

Planetary Science Archive
PSA Report and
PSA-UG Activities

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and the PSA DHA and SAT teams*

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Planetary Science Archive - Overview



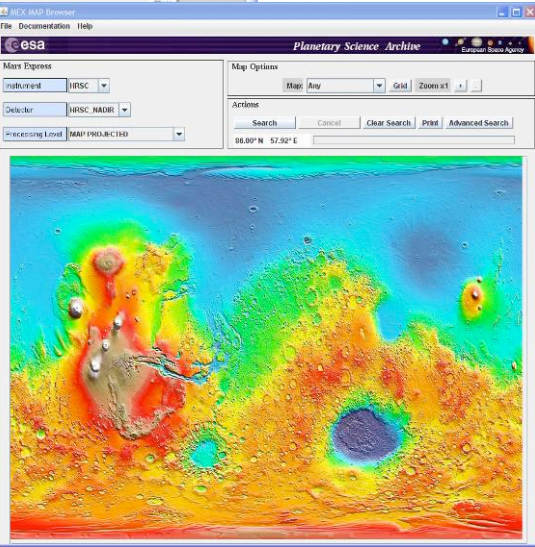
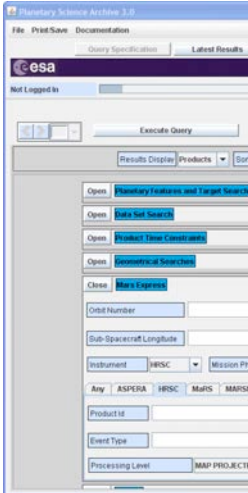
- Available since **March 2004**:
 - <http://archives.esac.esa.int/psa>
- **Active development**
- Datasets received from PI teams
 - **Peer-reviewed** by independent team
 - **Internally validated** before ingestion into the PSA
- Around **20TB** of data on hard disks
- Access services
 - **Advanced search** interface
 - **Map based** query for MEX
 - **FTP Browser** (not searchable)
 - **Machine interface** (PAIO)

Explore ESA's Planetary Science Archive!

The European Space Agency's Planetary Science Archive (PSA) is the central repository for all scientific and engineering data returned by ESA's Solar System missions: currently Giotto, Huygens, Mars Express, Rosetta, SMART-1, and Venus Express, as well as several ground-based cometary observations. The PSA uses NASA's Planetary Data System standards as a baseline for the formatting and structure of all data contained within the archive. Learn more...

Access the Data

- Anonymous FTP**: Get access to all publicly available data via an anonymous FTP server. Unlike the other interfaces, it has no search capability but you can quickly browse the content of the archive using the FTP-client application of your choice.
- Advanced Search**: Search through a Java-based application which allows for complex querying of data. You can search in the data set or data product level using a wide variety of query parameters. More...
- Map-based Search**: Search through a Java-based application which allows for visual querying of geographically referenced data. It can be used in combination with the Advanced Search interface to refine your search. More...



FTP Browser

Get access to all publicly available PSA data via an anonymous FTP server. Unlike the other interfaces, it has no search capability but you can quickly browse the content of the archive using the FTP-client application of your choice. We recommend using the MEX-based Search Interfaces.

Mars Express Orbiter Data

- Analyser of Space Plasmas and Energetic Atoms (ASPERA)
- High Resolution Stereo Camera (HRSC)
- Mars Advanced Radar for Subsurface and Ionosphere Sounding (MARSIS)
- Mars Express Orbiter Radio Science (MRS)
- Observatoire pour la Minéralogie, l'Eau, les Glaces et l'Activité (OMEGA)
- Planetary Fourier Spectrometer (PFS)
- Spectroscopy for Investigation of Characteristics of the Atmosphere of Mars (SPICAM)

