

AI solutions in forestry

Monitoring growth and dynamics throughout a full rotation

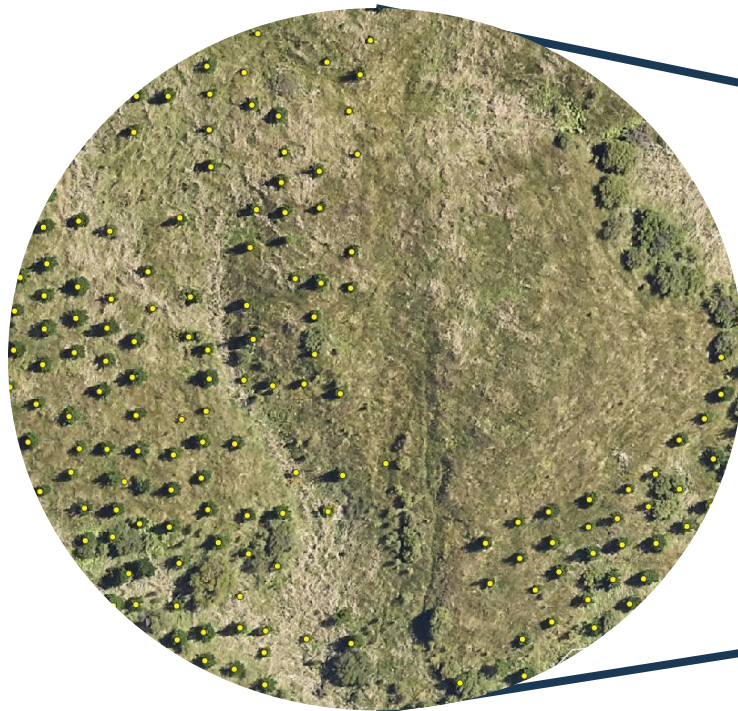


Indufor

Establishment Phase

Tree Detections

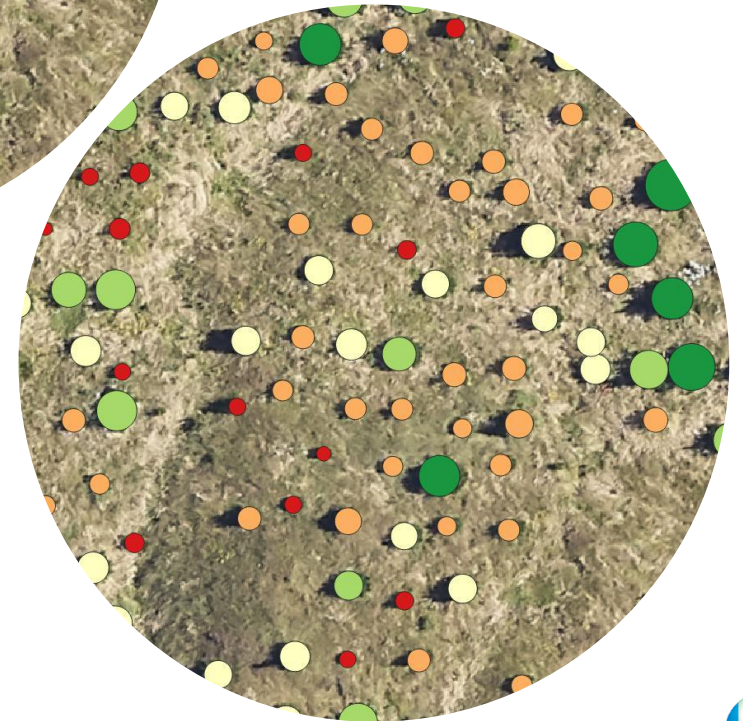
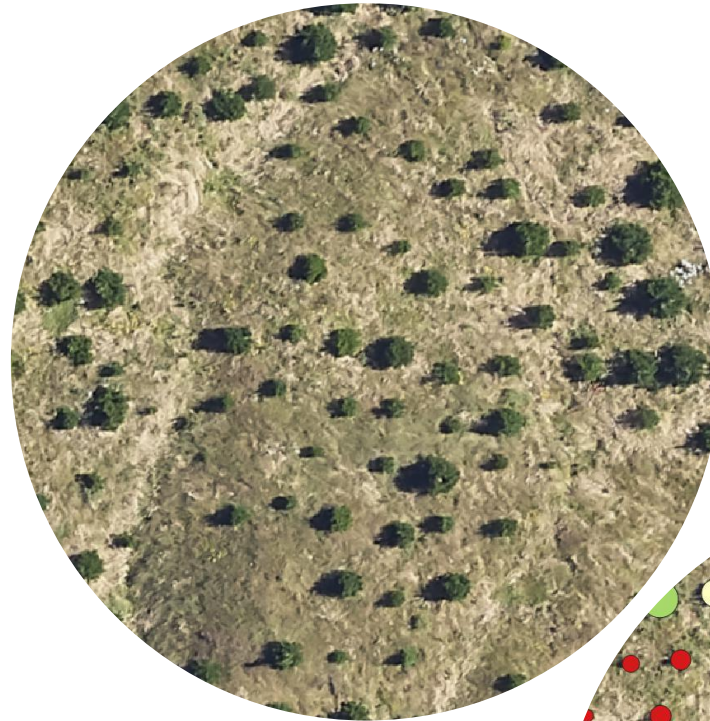
- Point layer
- Stocking layer (summary grid)
- Measure establishment success and assess mortality
- Best used from 8 months up to canopy closure
- Aerial imagery from fixed-wing aircraft captured in RGB + IR at 3.2 – 7 cm



