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EYE, EYE



Ever had that 'light-bulb' moment when a flash of genius transforms your business or solves a problem in a new and unique way? Mark Bishop has. He is founder and chief executive officer of Ocular Robotics, and he came up with a technology platform that has transformed the performance of two axis sensor pointing solutions applicable to a broad range of sensing applications.

Written by John Boley

This company, all-Australian (headquartered in Hurstville, New South Wales) and modest in scale as yet, attracted gasps of admiration from at least one multinational high-technology giant whose executives were heard to remark, “why didn’t we think of that?”

‘That’ is really very simple, when you think about it – which Mark did. The limitation of remote sensing operations is largely in the speed, or agility, of the system, which is governed by the bulk of the system itself. What Mark did was to separate the sensor from the sensor’s field of vision.

Pointing a sensor with the speed, agility and accuracy required of demanding operational imperatives is a complex engineering challenge; Ocular Robotics has developed its patented RobotEye technology which is small and light and does the high-performance bit fast and accurately. The sensor, all drive components and control electronics remain stationary inside the system enclosure; only the RobotEye scanning head itself is exposed.

“We have been able to remove most of the mass that is required in order to move the sensor from the sensor itself so most of it can now remain stationary. It is relatively simple,” Mark explains; it’s just that no one else had thought of it. The result, for imaging and sensing operations, is the equivalent of driving a Ferrari instead of a dump truck.

Mark was a researcher at Sydney University’s robotics research centre, working on numerous projects in which robots needed to get around in what are known as ‘unstructured’ environments – where the precise path and conditions are not programmable as they would be in, for example, a factory assembly-line situation.

“Ocular Robotics has developed its patented RobotEye technology which is small, light, fast and accurate.”

One of the main limitations on how a robotic platform can complete a given task is the rate at which it can obtain ‘well-registered’ data from its environment, in particular in mine automation and autonomous vehicles. This became the driver of the development in turn of RobotEye, and Mark left to found the company and commercialise his brainwave. Since founding Ocular Robotics in 2006, Mark has worked to position the company as a premium supplier of high performance sensor pointing technologies to the robotics, automation and unmanned systems sectors.

The core product is a high-performance optical pointer. “Almost the same system you might use to point a camera can be used to point a laser range-finder or a spectral sensor or a wide range of other sensors,” Mark explains. Ocular Robotics can adapt the optics that exist in the path of the device to suit applications and also the size of the aperture – though the standard at present is a 25mm ▶▶





▶ opening. Larger or smaller apertures are quite often required for specific applications, though, and the company is at a late stage of development of a 50mm version with essentially the same technology only larger. “In the future we expect there will be call for smaller aperture systems, which can be scaled down,” shares Mark. It is this core technology that is carefully and comprehensively patented; much of the rest of the company’s IP is wrapped up in know-how and its control systems.

So far, so good. But no one is going to form an orderly queue in Hurstville unless they know how to apply this clever technology to their advantage. Although RobotEye was developed to address a specific set of needs, “it soon became very obvious that it addresses a whole raft of other applications too, in all types of industrial automation or measurement.” There are applications in security and, not surprisingly, defence – even in sports broadcasting. “We are focusing at this stage primarily ▶▶



RIO TINTO MINE OF THE FUTURE PROGRAMME

Ocular Robotics is a development partner in Rio Tinto’s Mine of the Future programme, which is aimed at developing and using new levels of automation and remote operation, revolutionising the way mining is conducted. The programme will create a new generation of mining technologies to improve efficiency and health and safety, and lower production costs. Ocular Robotics is developing specialised sensor systems for Rio Tinto to assist the programme objectives. These technologies are particularly relevant to the resources and materials handling sectors combining the high performance levels required to enable advanced system automation and robustness to the harsh environments encountered in these industries.



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NSW STATE AWARD

Ocular Robotics recently won the NSW Business Chamber's 2013 Business of the Year Award.

