



## EPN2020-RI

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EPN-TAP client

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<b>PP</b>	Restricted to other programme participants (including the Commission Service)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (excluding the Commission Services)	

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<b>Author (s)</b>	Laurent BEIGBEDER

**Abstract:** One of the goals of VESPA is to increase the number of software tools able to access planetary data using the EPN-TAP protocol. For that, a generic library was created as well as a first use in the 3DView tool.

This is a JRA work (WP11) that has been delivered for VA use.

The software associated with the deliverable is developed by Laurent Beigbeder and it is available on the GFI server (<http://78.209.63.63/3DVH2020/>) until September 01 2016, and on IRAP server (<http://3dview.cdpp.eu/>) from September 15 2016.

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# Table of contents

<b>1</b>	<b>A generic EPN-TAP library .....</b>	<b>4</b>
<b>2</b>	<b>Use of EPN-TAP library in 3DView .....</b>	<b>6</b>
<b>2.1</b>	<b>Introduction.....</b>	<b>6</b>
<b>2.2</b>	<b>Search for available databases from registry .....</b>	<b>6</b>
<b>2.3</b>	<b>Select data and available actions .....</b>	<b>8</b>
<b>2.4</b>	<b>Use case T117 .....</b>	<b>9</b>

# 1 A generic EPN-TAP library

One of the goals of VESPA is to increase the number of software tools able to access planetary data using the EPN-TAP protocol. This is the reason why a generic library was designed. This library manages all the low levels functions of the EPN-TAP protocol. It is up to every software tool to specify how it uses the library.

A specification document was written by a working group composed of several members of the VESPA Team at IRAP and Observatoire de Paris. This document contains the specification of each function necessary to implement the EPN-TAP protocol.

The specification document is available at:

<https://voparis-confluence.obspm.fr/display/VES/VESPA+EPN-TAP+Library+specification>

According to this specification document, an implementation in Java was developed at IRAP

This Java implementation is public, and available at:

<https://gitlab.irap.omp.eu/OV-GSO-DC/EpnTAPClient/repository/archive.zip>

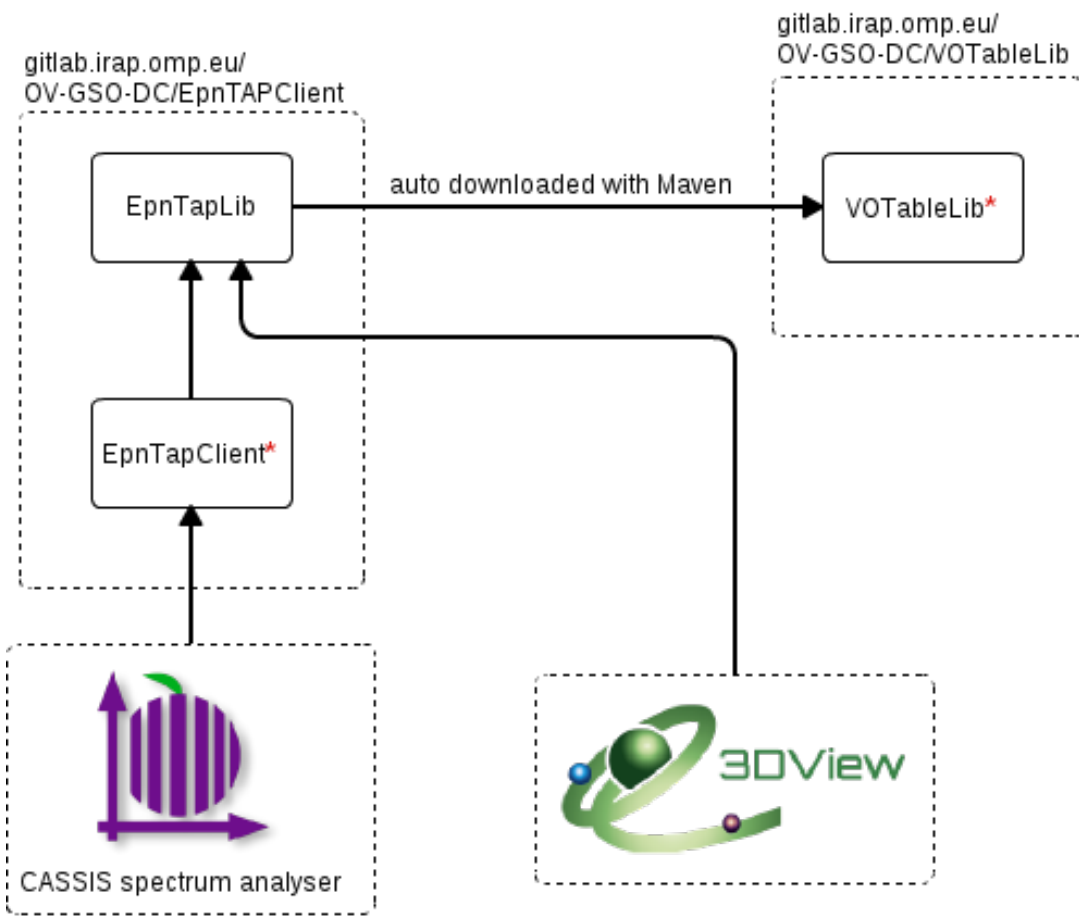
Java 7 is necessary to use the EpnTAP library.

