# WIVONA

## Opening the Virtual Observatory to the Amateur Astronomical Community

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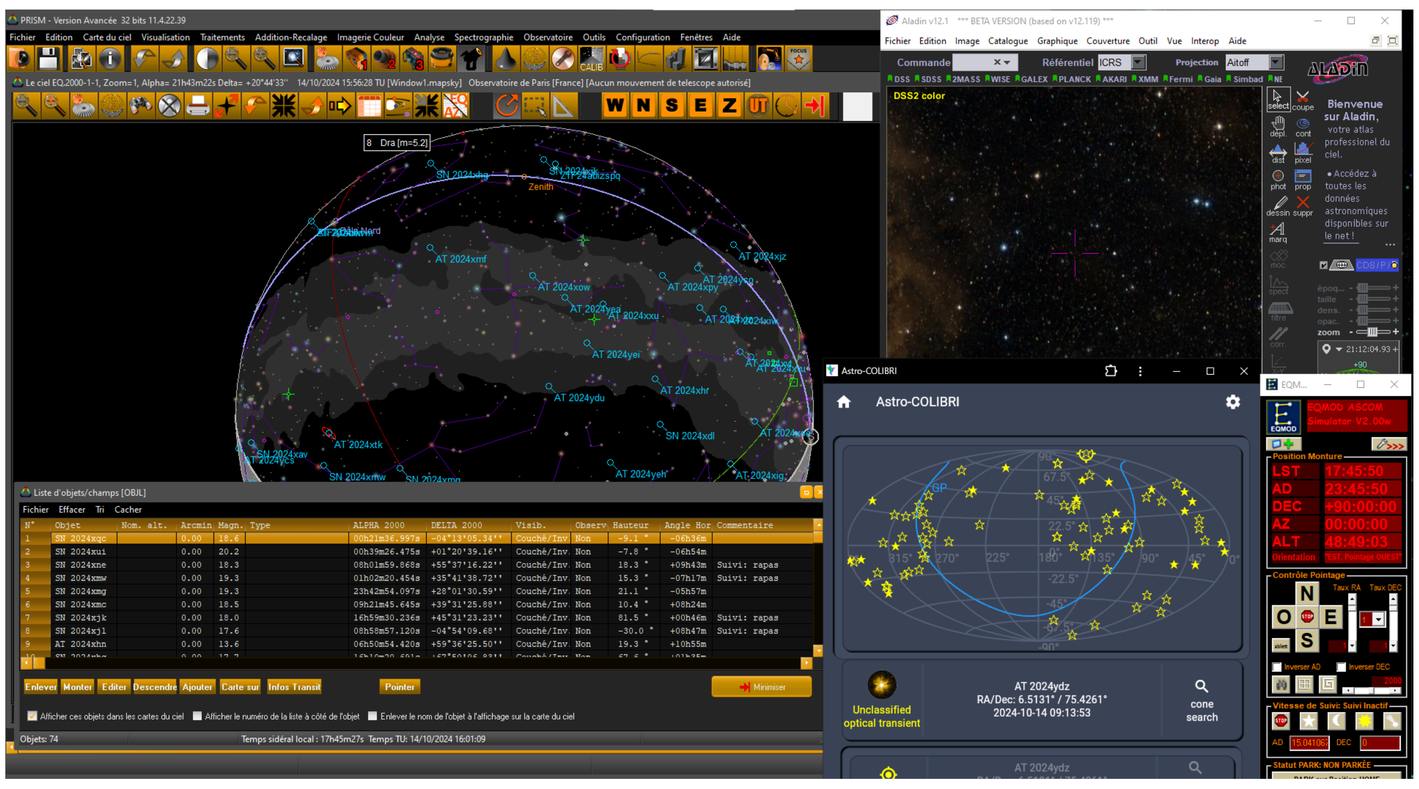
**Abstract:** In the context of Open Science and Citizen Science, the WIVONA (We Implement Virtual Observatory Needs of Astrams) project, funded by the Gemini Pro/Am initiative at Observatoire de Paris, aims to promote software interoperability as well as to provide access to astronomical data through the Virtual Observatory (VO) for the amateur astronomical community. During the first two years of this project, we have implemented several IVOA tools and protocols in the popular PRISM v11 software, an all-in-one observatory management solution. First, we have developed a native Delphi implementation of SAMP (Simple Application Messaging Protocol) to exchange celestial coordinates and images between PRISM and other VO software (such as Aladin). Then, by embedding a Python console within PRISM, we have enabled the use of Python scripts for VO discovery and data retrieval with the PyVO, AstroPy and Astroquery packages. Finally, we have implemented access to other services providing an open API such as Astro-Colibri (a transient event broker that allows filtering of interesting targets for follow-up), the Exo-Clock initiative (which facilitates the observations of exoplanet transits), and the BHTOM project (Black Hole Target Observation Manager: a web platform designed to coordinate a telescope network). These developments pave the way for an integrated workflow for processing and archiving observational results. The development of our VO interfaces greatly helps the amateur community to access professional databases and tools, enabling them to significantly enhance their contributions to astronomical research.

