

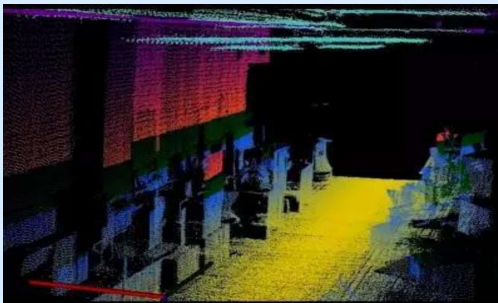
VUCS Series VIMU



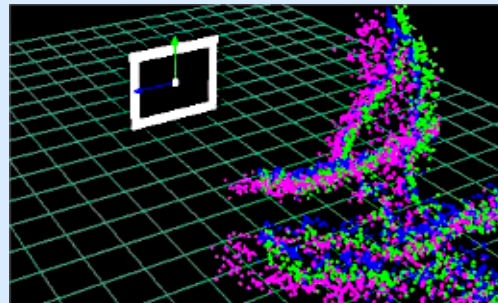
The VIMU features a modular design including an imaging sensor, an image processor, an embedded NVidia GPU, an IMU module, and industrial standard interfaces of high-speed USB 3.0 and CAN. The standalone VIMU provides onboard intelligent functions of image processing, depth estimation, motion estimation, and feature tracking. With the onboard image processor, the smart sensor provides core processing functions required in industrial and robotic applications, and is fully extendable to application-specific processing requirements.



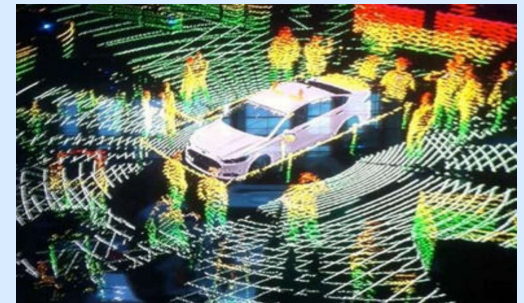
Applications



3-D Mapping



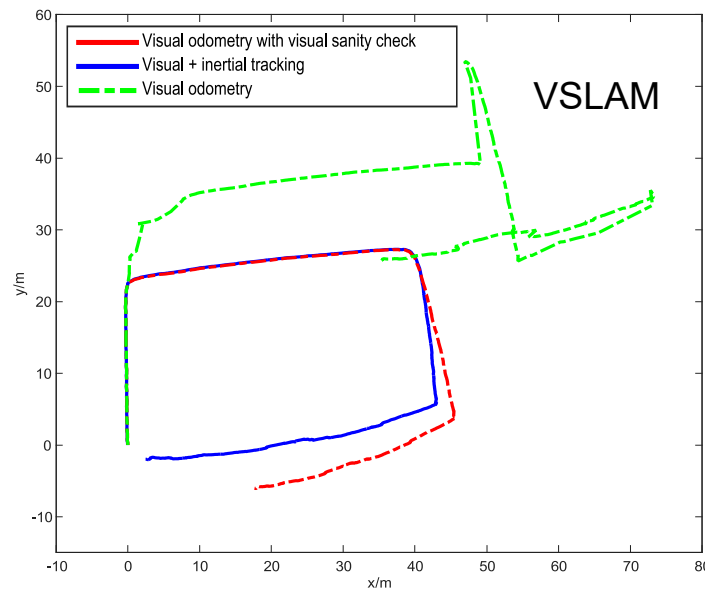
Motion Tracking



Obstacle Detection

Key Application Features

- Image Processing**
 Shape, line, and corner detection for optical flow.
- Motion Analysis & Tracking**
 Velocity estimation & trajectory tracking for moving objects.
- Depth Estimation**
 Working range of 0.1 m to 10 m.
- Feature Tracking**
 Real-time salient feature detection (>15 fps).

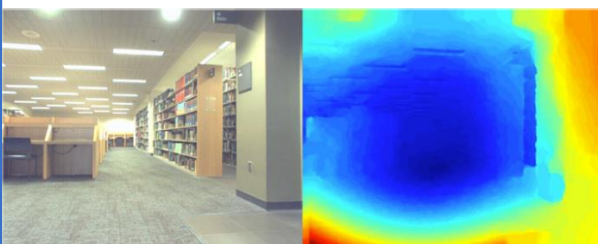


VSLAM

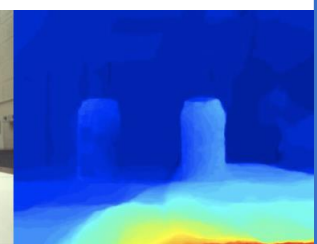
Motion tracking using the VUCS series VIMU (shown in blue), outperforming the visual odometry with visual check (shown in red).



