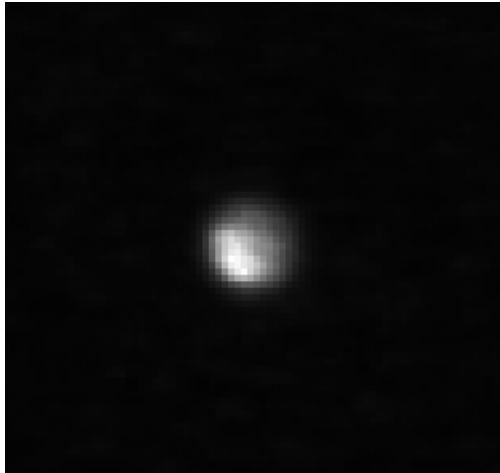


## OBSERVATIONS IN THE H BAND (1.625 $\mu$ m)

November 2014, Northern Ireland

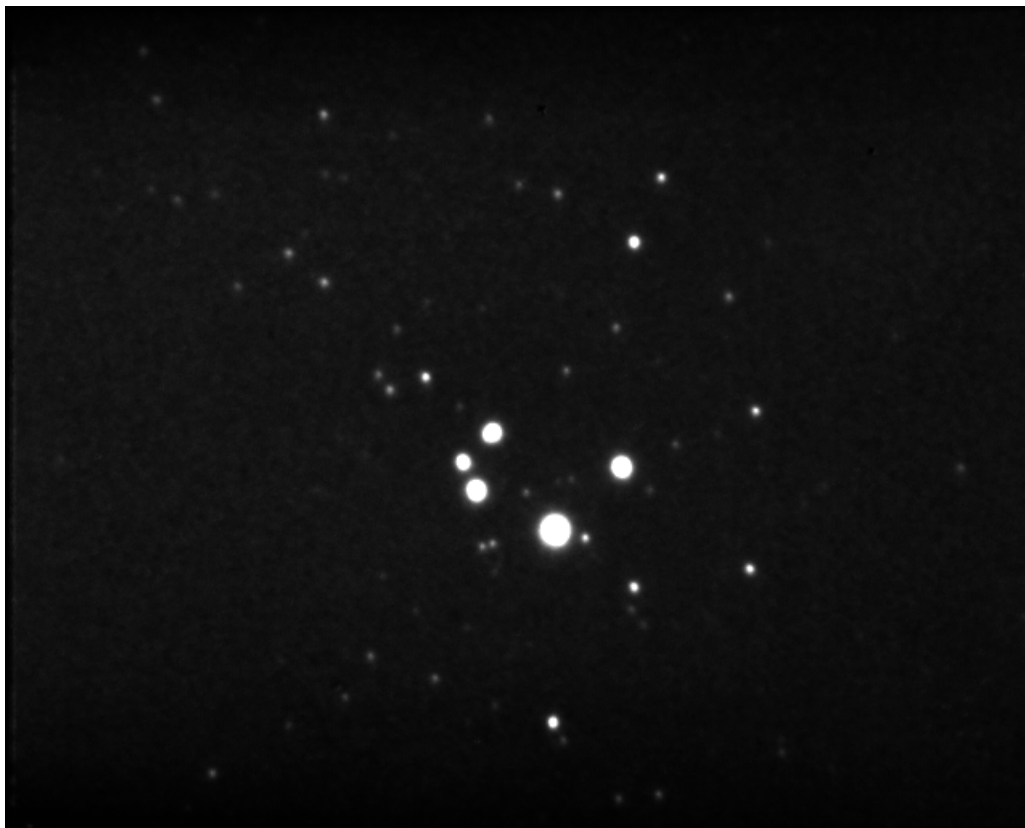
### Ninox Scientific SWIR at the C2PU 1m telescope:

Courtesy of [Dr. Lyu Abe](#)



All the images were taken at 1,625nm.

Left: Image of Uranus observed in the astronomical H band (1.625 $\mu$ m) on October, 24 2014 at the Cassegrain focus of the 1 meter Omicron telescope of the [C2PU facility](#) (Observatoire de la Côte d'Azur). The planet is about 20 times farther away from the sun than Earth. Its apparent diameter on this image is about 2.9". Surface inhomogeneities are caused by clouds in the atmosphere of Uranus. Stack of 1000 shift-and-added, 51ms exposure frames.



The core of the Trapezium cluster in the heart of the Orion nebulae observed in the astronomical H band (1.625 $\mu$ m) on October, 24 2014 at the Cassegrain focus of the 1 meter Omicron telescope of the C2PU facility (Observatoire de la Côte d'Azur). This region of the sky contains many young stars formed in that dust-rich environment. Stellar components of this open cluster are better observed at infrared wavelengths because of the lower absorption of the dust. The faintest stars are about H=13 magnitude. Stack of 4000 shift-and-added, 15ms exposure frames.

