

# Democratizing Astronomy with the Unistellar eVscope Network

Franck Marchis<sup>1, 2, 3</sup>, Arnaud Malvache<sup>1</sup>, Laurent Marfisi<sup>1</sup>, Antonin Borot<sup>1</sup> and Emmanuel Arbouch<sup>1</sup>

<sup>1</sup> Unistellar, 19 Rue Vacon, Marseille, 13001, France

<sup>2</sup> Carl Sagan Center, SETI Institute, 189 Bernardo Avenue, suite 500, Mountain View, 94043, CA, USA

<sup>3</sup> LESIA, Observatoire de Paris, Meudon, France  
email: [fmarchis@seti.org](mailto:fmarchis@seti.org)

**Abstract.** Unistellar has created the Enhanced Vision Telescope (eVscope), a compact telescope that amplifies light so users can finally see hundreds of nebulae and galaxies directly through its eyepiece. It can also pinpoint and identify objects in the sky, making amateur astronomy fun and more accessible to the public. Unistellar initiated a partnership with the SETI Institute to identify and develop scientific applications for a network of eVscopes. We briefly describe an occultation by Pluto recorded by the Unistellar eVscope prototype, a promising use of the network in the future.

---

## 1. Introduction

The general public has a broad interest in astronomy, the natural science that studies celestial objects and the cosmos. This interest is reflected in the number of telescopes purchased, which is estimated to be at least 4 millions per year (United Nations Comtrade 2018). Most of those are entry-level devices with modest apertures (<10 cm) equipped with a visual eyepiece used to observe moons and the planets. But even high-end telescopes, with large apertures and electronic cameras, are difficult to use and can't provide images as beautiful as the ones the public sees in the media. The Unistellar eVscope is a compact connected device equipped with a sensor, an on-board computer, and a projecting system. The device is smart, autonomous, and able to deliver a colorful image of a celestial object in just a few seconds (Figure 1). Unistellar's primary goal is to make observational astronomy far more fun, exciting, and easy to do than it is today, while fostering a strong, growing interest in astronomical research and citizen science.

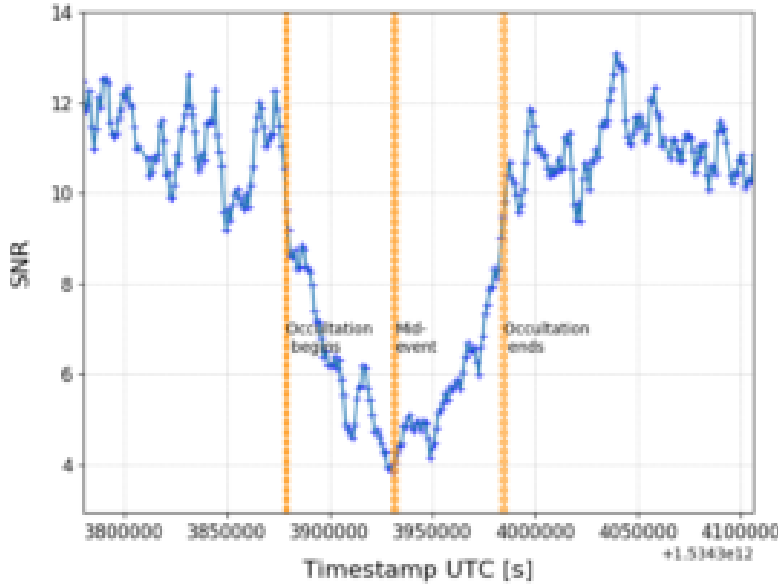
The potential of the eVscope, including its technology, the partnership with the SETI Institute, and several scientific applications has been presented at the 69th Astronautical Congress (Marchis, *et al.* 2018). We summarized an occultation by Pluto observed recently with the eVscope prototype.

## 2. Occultation by Pluto

The Lucky Star collaboration (Desmars *et al.* 2018) announced the existence of a very favorable upcoming occultation involving the dwarf planet Pluto and faint star on August 15 2018. Because Pluto is drifting away from the Milky Way, these kinds of events were becoming more rare, especially with such a bright star (Gaia magnitude  $G \sim 13$ ). And, as an extra kicker, the last occultation, observed in 2016, suggested that Pluto's atmosphere might have started its shrinking.



**Figure 1.** Five unique features of the eVscope (credit:Unistellar)



**Figure 2.** eVscope lightcurve showing the occultation event by Pluto and the detection of its atmosphere

Together with a team of the SETI Institute, the Observatoire de Paris, and Oceanside Photo and Telescope (OPT), the Unistellar team traveled to Southern California to observe this rare event. The observation was successful and a quick analysis of the eVscope's data has confirmed that we had indeed captured the occultation and the presence of the atmosphere because of the gradual disappearance and reappearance of the star.

The team of astronomers working together that night will combine all of their lightcurves to draw conclusions about the current state of Pluto's atmosphere.

The team of astronomers working together that night will combine all of their lightcurves to draw conclusions about the current state of Pluto's atmosphere.

### 3. Conclusion

Unistellar's goal is to democratize astronomy with the eVscope, a smart, compact, and easy-to-use telescope. Through a partnership with the SETI Institute, we validated

the potential of our mighty prototype to a rare occultation by Pluto in the context of a large community of Pro-Am collaborations. Unistellar's network could become the largest array of connected telescopes in the world, able to observe the dark sky 24/7 and provide information on what's happening around Earth and beyond in our galaxy.

## Acknowledgements

F. Marchis was partially supported by the National Science Foundation under Grant No 1743015.

The paper was also presented as a paper at the 69th International Astronautical Congress, 1-5 October 2018, Bremen-Germany – [www.iafastro.org](http://www.iafastro.org)

## References

- United Nation Comtrade 2018, *United Nation Comtrade telescope exports data*, <https://comtrade.un.org/data>
- Desmars, J., Sicardy, B. 2018, *LuckyStar Collaboration*, <http://lesia.obspm.fr/lucky-star/predictions/>
- Marchis, F., Malvache, A., Marfisi, L., Borot, A., Arbouch, E. 2018, *Unistellar eVscopes: Smart, Portable, And Easy-To-Use Telescopes For Exploration, Interactive Learning, and Citizen Astronomy*, 69th International Astronautical Congress, volume IAC-18-E1.9.9.