

# Treemetrics FORESTRY 4.0



# Background



- Founded May 2005 by 2 Foresters
- We wanted a better measurement system



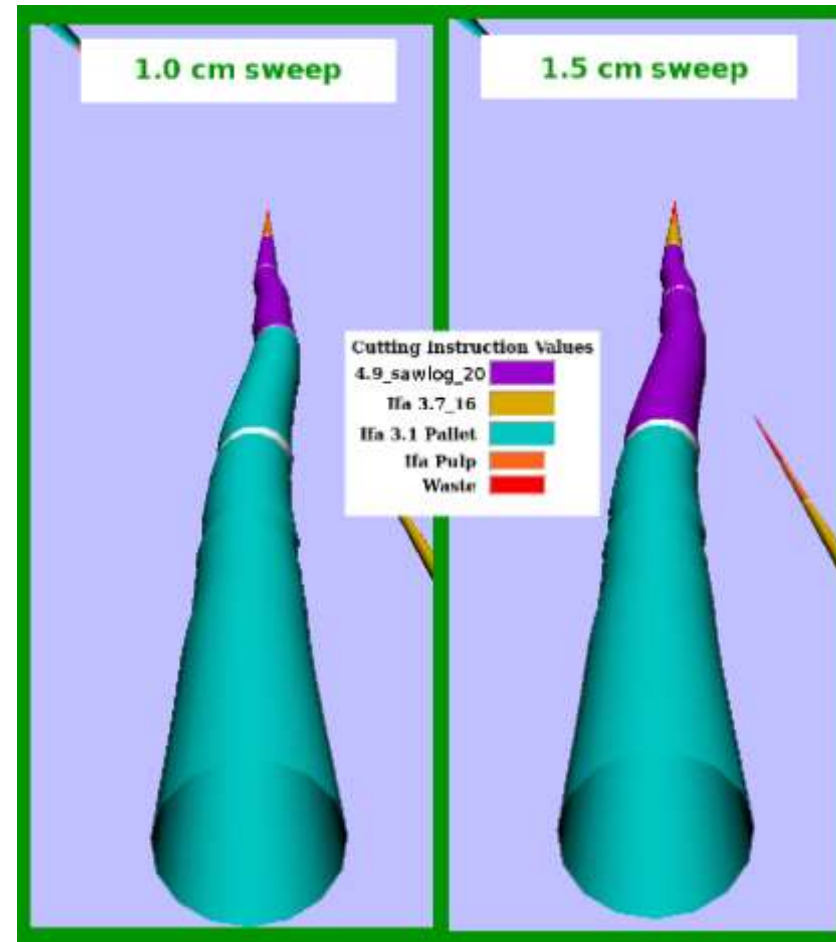
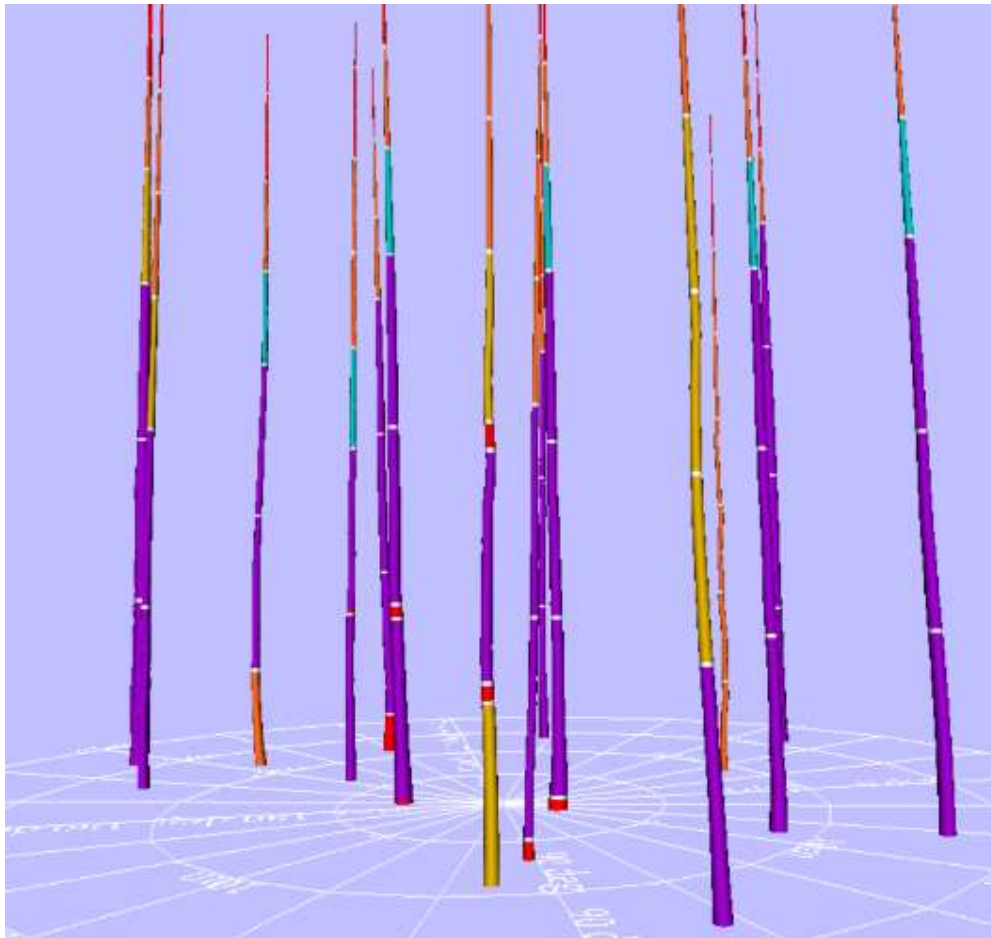
MANAGE

MEASURE

HARVEST

**FOREST**HQ

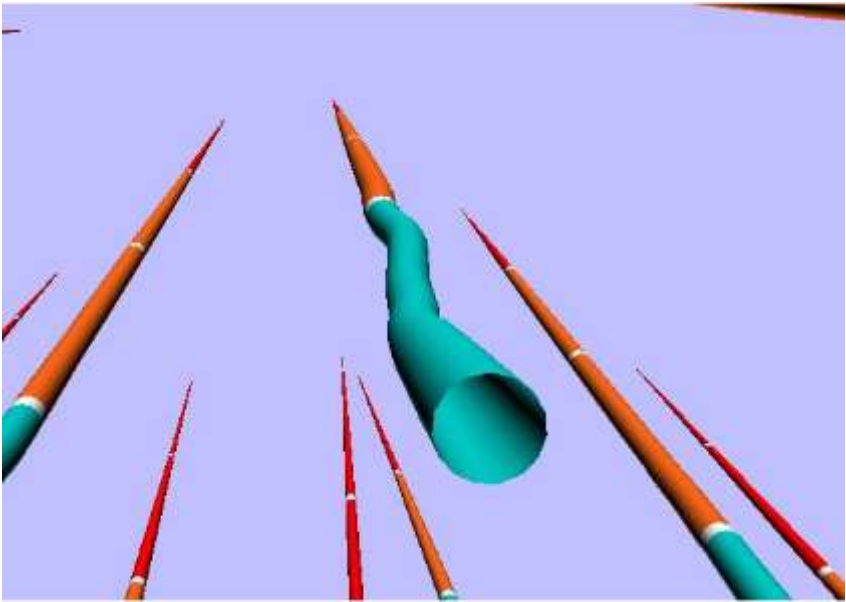
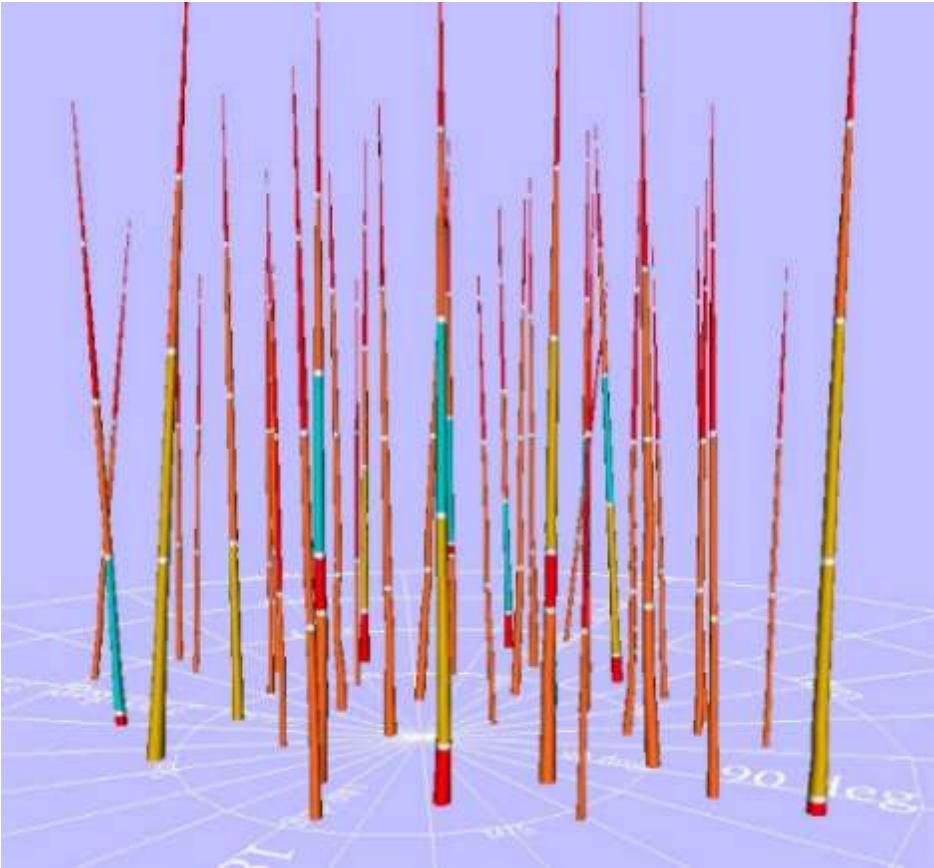
# 3D Stem Profiles & Simulated Log Merchandising





