Digital solutions for efficient, environmental and worker friendly, low impact wood sourcing

Forest Academy for EU decision makers
20.-22.11.2018, Finland
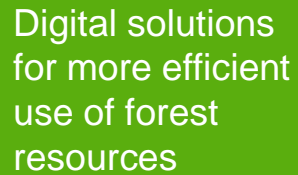
strategic**RESEARCH**
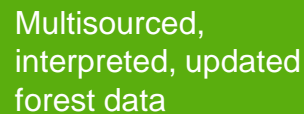
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What is digitalization?
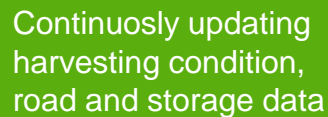
Digital solutions for more efficient use of forest resources
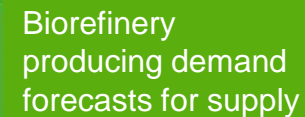
Multisourced, interpreted, updated forest data

Continuosly updating harvesting condition, road and storage data

Biorefinery producing demand forecasts for supply

GOAL
- Multilayer forest resource and condition data based on several data sources. Includes interpreted data and functions.

GOAL
- Data and forecast of trees, terrain conditions and road network trafficability based on weather data and vehicle reports

GOAL
- Demand forecasts based on the market and demand prognoses of the product portfolio, seamless communication with the biomass sourcing

Digitalization – five key terms

- **Big data and data analysis:**
  - *foundation of digitalisation, the enormous amount of data that can be gathered from advanced sensors and networked devices*
  - *The utilisation of existing data requires data analysis, which is made possible by increasing computing power and the improvement of programming skills*
- **Mobility:**
  - *The proliferation of portable, powerful and network-ready smart devices will create a new kind of operating environment characterised by mobility*
- **Cloud services and information networks:**
  - *Cloud services are related to the infrastructure solutions of the digital world. They transfer data storage and management from local servers to large data centres.*
- **Open data and My Data:**
  - *Because data is a central commodity of digitalisation, it also has financial value every individual should have ownership of the data concerning them*
- **The Internet of Things (IoT):**
  - *increasing numbers of devices are connected to an information network and can communicate with each other.*
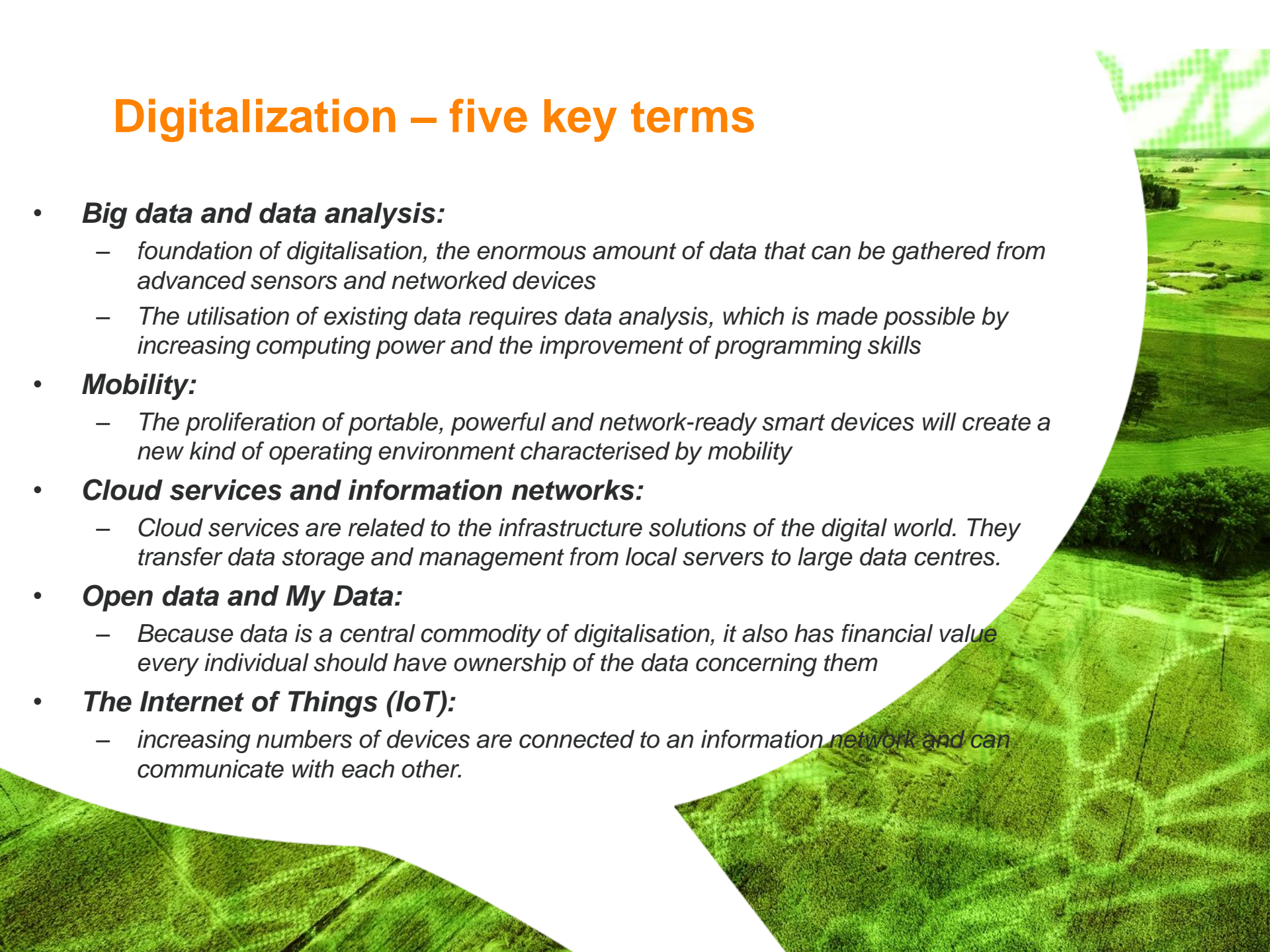
Crowdsourcing – observations and data collection about biosources

