Remote Sensing of Tree Structure and Biomass in north Australian mesic savanna

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THIS PHD RESEARCH AIMS TO DEVELOP AND ASSESS METHODS, USING STEREO SATELLITE IMAGERY AND LASER SCANNING DATA, TO EXTRACT 3D TREE STRUCTURAL PARAMETERS FOR THE ACCURATELY ESTIMATING BIOMASS/CARBON STOCKS IN NT MESIC SAVANNAS.*

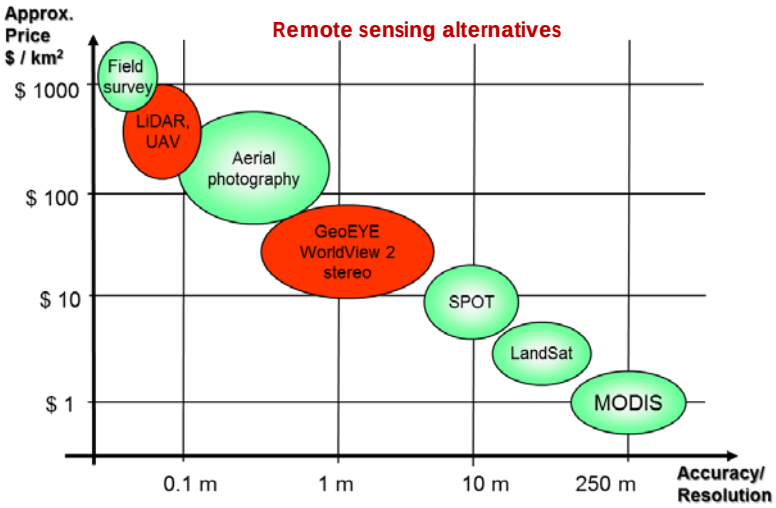
The following actualities determine the importance of biomass estimation by remote sensing tools:

- ✓ **In Australia, between 300,000 km2 and 700,000 km2 are affected by fire annually**
- ✓ **The vast savanna woodlands occupy 1/3rd of Australia and accurate biomass estimate critical for emissions estimates**
- ✓ **Fire-affected areas typically occur in remote and inaccessible situations in NT**

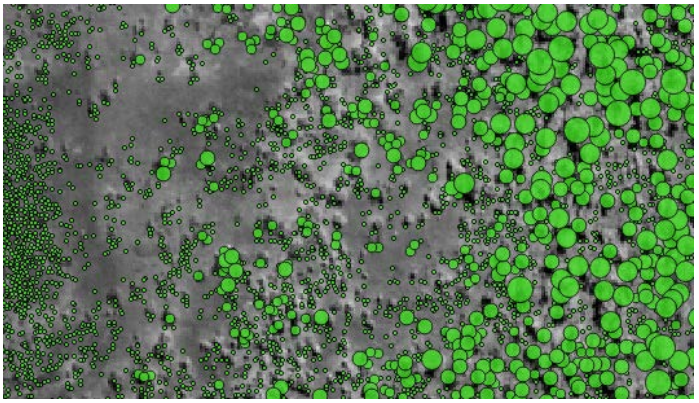
Biomass cannot be directly measured by remote sensing sensors.

An indicator of biomass may be the canopy or tree height, based on the close association (allometry) between tree height and wood volume.

The most accurate height estimations and 3D structure of vegetation could be obtained using Light Detection And Ranging (LiDAR) systems.



Two main approaches for deriving forest biomass information from LiDAR data have been applied so far: the area-based approach (also known as the raster-based approach), based on LiDAR data statistical canopy height distributions; and the single tree approach, relying on individual tree detection and crown modelling by applying height-related data derived from LiDAR:



Biomass map fragment, based on LiDAR individual tree approach.

Biomass map fragment, based on the area-based statistical canopy LiDAR height distributions (1ha plots).

Development and use of the next generation of remote sensing tools to efficiently and reliably quantify 3D AGB structure and biomass change related to changes in the frequency, timing and intensity of fires is a key aim of this research.

**** Current status of research: First paper writing based on LiDAR research; September 2015 - PhD proposal conformation.***

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