FARO® DMVS

3D Verification and Vision Guidance for the Smart Factory

This system is part of the FARO Early Adopter Program

In manufacturing, inline assembly verification and fast recognition of defects are key to ship correct assemblies, improve quality, reduce rework and scrap, and increase productivity. In addition, fast identification of object types and recognition of the object position enables the automation of picking and identification processes in manufacturing and logistics.

The FARO Dynamic Machine Vision Sensor (FARO DMVS), a new, one-of-a kind high speed 3D/2D vision system, enables tight integration of verification and vision guidance capabilities based on its ability to dynamically capture detailed 3D data. The DMVS can be mounted on a robot or a linear axis for applications where the sensor moves or can easily be integrated into gate-like solutions where parts and assemblies are moved along the production line e.g. on a conveyor belt or similar transport system.

Due to its unbeaten extreme frequency measurement rate of 70Hz, real time HDR capability, and dynamic structured light technology, the DMVS represents a breakthrough in 3D sensor technology. As a result, the hybrid sensor does not only reliably capture complex parts, complicated assemblies and difficult to capture surfaces as a detailed 3D point cloud and 2D grayscale images, but it does so with unparalleled efficiency.

Designed to function in lighting conditions where traditional sensors struggle or fail and able to survive in the most demanding environments, its advanced hybrid measurement technology makes the FARO DMVS an essential, versatile building block in systems integration whenever solutions require a fast recognition of objects or detection of quality deviations.

Master challenging requirements

Respond to diverse customer challenges without the integration complexity that comes with having to use different technologies on the same project. With the FARO DMVS you leverage the benefits of a high-speed 3D HDR system and a calibrated 2D stereo camera combined in one single sensor. The 2D stereo grayscale images are especially suited to read barcodes, identify fine, detailed structures such as wires, detect edges and perform fast, simple dimensional checks. The 3D infrared system captures detailed 3D point cloud data of features and surfaces for objects with multiple challenging surface characteristics including reflective, bright, dark, transparent and translucent materials.

Get the detail of complex parts

Easily inspect and verify complex or large assemblies, challenging features, deep geometries such as holes or pockets, or identify objects and their position based on unique geometry or even thin edges.

The sensor captures areas/patches of 3D data with every measurement shot quickly and easily while the part is moving in relation to the sensor. The continuous data capture, while the part or sensor is in motion, enables shadow free 3D measurement to see behind components such as wires and brackets, something traditional technologies cannot do efficiently.

In addition, based on its huge depth of field (300mm – 700mm), the FARO DMVS captures comprehensive and detailed 3D information with fewer sensors and positions compared to commonly used systems.

Detect fast, react quickly

Inspect and verify parts or assemblies without stopping or slowing down the production line and implement efficient, consistent material / product handling processes without unnecessary stops and delays. The sensor´s 70 Hz framerate and its ability to capture 3D data in motion guarantees fast data acquisition, processing and evaluation.

Focus on solving the core challenges

The sensor´s simple and robust design and easy SDK enables system integrators to concentrate on the core challenges rather than focusing effort on laser safety issues, barriers, special mounting or protective systems to control the environment in order to make data capture work. Designed to work in modern production environments where outdoor lighting is more common the FARO DMVS operates even in bright light. As the sensor is eye-safe it can safely be deployed in areas where people work and interact with the processing line or picking operations. The FARO DMVS can be easily cleaned and sanitized without concern because of its IP 67 rating.

In addition, the easy to use open SDK provides the necessary flexibility to integrate into other IT systems where necessary, while the BuildIT Metrology Software delivers a plug-and-play interface and comprehensive capabilities for data capture and analysis.

Application

Assembly Verification: Quickly check complex assemblies and recognize deviations from the intended setup

Quality Inspection: Identify quality defects quickly by comparing captured 3D data with CAD data or comparative 3D scans of a golden part

Part Identification: Easily identifies objects for quick and precise sorting operations where different variants or mixed parts are handled

Part Position and Orientation: Determines the exact position and orientation of objects in a three-dimensional space, for example to support fast and efficient pick and place operations

Integration

Stationary sensor: Parts, assemblies, objects are transported on a conveyor belt, linear axis, robot or other transport system past the sensor

Moving sensor: Sensor is moved on a linear axis, robot or similar past the part, assembly or object

Integration modes: In-line / Near line

Materials

Metals / castings / forgings / plastics / wood / other, including transparent, translucent, dark and reflective materials and surfaces

Specifications

Sensor Kit and Software	
Sensor Kit	Only available as sensor kit including • Sensor head • Power supply cable for sensor head • Dell Precision 3930 Rack-mount computer – Intel Core i7-8700K, 6 cores, 12MB Cache, 16GB DDR4 RAM, 256GB SATA-SSD, NVIDIA Quadro P200, Intel Ethernet 10G
Software	BuildIT Metrology for scanning and data analysis
SDK	Open SDK available

Sensor Head	
Modes of Operation	
Modes of Operation	• Highspeed 3D HDR capabilities for 3D point cloud data • Calibrated 2D stereo camera for stereo, grayscale infrared images
3D Performance Data	
Output	3D point cloud
Frame Rate	70Hz
Single Frame Speed	100µs – 2.45ms
3D Measurement Acquisition Rate	Up to 480,000 points per second
Depth of Field Range	300mm - 700mm (11.81in - 27.56in)
Field of View	275mm x 233mm at 300mm distance (10.8 x 9.1in at 11.81in distance) 380mm x 383mm at 500mm distance (14.9 x 15.0in at 19.66in distance) 485mm x 533mm at 700mm distance (19.0 x 20.9in at 27.56in distance)
Depth Accuracy*	200µm 2 sigma for 300mm - 500mm distance (11.81in - 19.66in distance) 400µm 2 sigma for 500mm - 700mm distance (19.66in - 27.56in distance)
2D Performance Data	
Output	• 2D stereo images, grayscale images with spectral filter 787 - 821nm • IR illumination using internal IR LEDs
Resolution	1.3MP
Bit Range	8bit
Frame Rate	25Hz
Hardware Specifications and Environmental	
Dimensions (L x W x H)	385mm x 98mm x 75mm (15.16in x 3.86in x 2.95in)
Weight	2.27kg (5.00lb)
Product Design	• Robust aluminum housing, T-slot mount on the rear and bottom of the sensor • Rugged design • IP67 rating
Connectivity	Industrial M12 connectors: 1 power and trigger IN/OUT, 2 GigE Ethernet, 1 100MBit Ethernet
Power Supply	19-25V, 20W average, 50W peak
Operating Temperature	0 - 40°C (32 - 107.6°F), passive cooling
Laser Specifications	
Laser Class	Class 1 Laser Product according to IEC 60825-1:2014 For countries in which IEC 60825-1:2014 standard is not applicable: Class 3R Laser Product according to IEC 60825-1:2007
Laser Wavelength	798 - 821nm, infrared

*Measured during FARO calibration on a reference plate

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