

# Data publication at PADDC using TAP ObsTap for CTA, Gaia ... and EPN-TAP for Europlanet

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# Why and How TAP ?

- **TAP was designed to publish data tables**
- **TAP is for accessing tables inside relational databases**
- **TAP is a singularity in IVOA DAL as there is no constrain vocabulary (no automatic relation to core Data Model).**
- **TAP allows description and access to any type of data**

## Relation between TAP and DM :

- **DM related to TAP proposed a Interop Strasbourg 2009.**
- **Defines sets of mandatory query parameters.**
- **ObsCore allows access to images, spectrum, cubes, time series, events ...**



# PADC data providing using TAP

## - CTA :

- **Data level 4 and above : spectrum, images, tables.**
  - **TAP and SIA+SSA, allow to access all data concerning one object in a single query.**
- **Data level 3 : to be processed, no defined protocol in IVOA to promote these type of data out of TAP. Standard access using ObsTap.**

## Gaia :

- **PADC will have a mirror of Gaia catalog mainly for internal use**



# PADC data providing using TAP

## - VESPA :

### – Planetary Science Data.

- All types of data : images, cubes, time series, dynamic spectra, laboratory data ...
- All levels of calibration
- Many scientific areas with specific standards : planetary surface (GIS), atmosphere, plasma physic (space), solar physics (helio), small bodies, exoplanets ...
- Many formats : Ascii, PDS 3 – 4, FITS, CDF, Net-CDF, GIS (geotiff, geojson ...), ...
- Ground-based data, spatial data, in situ data, sample and laboratory data.



# Accessing TAP for user TAP clients

## - CTA :

- **Data level 4 and above : spectra, images, tables.**
  - **Clearly defined using TAP, allows to access all data concerning one object in a single query.**
- **Data level 3 : to be processed, no defined protocol in IVOA to promote these type of data out of TAP. Standard access using ObsTap.**

## - GAIA :

- **PADC will have a mirror of Gaia catalog mainly for internal use**



# Accessing TAP for user TAP clients

## - TAP & ObsTap clients: TOPCAT

Select Service Use Service Resume Job Running Jobs

Locate TAP Service

By Table Properties By Service Properties

Keywords:  And

Service Writer Ids:  Table Name  Table Description  Service

Cancel Find Services

All TAP services (96)