The EPNTap library is used by 3Dview for its EPN-TAP module. It is also used for the same purpose by CASSIS, a software tool for the analysis and display of spectra.

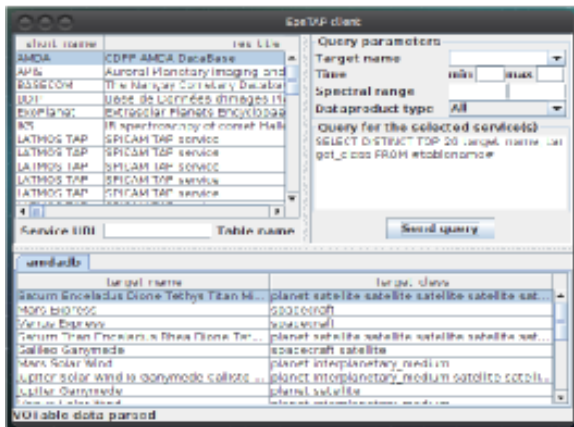
The following figure describes how a software tool like 3DView or CASSIS can use the EPNTap library

VOTabLib is a library which contains several parsing functions for files in VOTable format.

# Dependencies chart



\* Can be used as standalone, with a GUI:



EpnTapClient as standalone

The screenshot shows the VOTableLib standalone application interface, displaying a table of VOTableLib entries. The table has columns for 'res', 'description', 'accessurl', and 'ntable'. The entries list various astronomical services and their corresponding URLs.

res	description	accessurl	ntable
AL...	The AP DaCHS's TAP end point. The Table Acc...	http://gvo.al...	29
A...	The ASDC TAP service provides access to a nu...	http://tools.a...	21
C...	Table Access Protocol service for accessing cat...	http://casda...	13
C...	Repository of pulsar observations made at the ...	http://data.c...	1
C...		http://www.c...	31
C...		http://cddp-e...	10
SI...	The CDDP (Centre de Données de la Physique d...	http://smbad...	46
T...	This service provides TAP access to a simplified...	http://tapvid...	30760
C...	The Chandra X-ray Observatory is the J.S. follo...	http://cda.ha...	10
C...	The Chandra X-ray Observatory is the J.S. follo...	http://cda.ha...	8
N...	The Cosmic dust catalog is an internal resourc...	http://a2-tap...	15
La...	The Sloan Digital Sky Survey (SDSS) has observ...	http://msa.ip...	9
PL...	This is PCA's implementation of the vu table A...	http://msa.ip...	429
C...	A collection of QSO and AGN catalogs.	http://vo.nao...	1
AL...	ALMA VO Service (prototype)	http://vo.nao...	2
H...	Henry Draper Catalogue and Extension (Canno...	http://vo.nao...	2
T...	The Hipparcos and Tycho Catalogues are the p...	http://vo.nao...	2
A...	The AKARI Far-infrared All-Sky Survey Maps is pr...	http://vo.nao...	1
A...	Akari is Japan's first dedicated infrared astrono...	http://vo.nao...	4
C...		http://vo.nao...	1
R...	The ROSAT All-Sky Survey Bright Source Catalog...	http://vo.nao...	1

VOTableLib as standalone

## 2 Use of EPN-TAP library in 3DView

### 2.1 Introduction

3DView is an interactive software for 3D animated view of satellites trajectory and altitude in the solar system. It is a tool for the scientific community to be used during operational phases of mission and for exploitation of mission results, offering immediate knowledge of parameters, position and orientation and allowing scientific data interpretation.

