# RobotEye RE05 3D LIDAR
3D Laser Scanning System

Product Datasheet

## RobotEye RE05 3D LIDAR - 3D Laser Scanning System

Ocular Robotics' RobotEye RE05 3D LIDAR, 3D Laser Scanning System delivers the signature scanning flexibility common to all Ocular Robotics' RobotEye 3D scanners in a robust, lightweight device with a simple power and Ethernet interface. The unique scanning capabilities of Ocular Robotics 3D laser scanners provide the ability to moment by moment adapt the scanning behaviour to suit the task. Define the desired scan region, vertical and horizontal data resolution, sample rate and more using one of the RE05's three scanning modes Full Field, Bounded Elevation or Region Scanning and transition to the new scan parameters within milliseconds. Other features of the RE05 include a range of 30 metres to most natural surfaces, a 30kHz sample rate, 0.01 degree angular resolution and a C++ SDK to speed integration of the RE05 into your projects.

The RobotEye RE05 3D LIDAR's three scanning modes are described in the sections below. Each mode is fully parameterised, with scan region, scan rate, line resolution of up to 100 lines per degree, sample rate and sample averaging able to be set so that the behaviour of the system is entirely user defined.
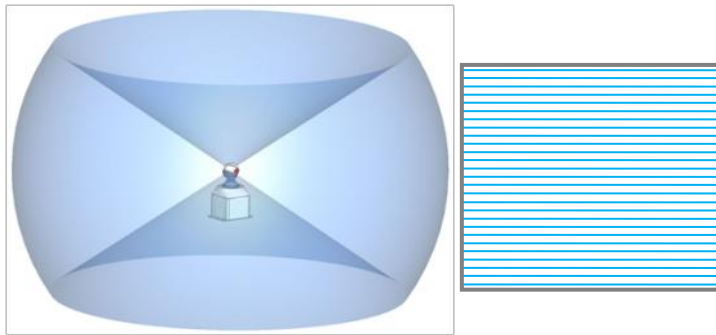
Full Field Scanning — Allows scans to be defined that cover the full 360° azimuth by 70° elevation field of the scanner. Parameters to adjust the azimuth scan rate, the number of lines per degree in elevation, the sample rate and sample averaging are available in this mode. These parameters enable the resolution of the resulting 3D data in both azimuth and elevation to be traded off against acquisition time to best meet the requirements of the application at any point in time.

Bounded Elevation Scanning — In Bounded Elevation Mode the user is additionally able to define the elevation bounds of a scan. Again the azimuth rate is configurable as is the number of lines per degree, sample rate and sample averaging. This mode enables the user to concentrate the focus of the scanner on a desired region in elevation and at the same time have complete control over the density of the data in that region and acquisition time.
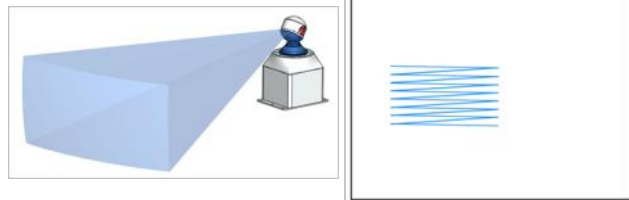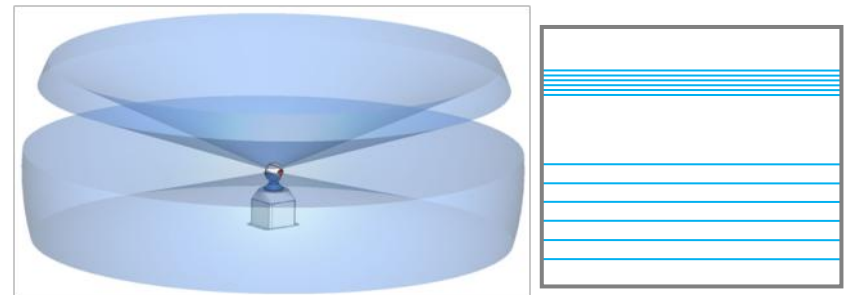
Region Scanning — This mode allows the user to define a rectangular region within the scanner's azimuth and elevation field in which to concentrate the scanning. The Region Scan mode gives the most control over the attention of the scanner with scan rate, number of lines per degree, sample rate and sample averaging parameters available as in other modes. Region Scanning is most useful when a region's extent in azimuth is less than 60°.

RE05 Specifications

Mechanical		Rangefinder	
Maximum Azimuth Rate	15Hz	Laser Class	1
Maximum Elevation Rate	3Hz	Laser Wavelength	905 nm
Azimuth Axis Resolution	0.010°	Laser Divergence	3 mrad x 1 mrad
Elevation Axis Resolution	0.010°	Range (reflectorless)	30 m
Azimuth Range	360° Continuous	Range (high reflectivity targets)	Up to 160 m
Elevation Range	70° (±35°)	Range Accuracy	±50mm
Weight (IP65/IP67)	2.8kg / 3.0kg	Range Reproducibility	±20mm
		Maximum Sample Rate	30 kHz
Electrical			
Communication	Ethernet	**Environmental**	
Supply Voltage	24VDC	Operating Temperature Range	-20°C - +50°C
Power Consumption — Typical (average)	50W	IP Class Rating	65 & 67 models
		Note: IP Rating valid only when both supplied power & optionally supplied weatherproof Ethernet cable connectors are fitted.	
Software			
RobotEye C++ Development Library	Windows/Linux		
RE05 Tools Application	Windows/Linux		

Specifications are subject to change without notice

Software

RE05 Tools — The **RE05 Tools** application is included with all RE05 systems and allows control of all RE05 system settings and scan parameters. **RE05 Tools** is also a viewer which allows users to view the 3D data as it is captured and completed scans can be saved in a number of common formats.

