

3D SWIR Camera Prototype

Ground-Breaking 3D Camera Operating at 1130nm Wavelength

A NEW PARADIGM OF SENSORS WORKING ACROSS ALL LIGHTING ENVIRONMENTS

Jabil Optics has developed a Time-of-Flight (ToF) camera prototype of an 1130nm illumination source and an image sensor capable of efficiently capturing photons at short-wavelength infrared (SWIR).

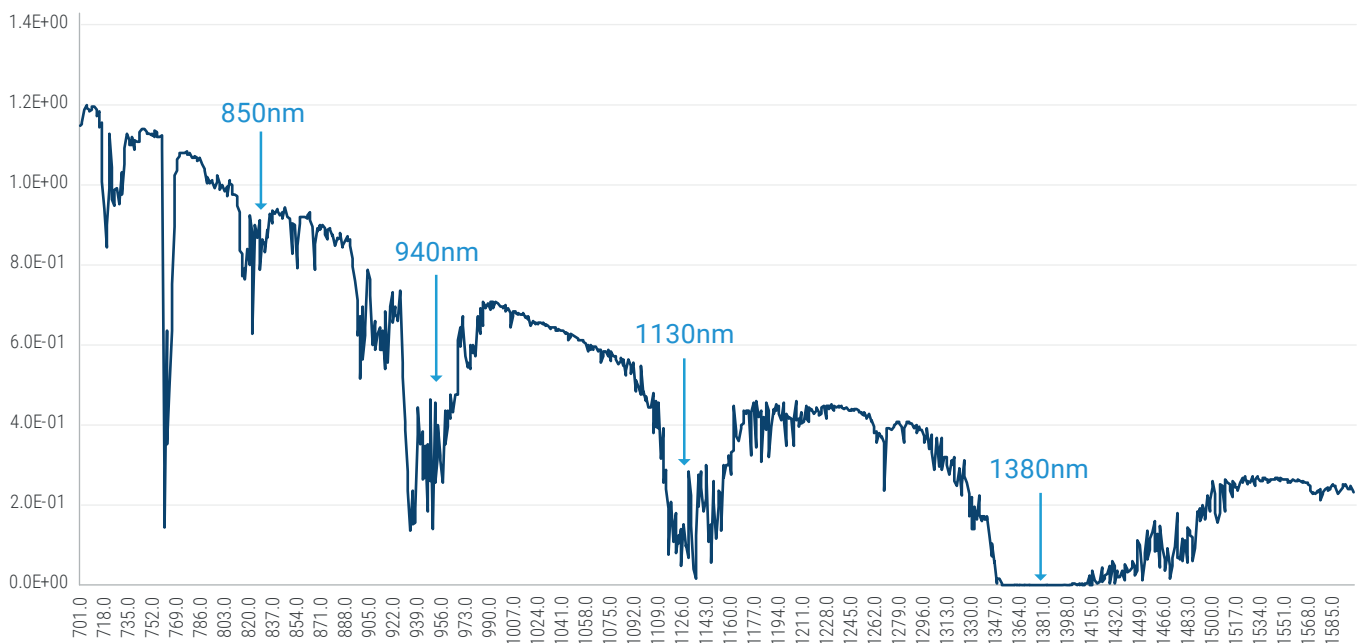
Compared to traditional 3D cameras, the high ambient light tolerance of the demonstrator allows it to seamlessly operate in both indoor and outdoor environments up to a range of 15m. With the increased operating range, ambient light tolerance, and higher laser eye safety threshold the demonstrator showcases a new paradigm for 3D sensor development.



BREAK-THROUGH

Historically, 3D cameras have operated with illumination sources and image sensors optimized for the 850nm, 905nm, and 940nm wavelengths. However, 3D cameras at these wavelengths face performance challenges in outdoor environments as they compete with the sun’s solar irradiance. By targeting short wave infrared wavelengths (1130nm, 1380nm) where sunlight is absorbed, scattered or filtered through the Earth’s atmosphere, noise is reduced and data quality dramatically improves.

Targeting Alternative Gaps in the Spectral Curve (1130nm, 1380nm)



Source: Data from ASTM International: ASTM-G173 > Standard Tables for Reference Solar Spectral Irradiances

PERFORMANCE

The prototype was tested at multiple distances, out to 15m, in both indoor (<1Klux) and outdoor (100K lux) conditions. For outdoor testing the 3D camera was tested with both the sun facing the camera and the sun facing the target. As shown, ambient light has minimal impact on the performance of the 3D camera.

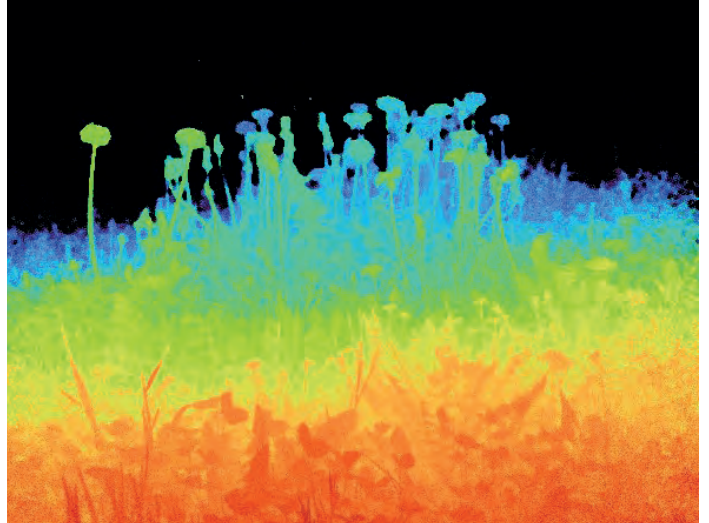
The figure of the plant highlights the ability of the demonstrator to capture depth information of an object that is partially illuminated by the sun and partially shaded from the sun.

TECHNICAL DETAILS

Dimensions	140 x 140 x 50 mm
Wavelength	1130nm
Optical Peek Power	64W (4 x 16W)
Field of View	60 x 45°
Field of Emission	40 x 20° or 60 x 45°
Range	14m for 40 x 20° FOE, 8m for 60 x 45° FOE



Outdoor Test Set Up with Sun Facing Targets & Camera



Capturing Depth in Sunlight

WHAT'S NEXT?

Jabil's Optics experts are leveraging decades of experience in optical design, 3D camera design, and camera manufacturing in the development of innovative 3D cameras and sensors for customers in the robotics, agriculture, material handling, and automotive markets. Please join Jabil and our ecosystem partners in promoting these technologies to accelerate adoption of autonomous platforms capable of working in conditions from extreme sunlight to nighttime conditions.