



Access to the Virtual Observatory for Prism and SharpCap

Wivona, a PRO/AM Project
supported by OBSPM

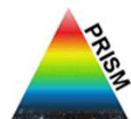
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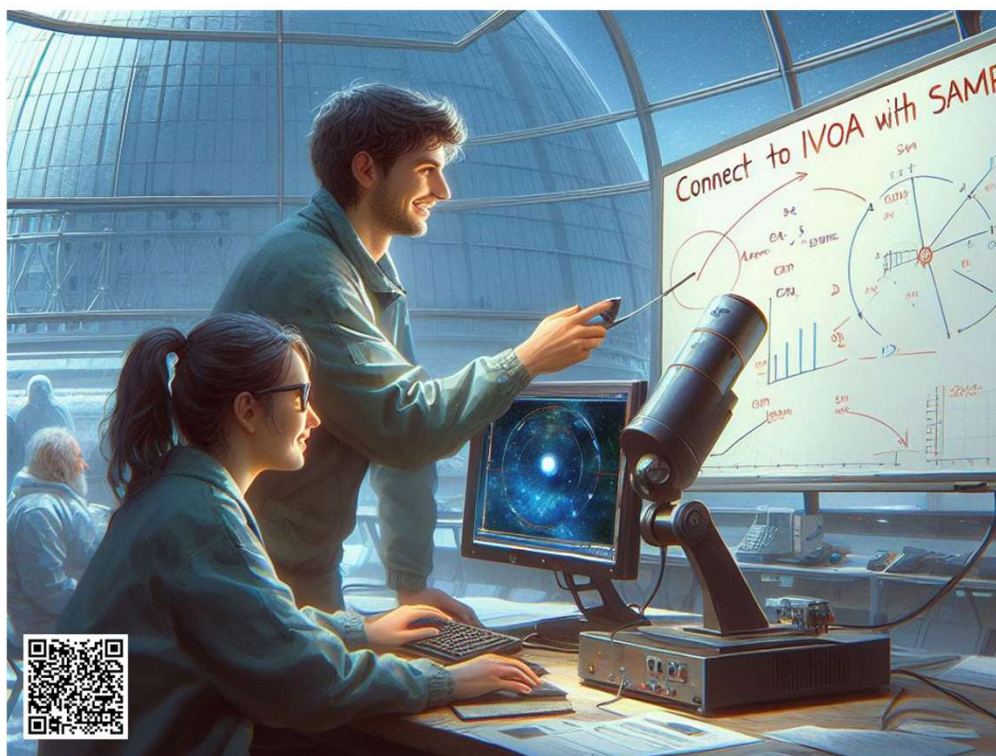


WIVONA

We Implement
Virtual Observatory
Needs of Astrams



A *Pro/Am* collaboration for the Observers Community



- PI: **Jean-Paul GODARD**,
Astronome amateur
(Dev PRISM: SAMP, Astro-Colibri)
- **Renaud SAVALLE**, PADC/
Observatoire de Paris, Ingénieur de
recherche CNRS, (Dev SharpCap:
SAMP, Scripts Python)
- **Cyril CAVADORE**, ALCOR
SYSTEM, PhD (Dev PRISM)
- **David VALLS-GABAUD**, LERMA/
Observatoire de Paris, Directeur de
Recherche CNRS

Topics

1. The Virtual Observatory (VO)
2. Astro-Colibri, Alert Tracking
3. ExoClock, ExoPlanets transits
4. 10Pc, GAIA objects at less than 10pc
5. A look back at developments

1 - The Virtual Observatory

Is not:

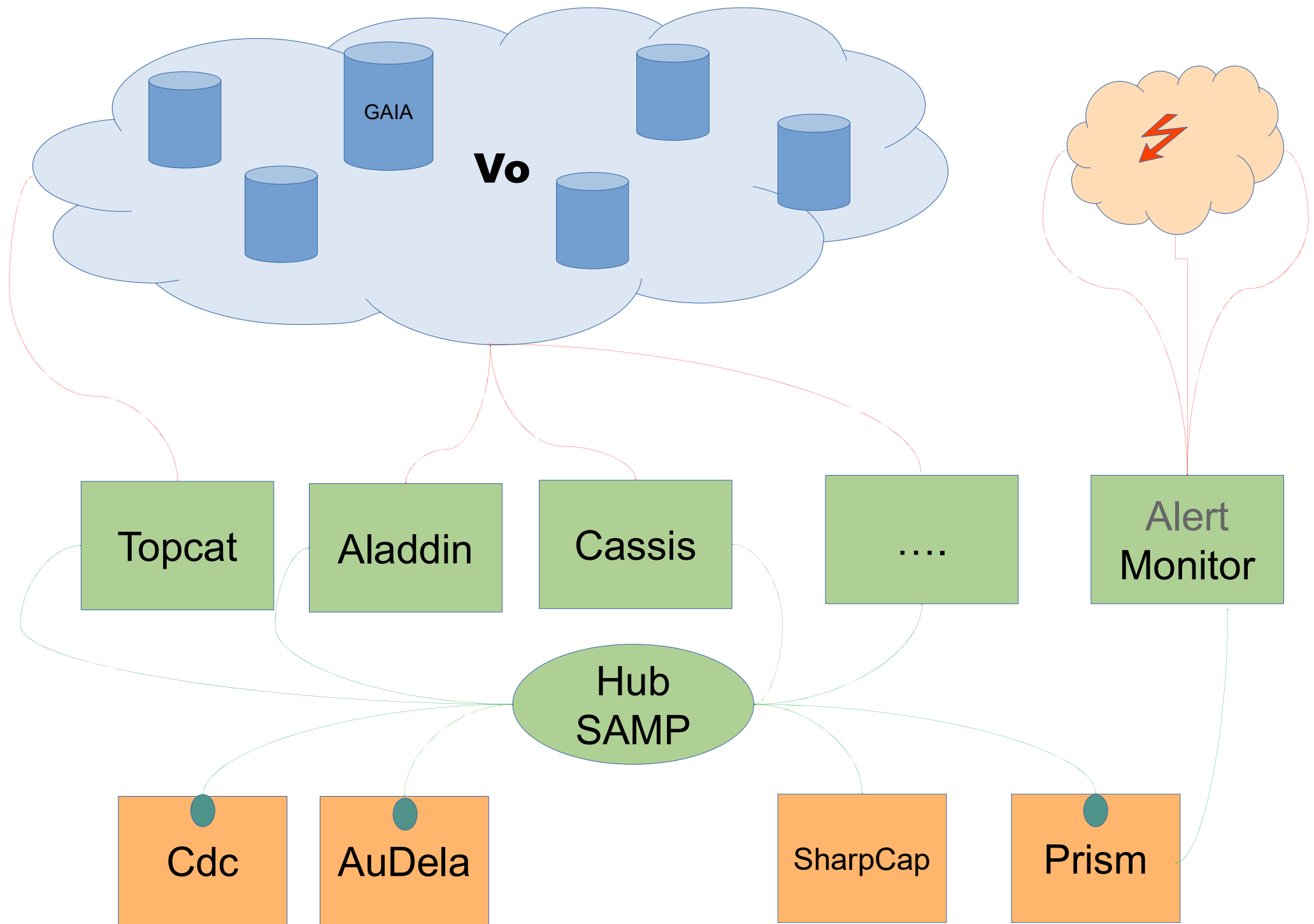
- a website, or a set of sites
- a program

But rather:

- standard IVOA protocols for finding, accessing, using data
- 50 data centers (CDS, ESA, ESO, NASA...) in ~ 20 countries
- operators for services and central infrastructure (the Register)
- client developers (TOPCAT, Aladin, etc.)

"A virtual observatory (OV) is a collection of interactive data archives and software tools that use the Internet to build a scientific research environment in which astronomy research programs can be conducted.

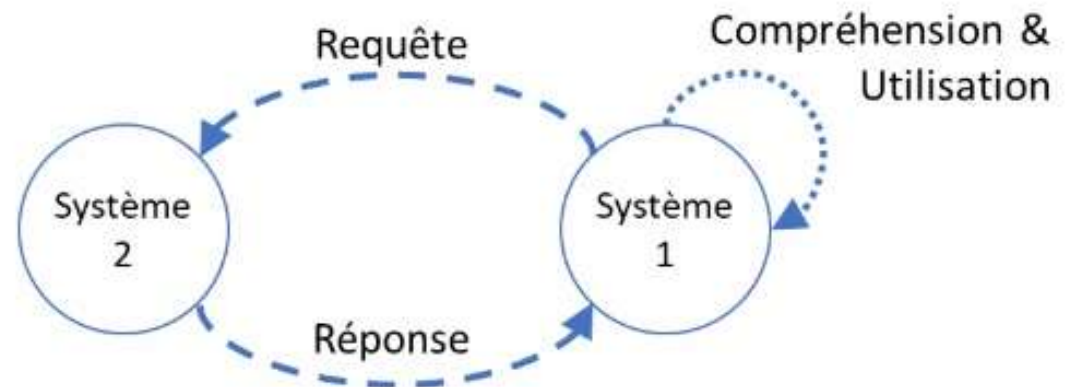
In the same way that a real astronomical observatory is a set of telescopes, each with a unique collection of astronomical instruments, the virtual observatory consists of a set of data centers, each with a unique collection of astronomical data, software and computing capabilities." [Wikipedia]



1 - Interoperability of Tools

- Amateur software exchanges objects with professional used car tools (Aladin, DS9, Topcat, Cassis, etc.):

- | | | |
|-----------------------|-----|--------------|
| • Stellar coordinates | <-> | Aladdin |
| • Images | <-> | Aladdin, DS9 |
| • Spectres | <-> | Cassis |
| • Data tables | <-> | Topcat |
| • Catalogs | <-> | Topcat |



1 – VO access via Python

- User scripts for VO querying
 - Configurable
 - Memorable,
 - Exchangeable between users,
- Require
 - Limited programming skills
 - Reduced knowledge of VO structures
 - ...

