Metsäteho

Wood supply digitalization in Finland

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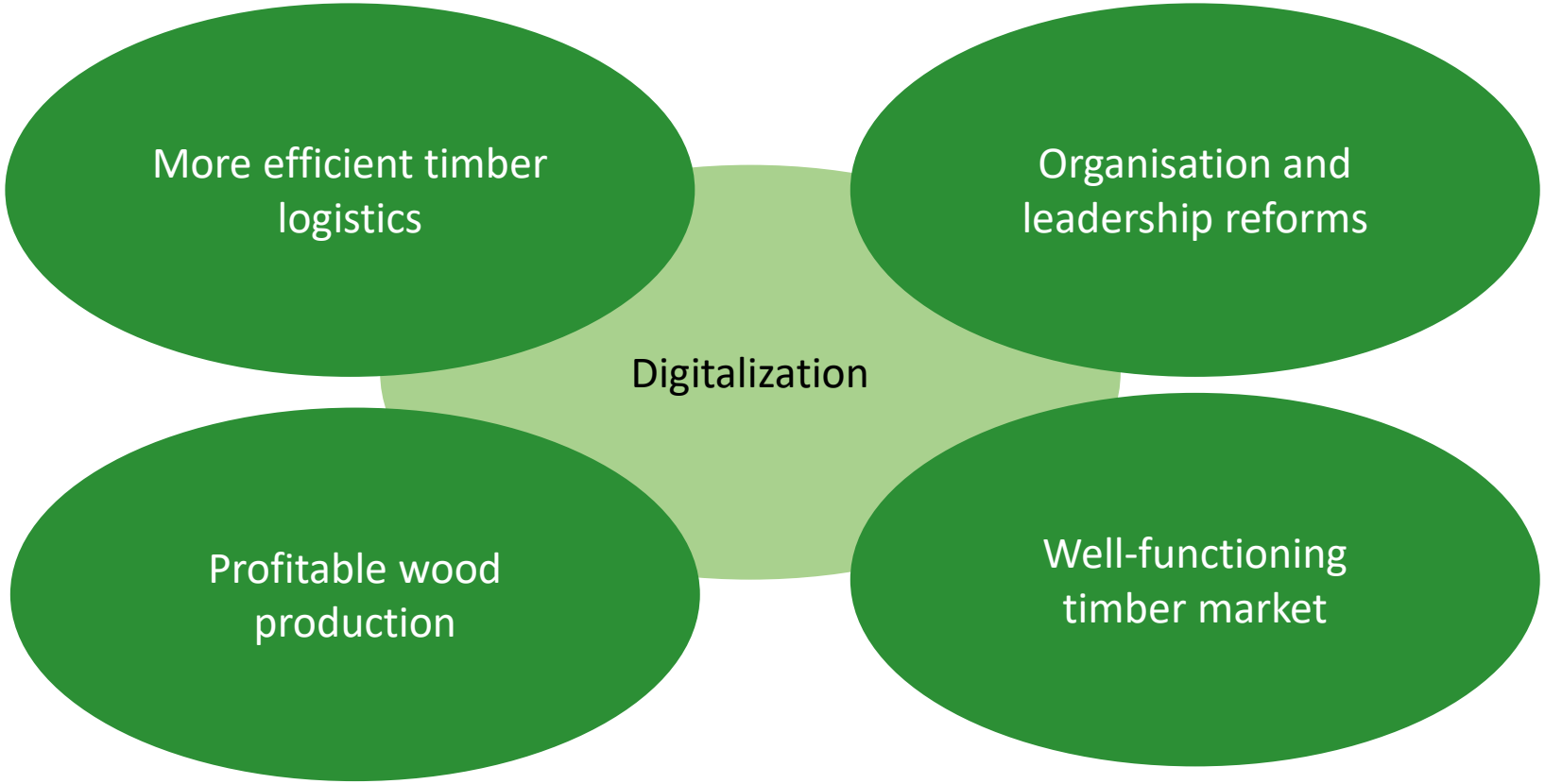
Vision: Efficient Wood Supply 2025

”Efficient and precise wood supply improves the competitiveness of the forest industry and guarantees its growth and regeneration potential.”

