Technology at work at Toi Ohomai

Gordon Acres and Richard Stringfellow

Students gaining logmaking, chainsaw, log loading and basic machine operating skills

It has been a busy year at Toi Ohomai Institute of Technology. Following the arrival of our new Chief Executive, Dr Leon Fourie, we have gone through a restructure to focus us more strongly on regional needs. Forest Management and Forest Operations now sit in the Faculty of Primary Industries, Science and Environment. Our new Faculty spans all the primary industries and environmental science. Highlights of our forestry activities follow.

NZ Diploma in Forest Management

James Broadley received his Massey University UAV flight wings this year and has participated in research projects, with Craig Morley, focusing on the use of UAVs and remote sensing. This included the use of drones to deploy opossum baits for small satellite forest areas, indigenous forest species classification, and post-harvest cutover waste assessment.

Juken NZ and the remote sensing team at Interpine Innovation have given us fantastic support by providing LiDAR tiles for the purposes of education and training. The LAStools suite of software was used to generate Digital Terrain Models (DTM), Digital Surface Models, Canopy Height Models (CHM) and other canopy metrics for forest management.

Our diploma students have also been training on the John Deere harvester simulator, generating a .pri file (production harvesting data length, diameter and volume for each log and stem) and a .drf file (operational monitoring of work, non-work time and machine performance metrics including fuel burn) from the system. The students generated an .apt file (cutting strategy), created a site, and then proceeded to fell and process stems on the harvester simulator.

The production and operational monitoring metrics were then uploaded to the STICKS© (ForestPHD and Interpine Innovation) cloud platform for analysis. Feedback on any likely changes to the .apt file then allowed the students to repeat the production/analysis to track the effect of any .apt file changes.

Students graduating from the diploma programme presented their tutors (James Broadley and Mark Cleland) with a Māori artwork each featuring a manaia, imagery that incorporates in this case part-man, part-bird and part-fish.

Forest operations

Earlier this year, Toi Ohomai Institute of Technology purchased a CAT excavator with 324DL grapple loader to complement the suite of harvesting simulators used to train students in its New Zealand Certificate in Forest Harvesting (Basic Machine Operations) qualification. The machine comes from industry, is in very good condition, and allows us to provide students with real work-ready skills. The machine is used to safely practice real skills that a new worker would be expected to have when starting in a harvesting crew. The purchase of the machine was supported by PF Olsen, with personal protective equipment (PPE) provided by Stihl.

The programme uses CAT simulators, as well as ones from John Deere and Waratah, to simulate day-to-day tasks expected of a machine operator, starting from the pre-start check through to loading log trucks. The real machine allows us to follow through with the lessons taught on simulators. This is vital because although the simulator can teach essential skills in a safe environment, and technical knowledge, it cannot simulate the feel of a real machine or its movement across terrain. The machine is also a useful resource in the early stages when tutors teach theory. These lessons can immediately be followed up with a visit to the machine where students can see, hear and touch that which they have learned on paper.

Starting on the simulators, students become familiarised with all aspects an operator should know, including identifying parts, performing daily checks,

NZ Diploma in Forest Management students and tutors at Greenoch Forest (Arbor Forestry), Whanganui. Photo: MavicPro UAV camera

and becoming accustomed to the controls and other operator tasks. These exercises are all recorded and assessed on completion of each exercise through the computer programme. This helps to speed up the time from the start of the course to accessing the live machine itself. Once in the machine, students are familiar enough with the controls that they can operate the machine alone while a tutor communicates with them via RT. This includes machine start up, tracking and sorting, to eventually loading and unloading a trailer. The real machine also accustoms the operator to all the other variables they can expect to experience – operator movement when operating, weight when moving logs, restricted visibility etc.
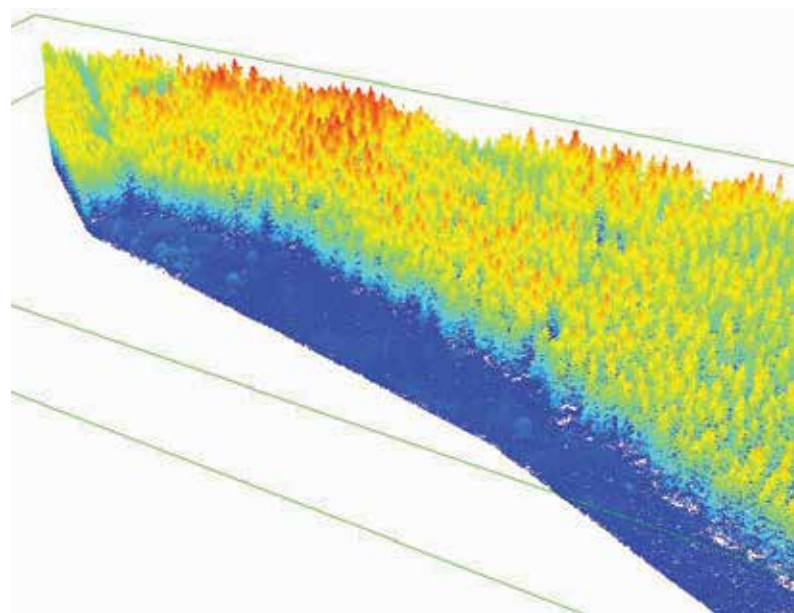

