Phobos Stereo Camera

Overview

Phobos is a high-resolution stereo vision system that uses 5 Megapixel cameras and can operate at 30 fps over a USB3.0 interface. The cameras use a global shutter and are suitable for imaging moving targets.

A software toolkit is provided to allow users to re-calibrate the cameras, acquire and match stereo imagery, and view/output 3D point clouds using i3Dr's state-of-the-art stereo matching algorithms. The instrument is compatible with OpenCV and ROS.

General Information

Interface	USB3.0 (5 Gbps)
Camera resolution (px)	2,448×2,048 (5 MP)
Pixel Size	3.45 µm x 3.45 µm
Bit depth	Monochrome 8/12-bit
Sensor (x 2)	Sony IMX250LLR (2/3")
Framerate	30 fps*
Focal length	8 mm
Focus	0.8 m to 1.25m**
Shutter type	Global
Synchronisation	Hardware triggered
Exposure range	20 µs to 4 s
Software compatibility	Windows 7+, Linux, OpenCV, ROS

*Limited by USB3.0. This can be increased if USB3.1 is used. Acquisition framerate reduced to 14fps if 12 bit bit-depth is used.

** The Phobos stereo systems are factory-focused for an optimum measurement at 1m. Please contact us if you require a different measurement range as the focus range may be adjusted.

Stereo information including theoretical measurements

Z axis indicates depth, perpendicular to the camera sensor plane.

Baseline	300 mm
Depth resolution at 1 m ($\in_z = \dfrac{z^2}{fB} \in_d$), $\in_d = 0.25\ px$	0.35 mm
X/Y resolution at 1 m	0.11 mm
Field of view at 1 m (H x V)	1.05 x 0.88 m (55.65° x 47.65°)

Theoretical performance graphs for other ranges are shown below, these are derived for Phobos assuming nominal calibration parameters and typical matching accuracy of 0.25 px using well-textured imagery.
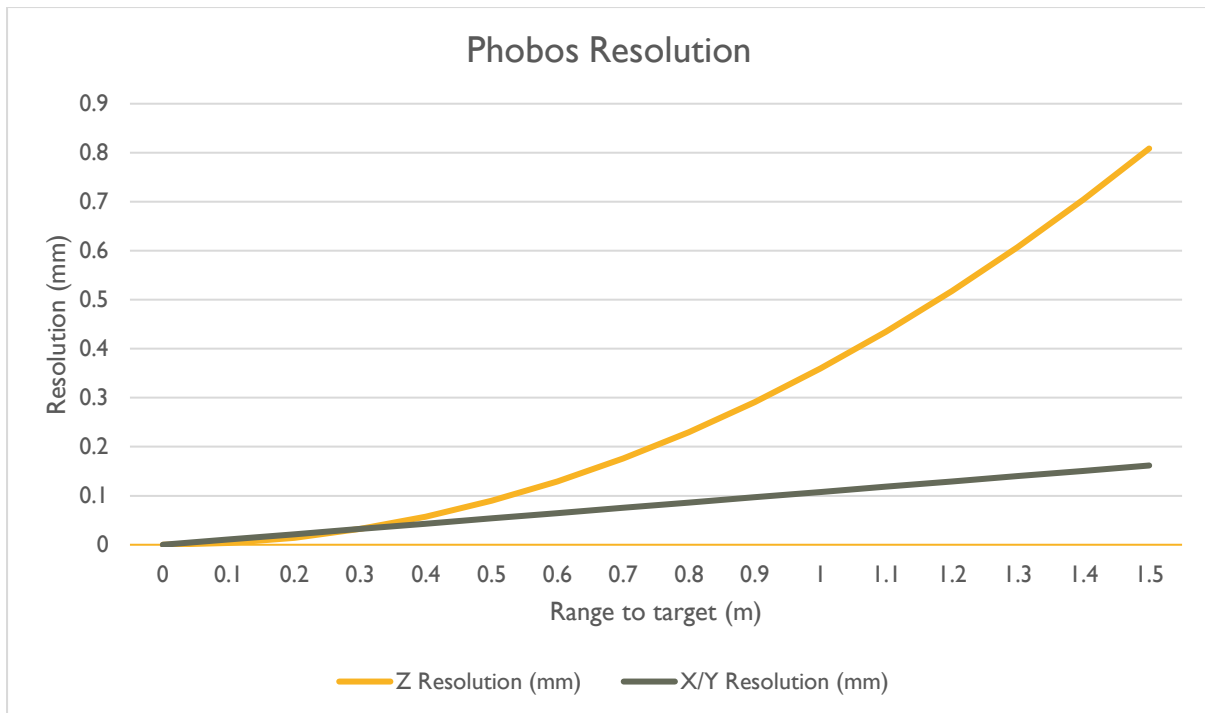

Mechanical and Electrical Information

Dimensions	390 x 50 x 140 mm
Weight without cable	3.2kg
Mounting	4 x M4 on base
Operating temperature	-5 – 45 °C
Supply voltage	USB powered, optional 12V supply
Power consumption	approx. 2.5W

Data connection to the Phobos system is via a USB3.0-A female input. The Phobos unit is IP 40 rated and may be used in certain industrial enviornments. Please contact i3D robotics if you require a 3D stereo system to be used in dusty, wet or hot environments.

Dimensional Information

All dimensions in millimetres. This drawing is reproduced here for reference, please contact us for a higher resolution copy or CAD models.
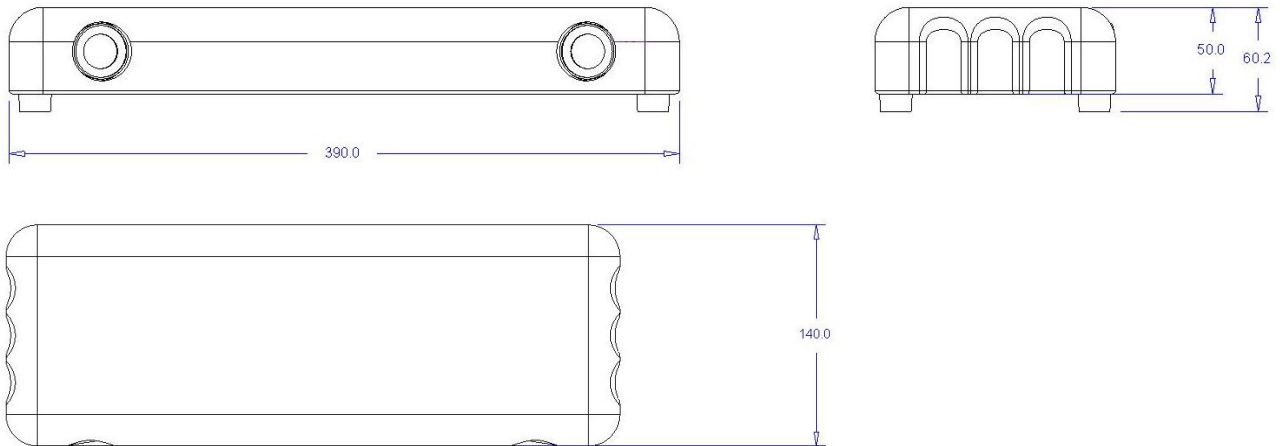
Moutning Information

M4 mounting holes allow simple, robust, interfacing to an end-user platform. A tripod (1/4-20 thread) adaptor is available.