Ancillary Data

- SPICE Repository
- SPICE PDS Data Set
- ESOC Ancillary Information

Visit the mission page for more information

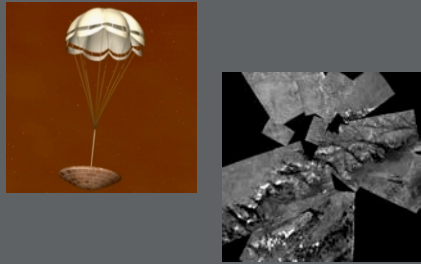
User's Guides

- PSA FTP Access Guide
- Active/Passive FTP Explanatory Note

PSA : one archive, several missions



Huygens



Rosetta



Giotto

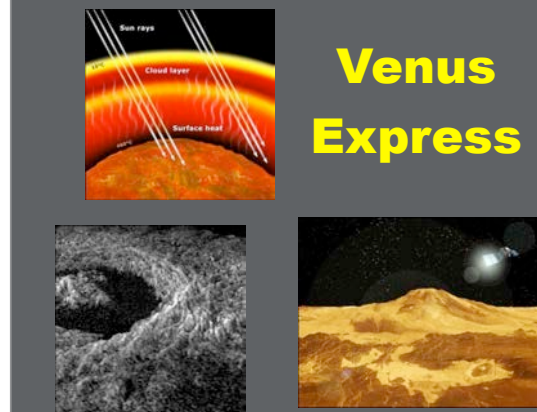


ALL IN 'PDS' FORMAT

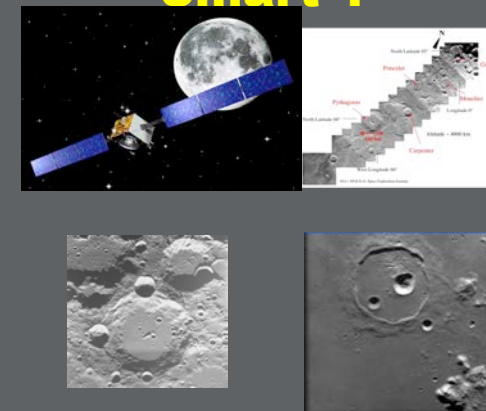
Mars Express



Venus Express



Smart-1



- GIOTTO data from comet Halley and Gripp-Skellerup
- Comet Halley ground-based observations (Halley-Watch)
- Comet Wirtanen ground-based observations
- Mars Express instrument and auxiliary data (ongoing)
- Venus Express instrument and auxiliary data (ongoing)
- Smart-1 instrument and auxiliary data
- Rosetta instrument and auxiliary data (ongoing)
- Huygens (complete)
- BepiColombo / ExoMars data handling and archive support – in preparation
- ESA supported instruments on Chandrayaan 1 – pipeline development and support from PSA

Background / roles

- ESA is a founding member of the IPDA with 2 Steering committee members (D. Heather and C. Arviset)
- Involved in development of Charter, set up of steering committee and establishment of member agencies.
- Lead role in the Technical Experts Group (P. Osuna and J. Salgado)

Working groups (previous examples):

- Development of 'IPDA Standards'.
- Continuing development of the PDAP protocol.
- VEX Interoperability with PDS Atmospheres (see next slides)
- Implementation and testing of PDS Standards and documentation
- etc...

VEX Interop. via PDS Atmospheres



PDS: The Planetary Atmospheres Data Node

- NASA Portal
- Site Help

Search for:

Go

- HOME
- ABOUT US
- DATA AND SERVICES
- EDUCATION
- CONTACT US
- SITE MAP
- EXTERNAL LINKS
- Sphere
- Local Weather
- ADS NASA Astrophysics Data System
- NASA Research Solicitations
- Abstracts of Funded NASA Proposals

Quick Searches

- Mercury
- Venus
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

PDS Web Sites

- PDS
- Atmospheres
- Geosciences
- Imaging
- Navigational & Ancillary Information (NAIF)
- Planetary Plasma Interactions (PPI)
- Planetary Rings
- Small Bodies

PDS Support

- Management
- Engineering
- PDS Phonebook

Venus Express

The Venus Express (VEX) spacecraft was built by the European Space Agency to study the atmosphere and the surface of Venus. It was launched in November 2005 and it was inserted into orbit around Venus on April 11, 2006. Venus Express is equipped with seven instruments. Links to more detailed information regarding the instruments on board Venus Express are given below.