Development goal 2025

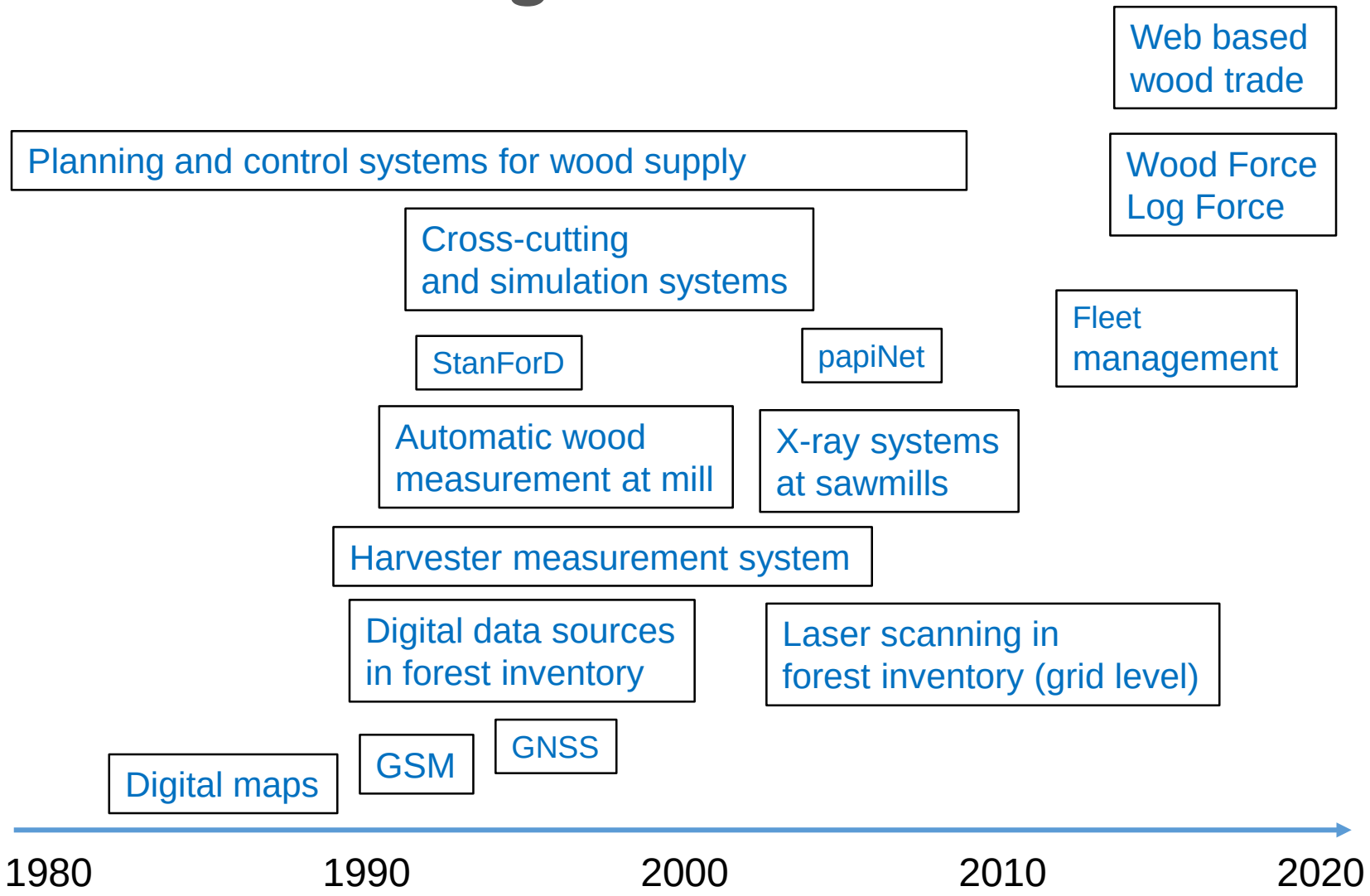
Wood supply produces added value to the value chain while being 30% more cost-efficient than today.

Digitalization enables a major leap in value chain



“Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities” (Gartner).

