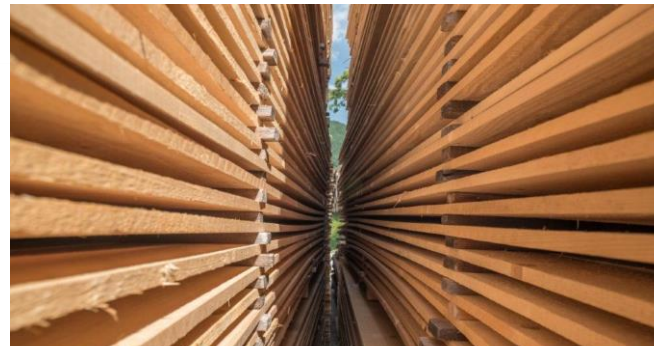




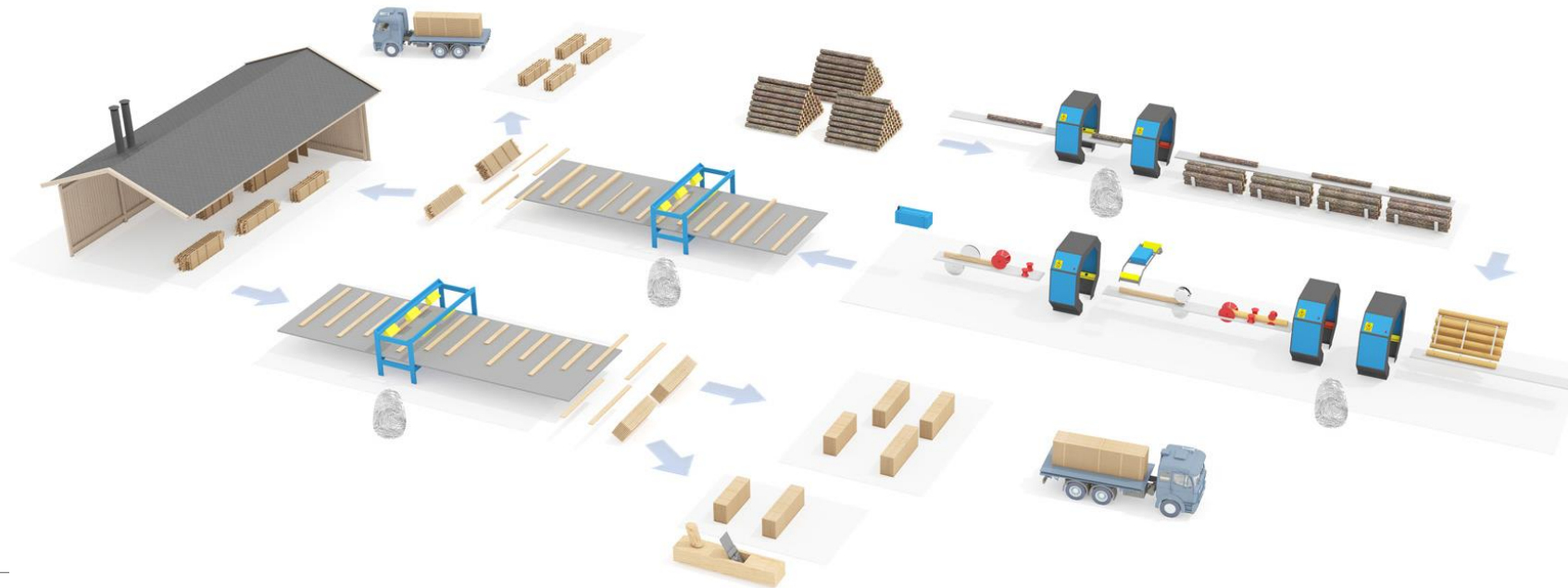
RemaSawco

CREATES THE **DIGITAL SAWMILL**



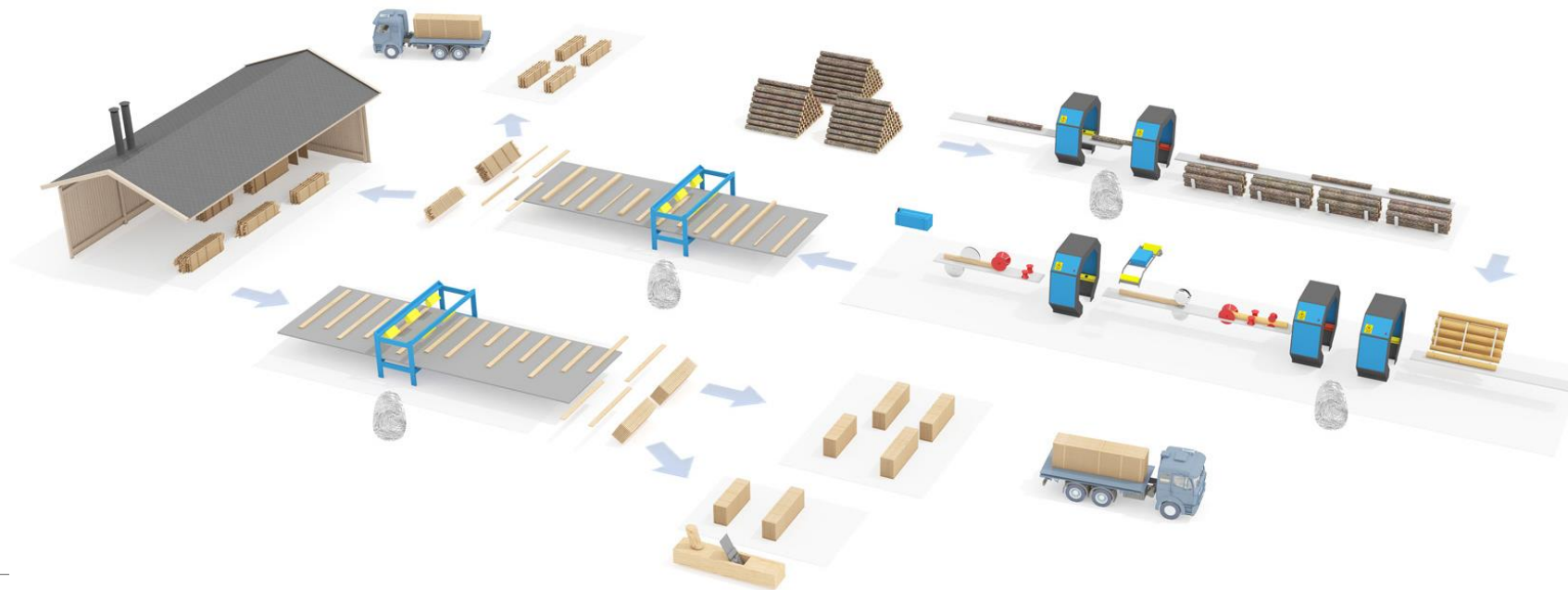
RemaSawco

- Limab Oy köptes upp i juni 2018
- 90 anställda
 - Sverige: Västerås, Nyköping, Sundsvall, Linköping, Skellefteå
 - Norge: Kirkenær
 - Finland: St Michel, Helsingfors



RemaSawco

- Omsättning: 190 MSEK
- Rörelsemarginal: 7-10%
- R&D investeringar: ca 15 MSEK per år
- Produktfamiljen sträcker sig från Timmersortering till hyvellinjer
- Samtliga produkter är egenutvecklade och egenägda.



