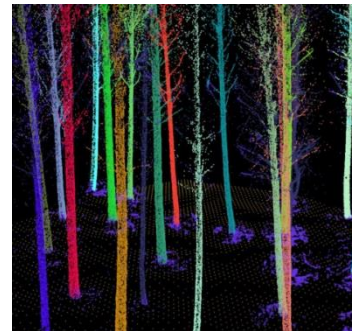# *Remote Sensing and GIS*

**Forest Informatics
Remote Sensing
Spatial Analysis**

LiDAR stem form research

Several long term spacing trails were scanned to compare stem form at different planting densities, with a Trimble FX terrestrial LiDAR scanner. The work formed part of a study on wood quality, where whole plots were scanned to create a virtual 3D model of each plot. Each 3D model can be analysed to extract parameters for single stems. Extracted information includes tree height, diameter at various heights in the tree, stem curvature and height of the live crown. Each tree can be virtually subdivided into several logs. Each log dimension and form is fed to a sawing simulator to estimate potential timber recovery from the log taking log shape into account.

Eco physiology work

The cost of scientific field equipment limits the installation and use over large areas. Typically multichannel loggers are used to monitor several sensors. The department engaged in a process to design systems which are less expensive and small enough with wireless technology to create distributed networks of single sensors. This architecture spreads the risk of theft and data loss. The wireless capability provides for continuous data communication which minimise data loss if a logger is damaged. Current loggers provide for both dendrometer as well as Granier sap flow probe inputs. Challenges still exist with regards to power to the devices, but several solutions are trailed for future implementation.

Hyperspectral sensing

Work on the stabilisation of the aerial platform continued in this year and two flight campaigns in early winter and spring were completed successfully. Target areas included plantation trails, vineyards and orchards. Trails with software for processing were completed and the PARGE solution from Rese Applications selected to orthorectify hyperspectral data streams recorded in the flight trails. In the coming year more flight are planned for forestry areas in the rest of the country and possibly even Mozambique. There are also future developments for miniaturisation to mount the sensor on UAV platforms. More close focus laboratory work is also planned to identify tree rings in core samples.