Planetary VO activities at VO-Paris: context and project

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ASOV 2010, Paris
11/10/2010

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Contexte national

Atelier OV planéto 2009

Organisation A. Sarkissian / P. Le Sidaner / J. Berthier
Soutenu par l'ASOV
(Observatoire de Paris, déc 2009)
13 présentations :

- IPDA, ESAC, PDS, Europlanet
- Participants français : proches d'Europlanet pour la plupart

Conclusions:

- Demandes de précisions à l'ESAC au sujet du PDAP
- Système de registry pour la planétologie ?
- Comment accéder au format PDS en ligne ?

Contexte national

Atelier OV planéto 2009

4 premières éditions: tour d'horizon des projets nationaux

- Pour l'essentiel des bases de données avec interface web
  => pas d'interopérabilité
- Parfois de gros projets, liés à des missions ou des grands programmes
- L'intérêt est maintenant centré sur Europlanet

Conclusion

Nous poursuivons l'Atelier OV planéto en 2010

- explicitement dans le cadre Europlanet
- avec une orientation vers le développement des standards
- développement de la collaboration OV-Paris / CDPP / Grenoble

Prochain atelier début décembre à Paris, pour travailler sur les documents

Ceux-ci seront ensuite proposés comme 1re version des standards Europlanet
(General IDIS meeting, fév. 2011)

Europlanet

1) Programme du 6e PCRD (2006-2009)

IDIS, activité de service :
- recensement des ressources existantes (bases de données, codes…)
  => liste de ressources
  => structuration par nœuds thématiques

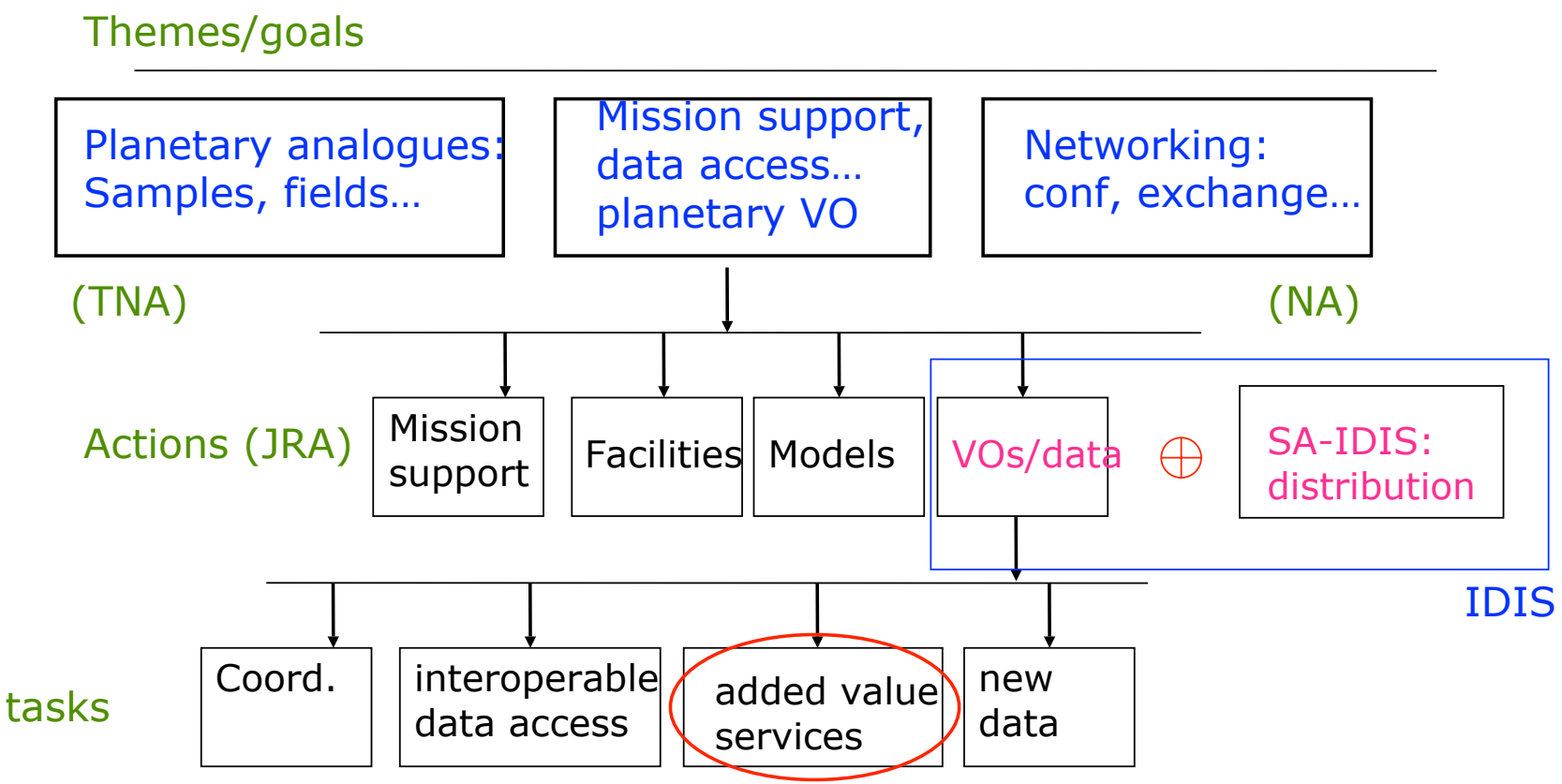
2) Programme du 7e PCRD (2009-2013): Europlanet-RI

IDIS, activité de service :
- Continuité
- Distribution des bdd développées dans le programme

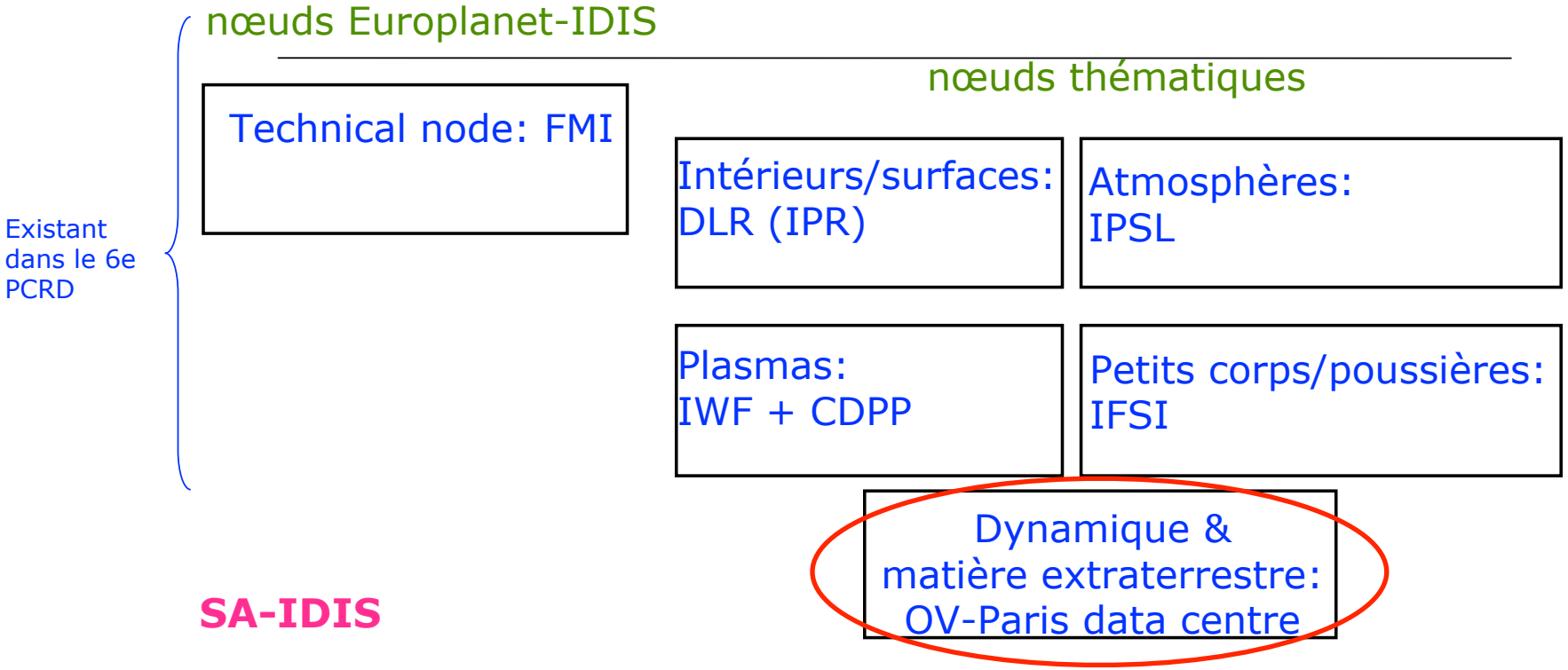
JRA4, activité de développement :
- Mis en place des bases d'un OV planétologie européen

VO-Paris est un des 6 partenaires de JRA4 / IDIS
Resp. sc. : SE
Chef de projet: PLS

