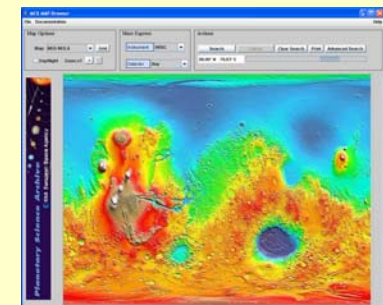




ESA Planetary Science Archive Overview and Inter-operability aspects

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Science Archives and VO Team
Science Operations Department
ESA/ESAC – Madrid, Spain





Planetary Science Archive



- ❑ Available since March 2004:
 - <http://www.rssd.esa.int/PSA>
- ❑ Active development, PSA 3.0 to come in December/January
- ❑ PSA Data Handling Team @ ESA-ESAC (Spain)
 - David Heather lead
 - Archive Scientist, setting up the requirements
 - Interface with Instrument Teams
 - Validating Data Sets
- ❑ PSA Development Team @ ESA-ESAC (Spain)
 - Christophe Arviset lead
 - PSA systems software development





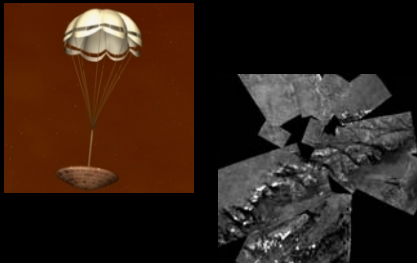
PSA Main drivers

- ☐ All data in a single archive
- ☐ All data in PDS format
- ☐ Re-use other ESA archive work (eg astronomy)
- ☐ Modular and flexible architecture
- ☐ Interoperable
 - IPDA
 - Data Model PDS format
 - Data access protocol

