

# Digitalising Regeneration Operations

A Lean Approach

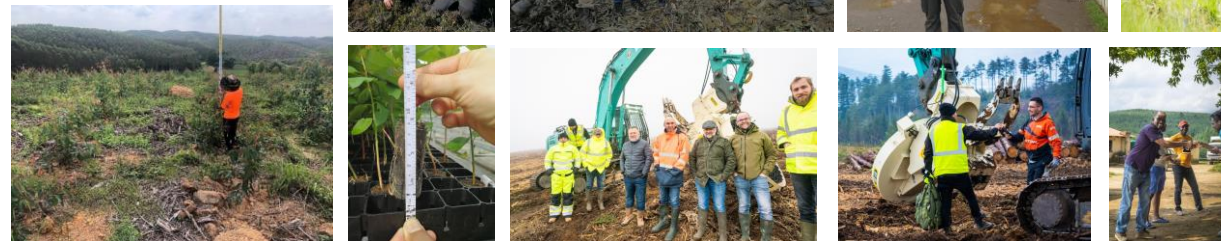
# Introduction

- Finnish Silviculture Machinery Designer and Manufacturer
- Founded in 2004
- HQ in Nakkila, Finland
- Philosophy: “One size does not fit all”
- Strong R&D focus
- Global customer and partner network
- Solutions for better growth through:  
Reforestation – Post Planting\* – Digital Forest

\* Young stand tending/pre-commercial thinning, coppice management, bioenergy harvesting and cut to tree thinning (early stage)



About the presenter:  
Henrik Janér, Development Director...  
... which is just a fancy way of saying that I'm responsible for developing new markets and have the overall responsibility for digital development



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# Why do we want to digitalise regeneration operations?

- We're losing too much money to mortality – we want to know what contributes to higher survival rates
- We can't handle the high staff turnover rates and want to mechanise – it makes sense to introduce digital capabilities
- We're worried about the risk and cost of compliance – even when we get reports we don't trust them
- We want to diversify our forest holdings due to the increased vulnerabilities from heat, pests and disease – we need a digital system to support this effort
- We've heard that you can make money from planting data in carbon markets – we want in on the action

# Informational: Poor Planning is the Root of All ~~Evil~~ Waste

Insufficient monitoring and reporting capabilities can lead to a lack of transparency

Create transparency by:

- Implementing a monitoring system
- Report on relevant procedural KPIs
- Document everything at the finest level of grain

Inadequate planning, including improper site selection, and poorly designed planting patterns, can lead to inefficient resource use

Capture new efficiencies by:

- Planning ahead with the right information
- Leveraging site characteristics for better growth
- Implement planting patterns and monitor them

Lack of awareness among stakeholders can result in encroachment into protected areas

Reduce risk by:

- Sharing reliable geographical data with operators
- Optimize land use with more accurate tools in planning and in-field

# Example – Applying Precision Forestry

## Workorder specification – Area 1234:

- Total Area 7 hectares (based on harvesting area)
- Stems per hectare 2100
- Seedling stock XYZ – 14700 pcs.
  - Protection against bark beetle (expensive)
- Environmental concern
  - Yes... not marked on the map... please take care and good luck! Just don't screw up our certification...



## Completed workorder – Area 1234:

- Total Area 3,1 hectares
- Stems per hectare 1900
- Total planted seedlings 5675 pcs.
  - NB! Poor substrate on 25% of seedlings
- Environmental concern
  - Old burial site (not marked)
  - Borders on conservation site (ditto)
- Other
  - Ran over someone's fibre, apologized... didn't help... (it wasn't marked)



# Operational: Growing Forests not Complexity

Insufficient training and skill development among forestry workers can lead to poor output and reduced efficiency

Poor communication between supervisors and workers can lead to misunderstandings and high turnover rates

Relying on manual, or more properly rudimentary, techniques for regeneration can result in higher costs

Increase efficiency by:

- Employee led “training by example”
- Automated “codified” inputs and rationale behind amounts/durations
- Gamifying the work – “scoreboard”