Figure 1: Normalised height LiDAR tile in LasView LA Stools (www.rapidlasso.com)

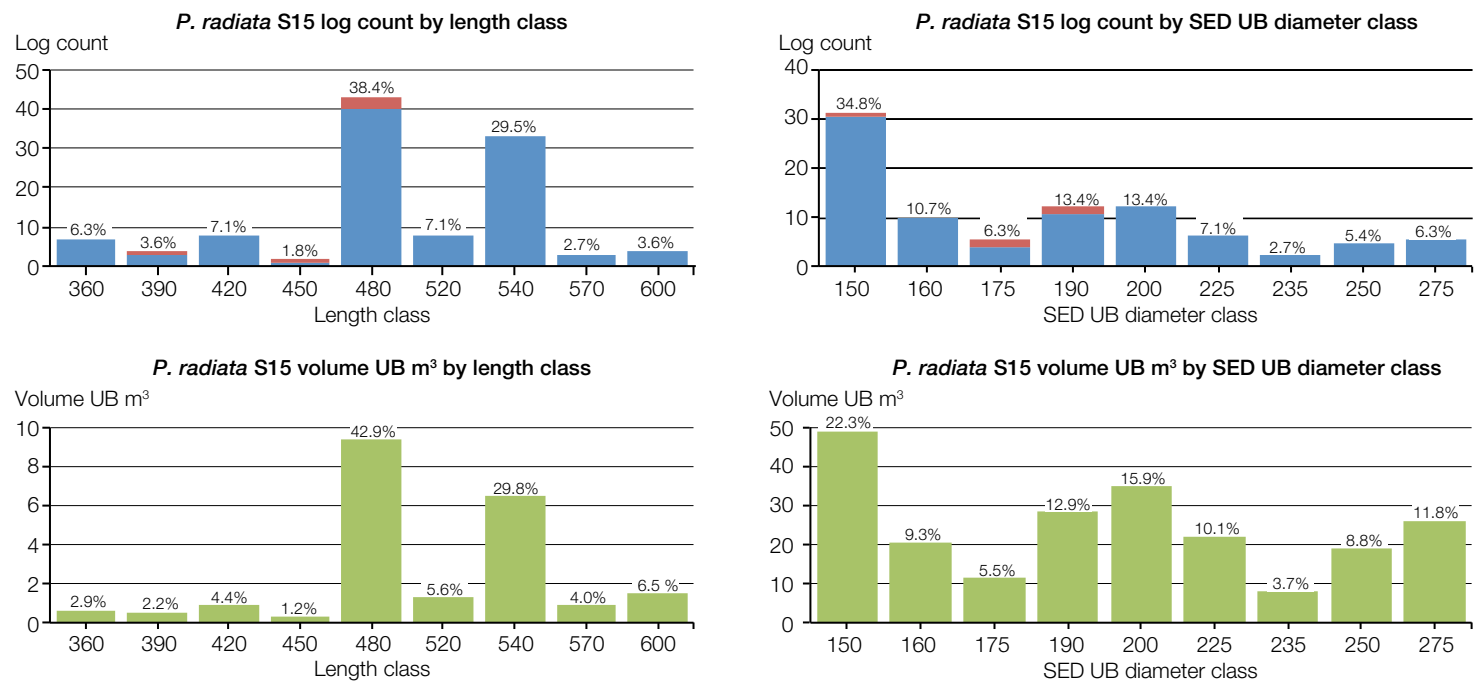Graduating second-year diploma students after celebrating the end of their programme in November 2017

Figure 2: Pri (production) file metrics from John Deere harvester simulator – NZ Diploma in Forest Management students' exercises

Acknowledgement

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