TAMPERE UNIVERSITY OF TECHNOLOGY

Agricultural business development with intelligent data analytics

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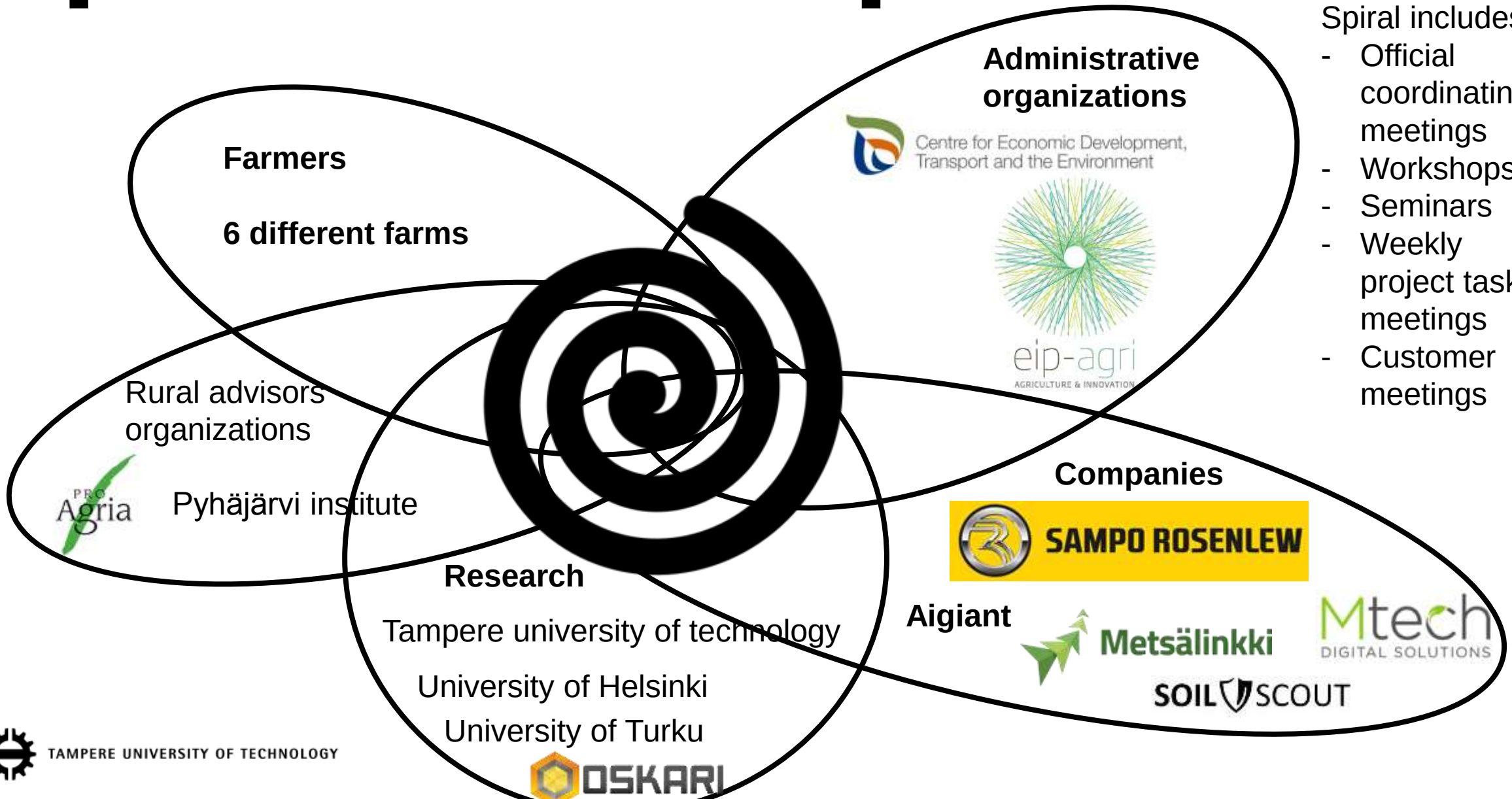
SAMPO ROSENLEW