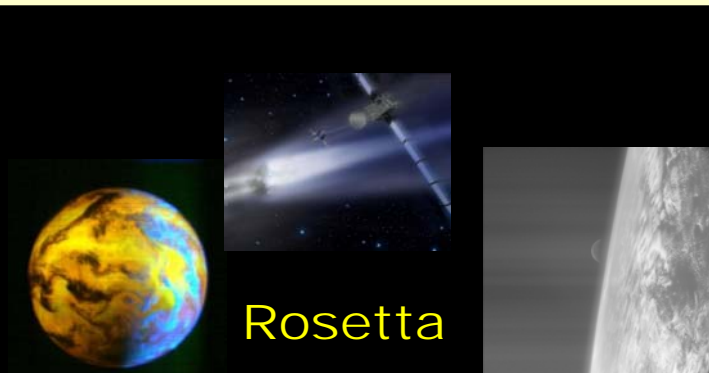


PSA : one archive, several missions

Huygens



Rosetta

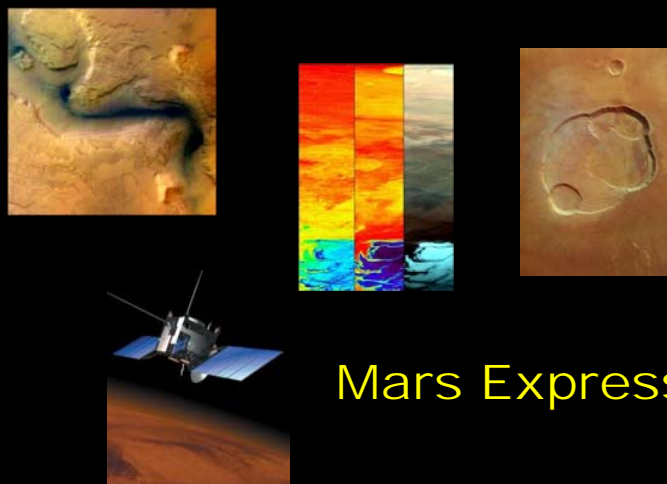


Giotto

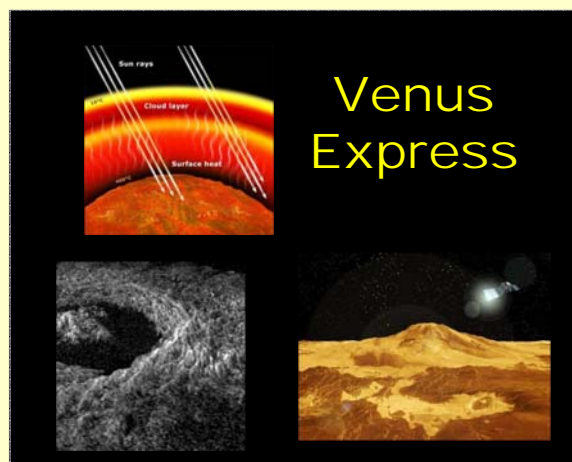


All Data in
PDS Format

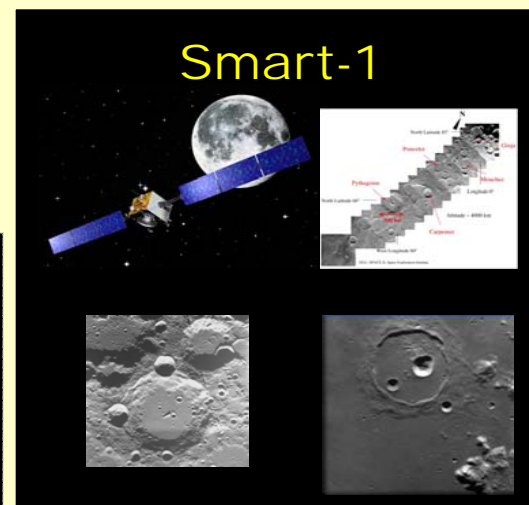
Mars Express



Venus
Express



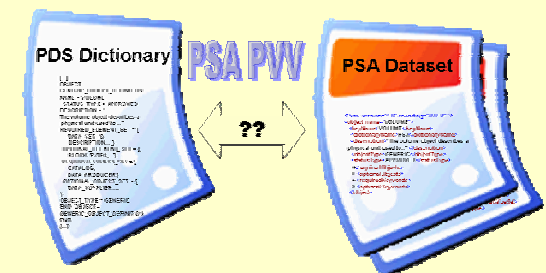
Smart-1





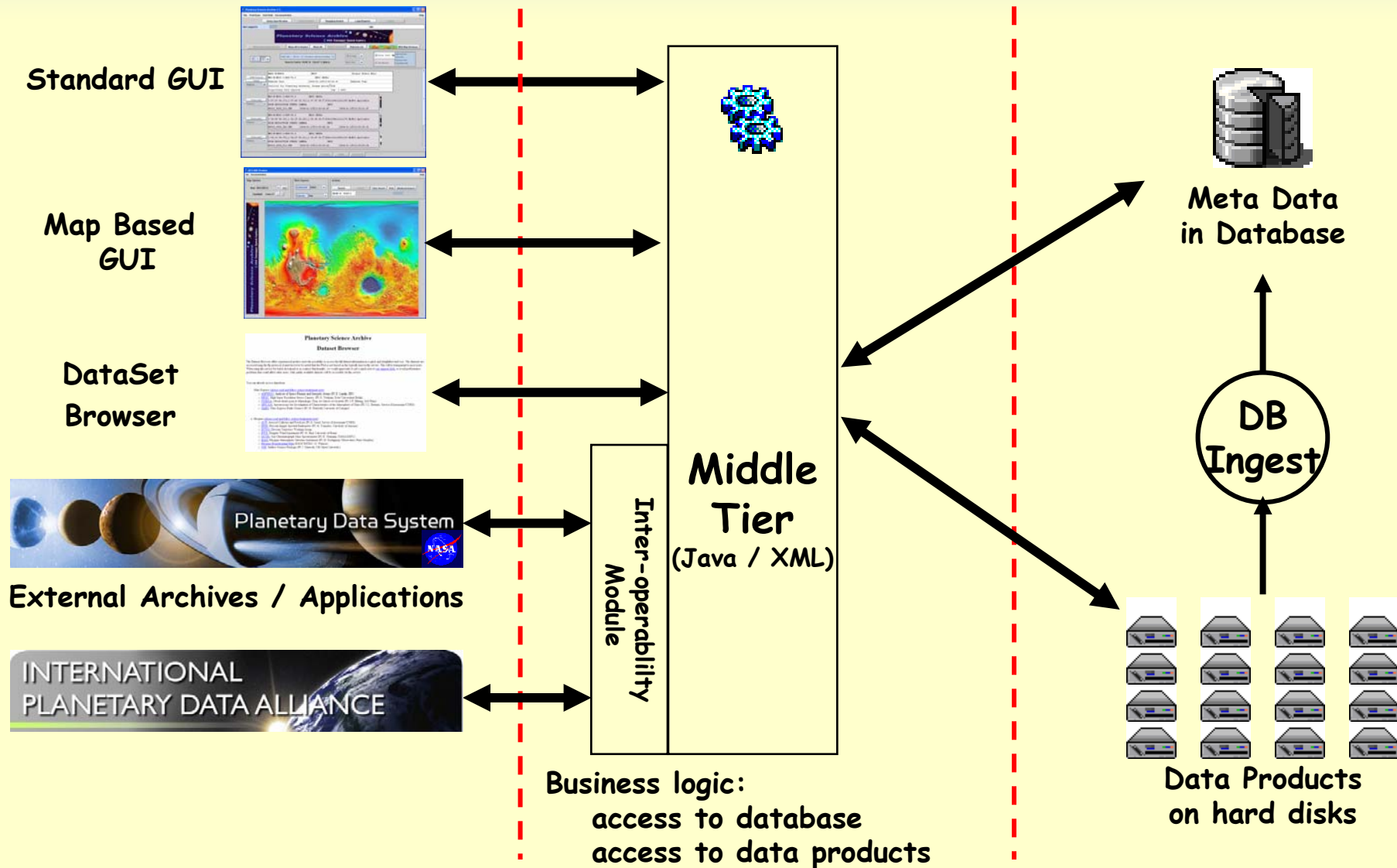
All in PDS format

- ❑ Compatibility of long existing PDS format for all US planetary missions
- ❑ PDS format being taken up by IPDA
