



SNAMP UCST Spatial Team Lidar FAQs

What kind of light do lidar instruments use?

Most terrestrial lidar applications (those mapping buildings, topography and vegetation) use laser light, in the near infrared portion of the electromagnetic spectrum.

Are there impacts to plant, animals or humans when they are "hit" by these lasers?

The laser's maximum power is limited so that they are safe to the human eye. Impacts to plants and animals is considered to be negligible.

What type of lidar instrument is the SNAMP project using?

We are using a "discrete return" lidar instrument, that gives us four returns per pulse. The time it takes a pulse to travel to a target and back is converted to a "range" or height measurement.

What is the difference between ground- and airborne-lidar?

Ground- and airborne-lidar use similar technology. Airborne lidar systems are mounted on an aircraft and include with the lidar emitter and receiver a global positioning system (GPS), an inertial measurement unit (to help determine the aircraft's exact position), and a computer to integrate all the data. Airborne-lidar systems can capture moderately detailed data covering 100s of km². Ground-based systems are mounted on a field-deployed tripod, and instead of scanning along a flight-line, they scan in a "doughnut" around the stationary tripod. Ground-lidar systems capture extremely detailed information about a few trees, or a forest stand. The tripod and system can be moved through the forest, but this process can be slow.

Can lidar data detect different plant species in a forest?

The detailed elevation returns from a lidar instrument can give us information about the shape of a tree, or the structure, but will not alone give us definitive information on species. When lidar data is combined with multispectral or hyperspectral imagery, species discrimination is possible. In addition, some researchers are using the intensity of the return (the maximum light returned from each lidar pulse) to help map species, but this is still an active area of research.

Can lidar data be used to measure parameters of individual trees, like DBH?

Lidar measures some variables directly, like tree height, and others are inferred.

DBH is not measured directly, but a relationship between tree height and tree dbh can be used to "model" DBH (diameter-at-breast-height) across the landscape from lidar data.

Can you identify snags with lidar data?

This is a difficult task, and there are very few papers that claim to be able to operationally identify snags with multiple-return airborne-based lidar data. This is likely more possible with ground-based lidar.

How far can a lidar pulse penetrate a dense forest canopy? How can you be sure that your last return is a "ground" return?

In dense canopy you cannot be sure your last return is a "ground" return. However, there are two factors that help us derive a model of the ground in dense canopy forests from airborne-lidar data. First, because each tree (and each patch of ground) is "sensed" by the lidar multiple times, and from multiple angles, often there will be a path through the forest to the forest floor. Second, we often use ground data from areas with less dense canopy and interpolate the ground through areas of dense canopy.

Is it possible to quantify ground fuels using LiDAR?

Airborne-lidar has been used to map forest canopy fuels, but not to measure ground fuels. These kinds of measurements will likely require ground-based lidar.