The Cutting Edge of Precision Forestry

At NHRI we strive to be at the cutting-edge of technology advances in precision forestry. That is the motivation behind our technology partnership with Rocky Mountain Unmanned Systems (RMUS). RMUS is the largest remotely piloted aircraft systems (RPAS) vendor in North America and the Canadian leader in RPAS and Aerial LiDAR technology.

The partnership allows NHRI to test world class RPAS in a forest operations context with the underlying objective of showcasing the benefits of these technologies to our clients and research partners. The partnership aims to grow Remotely Piloted Aircraft Systems (RPAS) and Aerial LiDAR use in Canadian and Global forestry applications. These applied research activities will ensure our team remains at the cutting edge when it comes to the commercial applications of RPAS. NHRI's work will benefit RMUS by offering their team the opportunity to test and showcase the uses and benefits of their products and services within the forest industry.

Founded in 2016 RMUS was one of the first commercial RPAS technology providers in North America, partnering with industry leaders like DJI, Emesent, GreenValley, Wingtra, Parrot, Pix4D and Autel. The company supports applied research at leading institutions like DND Canada,

DRDC, University of Toronto, University of Ottawa, Waterloo University, Ontario Ministry of the Environment, and Natural Resources Canada.

Under the terms of the partnership, RMUS provides NHRI with vetted equipment sales, training programs and professional and technical support services. The company also provides technical support and data review between NHRI technical partners and the engineering teams of their technology suppliers.
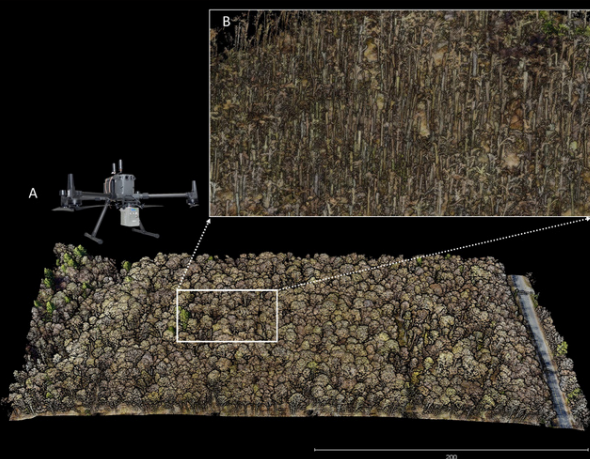
"As providers of new technologies, we are very excited about partnering with an organization like NHRI that embraces innovation in a field that affects all Canadians. Deploying he first SLAM LiDAR solution for mid canopy mapping in Canada will be an exciting milestone for Canadian forestry and is a great example of NHRI's leadership."

Kevin Toderel, General Manager, RMUS Canada.

Field Work and Training

RMUS and NHRI have already collaborated on field trials in two Canadian provinces - Ontario and New Brunswick. In Ontario, the field trial was conducted in the Blue Heron Demonstration Forest located within the Haliburton Forest and Wild Life Reserve. The objective of the trial was to determine the appropriate mobile scanner and UAV LiDAR systems and methods required for NHRI's Digital Timberlands 20/20 initiative. A particular emphasis was placed on testing the most effective overlap configuration for flight patterns using mobile LiDAR.

Three technology scenarios were tested. First, the RMUS team flew test flights with a VTOL (vertical take-off and landing) platform with a Red-Green-Blue (RGB) sensor. For that trial the Wingtra drone was chosen for its reputation as an efficient survey drone that can churn out high-quality survey data for large areas. Approximately 10 ha of the Blue Heron Demonstration Forest was surveyed with a Wingtra mounted with RGB.

Photo: ULS data collection - LiAirV70 - Haliburton Research Forest (ON). Photo credit: Bastien Vandendaele

RMUS also conducted trial flights over 2 hectares of the hardwood forests using unmanned aerial vehicle laser scanning (ULS). For the trials the pilots used the DJI M300 drone mounted with the LiAir V70 LiDAR survey instrument (by GreenValley International) and the Emesent Hovermap™. Various flight patterns were tested using ULS – parallel flight lines, crisscross flight lines and spiral flight lines.

Bastien Vandendaele, from NHRI, also conducted terrestrial mobile laser scanning (MLS) surveys with Emesent Hovermap™. Twenty circular plots were conducted using a "flower petal pattern."