- Field data collection is expensive
- Difficult-to-find issues especially demanding
    - Insect outbreaks damaging trees
    - Wildlife habitats
    - Berry and mushroom sweet spots
    - Game, rare animals
- Motivation is a challenge
    - Why would I report my observations?
    - Do I loose or win by doing so
- Data is not always statistically sound
    - No stratified sampling but observations come along summer cottage paths
    - Timing of field visits often random
- Interpretation of data needs expertise
   - Identification of insects, mushrooms etc.

Boreal **green bioeconomy**

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Try and fail/succeed fast – Bilberry - go
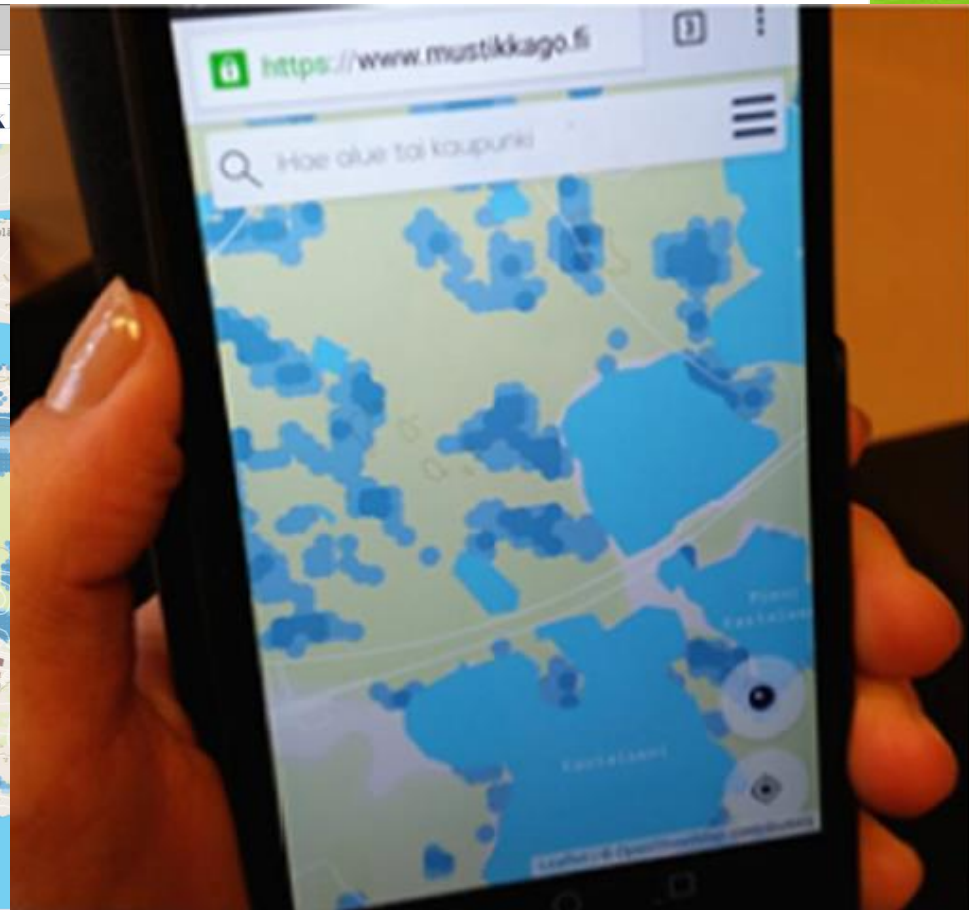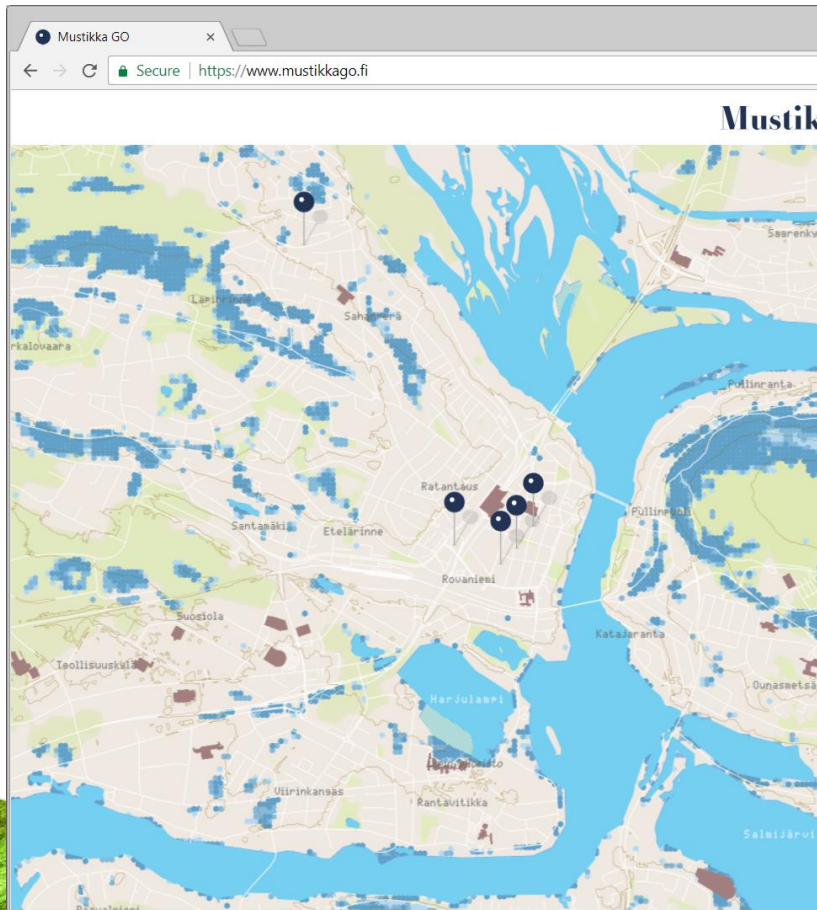
Digitalization for reduced site impact

- **Reducing site impact through improved information and planning**
  - based on topography and hydrological conditions
- **Field trials of emerging machine concepts**
  - comparison of 8-wheel and 10-wheel forwarder
  - Tethered (winch supported harvesting)
- **Methods for monitoring**
 - Drones and other technologies
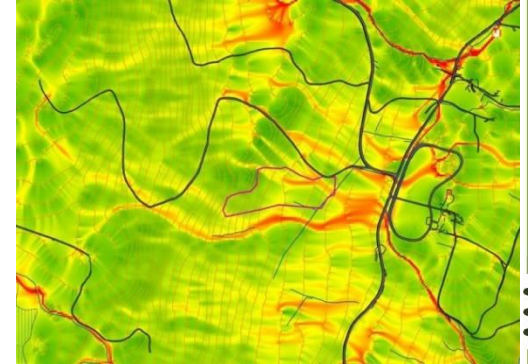
2D laser scanner for rut measurments (Ilomäki & Salmivaara 2017`

