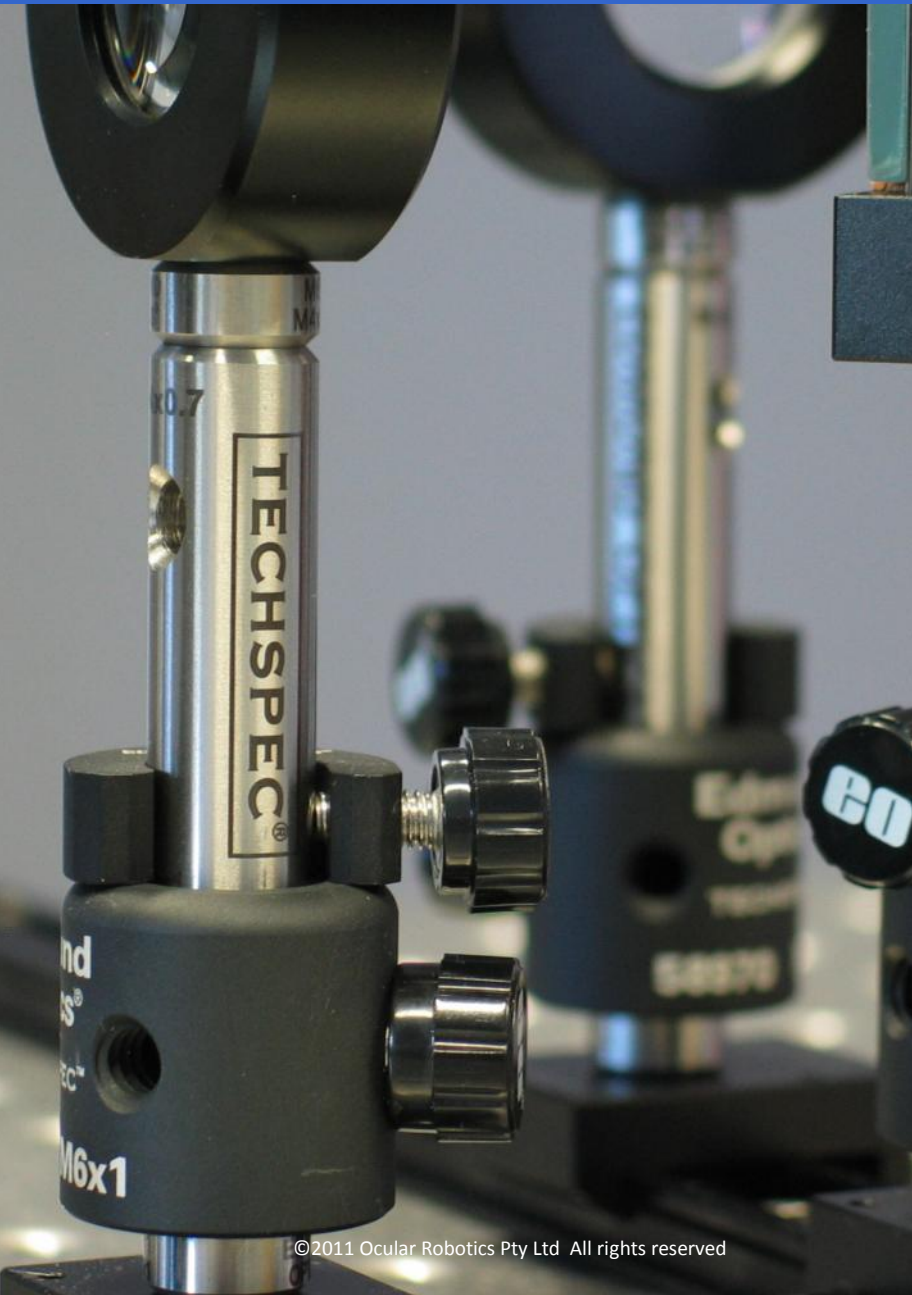




HIGH PERFORMANCE SENSOR POINTING TECHNOLOGIES

# Ocular Robotics Company Backgrounder



## Improving the dynamic performance of multi axis sensing

Ocular Robotics specialises in the design and development of ultra high performance two axis sensor pointing solutions applicable to a broad range of sensing applications. From robotic platforms, ISR and countermeasures in defence and homeland security, automation in the resources sector and intelligent security systems to industrial measurement and sensing, telepresence and high performance object tracking, Ocular Robotics' systems deliver previously unheard of performance.

The operational capability of many systems that rely on information sensed from their surroundings is directly dependant on the dynamic performance of the system's sensor pointing technology. Simply put, pointing a sensor with the speed, agility and accuracy required of demanding operational imperatives is a complex engineering challenge.

Ocular Robotics has overcome this challenge with its patented RobotEye technology. Rather than pointing the sensor, RobotEye systems point the sensor's field of vision. The sensor, all drive components and control electronics remain stationary inside the system enclosure, only the RobotEye scanning head is exposed.

The agility and responsiveness of RobotEye systems, their accuracy, reliability and robustness to harsh environments offer a ground breaking contribution to multi axis sensing, unmatched by current solutions.

Ocular brings all these benefits of the RobotEye technology to the market through its off the shelf product range, RobotEye system customisation and full custom system development.