1 - Python access from PRISM

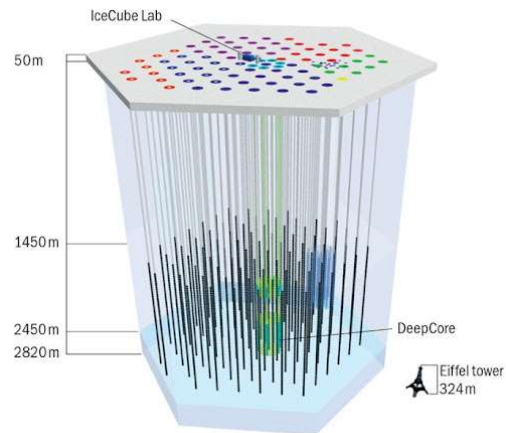
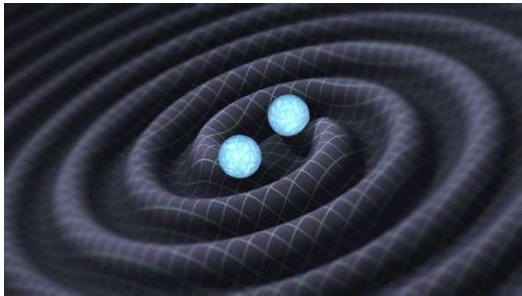
- Use of a programmed interface (P4D)
- Access to the user environment
 - Pointage (Ra, Dec),
 - Field of observation...
- Contextual queries
 - Images from Surveys (Sdss, 2Mass, Galex, Planck...)
 - Field Objects: "Cone Search"
 - **Astrometric Catalog of the Field**
 - **Photometric Catalog of the Field**

2 – Transients access

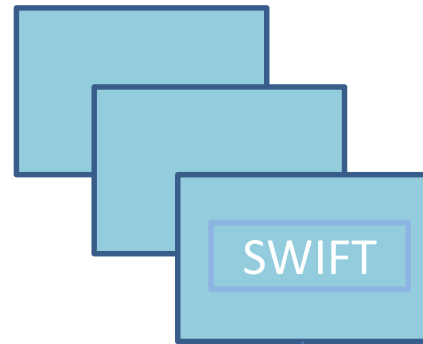
- Choice of a **cosmic rumor news agency** to be alerted to multi-messenger cosmic events.
- **Astro-Colibri** (CEA/Irfu) collects brokers' alerts, and makes them available to observers who are looking for optical counterparts.
- The follow-up group is indicated (RAPAS, BHTOM, etc.).



