

# VESPA: EPNCore and other topics

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VESPA includes 18 contributing participants (labs) in 13 beneficiary institutes:

Observatoire de Paris  
(IMCCE, LESIA)



IAPS/INAF Rome



Jacobs Univ. Bremen



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IASB-BIRA Brussels



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+ Contributions from  
the community

UPV/EHU Bilbao



IGN/PAS Wrocław



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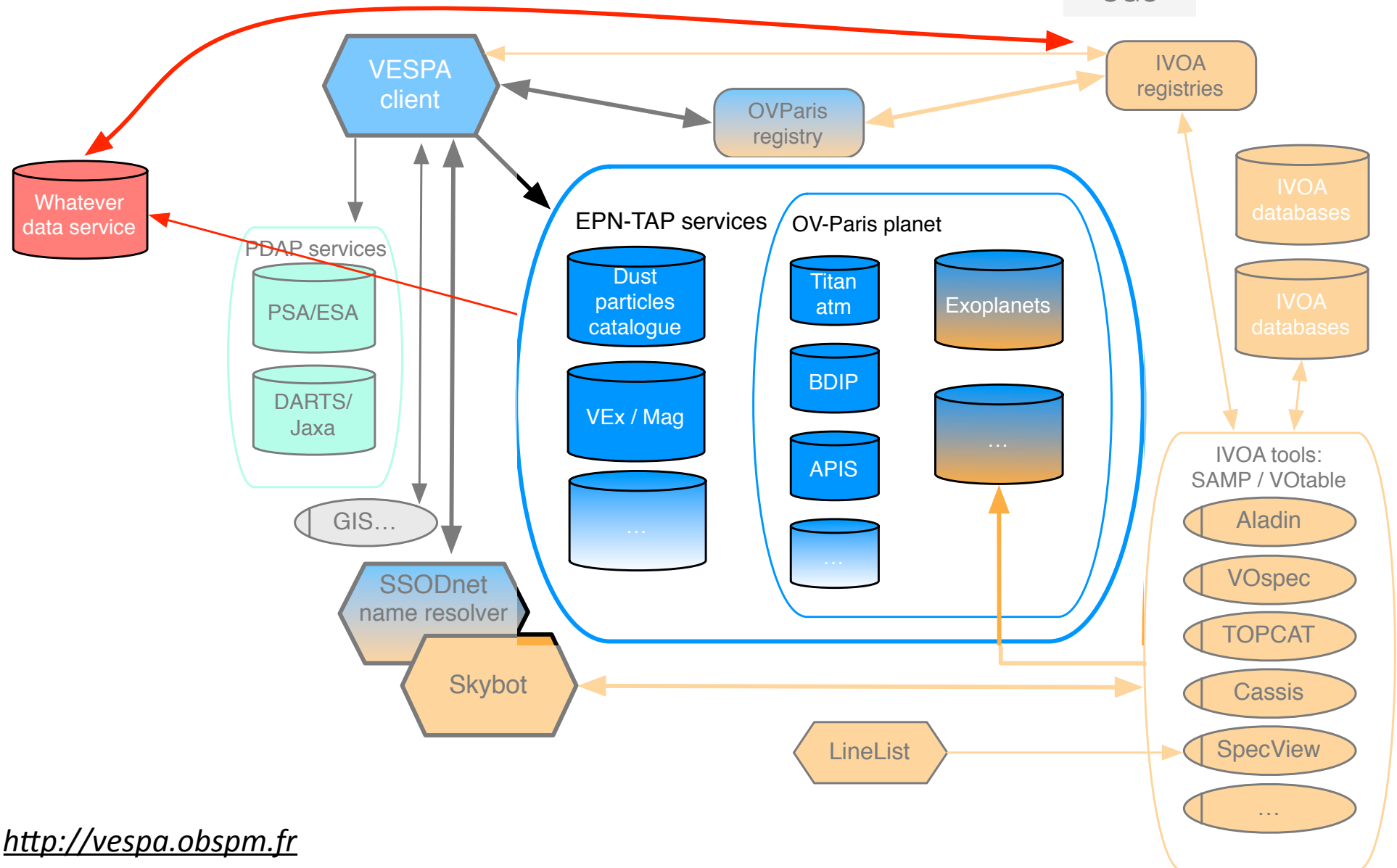
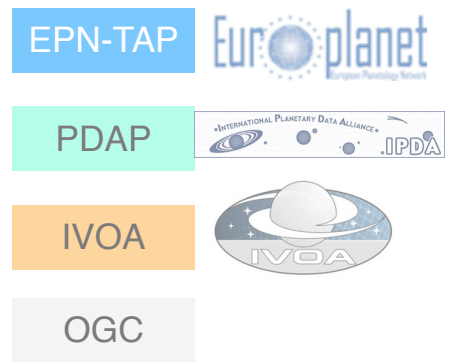


# A Virtual Observatory in Planetary Science

Built on astronomical VO developments

+ previous European programs: IMPEX, HELIO, VAMDC...

