

ESA'S PLANETARY SCIENCE ARCHIVE: STATUS AND PLANS. D. J. Heather¹, M. Barthelemy¹, N. Maunaud¹, S. Martinez¹, M. Szumlas¹, J.L. Vazquez¹, P. Osuna¹ and the PSA Development Team¹, ¹European Space Agency, ESAC, Villafranca del Castillo, 28080 Madrid, Spain (dheather@rssd.esa.int).

Introduction: The European Space Agency's Planetary Science Archive (PSA) is the central repository for all scientific and engineering data returned by ESA's planetary missions, making them accessible to the world-wide scientific community.

The prime objectives of the PSA are: (1) to support the experimenter teams in the preparation for the spacecraft and ground-based long-term archives, (2) to enable and ensure the long-term preservation of these archives, (3) to distribute scientific useful data to the world-wide scientific community, and (4) to provide supplementary data services aiming to maximize the usage of planetary mission data and ease the scientific data analysis.

The PSA currently holds data from Mars Express, Venus Express, SMART-1, Huygens, Rosetta and Giotto, as well as several ground-based cometary observations. It will be used for archiving on ExoMars, BepiColombo and for the European contributions to Chandrayaan-1.

Standards: All PSA data are compliant with NASA's Planetary Data System (PDS) Standards for formatting and labelling files, including requirements for documentation and the structuring of data sets.

It was decided at an early stage that PSA data would comply with PDS Standards to maximise the cross-compatibility of ESA and NASA data.

The Standards are based around a 'Data Dictionary' containing a set of keywords that can be used to provide all of the information required to access and analyse the data. PSA maintain their own 'PSA Data Dictionary', built up from the PDS version and appending many of their own 'local data dictionaries' to specify information pertinent only to individual ESA missions.

IPDA and the PDS4 Standards: PSA provides the ESA membership of the International Planetary Data Alliance (IPDA), an international collaboration of space agencies with a mission of providing access to scientific data returned from Solar System missions archived at international data centers.

A key IPDA project that is currently underway is the implementation of the new PDS4 data standards, which aim to provide a framework for capturing planetary science data results in international archives based on a homogeneous set of standards that can be extended as needed for international usage. PSA are co-leading this project, using the upcoming BepiColombo and ExoMars missions to develop our first PDS4 data models.

Other active projects in 2014 include the implementation of interoperability for sharing of the Chandrayaan-1 data, and the development of recommendations for managing international archive collaborations.

Long-term Preservation / data quality: The PSA provides expert consultancy to all of the data producers throughout the archiving process. As soon as an instrument is selected, PSA begins working with the instrument team to define a set of data products and data set structures that will be suitable for ingestion into the long-term archive.

The long-term preservation of data and knowledge from all of ESA's planetary missions is a core focus. All data provided within the Planetary Science Archive are therefore passed through a set of rigorous procedures designed to ensure the usability of the data not only at the time of ingestion, but also in the long-term, after the mission has closed and direct support from personnel involved with the mission can no longer be guaranteed.

Compliance with the conventions and requirements on each mission / instrument, and with the PDS Standards is verified using a validation tool developed by the PSA and distributed to all data providers, allowing them to syntactically validate their data at all phases in development of their pipelines, and before each delivery to the PSA. A tool is currently being tested that will provide a more qualitative validation step at the PSA to ensure correctness, completeness and cross correlation of all information, label and data content.

Each phase of the archiving process is controlled by a corresponding peer review, during which external experts are asked to validate the data and documentation for their suitability for long-term archiving.

Data query and retrieval: The PSA offers several interfaces to query and retrieve data from the PSA archive.

A java-based user interface provides advanced search, preview, download, notification and delivery basket functionality. You can search at the data set or data product level using a wide variety of query parameters (illumination condition, planetary features, instrument modes, etc). Visual querying of geographically referenced data, currently available only for Mars Express HRSC and OMEGA instruments, is also possible.

In addition to this interface, the PSA provides 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 con-