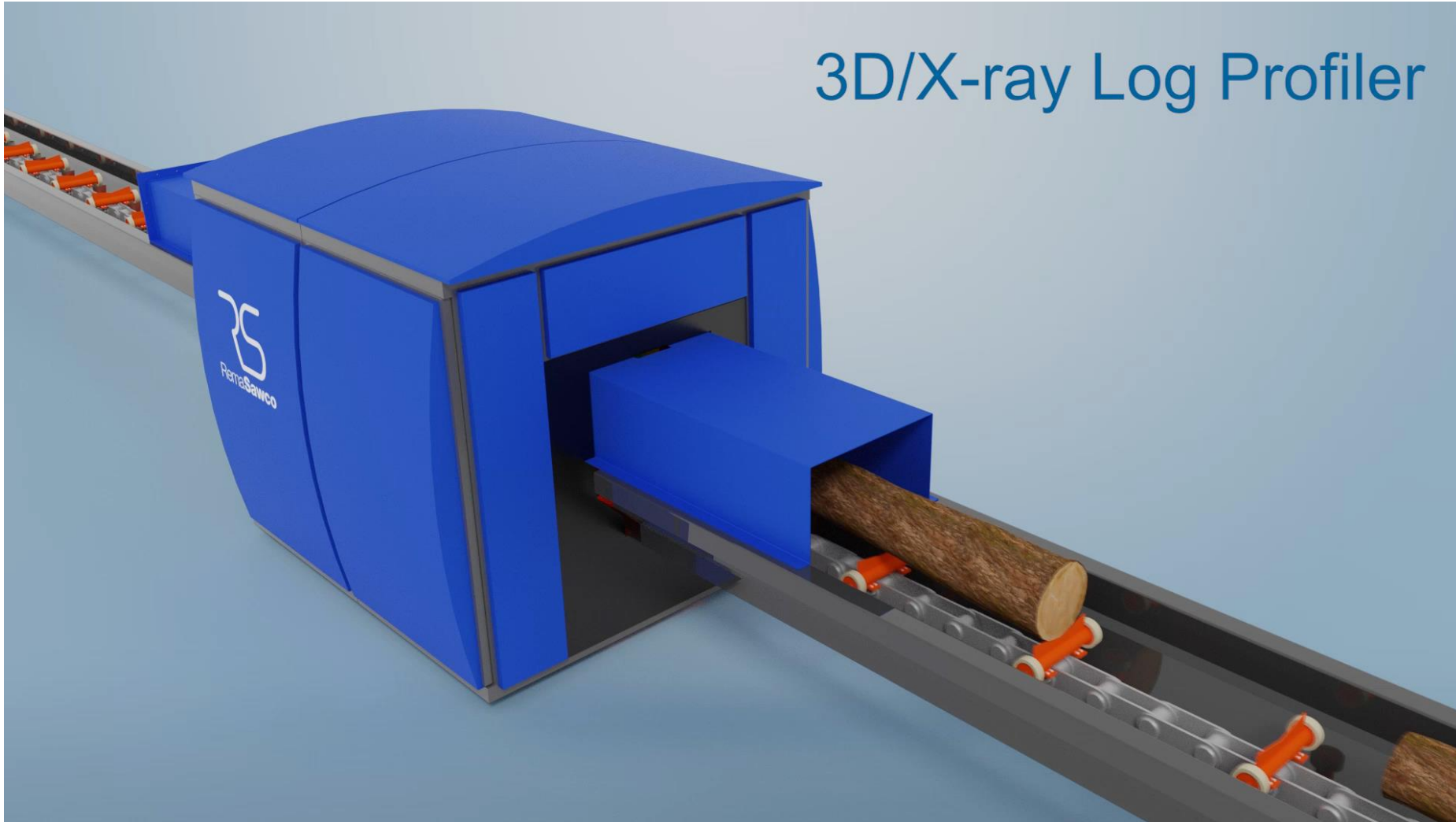
Nyttomål med det Digitala Sågverket

Projektet har drivits fokuserat mot ett antal kvantifierade ekonomiska målsättningar, typ intelligentare sortering, bättre optimering av köpt råvara samt anläggning, sänkt energiförbrukning, kortare stopptider mm

Målen har sedan aggregerats i två huvudmål som ska uppfyllas;

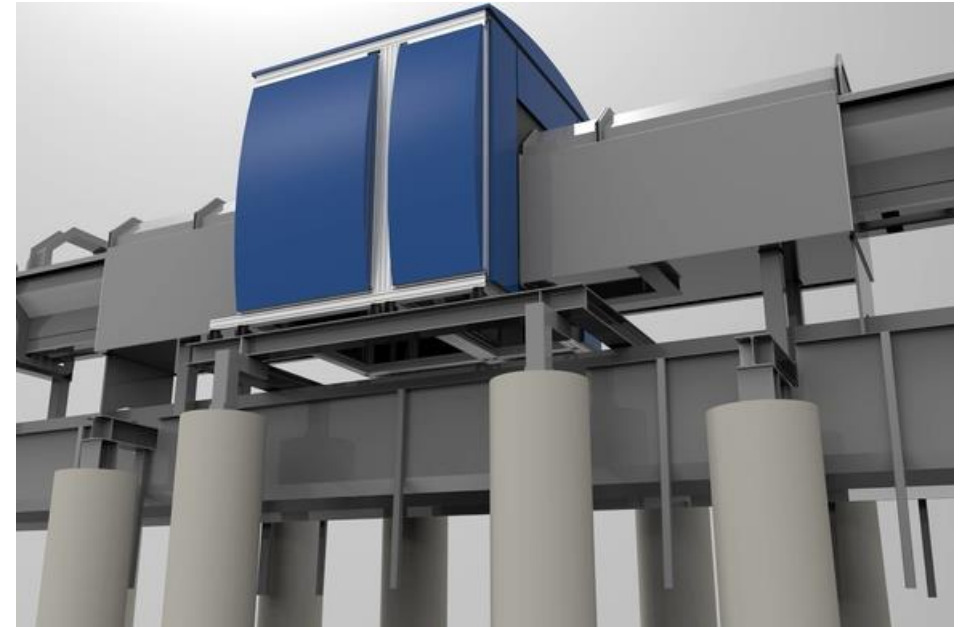
- Processeffektiviteten ska öka med 10%
- Slutkundsvärdet ska öka med 10%, givet samma råvarukostnad.

3D/X-ray Log Profiler



RS-XRay – Sorteringsmöjligheter

- Kundenspecifik sortering
 - Fingerskarv
 - Komponent
 - Friskkvist
- Styrkesortering
- Densitet
- Metalldetektion
- Diameter under bark
- Första station för AIS/DDS
- Semiautomatisk inmätning



