RobotEye RE08 3D LIDAR
## 3D Laser Scanning System

Product Datasheet

RobotEye RE08 3D LIDAR - 3D Laser Scanning System

Ocular Robotics' RobotEye RE08 3D LIDAR - 3D Laser Scanning System delivers the signature scanning flexibility common to all Ocular Robotics' RobotEye 3D scanners in a highly robust package that allows the scanning head to be separated from the control enclosure by up to 20 metres, connected only by optical fiber and power/signal cable. The external interface to the RE08 is just power and Ethernet.

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 RE08's three scanning modes Full Field, Bounded Elevation or Region Scanning and transition to the new scan parameters within milliseconds. Other features of the RE08 include a range of between 80 metres and 250 metres to most natural surfaces, up to 25kHz sample rate, up to 5 ranges measured for each laser pulse, 0.0025 degree angular resolution and a C++ SDK to speed integration of the RE08 into your projects.

The RobotEye RE08 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.
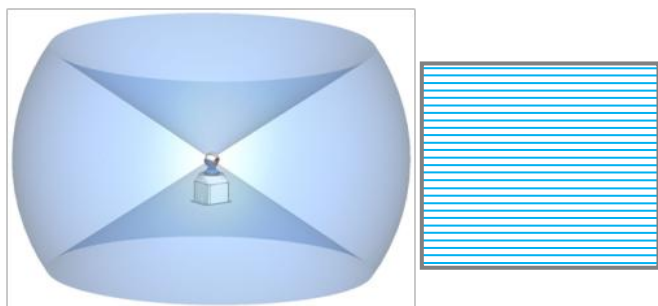
Full Field Scanning — Allows scans to be defined that cover the full 360° azimuth by 70° elevation field of the scanner. Parameters to adjust the azimuth scan rate, the number of lines per degree in elevation, the sample rate and sample averaging are available in this mode. These parameters enable the 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.
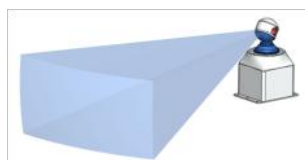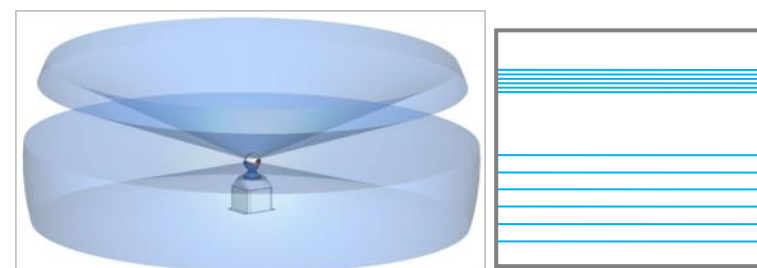
Region Scanning — This mode allows the user to define a rectangular region within the scanner's azimuth and elevation field in which to concentrate the scanning. The Region Scan mode gives the most control over the attention of the scanner with scan rate, number of lines per degree, sample rate and sample averaging parameters available as in other modes. Region Scanning is most useful when a region's extent in azimuth is less than 60°.

RE08 Specifications

Mechanical		Rangefinder	
Maximum Azimuth Rate	15Hz	Laser Class	1M
Maximum Elevation Rate	3Hz	Laser Wavelength	Near Infrared
Azimuth Axis Resolution	0.0025°	Laser Divergence	2.4 mrad
Elevation Axis Resolution	0.0025°	Max. Ranges per Laser Pulse	5
Azimuth Range	360° Continuous	Range Accuracy	±10mm
Elevation Range	70° (±35°)	**High Range Mode**	
Weight (Scan Head/Control Enclosure)	4.3kg / 5.5kg	Maximum Sample Rate	5 kHz
		Range (ρ=10% / ρ=80% / reflector)	60m/180m/1200m
Electrical		**High Speed Mode**	
Communication	Ethernet	Maximum Sample Rate	25 kHz
Supply Voltage	24VDC	Range (ρ=10% / ρ=80% / reflector)	35m/100m/1000m
Power Consumption — Typical (average)	200W	(ρ = reflectivity)	
Software		**Environmental**	
RobotEye C++ Development Library	Windows/Linux	Operating Temperature Range	-10°C - +50°C
RE08 Tools Application	Windows/Linux	IP Class Rating	67

Specifications are subject to change without notice

Software

RE08 Tools — The **RE08 Tools** application is included with all RE08 systems and allows control of all RE08 system settings and scan parameters. **RE08 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 RE08 ships with a fully documented C++ development library for both Windows and Linux that can be used to simply and quickly interface to the RE08 device. This enables rapid application development for users who wish to integrate the RE08 into their projects or proprietary systems. The library provides access to the entire range of RE08 features. The RobotEye Development Library Reference Manual is available for download from the Ocular Robotics website.