# Harvest Simulator

## Log Product Breakout



# Hard Lesson



# Hard Lesson

*“I was told to cut gun barrel straight logs”*



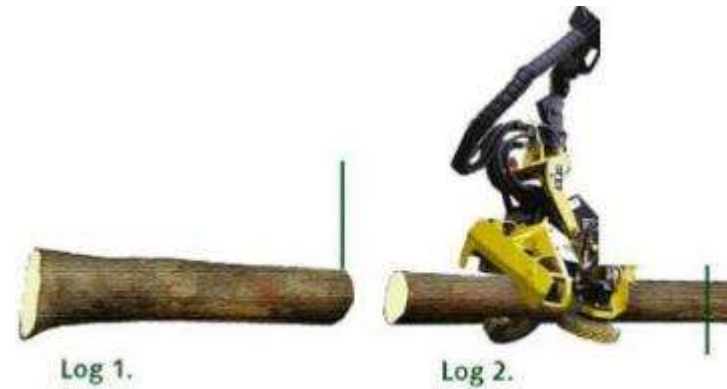


# Key Decisions

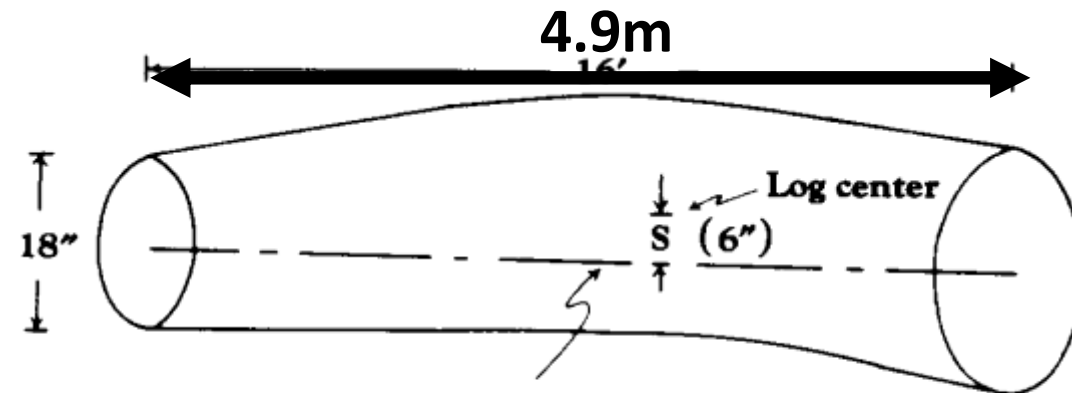
## Stem Data

## Log quality?

- Forced Cuts?



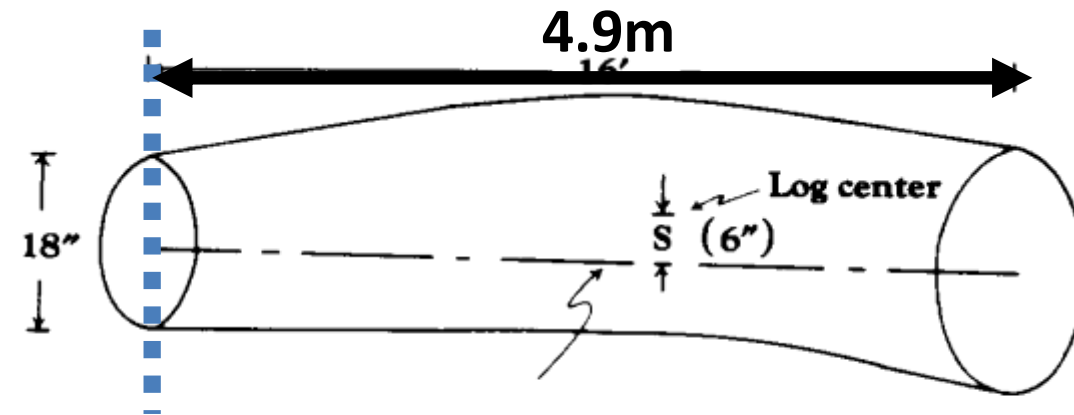
## Some Choices: Is it straight enough??