Digital Products

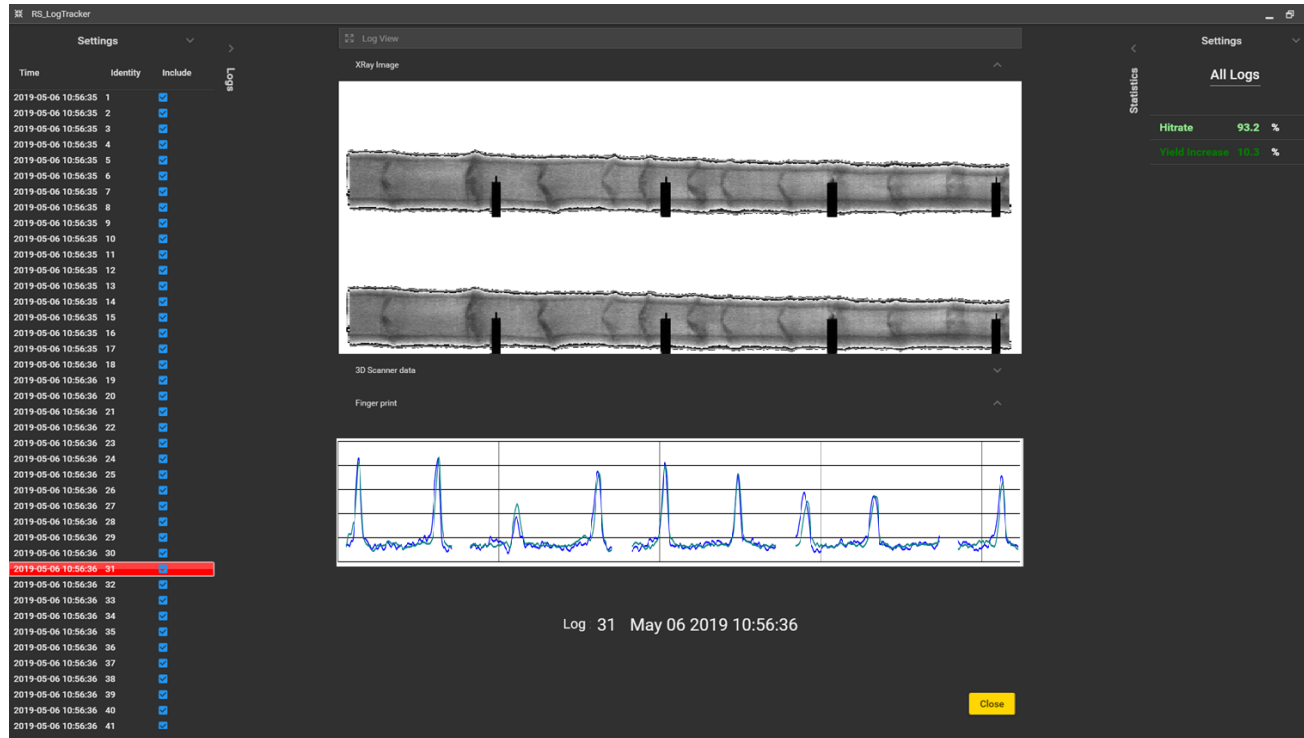
RS-LogTracker



- Unique identifier for each log
 - Fingerprint data
- KPI Viewer
 - How many logs have been matched
- API
 - Extract data for logs
- Viewer
 - View logdata

RS-LogTracker

Log Viewer



- Log data from LogProfiler
- X-ray image of log
- Graphic of the unique log fingerprint
- Shows that log fingerprints are stored from X-ray

Digital Products

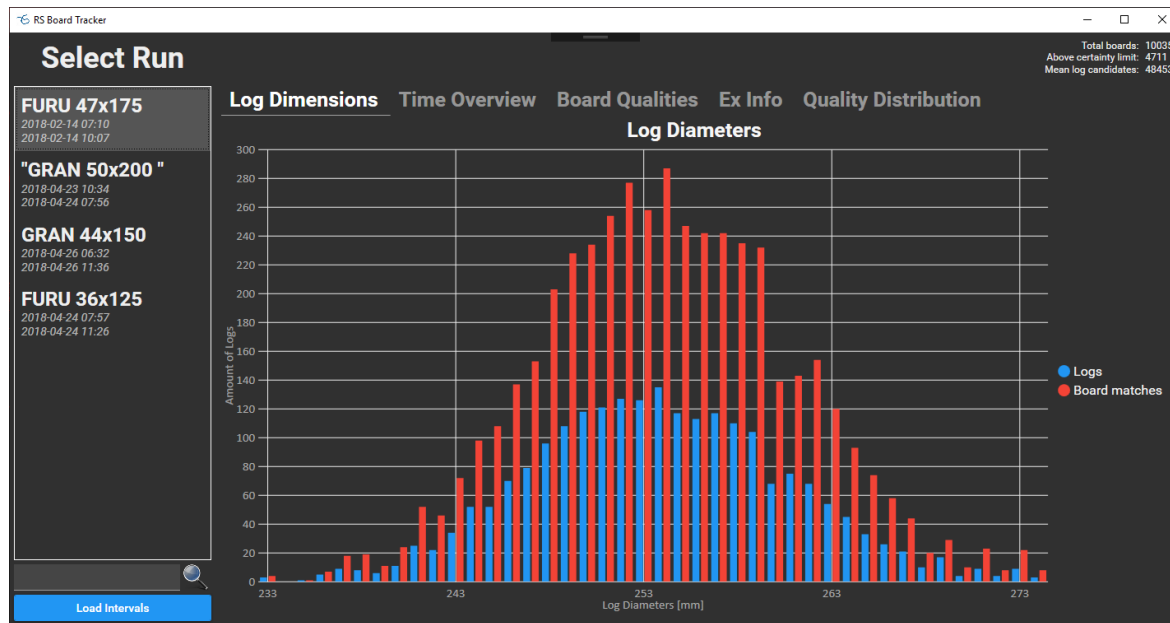
RS-Boardtracker



- Unique identifier for each board
 - Fingerprint data
 - Reference to the log
- KPI Viewer
 - How many boards have been matched
- API
 - Extract data for boards
- Viewer
 - View data