VO-Paris + Europlanet-RI

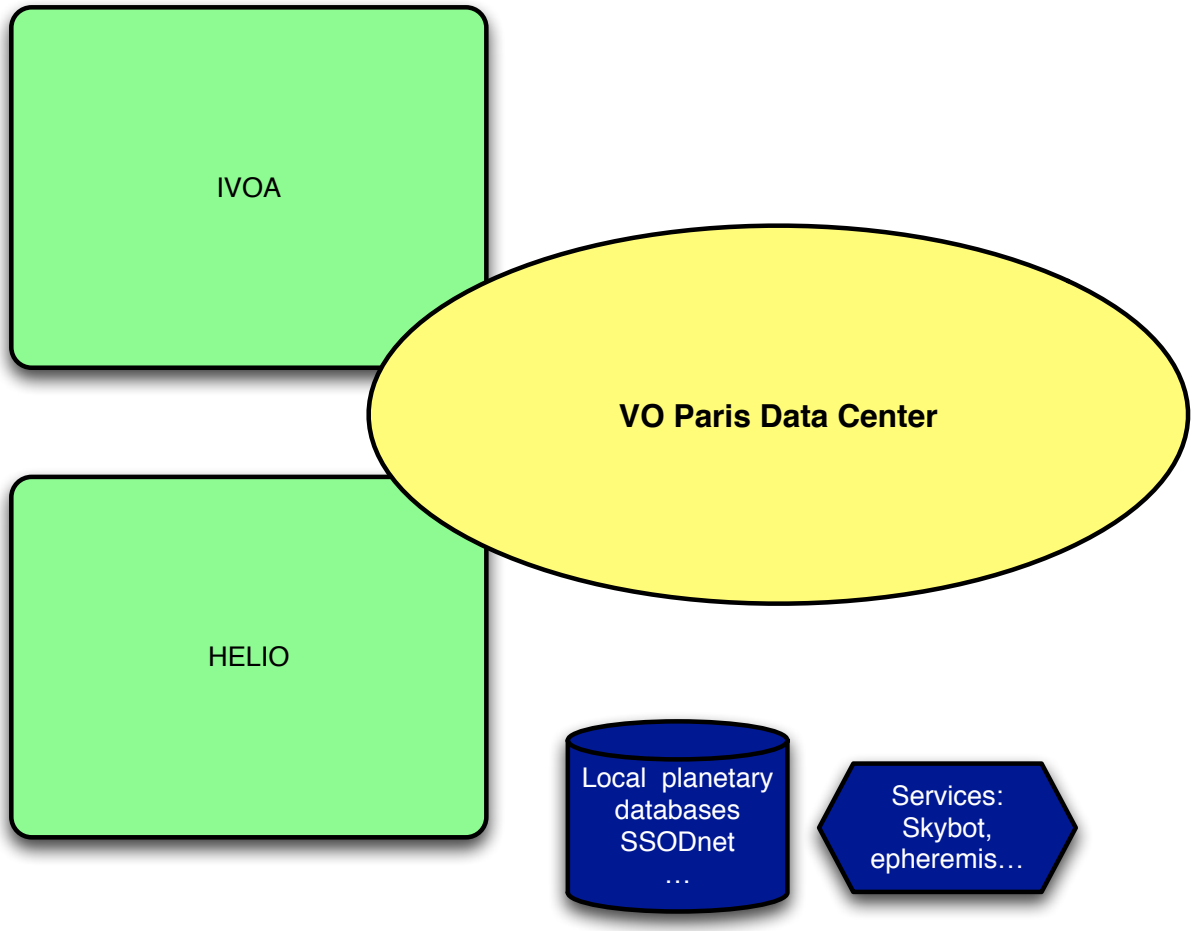


VO-Paris + Europlanet-RI

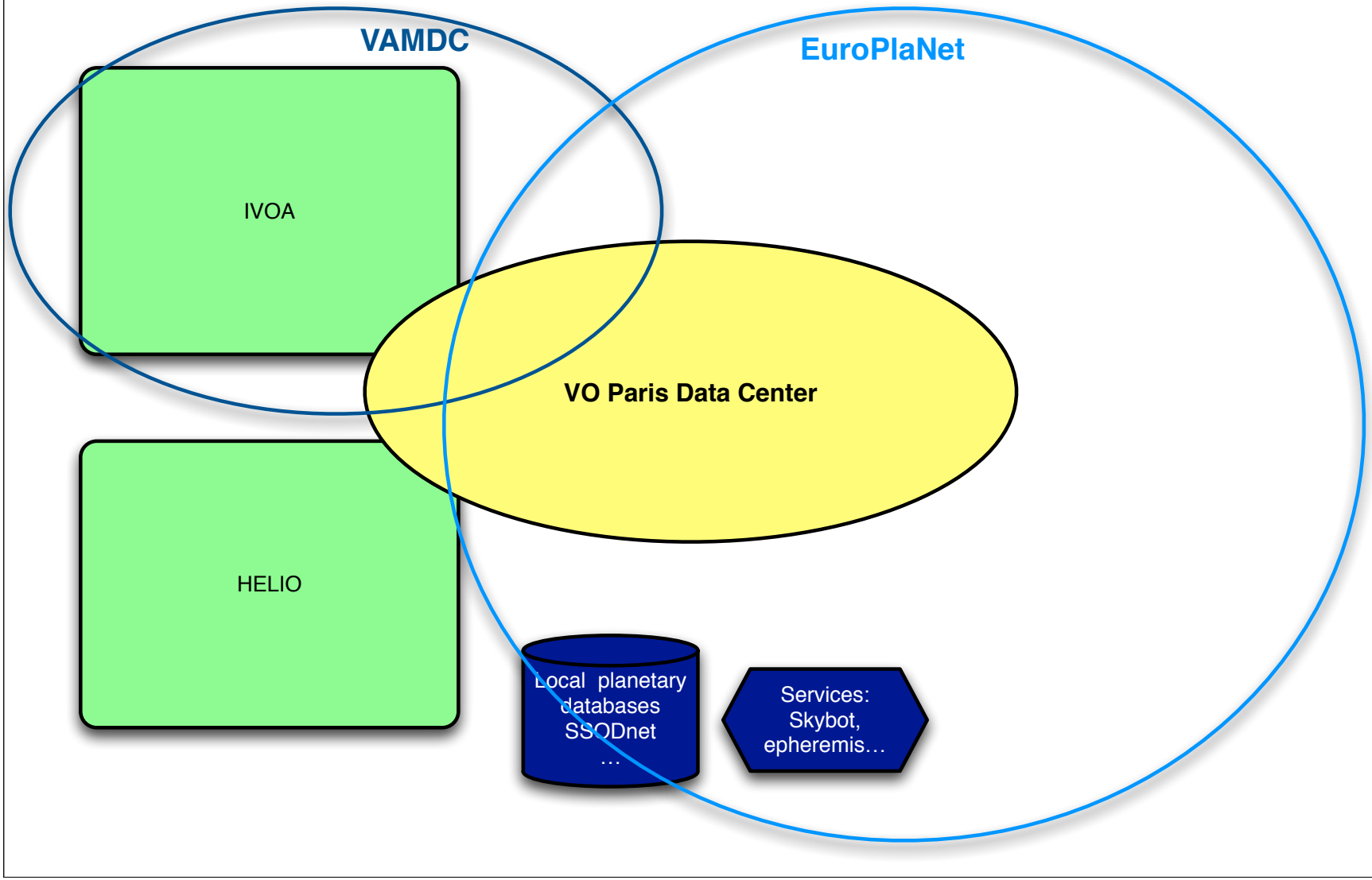


http://voparis-europlanet.obspm.fr/

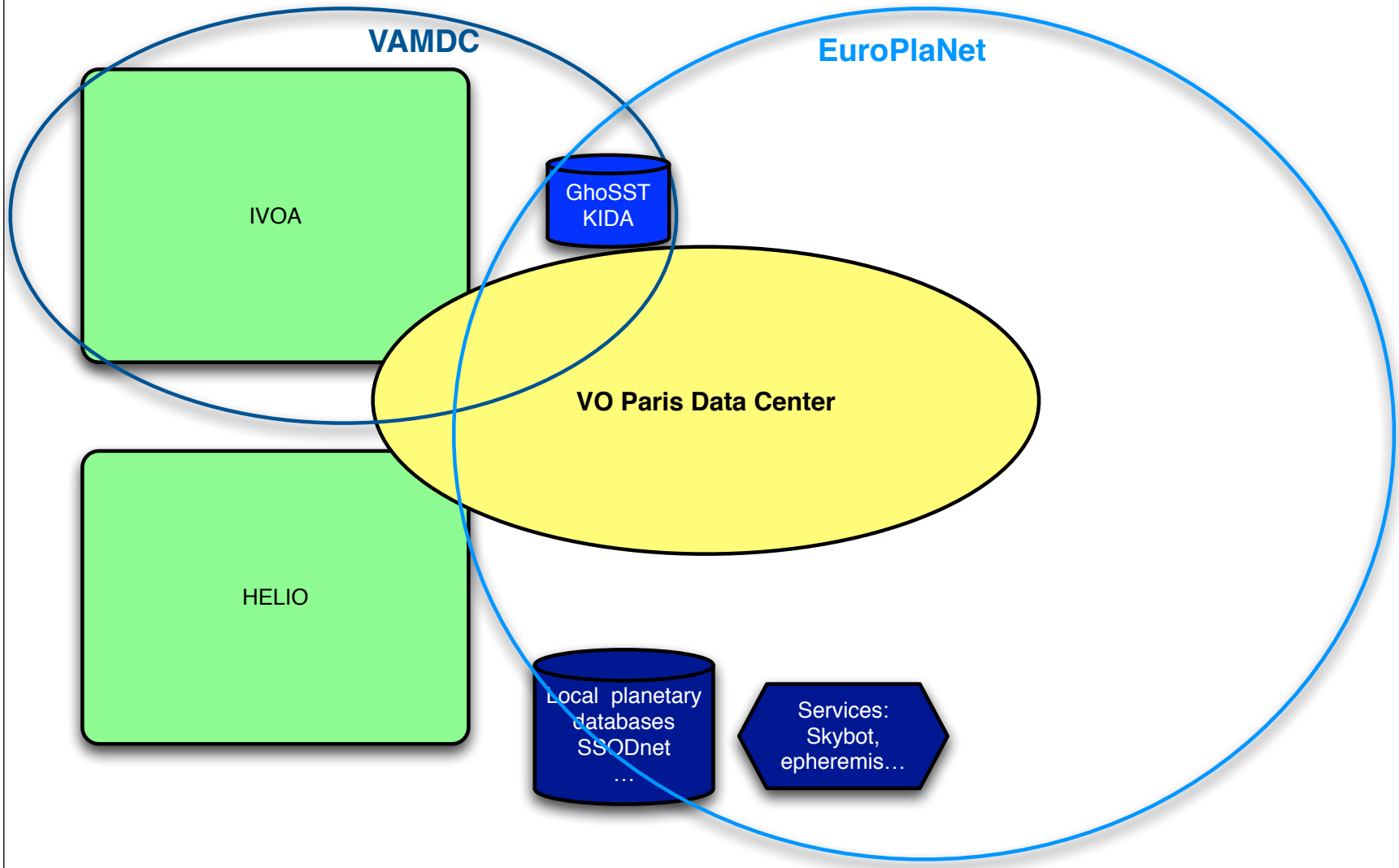
Contexte international



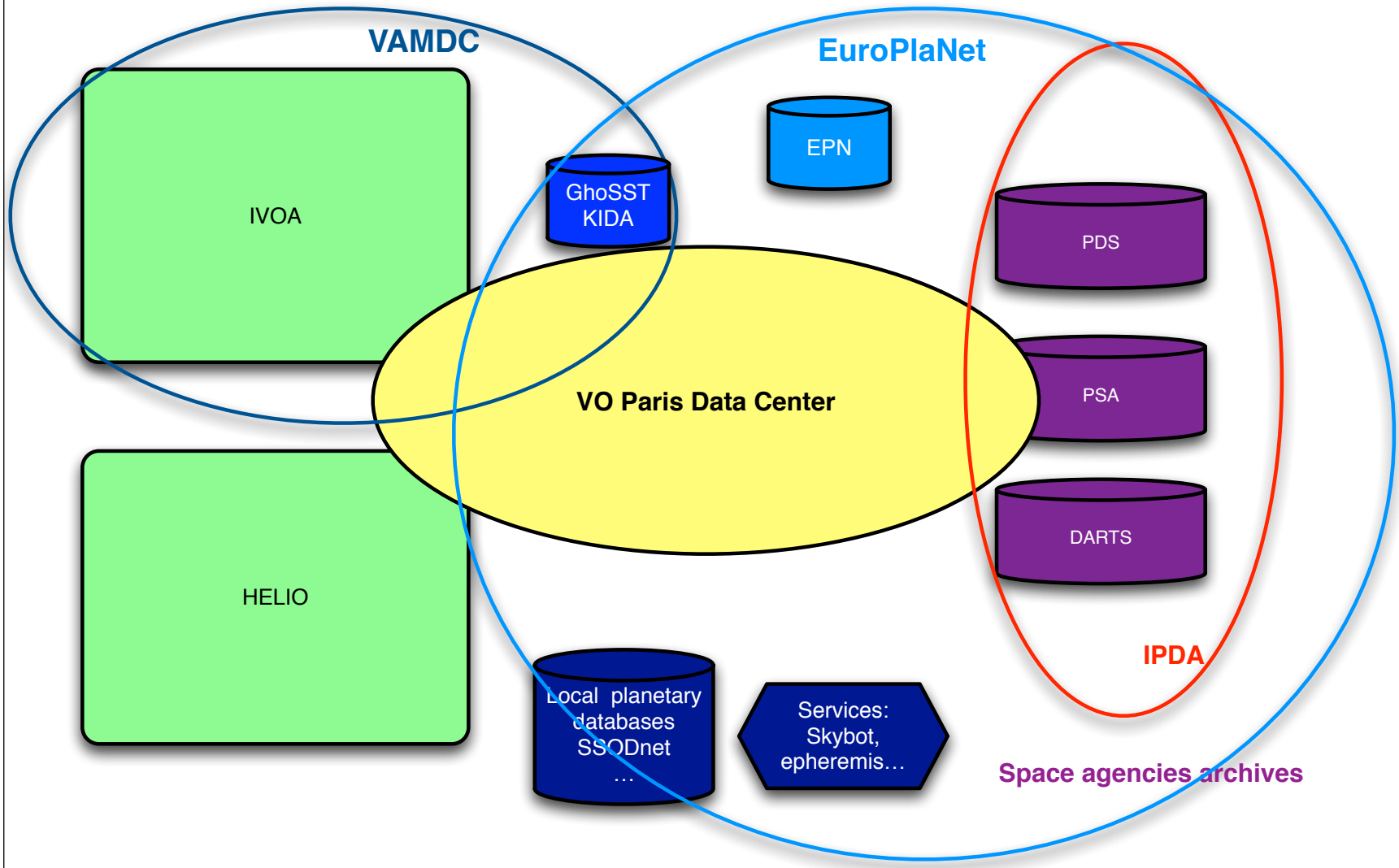
Contexte international



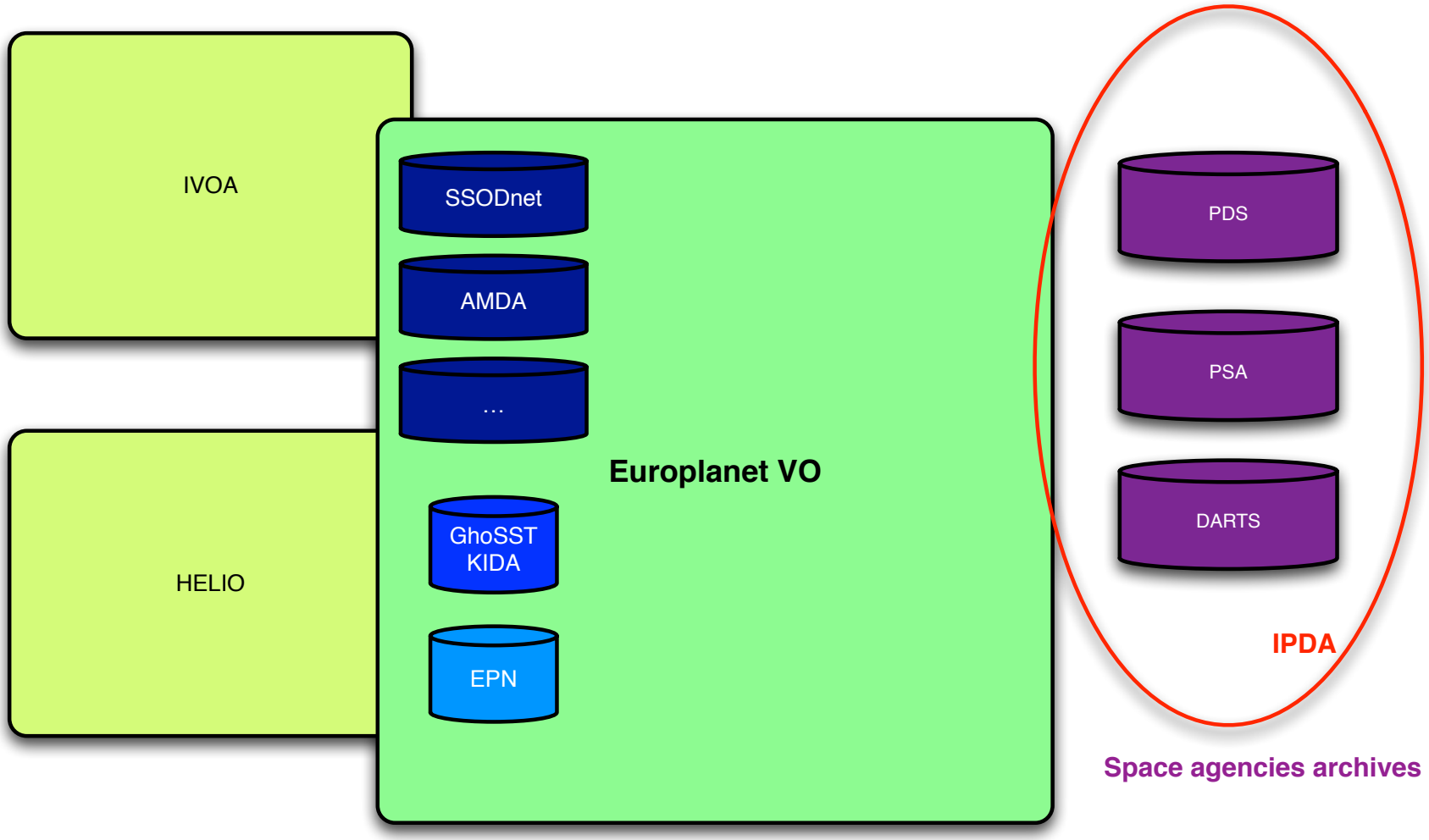
Contexte international



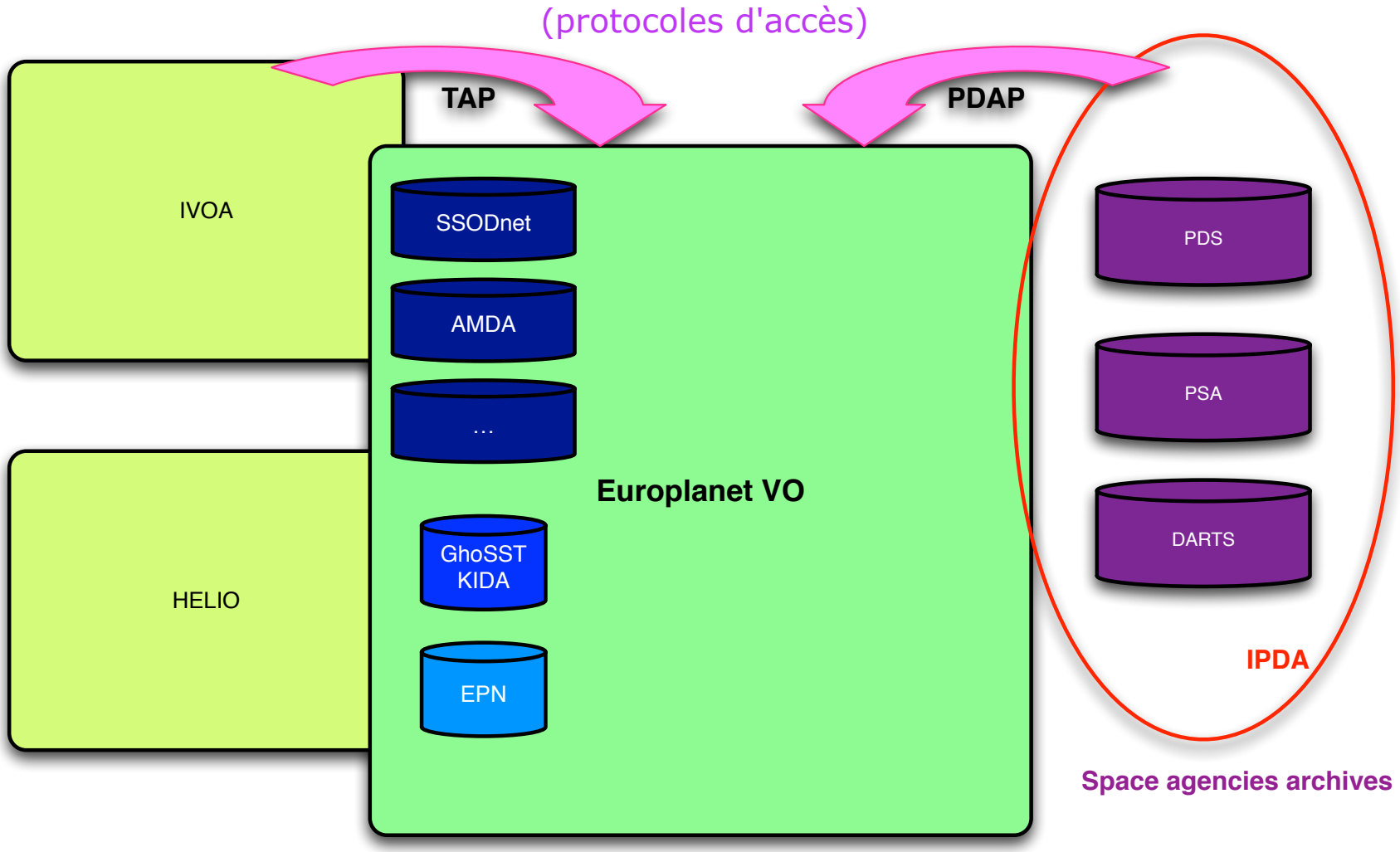
Contexte international



Europlanet VO



Europlanet VO



2009-10, VO-Paris: Functional analysis of IDIS' VO project

Open items addressed in this study:

- Perimeter of data to be accessed
    + Physical access to the data?

- Mechanisms:
    Data Access Layer / Access protocol
    Data Model
    Metadata exchange format
    Registries
