

PLANSFM

FORESTSCAN

Terrestrial laser scanning technology for multi-resource forest inventories

PROJECT TEAM

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BACKGROUND

Ireland is a high cost economy, which is reflected in the delivered-in price of wood. Research and development aimed at reducing costs and thereby increasing competitiveness in roundwood production is the key driver behind this project. Effective planning and decision-making in modern multi-purpose and sustainable forest management requires up to date and accurate data in order to evaluate the range of potential options for the future management and utilisation of a forest.

OBJECTIVES

The three main objectives of the study are:

- 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 and the development of new software, for a range of forestry applications;
- A cost-benefit analysis for the introduction and use of this technology over a range of potential inventory applications.

PROGRESS

An investigation of the state of the art of laser scanning has been conducted and the report is currently being written. The investigation includes terrestrial (Figure 1), aerial and space-borne LIDAR techniques, and their relative advantages and potential to support each other. It is understood that the combined application of these three techniques could enhance conducting forest inventories both on a local and global scale.

A survey has been completed and highlighted the data analysis software for terrestrial laser scanning data from forests. Other work includes the development of branch detection algorithms (Figure 2). This will be included in written work resulting from the development of a new software algorithm that is designed to detect and map a tree's branching structure.

Following the measurement of the first 19 plots, PTR and TreeMetrics have submitted their independently compiled data sets to University College Dublin for processing and comparative analysis.



Figure 1: Data collected from the scanning device (foreground) can be checked using a laptop computer before completing the plot scan.

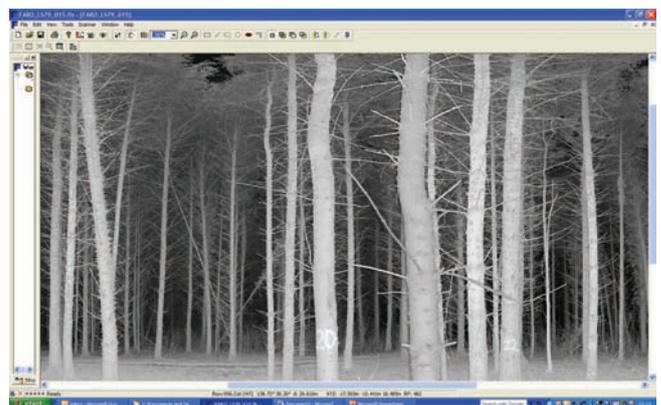


Figure 2: A point cloud derived from a laser scan. Part of the project aims to develop software that will recognise branching.

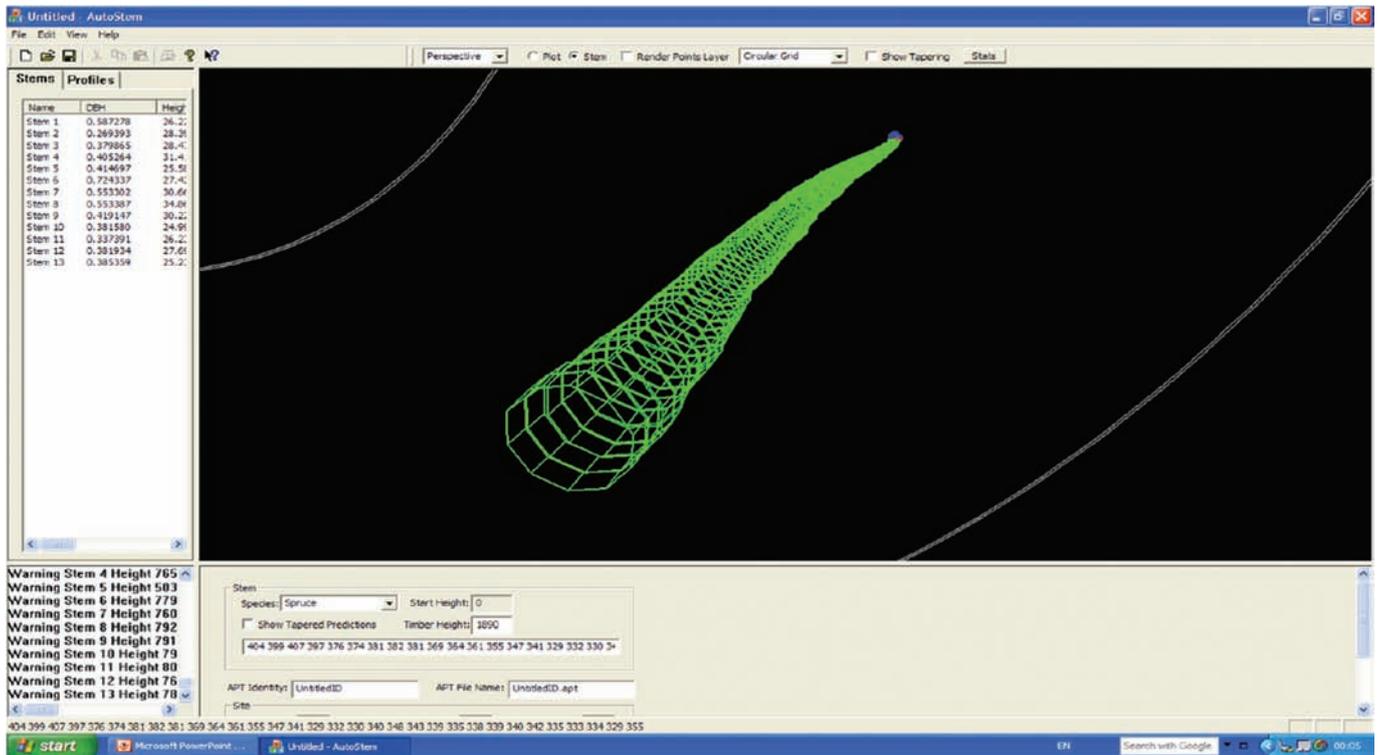


Figure 3: Autostem software interface during analysis of collected scan data.

ACTIVITIES PLANNED

- The data collected from the 19 plots will be analysed (Figure 3).
- Based on the results of the analysed data and manually measured parameters in the 19 plots, other sites will be selected by including various species of forests at different ages.
- The terrestrial scanning and measurement of sample trees by callipers will be carried out together with TreeMetrics and PTR.
- Work will commence on improving the reported weakness of the Autostem software together with the software developers from Dresden University and TreeMetrics.
- A research paper will be prepared on the results of the first data analysis.
- A second phase of field work will commence in spring 2009.

OUTPUTS

Nieuwenhuis, M. 2008. FORESTSCAN – Terrestrial laser scanning technology for multi-resource inventories. *Irish Timber and Forestry* 17(3): p 32 - 35.