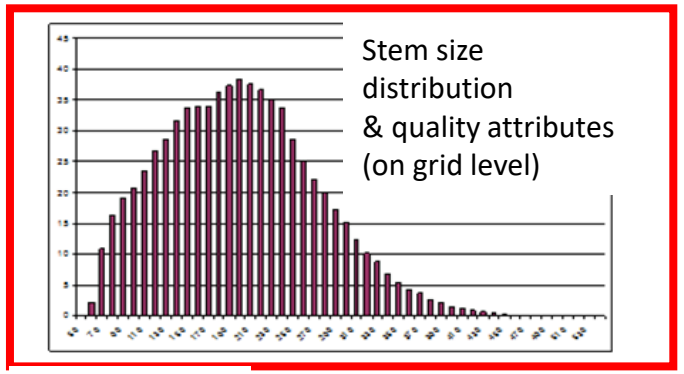
Some milestones of digitalization so far

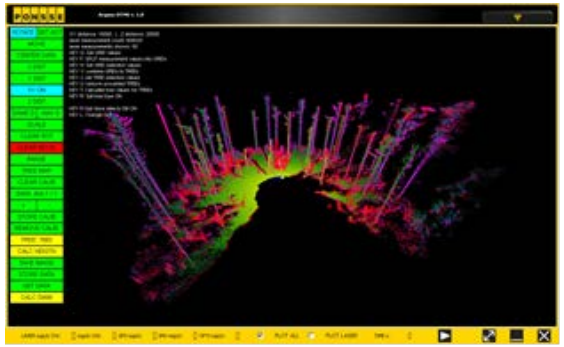


Technology drivers

- Sensor and automation technology
- Data transferring and storing capacity
- Open data sources
- Data standards and interfaces
- Big Data analysing methods

Forest Big Data vision – more precise and cost-effective wood supply through improved data and advanced decision support systems



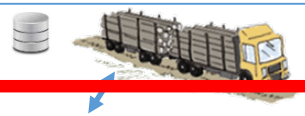


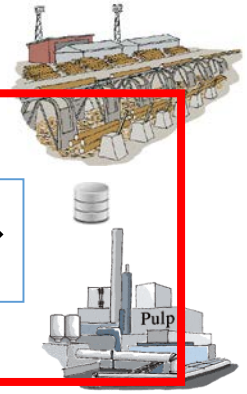
Tree map

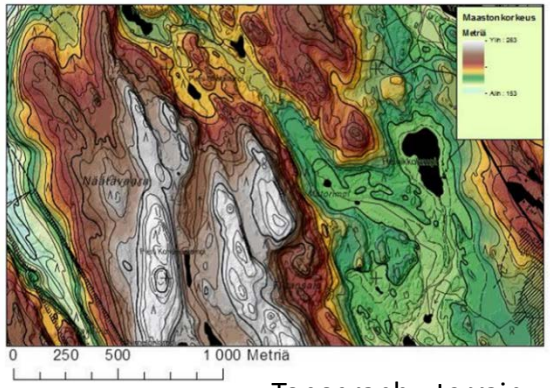
Ref.data & updating

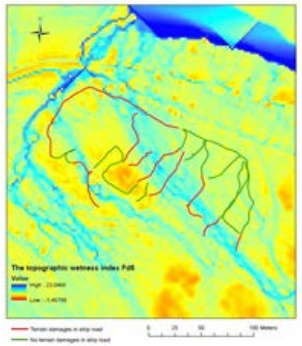
Web-based wood market,
Decision Support Systems

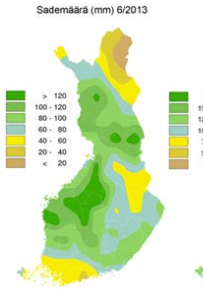
Planning & control of
wood flow, DSS











Topography, terrain wetness index, soil type, rainfall, road conditions.

Source: Hämäläinen, J. 2014.
Forest Big Data project.

What is needed?

