Progress towards a UAS for Plantation Forestry Research in New Zealand

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Abstract:
Inspired by UAS research from international research groups and convinced of the significant potential of UAS for forestry Scion have commissioned a UAS programme. The programme is designed to provide a research platform to deliver UAS research to the industrial plantation forestry sector in New Zealand. The current UAS consists of a quad-copter platform, developed by Aeronavics (NZ), and includes both active and passive sensors. The craft payload includes a Velodyne HDL-32e scanner unit embedded in a RouteScene LidarPod with integrated INS and GPS. This is complemented with a 5-band multi-spectral sensor (MicaSense RedEdge) and Sony A6000 camera. Scion have developed detailed pilot training and health and safety procedures to support craft operation and are currently seeking further certification under Civil Aviation Authority legislation. The craft is currently deployed on research missions designed to support practical solutions for the forestry sector. A cloud-based data storage and processing solution is also being developed to cope with the large volumes of data being produced and to provide timely analytics to extract valuable metrics from the data collected.

Early results from forest management applications research will be presented. These applications include forest inventory, modelling wildfire fuel loading in wilding conifers, a multi-sensor approach to monitoring tree stress and disease expression based on time series measurements, monitoring weed competition and guiding stand management interventions. Future developments will see modification of the UAS to undertake aerial chemical application for biosecurity purposes and for control of wilding conifers during total eradication procedures. This research is being funded by the New Zealand government and a coalition of forest management companies who see significant potential in UAS technology.

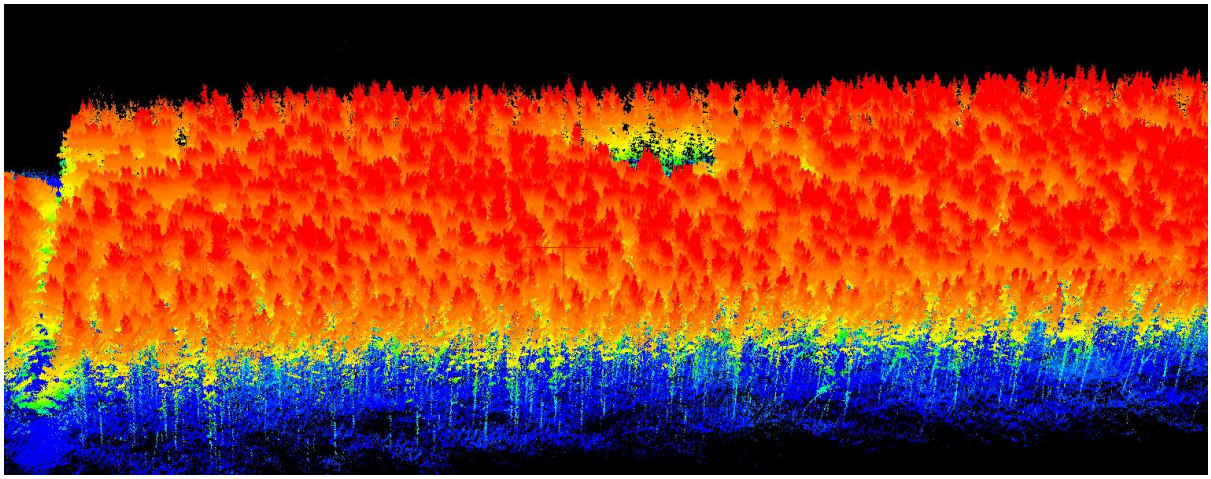

Figure 1. An ALS point cloud over a mature Pinus radiata plantation derived from Scion's UAS