    + VO visualization tools: which ones? Interface requirements?

- Development of contents:
    New data bases derived from science activities in Paris Observatory

2009-10, VO-Paris: Functional analysis of IDIS' VO project

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EuroPlaNet objectives:

- Improve support to planetary space missions
- Set the basis of European planetary science VO

=> *requirement to provide access to PSA (at least)*

+ requirement to provide access to data bases produced by EuroPlaNet activities

2009-10, VO-Paris: Functional analysis of IDIS' VO project

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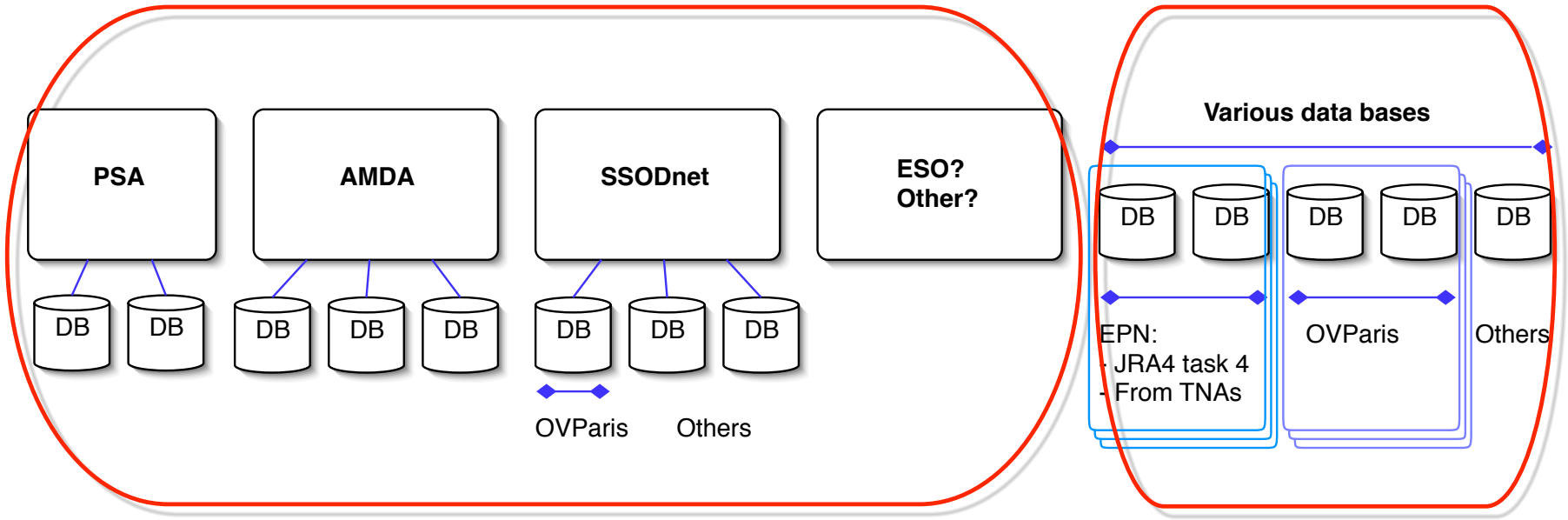
  Metadata exchange format
  Registries
  + VO visualization tools: which ones? Interface requirements?