Application development

Utilization concepts (POC)

Legislation and rules

Data management and analysing (methods)

Data transfer and fusion (methods)

Data acquisition and modelling (methods)

Vision and targets

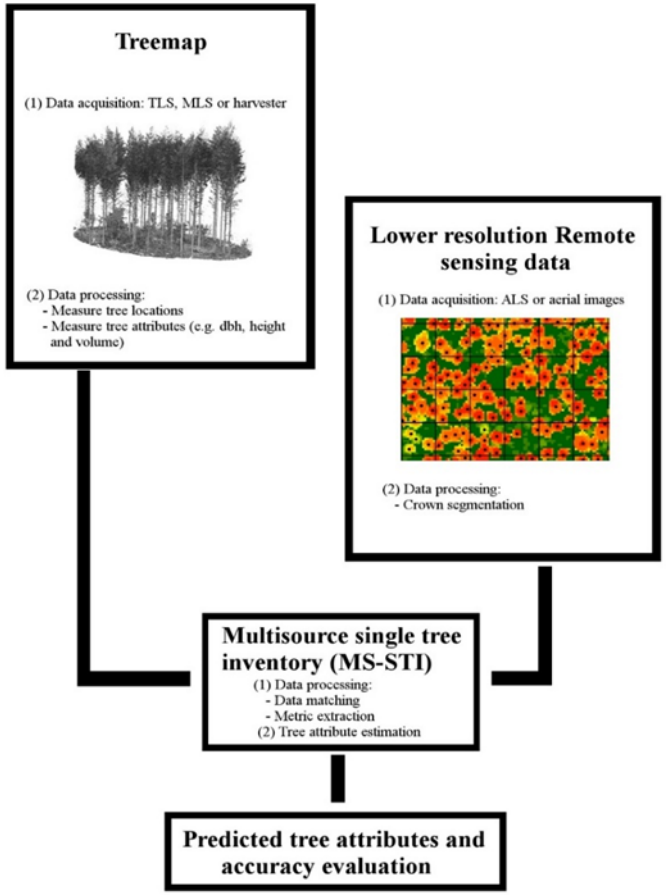
2014 2018

Goal: Next generations Forest Data Ecosystem

Examples of activities and results

The prediction of single-tree biomass, logging recoveries and quality attributes with laser scanning techniques

- Automatic processing of Terrestrial Laser Scanning (TLS) data was demonstrated to be effective and accurate and could be utilized to make future TLS measurements more efficient.
- Multisource approaches provide new possibilities to improve the accuracy of single-tree measurements but also for predicting values for larger areas.



Source: Ville Kankare (2015). Dissertationes Forestales 195.
University of Helsinki Department of Forest sciences/Centre of Excellence in Laser Scanning Research

