

GIM INTERVIEWS DR ALLAN CARSWELL, OPTECH INCORPORATED

Strong Emphasis on R&D in Lidar

Since its 1974 "spin-off"™ from the Physics Department of York University in Toronto, Optech has grown to become a world leader in the development, manufacture and sale of advanced laser-based instruments and products incorporating pulsed, time-of-flight laser radar (Lidar) systems. Strong emphasis on R&D has led to these being applied in a wide range of applications. The company has received awards for business excellence, innovation, R&D and university collaboration.

How big is your company in terms of number of employees and market share, who are your main clients and how is your customer-base distributed over the continents?

With over two hundred staff members, the company has a leading international position in the development and manufacture of Lidar systems for surveying, imaging and space applications. Our brands include ALTM, ILRIS, CMS, and SHOALS Lidar systems. We have a wide customer-base that includes surveying, mining and industrial corporations, research institutes and government agencies all over the world. Our products are used in well over a hundred countries. Our clients vary, based on type of application, such as space-borne, airborne, ground-based or under-ground. Some internationally recognised customers of note are NASA, the Japan Coast Guard, US Army Corp of Engineers, the FBI, UK Environmental Agency, GeoKosmos, Swiss Photo, and TopScan GmbH.

How is your (inter)national distribution network organised, including your after-sales services?

The organisation of our distribution network truly depends on the application. In some areas we sell directly to service providers or end-users. In other areas we support a dealer/reseller network which in turn sells to end-clients. Currently we provide an international 24/7 customer support network called "Optech Services"™ for our ALTM product-line, in addition to a European Service Center to support our ILRIS line of products: support that many other manufacturers do not have the ability or commitment to maintain.

What Lidar products do you manufacture for terrestrial applications?

We manufacture many Lidar products for multiple applications. Our Terrestrial Airborne Survey systems lead the Lidar industry in scanned time-of-flight ground-surveying technology and are used extensively in urban planning, powerline, pipeline and corridor-mapping applications. Our ground-based industrial and 3D imaging products include our ILRIS 3D and ILRIS 36D product-lines, which are ideally suited for applications such as mining, historical preservation/recreation and crime-scene investigation. Sentinel and Sentry product-lines are also included within this area of speciality. These products apply Lidar technology to level monitors and object positioners used extensively as industrial laser-measurement solutions. Our Cavity Monitoring Systems (CMS) round out our industrial product offerings and are designed for use in mining operations where safety and the measurement of production volumes are of highest priority.

What is your involvement in marine and space applications?

Our Marine Airborne Survey products enable survey in up to 50 meters of water and are specifically designed for applications such as coastline mapping, disaster management and object detection. The LARSEN system was the world's first operational airborne Lidar bathymeter, used for precise measurements of underwater marine topography. Playing a major role in advancing Lidar space applications, we developed together with our space partner MDA the first Canadian satellite-borne Lidar as part of the US Air Force XSS-11 mission. Our Space Division also designs products that are used to explore other worlds and enable humans to continue that exploratory journey. Our Lidar has been selected for inclusion in the NASA Mars Phoenix mission in 2007. This will be the first Lidar to operate on the surface of Mars and it will provide new information on the Martian atmosphere. We also collaborate in the development of space-based systems for spacecraft tracking and docking and precision planetary mapping and landing.

How do you see the future of Lidar technology in relation to the rapid developments going on in the GIS domain and the "democratisation of geo-information"™?

The technologies involved in the development and application of Lidar systems have expanded rapidly in recent years, with clear indications of significant advancements in the future. Lidar is demonstrating a high potential for additional contributions to the developments taking place in the GIS domain. The ability of Lidar to provide rapid, remotely sensed 3D information of high accuracy will

find increasing applications, particularly in synergy with other integrated remote-sensing instrumentation.

What technological developments do you expect in Lidar technology over the coming decade?

Our Lidar systems are based on optimisation of the latest state-of-the-art technologies in lasers, scanners, detectors, and high-speed, wide-dynamic-range electronics. They also need to utilise the latest capabilities of small, fast computers and high-capacity data-storage systems. For many applications, high-resolution position (GPS) and orientation (IMU) information are required. Rapid advances are taking place in all of these technologies and these will contribute to the ever-increasing capabilities of Lidar systems.

Who do you consider to be your main (inter)national competitors?

The nature and location of our international competitors depend upon the particular Lidar application. These competitors include some major survey instrument companies who now see the value of Lidar for airborne and surface-mapping applications. Competing technologies include photogrammetry, ultrasonics and acoustic sensing. In many applications, the need is to identify market sectors where the superior capabilities of Lidar are clearly evident. Close collaboration with potential users is very useful at the outset to ensure optimum design of Lidar systems.

What are the prospects for the Lidar market in the rapid emerging economies of China and India? What are the prospects for Africa and South America?

Our teams work with customers in locations worldwide where surveying, mapping and 3D imaging is in high demand. We anticipate an extensive opportunity for growth and great prospects in all of these regions. We have recently celebrated our first ALTM sale in China, and we expect several more in the coming months. In some of our product categories we have sold over forty Lidar systems in China. Currently we have customers in India, Brazil and many other locations within both the Pan-Asian and South American countries. We currently have ALTM customers in Africa and South America. Some of our other divisions have also penetrated the marketplace in all these countries and have plans to increase sales in the future. We will continue selling Lidar systems in all these regions and expand into new markets where Lidar technology will be valuable.

Do you co-operate with universities and research institutes to improve and innovate in terms of your products - please elaborate?

Since its inception Optech has had a high level of activity in research and development. Everything that we sell has been developed in-house and in close collaboration with associated research and user communities. We have very high-tech staff holding advanced graduate degrees. For example, we have at present 66 staff members with doctorate and master's degrees in science, engineering and business. This allows us to interact easily and effectively with collaborators in universities and research institutes. Our major strength is the advanced state-of-the-art expertise that we have in the full range of Lidar-related technologies. As a result, our Lidar system capabilities have followed the leading edge of these technologies. As well as having the technical know-how, we have placed high priority on working closely with customers and potential Lidar users to ensure that we develop innovative systems specifically designed to meet the needs of the particular application. As part of our international interactions we have supported a variety of universities, providing scholarships, laboratory facilities and equipment.

Where do you want to be five years from now?

Our future is based on developing an expanding suite of Lidar instrumentation that offers high-level cost-effectiveness for our customers, along with increasing technical capabilities. With the rapid advances in both the technology and market applications, we see significant growth for Optech as a leading Lidar-systems provider in the coming five years. A significant portion of our revenue continues to be returned to fund our ongoing R&D projects to help us to remain at the forefront of this technology. We actively listen to the feedback of our customers and other key leaders within the industry to ensure that we meet their needs, not only of today but those of future generations. As the pioneer in applied Lidar we feel it is our duty to work with Lidar governing bodies within the industry to help establish industry standards needed to ensure that end-users can expect a quality end-product at all times. They should be able to expect consistent results while being able to compare core competencies consistently from manufacturer to manufacturer.