Existing / natural solutions:
IVOA system
e.g. visualization tools: Aladin, VOSpec, TopCat…
PDAP protocol (IPDA)

1- Scope of IDIS-VO project

Data to be included/accessible in EuroPlaNet IDIS



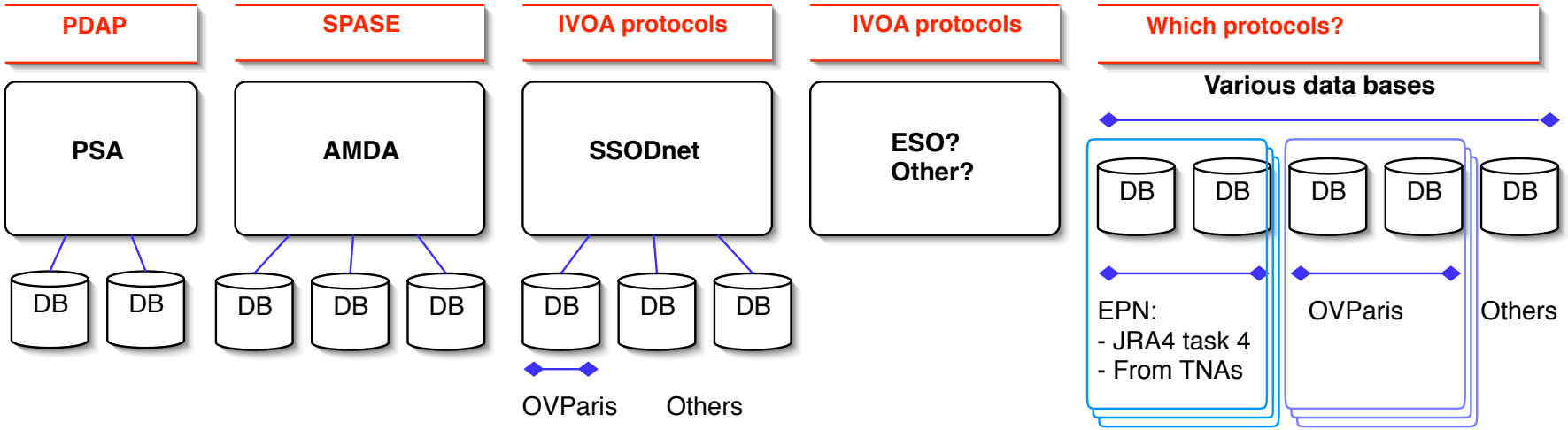
Big data repositories

Individual data bases
+ collections related to EPN

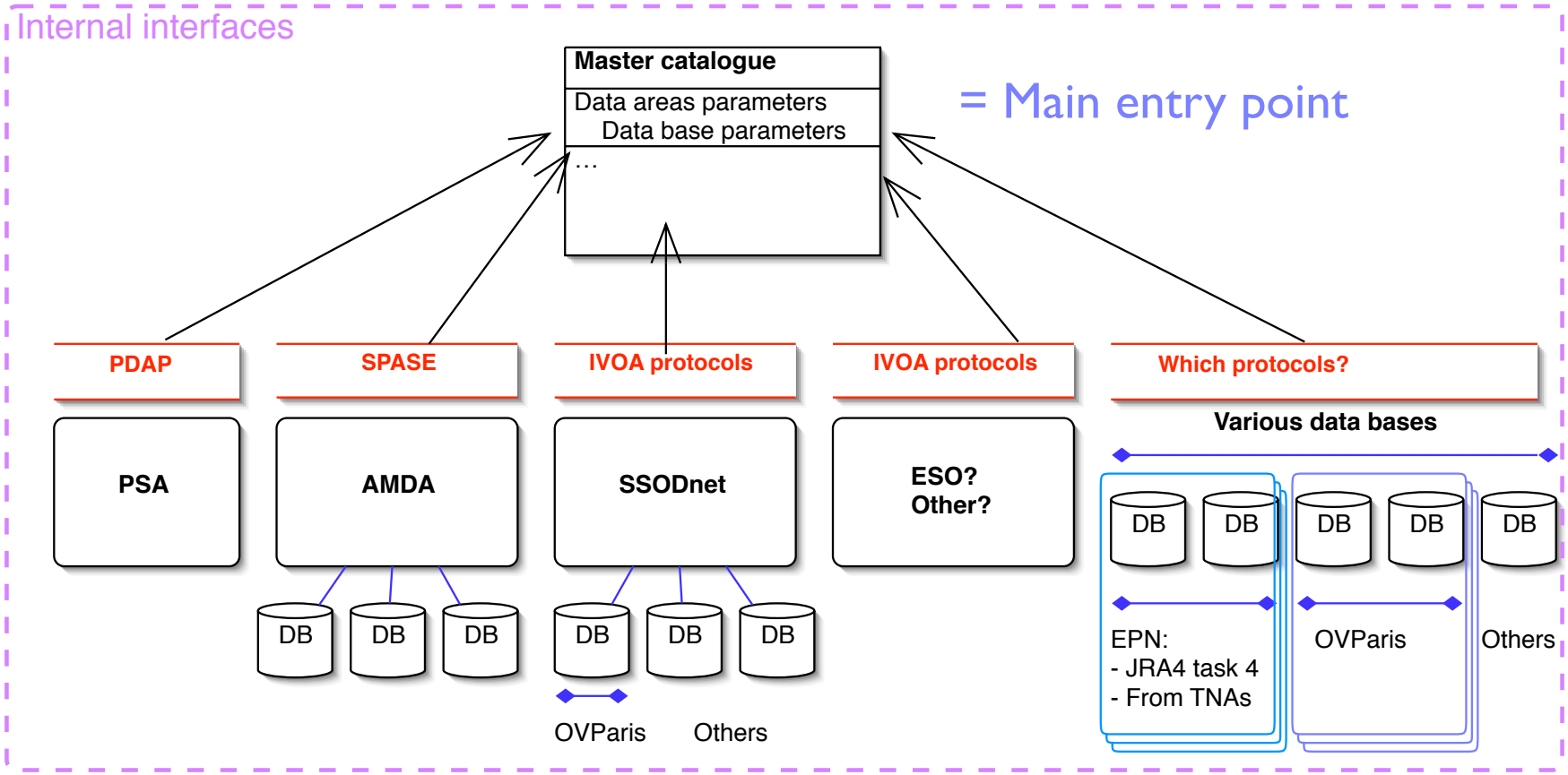
2- Individual data access layers

Mechanisms to access the data products
=> IDIS will have to deal with those

Define IDIS standard?



3- Interfaces / catalogue



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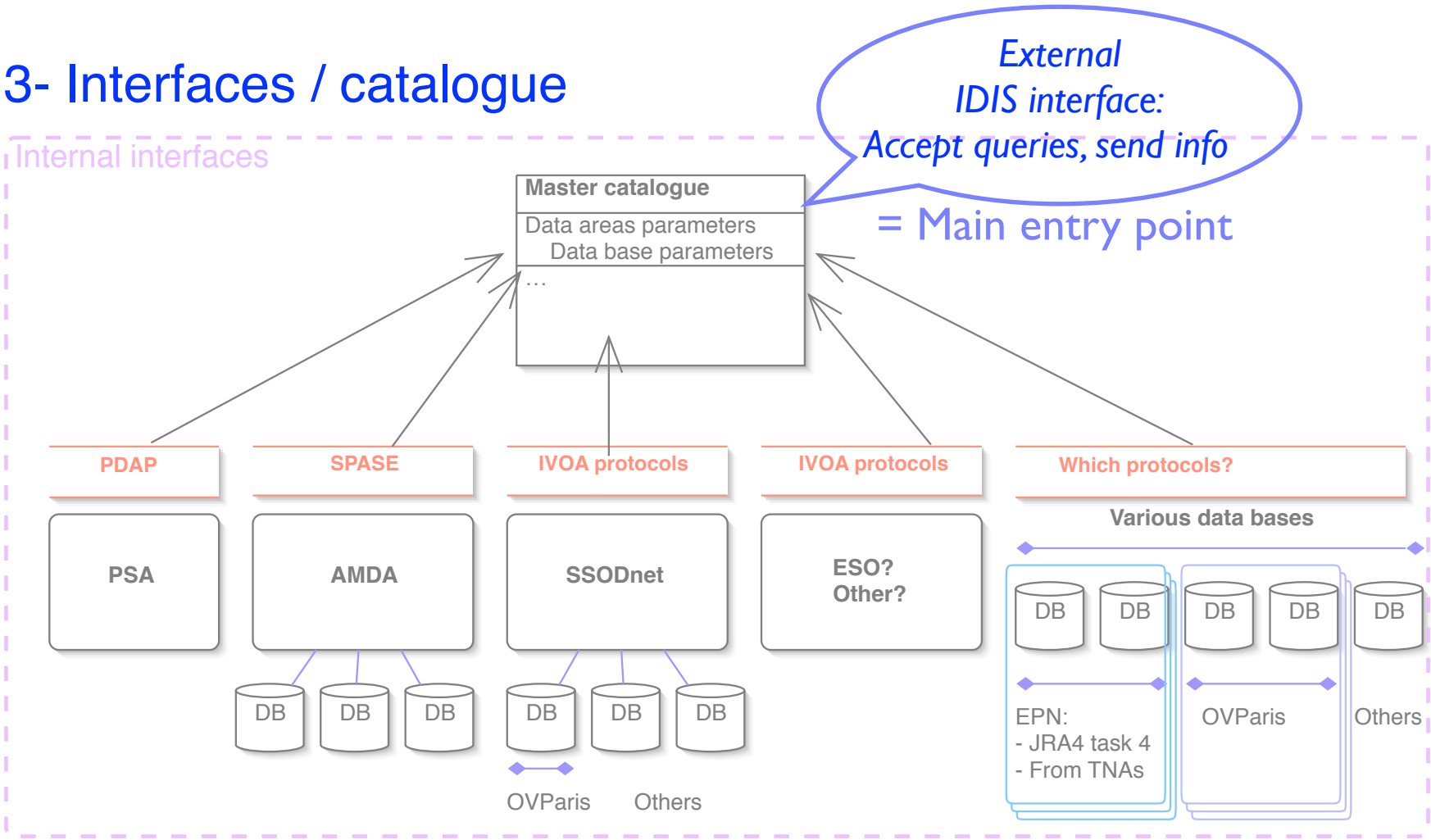
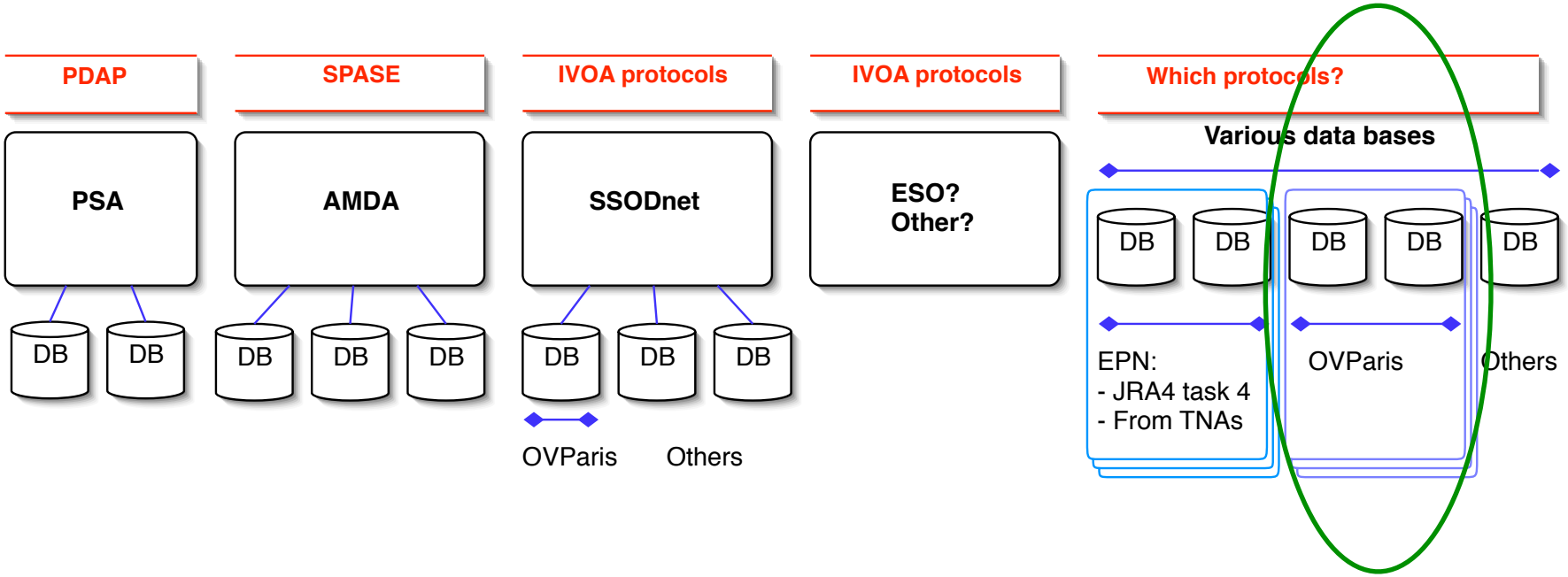


