Digitalization vision in the forestry sector – focus wood supply

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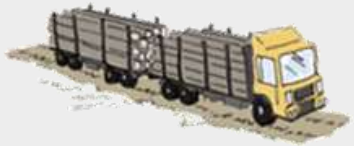
Metsäteho

Metsäteho is a wood procurement development company building a better future for the forest industry

Finnish wood supply in a nutshell



Forest inventory
- Finnish Forest Centre
- ALS & aerial photographs

Forest management
- 600 000 forest owners
- 100 000 timber transactions/year

Harvesting
- 1000 companies
- 2000 harvesters in cuttings

Transport
- 450 truck companies
- + Railroad and waterway transport

Forest industry
- 110 large mills
- Hundreds of smaller plants
- Turnover 30 billion €

Annual domestic wood deliveries about 70 Mm^3 and turnover 3 billion €.

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 TARGET FOR 2025

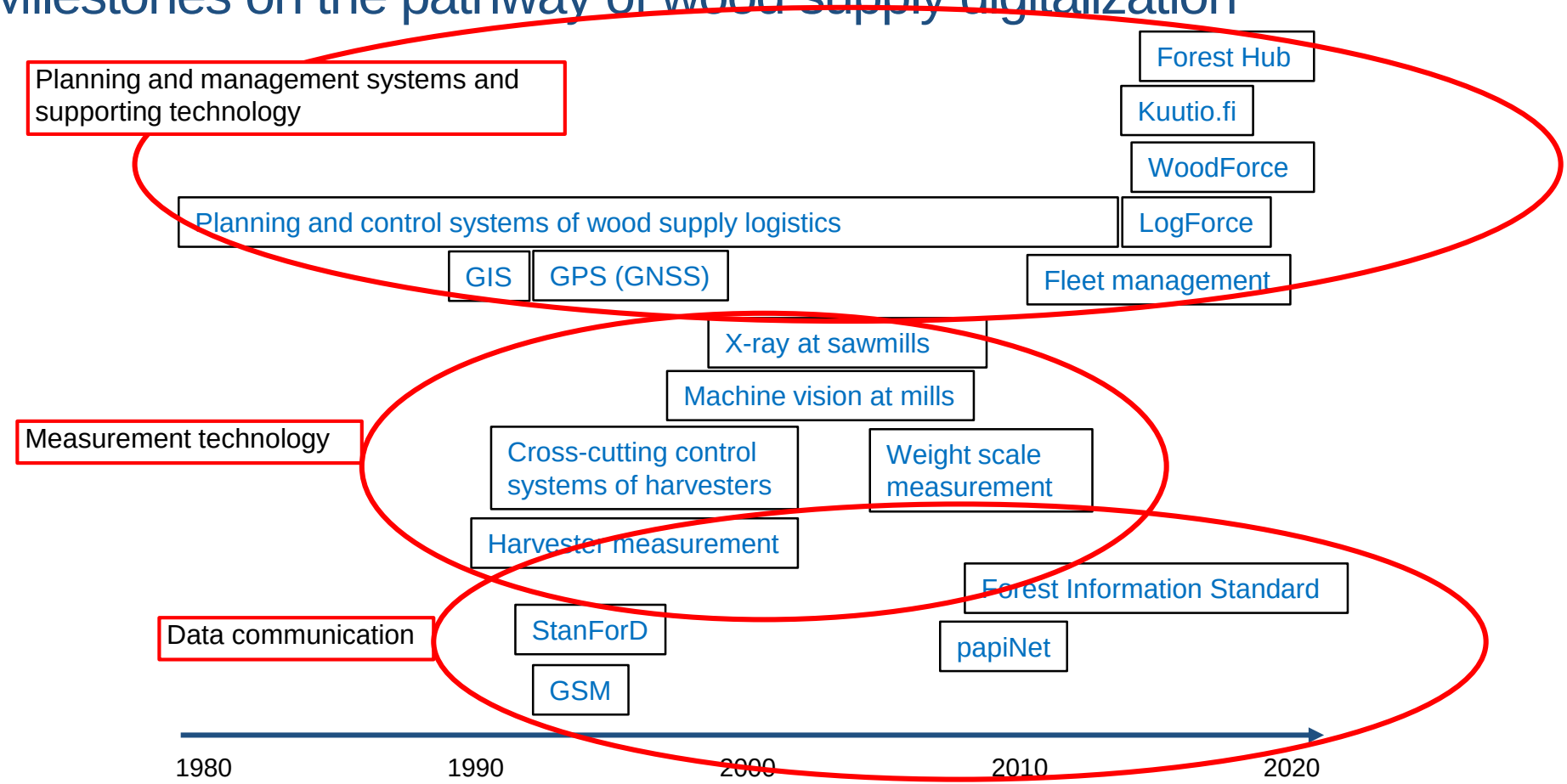
Wood supply to be sustainable, to add value to the wood value chain, and to be 30 percent more cost-effective.