PRO Agria

eip-agri AGRICULTURE & INNOVATION

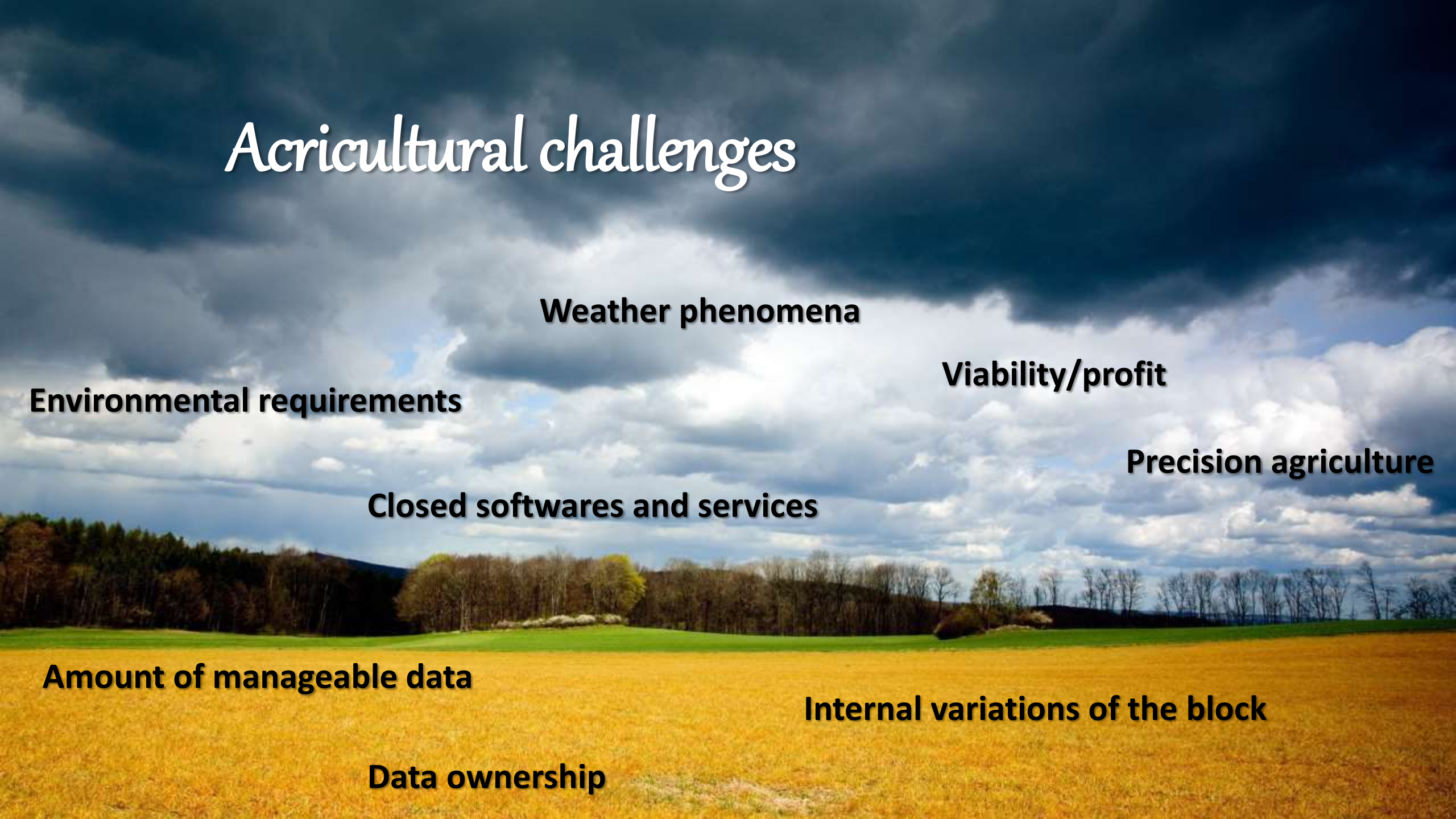
The European Agricultural Fund for Rural Development: Europe investing in rural areas

Operational Group

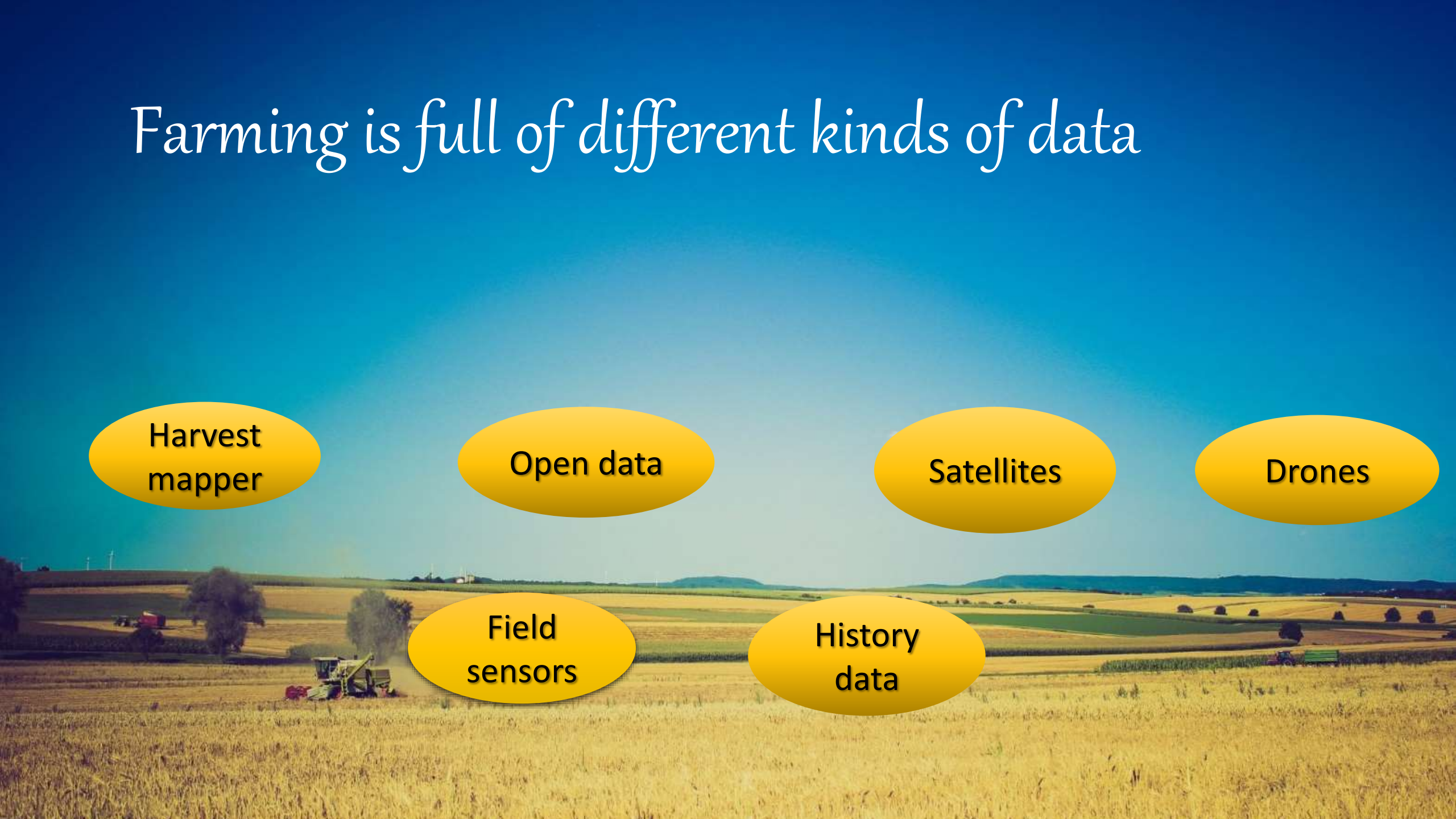


Spiral includes

- Official coordinating meetings
- Workshops
- Seminars
- Weekly project tasks meetings
- Customer meetings