3- Tests and assessments

- Test of PDAP protocol with local data bases
- Data model for Planetary Science?
- Registry / catalogue?
- Services: on-line visualization demonstrator
- Services: identify other required services
- Answers to queries: metadata
  Exchange format: VOTable

=> Tests on local data bases

4- New data bases



4- New data bases in VO-Paris

1- Integration of existing DB (IMCCE, LUTH):
- Ephemerides BdL
- Natural satellites data centre
- Exoplanets encyclopedia

2- Development of observational DB (LESIA)
- Comet spectroscopy
- Titan atmospheric profiles
- Historical images cured in Meudon (IAU project)

currently support IVOA standards

VO interface to be developed

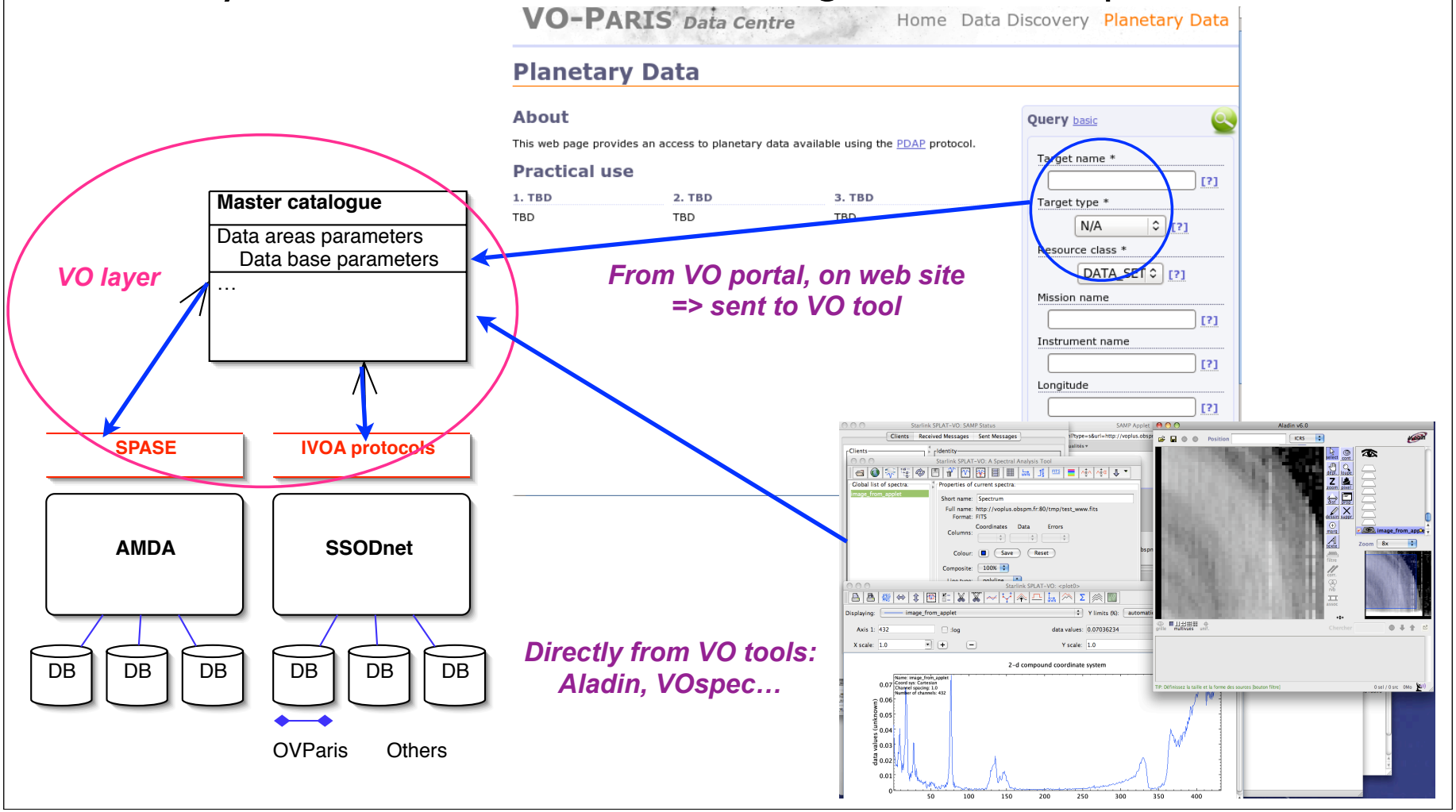
3- Projects:
- CCD imaging (Pic du Midi T1m archive)
- TNO properties (support to Herschel key pgr)
- Public space borne archives (VIRTIS VEx & Rosetta)
- SSODnet (small bodies data service)

All DB are accessible from VO-Paris IDIS node
Used as test cases to identify required evolutions of PDAP

5- Data access

Data bases are accessible:

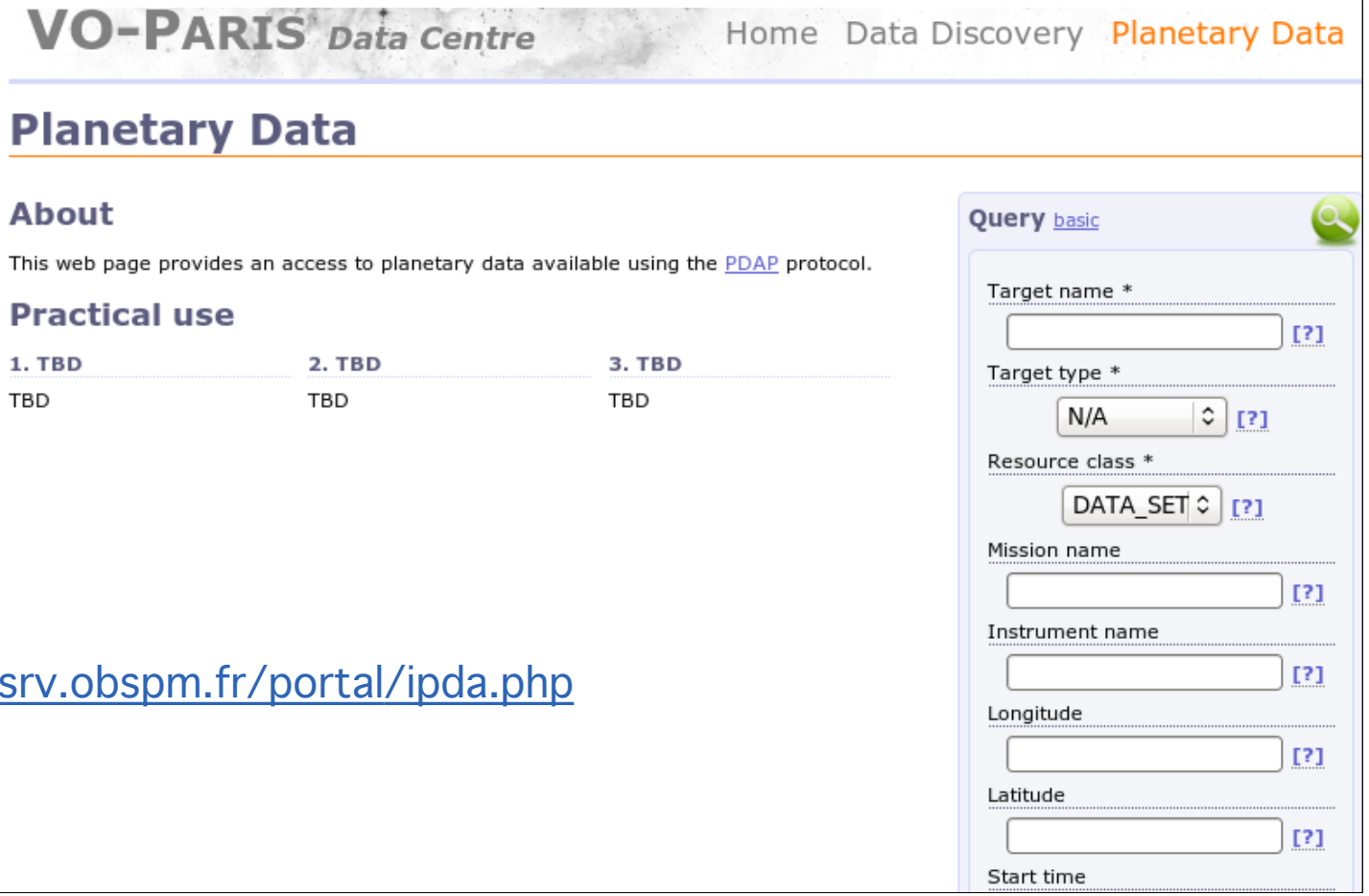
- from a common portal at VO-Paris (being developed)
- directly from visualization clients - if registries can be queried