Wood supply R&D objectives

Development drivers in wood supply

- Customer focus - raw material needs derived from mill production plans
- Optimal material flow: forest – woodyard – production
- Cost control: raw material price at mill gate, processing costs, material and quality losses
- Flexibility in changing situations and conditions - from reactivity to proactivity
- Operational reliability
- High work quality in the forest
- Sustainability and transparency of operations

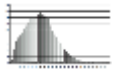
Milestones on the pathway of wood supply digitalization

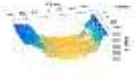


Precision forestry

More precise and cost-effective wood supply and raw material flow through improved data and advanced decision support systems

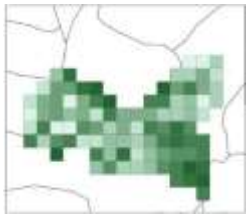
Real-time data from machines and public sources





Reference, modelling and feedback data

Information to control the processes

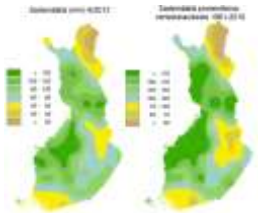


Decision support tools and applications

Models providing information prior to forestry operations or planning

Big data analytics

Production data



Transport-tation and traffic data

Permanent conditions

Real-time and history data of changing conditions

Rapid technological development brings new opportunities

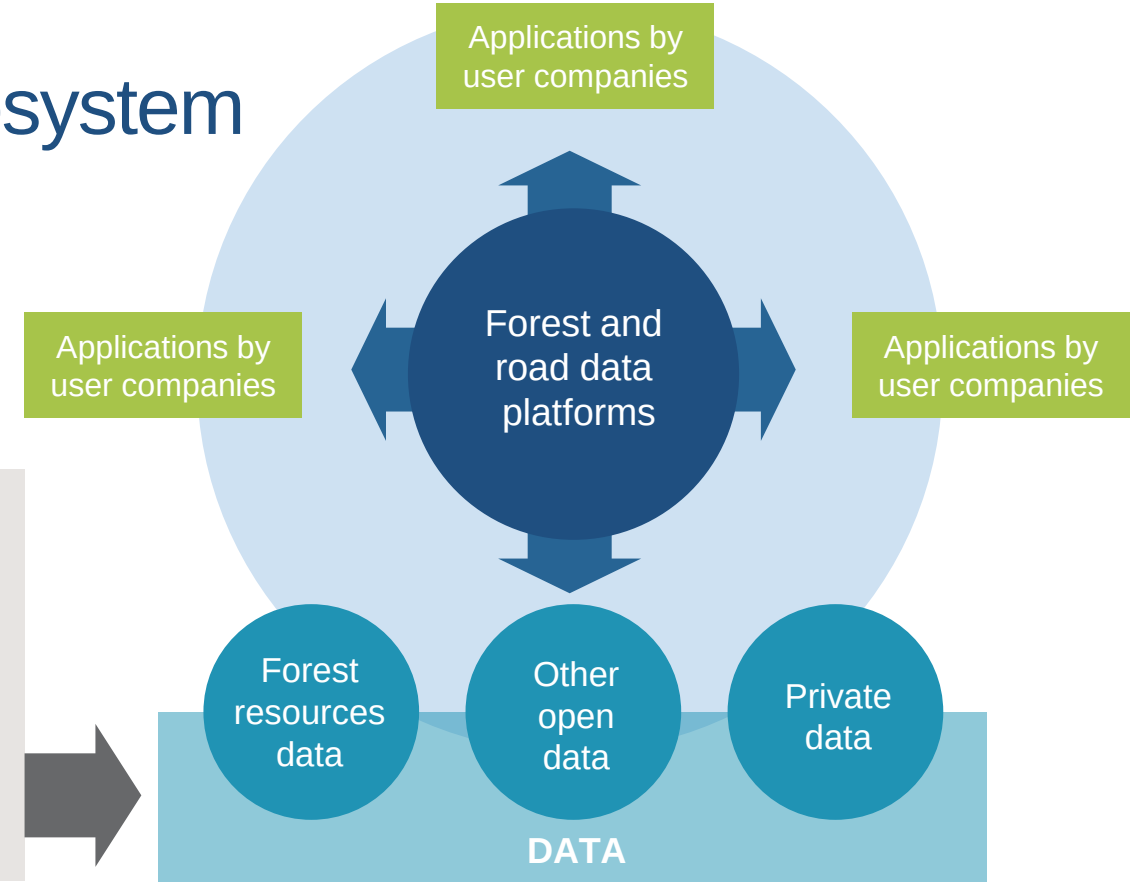
- Sensor technologies, automation and robotics
- Machine and truck data
- More efficient mobile networks (4G and 5G)
- Storing and analysing data capacity
- Methods for analysing Big Data
- AI and machine learning
- Data ecosystems and platform economy
- Virtual and augmented reality