Towards automatic work quality measurement in harvesting

Thinning intensity

- Laser

Picture: Metsäteho

Strip road density

- GNSS

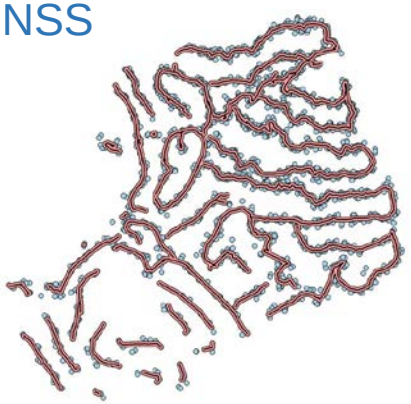


Fig. Metsäteho

Rut depth

- Time-of-flight imaging or laser

Picture: Lari Melander, TUT

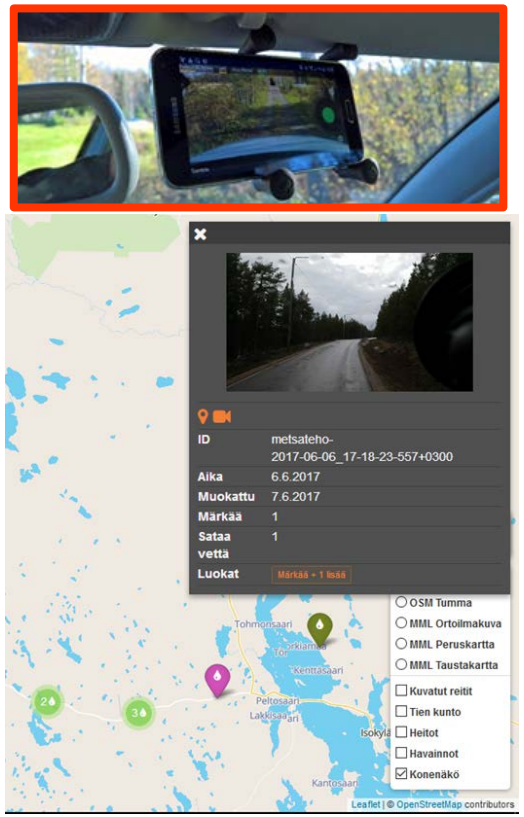
Tree damages

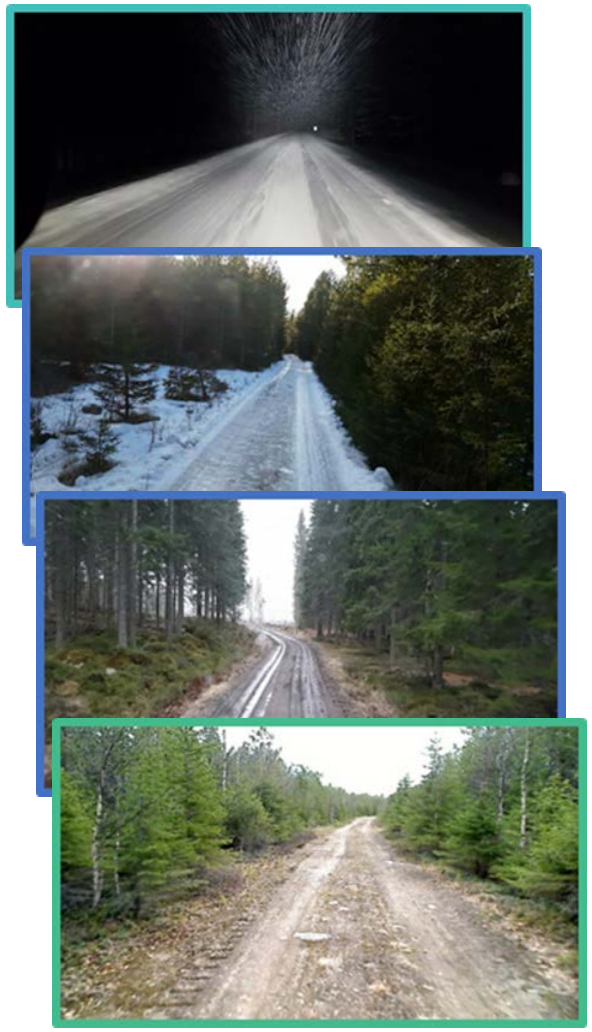
- Camera

(e) Phase 9 (f) Original image

Picture: Jyry Eronen, UEF

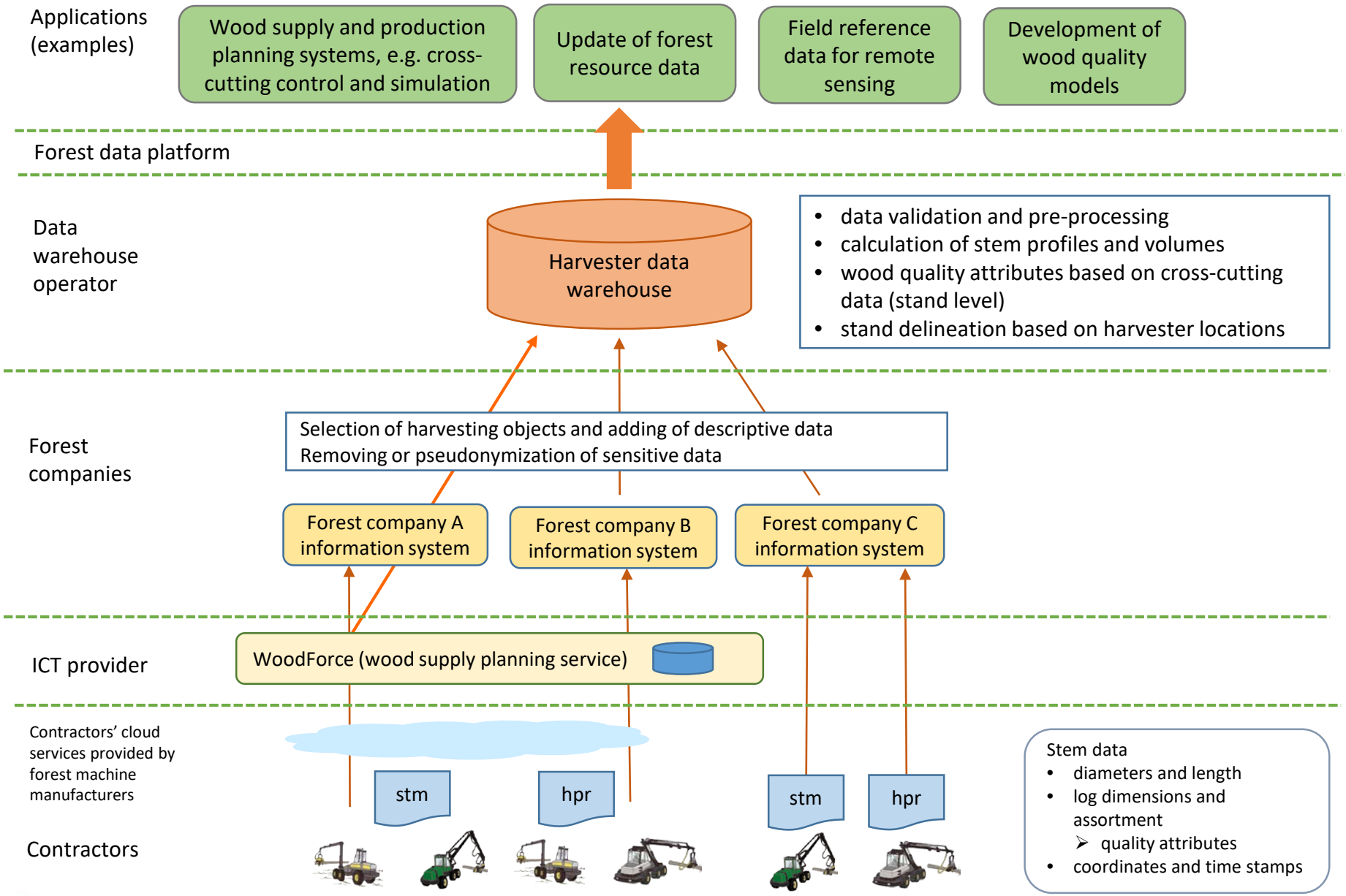
Road conditions through mobile phone data, machine vision and sensor fusion – pilot project