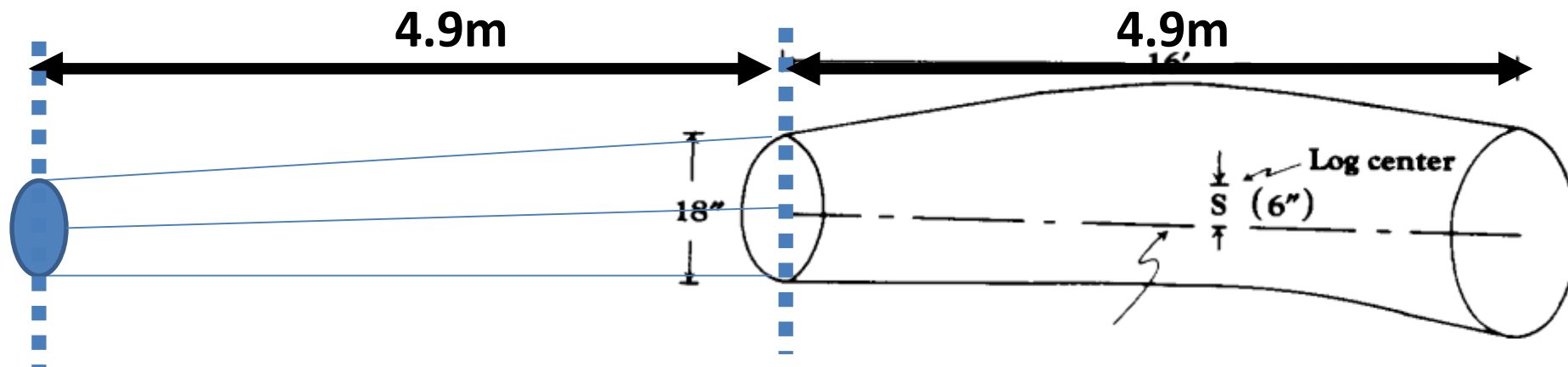
## Some Choices: If Yes

Option 1. Cut a 4.9 & Continue



## Some Choices: If Yes

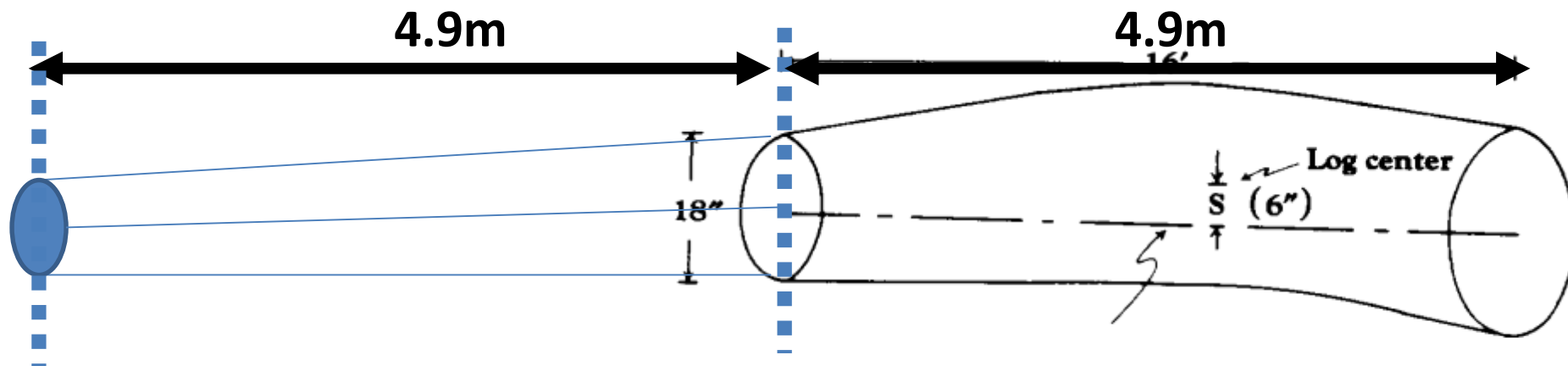
Option 1. Cut a 4.9 & Continue





## Some Choices: If Yes

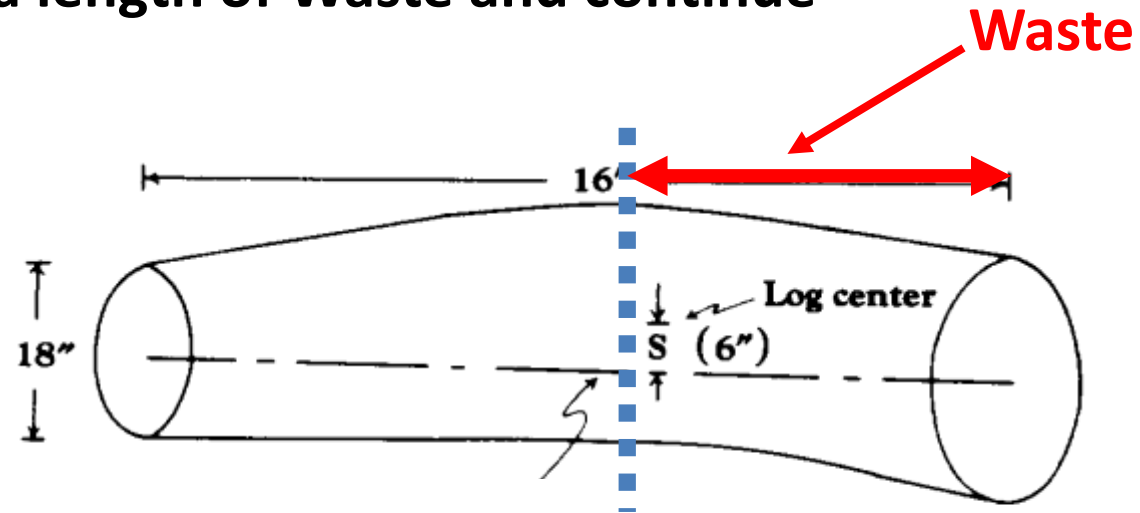
Option 1. Cut a 4.9 & Continue



Maximum Value £ 

## Some Choices: If No

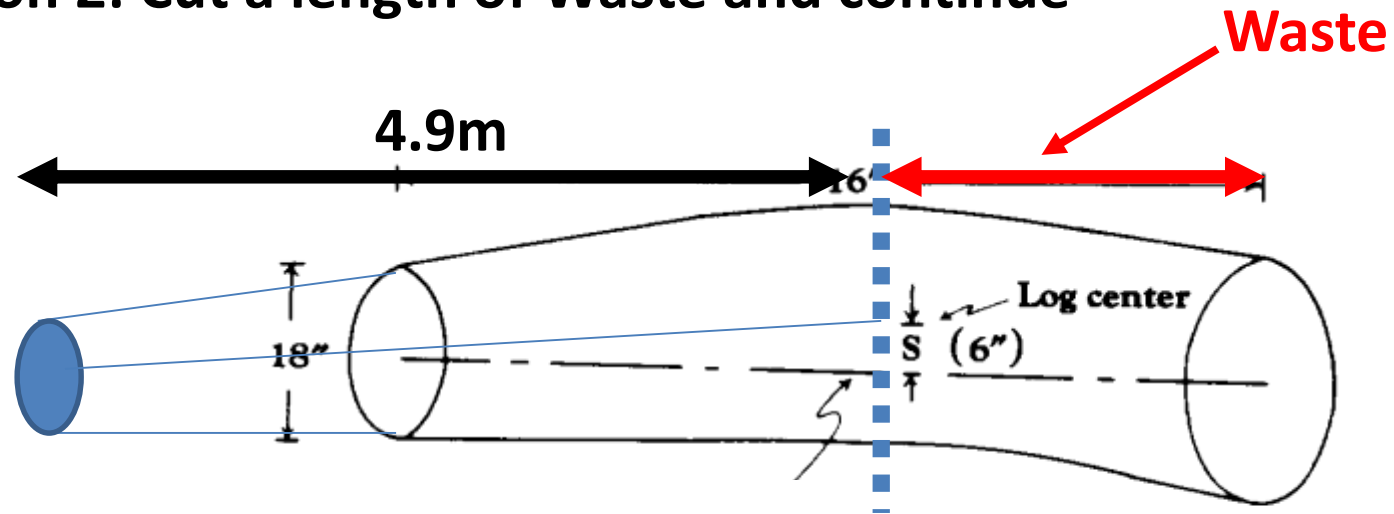
Option 2: Cut a length of Waste and continue





## Some Choices:

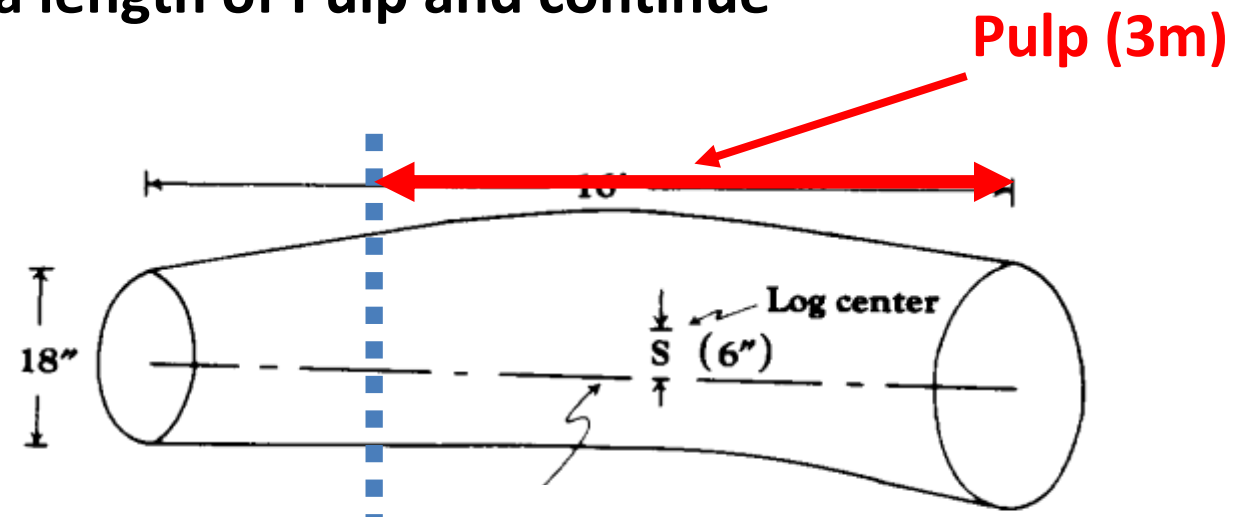
Option 2: Cut a length of Waste and continue



Potential Loss of Value ??

