-geophysical indices or coincidences are within user selected ranges. It can be used to restrict time periods to geomagnetically active periods, high solar activity, etc.

When done formulating query, click "Search for Products" to get results.

The VITMO currently supports the following internet browsers on the following systems

PC, UNIX:
- Internet Explorer version 6 or higher
- Mozilla Firefox version 1.5 or higher

Mac:
- Mozilla Firefox version 1.5 or higher
- Safari version 2 or higher

View VITMO Query Building Tutorial

FEATURES

- Simple interface for searching
- Connects to Virtual Solar Terrestrial Observatory
- Aim for a higher level of search capability - a “discovery” system
- Intending to enable image-based searching

Search Strategy: A special Halloween Storm 2003 search is provided under coverage but additional parameter must be specified - including all Near-Earth parameters yielded 26 “products” and 252 “results”

<http://mizar.jhuapl.edu/sras/frameset.jsp>

SPASE Registry

The SPASE Registry is a service for providing spacecraft, instrument, and personnel information for use in data set descriptions. Much of the information comes from the NSSDC Master Catalog and Personnel database.

Present

- Next release will support:
 - Forms interface
 - Ability to display results in raw XML or in XHTML form
 - Specification of SPASE version
 - Choice of NSSDC or SMWG IDs for resource IDs
- Completed all but last item which is in progress
- Release expected to be late March 2009

Future

- Configuration of git repository on NSSDC computer
- Setting up git repository to synchronize with VMO repository
- Creation of software to update NIMS database from git repository contents for observatories, instruments, people
- Creation of software to update git repository contents based on updates to NIMS database

Overview – Past Year

Data Model

- Official release: 2.1.0
- Current draft: 2.2.0
 - Add “Hardcopy” as a format
 - Add “Operating Span” to Instrument and Observatory
 - Add coordinate systems for solar physics (HCC, HCR, HPC, HPR)
 - Update definitions
 - More changes under consideration (i.e., S3_Bucket)

Software

- Release of SPASE toolkit

Web site

- New design for website (ready to implement)

Issues

- How well does SPASE function as an *interlingua* among the Virtual Observatories and data archives?
- How effective is SPASE in describing data sets for **data finding and usage**?
- How much should SPASE be "**inside**" vs. "**outside**" the observatories, etc. to be effective?
- To what level of **detail** should data descriptions be created in order to fulfill the objectives of SPASE and the Space Physics data environment?
- What else is needed in SPASE for the **non-NASA virtual observatories** environment?
- Should SPASE data descriptions be **centrally stored** or **distributed**?
- What **interfaces** are most effective for SPASE searches?
- Should SPASE be expanded for usage in closely-related disciplines such as **Planetary Science**?

ABSTRACT

Session H2: The ICSU World Data System: a Disciplined or Un-disciplined Initiative?

Title of H2-3: The Heliophysics Data Environment, Virtual Observatories, NSSDC, and SPASE

Heliophysics (the study of the Sun and its effects on the Solar System, especially the Earth) has an interesting data environment in that the data are often to be found in relatively small data sets widely scattered in archives around the world. Within the last decade there have been more concentrated efforts to organize the data access methods and create a Heliophysics Data and Model Consortium (HDMC). To provide data search and access capability a number of Virtual Observatories (VO's) have been established both via funding from the U.S. National Aeronautics and Space Administration (NASA) and through other funding agencies in the U.S. and worldwide. At least 15 systems can be labeled as Heliophysics Virtual Observatories, 9 of them funded by NASA. Other parts of this data environment include Resident Archives, and the final, or "deep" archive at the National Space Science Data Center (NSSDC). The problem is that different data search and access approaches are used by all of these elements of the HDMC and a search for data relevant to a particular research question can involve consulting with multiple VO's – needing to learn a different approach for finding and acquiring data for each.

The Space Physics Archive Search and Extract (SPASE) project is intended to provide a common data model for Heliophysics data and therefore a common set of metadata for searches of the VO's and other data environment elements. The SPASE Data Model has been developed through the common efforts of the HDMC representatives over a number of years. We currently have released Version 2.1 of the Data Model. The advantages and disadvantages of the Data Model will be discussed along with the plans for the future. Recent changes requested by new members of the SPASE community indicate some of the directions for further development.