RobotEye C++ Development Library — The RE05 ships with a fully documented C++ development library for both Windows and Linux that can be used to simply and quickly interface to the RE05 device. This enables rapid application development for users who wish to integrate the RE05 into their projects or proprietary systems. The library provides access to the entire range of RE05 features. The RobotEye Development Library Reference Manual is available for download from the Ocular Robotics website.

Data Output

The RE05 system outputs 3D data points at up to 30kHz making it possible to quickly acquire very dense point cloud data from the region specified by the current scan settings or alternatively rapidly update 3D range information over a wide area at ranges up to 30 metres. At sample rates up to 10kHz data output can include a value indicating the intensity of the returned signal to give (range, bearing, elevation, intensity) and (x, y, z, intensity) data points at the 30kHz sample rate intensity information is not available so data is output in (range, bearing, elevation) and (x, y, z) formats.
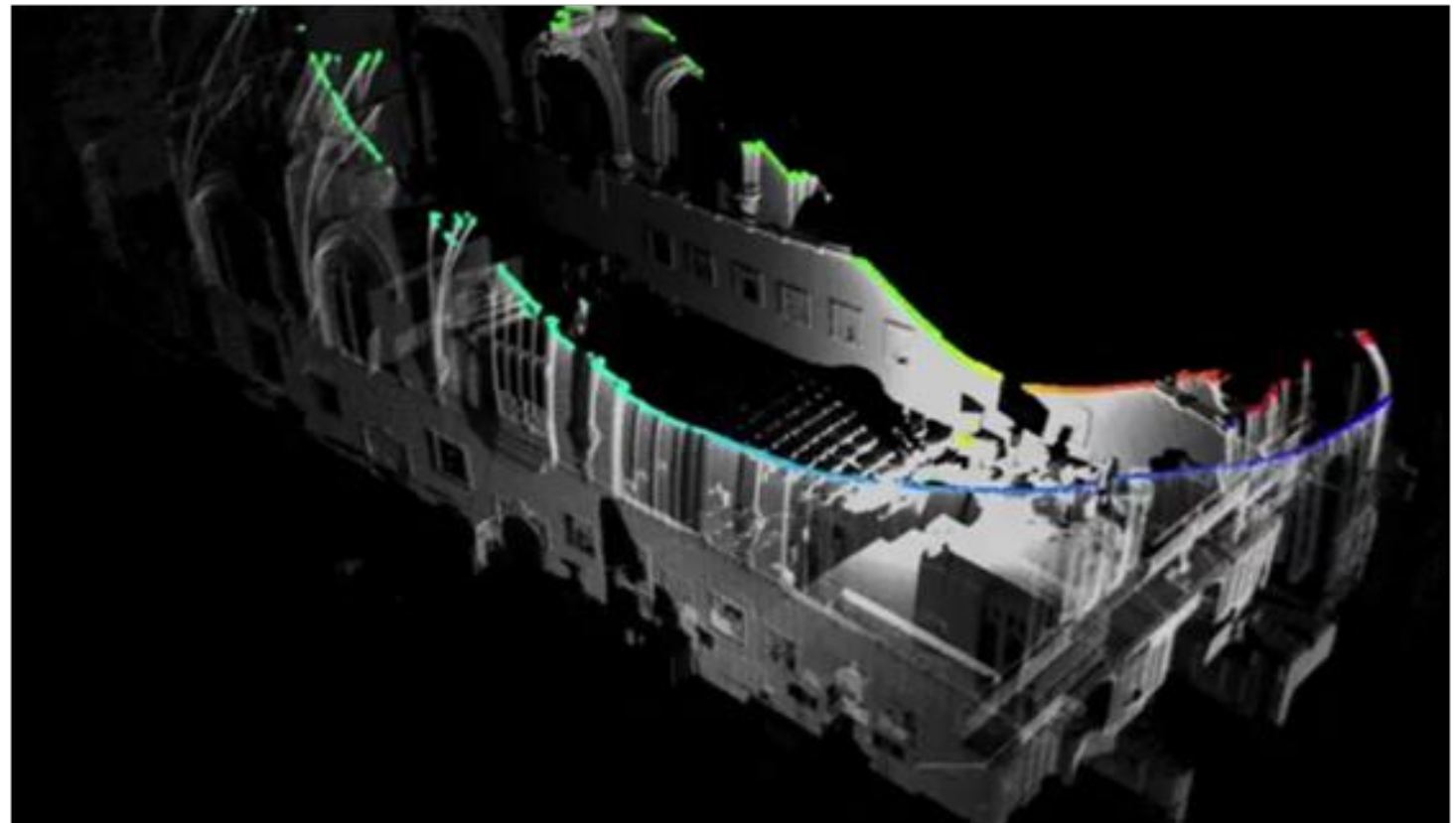
Communication

The bidirectional communication of data and control with the RobotEye RE05 3D LIDAR is achieved via the system's Ethernet port. This enables the system to be operated and data processing to occur anywhere on the network to which the RE05 is connected, limited only by the allowable length of Ethernet cable.

Environmental

The RE05 3D Laser Scanning System has been designed to operate in a wide variety of industrial environments and to be mounted as a permanent part of vehicles and mobile equipment. The RE05 is available in both IP65 and IP67 models and will operate in ambient temperatures of up to 50°C.

System components

The RE05 3D Laser Scanning System is supplied as standard with the following components:

- RobotEye RE05 3D Laser Scanning Unit
- 5 metre power cable
- RE05 Tools, operation and viewer application
- RobotEye C++ Development Library

Optional System components:

- 10 metre IP67 weatherproof Ethernet cable