Data Output

The RE08 system has a pulse repetition rate of up to 25kHz and is able to resolve up to five separate ranges for each laser pulse. This feature gives the RE08 enhanced capability to see through things like dust and rain, and to image complex objects like vegetation. Given the ability of the system to return multiple range measurements for each laser pulse the number of 3D data points returned can significantly exceed the pulse repetition rate setting. The high data rates possible with the RE08 allow very dense point cloud data to be acquired quickly from the region specified by the current scan settings or alternatively to rapidly update 3D range information at a lower resolution. The RE08's data output format is (x, y, z) points and at all pulse repetition rates 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.
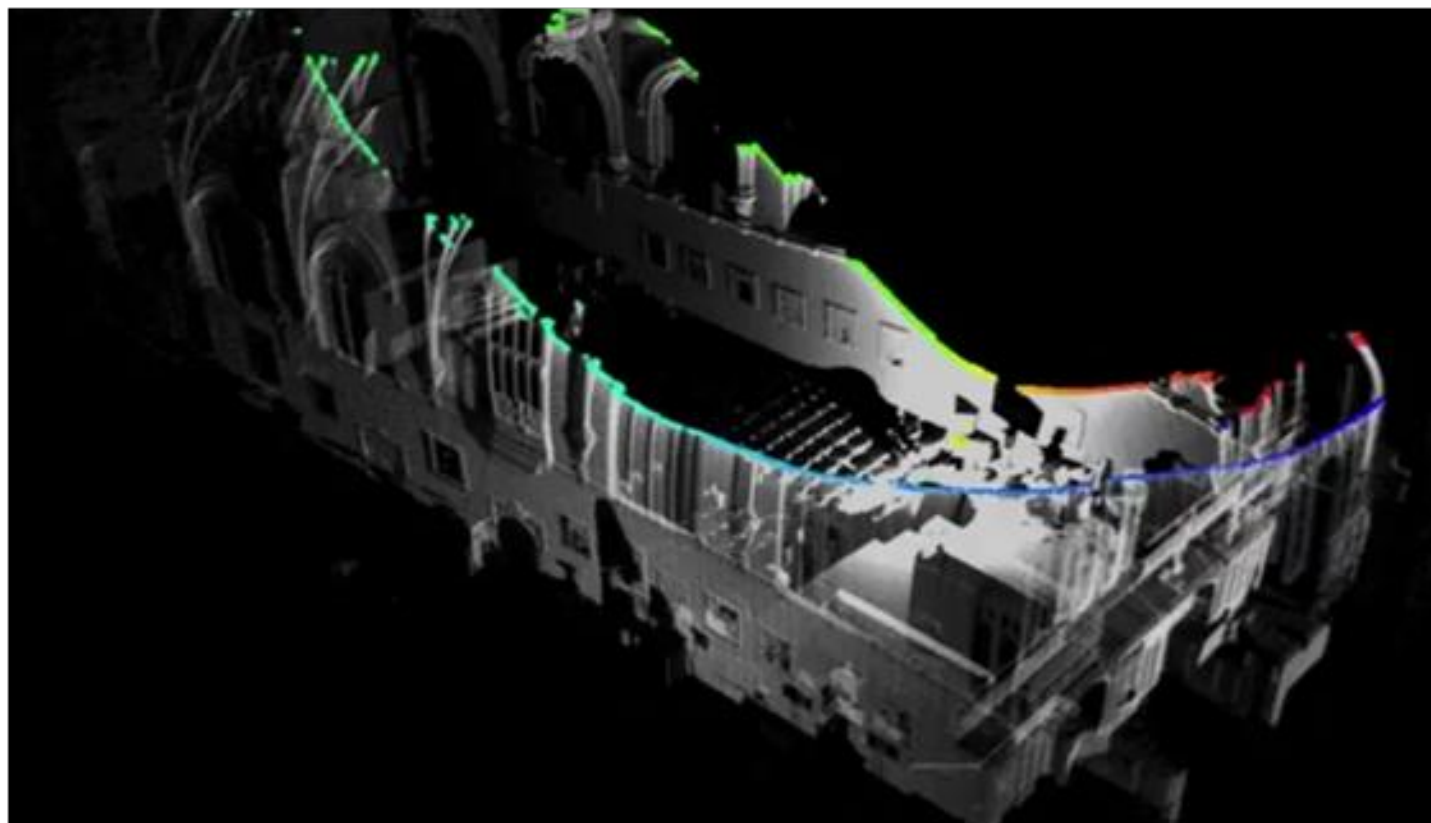
Communication

The bidirectional communication of data and control with the RobotEye RE08 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 RE08 is connected, limited only by the allowable length of Ethernet cable.

Environmental

The RE08 3D Laser Scanning System has been designed to operate in harsh industrial environments and to be mounted as a permanent part of vehicles and mobile equipment.

The RE08's configuration as separated scanning head and control enclosure elements contribute to the systems' robustness to harsh environments. By allowing the scanning head to be placed in the most suitable position for acquiring data and the control and measurement system components up to 20 metres away in a less exposed location system ruggedness is significantly enhanced.

The mining & resources, bulk materials handling and similar industries in particular will benefit greatly from a 3D scanning LIDAR system that can be a permanent part of their operations.

System components

The RE08 3D Laser Scanning System is supplied as standard with the following components:

- RobotEye RE08 3D Laser Scanning Head including 5 metre interconnecting cables
- RobotEye RE08 Control Enclosure
- 5 metre power cable
- RE08 Tools, operation and viewer application
- RobotEye C++ development library

Optional System components:

- Custom length interconnecting cables (up to 20 metres)
- 10 metre IP67 Weatherproof Ethernet Cable

HEXAGON | **AutonomouStuff**