- For research purposes, the soil disturbances can be measured manually and using scanners

- The use of moving resistance to predict rut formation is a promising method

- Forwarder can use this information to avoid driving on trails having low bearing capacity

Photo source: Ilomäki & Salmivaara 2017

Static trafficability maps are already in operational use

Photo source: Ilomäki & Salmivaara 2017
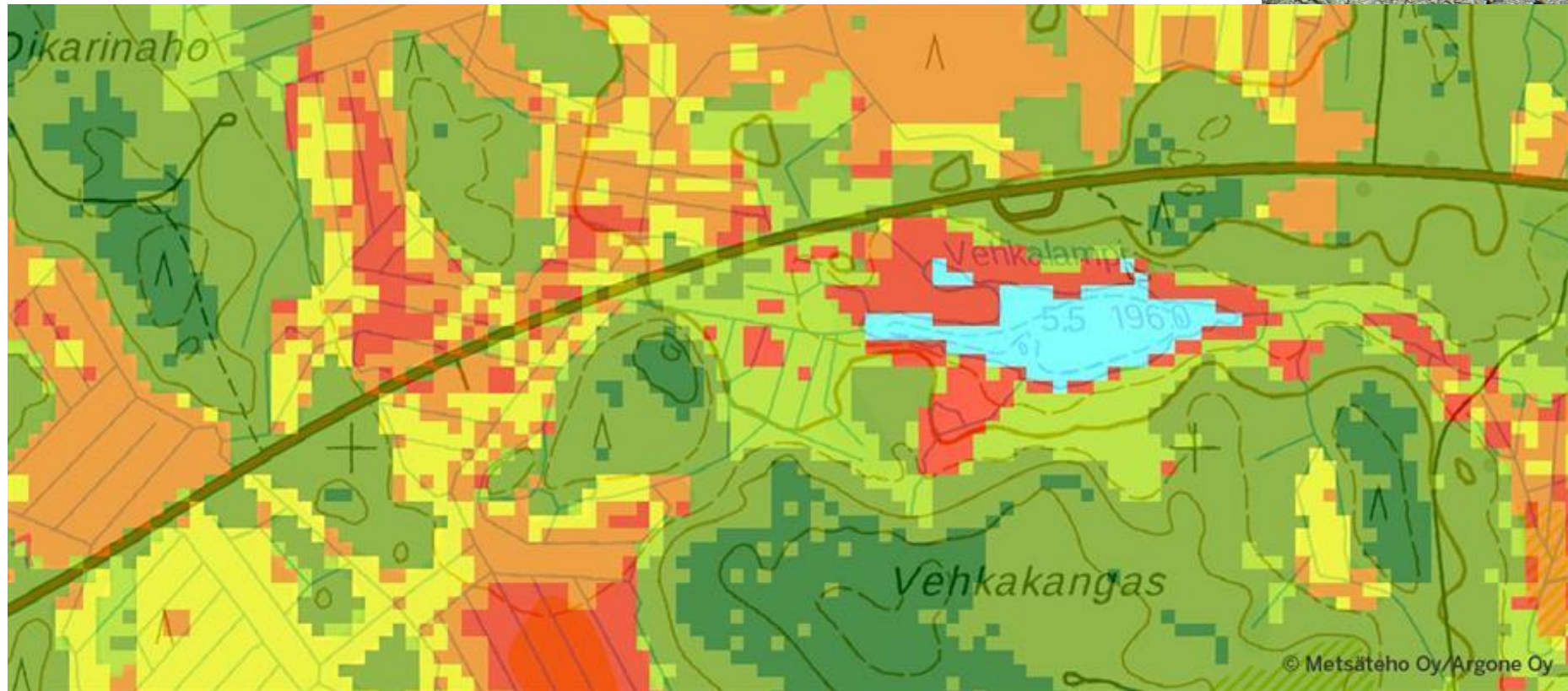
Digitalization of forest based bioeconomy – almost-so-yesterday

- Rapid ongoing development

- Applications come, stay and go

- Everything must end up to a MAP LAYER downloadable by a FOREST MANAGER, MACHINE OPERATOR AND TRUCK DRIVER

- To manage, harvest etc. A Single Forest Stand about 100 GIS –layers are already used

- Future: More frequent and hour-by-hour situation on forest operation conditions and environment

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Digtal solutions – new tools for old challenges

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