WOODTECH
MEASUREMENT SOLUTIONS

Timber Measurement Society Central Meeting 2015

Dr. Rodrigo Palma-Amestoy

Who is he?

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Who is he?

Electrical Engineer

PhD on Electrical Engineering

Machine learning

Artificial intelligence

Robotic systems

Pattern analysis

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Who is he?

Some publications

Spatiotemporal Context integration in Robot Vision
Int. Journal of Humanoid Robotics (ISI).

A perceptually Inspired Variational Framework for Color Correction
IEEE Trans. on Pattern Analysis and Machine Intelligence (ISI)

A Real-Time Hybrid Architecture for Biped Humanoids with Active Vision Mechanisms
Journal of Intelligent & Robotic Systems

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Who is he?

Some grants and awards

SIAG/IS Prize (USA) – Most outstanding paper

CONICYT fellowship (CHILE) – Industrial researching support

ALFA Fellowship (EU) – Computer vision researching

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Research Team

Who is this team?

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Who is this research team?

Innovative

Passionate

Specialized

Creative

PhD on Electrical Engineering

Electrical Engineers

Software Engineers

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Schedule

What is the Logmeter?

How Logmeter measures logs?

What about the results?

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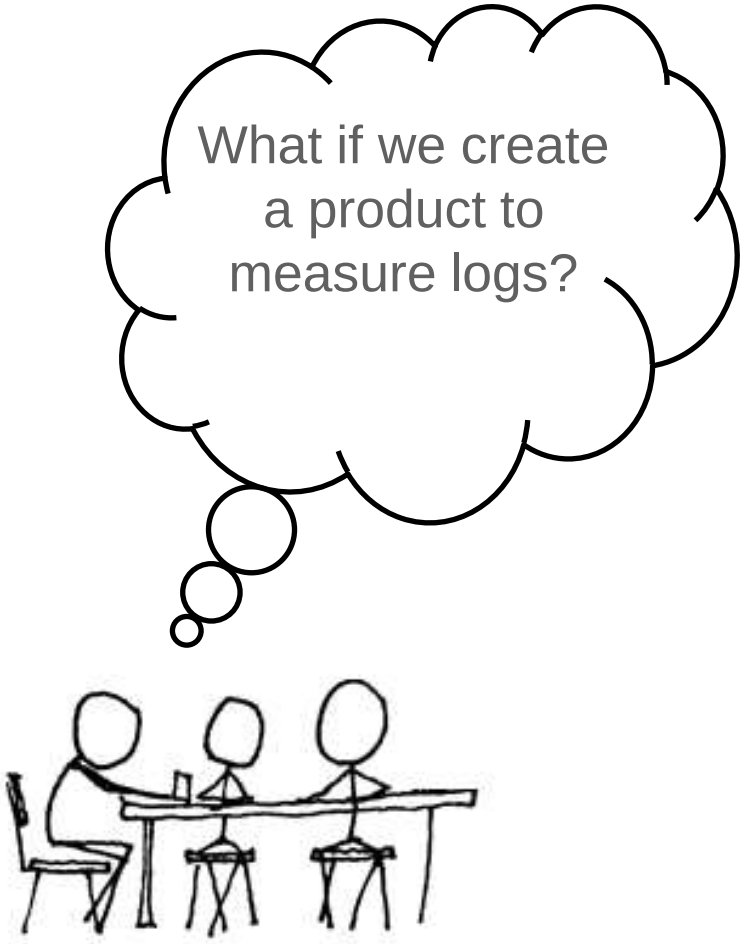
How we work?



Automatically!

Precisely!

While the logs are on the truck!

While the truck is on movement!

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What is the Logmeter?

Logmeter - Objectives

Makes high precision log models

Estimates particular log characteristics

Use measurement to classify defects

Range	Count	%	
< 7	2	2.30%	
7 - 9	31	35.63%	
9 - 11	23	26.44%	
11 - 13	22	25.29%	
13 - 15	7	8.05%	
15 - 18	2	2.30%	
18 - 20	0	0.00%	
20 - 22	0	0.00%	
22 - 24	0	0.00%	
24 - 26	0	0.00%	
>26	0	0.00%	

Log lengths estimation

Log sweeps estimation

Log diameters estimation

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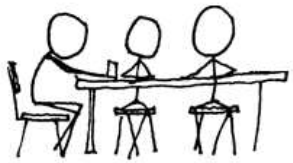
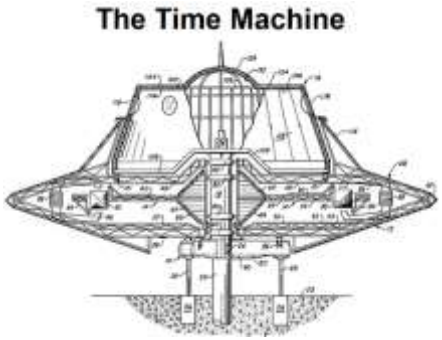
After many months…



We had some ideas!



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What is the new Logmeter?

Finally, after several years, we have a new product!

Logmeter® - measurement system

Automatic!

Bundle is on the truck!

Truck is on movement!