Observatories



Brokers



Alerts

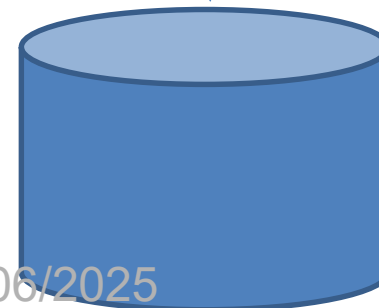


Aggregator

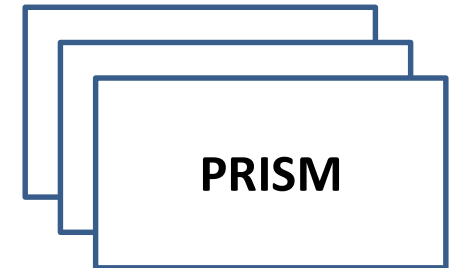


'Tags':KNC
RAPAS

BH_TOM

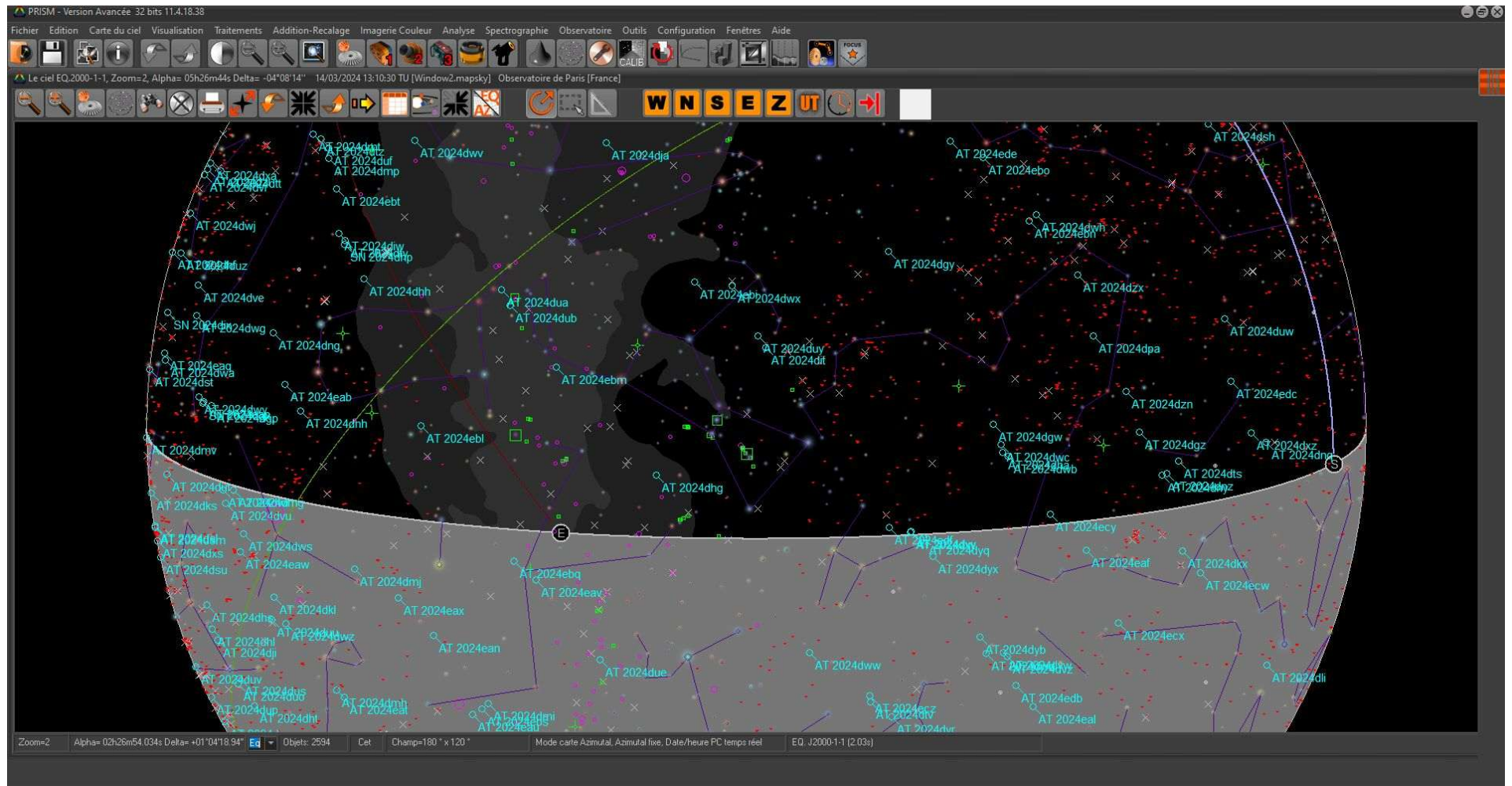


Customer
Users



API

2 - Transients in PRISM



3 - ExoClock, the transits of ExoPlanets

PRISM :

- Import of VO catalog of Host Stars
- Use known user's parameters (Location, F, D,..)
- Select user's accessible events
- Extract FOV astro/photometric catalog from latest GAIA resources
- Allow "Click, point and track" for the telescope
- Allow Image verification with official survey

4 - GAIA objects at less than 10pc

PRISM :

- Build project catalog from VO catalog
- Use known user's parameters (Location, F, D,..)
- Select user's accessible events
- Extract FOV astro/photometric catalog from latest GAIA resources for astrometry and FOV photometry
- Allow "Click, point and track" for the telescope
- Allow Image verification with official survey

5 - Project framework

- SAMP, Python, Astro-Colibri, EXOCLOCK, 10PC are integrated into the basic PRISM version.
- PRISM - Futures SAMP sources on GitHub
- SharpCap - Available SAMP (Python) sources: <https://github.com/rsav/samp4sharpcap>
- SF2A Days demos (see tutorial: t.ly/ugxOR)
- Deliveries made via V11 maintenance

**THANK YOU for your
attention**

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B – Deep integration with PYTHON

- The Virtual Observatory is a huge library of astronomical knowledge.
- To open access to data shared by professionals (VO), the user has a complete Python interface.



3 - Transients

- Fleeting phenomena (puffs, explosions, etc.)
- Detected by automatic observatories
- Multi-messengers
 - The entire electromagnetic spectrum
 - Gravitational Waves (GR)
 - Neutrinos
- The observatories generate "**alerts**",
- Observers are looking for **optical counterparts**.