TreeMetrics

“PROVIDE MORE END PRODUCT FROM LESS TREES”

Background to ForestrySA & TreeMetrics

- Research with Prof. Glen Murphy in 2009
- ForestrySA visit Ireland in April 2010
- TreeMetrics begin pilot in 2011
  - Terrestrial Laser Scanning
  - 8 Sources
  - 600 laser scans
  - 4962 sample stems
  - TLS Data collected by FSA staff
  - Forest Felled in 2011/12
Objectives

- Integrate Radiata Taper Equations into Treemetrics measurement system
- Create web based cutting software with ForestrySA specific functions
  - Bucking software adapted to ForestrySA stem quality codes
  - Branch Quality factored into Bucking Simulator
  - Transport & Harvesting cost factored into analysis
  - Testing of manual measurements of taper Vs Laser stem measurement

Online - 3D Stem Viewer Cutting Software
Independent TRUST “LOGS in the TREES”

Forest Warehouse for ForestrySA
TreeMetrics

“PROVIDE MORE END PRODUCT FROM LESS TREES”

TreeMetrics Offering to You

Better Yield Improvement
Better Forest Valuation
Better Forest Inventory
“More from Less”
Treemetrics - Company Focus

- Founded 2007
- Unique Database = Volume to Value ("Big Data")
- Customer focused
- Growth oriented
- Strong Know How
  - Business Advisors
  - Academic Advisors
  - Analytics Experts
  - Artificial Intelligence (AI), Data mining, Data modelling
  - Software / Hardware Engineers
  - Electronic Engineers
  - Optimisation
  - Telecommunications

Customers

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<tr>
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Why TreeMetrics?

• TreeMetrics is a smarter way use of the Earth's Resources

  - Wood Demand to double by 2050
  - 20% of the annual global carbon emissions occur through deforestation
  - Forests cover 25% of the Earth's Land Area!

  - **Forest Industry:** mounting complexity, rapid change, increasing competition, low margins

The Global Problem: Poor Information - Error

• Productive Area
• Stratification
• Stocking
• Stem Taper Variation
• Stem Quality Variation
The Problems

- Not properly predicting the products in the forest
- Tree quality is judged by the human eye
- Not Independent resulting in multiple re-measurement

= 

- Wrong forests being cut
- Wrong logs being cut
- Waste
- Lost value

Just in Time or “Just In Case” ??
The Problem - “The Collision of Interests”

- Taper Variation
- Straightness
- Branching
- Rot etc.

Who is in Control?

How can you be in control if you don’t really know what’s in front of the harvest machine?

- Cutting Instruction Allocation?
- Cutting to demand?
- Managing the trade off’s?
- Monitor Operator Performance?
- Production Control?
- Value Recovery?
The Starting Point – Better Data

- First in the world
  - Rich aerial & terrestrial 3D data
- Verifiable data
- Independent data

Automated – Closed Loop Control

- Pre-processing
  - Multisource data
  - Forest pre-stratification
  - Initial area
- Spatial analysis for field plots locations
- TLS recording
- Field survey

- Processing
  - Final stratification
  - Spatial generalization
  - Geostatistics
  - Area correction
- Tree modeling
- Parameters relations

- Web services
  - Harvest control
  - Data analytics

TREEMETRICS
Independent Tools

Scan Data is Downloaded over the Web to TM for Processing

Virtual Harvesting Machine

Creates 3D Stem Profiles Before Harvest: (StanForD format)
The Forest Warehouse - Stand Parameters, Bucking Simulator / Optimiser

Sales Proposals

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At any time click the 'Cross Cut Results' menu for printed results of your working set.

Multiple Forest Breakout Analysis

Cross Cut Results

New Stand Analytics - Log distribution

Automated Aerial Lidar Analysis To Select Ground Plots

Aerial scanning data analysis  Plot sampling plan
Product Mapping the Forest

New Product
New product: Real time log production tracker and optimiser

GPS Network Coverage
Cellular Network Coverage
Satellite Network Coverage

In Vehicle Device

In-Vehicle Device
Real Time Harvest Intelligence

Current Production?
Performance?
Remaining Standing Stock?
Opportunities?

Automate Thinning Control

Reduce machine supervision cost
Improve Production (Less control plots)
Automate Post Thinning Stand Assessment
Real Time Forest Intelligence

- Dynamic harvest control
- Cooperative machining
  - Multiple machines working as a team
  - Combinatorial problem
  - Managing the trade-off's

Sustainable Competitive Advantage

**Text Book:**
- Improved Customer Responsiveness
- Improved Quality of Service
- Improved Efficiency - Value
- Innovation

**Analytics competitive advantage:**
- Understanding data better
Treemetrics Smarter forests are forests that drive sustainable economic growth by...

- Leveraging better information to make better decisions
- Anticipating opportunities & problems and managing them proactively
- Coordinating resources to cooperate efficiently

...increasing the value forests generate for their owners in a rapidly changing economic world

Better Management

- Targets
- Incentives
- Monitoring
Current Innovation: Tree Growth Monitoring & Modelling

I MAGERY PROCESSING with European Space Agency

Forest area detection

Initial image  Land use classification  Forest productive area
“if you only do what worked in the past, you will wake up one day and find that you have been passed by.” Clayton Christensen
## Summary

- “More end product from less trees” =
  - Happy People
  - Healthy Environment
  - Better Profit

- **Who is in?**
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