- TAPvizer (31040) - ivo://cds.vizier/tap
- HEASARC TAP (896) - ivo://nasa.heasarc/services/xamin
- IRSA TAP (446) - ivo://irsa.ipac/tap
- SDSS DR7 (147) - ivo://wfau.roe.ac.uk/sdssdr7-dsa
- GAVO DC TAP (144) - ivo://org.gavo.dc/tap
- SDSS DR5 (129) - ivo://wfau.roe.ac.uk/sdssdr5-dsa
- SDSS DR6 (129) - ivo://wfau.roe.ac.uk/sdssdr6-dsa
- UKIDSS DR6 (124) - ivo://wfau.roe.ac.uk/ukidssdr6-dsa
- UKIDSS DR3 (122) - ivo://wfau.roe.ac.uk/ukidssdr3-dsa
- UKIDSS DR8 (120) - ivo://wfau.roe.ac.uk/ukidssdr8-dsa
- UKIDSS DR10 (118) - ivo://wfau.roe.ac.uk/ukidssdr10-dsa
- UKIDSS DR9 (118) - ivo://wfau.roe.ac.uk/ukidssdr9-dsa
- UKIDSS DR4 (117) - ivo://wfau.roe.ac.uk/ukidssdr4-dsa
- SDSS DR3 (116) - ivo://wfau.roe.ac.uk/sdssdr3-dsa
- UKIDSS DR5 (115) - ivo://wfau.roe.ac.uk/ukidssdr5-dsa
- UKIDSS DR7 (113) - ivo://wfau.roe.ac.uk/ukidssdr7-dsa
- UKIDSS DR2 (112) - ivo://wfau.roe.ac.uk/ukidssdr2-dsa
- SDSS DR9 - Sloan Digital Sky Survey Data Release 9 (92) - ivo://wfau.roe.ac.uk/sdssdr9-dsa
- SDSS DR8 (86) - ivo://wfau.roe.ac.uk/sdssdr8-dsa
- UKIDSS DR1 (85) - ivo://wfau.roe.ac.uk/ukidssdr1-dsa
- UKIDSS DR2 World Release (79) - ivo://wfau.roe.ac.uk/ukidssworld-dsa
- VMC DR3 (73) - ivo://wfau.roe.ac.uk/vmcd3-dsa
- ATLAS DR1 - VST ATLAS Survey (63) - ivo://wfau.roe.ac.uk/atlasdr1-dsa
- VMC DR1 (61) - ivo://wfau.roe.ac.uk/vmcd1-dsa
- VHS DR1 (58) - ivo://wfau.roe.ac.uk/vhsdr1-dsa
- VHS DR3 (58) - ivo://wfau.roe.ac.uk/vhsdr3-dsa
- VIKING DR4 (57) - ivo://wfau.roe.ac.uk/vikingdr4-dsa
- VHS DR2 (56) - ivo://wfau.roe.ac.uk/vhsdr2-dsa
- VVV DR1 (54) - ivo://wfau.roe.ac.uk/vvdr1-dsa
- VIKING DR2 (53) - ivo://wfau.roe.ac.uk/vikingdr2-dsa
- VIKING DR3 (53) - ivo://wfau.roe.ac.uk/vikingdr3-dsa
- VIDEO DR4 (50) - ivo://wfau.roe.ac.uk/video4-dsa
- SIMBAD TAP (47) - ivo://cds.simbad/tap
- VIDEO DR2 (46) - ivo://wfau.roe.ac.uk/video2-dsa
- VIDEO DR3 (46) - ivo://wfau.roe.ac.uk/video3-dsa
- CADC Table Query (TAP) Service (37) - ivo://cadc.nrc.ca/tap
- GALEX Release 6 (29) - ivo://wfau.roe.ac.uk/galexgr6-dsa
- asdctap (21) - ivo://asdctap
- APIS (20) - ivo://vopdc.obspm/lesia/apis/epn
- BASECOM (20) - ivo://vopdc.obspm/lesia/basecom/epn
- BDIP (20) - ivo://vopdc.obspm/lesia/bdip/epn
- ExoPlanet (20) - ivo://vopdc.obspm/luth/exoplanet/epn
- IKS (20) - ivo://vopdc.obspm/lesia/iks/epn
- M4AST (20) - ivo://vopdc.obspm/imcce/m4ast
- Titan (20) - ivo://vopdc.obspm/lesia/titan/epn
- planets (20) - ivo://vopdc.obspm/lesia/planets/epn
- STSci RegTAP (18) - ivo://archive.stsci.edu/regtap
- Personal SuperCOSMOS Science Archive (SSA) (16) - ivo://wfau.roe.ac.uk/psa-dsa
- SuperCOSMOS (16) - ivo://wfau.roe.ac.uk/ssa-dsa
- 6dF DR2 (15) - ivo://wfau.roe.ac.uk/6dfr2-dsa
- 6dF DR3 (15) - ivo://wfau.roe.ac.uk/6dfr3-dsa
- CSIRO ASKAP TAP (15) - ivo://au.csiro/casda/tap
- nasadustcat (15) - ivo://ia2.inaf.it/hosted/taps/epn/tap/nasadustcat
- MACHO TAP (12) - ivo://nci.org.au/macho/tap
- enp1 TAP (11) - ivo://iacobsun1/tap

Window TAP Edit Help

Service Properties Use Service Resume Job Running Jobs

Find:

