Investigating the Science Capability of the Unistellar eVscope

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The Unistellar eVscope is a popular addition to the observational astronomers' toolbox, with thousands of new-to-astronomy users. I undertook this work to determine the science capabilities of this novel instrument.

The eVscope is marketed as a recreational instrument, but technically it is a 114 mm f/4 reflector with a 1.3-megapixel CMOS sensor. The instrument is commanded via Wi-Fi link to a smartphone. The system features a computer-controlled alt-azimuth mounting. It can locate fields autonomously using on-board plate solving and then track and stack multiple short exposures to make deep-sky images, reaching 16th magnitude in 60 seconds of integration.

Using the eVscope, I observed the variable star XX Cygni for 3h 30m, capturing one complete cycle of variation. I uploaded the data stored in the eVscope to Unistellar and received 3300 FITS format images in return. Using AIP4Win software, I performed differential photometry on these images, producing a well-defined light curve. I determined the time of maximum light by fitting a sixth-order polynomial to data points near the peak. I also performed astrometry on test images of Barnard's Star.

I find that the eVscope is as capable of producing science results equaling other telescopes of similar aperture. However, because the eVscope is extremely easy to use, the instrument has the potential to make photometry and astrometry available to a wider base of amateur astronomers, students, and schools.