## Our capabilities

Ocular Robotics' cornerstone is the company's capability to generate new high performance sensor pointing embodiments from its patented core technology. From concept, through development to final product Ocular Robotics brings together expertise in optical system design, mechanical design, sensor integration and software development to create sensor pointing technologies unmatched in performance and flexibility.

Ocular's capability to generate and manufacture high quality integrated solutions manifests itself in both the product offering and custom development areas of the company's operations.

- **Product Offering** — Ocular's existing product line up will continue to expand with the design, manufacture and marketing of new off the shelf high performance sensor pointing systems. This ongoing product release program will see an increasing range of products that expand the reach of our technology into new sensor modalities and combinations. It will provide product options for use on a wide range of platforms and add new functionality through incorporation of additional subsystems.
- **Custom Development** — The engineering of sensor pointing solutions for integration into our client's systems is key to our business strategy. Ocular's capabilities in design and production are essential in this area of our operations ensuring that Ocular Robotics delivers to its clients and partners implementations designed specifically to match the target application environment, performance and system integration specifications.



## About Ocular Robotics technology

The patented technology at the heart of our systems enables them to meet or exceed by an order of magnitude or more the performance levels of other commonly used sensor pointing technologies. Specifically, capabilities in the following areas enable sensors to be used far more effectively and in ways not previously possible.

- **Acceleration** - The extremely high rates of acceleration, exceeding  $50,000/s^2$ , allow behaviours such as the inertial stabilisation of a sensor's field of view on any mobile platform, tracking of objects that display high accelerations and velocities, the simultaneous performance of the previous two behaviours, rapid point to point motion for disparate point data collection and environment mapping, and high speed arbitrary path scanning.
- **Speed** – It is in fact the coupling of high accelerations along with the high final speeds of up to  $10,000^\circ/s$  that makes the behaviours mentioned in the previous point achievable. When applied to tasks requiring constant high speed such as scanning range sensors our technology enables the continual adapting of the scan region on the fly and may jump between fixed path scanning and arbitrary path scanning in an instant as required.
- **Accuracy** – While delivering their impressive levels of speed and acceleration our systems maintain the high levels of accuracy required by many of the tasks in their areas of application, ensuring accurate registration of sensor data.

Ocular Robotics' solutions not only have the dynamic performance characteristics to meet the requirements of the most demanding tasks, they also deliver them in a package that is ideally suited to withstanding the harsh land, air and sea environments common to many application areas. Important features of our systems, including those that give them their ability to tolerate harsh environments, are covered in the points below:

- **Robustness** – The structure of our systems means that all sensors, drive components and control electronics remain stationary and reside underneath the housing of the platform to which the system is mounted, protecting them from physical damage and the effects of dust, water and other environmental contaminants.
- **Environmental Sealing and Protection** – The part of our systems' that extend above the platform's housing is straightforwardly environmentally sealed to whatever degree required by an application.
- **Reliability** – The low mechanical stress operation of the technology ensures continuous operation at high levels of performance over very long periods of time without failure.
- **Size and Weight** – An implementation of our technology will almost always return a significantly smaller and lighter device than alternative technologies, while maintaining vastly superior dynamic capabilities.
- **Scalability** – The technology's scalability allows systems to be constructed to suit the size and weight constraints of many applications.
- **Signal Path** – A system's signal path may be configured to accommodate the aperture, positioning and divergence of nearly any sensor.

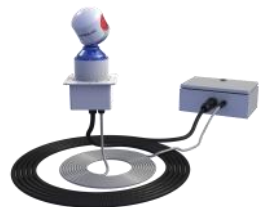
## About the product range

**RE01 Imaging** is a high performance general purpose vision implementation of our technology. RE01 Imaging is ideally suited for use on ground vehicles, surface craft and static installations where one or more behaviours such as inertial stabilisation, object tracking, telepresence, environment mapping, rapid disparate point data acquisition or persistent surveillance are required.



**RE01 OEM** is a high performance optical pointing system which can be delivered in a number of standard optical configurations or with custom optics. The RE01 OEM system provides the characteristic performance capabilities of the RobotEye RE01 system, configured for use with the customers sensor or source.

**RE02 Lidar** is a high performance, high accuracy short range 3D laser range scanner, with sample rates up to 200kHz and high scan speeds for generating dense point clouds of the environment up to 12 metres from the sensor. The RE02 system is ideal for tasks such as volume estimation, 3D geometry acquisition and scene reconstruction.



**RE03 Lidar** is a high performance long range 3D laser range scanner ideally suited to generating high frame rate point clouds at significant range from the sensor. The RE03 system is a breakthrough in robust 3D scanning for on board 3D mapping from mobile platforms operating in harsh environments as well as more familiar survey and measurement tasks.

**Custom Solutions**, a key part of Ocular Robotics operations is the customisation of our existing systems and full custom system design of RobotEye based systems to meet the operational requirements of our clients. Ocular Robotics can deliver to its clients and partners implementations designed specifically to match the target application environment, performance and system integration specifications.

**Software**, all RobotEye systems are supplied with a full suite of C++ software libraries needed for control of the RobotEye system with support for both Windows and Linux operating systems. The class libraries give developers a clear and complete interface to the control of RobotEye systems enabling rapid application software development. In addition to the class libraries some systems include ready to use operating software applications often with source code to further assist end user application software development. In addition, Ocular Robotics provides a full range of custom development services for users who have specific application requirements. These services range from custom firmware development through to large scale application software development. Please contact Ocular Robotics for more information if required.

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