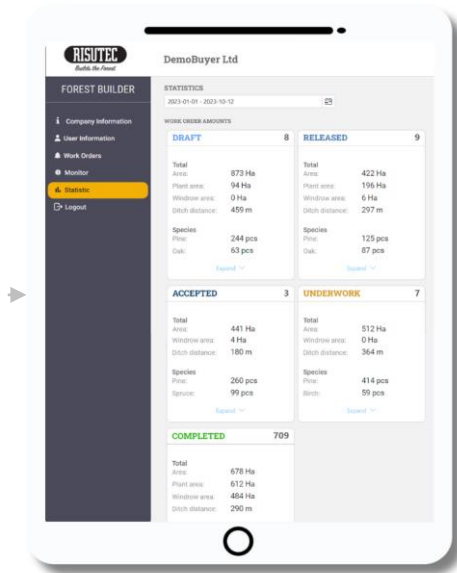
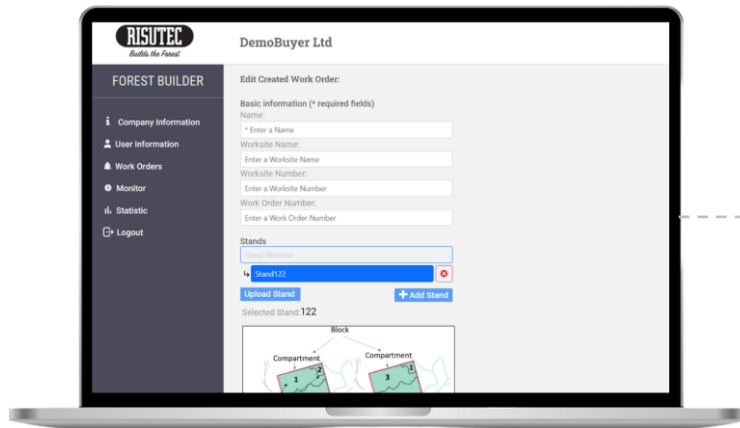
Decrease employee turnover by:

- Creating a “just the facts ma’am” approach to communication
- Providing a base for regular feedback and targets for incentivizing employees
- Matching skills and tasks

Improve profitability by:

- Introducing new technologies
- Prioritizing resources and work
- Automating process flow

# Example – Digital Workorder Management and Execution



Foresters and contractors can plan the work by:

- Describing what needs to be done
- Adding geographic intelligence, e.g. shapefiles for work areas, environmental concern and hazards
- Work type specific features, e.g. mech planting, soil cultivation, harvesting and more

Operators can execute workorders by:

- Selecting a workorder from a sorted list (workorder ranking by proximity to asset)
- Using shapefiles and contextual information on-screen
- Leveraging automated process control and preset planting parameters

Foresters and contractors can report by:

- The stage of process with breakdown by work type
- Assess productivity and analyse performance
- Integrate with any host of applications, e.g. Power BI, Excel, ArcGIS/QGIS and Forest ERPs
- Update inventory based on facts (not stories)



# Biological: Focusing on Monocultural Myopia

Insufficient data to identify problems and implement corrective actions can lead to low survival rates

Increase plant survival by:

- Gathering all relevant data during establishment
- Implement an adaptive strategy with adequate monitoring and reporting

Monocultures are less resilient and can lead to imbalanced ecosystems

Boost resilience by:

- Precise planning for mixed stands
- Planting mixed stands that are less vulnerable to risks (heat, pests, disease)

Lack of native species can lead to biodiversity loss

Improve biodiversity by:

- Re-introducing native species
- Applying the right amount of inputs and using the right techniques for different species

# Reforestation for Heterogeneity

- Growers – especially large corporate growers – want to plant the right seedling in the right place at the right time with the right inputs cost effectively
- Can we plant heterogenous forests in commercial settings? What might that look like?
- What would the silvicultural processes look like if we had access to information on each and every seedling, the silvicultural inputs, soil (growth site)
- How can we ensure efficiency in post-planting processes like thinning and harvesting with digital data?
- Green means fertilizers and herbicides. Mycchorizza for afforestation – communication network between trees



# Risutec's Stand-alone Precision Forestry Offering

- Risutec's Precision Forestry Toolkit consists of:
  - The Forest Builder Service for digital workorder management
  - ASTA Precision Forestry Toolkit
    - Android-based app
    - GNSS/GPS rover
    - Correction for CM-accuracy globally
  - The Data Forest – heterogenous data lake - for secure integration to forest ERP and GIS platforms
    - Hot storage for transactional API calls
    - Cold storage for bulk data loading and consolidation
    - Backend powered by Microsoft Azure



Thank you for listening!