Demo 1: test and use of PDAP

Mechanisms to locate data files of interest implemented on VO-Paris portal

- send queries to local data bases through PDAP
- identify services (~data sets), then products (=files)

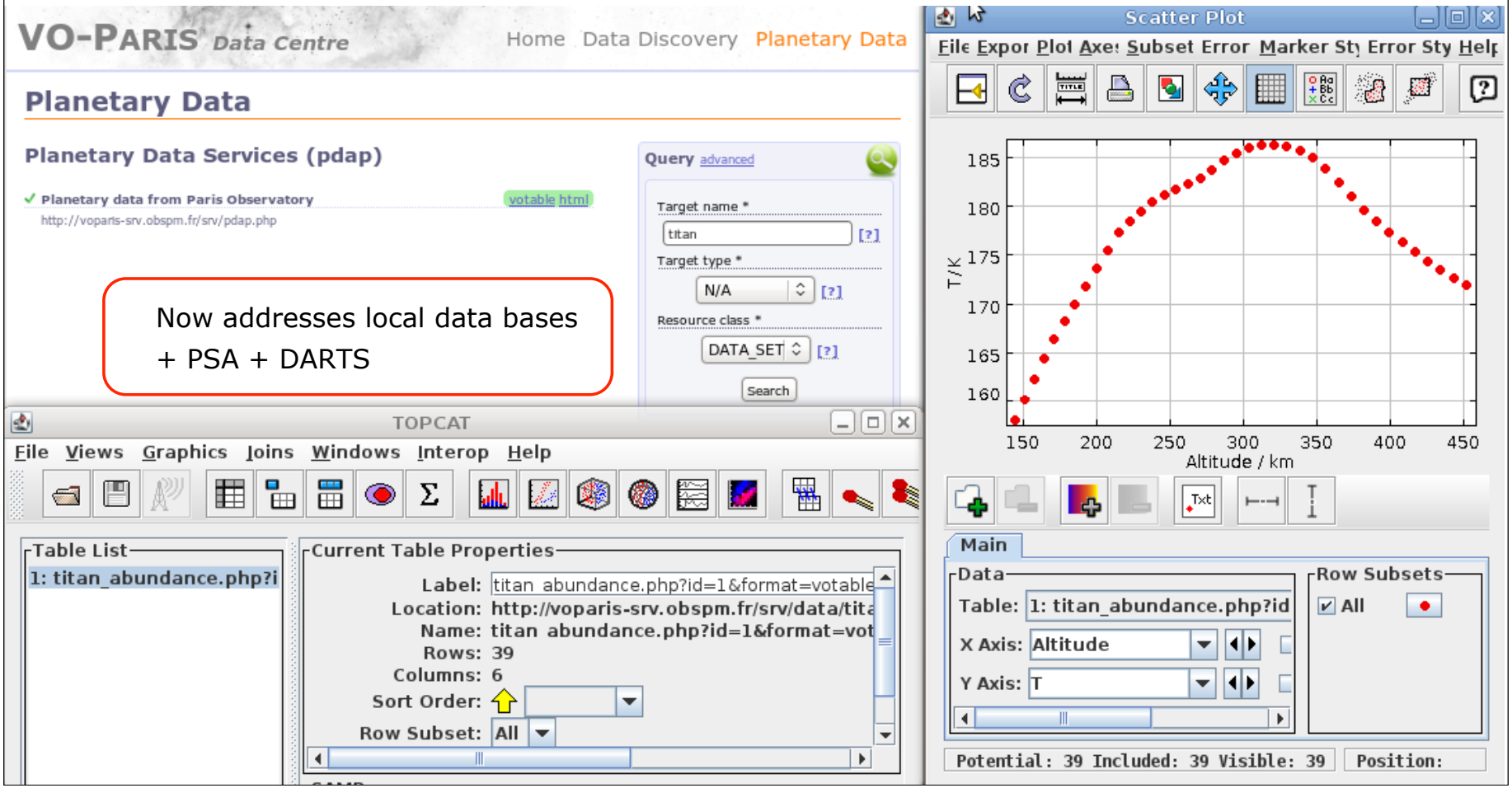


http://voparis-srv.obspm.fr/portal/ipda.php

Demo 1: test and use of PDAP

Answer is in a VOtable

- can be forwarded to visualization tools (very light)
- tools can load data files independently if format is OK (fits)



Test and use of PDAP, conclusion

PDAP can be used for IDIS, perhaps in addition to other protocoles

Registry system required:

- to list increasing number of data services

- to specify service interfaces

Potential difficulties:

- Defined for space-borne data, to be extended to support ground-based data + experimental data in the frame of EuroPlaNet

- Possible parameter values need to be listed — who will manage this?

- Homonimies require name resolver system

- Registry entries? i.e.: ivo:// vs epn:// or ipda:// ?
  Access to EuroVO-AIDA registry software?

- How do we read/plot PDS files?

6- PDAP-related Data Model

Defines all possible parameters describing data in the planetary VO

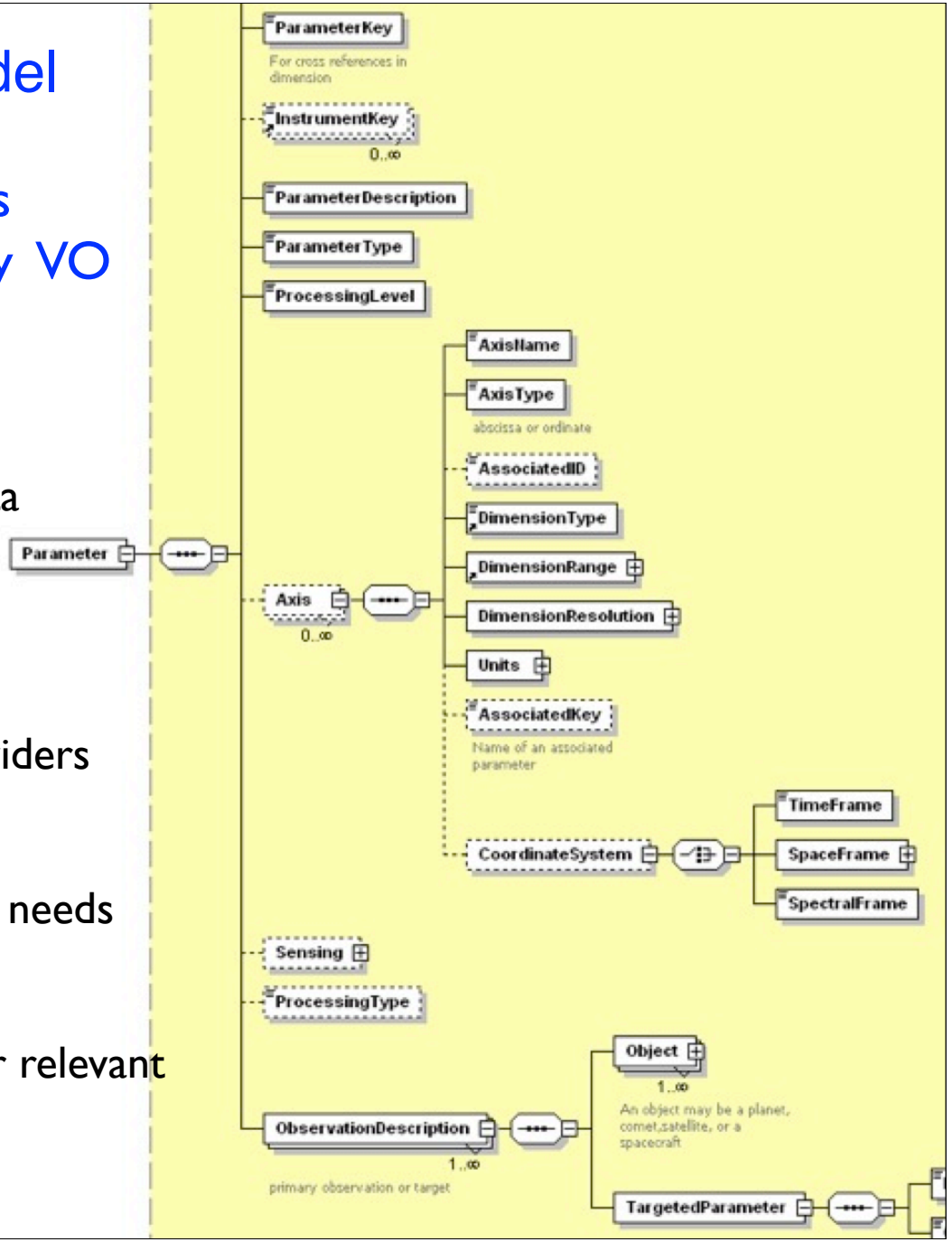
- Currently defined for plasma data only (with CDPP)

- Should be interfaced with PDAP

- To be used by external data providers to integrate their data in IDIS

- Built from PDS/PDAP dictionary, needs extensions.

- Stick to IAU standards whenever relevant

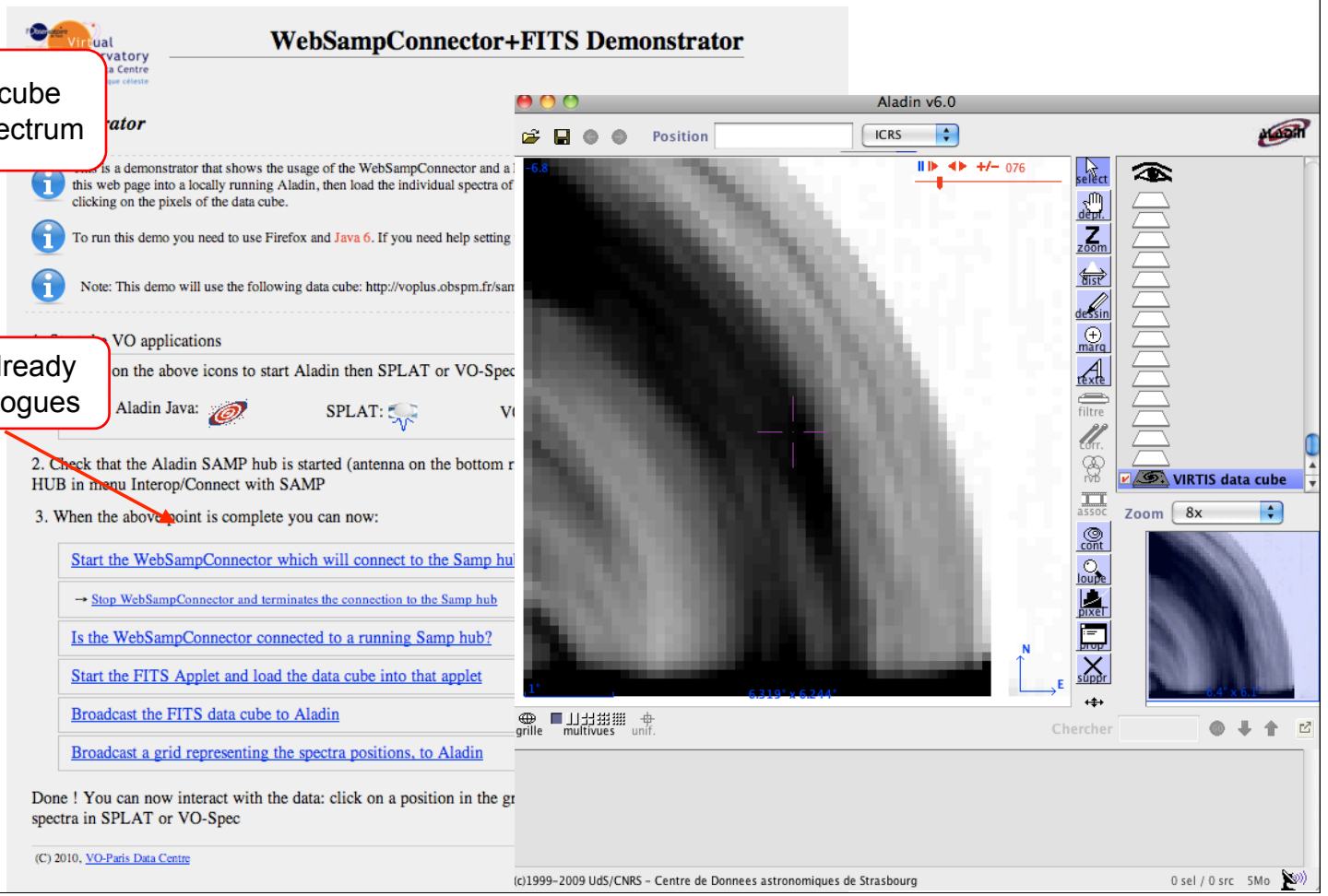


Demo 2: PDS on-line quick look

Purpose: to read and plot PDS data on line
At stake: to include PSA archive in Europlanet IDIS
Starts from identified data files
http://voplus.obspm.fr/samp/WebSampConnector+FITS/demo.html