Search Mechanism Across Virtual Observatories

- Many Virtual Observatories in Heliophysics, both new and old - often quite different from each other
- Many important Heliophysics Data Centers are not yet directly connected with a Virtual Observatory

To make data “findable” in the Heliophysics Data Environment a common metadata language and descriptions of data sets in the metadata language are important (SPASE)

- The Space Physics Archive Search and Extract (SPASE) project is an international collaboration begun through the NASA-funded Heliophysics Virtual Observatories initiative

Activities of SPASE

Tools

- SPASE Editor
- SPASE Validator
- SPASE Referential checker.
- SPASE Collator.

Engineering/Design

- SPASE data model. (dictionary, documents, tools)

Services

- SMWG (Core entity descriptions)
- SPASE services (reference implementation)
 - resolver, downloader, render, status,
 - jetty server, explorer

Content

- SPASE publication list
- Website

THE WEBSITE AND THE SPASE DATA MODEL

The screenshot shows the SPASE website interface. The header includes the SPASE logo and navigation links: 'Visit NASA.gov', 'Goddard Home', and 'SSEDSO Home'. The main content area is titled 'SPACE PHYSICS ARCHIVE SEARCH AND EXTRACT (SPASE)'. A red box highlights the 'DATA MODEL DOCUMENT' link in the left sidebar. The main content area contains text about the diversity of space physics data and services, and a list of links under 'DATA MODEL DOCUMENT'.

SPASE Space Physics Archive Search & Extract (SPASE) > Visit NASA.gov > Goddard Home > SSEDSO Home

Home

SPACE PHYSICS ARCHIVE SEARCH AND EXTRACT (SPASE)

The diversity of space physics data and services available electronically has become so great that it is difficult to keep track of what exists. No single data center can ingest, store, and distribute all space physics data and therefore data, when archived, will exist in a globally distributed heterogeneous ensemble of data distribution and archiving centers. With current technology it should be possible to determine, via a relatively simple user interface, the existence and location of data of interest, and then request and retrieve that data. An international group of Space Physics data centers is collaborating to develop such an interface system within a Consortium called "Space Physics Archive Search & Exchange" (SPASE).

These pages focus on the data model for SPASE. The data model includes the structure of messages passed between systems, how to enrich data for interchange and archiving, and a data dictionary defining all terms and keywords used in the system. A full description of the data model is included under Documents.

Also included are:

- Examples that implement the data model; and,
- Tools to demonstrate the utility and capability of the SPASE metadata and framework

If you should have any questions or comments please contact us.

DATA MODEL DOCUMENT

- History of changes
- Current Version (1.2.1, released 2008-03-20)
- Current Draft (1.3.0, updated 2008-04-25)
- All documents

SERVICES

- Control Authority

DATA DICTIONARY

- Search
- Tree
- XML Schema
- XML Stylesheet
- XML Templates
- UML Models
- Ontologies

NEWS

- Briefs
- RSS

TOOLS

- ...of all kinds

DOCUMENTS

- Charters
- Meetings
- Presentations
- Standards

DATA MODEL DOCUMENT

- History of changes
- Current Version (1.2.1, released 2008-03-20)
- Current Draft (1.3.0, updated 2008-04-25)
- All documents

Version 1.4 of the Data Model is imminent and will be “frozen” for community usage.

World Data Centers Relationship

- Solar-Terrestrial World Data Centers are important to the Solar and Space Physics Data Environment
- Not often a relationship with a Virtual Observatory
- Many other important Heliophysics Data Centers are also not likely to be directly connected with a Virtual Observatory

To make data “findable” in the Heliophysics Data Environment a common metadata language and descriptions of data sets in the metadata language are important (SPASE)

- The Space Physics Archive Search and Extract (SPASE) project is led by the National Space Science Data Center which is also the World Data Center for Satellite Information

Current Status

Development of the SPASE Data Model continues in biweekly teleconferences and occasional face-to-face meetings

- Version 1.2.1 is frozen for use in data description
- New developments are incorporated in Version 1.3
- Data descriptions using the SPASE Data Model are being made in a number of places
- Issues resulting from data description problems are usually addressed and resolved within a few weeks
- NSSDC provides SPASE support from its budget
- NSSDC provides spacecraft, instrument, and personnel information for registries
- Tools for assisting in the use of SPASE continue to be developed
- The SPASE core group is considering the level of detail necessary to support data descriptions

Roles for SPASE

- Current focus is the SPASE data model.
- Demonstration technologies.
- Keep scope or expand?