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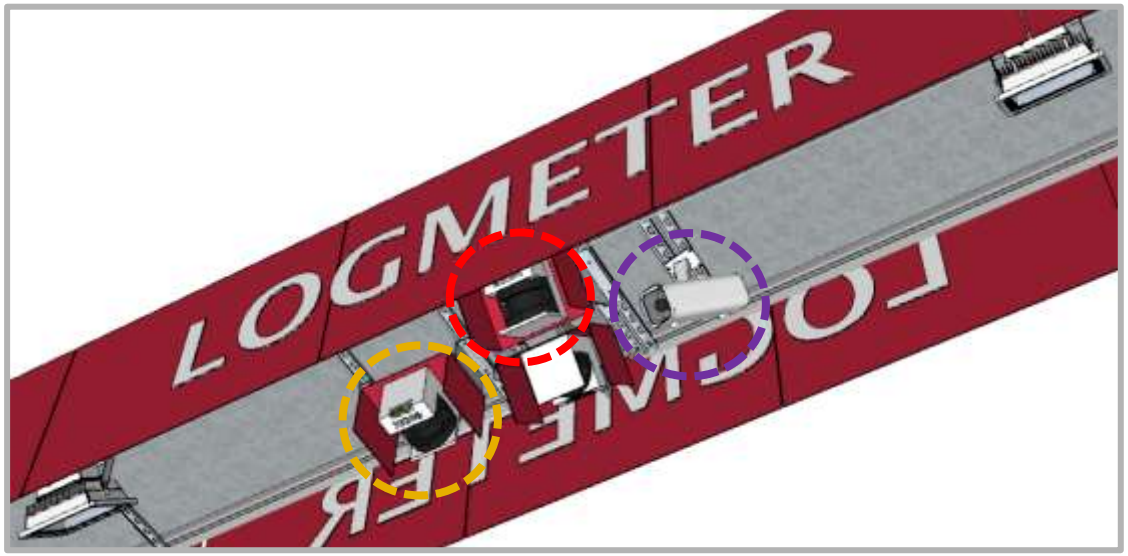
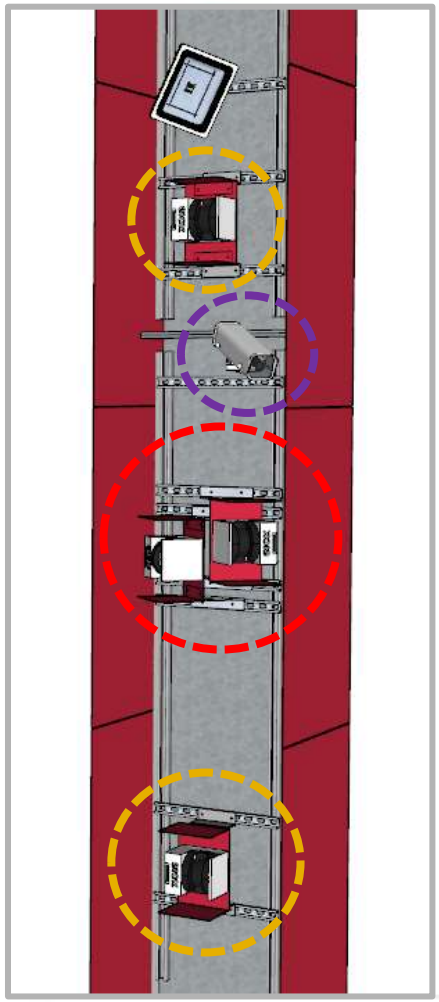
What is the new Logmeter?





Perpendicular lasers x 5

Diagonal lasers x 6

High definition cameras x 3

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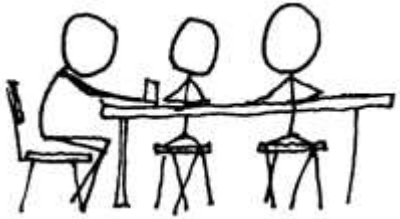
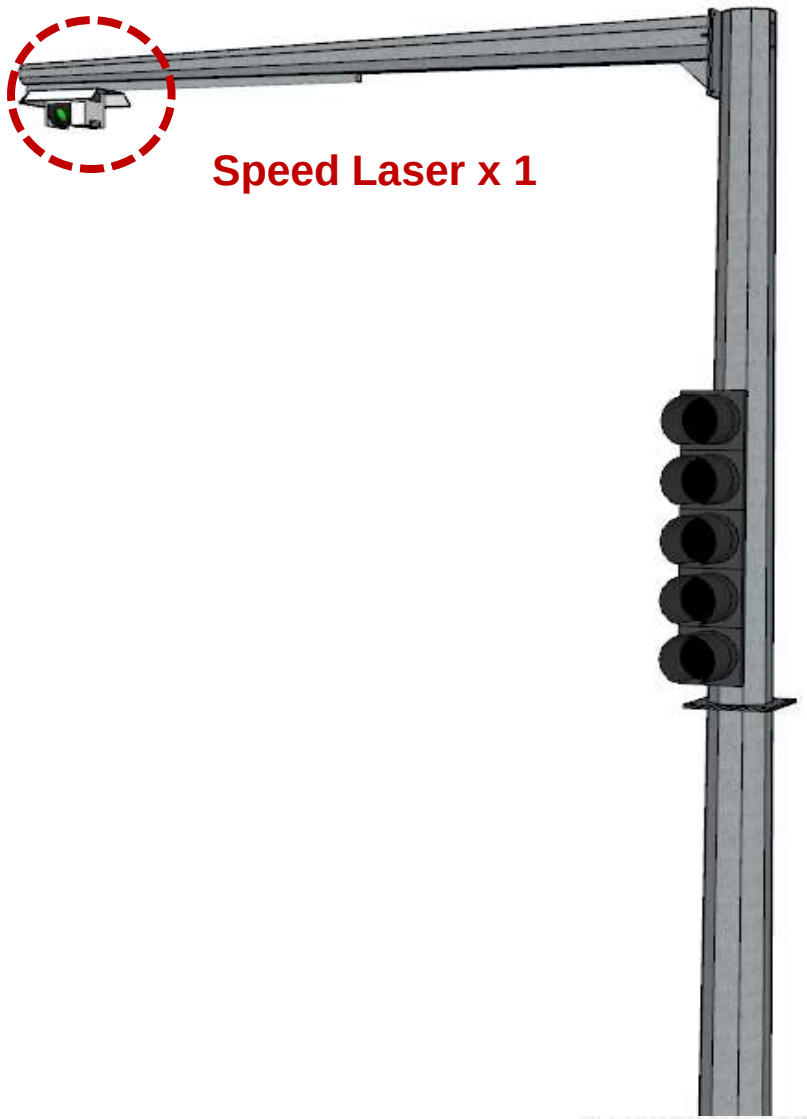
What is the new Logmeter?

We have the hardware.
Now we need the
software...





Speed Laser x 1

Schedule

What is the Logmeter?

How the Logmeter measures logs?

What about the results?

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How Logmeter measures logs?

Going to a global coordinate system

Wood bundle segmentation

Making log models

Visual defects marking tool

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How Logmeter measures logs?

Going to a global coordinate system

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How Logmeter measures logs?