Acricultural challenges
Weather phenomena
Viability/profit
Environmental requirements
Precision agriculture
Closed softwares and services
Amount of manageable data
Internal variations of the block
Data ownership

Farming is full of different kinds of data



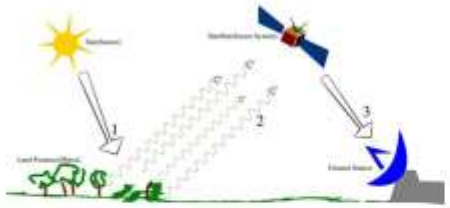
MIKÄ DATA-project

The project will develop an intelligent data analysis service that will highlight:

- Variations in soil types
- Nutrient levels (e.g. potassium and phosphorus)

Project schedule 2017/2-2019/12 (3years)





REMOTE SENSING

- satellite
- UAV
- field spectrometry

SYSTEM DATABASE

- measurement data (soil sensors; yield data; …)
- historic data (fertilization data; other cultivation data; …)
- farmer's notes
- …

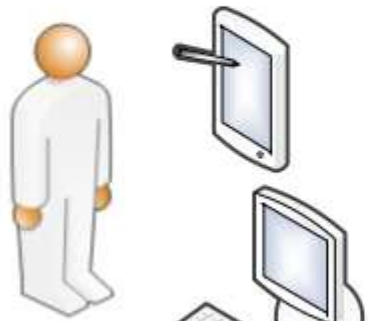
OPEN DATA

- weather data
- soil maps
- elevation models
- …



FIELD DATA
HARVESTER DATA

ANALYTICS SERVICE



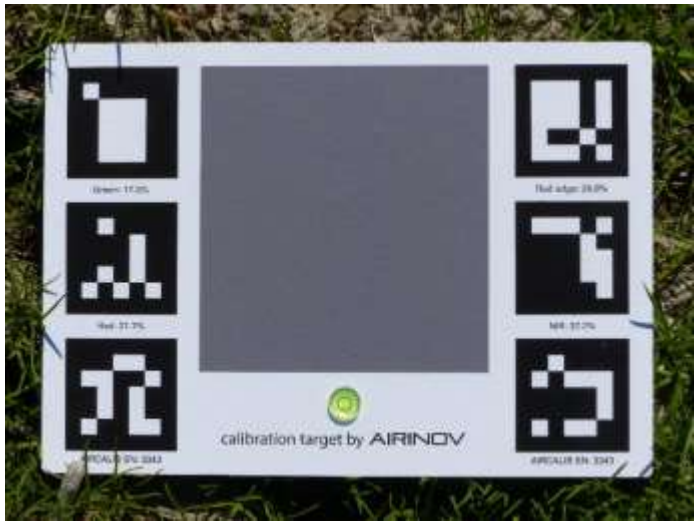
USER INTERFACE

What we have done so far?

Drone flights with multispectral camera











Specs



- Drone: Airinov solo 3DR
- Camera: Parrot SEQUOIA sensor
  - 5 spectral bands (red, green, red edge, near infrared and RGB)