The data will be archived in the European Space Agency's Planetary Science Archive. To provide PDS Atmospheres Node users transparent access to VEX data, we are developing an interoperability protocol whereby users can link to the VEX data from this site.

Some of the VEX data are fully ingested into the PSA and are available through this interoperability protocol.



Image Courtesy of ESA

VEX mission phases

Phase Acronym	Phase name	Start Date	End Date	Duration (days)
LEOP	Launch and Early Orbit Phase	09/11/05	11/11/05	3
NECP	Near Earth Commissioning Phase	12/11/05	16/12/05	21
ICP	Interplanetary Cruise Phase	17/12/05	04/04/06	107
VOI	Venus Orbit Insertion	05/04/06	21/04/06	16
VOCP	Venus Orbit Commissioning Phase	22/04/06	03/06/06	42
NMP	Nominal Mission Phase	04/06/06	02/10/07	486

VEX Interop. via PDS Atmospheres



Instruments

Below is a listing of the seven instruments on board Venus Express along with a description of each instrument and the data collected.

ASPERA

"Analyser of Space Plasma and Energetic Atoms"

Led by the Institute of Space Physics, Kiruna, Sweden.

ASPERA studies the interaction between the solar wind and the atmosphere of Venus. It studies how molecules and ions escape the planet by measuring the particles in the solar wind, and the outflowing particles from the planet's atmosphere.



Planetary Science Archive



Magnetometer (MAG)

Led by the IWF, Graz, Austria.

[VOLDESC.CAT](#)
[AAREADME.TXT](#)
▢ [INDEX/](#)
▢ [CATALOG/](#)
▢ [DATA/](#)
▢ [DOCUMENT/](#)

but it reuses sensor designs from the Rosetta lar

Instrument	CODMAC level	DATA_SET_ID
MAG	2	VEX-V/Y-MAG-2-V
MAG	4	VEX-V/Y-MAG-4-V

SPICAV

"Spectroscopy for Investigation of Characteristic"
Led by the Service d' Aéronomie du CNRS, Vern
Belgium; and the IKI, Russia. SPICAV assists in

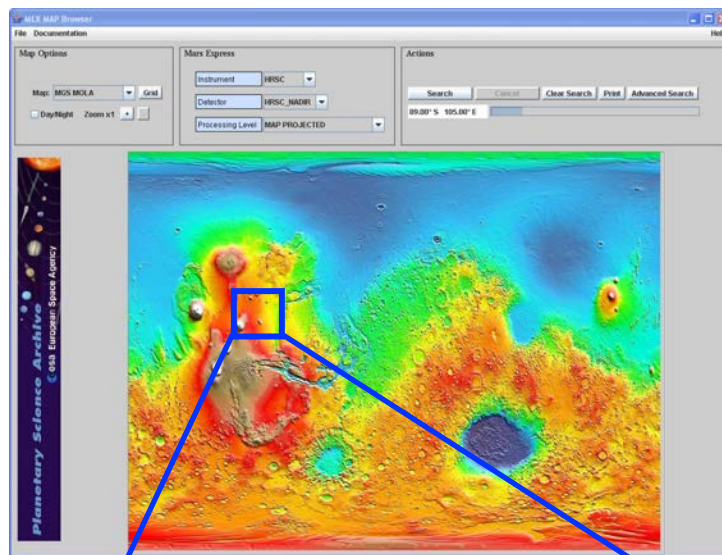
the cloud dynamics and image the surface. In addition it will assist in the identification of phenomena seen by other instruments. VMC was designed for Venus Express, however it reuses some parts from Mars Express's High Resolution Stereo Camera.