## Some Choices: If No

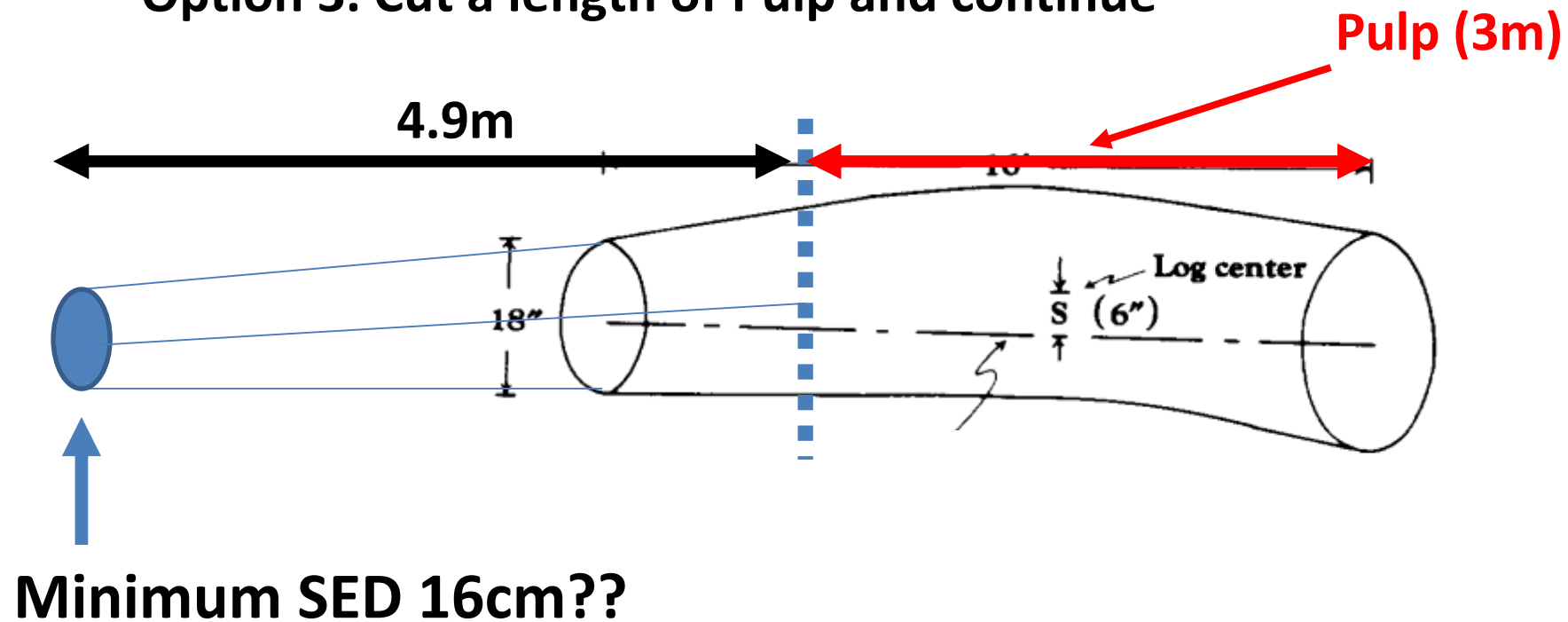
Option 3. Cut a length of Pulp and continue





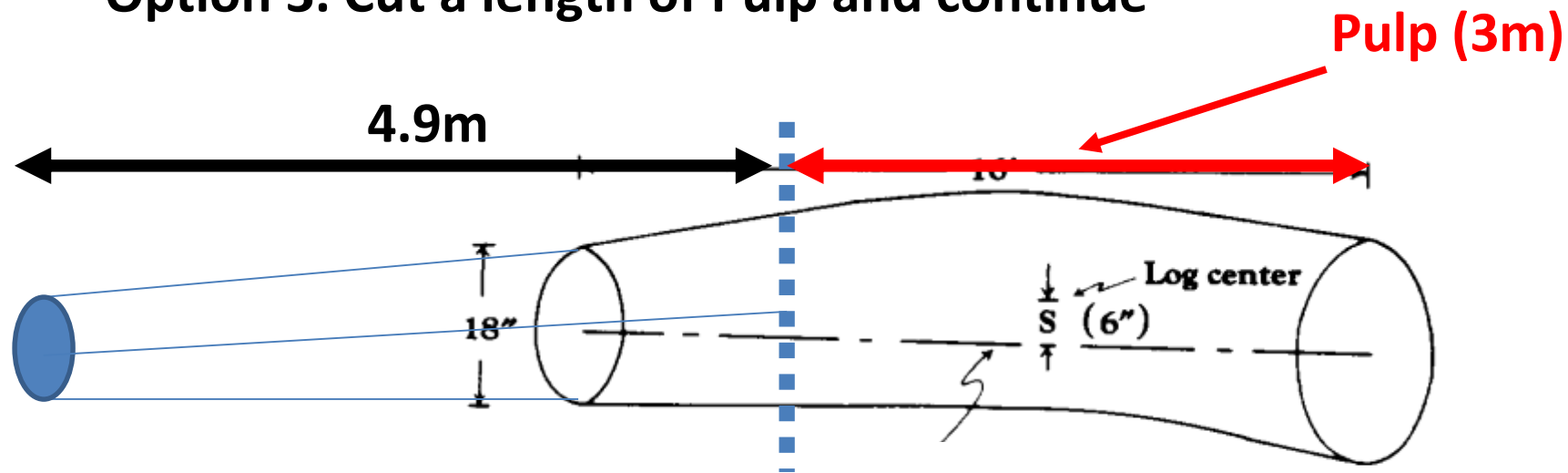
## Some Choices: If No

Option 3. Cut a length of Pulp and continue



## Some Choices: If No

Option 3. Cut a length of Pulp and continue



Potential Loss of Value ??

# Hard Job

**Important high speed decisions: e.g. 5m per second**



# Value Loss ??



- Cutting Instruction File?
- Machine Calibration?
- Poor log making decisions?
  - Forced Cuts?

*“On average 20% of the value of a forest is lost at harvest time” Prof. Glen Murphy (OSU)*



# The Journey: Vision for Forestry 4.0

- *IBM Smarter Planet*
  - *2010*
  - *Cloud computing*
  - *Smart Manufacturing*
  - *IoT*
  - *Technology Integration*



# Key Learnings



- *Lean Manufacturing: e.g. Toyota Manufacturing Principles*
- *Process Control*
- *“the stronger the **LINKAGES** between the primary and secondary producers the greater the source of competitive advantage”* Michael Porter, Harvard Business School