Name  Descrip Or

- M4AST (20)
  - apis (1)
    - apis.epn\_core
  - basecom (1)
    - basecom.epn\_core
  - bdip (1)
    - bdip.epn\_core
  - exoplanet (1)
    - exoplanet.epn\_core
  - iks (1)
    - iks.epn\_core
  - ivoa (2)
    - ivoa.emptyjobscore
    - ivoa.obscore
  - kronos (1)
    - kronos.epn\_core
  - m4ast (1)
    - m4ast.epn\_core
  - masses (1)
    - masses.epn\_core
  - planets (1)
    - planets.epn\_core
  - radiojove (1)
    - radiojove.epn\_core
  - tap\_schema (6)
    - tap\_schema.columns
    - tap\_schema.groups
    - tap\_schema.key\_columns
    - tap\_schema.keys
    - tap\_schema.schemas
    - tap\_schema.tables
  - titan (1)
    - titan.epn\_core
  - vo\_mars (1)
    - vo\_mars.epn\_core

Short Name: M4AST

Title: M4AST - Modeling for Asteroids

IVO ID: ivo://vopdc.obspm/imcce/m4ast

Service URL: http://voparis-tap.obspm.fr/\_system\_/tap/r

Reference URL: http://cardamine.imcce.fr/m4ast

Examples URL: http://voparis-tap.obspm.fr/\_system\_/tap/r

Size: 14 schemas, 20 tables

Publisher: VO-Paris Data Centre - IMCCE

Creator: M. Birlan

Contact: M. Birlan <Mirel.Birlan@imcce.fr>

Description: Compiled database for asteroid spectra in the visible and nir regions.

Data Models: ivo://ivoa.net/std/ObsCore-1.0 ivo://vopdc.obspm/std/EpnCore-1.0

Geometry Functions: AREA, BOX, CENTROID, CIRCLE, CONTAINS, COORD1, COORD2, DISTANCE, INTERSECTS, POINT, POLYGON, REGION

User-Defined Functions:

```
gavo_match(pattern TEXT, string TEXT) -> INT
gavo_match returns 1 if the POSIX regex
pattern matches anything in string, 0
otherwise.

ivo_string_agg(expression TEXT, delimiter TEXT)
An aggregate function returning all v
within a GROUP concatenated with d
delimiter.

gavo_to_jd(d TIMESTAMP) -> DOUBLE PRECISION
The function converts a postgres tim
stamp to Julian date. This is naive; no corrections
are made for leap seconds.

gavo_to_mjd(d TIMESTAMP) -> DOUBLE PRECISION
The function converts a postgres tim
stamp to Modified Julian date. This is naive; no corrections
```

Service Capabilities

Query Language: ADQL-2.0 Max Rows: 2000 (default) Uploads: 20Mb

ADQL Text

Mode: Synchronous

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Examples Info



# Accessing TAP for user TAP clients

## - TapHandle

The screenshot shows the TapHandle website interface. At the top, there is a search bar with the text "Enter a TAP service URL or a keyword". Below this, there are three main sections:

- Search your TAP service:** "Type free text and follow the GAVO TAP registry suggestions or type a full URL in the search field above."
- Explore the database content:** "Double click on a table icon on the resource tree to see its content. Look below: there is a query form! You can filter your results with what you need."
- Enjoy!** "We hope you have found what you want."

At the bottom, there is a section titled "Most popular databases" with buttons for 3XMM, CADC, GAVO, Vizier - CDS, Simbad - CDS, VO Planet - Paris, HEASARCH, Chandra Archive, and SDSS9.

The screenshot shows the TapHandle query execution interface. At the top, there is a search bar with the text "Enter a TAP service URL or a keyword". Below this, there is a "Tap Nodes" tree view showing a hierarchy of nodes including voparis-m4ast, titan, and titan.epn\_core. The selected node is "voparis-m4ast>titan>epn\_core>8qxutp".