Local laser information to a global system

Segmentation of the wood bundle

Making log models

Visual defects marking tool

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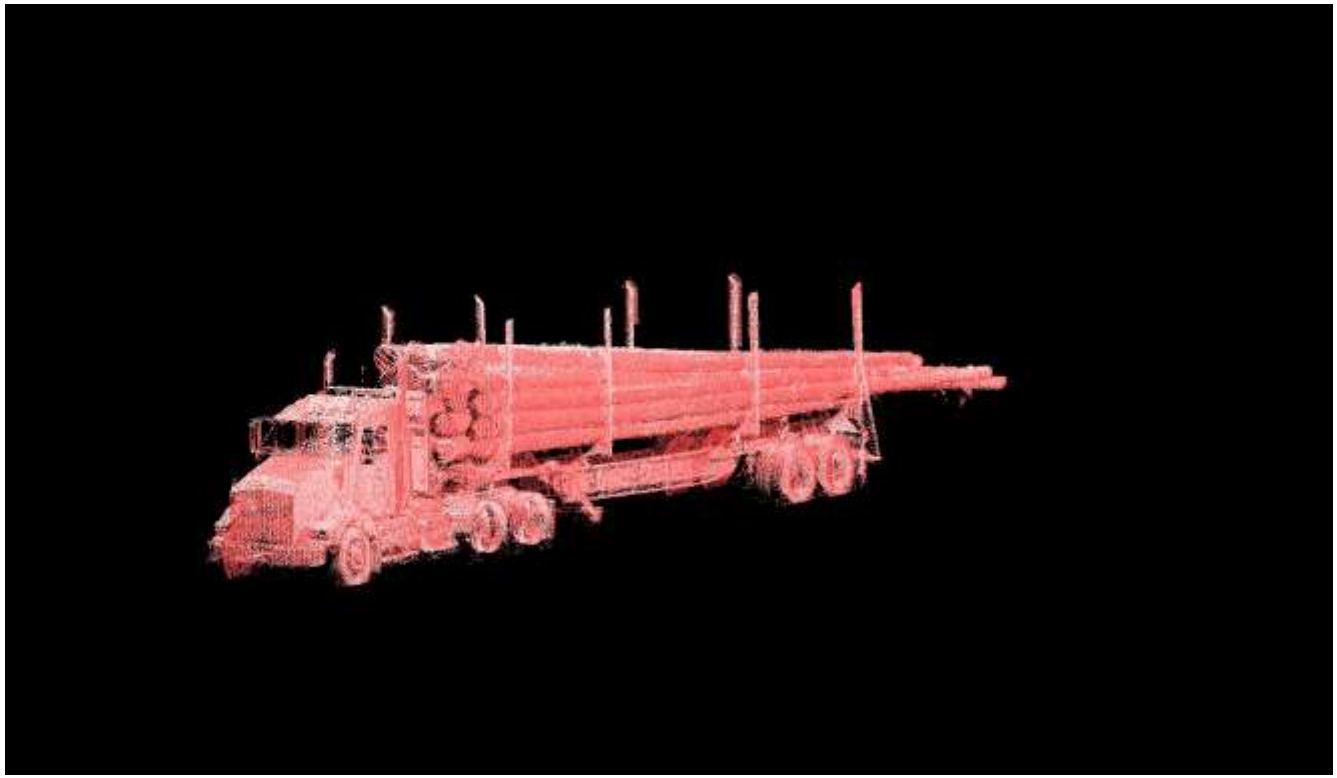

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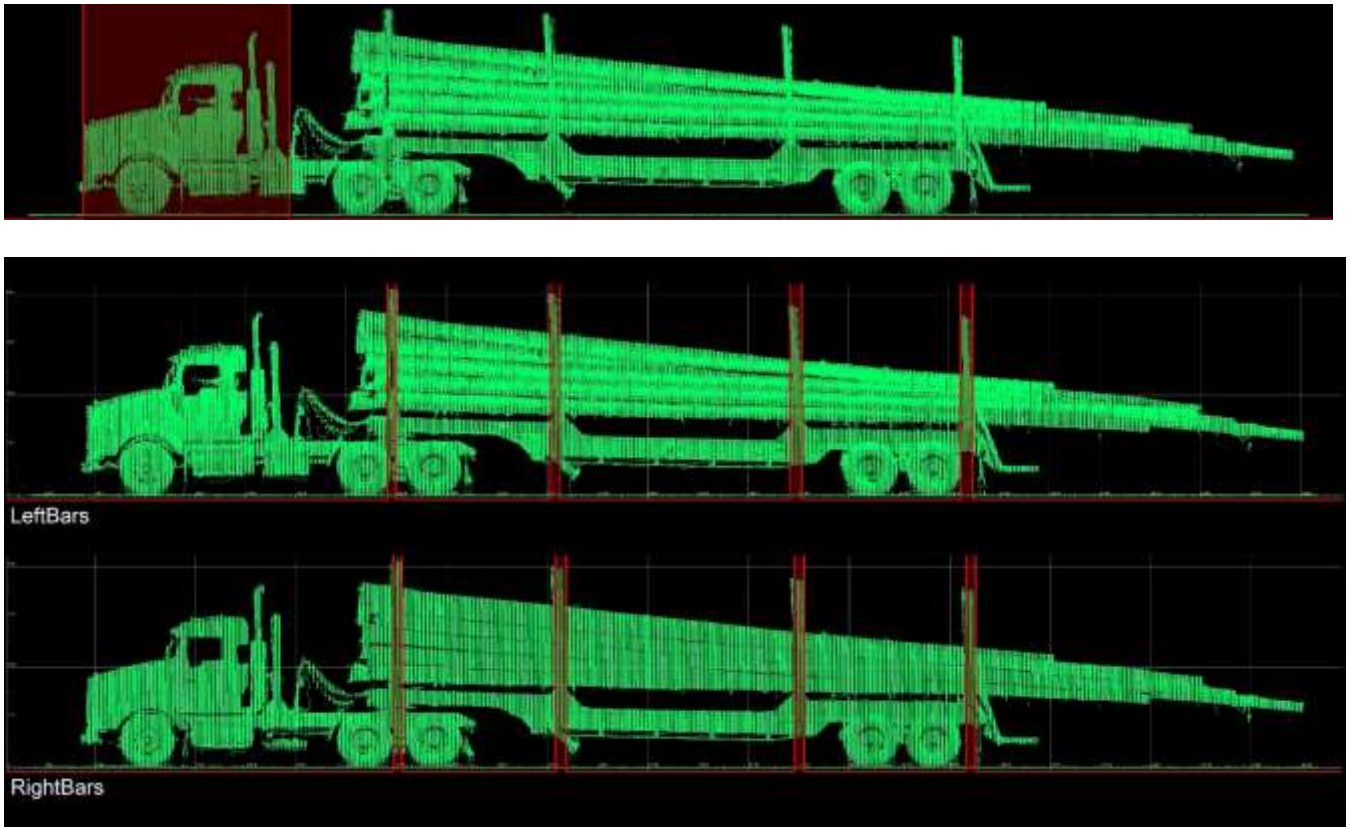
How Logmeter measures logs?