Summer 2018

https://www.parrot.com/eu/business-solutions/parrot-disco-pro-ag



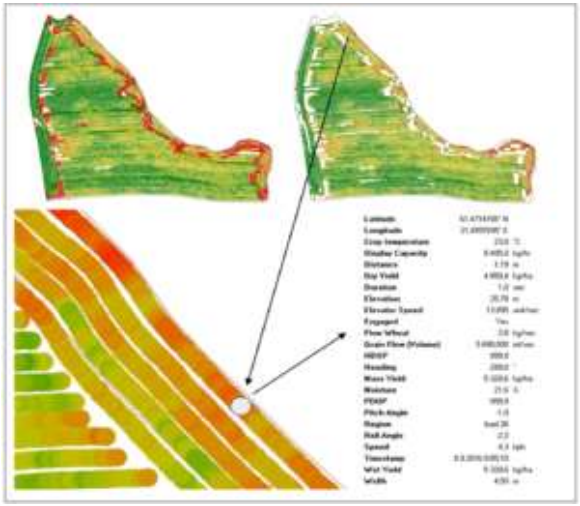


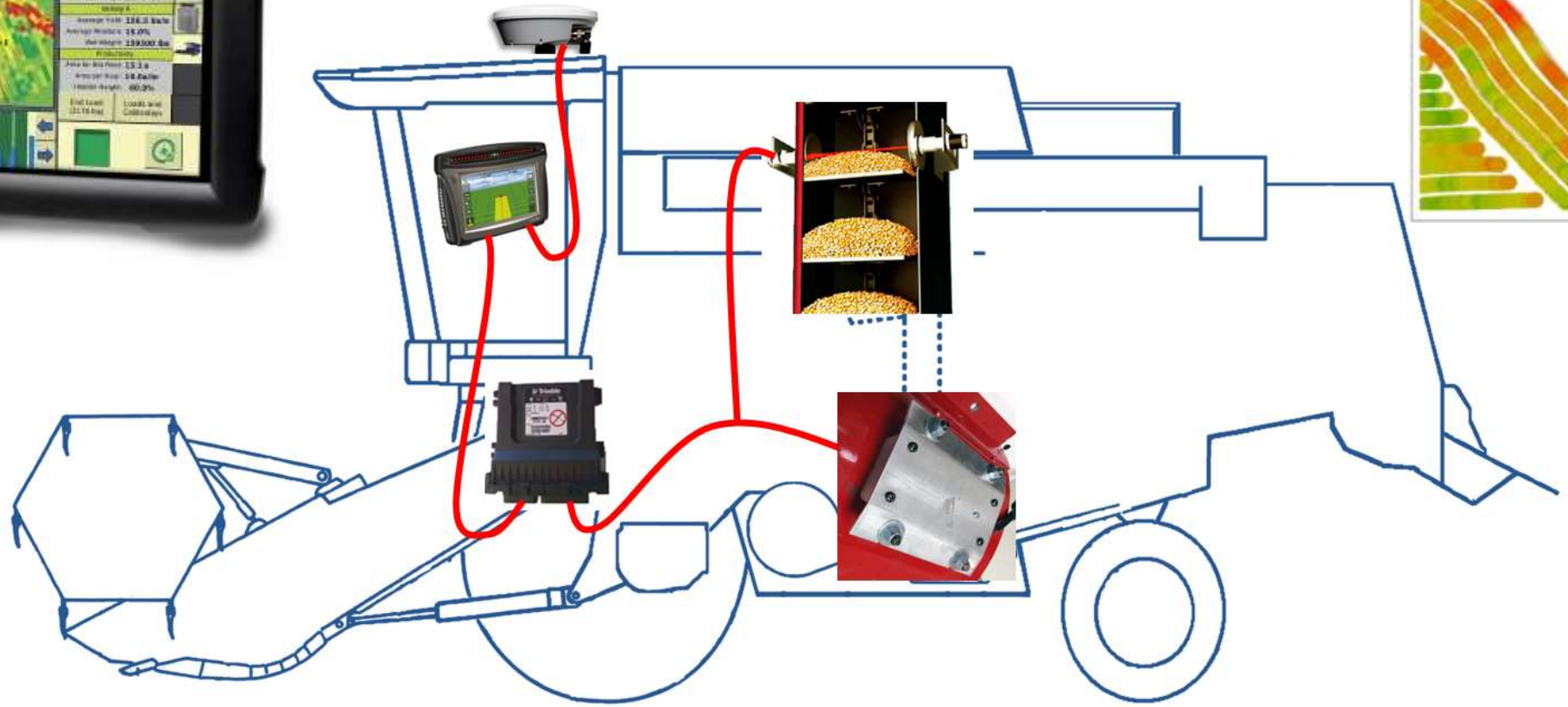


Combine harvest, yield data



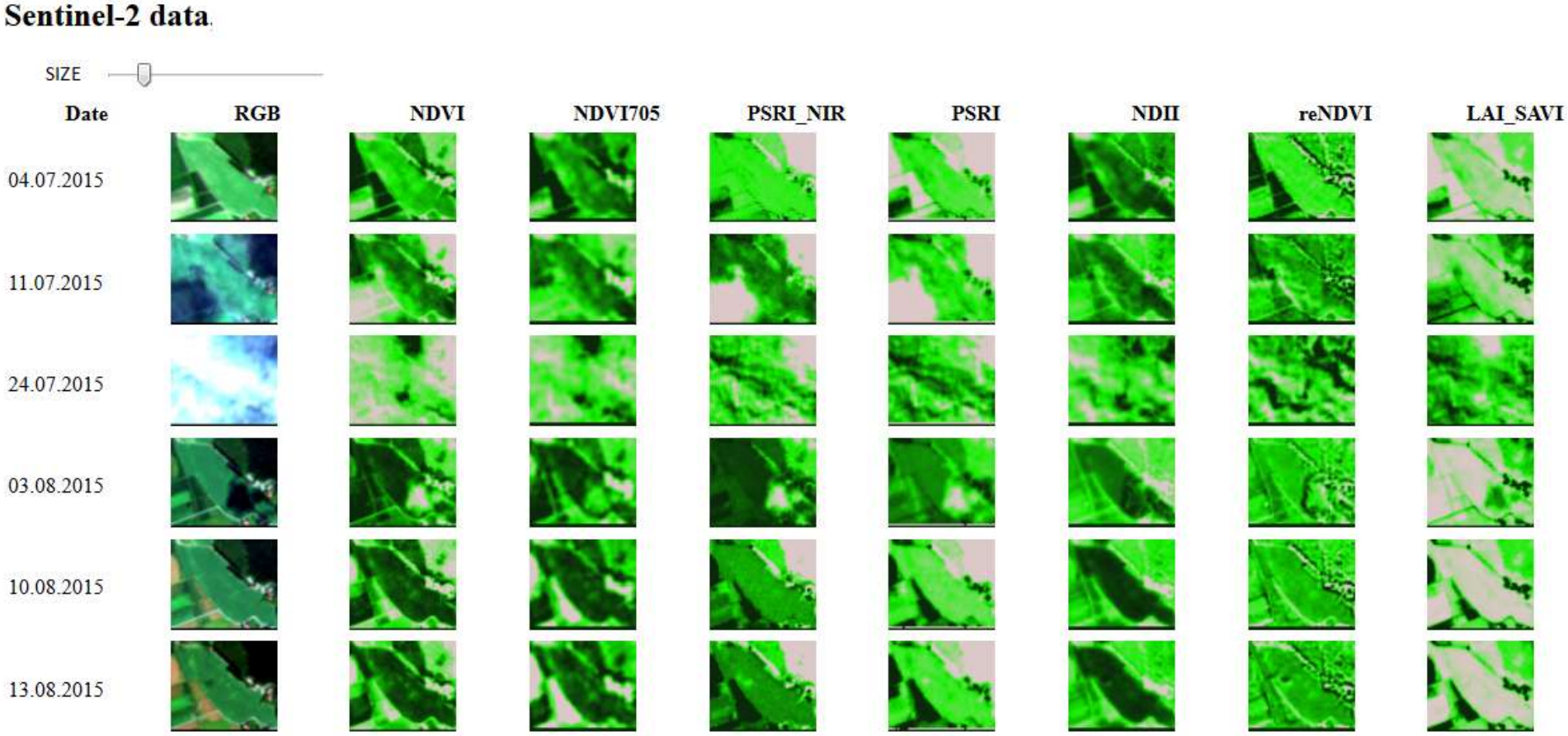
Trimble





TA

Satellite data, European Space Agency, Sentinel-2