RS-BoardTracker

View and analyze matched data from logs and boards

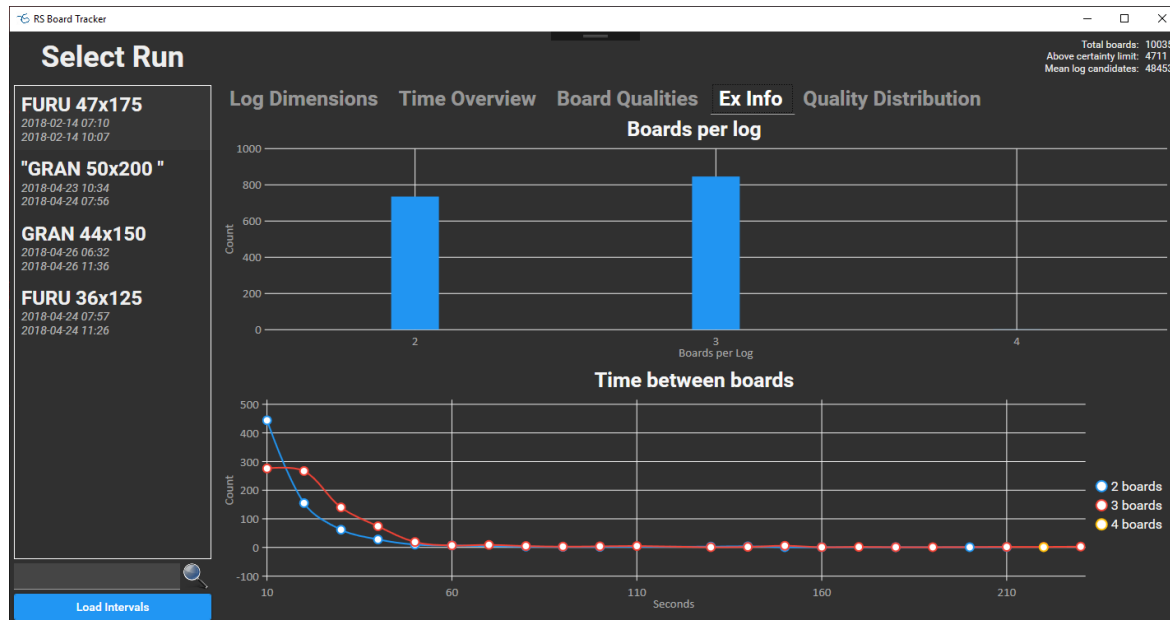


- Match boards to logs
 - Use BSQ and LogProfilerX data
- User can analyze matched data and select data for improvements in the board manufacturing process.
- Shows diameter data for logs and their corresponding boards. Bars indicate number of items (boards or logs).

RS-BoardTracker

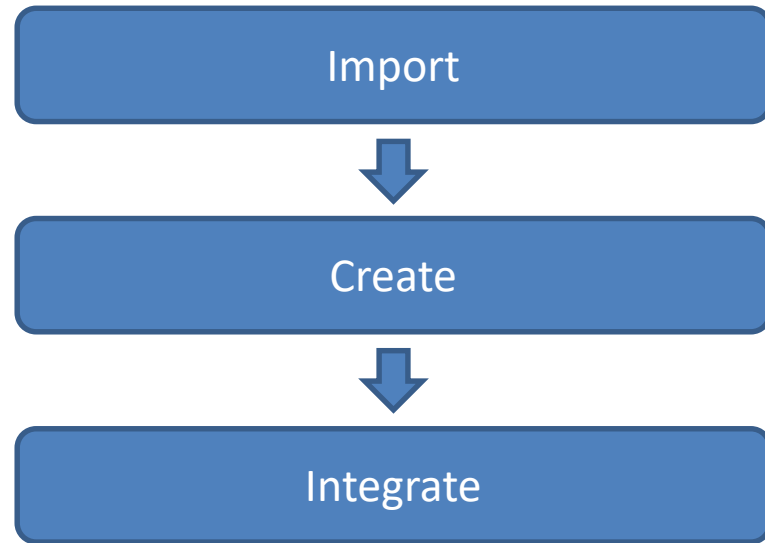
View and analyze matched data from logs and boards

Shows count of pieces in log and time through sorting line to show reliability. Qualities show how different production steps affect quality. Easiest analyze, look for highest quality and check where most boards are reduced in quality at previous steps. Look for shorter graphs.