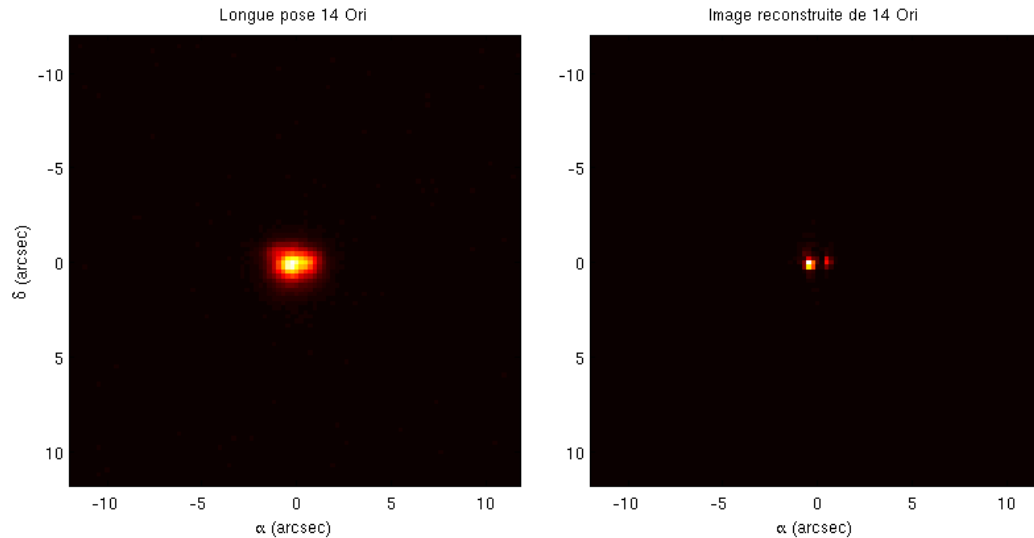


Image reconstruction test of the binary star system 14 Ori (H=4.6 magnitude), recorded in the astronomical H band (1.625 $\mu$ m) on October, 24 2014 at the Cassegrain focus of the 1 meter Omicron telescope of the C2PU facility (Observatoire de la Côte d'Azur). (left) Stack of 3000 co-added, 15ms exposure frames. (right) Reconstructed object from the 3000 short-exposure images.

According to Dr. Abe: “The Raptor Ninox 640 is a very exciting camera for me. I am now able to taken good images at the astronomical H band (1.625 $\mu$ m) using stacks which require stability over long periods. This camera will enable me to potentially discover new things”.

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### Owl 640 guiding camera for SPiRou at CFHT:

Courtesy of [Dr. Shiang-Yu Wang](#)

SPiRou is a near-infrared spectropolarimeter and high-precision velocimeter designed to search and characterization of habitable exo-Earths around low-mass stars. Raptor Photonics Owl 640 has been selected as a guiding camera and pushed to the limit of sensitivity with superior custom cooling. It has been characterised with a readout noise of 45 electrons per pixel and a dark current of about 363 electrons/pixel/second at a sensor temperature of -30°C.

The linearity of the camera, Figure 1, and the exposure needed to detect different magnitude of stars were also characterised against the 2MASS catalogue

Spirou Guiding Camera On-Sky testing

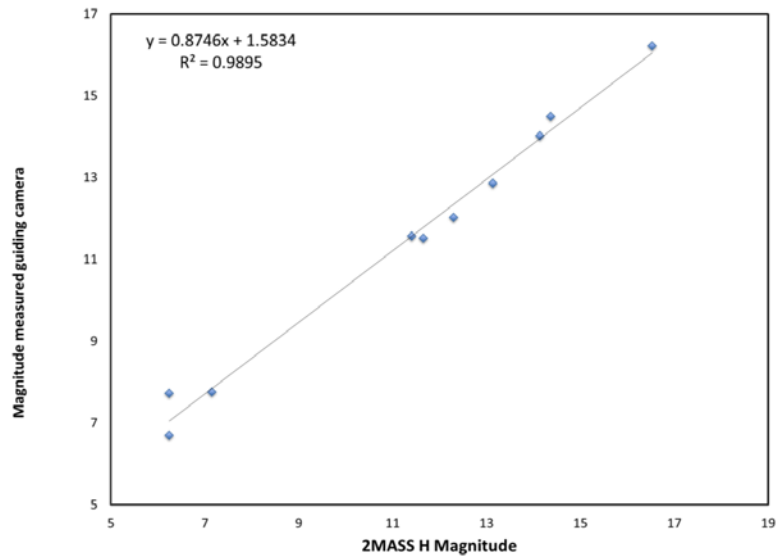


Figure 1: The measured magnitude versus 2MASS H band magnitude for the stars

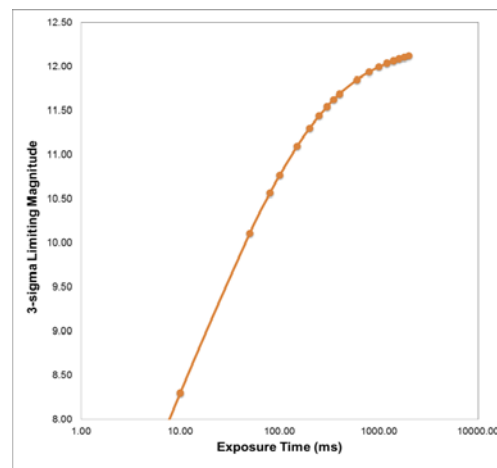


Figure 2: The exposure time needed to reach 3 $\sigma$  detection for different magnitude for the stars

### Raptor Photonics Ninox 640 scientific SWIR features:

- **SWIR technology.** Enables high sensitivity imaging from 0.4 $\mu$ m to 1.7 $\mu$ m
- **>85% Peak QE**
- **High resolution 640x512 sensor with 15 $\mu$ m pixel**
- **<50 electrons readout noise in high gain**
- **<1500 electrons/pixel/second dark current at -20°C**
- **14 bit CameraLink output.** Enables high speed digital video with intelligent auto AGC
- **On-board Automated Gain Control (AGC).** Enables clear video in all light conditions
- **On-board intelligent 3 point NUC.** Enables highest quality images
- **1 $\mu$ s minimum to 107s maximum exposure**
- **Air or water cooled.** Easy and flexible integration.

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