Segmentation of the wood bundle



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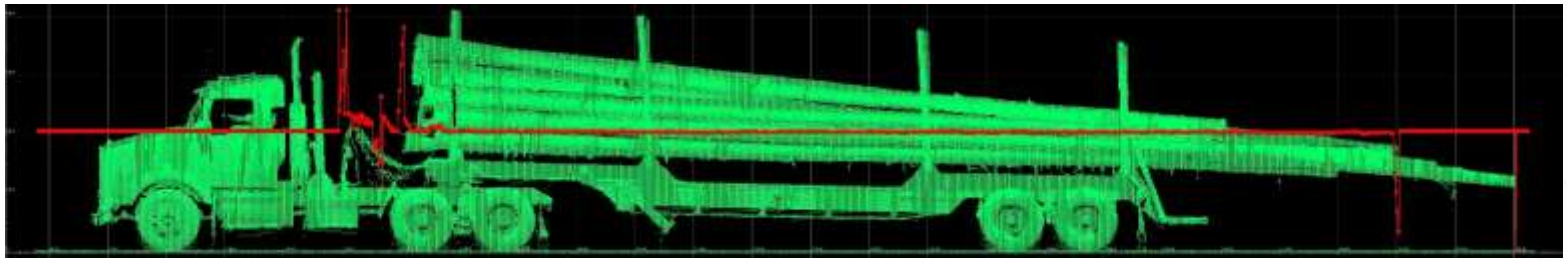

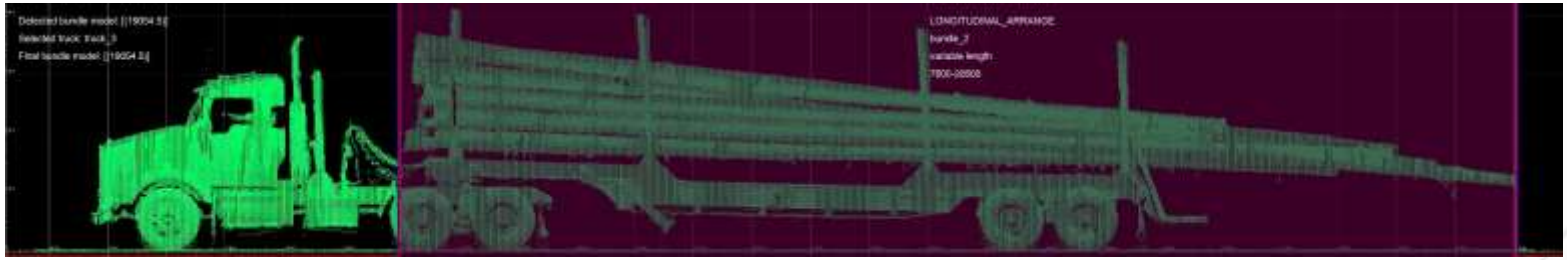

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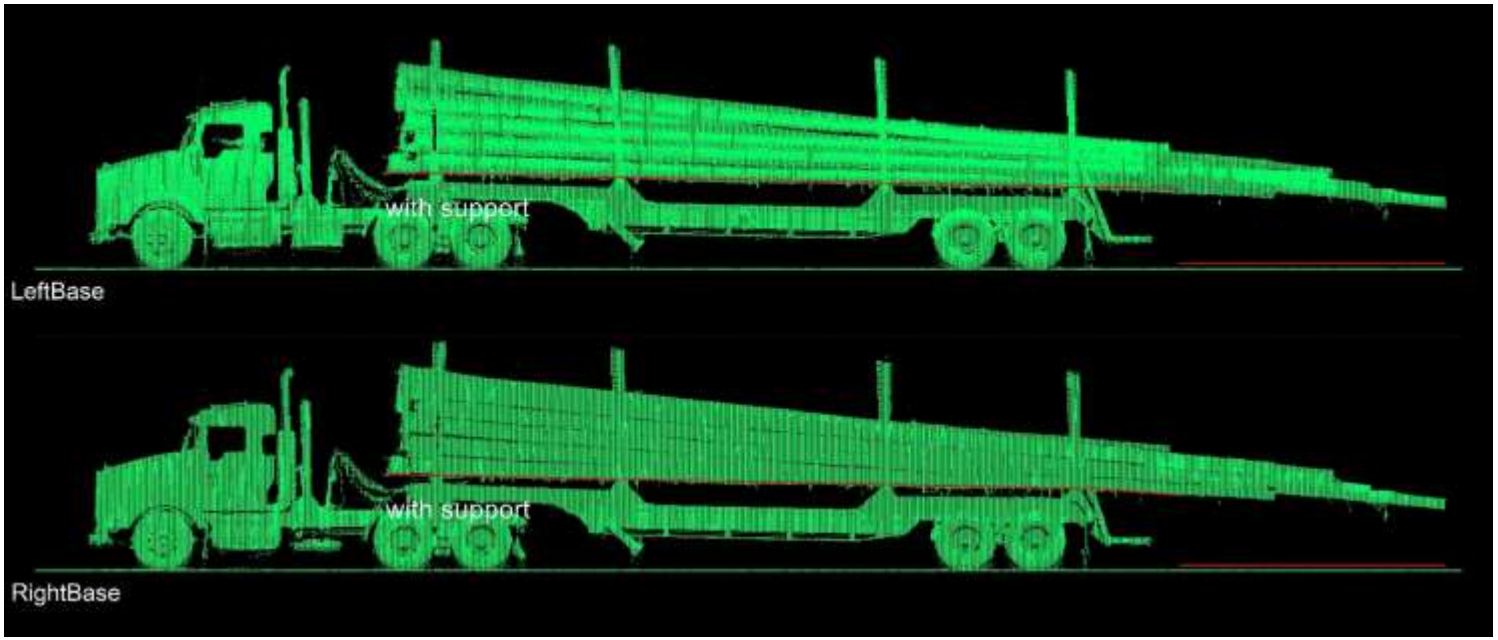

How Logmeter measures logs?

Local laser information to a global system

Wood bundle segmentation

Making log models

Visual defects marking tool

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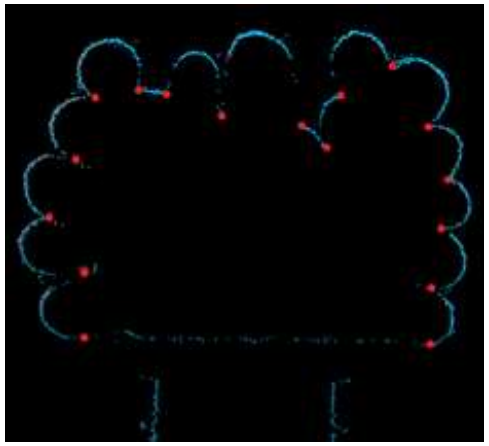
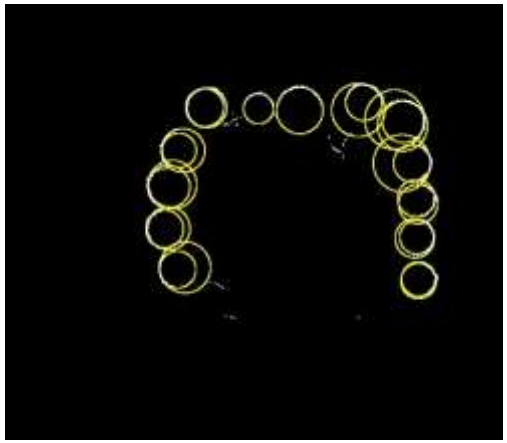
How Logmeter measures logs?

