The new Planetary Science Archive: A tool for exploration and discovery of scientific data from ESA planetary missions

Introduction

The Planetary Science Archive (PSA) [1] is the European Space Agency’s (ESA) repository of science data from all planetary science and exploration missions. The PSA provides access to datasets that are scientifically peer-reviewed by independent scientists, and are compliant with the Planetary Data System (PDS) standard, which is the default standard used in planetary science.

The PSA is undergoing a complete reengineering in order to increase the accessibility of ESA’s planetary data holdings utilising the latest technologies and to significantly improve the user experience for both the scientific community and the general public.

ESA Planetary Missions

The PSA hosts data still being actively generated by missions such as Rosetta and Mars Express as well as data from missions that have reached their legacy phase, e.g. Venus Express, Huygens, SMART-1 and Giotto. The upcoming missions from the ExoMars programme (Exomars 2016 & ExoMars 2018) and BepiColombo will be archived using the newly defined PDS4 standard.

New functionalities

PDS3 and PDS4 compliant database
The PSA implements a data model which is capable of querying PDS3 and PDS4 datasets. This is done through the metadata keywords provided in the datasets. PDS3 datasets are mapped to the PSA data model using PDS4 terminology where possible.

Interactive user interface
The interface will allow dynamic queries of the scientific datasets using parameters such as targets, time, processing level, illumination conditions, heliocentric distance, etc., and provide quick views of the data that match the selected parameters.

Geographical Information System
GIS technologies such as WMS, WFS (Standards) and Openlayers, Geoserver, Postgres/PostGIS (Tools) are used to display datasets from planetary surfaces. GIS will allow the user to select and visualize scientific datasets in a 2D/3D rendering, which will improve the selection of scientific products.

Roadmap for the new PSA

The first release of the new PSA interface and functionalities is expected by mid 2016 with limited functionality and then as follows.

2016
1. Reengineered infrastructure that allows comprehensive and fast queries.
2. PDS3 and PDS4 compliant [2], for missions such as Rosetta.
3. Free access to public data, protected access to datasets with proprietary periods (e.g., ExoMars 2016).
4. Machine access through the PDAP and EPN-TAP protocols.

2017 and onward
1. Map search using GIS technology to display ESA planetary datasets [3].
2. Image gallery providing direct and interactive access to images acquired “To infinity and… beyond!”
3. Interoperability with scientific datasets of our international partners (i.e., JAXA, ROSCOSMOS, NASA, ISRO, etc….) [4].

References

[3] Docasal et al., 2015, AGU
[4] Rios et al., 2015, AGU

Development and support to Rosetta

The PSA will provide direct and simple access to the scientific data, as well as to the documentation and additional information needed to properly interpret them.

The archive can be explored through a set of parameters that allow the selection of products through space and time. Quick views provide information needed for the selection of appropriate scientific products. Example: NAVCAM onboard Rosetta.

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