Adding access to EPN-TAP from 3DView is pretty simple. Add EPNTAP library to the 3DView client and add a new GUI to:

- search and display results
- download, send via SAMP or open in 3DView selected data, depending on their “product type/mime type”.

### 2.2 Search for available databases from registry

The EPN-TAP GUI available in the Science/Remote data (VESPA) menu:

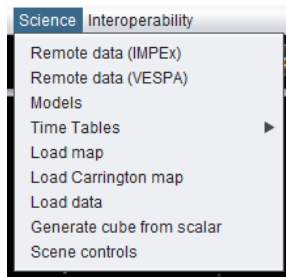


Figure 1: EPN-TAP GUI Access

First a request is made to an EPN-TAP registry to obtain all available registered services. The EPNTAP library being only compatible with EPN-TAP V2 services, only V2 databases could be shown.

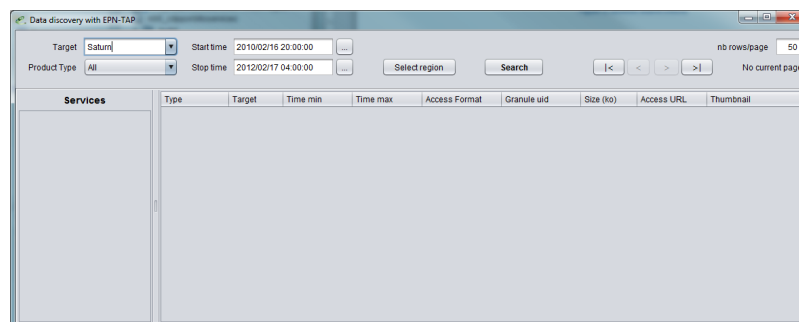
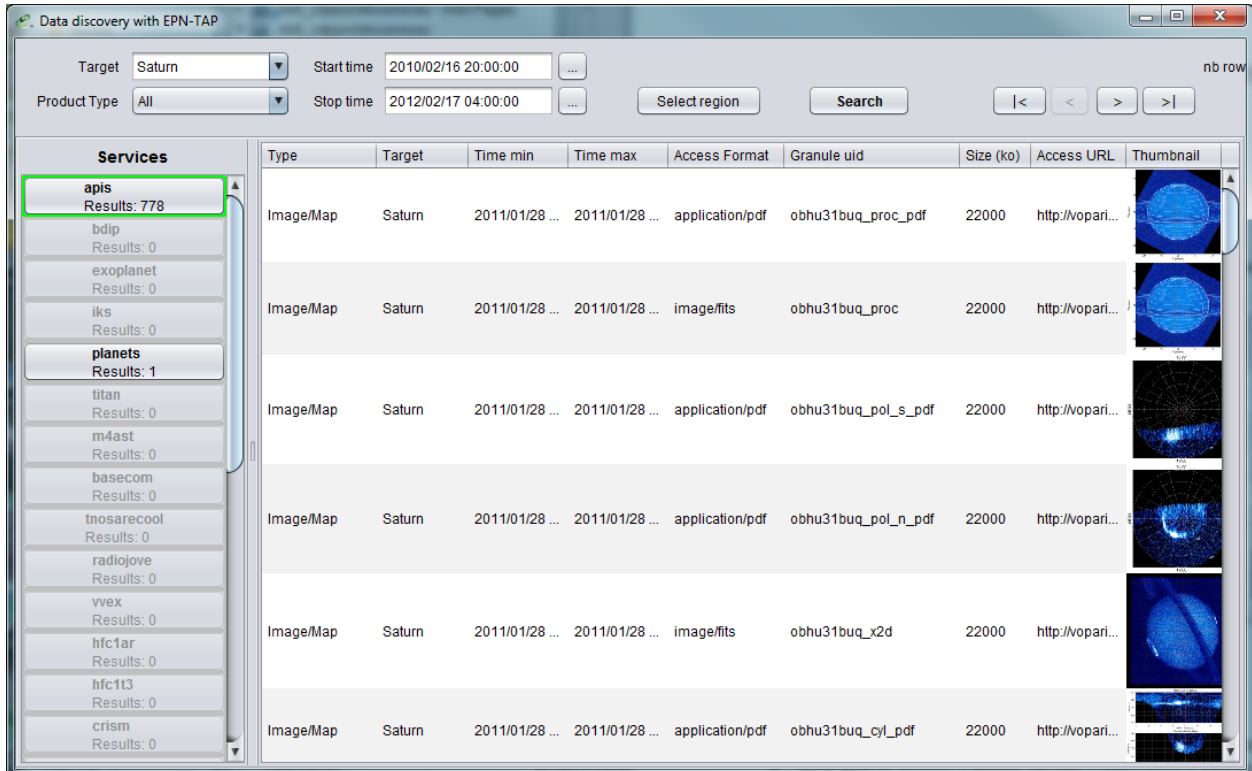