 - Compatibility with other planetary missions
 - Globalisation of planetary archiving standards
- ❑ Datasets produced by various Instrument Teams
- ❑ Need to validate and verify any volume / dataset according to:
 - Planetary Data System standards reference (PDS, NASA).
 - Specific PSA constraints and extensions.
- ❑ PVV ensures PDS/PSA compliancy in all datasets accessible from PSA.
 - PVV distributed to Instrument Teams for pre-validation





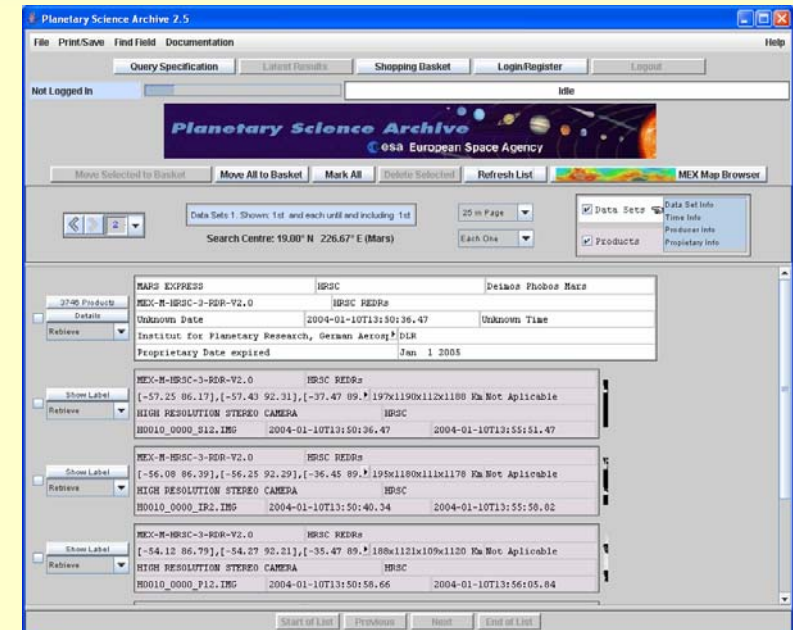
An open 3-tier architecture : Separate the Data from the Presentation