Satellite data, Digital globe, worldview 3



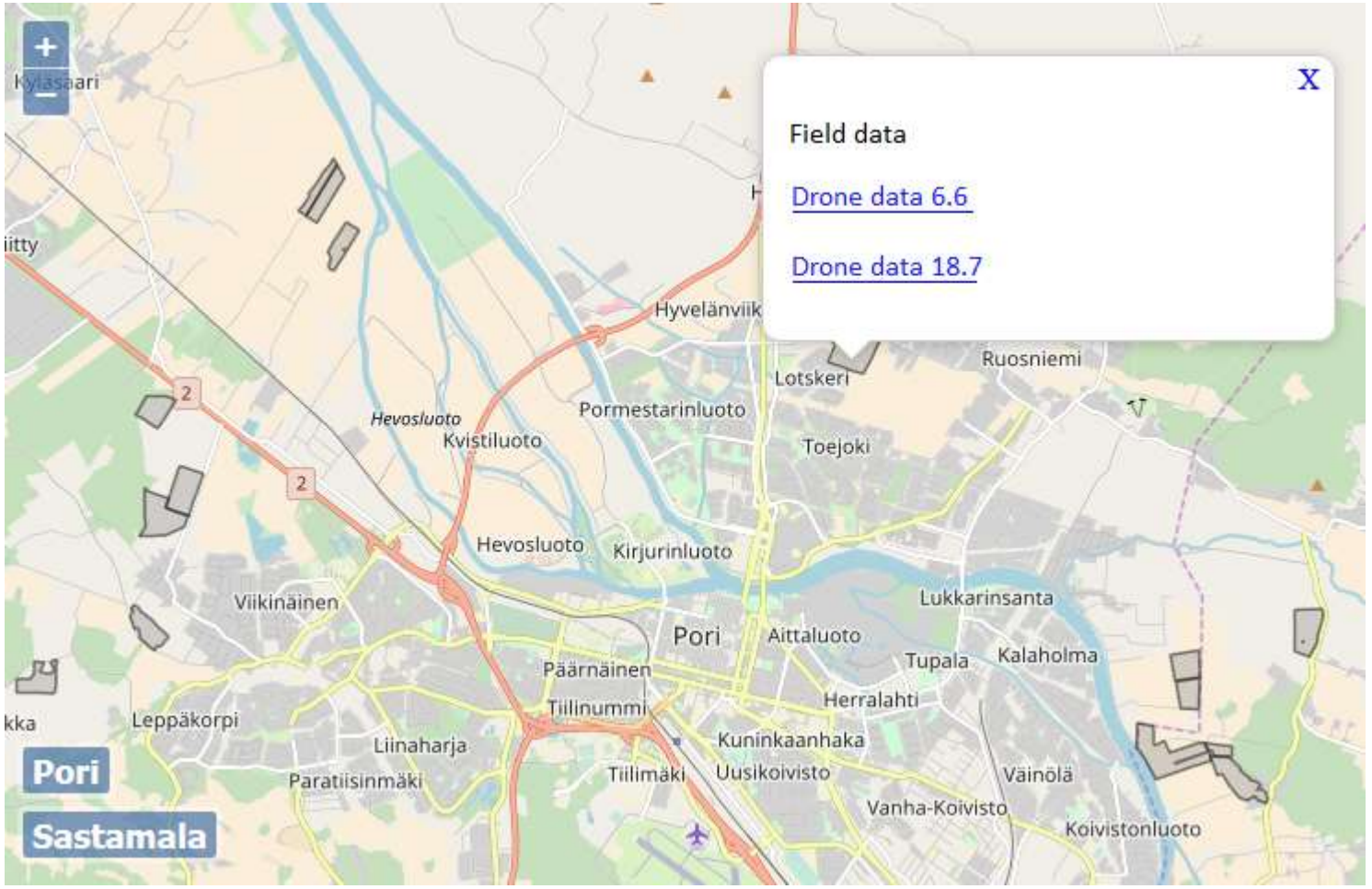


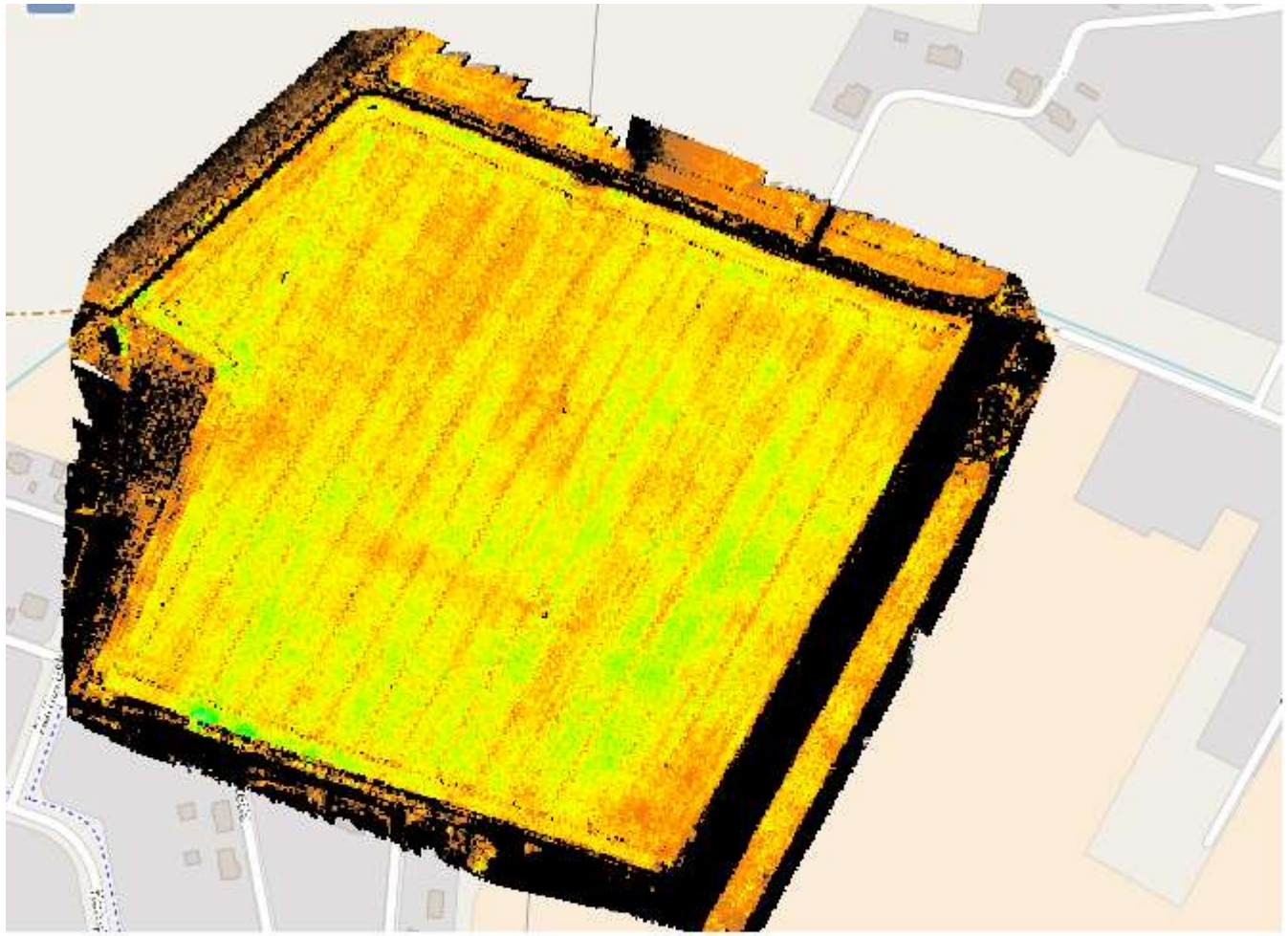






Development environment



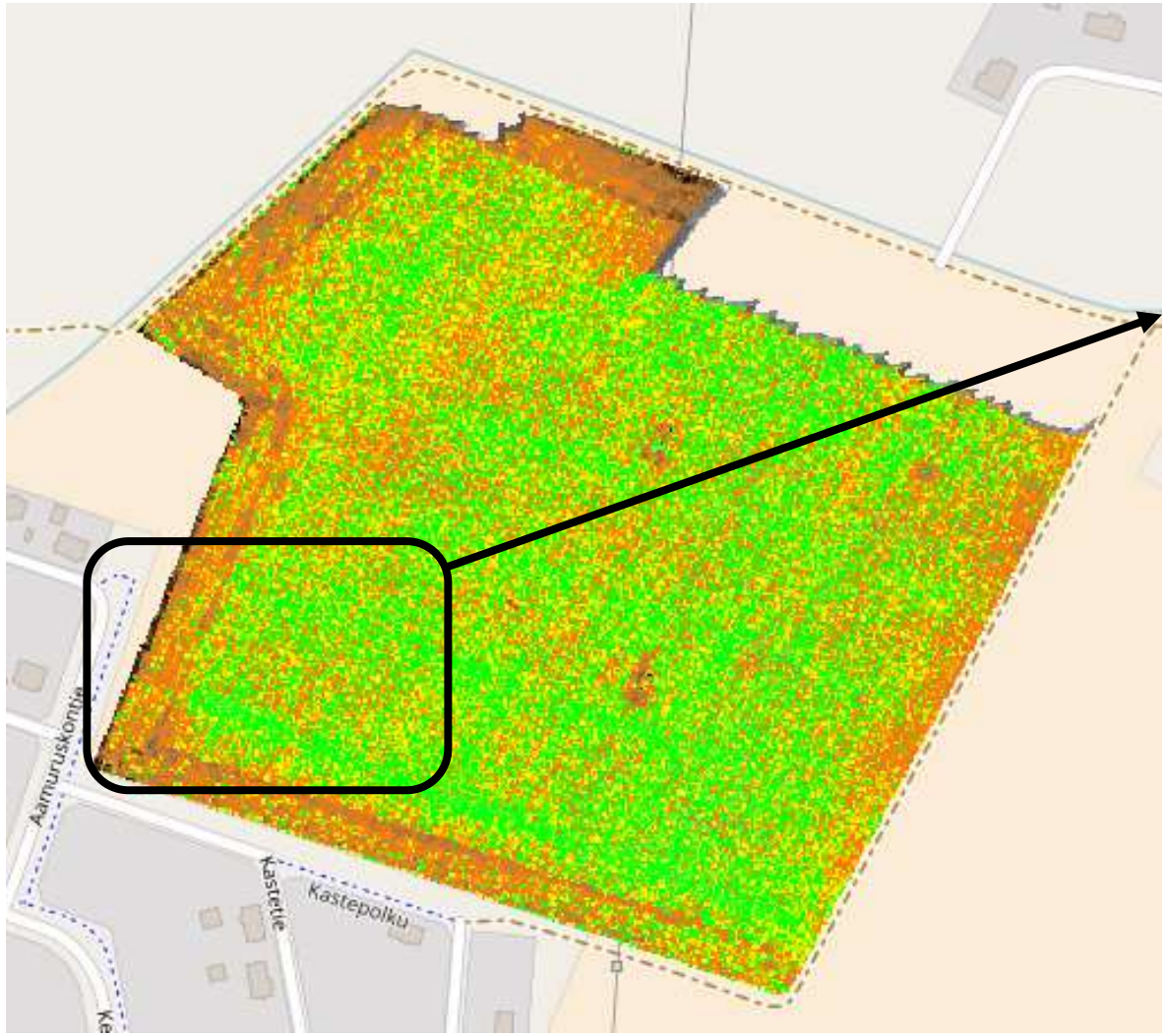


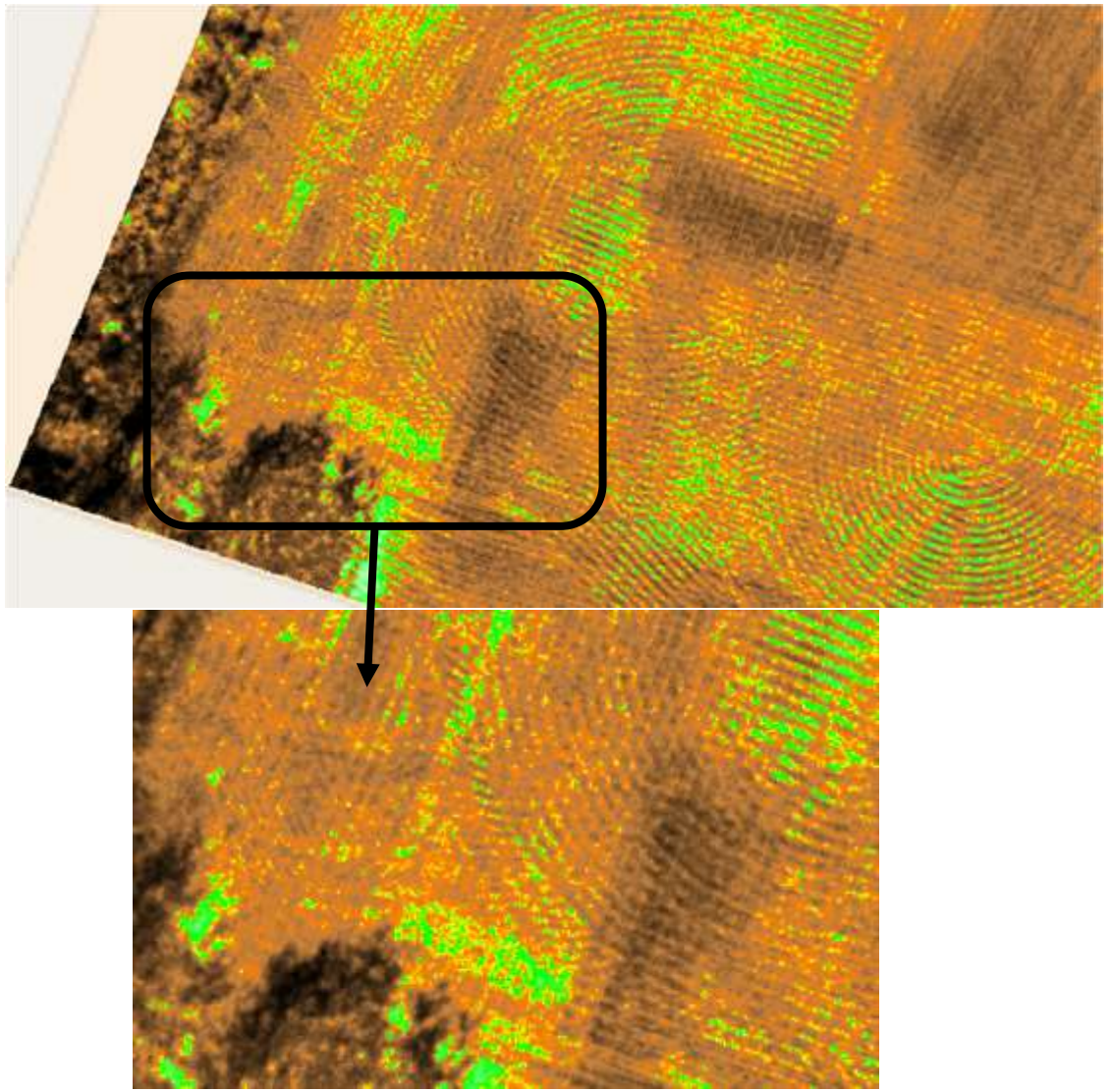