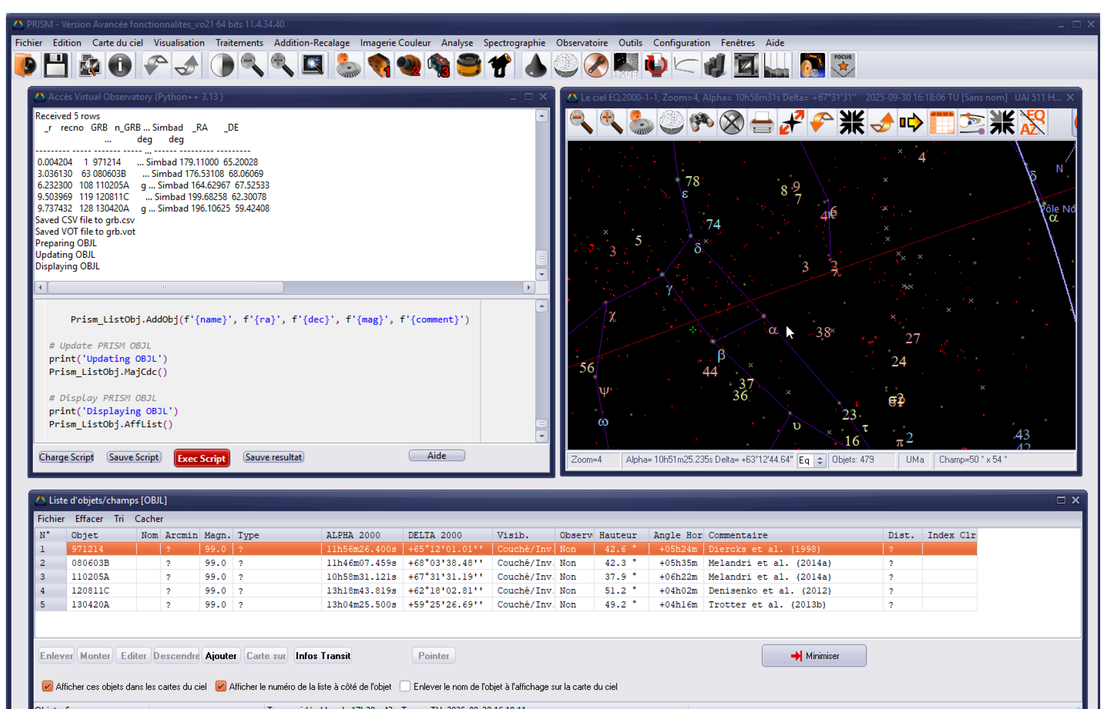
### Astro-Colibri interface ➡️

We have incorporated in PRISM [1] stellar and extra-galactic transients, as reported by Astro-Colibri [2], and now observed by amateur astronomers within the French Pro/Am RAPAS network. To ensure a fast, user-friendly interface, we implemented a two-click procedure in the new VO-compliant version of PRISM. The first click on the PRISM screen requests latest transients from Astro-COLIBRI and plots them on a sky map. A second click selects the object to be observed and automatically points the telescope to that position.




### Python Console and Editor ⬅️

A python scripting facility has been integrated within PRISM using Python4Delphi so that the user can load Python scripts, edit, parametrise and execute them. Our software automatically detects the Python platform installed on the computer. Once the user installs the packages astropy, astroquery and pyvo using pip, they are available in PRISM. Scripts can easily be debugged locally during the observations thanks to the text editor next to the Python console. Using VO queries, amateurs can access existing archives and measurements, and prepare the list of objects to observe. Furthermore, we are developing a Python interface to the connected hardware devices so the user will be able to drive the Telescope mount, control the Cameras, etc. allowing full automatization of the the observing process with Python.




### BHTOM interface ➡️

BHTOM [3] (Black Hole Target Observation Manager) aims at enabling seamless collaboration and efficient data management between professional and amateur astronomers. It features a powerful form interface to query targets for which follow-up observations are requested by researchers. These targets are also available through an API, which we have hence used to build a form to extract the objects of interest in PRISM. This allows the amateur astronomer to use a simple interface to ensure a very efficient and quick access to the targets to be observed, leaving the nitty-gritty aspects to the underlying code.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### References

[1] PRISM v11 is available at https://www.prism-astro.com/en/home/

[2] Reichherzer, P., Schussler, F., Lefranc, V., Alkan, A., Tjus, J. B. 2024. Realtime Alerts of the Transient Sky on Mobile Devices. Astromical Data Analysis Software and Systems XXXI 535, 159. https://astro-colibri.com/

[3] Wyrzykowski, L. 2024, in What Was That? - Planning ESO Follow up for Transients, Variables, and Solar System Objects in the Era of LSST, 4. https://bhtom.space/

V1.1