



PROJECT HIGHLIGHTS

- Sophisticated laser scan process enables data collection of every tree in a forest
- Trimble Nomad handheld is perfect for performance under forest canopy
- Pocket-sized Juno ST handheld gives forest owners access to entire database in the field

PROJECT: Norwegian Company Combines LiDAR with Trimble Technologies For Forest Work

PROJECT DATE: Ongoing

When most people think of Norway, the first thing that comes to mind is often cold, snowy weather and a landscape dotted with fiords and mountains. What many people don't realize is that 37 percent of the surface area of Norway is covered by forest.

More than 80 percent of the country's forest land is owned by Norwegian families, many of them farmers who manage the land that has been passed down through their families for many generations. Because of this rich history, many Norwegians feel a deep sense of responsibility for maintaining the value of the country's forest.

Forestry is a versatile source of income for many Norwegians, and farmers often make decisions today that will help protect their forest land for decades into the future.

The FORAN Group, which has offices in Norway, Sweden, and Latvia, is one of the leading forestry and nature consulting companies in the country. It is often the first place forest owners look for help with data collection and analysis of their farmland, forest certification and environmental auditing services, Global Positioning System (GPS) and Geographic Information System (GIS) services, and more.

"Whether it's a large forest company or a small, family-owned forest, owners of forest land are always looking for an easier way to collect and manage data about their forest" said Erik Eikrem with the FORAN Group. "We offer flexible and precise information to help with planning for layout and harvesting, determining their thinning strategy, and other operational decisions."

In order to deliver the data forest owners need, FORAN has developed a complete

production process that relies on pulse intensive laser scanning of single trees, as well as the Trimble® Nomad™ high performance handheld computer with a built-in GPS receiver. The Trimble Nomad handheld is designed for productive data collection in difficult GPS conditions, such as under forest canopy, and its ultra-rugged design makes it ideal for work in the damp, cold Scandinavian climate.

The sophisticated system delivers forest analysis and computations that use every tree in the forest and includes information about position, species and volume. With information such as trunk diameter and position of individual trees, forest owners can create forecasts and cutting plans without leaving the office.

By using topography of the ground surface, analysis of the maneuverability and drainage can be performed quickly and easily, and realistic 3D visualizations make it easier to understand and use the data collected.

As a first step, FORAN workers obtain any data already available on the property, and often enlist the help of land survey experts to fly over the forest area in an airplane or helicopter equipped with a Light Detection and Ranging (LiDAR) technology.

The LiDAR laser pulses strike the surface of the earth, measuring properties of scattered light to determine precise details about the trees, such as location and height of every tree. The laser-scan results in terabytes of information, which FORAN managers process into GIS-enabled data.

Once the laser-scan data has been collected, a team of two forestry experts takes the Trimble Nomad handheld into the field to collect data from an eight-square meter sample plot of the forest. The sample plots are selected at random,

THE EQUIPMENT USED ON THIS PROJECT INCLUDES

- Trimble Nomad handheld
- Juno ST handheld
- GPS Pathfinder Office software
- Light Detection and Ranging (LiDAR) technology

NORTH & SOUTH AMERICA
Trimble Navigation Limited
10355 Westmoor Drive
Suite #100
Westminster, CO 80021
USA
+1-720-587-4574 Phone
+1-720-587-4878 Fax

EUROPE, AFRICA & MIDDLE EAST
Trimble GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY
+49-6142-2100-0 Phone
+49-6142-2100-550 Fax

ASIA-PACIFIC
Trimble Navigation
Singapore PTE Limited
80 Marine Parade Road
#22-06 Parkway Parade
Singapore, 449269
SINGAPORE
+65-6348-2212 Phone
+65-6348-2232 Fax

and the data is used to establish ground truths to put into the remote sensing process. The field workers collect precise data about the trees in the sample plot, including species, condition and diameter, and match it to the laser-created trees from the scan.

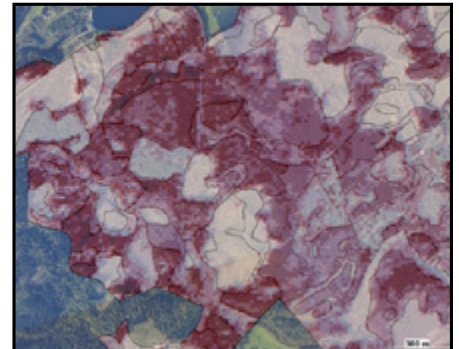
Back in the office, Trimble GPS Pathfinder® Office software makes it easy for FORAN workers to quickly and easily post process the data for maximum accuracy.

“Before we added the Trimble technology to our system, we had to get correction data by e-mail in several separate files to have it post processed,” said Eikrem. “We had to piece it together over our positioning data before processing it. The Trimble technology has been really reliable and easy to use, and both the hardware and software components are saving us a lot of work.”

Next, the FORAN team plugs the information gathered from the laser-scan and field data collection together with aerial imagery into a sophisticated remote sensing process. Trees are identified with position, species, height and estimates for the diameter and volume of each tree in the forest, and detailed models of both terrain and forest canopy are created.

The finished inventory data is stored as trees, grids, and stands ready for use in a GIS. Once in the GIS, the forest owners can easily produce diagrams, charts, and reports on any section of the forest, or on individual trees.

As an added service, FORAN also sells compact Trimble Juno™ ST handheld computers bundled with ESRI's ArcPad software to forest owners and managers. With this pocket-sized package, the owners can bring their complete inventory of data with them for reference when planning operations in the field.



“The technology and services we provide to our clients are constantly evolving,” said Eikrem. “Trimble equipment is now an integral part of the complete solution we offer, and as we continually fine-tune our processes I’m sure we’ll find even more ways to use this type of technology.”

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE



www.trimble.com