ALTM ORION: BRIDGING CONVENTIONAL LIDAR AND FULL WAVEFORM DIGITIZER TECHNOLOGY

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ABSTRACT:

Over the past decade airborne lidar technology has seen the development of new systems capable of digitising and recording the entire waveform of each emitted laser pulse through waveform digitisers (WFD). WFD technology holds enormous potential for forestry and urban mapping, but the high cost and complexity of data handling and analysis has confined it mainly to research institutions. Alternatively, conventional lidar systems used in the commercial lidar sector for high-quality mapping of complex targets such as power lines and vegetation have been limited in their ability to collect and record data of sufficient quality for sophisticated data analysis, including waveform interpretation. This paper focuses on technical characteristics of the ALTM Orion, a new airborne lidar mapper manufactured by Optech Incorporated, and in particular, its ability to discriminate consecutive multiple laser returns. Unlike a conventional lidar, the ALTM Orion offers fundamentally improved specifications for multiple return data. High-density, multiple return ALTM Orion data with unique pulse separation characteristics and exceptional precision might be viewed as a new cost-effective alternative to WFD for applications requiring complex target analysis and partial waveform modelling, such as forest research and urban mapping. The new technology bears the potential to create an application niche where top-quality dense point clouds, enhanced by fully recorded intensity for each return, may provide sufficient information for modelling the received waveforms. Recognizing the importance of further development in existing WFD technology, the paper also discusses the possibility of data fusion interpretation and analysis tools for both technologies.

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