

# EPN-TAP and EPNcore v2.0

S. Erard, B. Cecconi, P. Le Sidaner, M. Demleitner and the VESPA/Europlanet team

IVOA Virtual Interop. May 25-27 2021



# EPN-TAP / Motivation

- Europlanet EU programme(s): consistent access to Solar System data (including derived data)? VO framework seemed appropriate. Scope = Planetary Science, Heliophysics, exoplanets
- Difficulties:
  - Moving objects / targets, seldom clearly identified in existing archives
  - Targets are resolved: many coordinate systems - related to targets or configurations
  - More diverse types of measurements:
    - Not only (reflected) light, but also particles, fields + lab samples
- TAP is adapted to searches in catalogues (one of the main expected usages)
- ObsCore provides similar concepts for general parameters
  - Missing vocabulary to name observing and configuration parameters
    - but this exists to some extent in PDS (space archives) and SPASE (plasma related)
- Missing UCDs for reflected light, in-situ and sample measurements

EPN-TAP = Usual TAP mechanism

EPNCore metadata vocabulary + associated UCDs

Set of rules related to services and tables

# EPN-TAP status

- First published in Astronomy and Computing (Erard et al 2014) — v1.0
- Proto-version 2.0 presented by Baptiste Cecconi at Interop 2015, Sesto
- **Mature v2.0 submitted as a Working Draft to DAL WG last October**  
<https://ivoa.net/documents/EPNTAP/20201027/WD-epntap-2.0-20201027.html>

- **Presented at last Interop, Nov 2020**

Relies on publication of 55 data services worldwide (~ 20 teams) and is now mature

- All existing services are in v2.0, being reviewed and updated to latest version
- Validator in place at VOParis (PADC) (P. Le Sidaner, Interop 2015): TAP validation using TAPLINT, includes check on EPNcore keywords/ucd/units
- Preliminary EPN-TAP2 mixin in DaCHS (to be reviewed and completed)

# Europlanet VESPA: Data services connected via EPN-TAP / field

Open  
Open in test | upgrade required  
Drafted  
Scheduled 2024 (selection)  
• New or upgraded in 2020/21  
• New content in 2020/21

## Atmospheres

- - Titan profiles - CIRS (Cassini, LESIA)
- - Venus spectroscopy - VIRTIS (VEx, LESIA)
  - Mars Climate Database (modeling, LMD)
- - Venus profiles - SPICAV/SOIR (VEx, IASB-BIRA)
- Mars profiles - SPICAM (MEx, LATMOS)
  - All MEx derived atmospheric products (via MEx IDS)
  - Venus cloud products (LATMOS)
  - ExoMars/NOMAD (BIRA-IASB)

## Small bodies

- M4ast (ground based spectroscopy, IMCCE)
- 1P/Halley spectroscopy (IKS / Vega-1, LESIA)
- - BaseCom (Nançay Obs, LESIA)
- TNOs are cool (Herchel & Spitzer + compilation, LESIA & LAM & Utinam)
- - SBNAF (from H2020 prog, Konkoly Obs)
  - Cometary lines catalogue (IAPS)
  - Vesta & Ceres spectroscopy - VIR/DAWN (IAPS)
- - DynAstVO: NEO refined parameters (IMCCE)
- - MPCorb: Small bodies orbital cat (MPC/Heidelberg)
  - Rosetta ground-based support
  - 67P illumination config (IRAP)
  - Meteor\_showers predictions (IMCCE)
  - Occultations predictions, ast & sat (IMCCE)
  - LuckyStar, occultations (ERC prog, LESIA)
  - Natural satellites db (IMCCE)
- - VizieR asteroid spectra (CDS / LESIA)

## Solid spectroscopy

- - SSHADE ices & minerals spectro (IPAG & network)
  - Planetary Spectral Library (DLR)
  - PDS spectral library (LESIA)
  - Berlin Reflectance Spectral Lib (DLR)
  - Hoserlab (Winnipeg U)

## Surfaces

- CRISM WCS service (MRO, Jacobs U)
- - Mars craters (Jacobs U, + update by GEOPS)
- USGS planetary maps WMS (Jacobs U)
- M3 WMS service (Chandrayaan-1, Jacobs U)
- HRSC nadir images, WMS (MEx, Frei Univ)
- OMEGA cubes and maps (MEx, IAS)
- - VIMS satellites, w/geometry (Cassini, LPG)
  - MarsSI GIS (Lyon)
  - Global spectral param of Mercury (DLR)