# Linkages: Think of all the DATA SILO'S in the Industry

- Inventory
- Planning
- Marketing
- Harvesting
- Transport
- Sawmilling



# European Space Agency



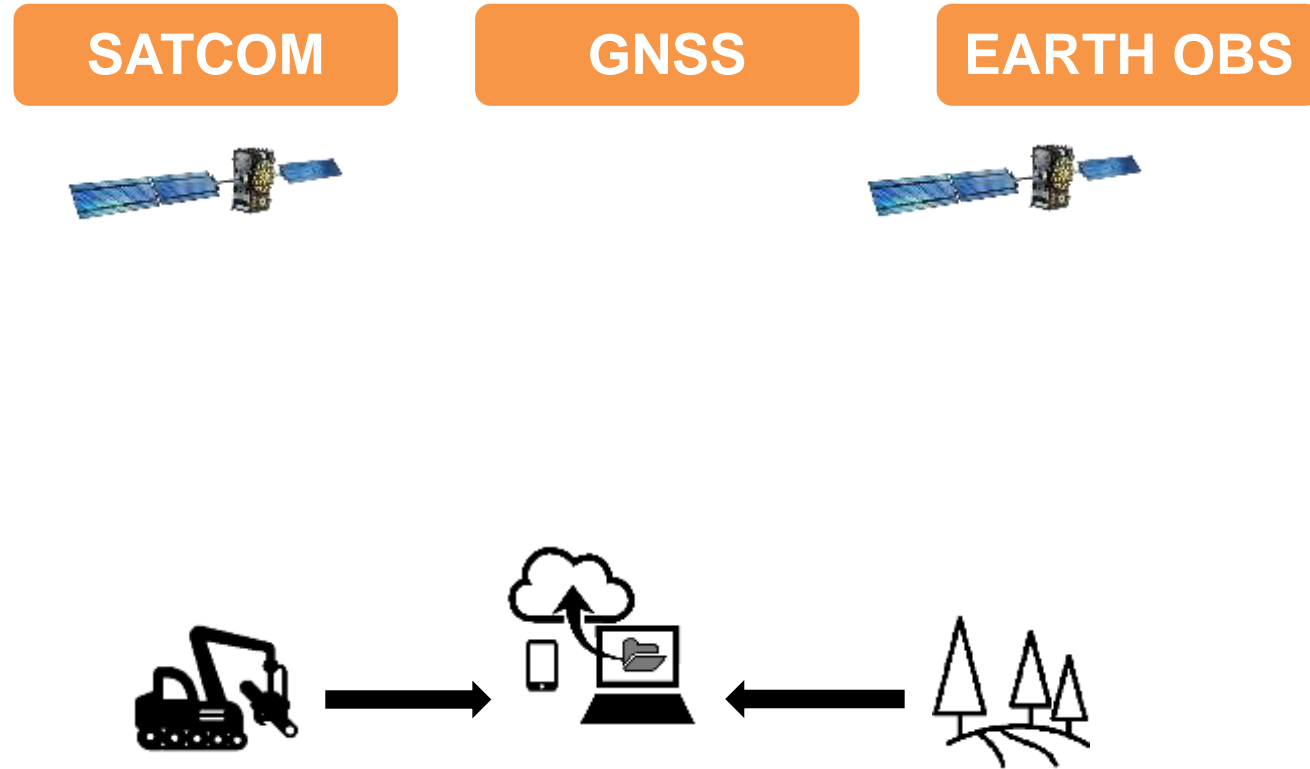
- First Contract Feb 2012
- Satmodo Project
- Real Time Harvester Data