THE OBJECTIVE

Forest data ecosystem 2020

Based on R&D projects (–2019)

- The vision in the industry
- Data collection methods
- Data distribution and sharing concepts
- Usability of information
- New application concepts



Implementation and roadmap of the digitalization vision

R&D programs
- Effibre
- Forest Big Data
- Forest Information and Digital Services
- *Smart Forestry next ?*

Application development (continuing)

Utilization concepts (POC)

Legislation and rules (=> open data)

Data management and analysing

Data transfer and fusion

Data acquisition and modelling

Vision and targets

2014 *Towards the vision with large R&D efforts* 2019

Measures taken to improve the usability of forest data

- Change of **Act on the forest data system of the Finnish Forest Centre** (03/2018)
  - forest data became open and free
  - it is possible to submit forest data to FFC in order to update or supplement data held by FFC

- A commonly agreed **recommendation to submit data** on forest operations to FFC in order to update the forest data (04/2018)
  - harvested stands based on harvester data
  - information about silvicultural operations based on data of work self-control reporting systems
  - permit of the forest owner is required

- **Principles relating to the ownership, use and processing of forest machine data – a recommendation** (10/2017). The purpose of the recommendation is
  - to clarify the rules of ownership and use of data
  - to promote the development of applications and services based on forest machine data
  - to describe how the requirements of GDPR should be taken into account in daily operations

Open forest data

The majority of the forest data collected by the Finnish Forest Centre is openly available in digital format

- map services
- spatial datasets
- data interfaces

Open forest data includes environmental data, such as

- growing stock
- action suggestions
- measures implemented
- soil characteristics
- habitats of special importance
- remote sensing sample plots
- forest use declaration data
- data on Kemera subsidies

Grid cell as a basic object for many purposes

- micro compartments → flexible operational units

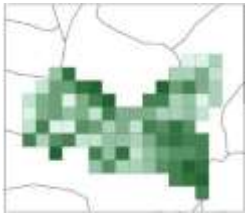
Forest resources stands

Grid cell data (16 x 16 m) based on laser scanning

New forest inventory system based on laser scanning and aerial photography

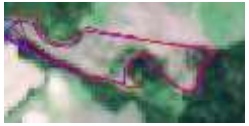
- In production from 2020 →
- Laser scanning campaigns are coordinated by National Land Survey and funded in co-operation with several organisations
- Scanning cycle 6 years
  - in Lapland 12 years
  - increase of resolution to 5 points / m^2 density
- Aerial photographing cycle 3 years