Below the tree view, there is a "Hide query" button and a "SUBMIT" button. The "Job Control" tab is selected, showing a "List of UWS jobs" table with one entry: "voparis-m4ast.titan.epn\_core: job 8qxutp COMPLETED".

Below the job list, there is a "Result Limit" input field set to "100".

| resource_type | dataset_id | index | dataproducit_type | target_name | target_class | time_min  | time_max  | time_sampling_step_min |
|---------------|------------|-------|-------------------|-------------|--------------|-----------|-----------|------------------------|
| granule       | 32000      | 307   | pr                | Titan       | satellite    | 2455037.0 | 2455037.0 | NaN                    |
| granule       | 32000      | 19    | pr                | Titan       | satellite    | 2453938.0 | 2453938.0 | NaN                    |
| granule       | 32000      | 20    | pr                | Titan       | satellite    | 2455733.0 | 2455733.0 | NaN                    |
| granule       | 32000      | 21    | pr                | Titan       | satellite    | 2455037.0 | 2455037.0 | NaN                    |
| granule       | 32000      | 22    | pr                | Titan       | satellite    | 2455976.0 | 2455976.0 | NaN                    |
| granule       | 32000      | 23    | pr                | Titan       | satellite    | 2453938.0 | 2453938.0 | NaN                    |
| granule       | 32000      | 24    | pr                | Titan       | satellite    | 2455037.0 | 2455037.0 | NaN                    |
| granule       | 32000      | 25    | pr                | Titan       | satellite    | 2456260.0 | 2456260.0 | NaN                    |
| granule       | 32000      | 26    | pr                | Titan       | satellite    | 2455929.0 | 2455929.0 | NaN                    |
| granule       | 32000      | 27    | pr                | Titan       | satellite    | 2455976.0 | 2455976.0 | NaN                    |

User friendly, not specific to a DM



# Accessing TAP for user TAP clients

## - TAP shell client: Tapsh

- A way to script tap access in shell, also allows SAMP interaction
- Dedicated to “advanced users”
- Good complement to graphical access



# Accessing TAP for user TAP clients

## - TAP for dedicated project (web portals) CTA



[Monte Carlo simulations](#)

[Data Distiller](#)

[Data Reduction](#)

[INAF CTA portal](#)

Not logged in

### Cone Search

Target Name

Used to query Simbad with Sesame and set RA/Dec.

Source RA (deg)

Right Ascension.

Source Dec (deg)

Declination.

Search radius (deg)