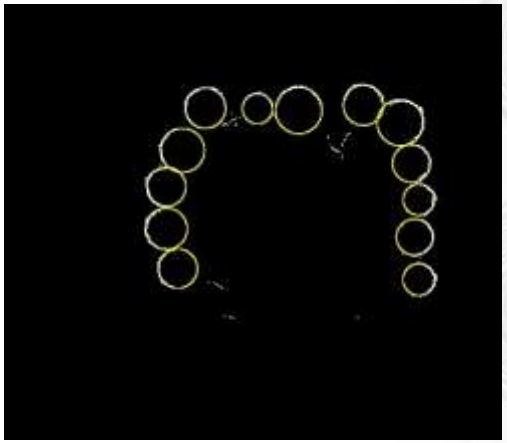
Making log models



Minutiae detection



Fitting all possible circles



Merge circles of the same logs

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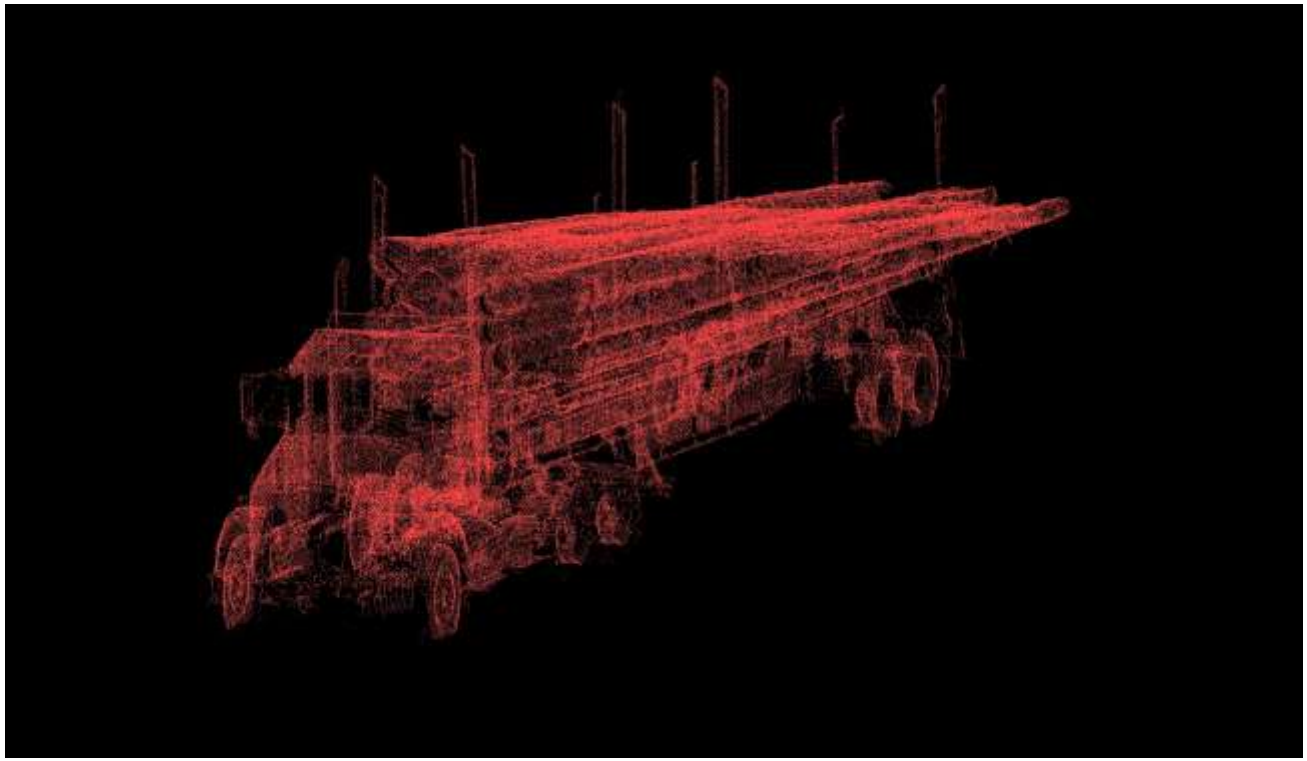
How Logmeter measures logs?

Making log models



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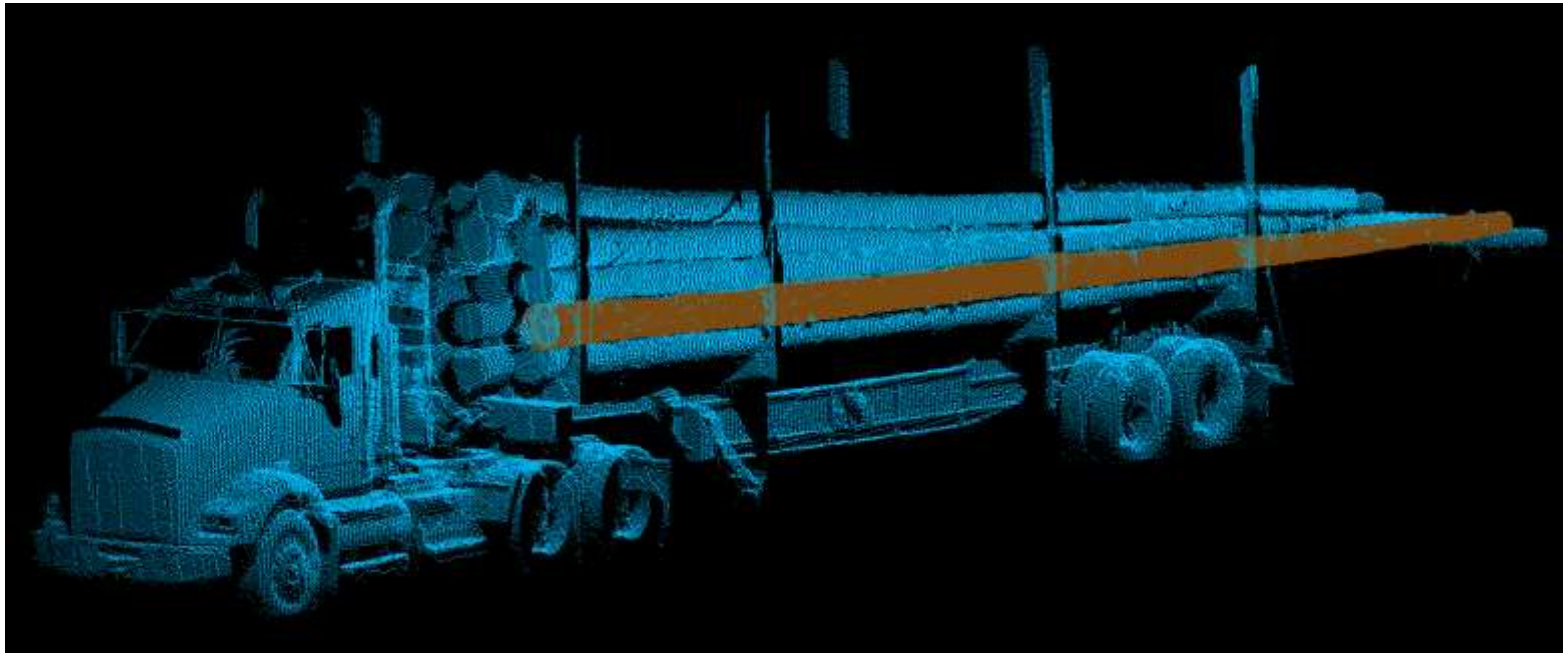
How Logmeter measures logs?