Source: Viominer service (Vionice Ltd.)

Collecting harvester data into a common or company-specific data warehouse (proof-of-concept)



Tapio Räsänen, Metsäteho 2017

Method to Generate Stand Delineation Based on Harvester Locations

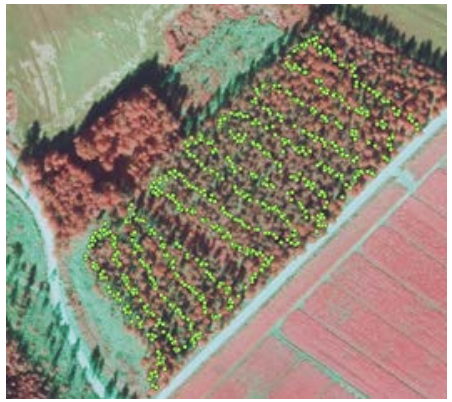
Data collection by harvester and pre-processing of STM -files

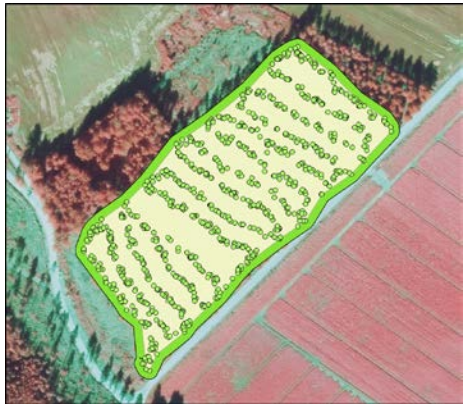
Importing data to GIS - software and performing coordinate transformations

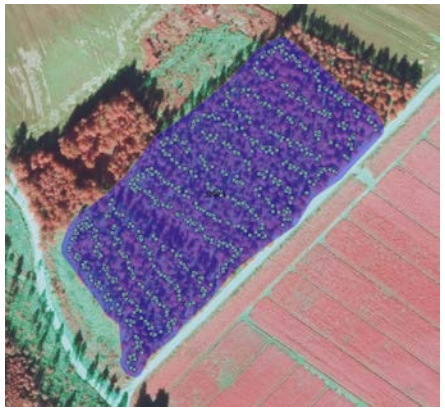
Separation of strip roads, which lead to the stand.

