

DEVELOPING MODELS TO PROVIDE COMPREHENSIVE FOREST INVENTORIES

A McIntire-Stennis supported project



Oregon State
University

PROJECT

Having a reliable way to monitor and analyze forest inventory is a key part of managing forests and forecasting forest dynamics. Remote sensing techniques offer a way to do this vital work, as they allow forest managers to consistently collect a large amount of relevant data and information across vast landscapes. This data provides valuable insights into the status and trends of forests, which supports informed decision-making related to forest management.

The most common remote sensing method used to collect data about tree dimensions and defects, has been laser scanning, or lidar (light detection and ranging). Lidar has traditionally been used to observe the forest from above the canopy and take vertical measurements of tree dimensions, but it less reliable for producing horizontal measurements. Lidar is often supplemented by field measurements, which provide on-the-ground observations to round out the data.

In the last decade, with improvements in laser technology and decreased use costs, it's now possible to scan the forest from below the canopy, usually using handheld mobile lidar systems. While this technology collects robust data from below the canopy, it does not provide information about the tops of the trees, as the above-the-canopy lidar system does.

This means that to compile a comprehensive forest inventory, multiple datasets are needed. However, it can be challenging to combine datasets because georeferencing technology that efficiently merges datasets is lacking.

This research project, led by Oregon State University Associate Professor Bogdan Strimbu, aims to improve forest inventory data collection by developing an operational system to integrate the data, or point clouds, and provide a more complete inventory of forests.

The goal is to develop two software programs, one that will fuse point clouds from above and below the canopy – and another, which will compile a comprehensive forest inventory from point clouds.

COLLABORATION

Oregon State University is working in conjunction with the Elliott State Research Forest, the Oregon Department of Forestry, the Siuslaw National Forest, and private landowners.



IMPACT

The researchers hope that this project will improve forest monitoring and analysis and help inform decision makers.

- Comprehensive 3-D datasets can provide information about threats to trees including fire, insect, diseases, and competition.
- A near complete picture of the forest ecosystem will help researchers and forest managers better understand the effects of climate change, the state of wildlife habitat, and the status of carbon storage in forests.
- Quickly produced and reliable data can help decision-makers implement more sustainable forest management practices.

About McIntire-Stennis

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.