### ObsCore Search

proposal\_id

Proposal ID

dataprodct\_type

Data product (file content) primary type

dataprodct\_level

DL0-5

obs\_id

Run ID

t\_min

Start time in MJD

t\_max

Stop time in MJD

em\_min\_tev

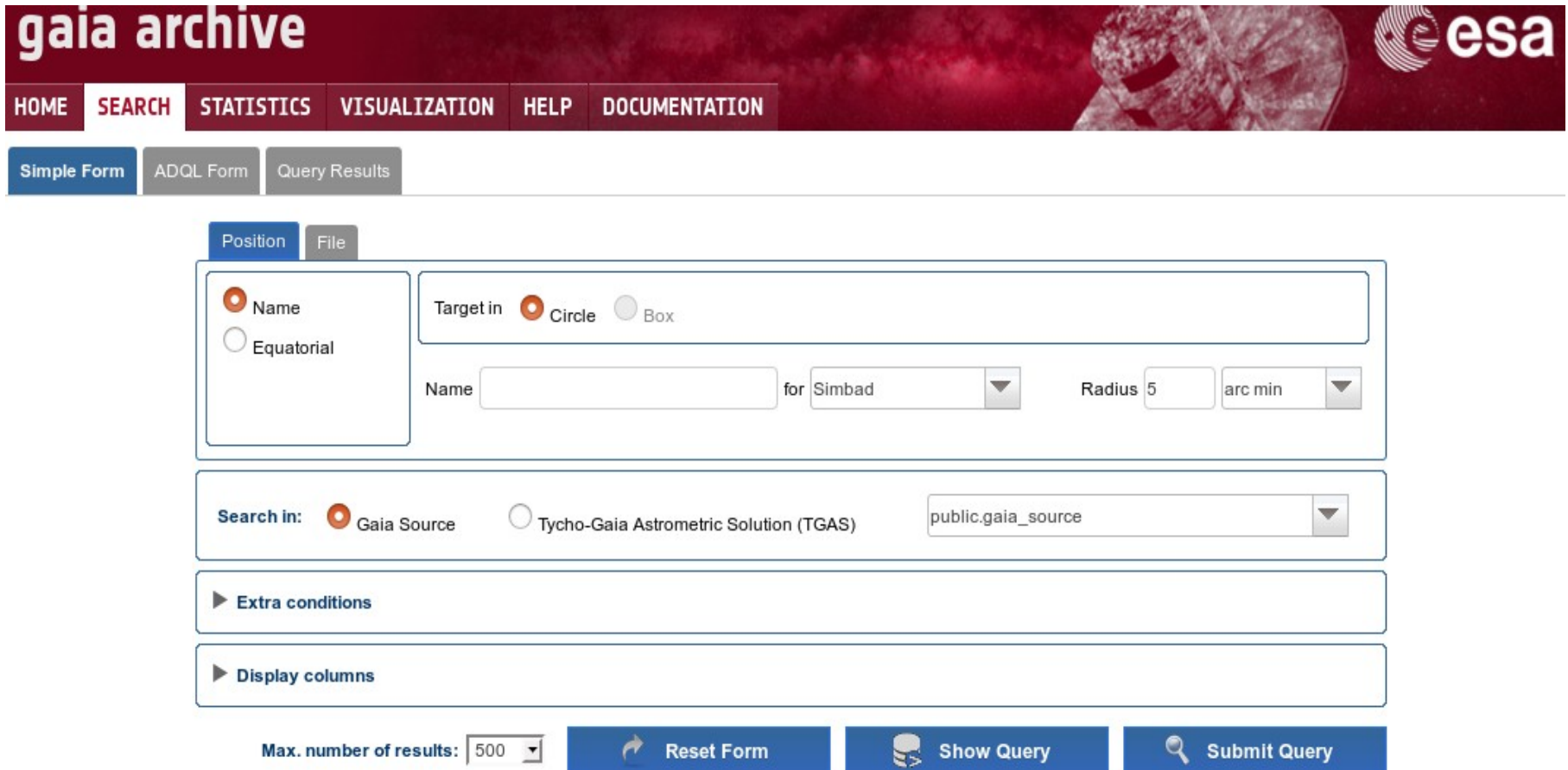
Start in spectral coordinates

em\_max\_tev

Stop in spectral coordinates

# Accessing TAP for user TAP clients

## - TAP for dedicated project (web portals) GAIA



The screenshot shows the Gaia Archive search interface. At the top, there is a navigation bar with links for HOME, SEARCH, STATISTICS, VISUALIZATION, HELP, and DOCUMENTATION. Below this, there are tabs for Simple Form, ADQL Form, and Query Results. The main search area is divided into two sections: Position and File. The Position section has radio buttons for Name (selected) and Equatorial. A Target in section has radio buttons for Circle (selected) and Box. Below this, there is a Name input field, a dropdown menu for the catalog (set to Simbad), and a Radius input field (set to 5) with a unit dropdown (set to arc min). The Search in section has radio buttons for Gaia Source (selected) and Tycho-Gaia Astrometric Solution (TGAS), and a dropdown menu for the search scope (set to public.gaia\_source). There are also expandable sections for Extra conditions and Display columns. At the bottom, there is a Max. number of results dropdown (set to 500), a Reset Form button, a Show Query button, and a Submit Query button.