Creating basic patterns based on Delanay triangulation and buffering

Creating final stands delineations and calculating the area of the stand.



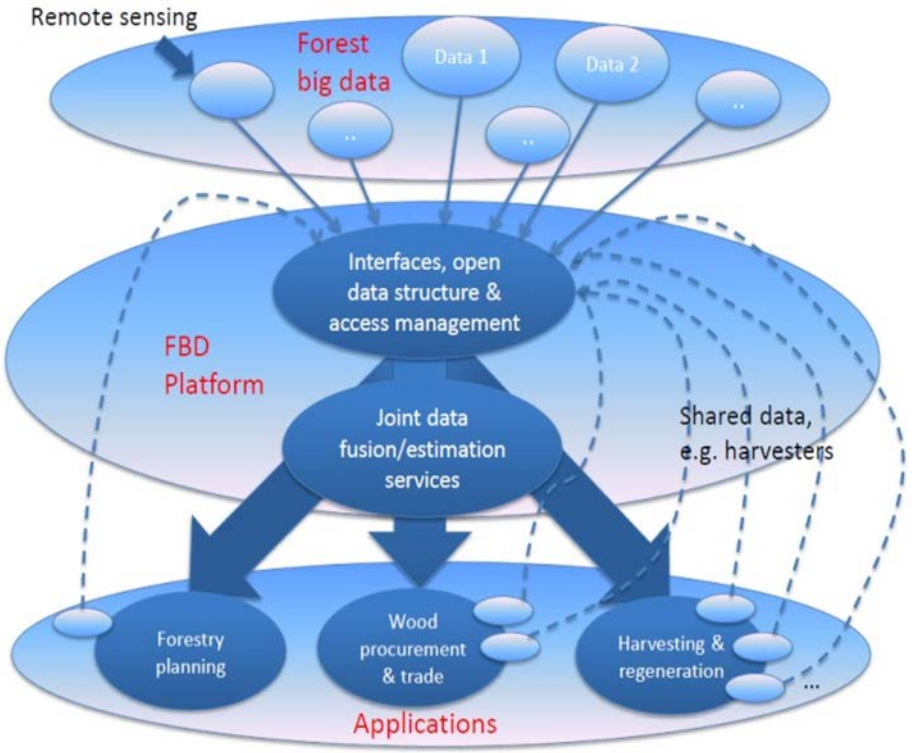




Timo Melkas & Kirsi Riekki, Metsäteho 2017

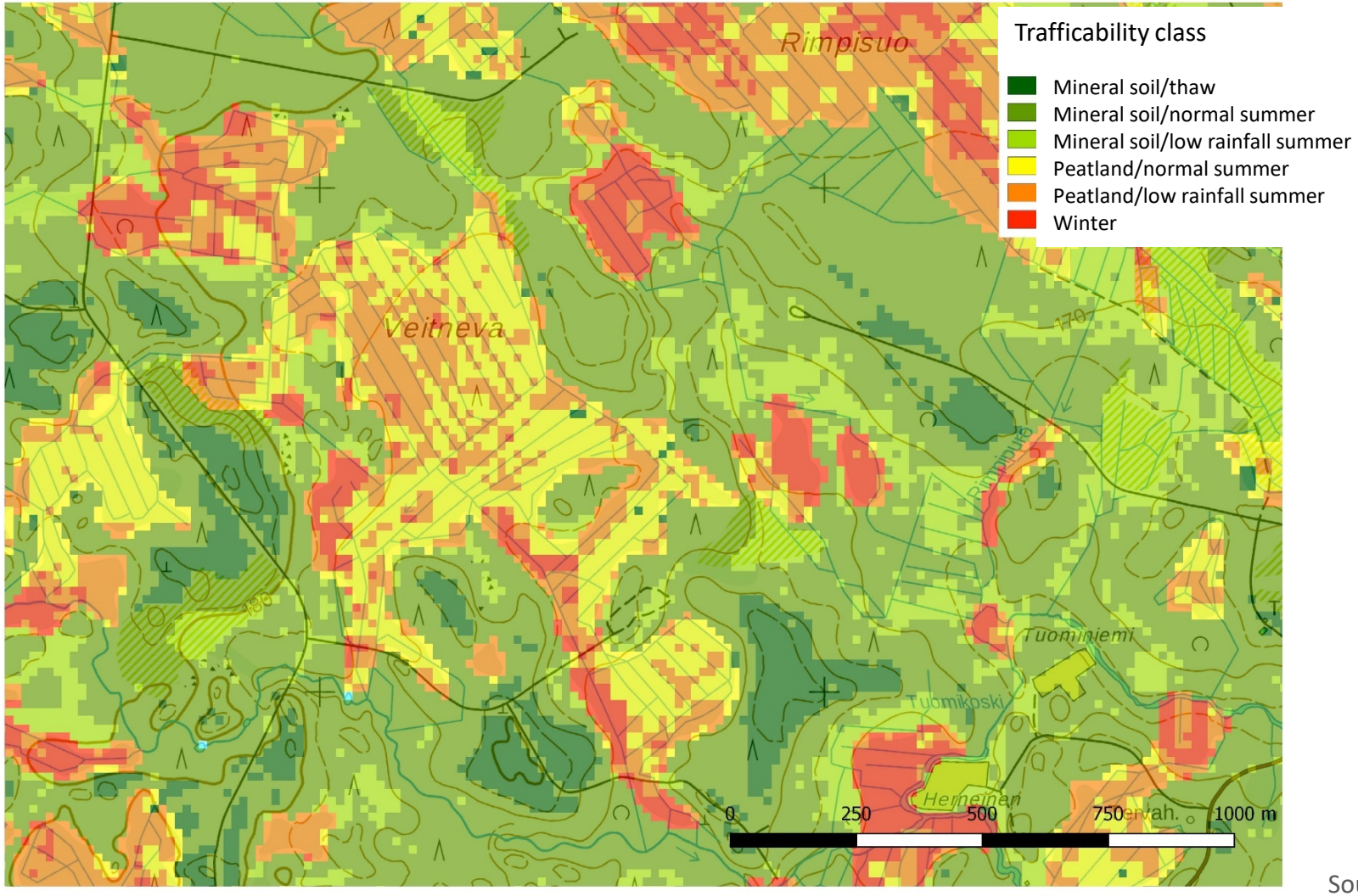
Forest Big Data Platform

- How to make the access and utilization of heterogeneous data simple for the applications?
- Goal: reduce the threshold for developing and implementing new forestry applications → new businesses, e.g., related to wood trade and forestry planning
- Solution: platform enabling uniform view to varying heterogeneous forest data sources
  - Data inquiry interface
  - Data structure
  - Basic services for data updating and fusion



Source: Miika Rajala & Risto Ritala (2014), Tampere University of Technology

Terrain trafficability maps for timber harvesting



Source: Arbonaut Ltd

Web based wood trade service - Kuutio.fi

Mobile applications

- Interfaces (API)

Forest owner

Secure authentication

Forest resource data from Metsään.fi -service

Call for offers

Comparison of offers

Service requests

Kuutio.fi

Market place for trade objects

Standardized reliable data transfer

Available with different devices

Buyer

Receiving of offer requests

Offer making

Receiving of contact requests *)

Object trader

- eg. consultant to forest owner

*) Finalization of wood trade/purchase contracts outside Kuutio

Implementation of R&D results in full flow

- Web based wood trade platform released (Kuutio.fi)
- New timber cross-cutting service under construction in forest companies
- Soil trafficability maps into operational use 2017
- Forest Hub data transfer service under construction
- FBD Platform under construction (prototype)
- Harvester database under construction (prototype)
- Most promising new forest inventory methods into practice by Finnish Forest Centre
- “ForestDigiroad” system under planning
- Updating of forest data legislation and recommendations concerning machine data ownership and availability in process
- Several further research and proof-of-concept projects have started

Thank you!

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