Sources to update the forest data



Self-control of silvicultural operations

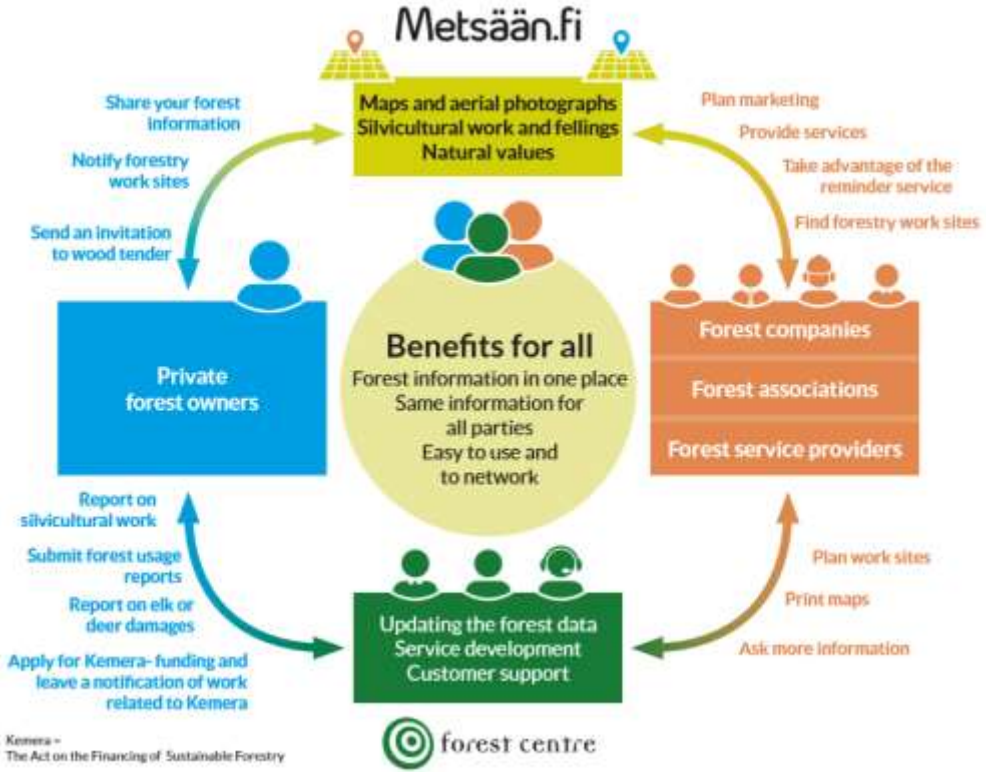
Harvesters



Satellite image vegetation change detection

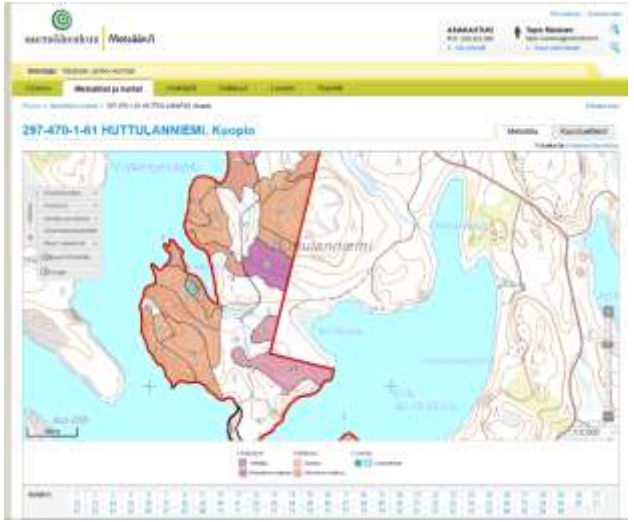
Target to be in production from 2021

Metsään.fi – eServices for forest owners and service providers

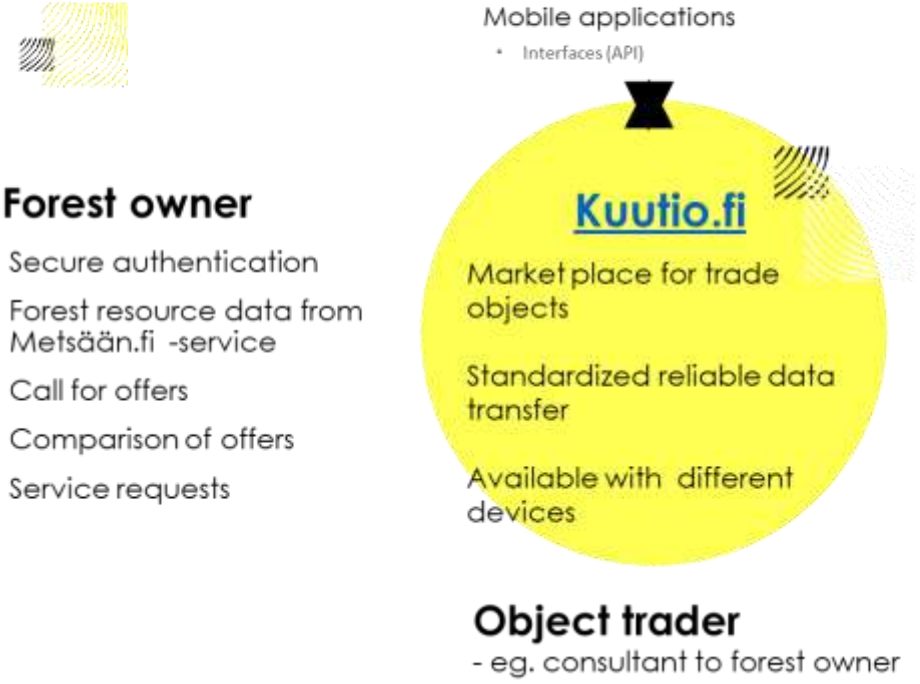


A portal which offers the latest information to forest owners on their properties