European Space Agency  
Agence spatiale européenne



# Why ESA?



# 2 way communications (Satcom, GPRS & GPS)



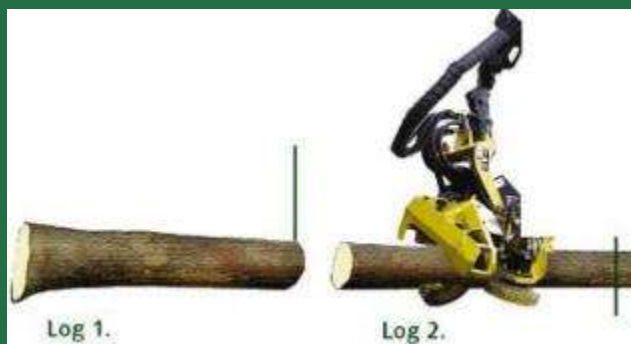
MANAGE

MEASURE

HARVEST

FORESTHQ

# Full Visibility of the Harvesting Process



Cellular &  
Satellite  
Connectivity



# Integration of Harvest and Inventory Data



MANAGE

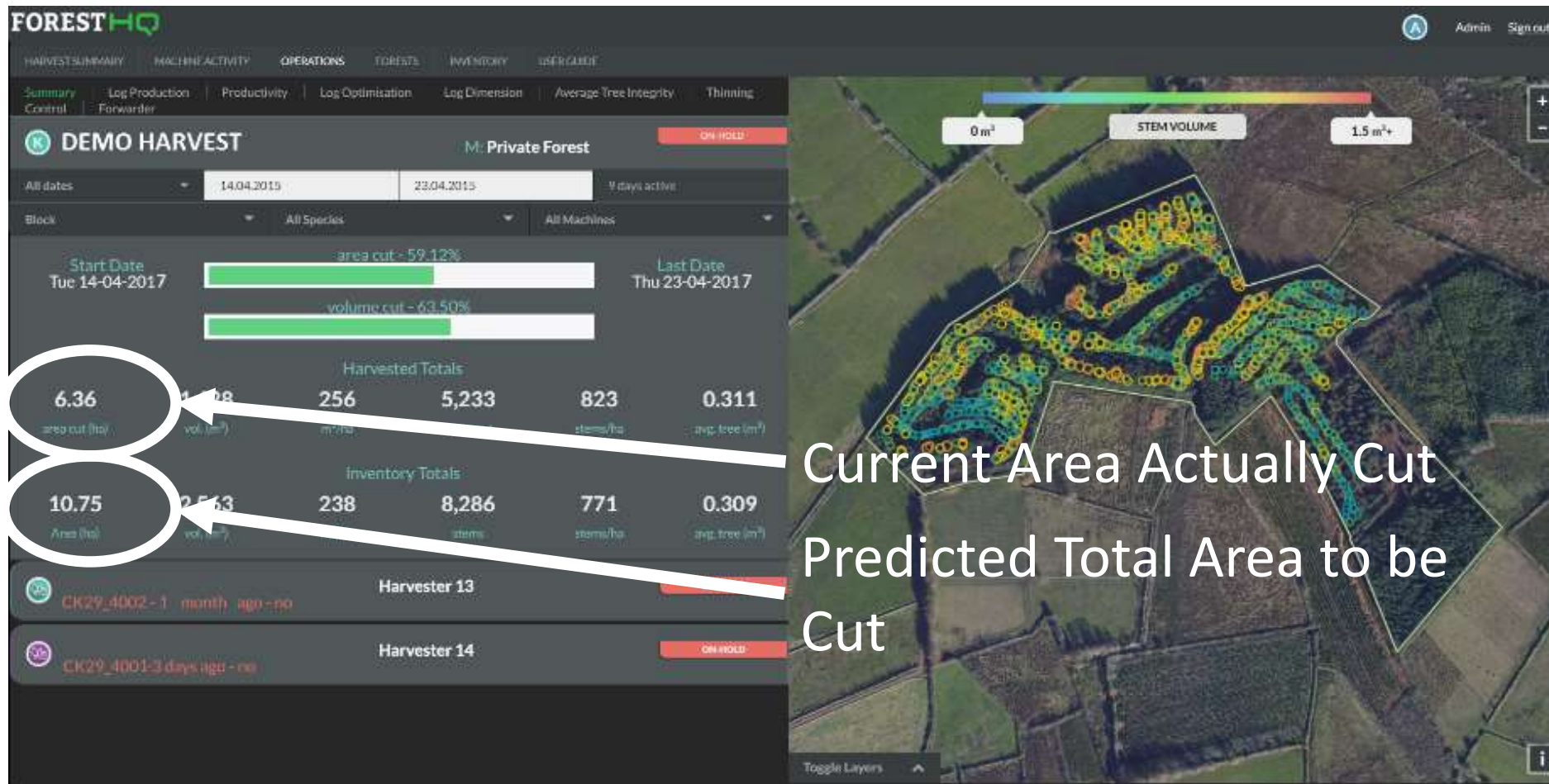
MEASURE

HARVEST

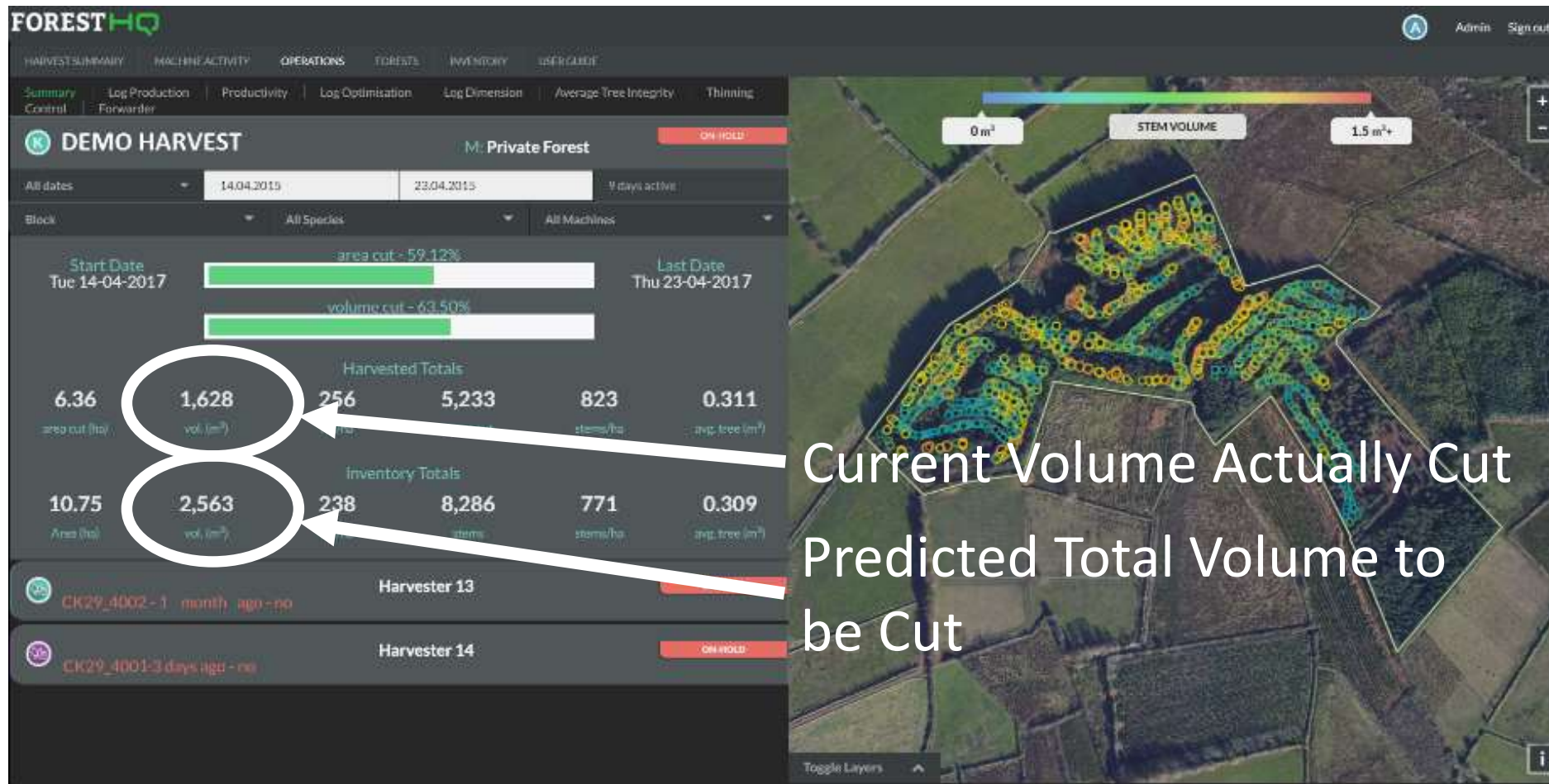
**FOREST HQ**



# Unique Harvest Analysis Predicted Versus Actual



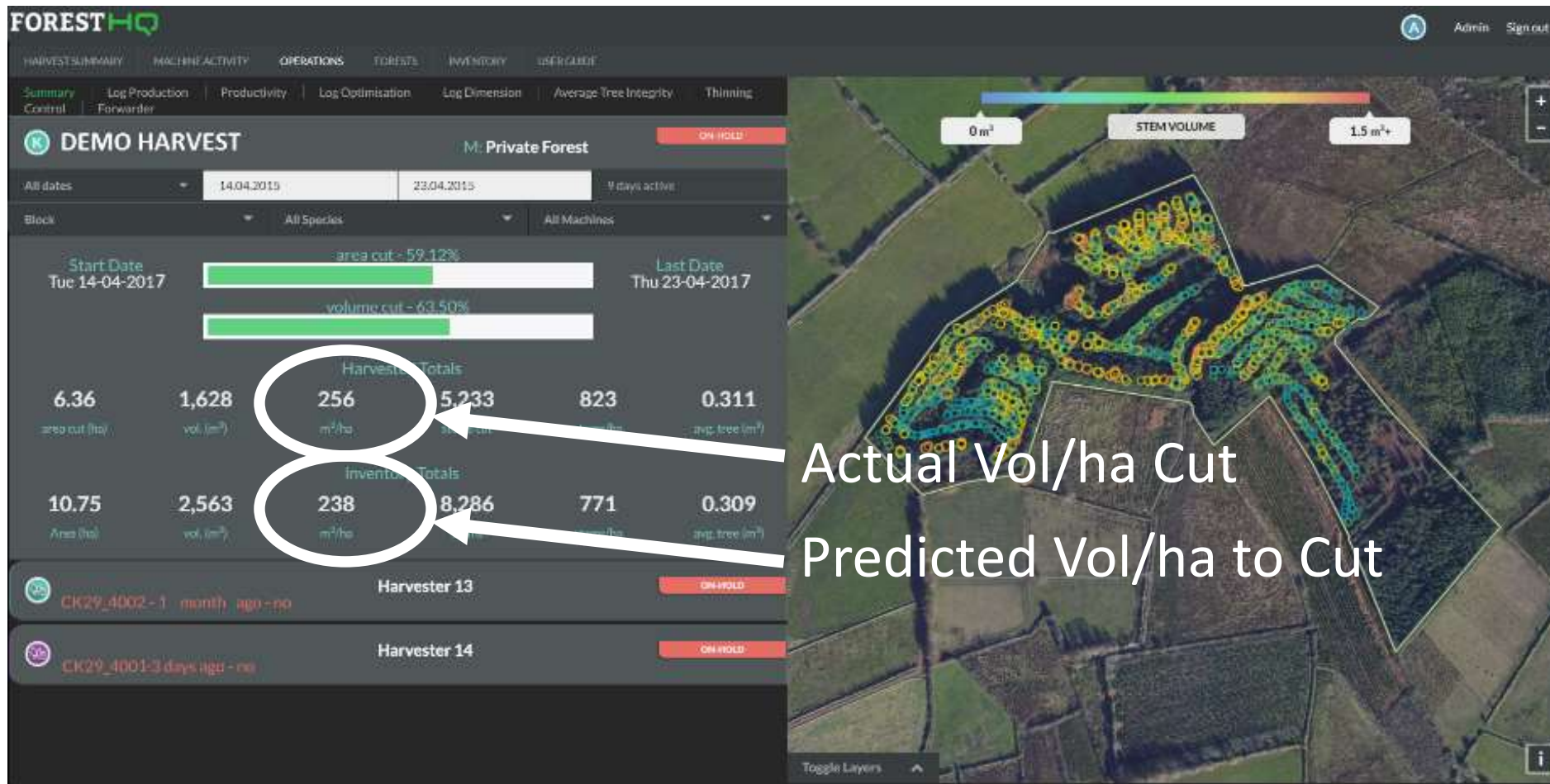
# Unique Harvest Analysis Predicted Versus Actual