Figure 2: services search criteria

A technical problem currently prevents EPN-TAPV2 services to be included to the IVOA registries, and is being studied by ObsParis. Meanwhile, the registry query is replaced by a direct call based on a list of available services. This will be finalized when the registry declaration is fixed.

## 2.3 Select data and available actions

When a service is selected, data is shown in rows in the center panel:



The screenshot shows the 'Data discovery with EPN-TAP' application window. At the top, there are search filters: 'Target' set to 'Saturn', 'Start time' '2010/02/16 20:00:00', 'Product Type' 'All', and 'Stop time' '2012/02/17 04:00:00'. A 'Search' button and navigation arrows are also present. On the left, a 'Services' sidebar lists various services, with 'apis' selected and highlighted in green, showing 'Results: 778'. The main panel displays a table of data rows for the selected service.







Type	Target	Time min	Time max	Access Format	Granule uid	Size (ko)	Access URL	Thumbnail
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	application/pdf	obhu31buq_proc_pdf	22000	http://vopari...	
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	image/fits	obhu31buq_proc	22000	http://vopari...	
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	application/pdf	obhu31buq_pol_s_pdf	22000	http://vopari...	
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	application/pdf	obhu31buq_pol_n_pdf	22000	http://vopari...	
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	image/fits	obhu31buq_x2d	22000	http://vopari...	
Image/Map	Saturn	2011/01/28 ...	2011/01/28 ...	application/pdf	obhu31buq_cyl_pdf	22000	http://vopari...	

Figure 3: APIS service data display

From there, you can trigger following actions by clicking right button on a row:

- Download data pointed by access\_URL column on local drive.
- Send data via SAMP if access\_format is application/x-cdf or application x-votable
- Send data to 3DView if access\_format is application x-votable



## 2.4 Use case T117

For this use case, which shows CASSINI Titan flyby, you have to create a 3DView scene around 2016/02/17 00:00:00 with CASSINI, centered on Titan.

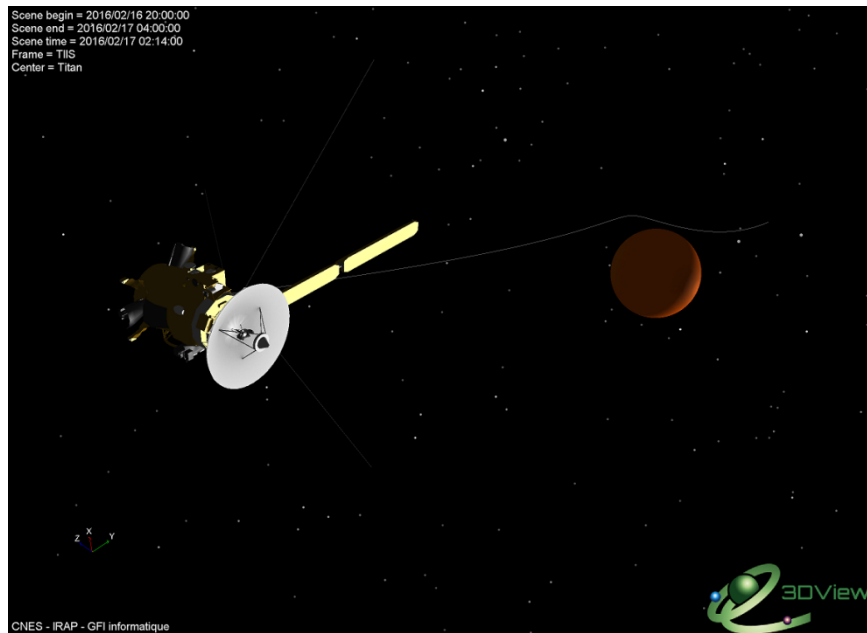


Figure 4 : T117 use case 3DScene

Then, open the EPN-TAP GUI, set start time to 2010 to search for all produced data but add search criteria by using the *Select region* button.