## Magnetospheres / radio

- - APIS (HST/Cassini, LESIA)
- - NDA (Jupiter radio Nançay, LESIA)
- - AMDA (CDPP / IRAP)
  - MAG data (VEx, IWF Graz)
- - MASER & related services (LESIA)
  - RadioJove (LESIA & US amateur network)
  - Iitate HF data of Jupiter (Tohoku Univ, Jap)
  - UTR-2 Juno ground support (Kharkiv)
  - MDISC & JASMIN (modeling, UCL)
  - Cluster & Themis data (IAP, Prague)
  - IMPEx models (from FP7 prog, IWF Graz)
- - Hisaki (Tohoku Univ., Jap)
- Transplanet (CDPP / IRAP)
- - LOFAR Jupiter (CBK/PAS, Warsaw)
- Magnetic field simus (LMSU)
- ASPERA & MARSIS atm obs (MEx, Iowa U)

## Solar

- HELIO AR & 1T3 solar features (from FP7 prog, LESIA)
- - Bass2000 (LESIA)
  - Radio Solar db (Nançay, LESIA)
- - CLIMSO (Pic du Midi, IRAP)
- - IPRT/AMATERAS (Tohoku Univ, Jap)
  - - Gaia-DEM (SDO, IAS)
  - - e-Callisto (Windisch, Sw)

## Generic / interdisciplinary

- - BDIP (LESIA)
- - PVOL (UPV/EHU & amateur network)
  - Telescopic planetary spectra collection (LESIA)
- - PSA complete archive (ESA)
- - HST planetary data (LESIA, to CADC archive)
  - Catalogues of planetary maps (Budapest)
- - VizieR catalogues in Planetary Science (CDS)
  - Gas absorption cross-sections (Granada)
  - Planets then satellites characteristics (LESIA/IMCCE)
  - Nasa dust catalogue (IAPS)
  - Stellar spectra, support for observations & exopl. (LESIA)
  - DARTS (JAXA - currently via PDAP)
  - ESA sky planetary data (ESA)
  - Interface with VAMDC (TBD)

## Exoplanets

- - Encyclopedia of exoplanets (compilation, LUTH/LESIA)
  - Catalogue of exo disks (LESIA)
  - Interface with DACE (Geneva)
  - ARTECS climate simulations (AOTS/INAF)
  - Atmospheric studies (UCL)
- - surface simulations (GEOPS)

# EPN-TAP news

- Some feedback and comments collected since last Interop
- Most inputs are not from IVOA (Europlanet, providers, users, new services)
- **Main changes:**
  - New dataproduct\_type — photometric curve, unclear  
(includes phase & polarization curves, but also 3D sequences)
  - Some corrections in the UCD (used to describe measurement\_type, like ObsCore)
  - spectral\_resolution practically changed to  $R = \delta\lambda / \lambda = \delta f / f$   
(was  $\delta f$  in older services)
  - s\_region can now accommodate MOCs — TBC for consistency with ObsCore
  - Merge existing APIS extension ( $\supset$  obs programmes, instrument detectors, orientation of giant planets)  
(not necessarily an extension per se, as most parameters are defined in other extensions)

# Open issues

- Vocabulary will keep growing with more extensions. Need for more UCDs!
- Datalink new style being worked out (compliance with DaCHS v2)
  - Need to access datalinks for several granules
- Some flexibility expected in ADQL? Non-ambiguous support of contours, etc
  - Pagination would help
- Extra standards required:
  - Target names (small bodies) => IAU / SSODNet service
  - Coordinate systems => being listed. Body-fixed frames need be OGS compliant
  - Observatory / space mission catalogues and ID => current VO project

# Work Plan

- XSD schema was issued for v1.0, to be updated
- EPN-TAP services declared in the registry being reviewed (Baptiste's talk) (many remnants of older versions)
- TAP clients can query all services
- optimized clients: VESPA portal; EPN-TAP lib in CASSIS and 3Dview
- TAP validator at VOParis / PADC has an EPN-TAP mode
- Existing mixin in DaCHS, to be checked and completed
- Plans for a future v2.1, would imply a major upgrade of existing services (and clients?)