PSA Standard User Interface

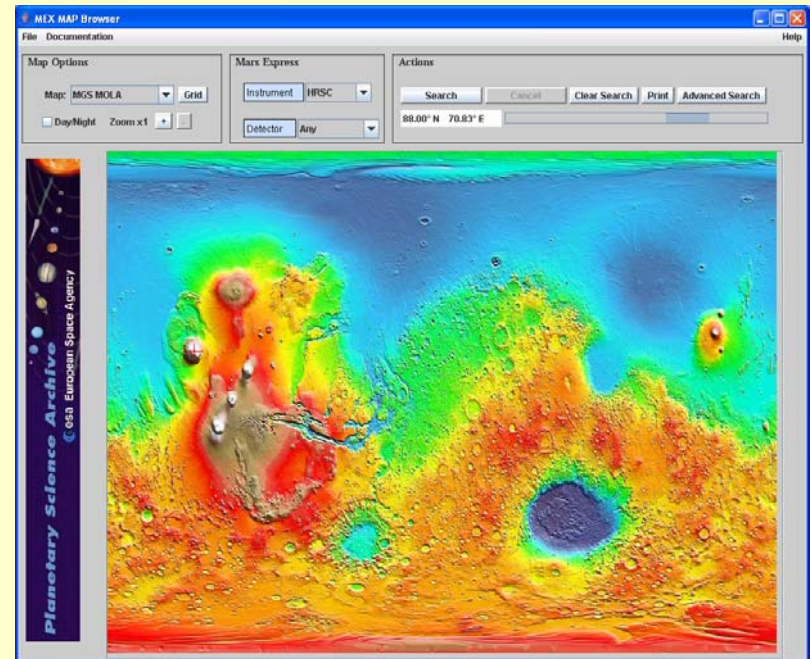
- ❑ User friendly web access : Java Applet
 - <http://www.rssd.esa.int/PSA>
- ❑ Powerful queries, organized by panel
 - General query panels
 - Mission / instrument specific panels
- ❑ Hierarchical data presentation
 - 1 Dataset -> several dataproducts
- ❑ Public data accessible to all, proprietary data accessible only to privileged users
- ❑ Images preview (icons, full image)
- ❑ Quick download (1 click) at various processing levels, shopping basket retrieval





PSA Mars Map Based Interface

- ☐ Interface for Mars Express image data
 - <http://www.rssd.esa.int/PSA>
 - Java Applet
- ☐ No need to be an expert
 - Easy for general public
- ☐ Area selection by mouse
 - Display images footprints
- ☐ Image download by 1 mouse click
 - Some are big (be patient!)
- ☐ Go back and forth to the standard interface to refine search parameters



