

## Dr. Allan Carswell

**W**hen it comes to earning the label of a LiDAR industry pioneer I am not aware of anyone who is more deserving than Dr. Allan Carswell, the founder of [Optech](#). It would take a book, rather than this short article to do justice to Dr. Carswell's illustrious career. First and foremost he is a world renowned physicist, having completed his formal training with a postdoctoral fellowship at the Institute of Theoretical Physics of the University of Amsterdam in 1961.

On his return to Canada Dr. Carswell joined the RCA Victor Research Laboratories in Montreal where he studied microwave propagation and ionized gas plasmas. In 1965 he was appointed founding Director of the RCA Optical and Microwave Research Laboratory leading research on millimeter microwave systems, gas discharge lasers and their applications. This group developed the first Helium-neon and carbon dioxide lasers in Canada.

In 1968 Dr. Carswell joined the faculty of York University in Toronto where he continued his laser research as a Professor of Physics. He worked on the properties and applications



Allan Carswell at the Phoenix Operations Center in Tucson, Arizona, the day Optech's LiDAR landed on Mars.

of high-power lasers and initiated LiDAR (laser radar) research for remote sensing and environmental diagnostics. In addition to his teaching and research activities Dr. Carswell was a founding member, Laboratory Director, Chairman of the Technical Program Committee and Member of the Board of Directors of the Institute for Space and Terrestrial Science (ISTS), a Canadian Centre of Excellence in Space Science. He was

Laboratory Director and Principal Investigator in the International Network for the Detection of Stratospheric Change (NDSC) responsible for the operation of LiDAR Atmospheric Observatories in Toronto and at Eureka in the Canadian High Arctic.

In 1974 Dr. Carswell founded Optech Incorporated as a "spin-off" from his university research to enable an increased emphasis on the more practical applications of LiDAR systems. With the company he has developed LiDAR systems and applications using advanced electro-optical technology. Over the years Optech has grown to become a world leader in the provision of LiDARs for airborne surveying, 3-D imaging,

atmospheric measurements, process control applications and space systems. Optech has over 275 employees serving the international LiDAR market from its locations in Toronto, Belgium and the USA in Rochester, New York and the Stennis Space Center in Mississippi.

Dr. Carswell is a recipient of the Order of Canada and the Queen Elizabeth II Diamond Jubilee Medal and is a Fellow of the Royal Society of Canada, the Canadian Academy

of Engineering and the Canadian Aeronautics and Space Institute. Dr. Carswell is Founder and Chairman of the Carswell Foundation supporting community work in education and health care. He is author of over 250 scientific and technical publications and has won awards for achievements in R&D, innovation, space science, entrepreneurship and engineering & construction technology.

When Dr. Carswell completed his Ph.D. in 1959 it was one year before the laser was invented. He pointed out, “The words ‘laser’ and ‘LiDAR’ did

For several decades before 3D scanners were developed LiDARs were widely used for such atmospheric studies and as rangefinders.

His expertise with LiDAR led to the NASA invitation to include a Canadian LiDAR on “PHOENIX”, the NASA 2007 mission to Mars. He served as Co-Investigator, Meteorology, for the Phoenix mission and led the development of the first LiDAR on Mars for studies of the Martian atmosphere. This LiDAR provided the first information on the detailed 3D structure of the Martian atmosphere including the

“I have had two full-time ‘hobbies,’ one as a professor and one as an entrepreneur and both have provided no shortage of very diverse and fun activities.” When not working, in addition to spending time with his family he enjoys golf, hiking and cross-country skiing as well as international travel.

Dr. Carswell commented, “Apart from the absolutely critical role of the GPS I hesitate to identify any specific ‘top events.’ The field is benefiting hugely from a very broad range of rapidly advancing hardware, software and information handling capabilities.” He continued, “The ‘3D laser scanning/ LiDAR industry’ is just one relatively small portion of the broad fields of electro-optics, photonics, etc. The ‘most pressing needs’ are quite specific to the application involved or the solution required.”

When asked about the future Dr. Carswell was reluctant to predict anything too specific noting, “Based on my totally unexpected laser career who am I to predict what lies around the corner?” He continued, “Things will continue to move at a fast and challenging pace. In surveying and 3D imaging a revolution is in progress—very exciting and productive times lie ahead.”

Did Dr. Carswell ever consider changing careers? He responded, “No, I am now 80 and still working and having lots of fun. Why would I want to change careers? However, I am now applying much of my time and enthusiasm to challenging and exciting philanthropic projects.”

And on a final note he recommended, “Keep doing what you enjoy.” ■

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**Gene Roe** is the Managing Editor and Co-Founder of *LiDAR Magazine*.

“In surveying and 3D imaging a revolution is in progress—very exciting and productive times lie ahead.”

not exist in my early days. When my undergraduate students ask me what courses would be best for their future success I liked to use my own career as an example of the great unpredictability of the future. I have spent over five decades in a career for which I had no ‘formal’ education. In my view the main preparation for success is to acquire a useful ‘toolkit of skills,’ along with the enthusiasm to keep learning!”

Dr. Carswell has been involved with lasers and laser applications since 1961 shortly after they were first invented. His LiDAR work came along somewhat later, about 1968. It was initially centered on atmospheric studies for meteorology and environmental quality.

discovery that it snows on Mars—a very important discovery about the hydrological cycle of Mars.

The surveying and scanning applications of LiDARs have arisen much more recently because of the development and availability of key new technologies such as GPS, high rep-rate lasers, high speed computers and massive memory storage in tiny packages along with a wealth of other rapidly advancing capabilities. He has been fortunate enough to be closely involved with the evolution of many of the activities leading to the sea change of capabilities in the survey field.

As with most of the Industry Pioneers that I have interviewed their primary passion is work. As Dr. Carswell notes,