Making log models



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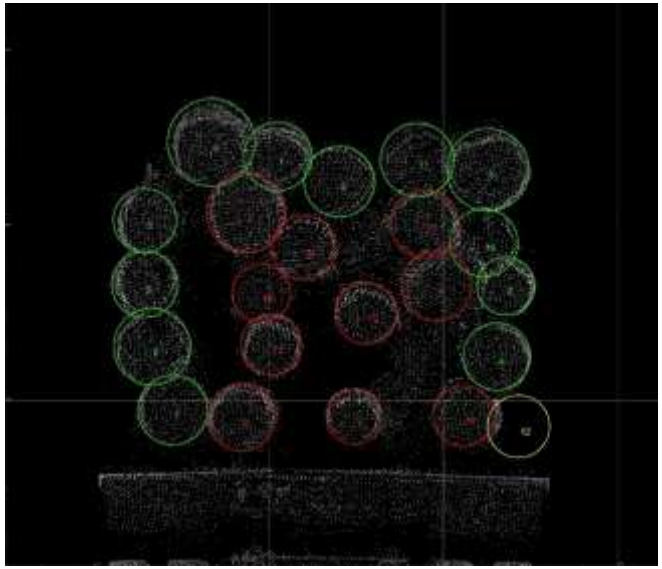
How Logmeter measures logs?

Making log models

Logs' faces detection



Matching faces and logs' segments

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How Logmeter measures logs?

Local laser information to a global system

Wood bundle segmentation

Making log models

Marking visual defect manually

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How does the Logmeter measure logs?

Marking visual defect manually

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How does the Logmeter measure logs?

Visual defects examples

Knots

Blue stain

Cankers

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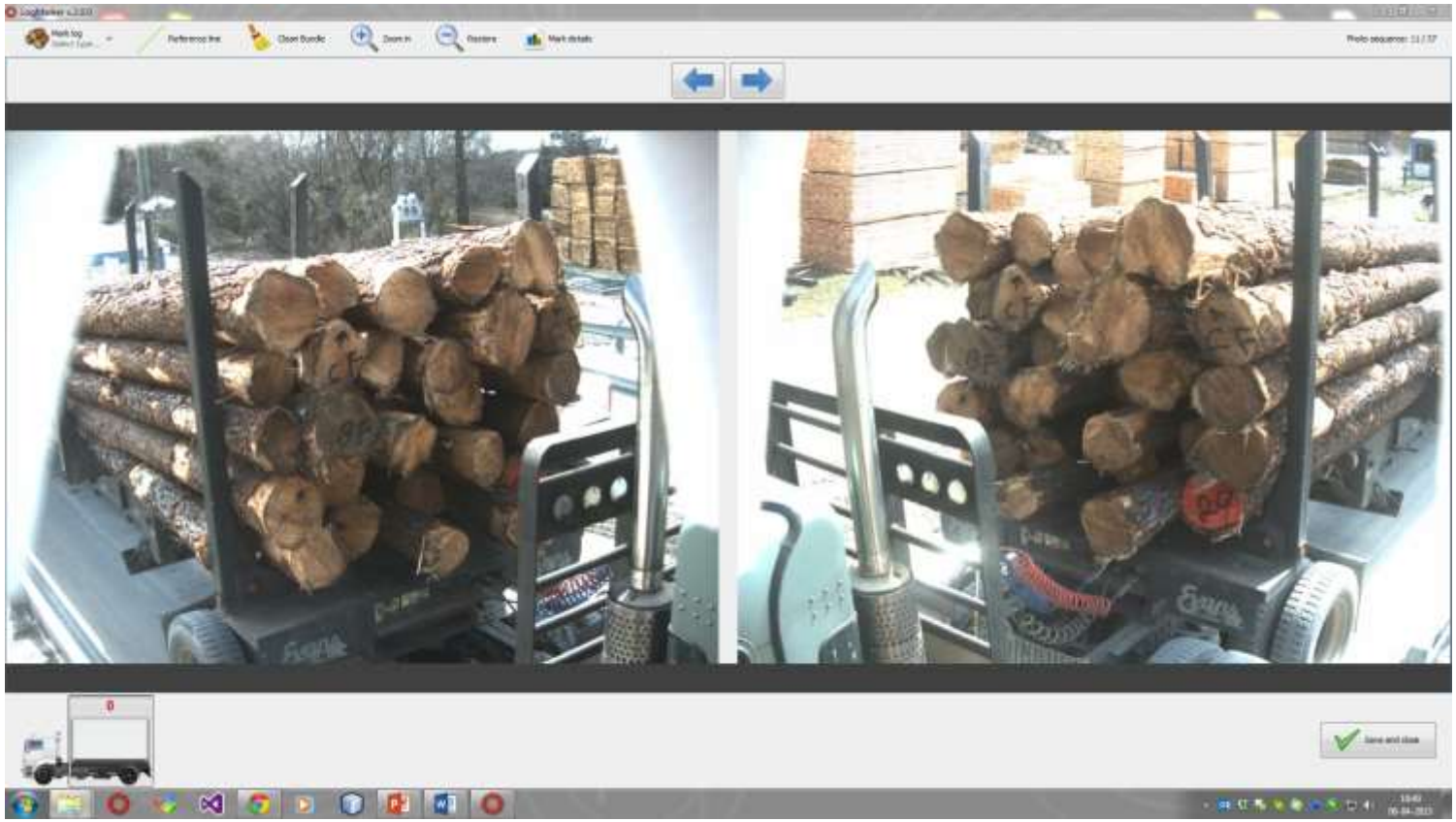
How Logmeter measures logs?

Marking visual defect manually



Logmarker®

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Schedule

What is the Logmeter?

How the Logmeter measures logs?

What about the results?