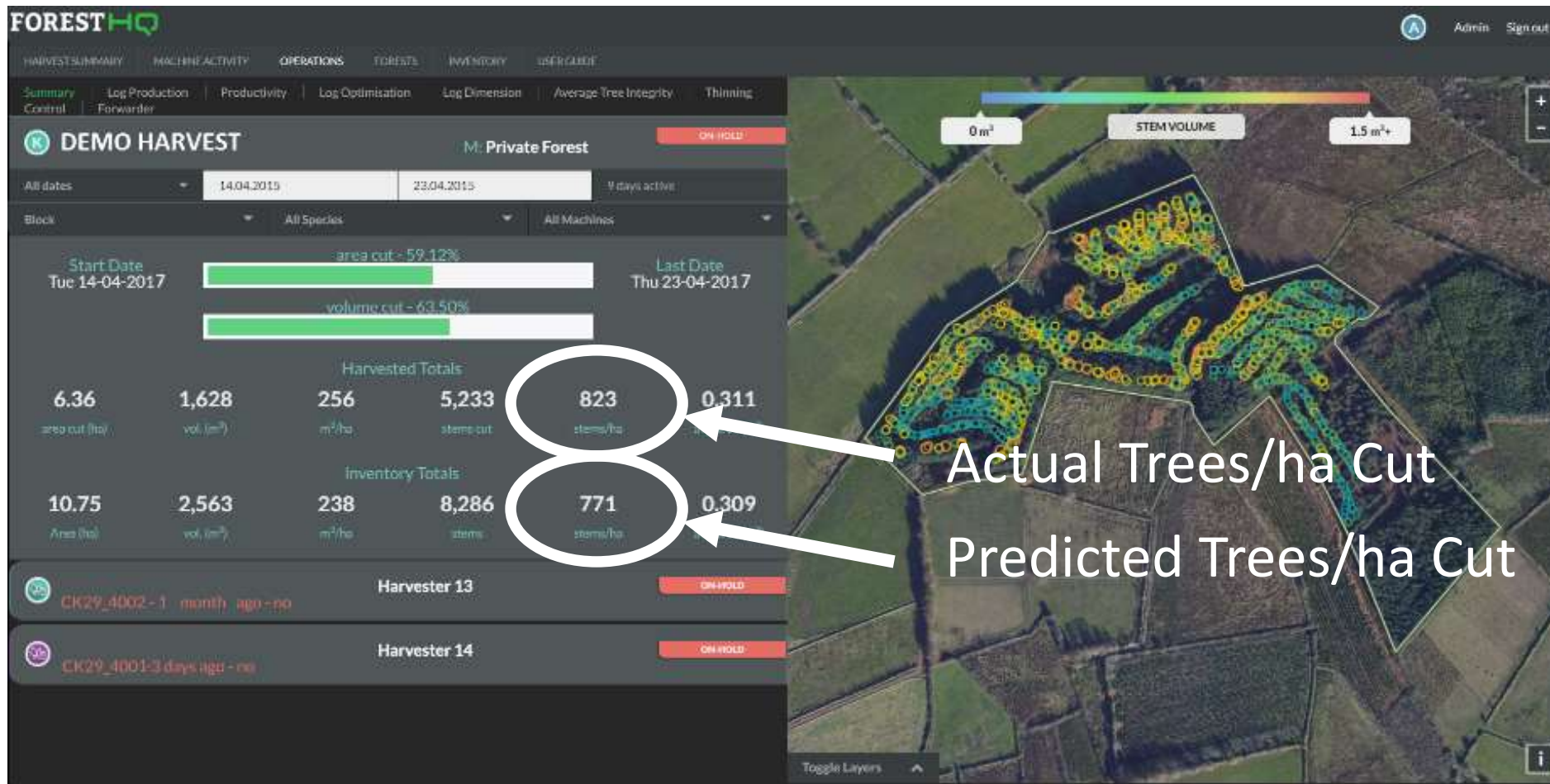
Current Volume Actually Cut  
Predicted Total Volume to be Cut