Digital Products

RS-ModelCreator

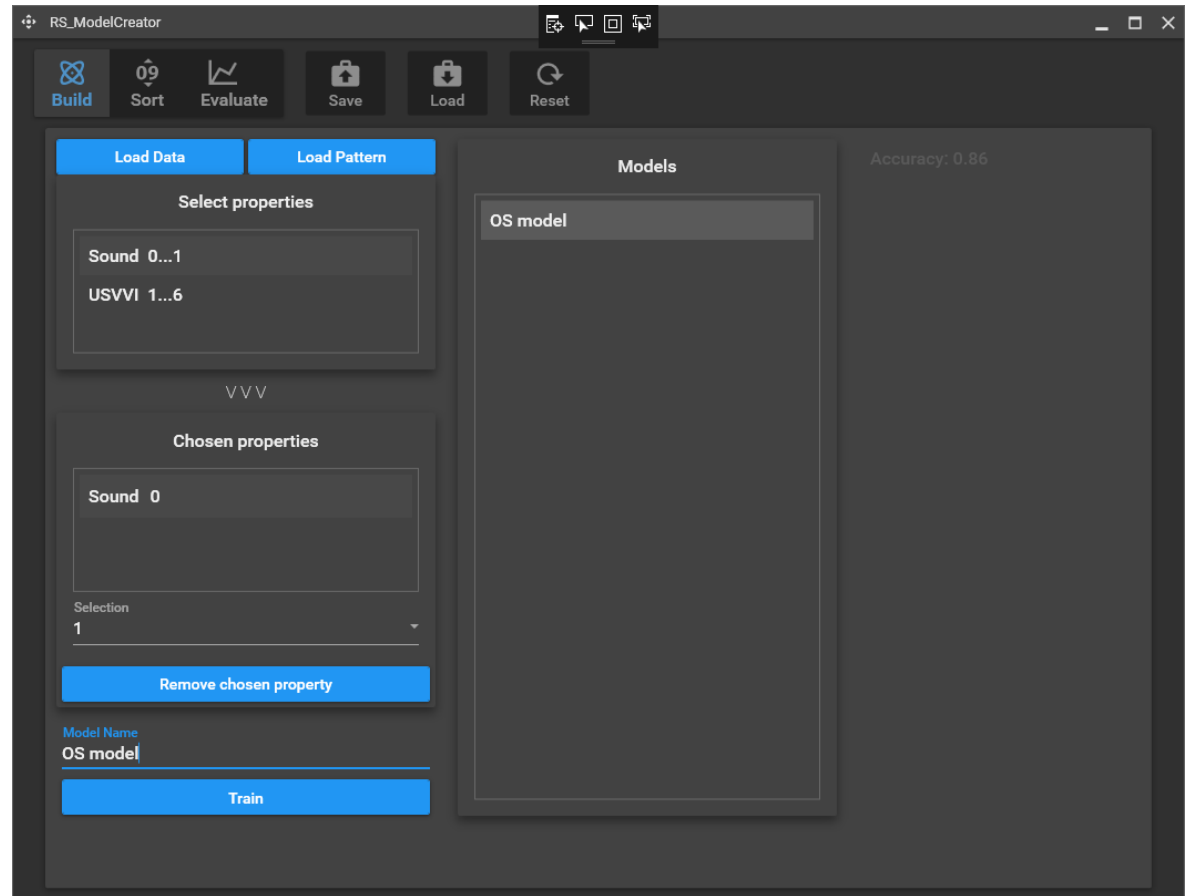


- Use historical data from logs and boards to improve x-ray models for log sorting
- Automate today's manual steps to export and handle data
- Measure result over time

RS-ModelCreator

Use AI to create models for quality sorting

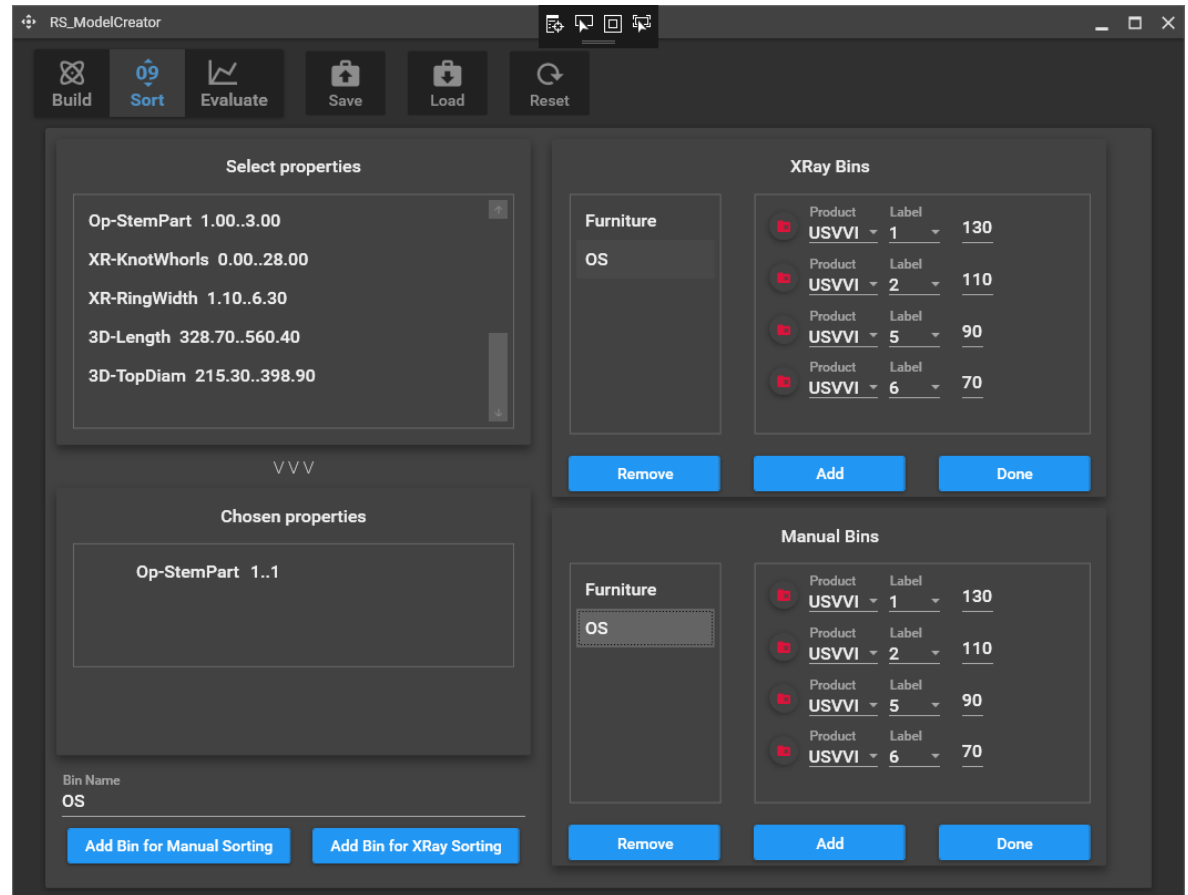
- User-friendly & fast!
- Using new or historical data
 - RS BoardScanner sawn grades,
 - Grades for payment,
 - Species, etc.
- Based on latest scientific kits for AI
 - Easy to keep up to date with new machine learning developments



