Project 4.12 | Estimating trunk diameter at breast height for scattered eucalyptus trees: a comparison of remote sensing system and analysis techniques

Project Leader: Prof David Lamb, University of New England, dlamb@une.edu.au
Principal Researchers: Niva Kiran Verma (PhD Student), University of New England; Prof Nick Reid (UNE); A/Prof Brian Wilson (UNE/NSW Office of Environment and Heritage); Prof Kerrie Mengersen (QUT); Ben Fitzpatrick (QUT PhD Student)
Project Participants: University of New England, Queensland University of Technology, Land and Property Information (NSW)

Objectives:
- To develop allometric relationships between diameter at breast height (DBH) and tree dimensions (canopy size and height) for scattered eucalyptus trees in an Australian farmscape
- To investigate optical remote sensing for inferring DBH from these measurables
- Investigate use of remote sensing for inferring stem density (tree clusters), canopy volume and species

Outcomes:
For using tree canopy parameters to estimate DBH, image-based remote sensing (multispectral) performs as well, if not better, than LiDAR-derived data

Methodology:
- Allometric equations created for five species of eucalyptus in the North western region of New South Wales based on field based measurements, and using regression methods
- Estimation of tree characteristics like canopy area, tree height, stem density (Tree clusters) using multi sensor remote sensing datasets of submetre resolution
- An allometric model to estimate canopy volume using optical remote sensing and regression methods
- Comparison of performance of multispectral image and LiDAR data, and data fusion for species classification

Future Work:
- The developed model should now be validated in other areas.