MEX MAP Browser

File Documentation

Map Options

Map: MGS MOLA



Grid

☐ Day/Night Zoom x1 + -

Mars Express

Instrument HRSC



Detector HRSC_NADIR



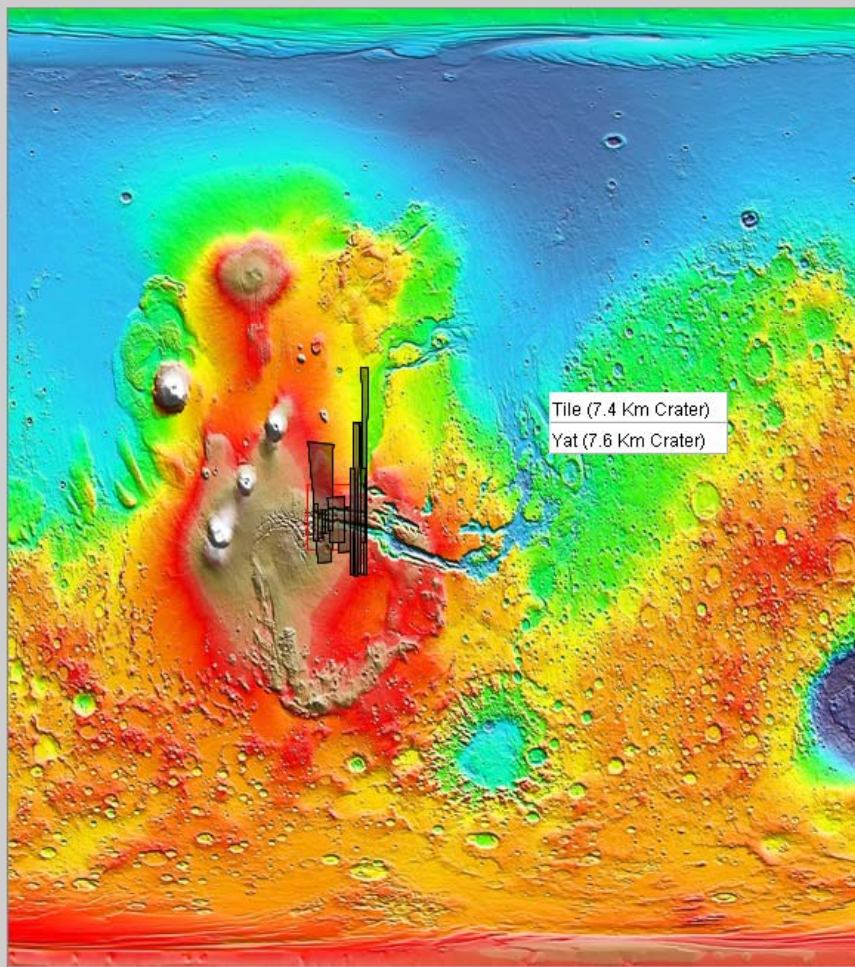
Processing Level MAP PROJECTED



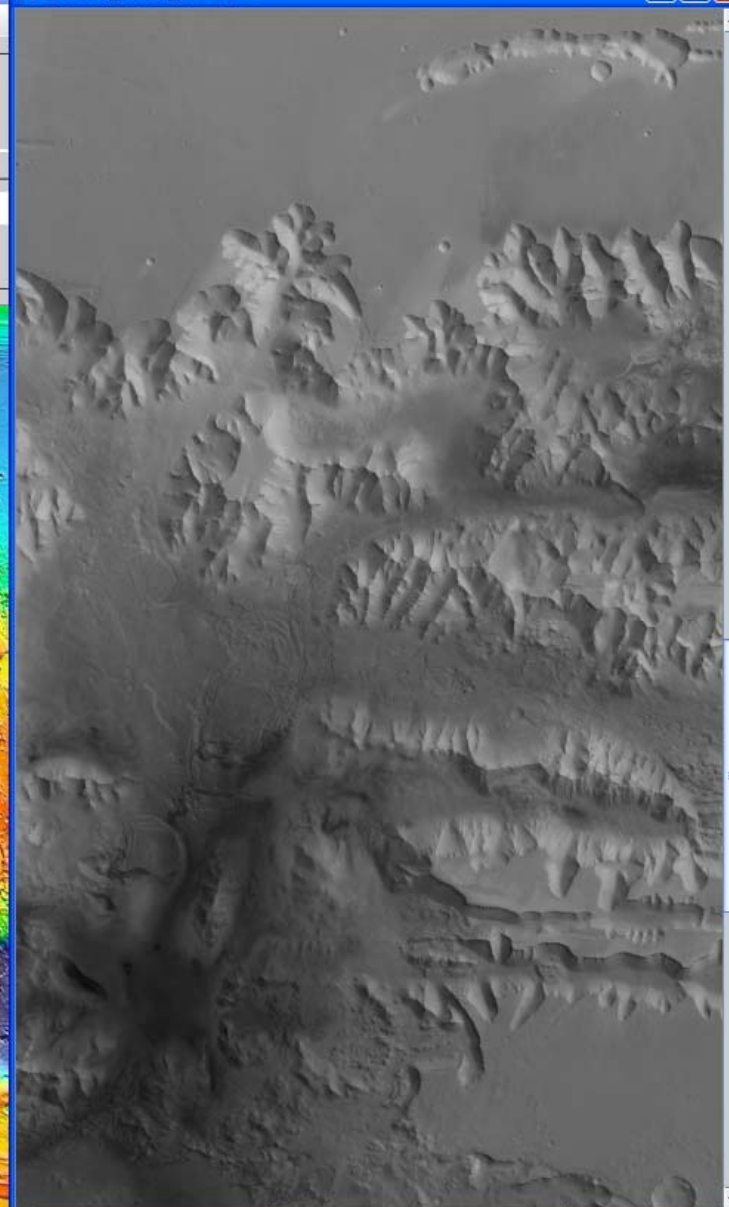