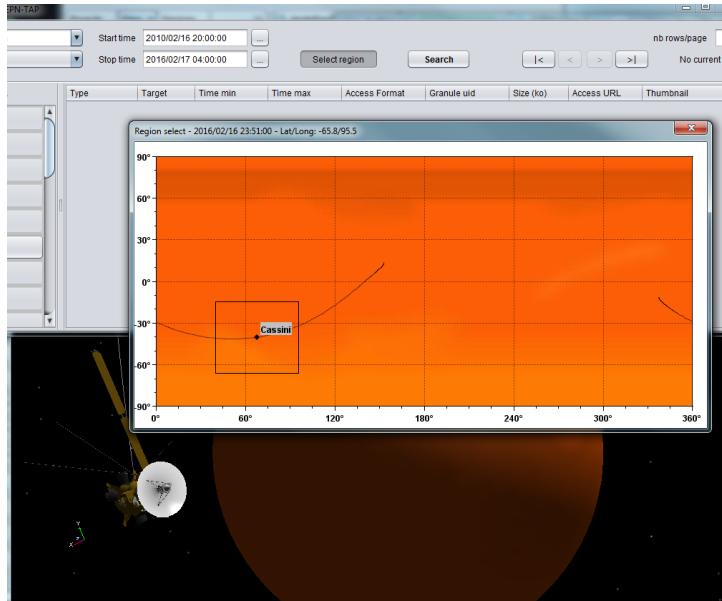


Figure 5 : Region selection

Use the Search data to find available data and click on Titan service to show found results:

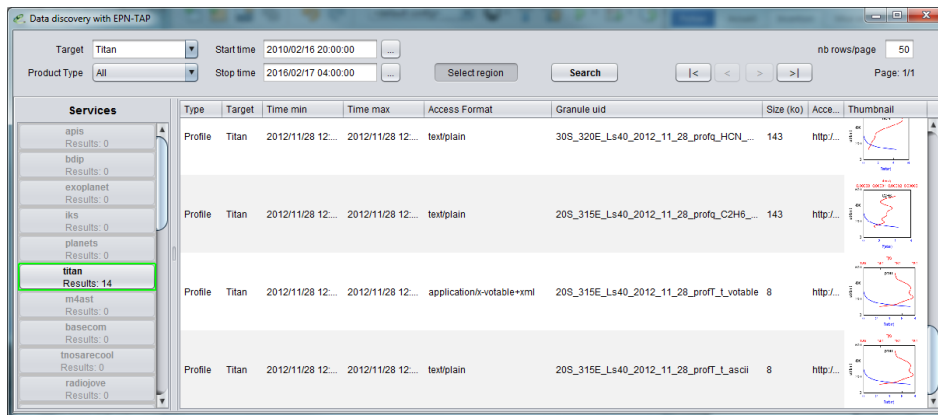


Figure 6 : Results in Titan database

With TOPCAT open, you can send it via SAMP with the popup menu:



Figure 7 : Popup menu from an x-votable+xml object

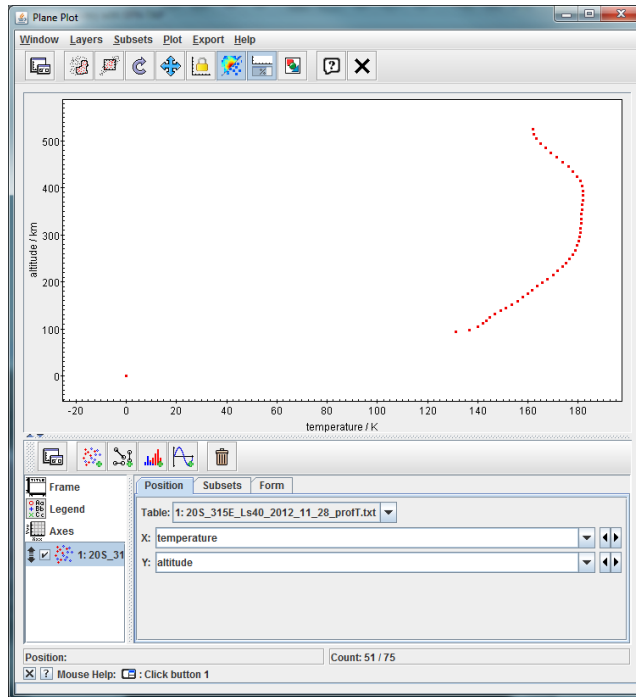


Figure 8 : Plot of object in SAMP