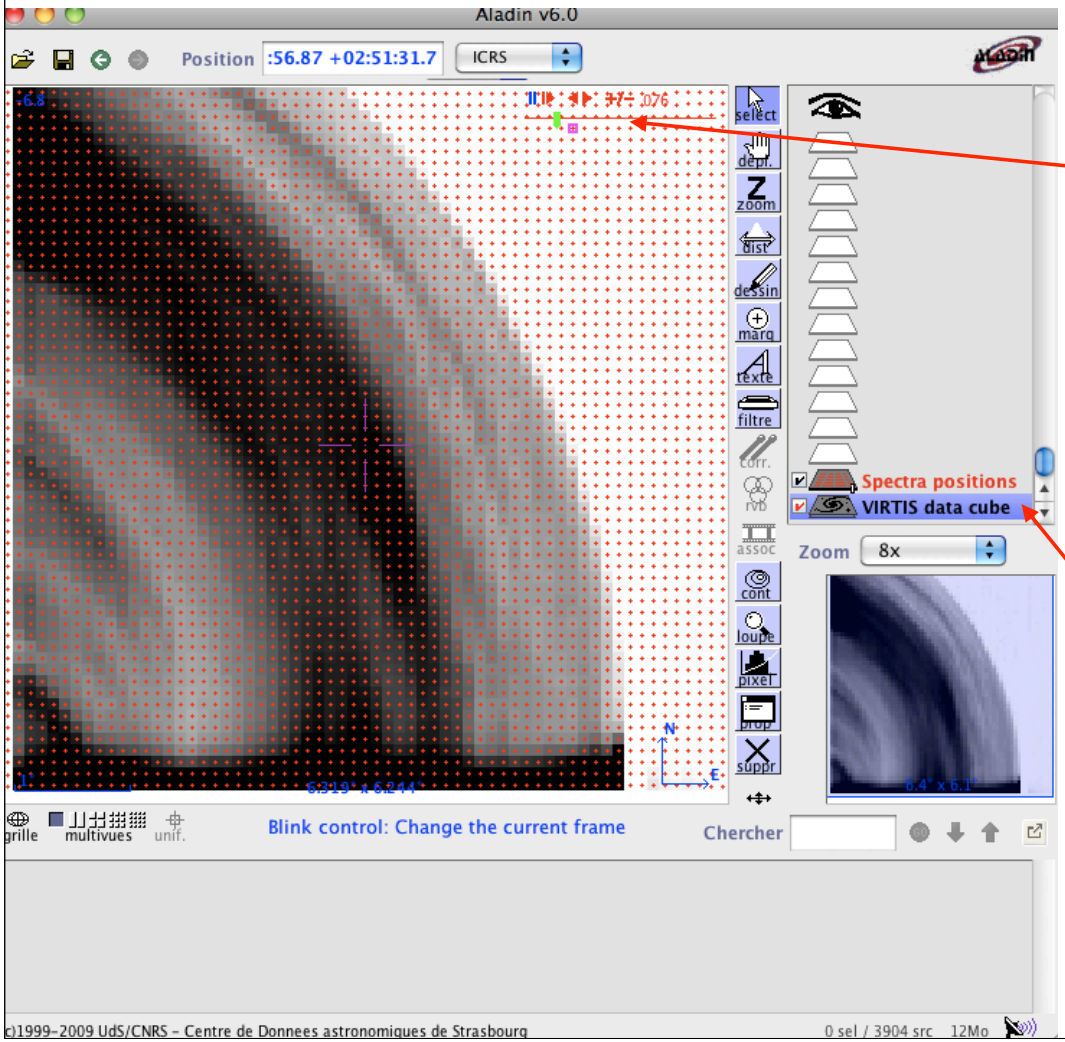
Ex: Virtis VEx spectral cube plots one slice or one spectrum

Assumes file has been already identified from data catalogues



Demo 2: PDS on-line quick look

Data file read on line in IDL, loaded into Aladin
Aladin provides image visualization, can browse data cube by wavelengths
Data are shared among web services (SAMP)



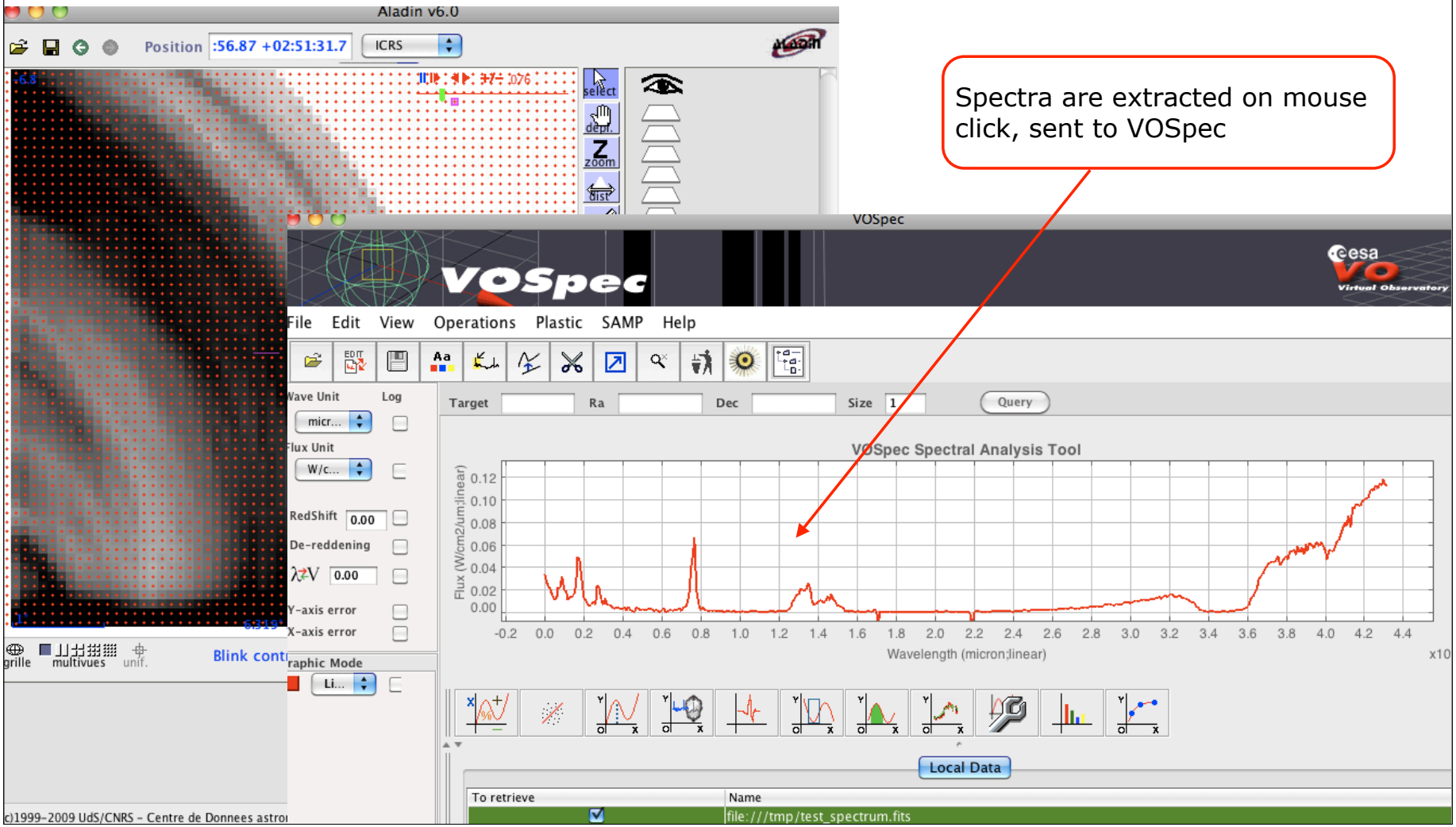
Aladin provides full cube support

Uses PDS client under IDL, recycled from LESIA space experiments

Recently ported to GDL, an open source environment

Demo 2: PDS on-line quick look

VOSpec provides sophisticated spectroscopy tools (band measurements…)



7- Other services - to be developed

To identify targets:

- Object name resolver (ex, Pluto vs 134340 Pluto) <=> SSODnet ?
- Events handling (including propagation of events) <=> HELIO ?
- Sky coordinates conversion (between different α/δ systems) <=> Aladin WCS
- Inverted ephemerides (which object in a given field/moment?) <=> Skybot

To access/handle data:

- FITS/PDS readers OK - Other formats? <=> VirtisPDS/GDL + javaScript
- Data format conversion <=> ?
- Metadata format <=> VOtable used by PDAP + IVOA tools, OK
- Data model <=> specific to planetary science (IDIS) + others (VAMDC, GhooST…)

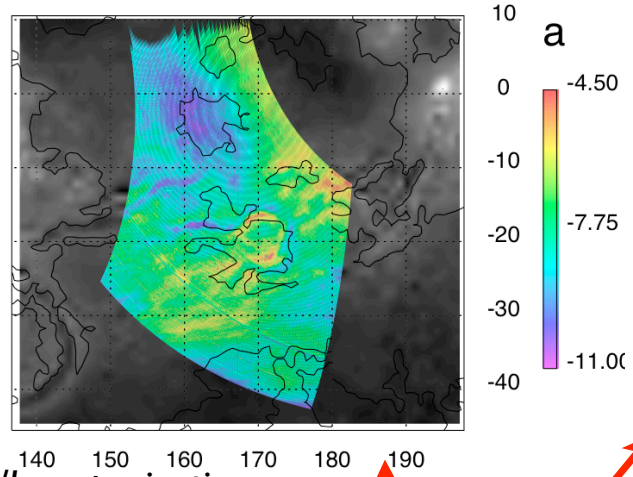
To plug added value services:

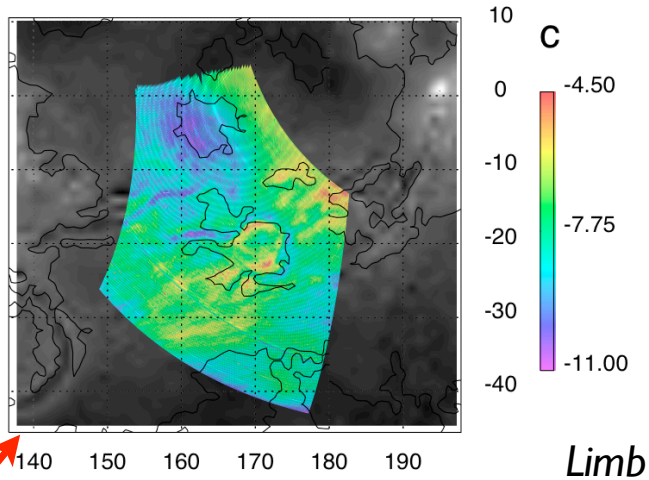
- Data exchange format <=> SAMP (communication between tools)
- Coordinate frames conversion (ex: MDIM 1 vs MDIM 2.1, Clementine vs ULCN)
- Geographic projections & mosaics: should handle VO inputs?