Actions

Search

18.00° N 332.50° E



H0442_0008_ND3.IMG



Save graphical product

Print

Dismiss



PSA Data Set Browser Interface

Opening Screen

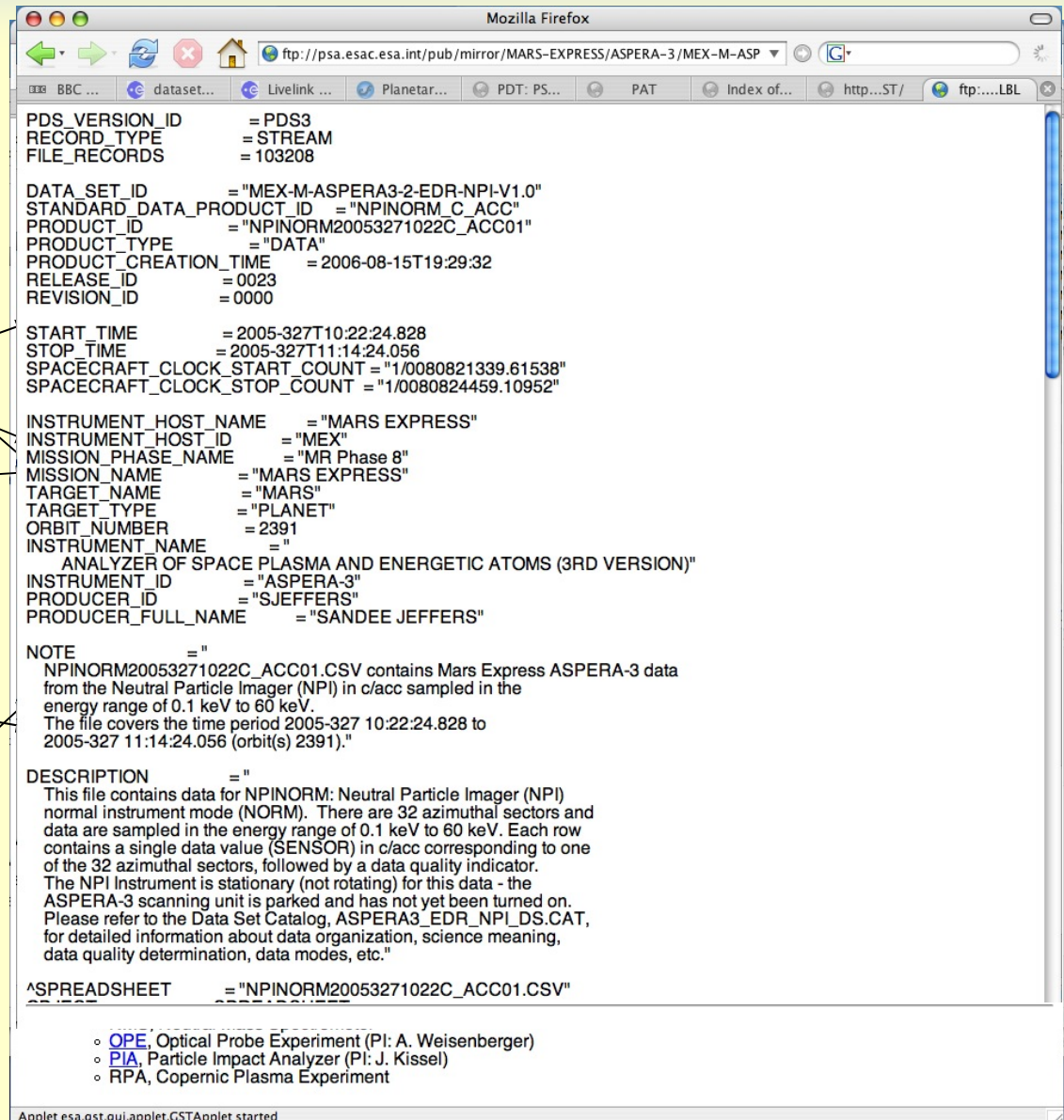
Click on the instrument that interests you