- publicly funded
- free to use for forest owners since 2015
- 110 000 registered users (2018)



Web based wood trade service - Kuutio.fi



World's first digital marketplace for timber

Suomen Puukauppa Oy (company) was established to operate the service

- 50 % of shareholders are representing timber sellers and 50 % buyers

Service launched 2017

Basic figures

- 141 registered organisations
  - 95 % of buyers (by volume)
  - 60 % of forestry associations
- Requests for quotes (2018)
  - 5 900
  - 8 mill. m^3
- Share of all timber transactions of private forests 15 – 30 %

Commercial digital services in wood supply logistics

Change of entrepreneur business models as background

- gradual change started around year 2000 in forest companies
- extended services and more responsibilities
- more than one customers
- company-specific IT systems did not support any more

Planning and managing services for logging and transport companies

- development projects
- a lot of push and support from the forest companies was needed

Integration between services and forest company systems using all three data standards

WoodForce™

LogForce™

Trimble FORESTRY

Forest Hub

tieto

A new ecosystem service providing digital collaboration and transparency in wood logistics and mill reception processes.

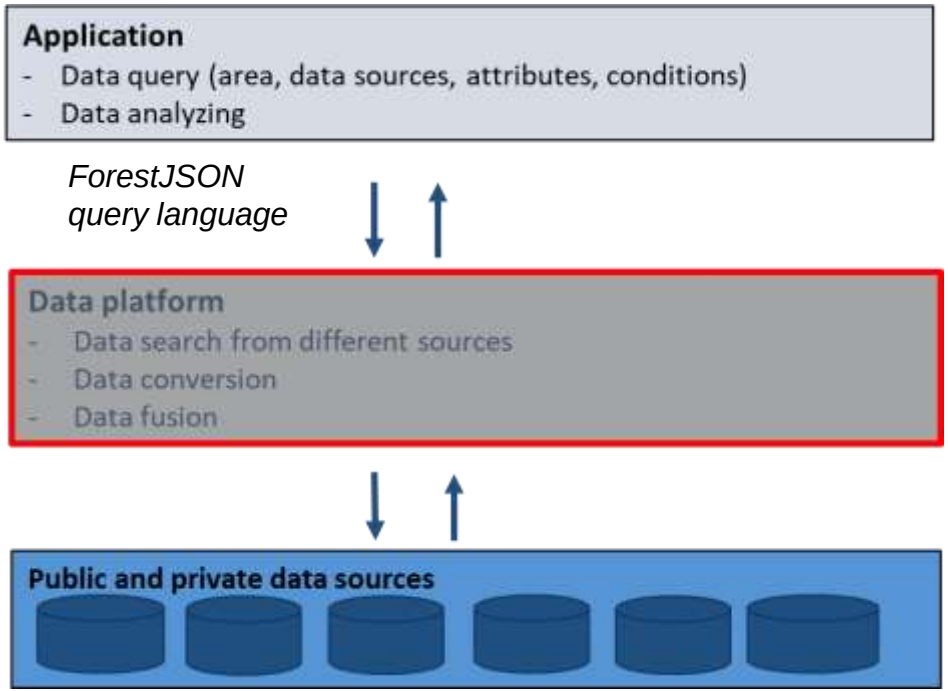
Message transactions B2B

- papiNet supported

To be developed together with customers

Forest Data Platform accelerating data usage

- Main target is to boost forest sector's data utilization
- Platform's role is **data fusion, enrichment and delivery of data from different sources to applications**
- The target is
  - to make application and service development easier and more cost-effective
  - to improve the flexibility to implement new data sources
- Productization started by Finnish Forest Centre
- Public – private partnership as business and governance model ?
  - some limitations have emerged recently
  - a solution could be separate compatible platforms for public and private use



Source: Metsäteho, CGI, Tampere University

Summing up – where are we now with digitalization?

Operational efficiency

- Access to data as a key enabler
- Utilisation of forest machine data has started – big interest
- Intelligent decision support tools and monitoring systems – operative applications exist, some ideas are tested in POC's
- Automatisation of processes – target solutions are in different phases depending on the technology readiness

Digital integration and services

- Integrations of company systems to external IT services through digital interfaces have been done based on business needs – work is ongoing
- Digital channels in customer communication and marketing: new platforms and applications for forest owners

New business models

- In forest industry new potential business models are expected to arise from various starting points: new products, demand for value increment, market requirements, changes in operational environment etc.
- Technology and new innovations may also enable new types of business
- In forestry there is seen a good potential for new business with the help of modern digital tools

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