+ interfaces with: PDS, GIS/OGC, etc...



## IVOA standards used in VESPA

### Recently:

Big progress on:

- HEALPix maps support (TOPCAT and Aladin)
- Support for footprints through STC-S strings (TOPCAT; e.g. extended pixels)
- Support for reflectance spectra (CASSIS)
- DaCHS installation on Docker, very quick for new services/providers

### Other standards of importance:

- SAMP (to exchange data between tools and search interfaces)
- Coordinate frames in the Solar System (see S. Joy's presentation)
- Observatory / spacecraft list
- UCDs — essential to identify quantities
- Datalink
- etc...

# VESPA DAL

## Main Data Access Protocol: EPN-TAP 2.0

- TAP mechanism

- EPN-TAP parameters

  - Set of EPNCore parameters — similar to ObsCore, wider scope

  - Require UCDs — used by some tools to understand data correctly (spectro)

    - Utype — EPNCore / EPN-TAP doc in progress

- Rules

  - Parameter usage + syntax for new ones

EPN-TAP v1 published in 2014 (Erard et al, A&C 7, 52)

**EPN-TAP v2.0 Reworked during Europlanet-2020**

## Data services connected via EPN-TAP

### Currently:

48 interoperable data services connected, from 16 institutes (~ 15 in dev)

Encompass many aspects of Solar System studies:

- surfaces
  - small bodies / satellites / rings / dynamics
  - atmospheres
  - magnetospheres / radio observations
  - solar physics / planetary plasmas
  - exoplanets
  - solid spectroscopy / experimental reference data
- + multiple content services (ESA/PSA, VizieR catalogues,...)

Most services implemented on DaCHS + some on TAPlibrary (ESA/PSA...)

Very efficient call/workshop procedure to involve the community

## EPN-TAP 2.0

- **Parameter table:** 160+ standard parameters with UCD

<https://voparis-wiki.obspm.fr/display/VES/EPN-TAP+V2.0+parameters>

- **Parameter description:**

<https://voparis-wiki.obspm.fr/display/VES/EPN-TAP+v2+parameter+description>

- **Mandatory parameters:**

allow global searches on all services from the VESPA portal

- **Optional parameters:**

extra standard parameters — for common situations

parameters from thematic extensions

- **Free parameters:**

Additional parameters+UCD can be used in a service

## EPN-TAP 2.0

**Mandatory parameters:** 46 — allow global searches on all services

- **Target description**
- **Data /measurement description**
- **Range on axes: temporal, spatial, spectral, 3 illumination angles**
- **Data reference & origin**

**Optional parameters:** 42 - to be used in common situations

- **File access (when data not in table)**
- **Additional data and target description**

**Thematic extensions:** ~75, available when needed

- **To be used consistently in related services**
- **In particular, provide additional axes**



## EPN-TAP 2.0

### Rules on parameters, e.g.:

- **One data product / line**
- **\*\_min / \*\_max associated values**
  - must contain the same value if not relevant / unknown
- **some can be multivalued:**
  - hash-lists only
- **Call-back parameters:**
  - currently uses service\_title (may use ivoid in the future)
- **Convention to provide associated files**
  - e.g. PDS detached labels via datalink

## EPN-TAP 2.0 - open points

### UCDs

- **Most issues solved with 2018 discussions**

remaining issue with phys.reflectance, to be clarified

- **modification date?** time.processing, but ?
- **map projections?** pos.projection?? (there is a pos.lambert)
- **map scale?** pos.wcs.scale would do?
- **numerical constants?** arith.zp would do?
- **md5 or similar** meta.checksum;meta.file ??
- **datalink** meta.ref.url;meta.datalink ??
- **asymmetric error bars?** need for stat.error.min/max
- **particle spectroscopy?**
- **UCDs for VOevents?** type, status, cite (+ location of event)

Other UCDs are used in data files, less critical

## EPN-TAP 2.0 - open points

### Other points

- **Clarify usage of inf / -inf / NaN in ADQL**

at least inf/-inf should apparently exist, as per DALI - but do they?

- **Clarify usage of s\_region / STC-S strings**

E-handed frames need to be supported with polygons for planets (IAU convention)

## **EPN-TAP 2.0 / VESPA**

- **Europlanet doc being written**

Due end of May

- **More complete doc to be submitted to IVOA**

Draft ready in the summer?