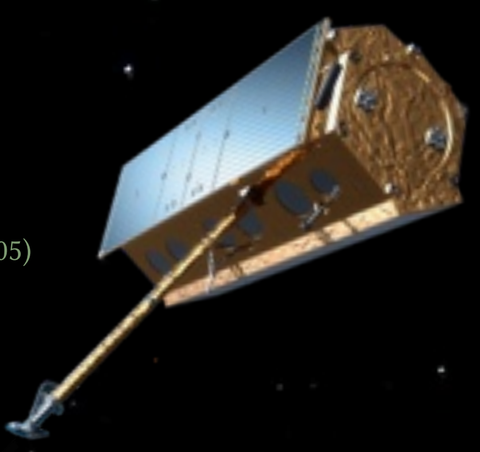
STEREO RADAR: THE FUTURE OF FORESTRY

"Advances have assured a critical role for remote sensing in mapping, monitoring and managing forest resources"

Boyd and Danson (2005)



Forests are a vital resource both as an **ecosystem service**, cleansing the oxygen we breathe, and as a **resource**, used to make products such a paper and furniture. Thus we must be able to monitor and measure their resources.

Remote sensing allows us to do this, with the **benefit over traditional forest inventories** of access to remote areas, fast global coverage and regular updates. If we can measure forest height, we can map forest distribution, biomass and carbon stocks.

Assessing Stereo Radar

The **aim** is to test the ability of stereo radar to measure **average tree height**. This is achieved by comparing stereo radar heights from the **TerraSAR-X satellite** (top right) to actual heights of forest in the **Galloway Forest Park**, Scotland. Further, the data is compared to other remotely sensed datasets to assess how the stereo radar compares to current techniques.

Measuring Tree Height

Methods involve making a canopy height model within **GIS software** by differencing the TerraSAR-X canopy elevation from ground elevation.

Fieldwork was undertaken within the forest park to **measure** tree height and other variables within 9m radius plots.

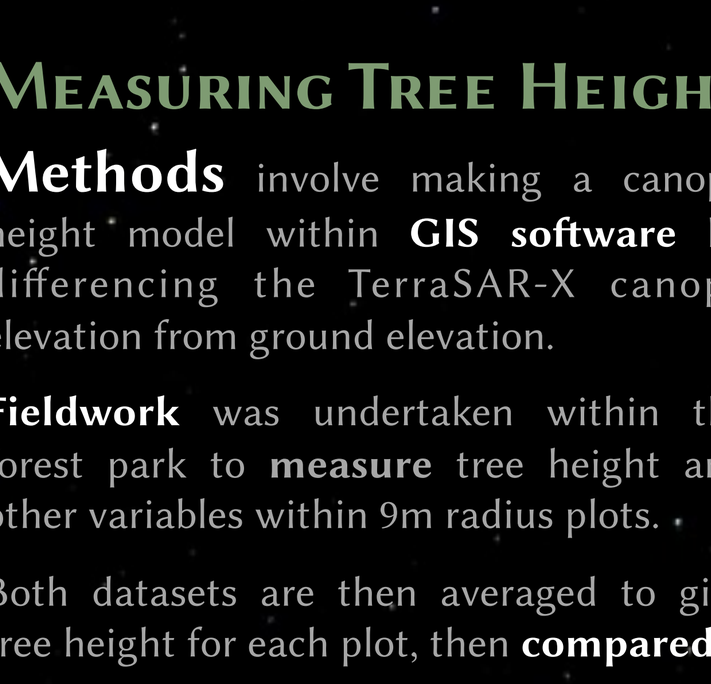
Both datasets are then averaged to give tree height for each plot, then **compared.**

Forest Density Affects Success of Stereo Radar

Results show that stereo radar **predicts tree height well** (27.6% RMSE). The graph shows the height for each plot with the line indicating a perfect fit.

Heights are **measured** with greater success in stands with a **high number density** (stems/ha), likely due to wave penetration.

Stereo radar performs worse than aerial stereo but given its relative cheapness it proves to be a promising technique in forestry.



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Boyd, D.S. and Danson, F.M., 2005, Satellite remote sensing of forest resources: three decades of research development, Progress in Physical Geography, 29, 1-26.
http://www2.astrium-geo.com/files/pmedia/public/r386_9_terrasar-x_services.png, http://www.cgtextures.com/texview.php?id=17438&PHPSESSID=ajm6ai57jpos0lqktu6qkqrdf7, http://www.cgtextures.com/texview.php?id=43955&PHPSESSID=tt3scoacet57dmrpdel36mgho2