

# Accessing Solar System data in telescopic archives

**S. Erard and the VESPA / Europlanet team**

*Observatoire de Paris-PSL*

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# Planetary Data in HST collections

## **Objective:**

- provide easy and quick access to planetary data from HST
- => TAP access, description using EPNCore (*HST\_planeto service*)

## **Scope :**

- Only planets, dwarf planets & satellites (no small bodies)
- => leave room for another project at CADC (2017 Victoria Interop)
- Science data only, calibrated or derived

## **Data origin:**

- CADC (rather than ESA or MAST)
- Partly because of context, convenient thanks to CADC interfaces

# Planetary Data in HST collections

## **Identifying the data / 1:**

Usual issue with moving targets!

CADC *SSOIS interface* seems intended for small bodies (?)

=> 'mars' will not provide answers

=> '499' (SPICE code) + Horizon ephemeris is OK

- retrospectively, misses some data:

- 'ceres' / HST provides 402 results (images only?)

Eventually found 676 observations (602 images, some only background)

- '499' (Mars) / HST provides 1527 results (images only?)

Eventually found 3269 images

# Planetary Data in HST collections

**Identifying the data / 2** (long story short - and thanks to D. Durand!):

CADC *TAP* interface is OK

The HST catalogue is OK — remarkably consistent over ~30 years

=> uses CAOM DM, 2 tables

## **Two step process:**

1) Grab all solar system data except comets and asteroids (but keep dwarf planets) through TAP

2) Identify correct target name and class during ingestion

But Target\_name may be composite, derived, or misspelled (or lunar craters)

=> also look in Target\_keywords

- No attempt to identify secondary targets

# Planetary Data in HST collections

```
SELECT ...  
FROM caom2.Plane AS Plane  
  JOIN caom2.Observation AS Observation ON Plane.obsID = Observation.obsID  
WHERE ( lower(Observation.intent) = 'science'  
  AND Observation.collection='HST'  
  AND lower(Observation.target_keywords) LIKE '%solar system%'  
  AND NOT (lower(Observation.target_keywords) LIKE '%asteroid%' AND NOT ( (lower(Observation.target_name) LIKE 'ceres%') or (lower(Observation.target_name) = '1-ceres') or (lower(Observation.target_name) LIKE '%haumea%') or (lower(Observation.target_name) LIKE 'kbo-2005-fy9%') or (lower(Observation.target_name) LIKE 'kbo2005fy9%') or (lower(Observation.target_name) LIKE '2003ub313%') or (lower(Observation.target_keywords) LIKE '%dwarf planet%')) )  
  
  AND NOT (lower(Observation.target_keywords) LIKE '%comet%' OR lower(Observation.target_keywords) LIKE '%other%' OR lower(Observation.target_keywords) LIKE '%blank field%')  
  AND NOT (lower(Observation.target_name) LIKE '%k31114a%' OR lower(Observation.target_name) LIKE '%kbo-g1%' OR lower(Observation.target_name) = '1996rr20'  
OR lower(Observation.target_name) LIKE '%k14od3s%' OR lower(Observation.target_name) LIKE '%k14p70n%')  
  AND (Plane.calibrationLevel='2' OR Plane.calibrationLevel='3')  
  AND ( Plane.quality_flag IS NULL OR Plane.quality_flag!='junk' ) )
```

*=> What makes it work is that*

*1) solar system data are tagged (through target\_keyword)*

*2) target is identified either in target\_name, target\_keyword, or proposal\_title*

# Planetary Data in HST collections

## **Ingestion:**

- Through DaCHS 2, no problem

Main issues (not entirely fixed):

- locate url of product and thumbnail
- keep up with changes in CADC data tree (now slightly behind)

## **Updates:**

- TAP query on daily crontab
- Manually check if blank target fields (new satellites, misspelled names...)  
and fix ingestion script

# Planetary Data in HST collections

## **Extra services:**

- IMCCE ephemeris provided through datalink (table / config image)
- original s\_region copied from catalogue => convert them to ST-MOC?

## **Possible extensions:**

- write phase angle and Ls in EPNCore table to use them as search parameters (phase is present in ephemeris table)
- add disk center coordinates / attitude ? (in physical ephemeris)
- Identify serendipity targets ? (done in ESAsky)
- Compute geometry, including secondary targets (done in ESAsky)

# Applications to other collections

## **Required:**

- A consistent catalogue explicitly identifying solar system data
- Enough information to identify the target
  - Target class is helpful
  - Body name must appear somewhere explicitly  
(not a lunar crater name or composite/encoded names)

## **Other possible data collections:**

Mostly makes sense if calibrated data are available

- Solar system telescopes: IRTF is an obvious one
- CFHT — but target\_keyword unused & target\_name ~ always empty ;(
- ESO (TBC)
- radio-telescopes