Select the data set you wish to look at

Browse through the directories to locate the files you want

Right click the product you want to save etc. to bring up the menu

Left click to view directly (where possible)



Mozilla Firefox

ftp://psa.esac.esa.int/pub/mirror/MARS-EXPRESS/ASPERA-3/MEX-M-ASP

BBC ... dataset... Livelink ... Planetar... PDT: PS... PAT Index of... http...ST/ ftp...LBL

PDS_VERSION_ID = PDS3
 RECORD_TYPE = STREAM
 FILE_RECORDS = 103208

DATA_SET_ID = "MEX-M-ASPERA3-2-EDR-NPI-V1.0"
 STANDARD_DATA_PRODUCT_ID = "NPINORM_C_ACC"
 PRODUCT_ID = "NPINORM20053271022C_ACC01"
 PRODUCT_TYPE = "DATA"
 PRODUCT_CREATION_TIME = 2006-08-15T19:29:32
 RELEASE_ID = 0023
 REVISION_ID = 0000

START_TIME = 2005-327T10:22:24.828
 STOP_TIME = 2005-327T11:14:24.056
 SPACECRAFT_CLOCK_START_COUNT = "1/0080821339.61538"
 SPACECRAFT_CLOCK_STOP_COUNT = "1/0080824459.10952"

INSTRUMENT_HOST_NAME = "MARS EXPRESS"
 INSTRUMENT_HOST_ID = "MEX"
 MISSION_PHASE_NAME = "MR Phase 8"
 MISSION_NAME = "MARS EXPRESS"
 TARGET_NAME = "MARS"
 TARGET_TYPE = "PLANET"
 ORBIT_NUMBER = 2391
 INSTRUMENT_NAME = "ANALYZER OF SPACE PLASMA AND ENERGETIC ATOMS (3RD VERSION)"
 INSTRUMENT_ID = "ASPERA-3"
 PRODUCER_ID = "SJEFFERS"
 PRODUCER_FULL_NAME = "SANDEE JEFFERS"

NOTE = "
 NPINORM20053271022C_ACC01.CSV contains Mars Express ASPERA-3 data from the Neutral Particle Imager (NPI) in c/acc sampled in the energy range of 0.1 keV to 60 keV. The file covers the time period 2005-327 10:22:24.828 to 2005-327 11:14:24.056 (orbit(s) 2391)."

DESCRIPTION = "
 This file contains data for NPINORM: Neutral Particle Imager (NPI) normal instrument mode (NORM). There are 32 azimuthal sectors and data are sampled in the energy range of 0.1 keV to 60 keV. Each row contains a single data value (SENSOR) in c/acc corresponding to one of the 32 azimuthal sectors, followed by a data quality indicator. The NPI Instrument is stationary (not rotating) for this data - the ASPERA-3 scanning unit is parked and has not yet been turned on. Please refer to the Data Set Catalog, ASPERA3_EDR_NPI_DS.CAT, for detailed information about data organization, science meaning, data quality determination, data modes, etc."