Instrument	CODMAC level	DATA_SET_ID	Data available up to			Data Volume (Gb)
VMC		VEX-V-VMC-3-RDR-EXT1-V1.0	Jul-2009	browse	download	34.0
		VEX-V-VMC-3-RDR-EXT2-V1.0		browse	download	3.98
		VEX-V-VMC-3-RDR-V1.0		browse	download	39.64

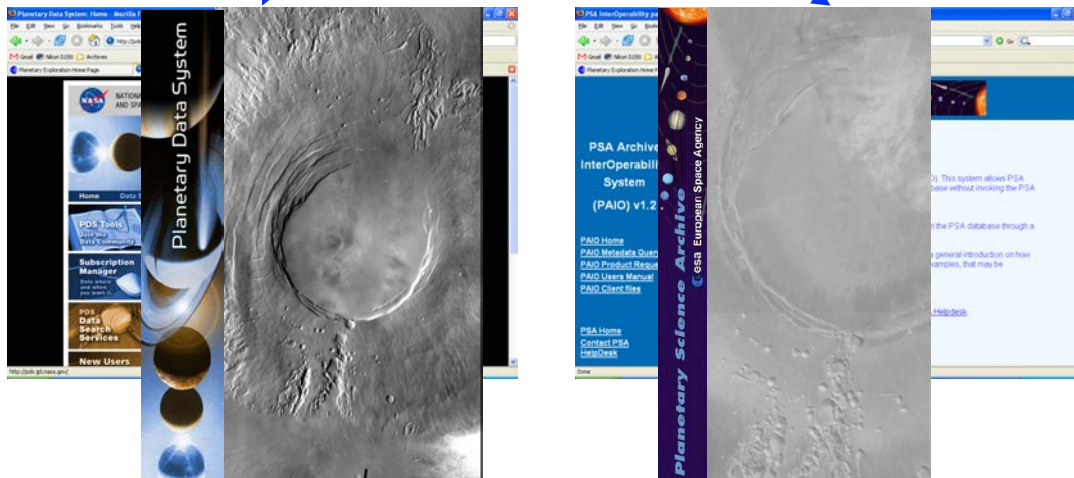
More information about the Venus Express mission can be found at the [ESA Venus Express web site](#).

Data from the Venus Express mission are also available directly from the [Planetary Science Archive](#). Click for instructions for subscribing to the PSA.

Interoperability ESA PSA – NASA PDS



- Simple example of potential future development / usage
- From a Mars Map Browser, Select region of interest
- Contact PSA and PDS using the PDAP (Planetary Data Access Protocol)
- Display NASA PDS and ESA PSA images



- *International MOU template*
 - Generation of MOU template to ensure archiving needs are met for future international planetary missions.
- *Registry implementation*
 - Creating / population 'PDS4 registries' for querying international archives. Done for querying VEX data from PDS.
- *PDS4 Implementation*
 - ESA's first implementation of the new PDS4 standards on BepiColombo and ExoMars 2016.
- *Chandrayaan 1 interoperability with ISRO*
 - Working with ISRO to implement interoperable access to the Chandrayaan-1 data via PDAP

- *PDAP extensions*
 - Implementation of extensions needed to the existing PDAP after consolidation exercise last year.
- ***IPDA / IVOA interactions*** (C. Arviset [lead], D. Crichton, M.T.Capria, B. Cecconi)
 - *This meeting!*
 - *Determine the common interests for interoperability standards*
 - *Investigate if there is a common benefit / interest for closer and more formal coordination between IVOA/IPDA.*

PSA User Group



Objective:

- Advise ESA on the future development of the PSA content, interfaces, documentation, compatibility with other planetary science archives and tools.
- Act as a focus for the interests of the scientific community in the PSA and as an advocate for the PSA within that community.

Members: The PSA-UG is comprised of 6-8 members covering a range of expertise in scientific disciplines.