Establishment Phase

Early Metrics

- Crown canopy estimate
- Starting from 12 months
- Does not require LiDAR and is more repeatable
- First indicator of NSA and productivity
- Useful tree management solution in the establishment phase identifying:
 - Anomalies/canopy disturbance
 - Variability in growth rates
 - Presence of (weed) competition
 - Drought indicator



Establishment Phase

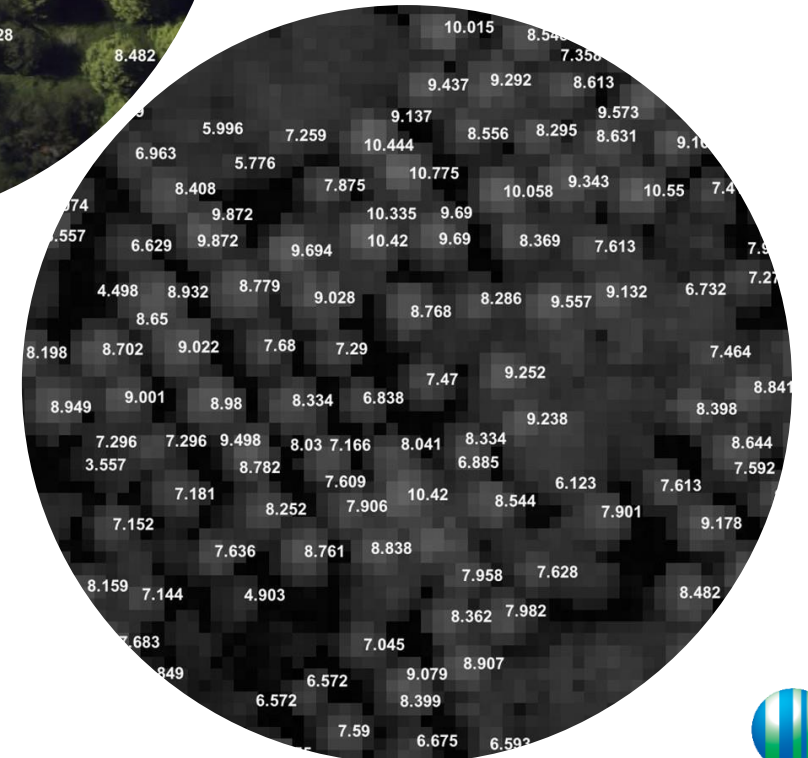
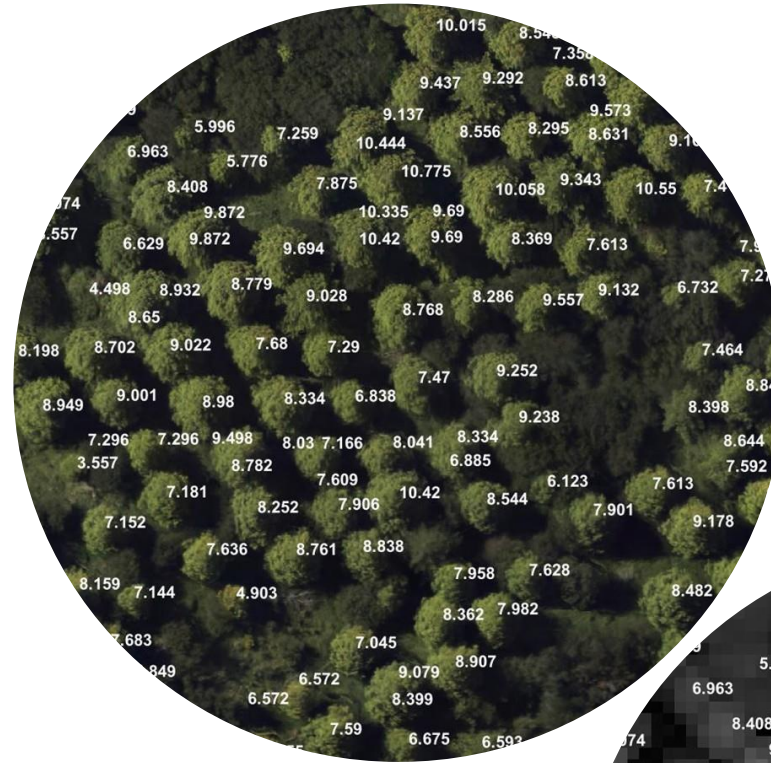
Web App (dashboard)



Operational Phase

First Management

- LiDAR becomes more feasible
- Accurate height measurement assigned to individual trees
- Additional measure of productivity
- Useful to modelling:
 - Future potential (resource insights)
 - Carbon estimates
- More efficient and targeted intervention for activities such as thinning



Established Forest Canopy Closure

- Transitioning from object detection to area segmentation
 - More informative solution once we reach canopy closure
- Separation of primary species
 - Indigenous versus exotic
- Using aerial imagery to precisely delineate:
 - Forest/stand boundaries
 - Roading and operational (skid) sites
 - Areas of low stocking
 - Gaps
 - And finally harvesting...



Monitoring at Scale

Guyana Case Study

- Indufor's long term, national-scale programme in Guyana monitoring deforestation.
- Annual deforestation mapping and reporting requirements over some 18 million square km of rainforest.
- Programme is driven by carbon markets
- Developed working AI solutions using space borne data (Sentinel-2) 10 m resolution satellite data



Summary

Applications & Operational Examples

- AI-based solutions offer consistent and repeatable mapping but still require QC
- Some hesitation and pushback from industry but this is slowly changing
- Supporting valuation and due diligence projects
- ETS mapping which is an evolving space globally
- Object segmentation for census work driving modelling and yield forecasting
- National level estimates (Guyana)



Thank you 😊

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