gaia archive

esa

HOME SEARCH STATISTICS VISUALIZATION HELP DOCUMENTATION

Simple Form ADQL Form Query Results

Position File

Name  
 Equatorial

Target in  Circle  Box

Name  for  Radius

Search in:  Gaia Source  Tycho-Gaia Astrometric Solution (TGAS)

▶ Extra conditions

▶ Display columns



Max. number of results:

Reset Form Show Query Submit Query

# - TAP for dedicated project (web portals) Vespa

Submit Reset

Main Parameters

|   |   |
|---|---|
| <b>Target Name</b><br><input type="text"/>  | <b>Target Class</b><br>Asteroid<br>Comet<br>Dwarf Planet<br>Exoplanet   |
| <b>Granule UID</b><br><input type="text"/>  | <b>Dataproduct Type</b><br>Catalog<br>Cube<br>Dynamic Spectrum  |
| <b>Granule GID</b><br><input type="text"/>  | <b>Measurement Type</b><br><input type="text"/>   |
| <b>Obs ID</b><br><input type="text"/>   | <b>Time selection</b><br>Data range is included in  |
| <b>Time Min</b> <br><input type="text"/> | <b>Time Max</b> <br><input type="text"/> |

Location

Spectral

Time





Photometry

Instrument

Optional

Submit Reset

**Plotting tools**

-  TOPCAT
-  Aladin
-  SPLAT
-  CASSIS

**Example queries**

Saturn in March 2012

# Accessing TAP for user

## TAP clients

- TAP for dedicated project (web portals) Vespa

EPN Resources

**AMDA - CDPP AMDA DataBase** 939298 results

**APIS - Auroral Planetary Imaging and Spectroscopy** 23398 results

**BASECOM - The Nançay Cometary Database** 15612 results

**BDIP - Base de Données d'Images Planetaires** 16907 results

**hfc1ar - Heliophysics Feature Catalog active regions** 948628 results

**hfc1t3 - Heliophysics Feature Catalog type 3 radio bursts** 90846 results

**IKS - IR spectroscopy of comet Halley** 104 results

**M4AST - M4AST - Modeling for Asteroids** 2750 results

**nasadustcat - INAF-IAPS RDB NASA dust catalogue TAP service** 4272 results

**planets - Main characteristics of solar system planets** 9 results

**routinejup - Jupiter Routine Observations** 708 results

**Titan - Vertical Profiles in Titan Middle Atmosphere** 717 results

Plotting tools

TOPCAT

Aladin

SPLAT

CASSIS

Example queries

Saturn in  
March 2012

Generated WHERE clause of ADQL statement:

SELECT \* FROM ...



# User point of view and TAP client

**Generic client have to guide user in  
Schema + Table +ADQL**

**Specific client hide complexity and allow to visualize only  
the useful data :**

- **Dedicate a specific TAP server for the project**
- **Identify the useful services**
  
- **For EPN-TAP : extract specific resources from the registry.**



# Declaration of TAP service in the registry

## Define schema

```
<tableset>  
  <schema>  
    <name>apis</name>  
    <table>  
      <name>apis.epn_core</name>  
    </table>  
  </schema>  
</tableset>
```



# We encourage data providers to use DaCHS

## Model of One VOResource for One Service

- Easy to register all information
- Appear N time in generic clients

## Model of publishing registry inside DaCHS

- One TAP service and many collections / VODataService
- One collection must define EPN-CORE DM, the version and the database schema name. Not compatible with DataCollection Schema (XML Schema)
- Need to customise registry query
- Wrong use of Utype to register datamodel and version



**Conclusion : TAP is largely used ↗**

**\* Astronomers :**

**All new large projects intend to use ObsTap,  
scientific use case will come soon.**

**Data mining will come soon, we have to be ready.**

**Clients have to be ready for VO agnostic users.**

**\* Data Providers**

**Already two advanced framework for data  
publishing : Advertise, feedback, community  
should be encouraged and followed to increase  
publication.**