Data access / services, examples

Image projection / mapping should handle various types of coordinates

=> Need to perform this in a generic service

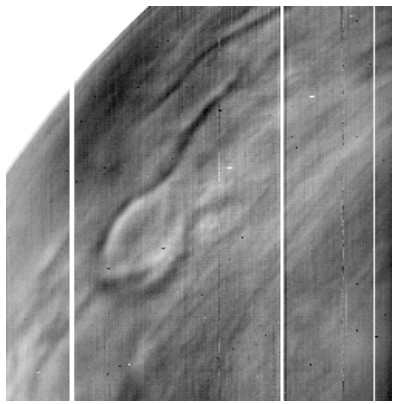




lat/long projection at top of atmosphere (superposed on Magellan topo)

lat/long projection at surface

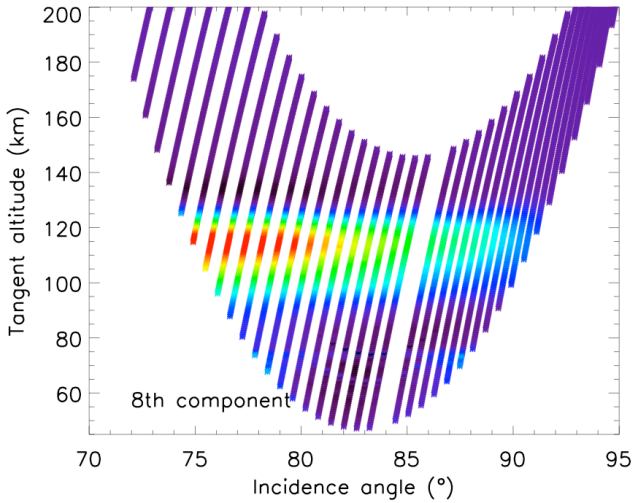
Geometry file (derived from Spice analyses)



Virtis/Venus-Express Surface signature (411_02)

XY format (cube slice)

Limb view: altitude/depth (CO_2 fluorescence)



Data access / services, examples

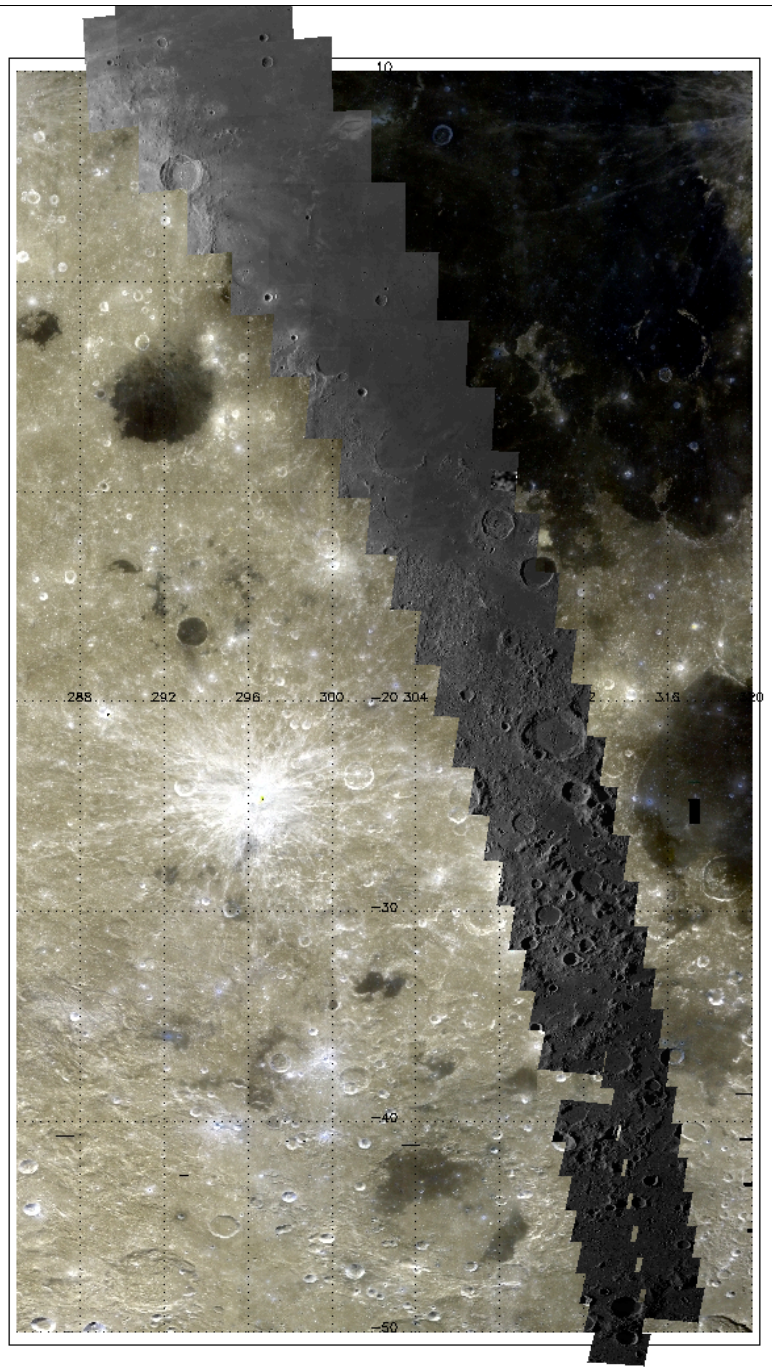
Image projection / mapping

Should handle various coordinate systems / control point networks to preserve instrument resolution

ex: ULCN vs Clementine

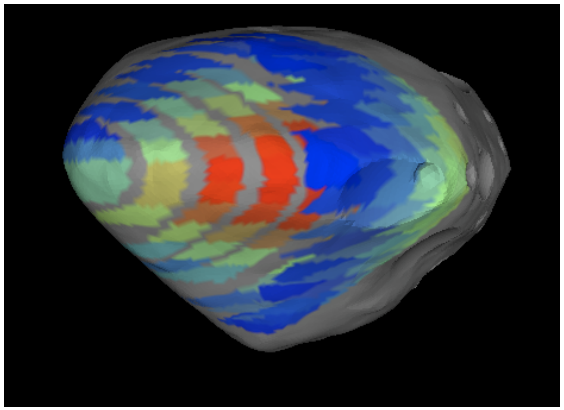
=> Requirements on:
- data description
- input interface of mapping (and other) tools

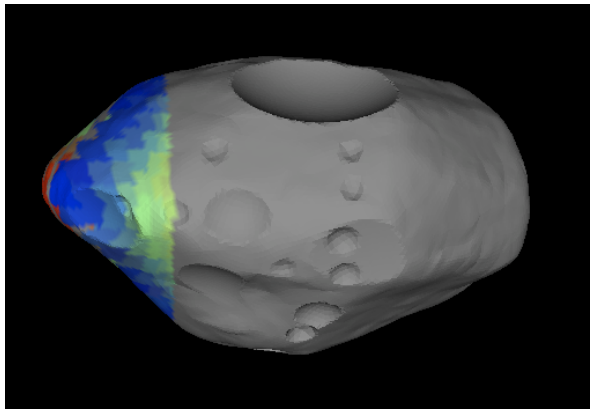
GIS interface ?



AMIE / Smart-1 mosaic on top of Clementine map

Data access / services, examples





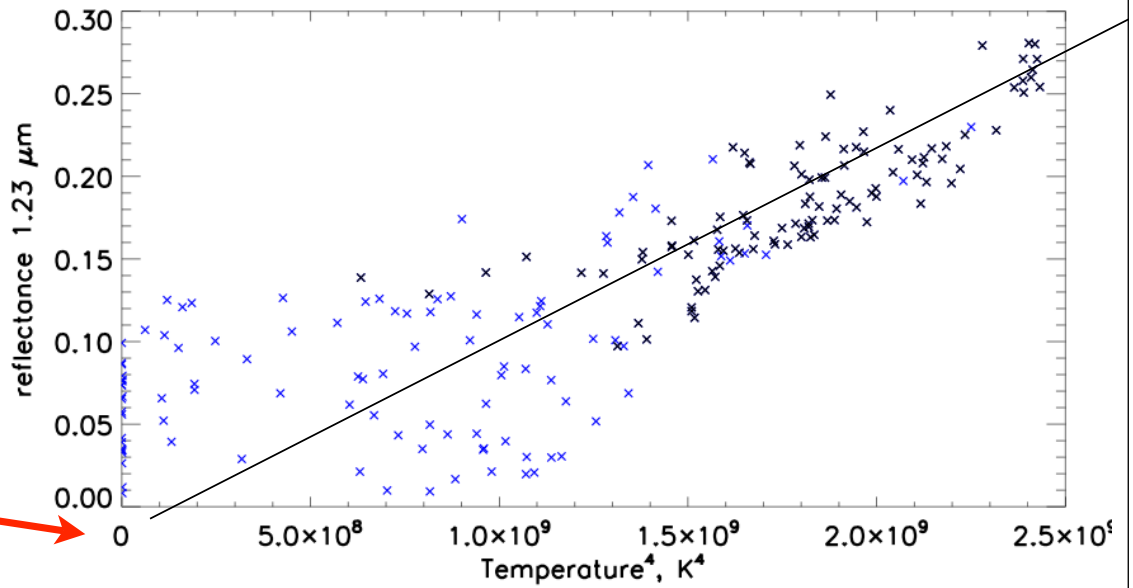
VIRTIS / Rosetta
Projection on Steins plate model

Before start of acquisition

At end of acquisition

Geometric computation

Thermal modeling



Conclusions

- Activité OV-Planétologie européen démarrée
  - Participation française motrice (OV-Paris, CDPP, Grenoble)

- Contexte & objectifs identifiés
  - Périmètre de données
  - Réutilisation d'outils existants: IVOA
  - Participation au développement d'outils nouveaux: IPDA / ESA

- Quelques solution identifiées:
  - Recherche de *certaines* données via TAP
  - Accès PDS en ligne + liens vers SAMP

- A développer
  - Extensions de PDAP + modèle de données
  - Services additionnels? Résolveur de noms…

Conclusions, 2

- Mechanisms:

Data Access Layer: - PDAP favored, requires extensions
- IVOA protocols may also be used

=> Close collaboration with ESA / ESAC needed
direct interaction started at IPDA's last steering commitee

Data Model - IDIS specific, in development
(to be related to PDAP)

Metadata exchange format => VOtable — IVAO + PDAP compliant

Registries - IVOA-like — organization TBD

Standard documents to be more formally written
First drafts will be proposed as IDIS standards at next general meeting
(Paris, Feb 2011)