

Terrestrial laser scanning technology for multi-resource forest inventories

PROJECT TEAM

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OBJECTIVES

- An investigation of the basic principles of terrestrial laser scanning technology and its applicability to (multi-resource) forest inventories.
- An evaluation of existing data analysis software for forestry applications. Development of new software for a range of applications will be investigated.
- A cost-benefit analysis for the introduction and use of this technology over a range of potential inventory applications.

PROGRESS

Following the development of a detailed field work methodology, the first phase of the field work began in September 2007 with the selection and measurement of 20 experimental plots in Co Laois and Waterford. This initial phase of measurement and scanning is focusing on mature coniferous crops approaching or at final harvest stage.

Each 15 m radius circular plot has been carefully set up with a detailed tree numbering system so that all manual and scanner measurement data compiled are accurately referenced and directly comparable. Each plot has been measured manually using traditional mensuration techniques (dbh, upper stem diameter (at 2.0 m)

and total height) prior to laser scanning. Each plot is scanned at least once, with additional scans being taken in some plots depending on the level of stem occlusion and lower stem branching. Following scanning, a 10% sub-set of stems in each plot was felled and measured. The stem diameter of each felled sample tree has been measured at 50 cm intervals from base to tip in order to compile a detailed stem profile. Total height and crown height have also been recorded. The initial standing tree measurement and laser scanning is completed for the first 20 plots and the felled sample tree measurements are currently being completed.

The independently compiled data sets will be submitted to UCD for processing and comparative analysis. The primary focus of this initial analysis will be to make direct comparisons between timber measurement results from conventional mensuration techniques and developing laser scanning systems.

ACTIVITIES PLANNED

Research in 2008 will focus on the analysis of the initial 20 plots and the selection, measurement and scanning of a second phase of 30 to 40 plots. While it is planned to include different crop age classes and species classes in this phase of work, the selection of stand types will be somewhat dictated by the initial results from the analysis of the first 20 plots.

As field work progresses and comparative data sets are compiled, the team will begin to assess the potential for laser scanning technologies to measure additional tree, crop and environmental parameters, outside the scope of conventional mensuration techniques.