Presenting the prize, Stephen Cartwright, CEO of the NSW Business Chamber, said: "It is great to see an Australian high-tech manufacturing business at the cutting edge of the industry, and thriving through innovation, employing highly skilled workers and forging a strong reputation for Australian businesses in the international marketplace. The NSW Business Chamber can trace its origins back to the Chamber of Manufacturers, and manufacturing still makes up a significant part of our membership, so to see a manufacturing business win this highly sought after award is a wonderful achievement.

"It speaks volumes about the importance of innovation in preserving and advancing Australia's technology and manufacturing sectors. The state-wide awards program is a result of the strong relationships we are forging between the NSW Business Chamber and Local Chambers of Commerce across the State. An important goal of the program is to support the



Chamber movement as it continues to grow and strengthen the voice of business across Australia," he added.

Ocular Robotics was also named as winner of the Excellence in Innovation category.

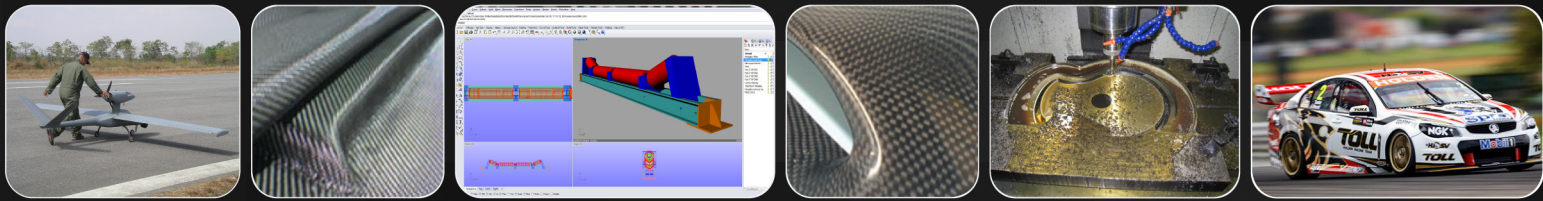
The impact of this innovative technology has been the generation of significant export revenues, the creation of a number of highly skilled, high value jobs that help to build a healthy and dynamic robotics industry in Australia.

Mark Bishop said: "I am absolutely thrilled to win this award. It is a wonderful surprise and a great reward for the entire team at Ocular Robotics. Australia has not traditionally been successful in commercialising local technology. This award demonstrates that success against the odds is attainable, and we are proud to be an example to other companies and entrepreneurs."

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▶ on the areas of defence and automation; the latter takes in robotics.”

The company's systems are used, for example, in port facilities – imaging the hatch of a ship and being able to locate the chute within the hatch, thus being able to give a warning or physically stop the operator from causing damage. This is a real issue, especially when the operator is unsighted or only has a partial view. Typically this might be effected by an initial high-resolution scan of the ship's deck after which the scanner switches to a mode where it directly targets the chute and identifies where it is in relation to the hatch. This activity can be repeated and compared at a much higher rate than would previously have been possible, yielding around a ten-fold improvement in performance.

In the future, most of Ocular Robotics' revenue will likely be generated by OEM supply of pointing technology to other integrators to put into their systems, although the business will continue to supply direct to end users for a number of applications. Particularly in the case of the laser scanning systems, it will be possible for an integrator to replace existing conventional technology with this new system of vastly improved performance, so as to gain interim benefits even without redesigning the integrator's products.

“The company is positioned as a premium supplier of high performance sensor pointing technologies.”

To be sure, Ocular Robotics' RobotEye has solved significant problems of performance limitation for many systems that rely on information from sensors such as cameras, laser range scanners – in fact any sensor operating from the ultraviolet through to millimetre wave radar. The company is starting to attract investors, who themselves can sense the potential not only in Australia but worldwide. The company is currently looking to progress further with its scalable business model which it says is capable of delivering sustained high growth.





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