Dr. Angelo Pio Rossi (Chair)
Remote Sensing: Solid Surfaces
[Contact](#)

Dr. Axel Hagermann
Auxilliary data
[Contact](#)

Dr. Baptiste Cecconi
Magnetospheres
[Contact](#)

Dr. David Heather
PSA Coordinator
PSA-UG Secretary
[Contact](#)

Dr. Thomas Widemann
Remote Sensing: Atmospheres
[Contact](#)

Dr. Pascal Rosenblatt
Radio Science
[Contact](#)

Dr. Markus Fraenz
Plasmas
[Contact](#)

Dr. Hakan Svedhem
Project Scientist Representative
PSA-UG Observer
[Contact](#)

Status:

- <http://archives.esac.esa.int/psa/psa-ug>
- Two face-to-face meetings so far (aim for 2 per year).
- Regular promotion of PSA-UG and the PSA at conferences.
- Canvassing the community for inputs on the current state of the PSA and the way forwards.

Questionnaire:

- The PSA-UG has put together a questionnaire for the community for inputs:
- <http://surveymonkey.com/s/psaug>
- It is early days but:
- ***Inputs so far already show there to be a strong interest from the community in improving our interoperability access.***

- PSA is an established and well used archive containing all of ESA's planetary science missions.
- Currently interoperability through the archive is limited and the community would like more in this area.
- ESA is fully committed to the IPDA and heavily involved in many of the working groups and projects.
- One key objective of the IPDA is to provide transparent interoperable access to data in all participating international archives.
- IPDA / IVOA interactions project, partly through this meeting, is aiming to:
 - Determine the common interests for interoperability standards
 - Investigate if there is a common benefit / interest for closer and more formal coordination between IVOA/IPDA

BACKUP

- Instrument specific software not listed
- Basic data usage tools as most used by community

Tools



This is a list of useful software tools and utilities to assist PSA data users and data producers in finding, using and producing PSA data. This page contains internal and external tools. We rely on you to help keep this list complete and up-to-date.

tool.

Please [contact us](#) if you find any problem or if you know of any additional

For Data Users

PSA Search Interfaces

Interfaces to the online PSA database that allow search and retrieval of scientific and ancillary data for all ESA planetary missions. Users can specify complex queries to select the data of their interest.

PSA Geometry Search (PGS)

Java application that provides fast and efficient data queries based on geometry coordinates.

PDS NasaView [↗](#)

For Data Producers

PDS Data Dictionary Lookup [↗](#)

Online tool for searching the PDS dictionary and finding details of keywords and values in PDS labels.

PSA Geometry Library (GeoLib)

C library to assist data producers in the generation of PSA geometry indices.

PSA Volume Verifier (PVV)

Java tool that verifies PDS compliance of the

Instrument-specific Software

Instrument-specific software is not included in this list, but can be found in the Mission or Instrument pages. Software tools, libraries, or utility programs to access or process data products, if provided by the instrument team, are available in the [SOFTWARE, DOCUMENT](#) or [EXTRAS](#) directory of the corresponding dataset, along with instructions.

Ancillary Software Tools (SPICE)

A software library and other useful utilities to read SPICE kernels and to compute derived observation geometry, such as altitude, latitude/longitude, and lighting angles, can be found in the [NAIF SPICE Toolkit \[↗\]\(#\)](#) page. This software is offered in FORTRAN, C, IDL and MATLAB.

Related/Interesting Links

- [Planetary Science Tools \[↗\]\(#\)](#)
- [SBN Tools, Utilities and Interfaces \[↗\]\(#\)](#)
- [PDS Tools \[↗\]\(#\)](#)

The following tools are linked / provided directly through the PSA web pages:

- User interfaces
- PSA Geometry Search tool (PGS)
- PVV and PVS validation tools
- NASAView
- ReadPDS
- FITS Viewers, ISIS, GIMP, GDAL, VICAR
- PSA Geometry Library (GeoLib)
- PDS Dictionary look-up.