RS-ModelCreator

Use AI to create models for quality sorting

- Set-up a simulated log sorting using the AI models
- Compare with a reference log sorting



RS-ModelCreator

Use AI to create models for quality sorting

- See distribution of **sawn grades** in all bins – easy to fine tune sorting!
- See value increase of new sorting



Digital Products

RS-OversizeViewer

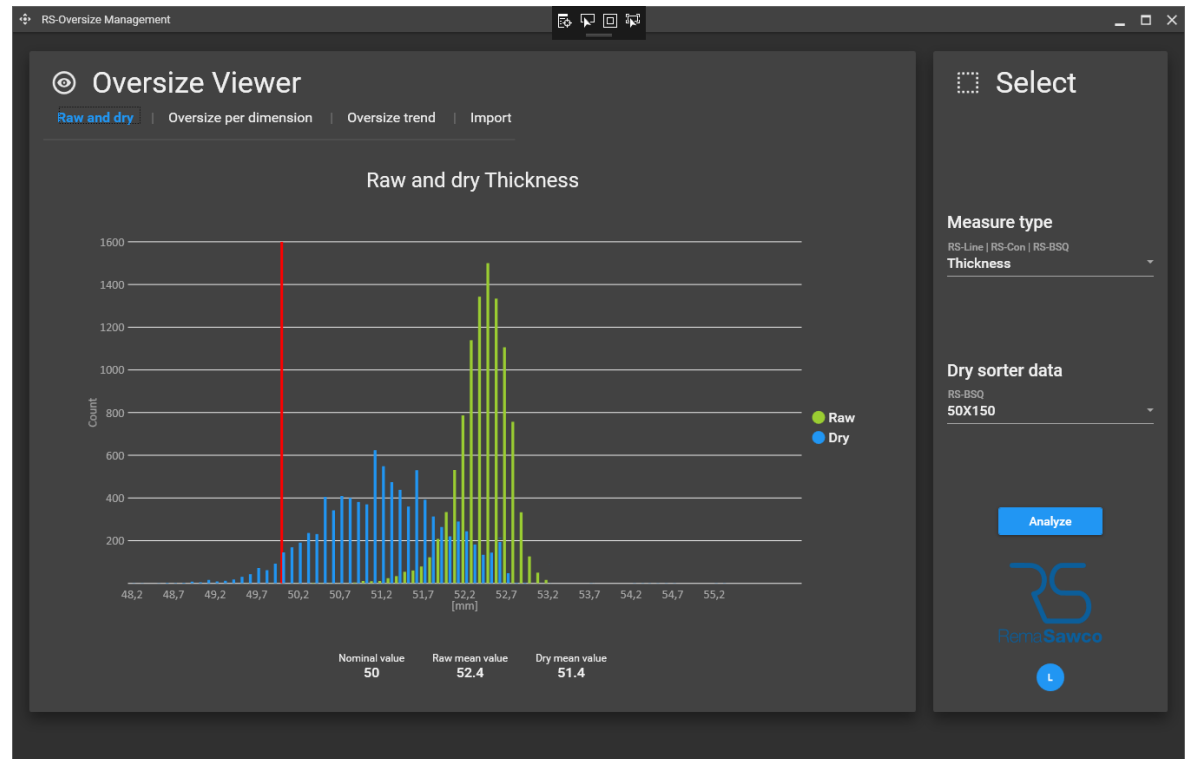
- Use historical data combined with measurement data from the sawline to trim the saw settings.
- Proof-of-concept in Valåsen
 - RS-Line and RS-Con data matched with data from the Boardscanner
- Info client in the office
 - Trending oversize
 - Help the sawmill to trim their production to reduce oversize = \$\$\$



Digital Sawmill

RS-OversizeViewer

- Histogram of board dimensions
 - before drying
 - After drying
 - Nominal value
- Clear view of how far off the dry dimensions are from the nominal value.