# Unique Harvest Analysis

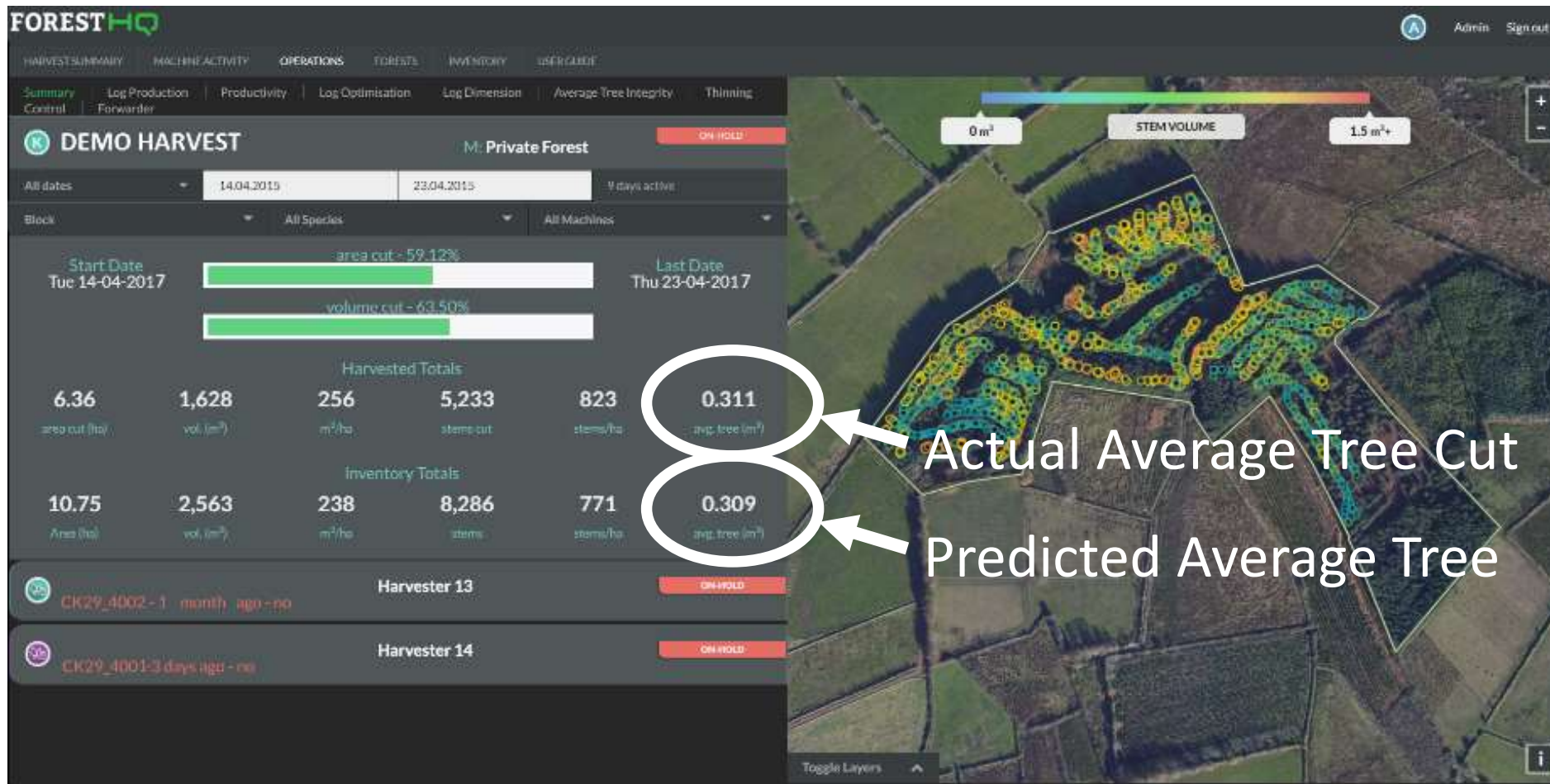


# Unique Harvest Analysis

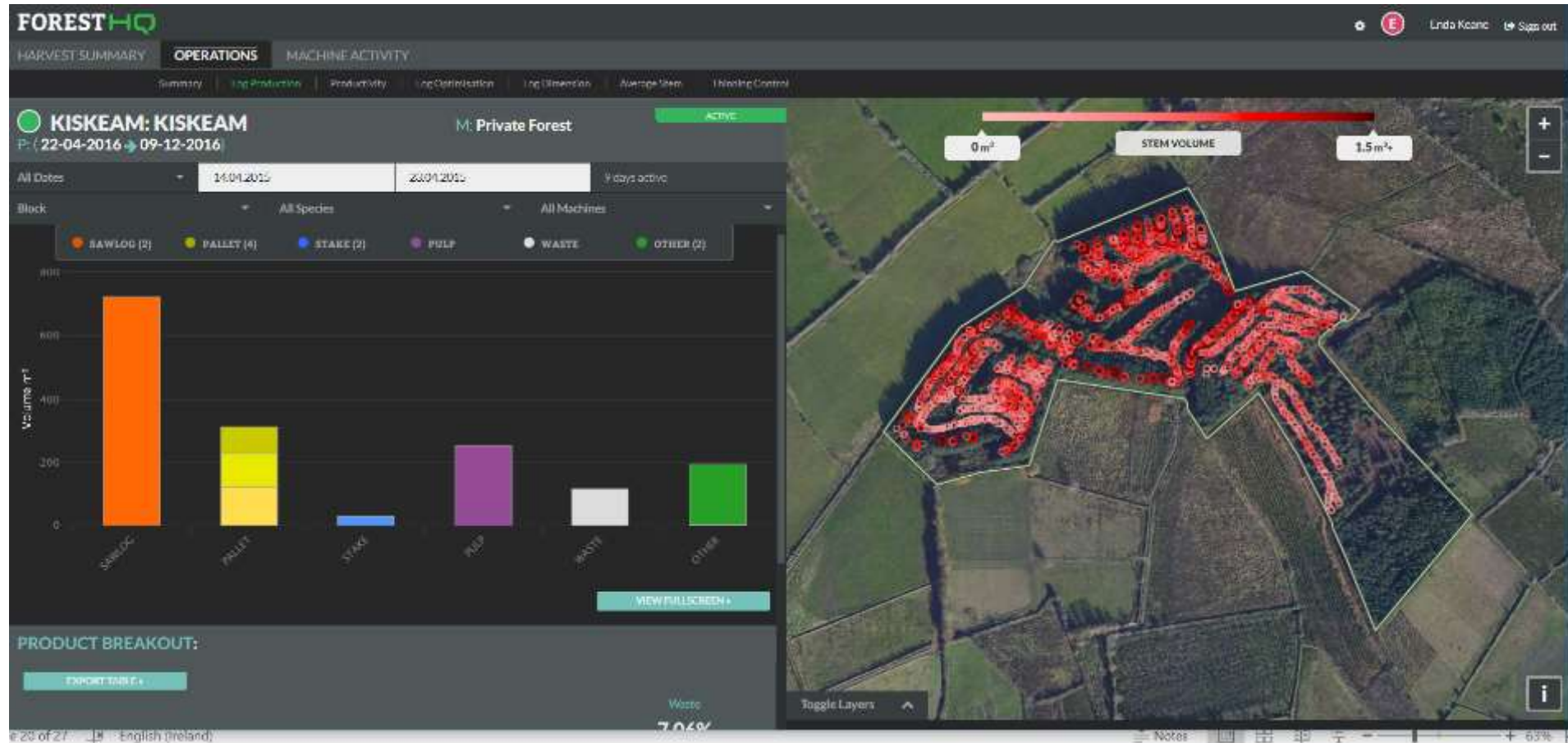




# Unique Harvest Analysis



# Unique Harvest Analysis Real Time Log Production



MANAGE

MEASURE

HARVEST

FOREST HQ



# Unique Harvest Analysis

## Small End Diameter Distribution



# Unique Harvest Analysis Small End Diameter (SED) Distribution. Identify product leakage





# Benefits to Machine Operator:



## Harvest Machine Tracking & Geo-Fence Boundary Control



# Users



- Tillhill Forestry



- Coillte



# ESA Key Principles



- User Requirements
- Knowledge and experience of the user built into the system
- Intuitive User Interface



# ESA Earth Observation



- Satellite Mapping System
- Forest Management Platform



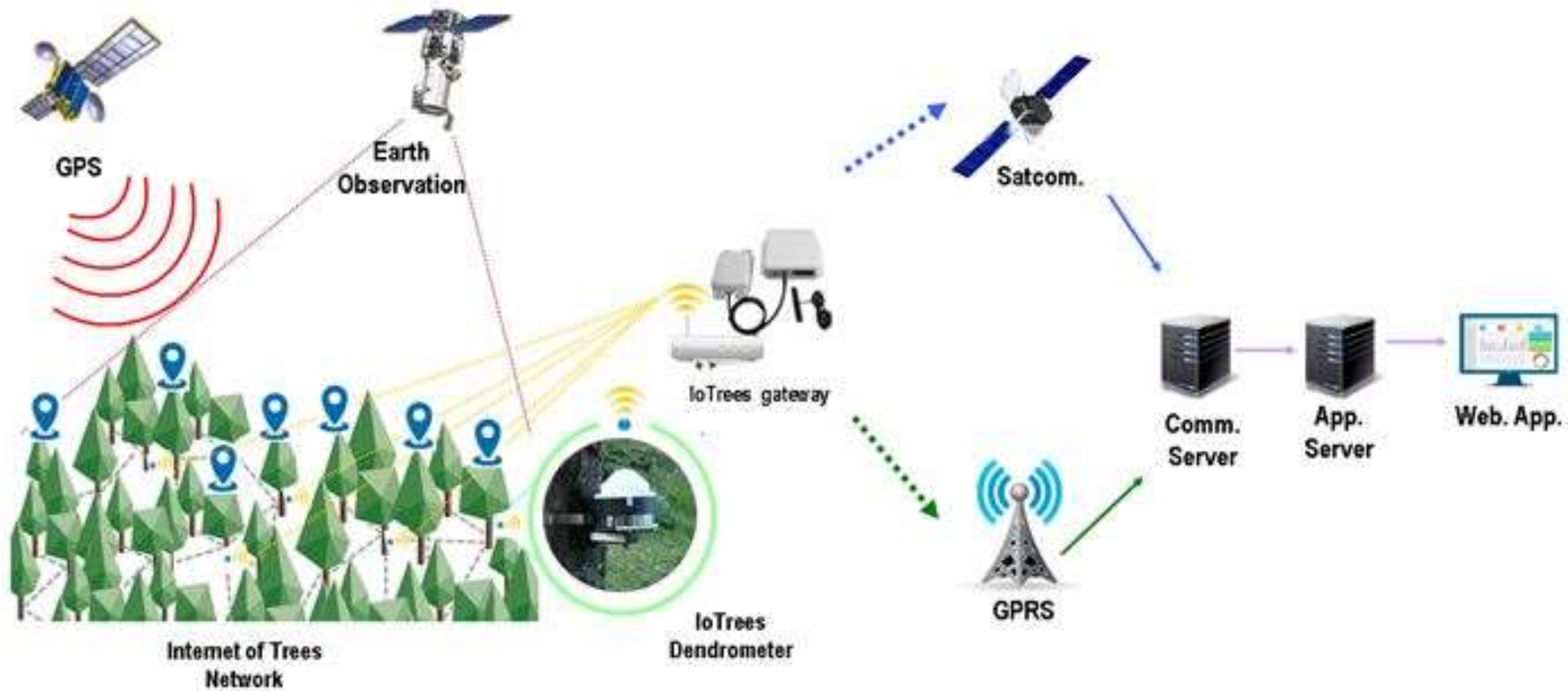
MANAGE

MEASURE

HARVEST

FORESTHQ





# Treemetrics Latest Innovation Internet of Trees™



# IoTrees: LPWAN enabled Dendrometer

Designed to last for  
minimum 10 years

Low Battery consumption

LORA protocol

Transmits tree diameter  
measurements monthly



# Evolution of Technology



2005



2012



2017

# What's next: Machine based Lidar



**Fusion of GPS &  
Lidar Data**

MANAGE

MEASURE

HARVEST

**FOREST**HQ



# What's next for Treemetrics?



Forwarder Application for Roadside Sock





# Latest Mega-Trends

- Big Data Analytics
- Artificial Intelligence
- Automation
- Virtual Reality
- Augmented Reality
- Drones

**What does this all mean for the future role of the forester?**

[www.treemetrics.com](http://www.treemetrics.com)

[enda@treemetrics.com](mailto:enda@treemetrics.com)



**FORESTHQ**

**TREEMETRICS**

# Decision making



Every important decision can and should be supported by the application of data and analytics



# Talent Economy



- We are living in a talent economy
- A battle for the best talent
- Forestry Profession

# FORESTHQ

## Treemetrics ENABLING FORESTRY 4.0



[www.treemetrics.com](http://www.treemetrics.com)

[enda@treemetrics.com](mailto:enda@treemetrics.com)



FORESTHQ

TREEMETRICS

# Thank You All.....

## Let's enable FORESTRY 4.0

[enda@treemetrics.com](mailto:enda@treemetrics.com)

[www.treemetrics.com](http://www.treemetrics.com)

Tel: +353 (0)21 241 4709



FORESTHQ

TREEMETRICS