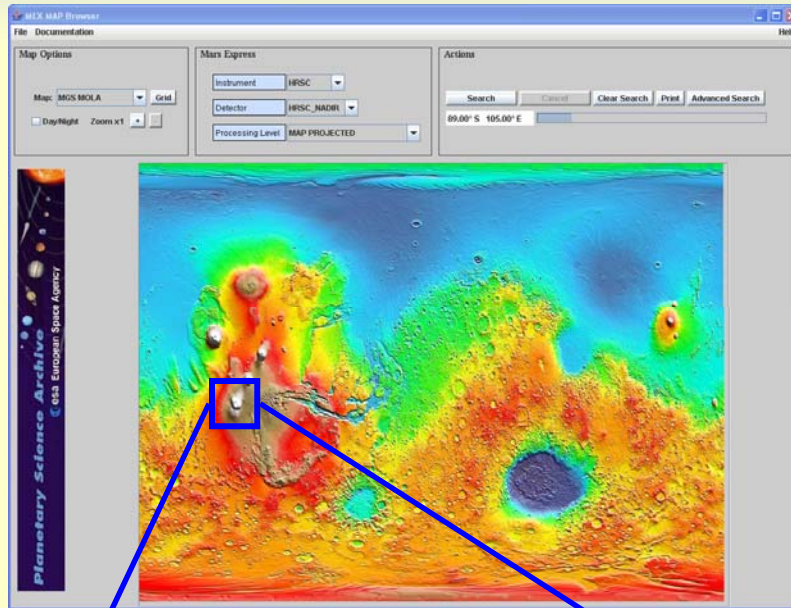
^SPREADSHEET = "NPINORM20053271022C_ACC01.CSV"

- [OPE](#), Optical Probe Experiment (PI: A. Weisenberger)
- [PIA](#), Particle Impact Analyzer (PI: J. Kissel)
- [RPA](#), Copernic Plasma Experiment

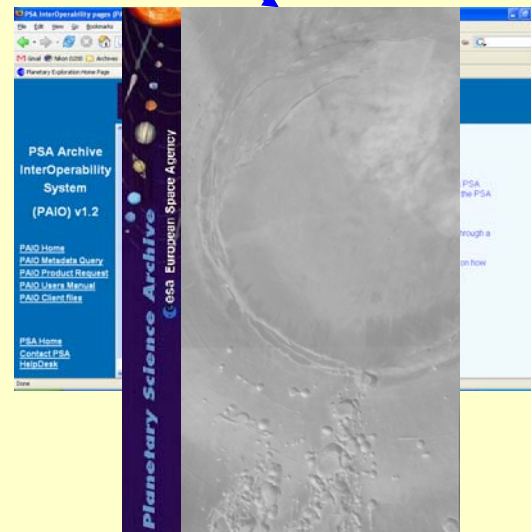
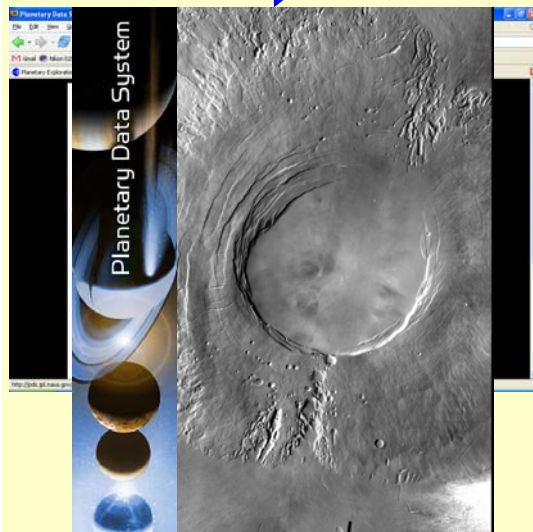
Applet esa.gst.gui.applet.GSTApplet started



Interoperability ESA PSA – NASA PDS



- ❑ Prototype in development In the IPDA context
- ❑ From Mars Map Browser, Select region of interest
- ❑ Contact PSA and PDS using the PDAP (Planetary Data Access Protocol)
 - Re-use of IVOA experience
 - Adapted to PDS
- ❑ Display NASA PDS and ESA PSA images





Interoperability aspects in Planetary

- ❑ IPDA has representatives from all national agencies active in planetary data collection

- ❑ Standards being defined in IPDA
 - Data Generation Process
 - Data access protocols (eg PDAP)
 - Data Model (PDS evolution)

- ❑ Closer link required between IPDA and EuroPlanet
 - In particular IDIS and IPDA standards

- ❑ Closer link required between Planetary and Astronomy
 - Registry
 - Access protocols
 - But very different Data Model and data generation process