☑ NDVI ☑ Reflectance red ☑ Reflectance redge ☑ Reflectance nir ☑ Reflectance green ☑ Pohjakartta

Valittu karttataso: NDVI

Lukuväli: 0.87 - 0.98

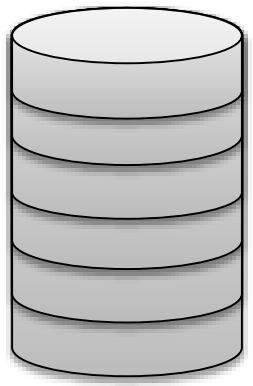
Päivitä valitun tason skaala


Aamuruskontie
Kastetie
Kastepolku



Project steps

Data → Service



Data Sources:

- Satellite
- Drone
- Combine harvester
- Yara Nsensors
- Soil data

New sources

- Weather stations
- Claas Isaria
- Drainage diagrams
- Precise soil measurement?

Working of data:

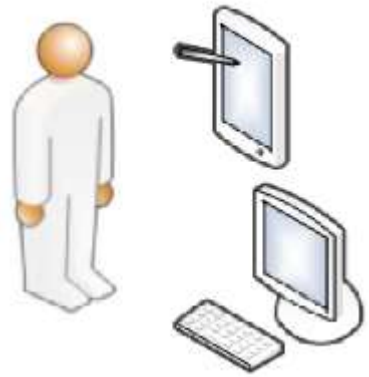
- Correction
- Integration
- Analyses
- Correlations
- AI

Intelligent data Service:

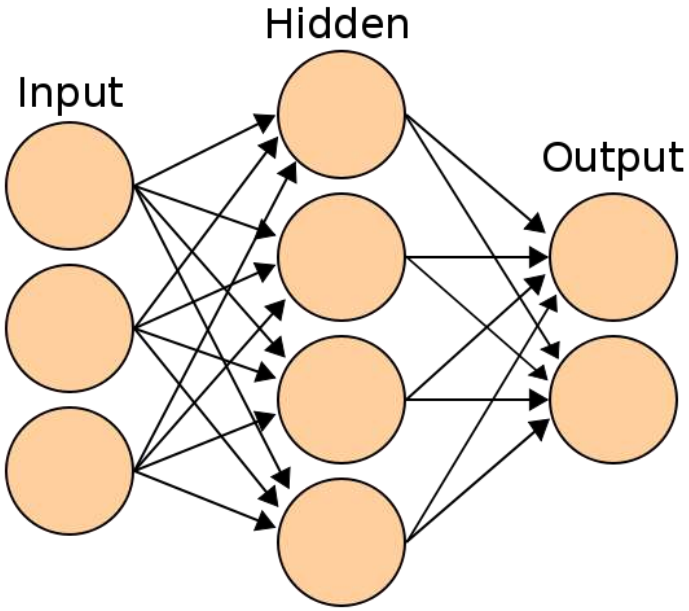
- Architecture of service
- Use & education guides
- UI & Backend development

Goal of intelligent service:

- Soil variation
- Nutrient levels (potassium, phosphorus)



AI – Neural networks



- Next steps
  - Neural network model
    - based on field data and yield data of combine harvester
  - PhD students from Mtech digital solutions developes this area

Mtech DIGITAL SOLUTIONS

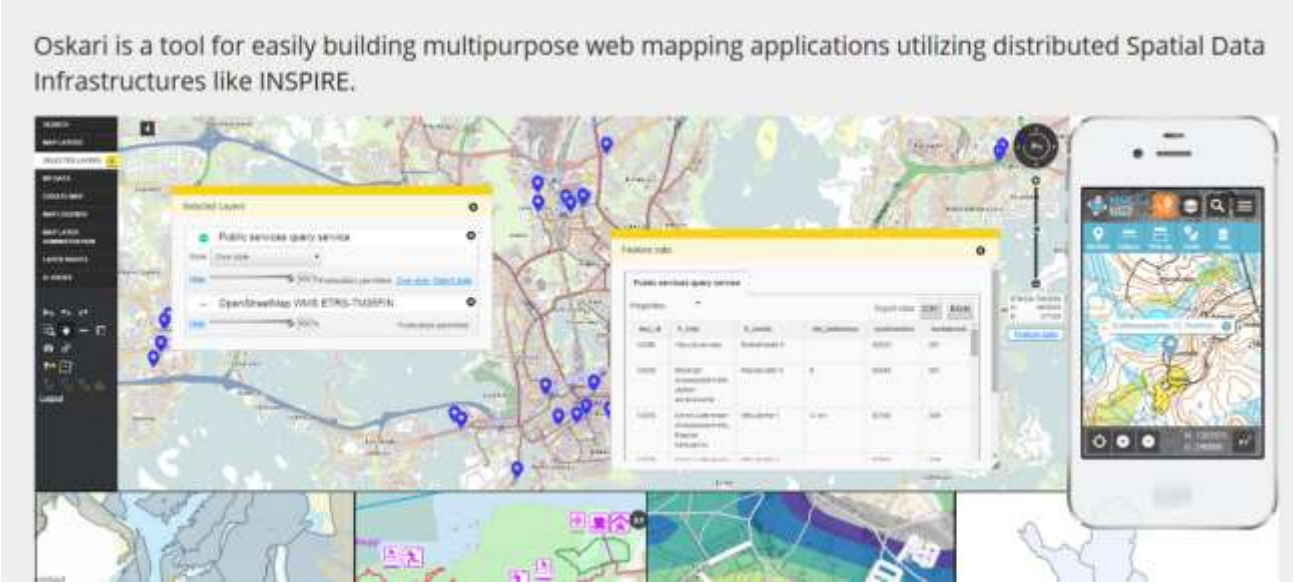
UI and Backends

Test development enviroment have build

- GeoServer

Next step

- oskari.org?
- Other open source services?



Next summer new data sources

- Claas Isaria
- Davis Vantage pro2
- Drainage diagrams
- Precise soil measurement, x-ray?





Platform for data transfer and identification

https://esuomi.fi/?lang=en

Haku

Suomi Svenska English

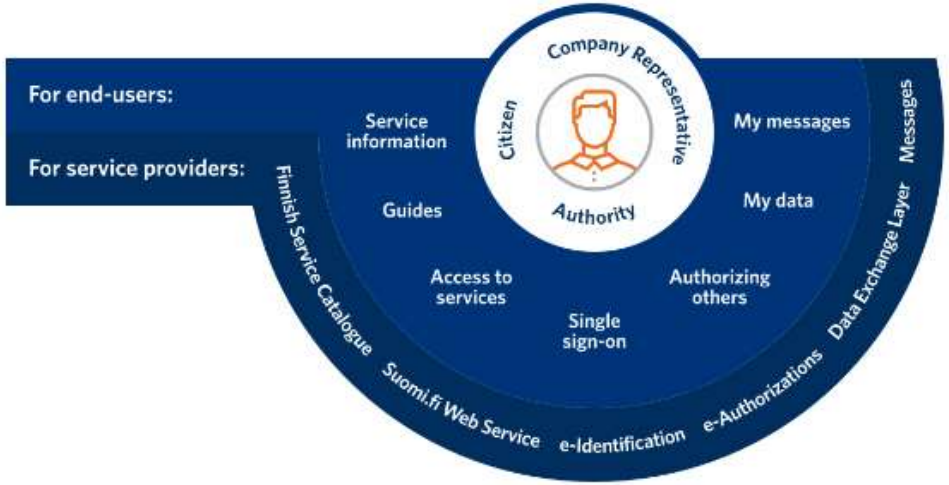
eSUOMI.FI Communication Channel for National Architecture for Digital Services

Suomi.fi Services | Contact information

Suomi.fi Services

Suomi.fi Services help public and private sector organizations to create a common platform for digital services.

The digital services that utilize the platform *will be used by us all*, with a single identity and single sign-on. We can use them in the role of a citizen, and when representing a private or public sector organization. We can also give and receive authorizations for making transactions on behalf of another person or organization. Digital communication and interaction with public authorities will become a lot easier.



Thank you

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