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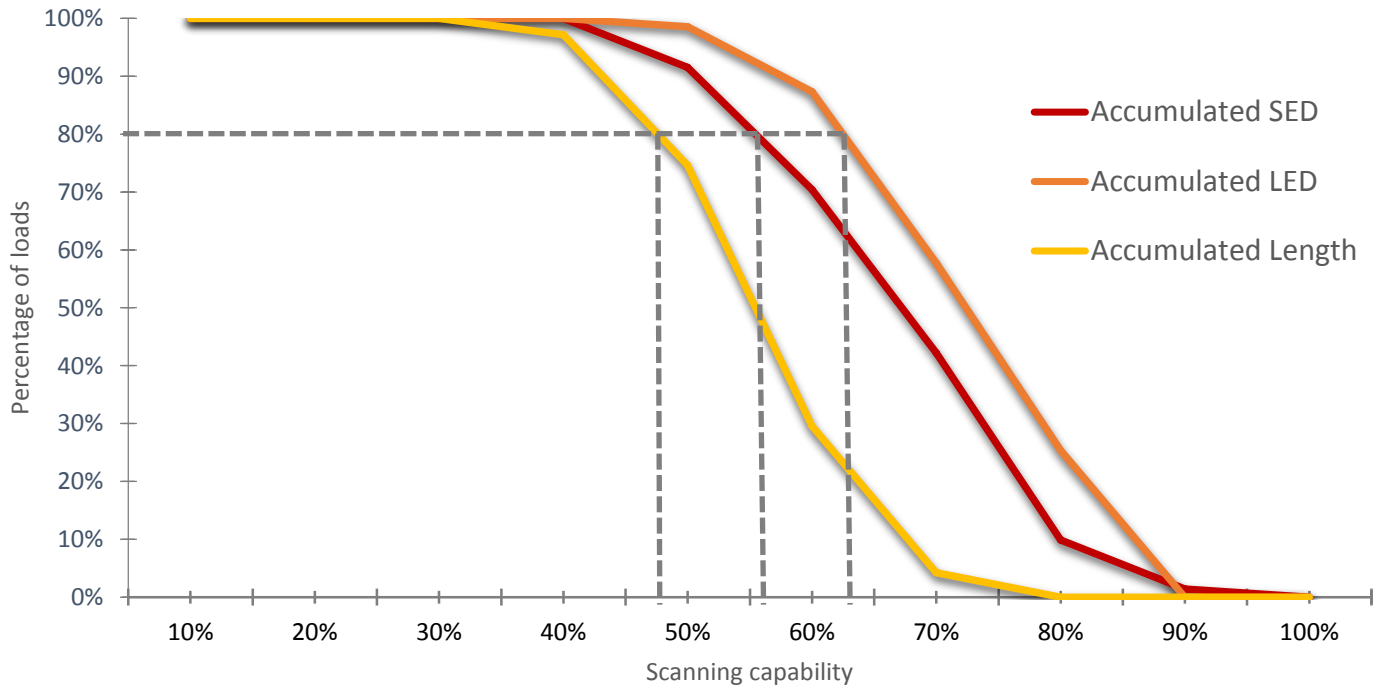
What about the results?

Scanning Capabilities



80% of loads have detected more than **45%** of length, **55%** of SED and **60%** of LED

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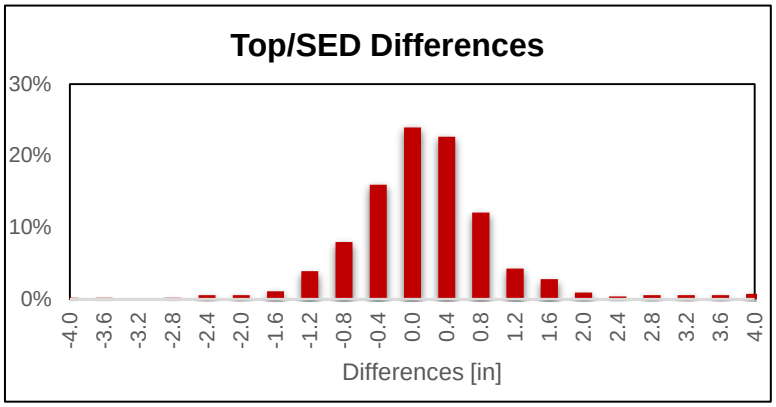
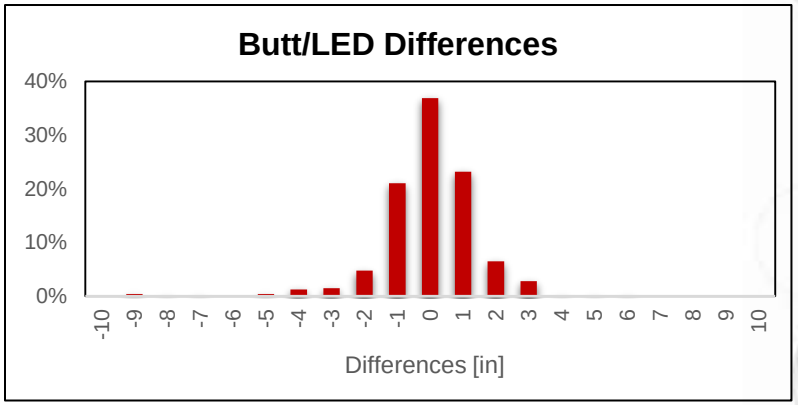
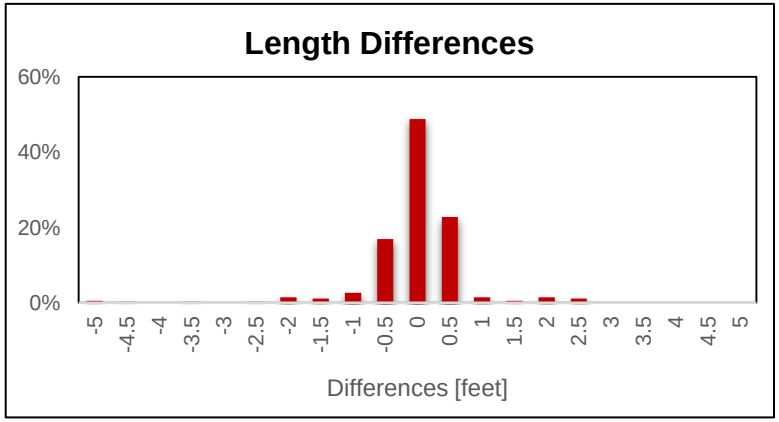
What about the results?