Optical Flow

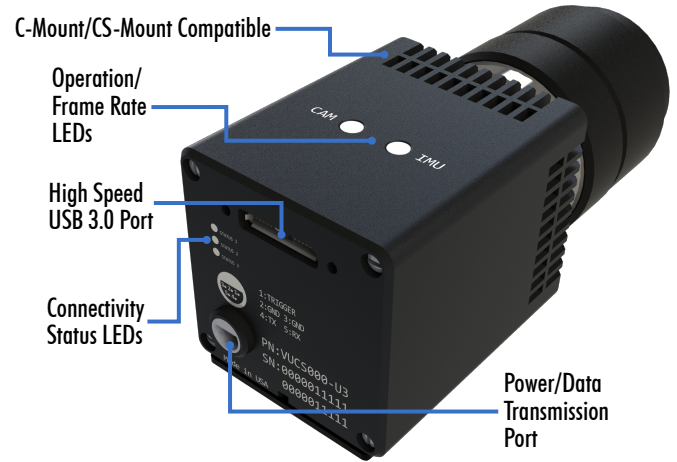
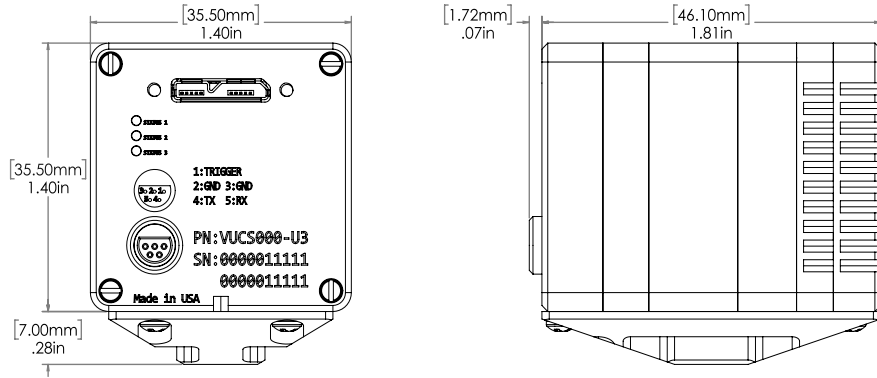


Long range (left) & short range (right) depth estimation using the VUCS series VIMU.



VUCS Series VIMU

Dimensions & Features



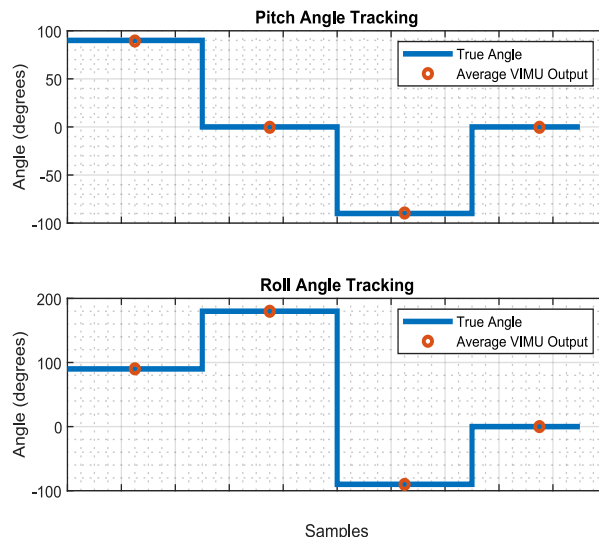
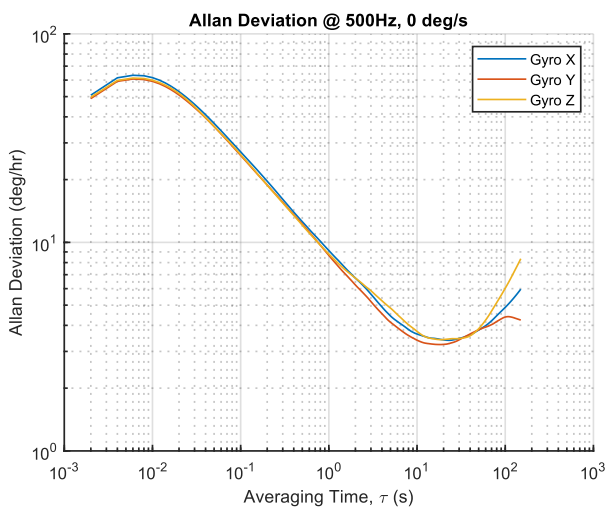
Specifications

Fusion Performance	
Range	Pitch $\pm 90^\circ$
	Roll $\pm 180^\circ$
Static Accuracy	Pitch 0.48 $^\circ$ RMS
	Roll 0.13 $^\circ$ RMS
Angular Resolution	< 0.02 $^\circ$
Output Rate	1000 Hz

Gyroscope	
Dynamic Range	$\pm 2000^\circ/\text{s}$
Bias Stability	< 6 $^\circ/\text{hr}$
Non-Linearity	$\pm 0.1\%$
Rate Noise Spectral Density	0.01 $^\circ/\text{s}/\sqrt{\text{Hz}}$
Accelerometer	
Dynamic Range	$\pm 16\text{ g}$
Noise Density	< 0.3 mg/ $\sqrt{\text{Hz}}$
Sensitivity ($\pm 16\text{g}$)	0.488 mg
Non-Linearity	$\pm 0.5\%$

Imaging Sensor	
Sensor Type	1/3-inch CMOS
Shutter Type	Global shutter
Pixel	1.2 MP
Max Resolution	1280 (W) x 960 (H)
Max Frame Rate	60 fps
Magnetometer	
Full-Scale Range	± 48 Gauss
Sensitivity	6 mGauss

Performance



The VIMU gyroscope Allan deviation plot (left) & fusion tracking of the VIMU based on a rate table reference (right).

Product Number **VUCS0106-U3**

VIMU
Consumer Grade
1 Megapixel

USB 3.0
6 $^\circ/\text{hr}$ Bias Instability

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