EPSC Abstracts
Vol. 5, EPSC2010-364, 2010
European Planetary Science Congress 2010

VO-Paris Data Centre activities in Europlanet IDIS

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Abstract

VO-Paris Data Centre (VOPDC) acts as a partner in EuroPlaNet JRA4 activities to study VO mechanisms adapted to Planetary Science data handling. This activity includes implementation of new VO protocols for use in planetary science. Besides, OVPDC maintains the IDIS Planetary Dynamics & Extra-Terrestrial Matter node. This is one of the five thematic nodes implemented in IDIS, which provides access to both data bases and Virtual Observatory (VO) tools. In addition, VOPCD develops data services derived from local research activities, which therefore encompass a much larger field. The node can be reached at:
http://voparis-europlanet.obspm.fr/

VO-Paris Data Centre

VO-Paris Data Centre (VOPDC) is a consortium of French research institutes involved in Virtual Observatory (VO) development. The main contributor is the Observatory of Paris. Since 2002, VOPDC has been an active participant in the development of the astronomical VO, both at national (ASOV) and international (IVOA) levels. In EuroPlaNet-RI, VOPDC is a participant in IDIS activities, both in the JRA4 (data models and added value services) and in the Service Activity (thematic node).

Activity in JRA4

VOPDC is first involved in the definition of planetary VO mechanisms. This includes adaptation of existing protocols and data models to Planetary Science data, and development of new services. As co-responsible for task 3 in JRA4 (added value services), VOPDC focuses on adapting existing VO tools to a Planetary Science context. This activity implies the identification of specific parameters defining planetary data, and possibly their inclusion in IVOA data models and data access protocols. A first point is therefore to use VO tools to visualize planetary test data (most notably Aladin, TomCat, and VOSpec), and to propose their evolution in this context

Besides, the existing VO protocols must also be adapted to support specific data properties. A study is currently being performed both to identify required additions to the IVOA protocols (SAMP, SIA…) and to contribute to the development of a specific protocol (PDAP). PDAP is a VO access protocol to planetary data developed within the frame of IPDA (International Planetary Data Alliance) as a future way to handle space borne data from PDS and PSA. PDAP is so far restricted to images, and OVPDC is studying its generalization to other data types.

Finally, new services have been identified to optimize the processing of planetary OV requests. Examples of such services include: Object name resolvers, Inverted ephemeris, Data format conversion (mostly from PDS which is used for most spaceborne observations), Coordinate conversion tools (adapted to latitude/longitude systems), Control point networks conversions, Mapping. Some of these items are being addressed through generic mechanisms.

Scheduled activity in SA-IDIS

As defined in the EuroPlaNet proposal, the first role of the nodes in FP7 is to contribute to a central resource list in planetary science (currently accessible at http://europlanet.cesr.fr/n7/res). To meet the goal of the project, this resource list should promptly evolve towards a registry system similar to those existing in the IVOA. VOPDC contributes in the frame of JRA4 to a description system which will allow interoperability between data resources, and therefore to retrieve data of interest automatically.

Another role is to make the outputs of some other EuroPlaNet work packages available to a wide community. The areas of interest for this node include

JRA1/task 2 (planetary dynamics aspects), and possibly some facilities in TNA2 (those related to planetary surfaces, especially when providing spectroscopic data or chemical analyses). The aim is to integrate the corresponding data in the IDIS system, so as to make them available easily in context.

Other activities will focus on providing access and support to VO-related tools, and on providing web implementation for new data bases developed in the institutes involved in VOPDC.

Services

VO-related tools of interest for planetary science will be accessible through the VO-Paris node, including user interface, documentation and references, and possibly use cases. This includes:

- References to selected, existing VO software tools (either online or to be downloaded).
- main interface to services developed at VO-Paris, such as Skybot, SSODnet... Skybot is a service of dynamic ephemeris allowing to identify moving objects in telescopic image archives; SSODnet is a VO-like data system using simplified infrastructure.
- A VO web portal demonstrator, addressing the local data resources in a first step. One of the goals of VOPDC is to connect ephemeris services with observational data bases. The demonstrator will therefore also serve as a use case to develop data access protocols, interoperability, and a future registry system.
- Data access utilities, in particular a software library to read imaging and spectroscopy PDS-formatted data under GDL (open source environment). This is intended to complement the PDAP protocol to access ESA's Planetary Science Archive and similar data sets.

Data resources

Finally, VOPDC will also provide web access and VO support for new data resources developed locally as by-products of our research activity. Those encompass a much wider thematic field than the node, reflecting the activity in the local teams (mostly at IMCCE and LESIA). Although implemented at VOPDC, these resources will be accessible and referenced by the other IDIS nodes, whenever relevant, through their VO layer. The scheduled data resources are the initial scope of the VO web portal demonstrator. The following data resource are already available:

- Comet ephemeris data base
- Natural satellites data centre
- Nançay cometary database, from decametric spectroscopy
- Vertical profiles of Titan's atmosphere (from CIRS/Cassini), to be extended to other data sets (Mars...) in the future
- Historical planetary images cured at Meudon's IAU Center for Photographic Documentation
- The Encyclopedia of Exoplanets

Other resources will also be implemented during the EuroPlaNet contract, among which:

- 20 years of CCD imaging of Solar System objects from Pic du Midi 1m-telescope, with Skybot indexing
- Molecular database (properties of molecules of cometary interest)
- Virtis/Venus-Express archive, similar to PSA's with additional derived data such as wind maps...

The existing data sets are use cases to study the extension of existing data models to planetary data, as well as the adaptation of existing VO-tools in this context. Besides, the local data sets are used to test the PDAP protocol to query planetary science data archives, and possibly enlarge its functionalities.