Logmeter accuracy of log variables







	SED [in]	LED [in]	Length [feet]
Mean:	0.17	-0.02	-0.07
Deviation:	1.03	1.64	1.97

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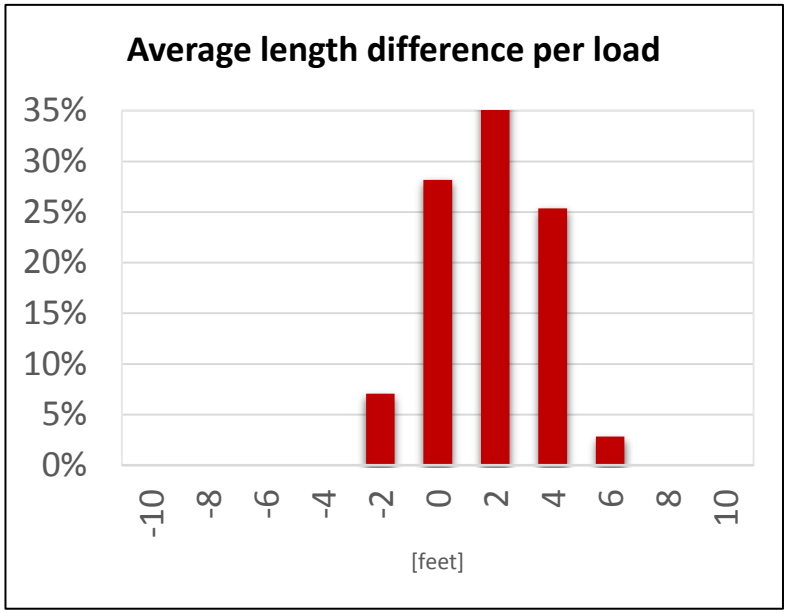
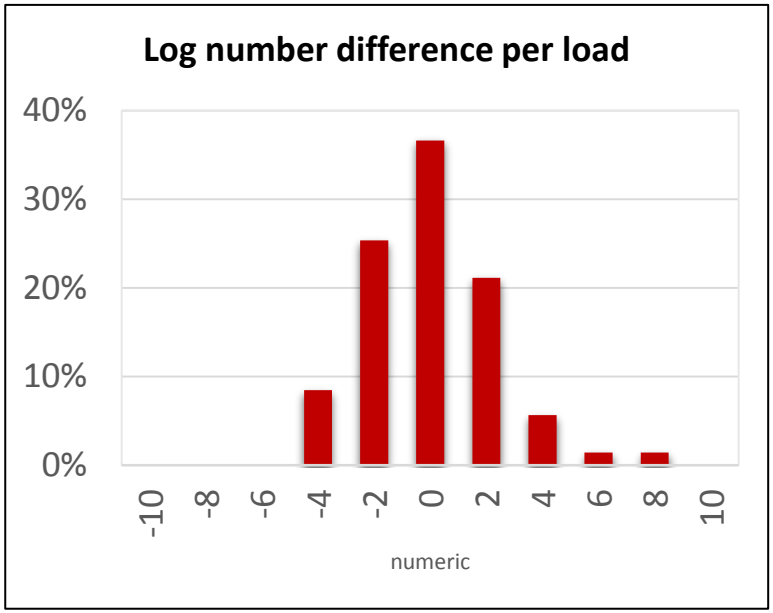
What about the results?

Logmeter accuracy of bundle variables





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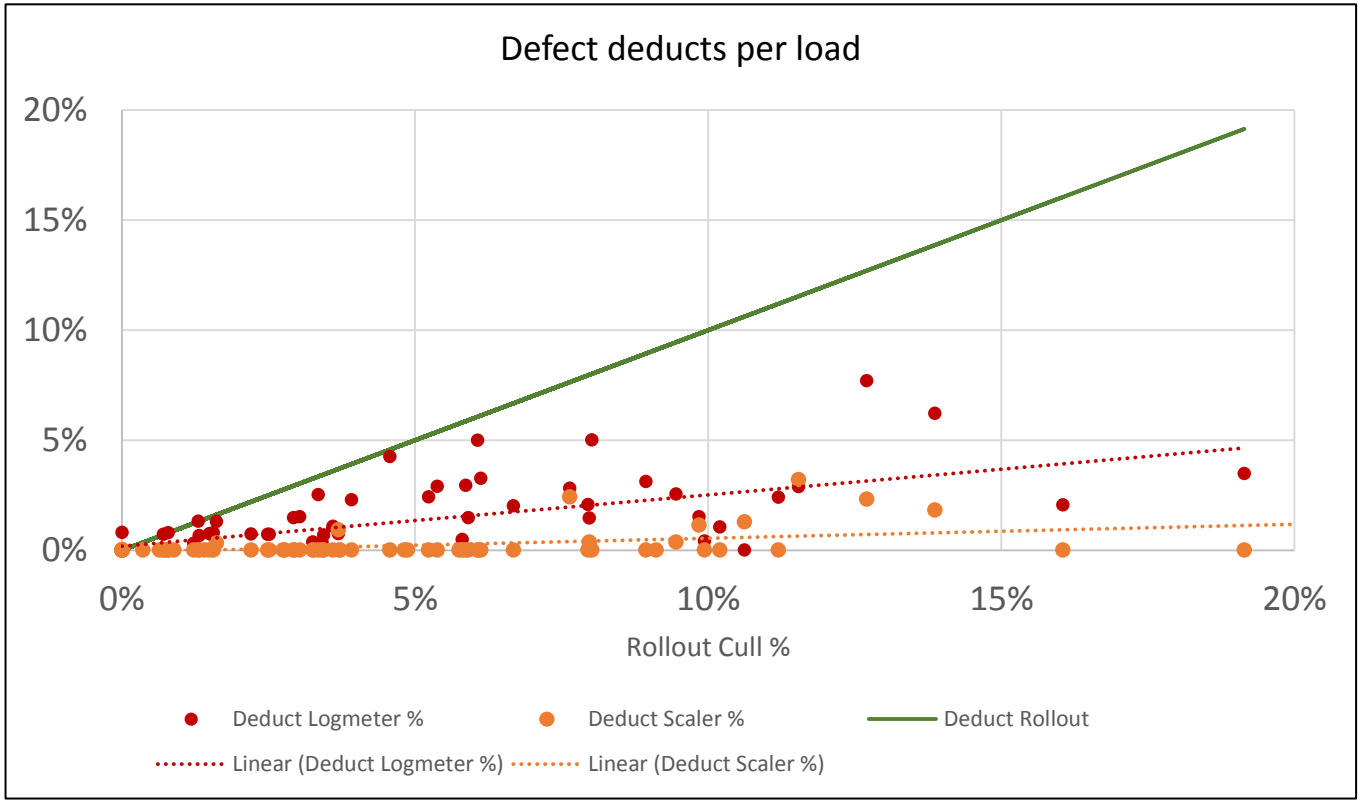
What about the results?

Logmeter defects detection



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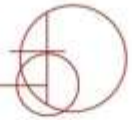
Conclusions



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Conclusions

Top level technology applied to the timber industry

Reliable and accurate product for wood measurement

Log models very powerful information

- Log variables distribution
- Bundle variable distribution
- Defects classification

We are simplifying the visual defects marking

Future work

Improving information reporting

Improving visual defects detection and marking

Improving our technology (software and hardware)

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