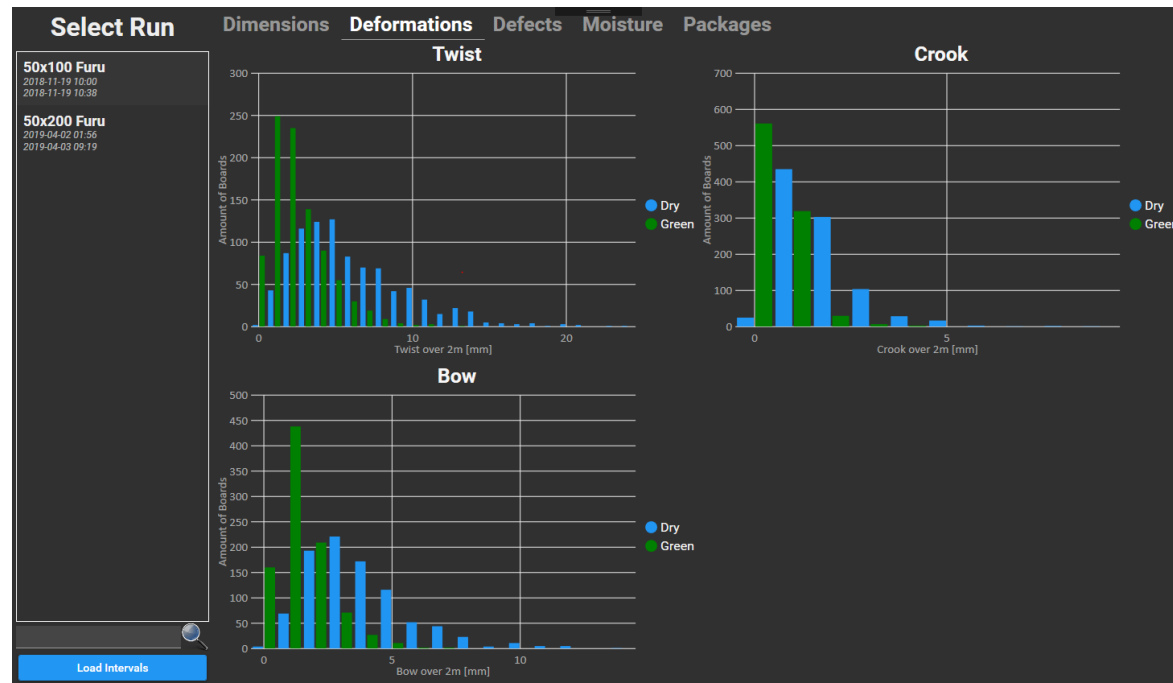
Digital Products

RS-DryOpt

- Dry kiln optimization
 - Use data from the green sorting, from RS-ProSort and from the trim sorting.
 - Identify over dried boards -> increase the dry kiln capacity
 - Identify skewness
 - Identify defects caused by drying
- Analyze property changes of the board during the kiln process.
 - Compares profile and defect data from the boardscanners
 - BSQ needed on both sides of the kiln
- Optimizing the kiln
 - Increase production capacity
 - Reduce energy cost (1% moisture equals ~ 10% energy cost for the kiln)

RS-DryOpt

Deformation view



- Deformations
 - Spring
 - Bow
 - Crook
- Data can be used to learn more and optimize the kiln

RS-DryOpt

Package view

RS Kiln Tracker

Select Run

50x100 Furu
2018-11-19 10:00
2018-11-19 10:38

50x200 Furu
2019-04-02 01:56
2019-04-03 09:19

Dimensions

Deformations

Defects

Moisture

Packages

80029122

	Green	Dry
Avg Thickness [mm]	52.5	50.6
Avg Width [mm]	105.8	102.0
Avg Moist [%]	35.8	16.3
Avg Twist [mm]	3.0	6.8
Avg Bow [mm]	1.5	3.3
Avg Crook [mm]	1.1	2.3
Avg Shake [mm]	54.8	147.0

80030160

	Green	Dry
Avg Thickness [mm]	52.3	50.4
Avg Width [mm]	105.9	102.0
Avg Moist [%]	35.6	16.2
Avg Twist [mm]	3.0	6.6
Avg Bow [mm]	1.7	3.8
Avg Crook [mm]	0.9	2.1
Avg Shake [mm]	53.3	150.2

8003198

	Green	Dry
Avg Thickness [mm]	52.3	50.4
Avg Width [mm]	106.1	102.2
Avg Moist [%]	32.6	14.8
Avg Twist [mm]	3.0	6.7
Avg Bow [mm]	1.9	4.3
Avg Crook [mm]	1.0	2.2
Avg Shake [mm]	45.5	136.8

80032127

	Green	Dry
Avg Thickness [mm]	52.2	50.3
Avg Width [mm]	105.9	102.1
Avg Moist [%]	32.7	14.8
Avg Twist [mm]	3.3	7.2
Avg Bow [mm]	2.1	4.5
Avg Crook [mm]	1.0	2.2
Avg Shake [mm]	58.1	164.8

80033157

	Green	Dry
Avg Thickness [mm]	52.3	50.4
Avg Width [mm]	106.0	102.2
Avg Moist [%]	33.0	15.0
Avg Twist [mm]	2.8	6.1
Avg Bow [mm]	2.2	5.0
Avg Crook [mm]	1.0	2.3
Avg Shake [mm]	44.5	133.5

80034110

	Green	Dry
Avg Thickness [mm]	52.4	50.5
Avg Width [mm]	106.1	102.3
Avg Moist [%]	35.0	15.9
Avg Twist [mm]	2.4	5.4
Avg Bow [mm]	1.9	4.4
Avg Crook [mm]	0.9	2.0
Avg Shake [mm]	41.9	122.9

<

- The board data could also be tracked back to each package from the green sorting
- With this data it is possible to track potential problems

What's next?

The digital wood value chain is the topic of a new EU project



- RemaSawco: Technology provider for the digital sawmill
- Moelven: industry partner for demo installations
- 10 research partners from all EU: Tecnalia, RISE, VTT, FCBA, TUM, Lund...