"RMUS Canada's partnership with NHRI to drive innovation in forestry applications has showcased new applications for RPAS and LiDAR technologies that will provide models for other sustainability initiatives in North America and beyond. RMUS Canada has seen great interest in deploying these technologies from other significant public and private partners, and we are poised to capitalize on these opportunities thanks to our work with NHRI."

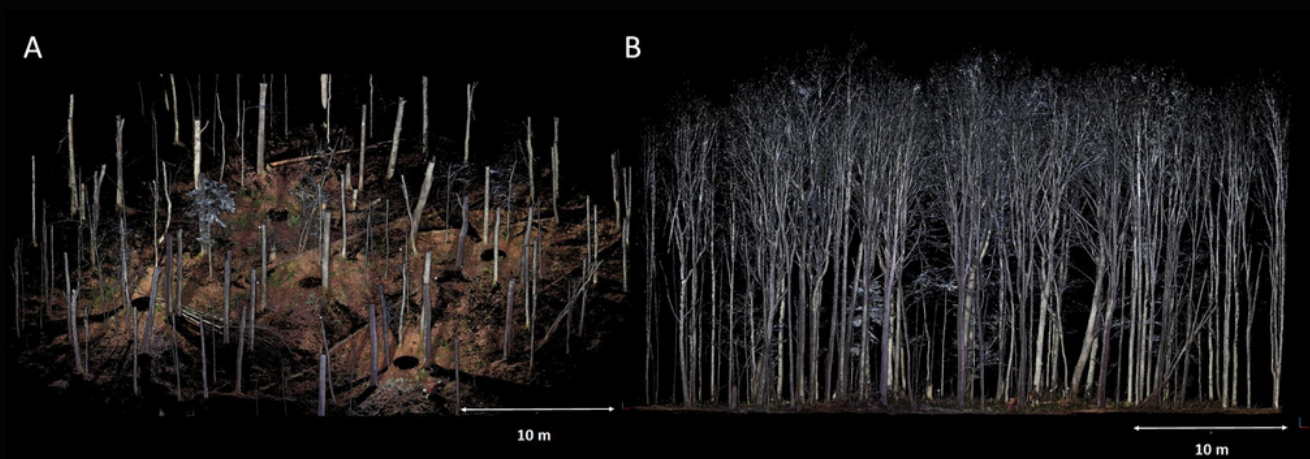Kevin Toderel, General Manager, RMUS Canada

Photo: TLS acquisition : A. position of the scans; B.Profile view (NB)
Photo Credit. Bastien Vandendaele.

THE CUTTING EDGE OF PRECISION FORESTRY
Promising partnership with RMUS Canada

The Ontario field trial allowed our team to determine the appropriate ULS systems and methods for our Digital Timbelands 20/20 project. Once the vetting process with the RMUS team was complete, it was determined that the Mavic 300 platform mounted with the LiAir V70 LiDAR survey instrument (by GreenValley International) was the hardware package that best fit our needs in terms of ULS technology. NHRI is also considering adding an MLS technology component to its arsenal. The Emesent Hovermap™ is the top contender under consideration.

RMUS was also the technology partner in an innovative field trial in New Brunswick. The trial was done at the request of one of our industrial partners. The objective was to investigate platforms, sensors, methods, and workflows that could lead to the automatic or semi-automatic determination of tree location, density, height, and projection of live crown of planted trees (spruce) in young plantations of between 3 and 7 years of age. The field trials' ultimate end was to determine opportunities for scaling up the processes so that the company could consider operational implementation and to present an overview of the accuracies that can be expected.

RMUS provided the technology in the form of a DJI M300 RTK UAV mounted with LiAirV70 from GreenValley International. The RMUS team also used the field trial as a knowledge transfer activity. Pamela Hurley Poitras, NHRI's drone pilot, received training and support on various applicable software – Drone Harmony, LiAcquireWeb and LiGeoreference.

Needless to say, it is a great benefit to both our teams to spend time in the field deploying cutting-edge technology and troubleshooting issues in a precision forestry setting.

HARVEST KNOWLEDGE | PROMOTE GROWTH

MORE THAN A THEORETICAL CONCEPT...

NHRI-IRFN

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