NLS
NATIONAL
LAND SURVEY
OF FINLAND

More with less – the Finnish collaboration model

Collaborative data collection enabling evidence-based decision making and innovation + Some ways forward

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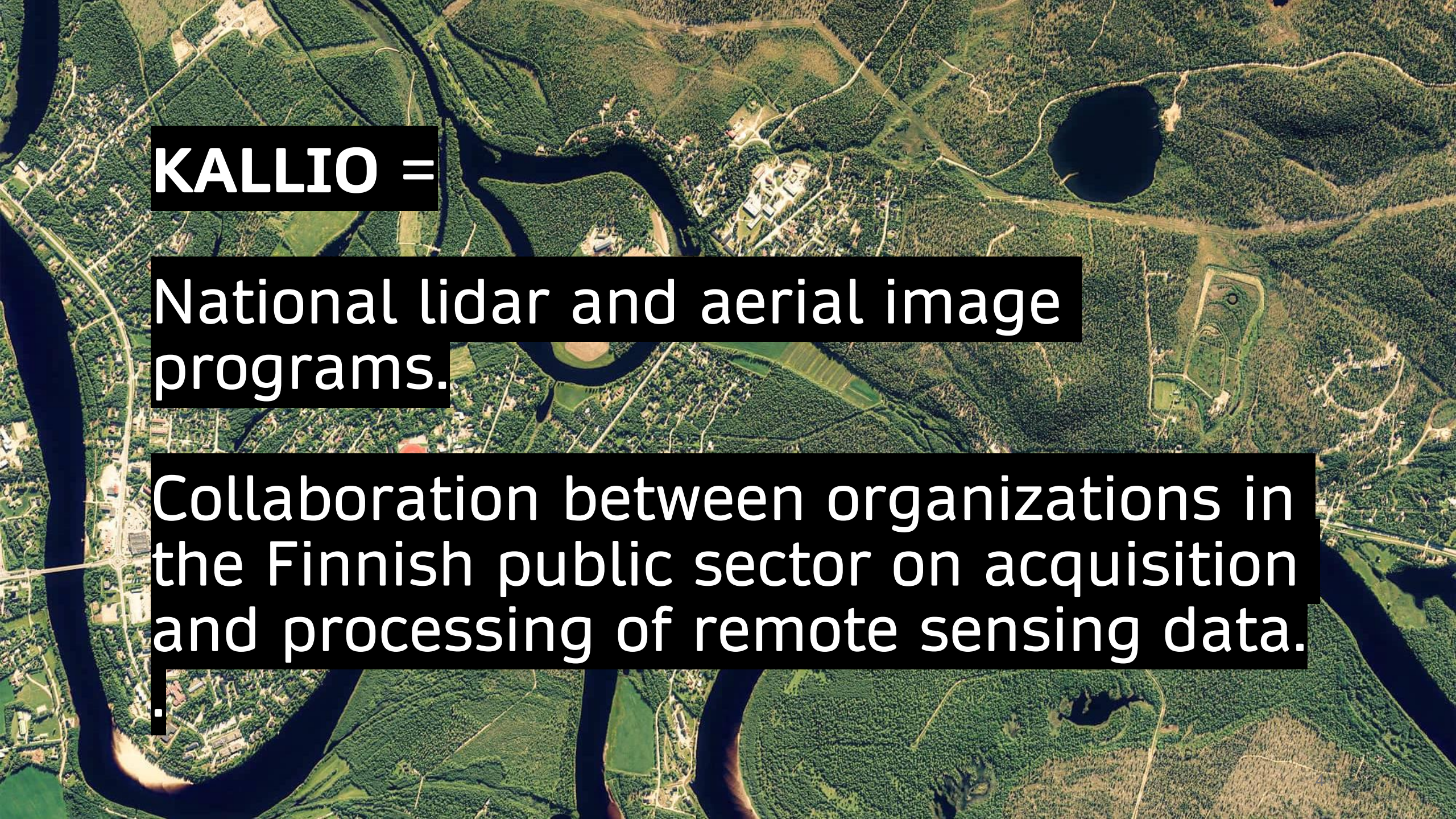
Finland - geographical challenges

Finland in a nutshell

- 390 000 km2 (forested areas 77 %)
- 64th largest country in the world – lots of data needed to cover the whole country
- Bordering countries
  - Norway
  - Sweden
  - Russia (**1340 km** borderline)

- Between 60’ and 70’ latitudes
- Weather conditions often challenging for data acquisition - clouds, snow

Image: Geoportal Arctic-SDI



KALLIO =

National lidar and aerial image programs.

Collaboration between organizations in the Finnish public sector on acquisition and processing of remote sensing data.

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Together.

5 public organizations are planning, funding and implementing the data acquisition together:

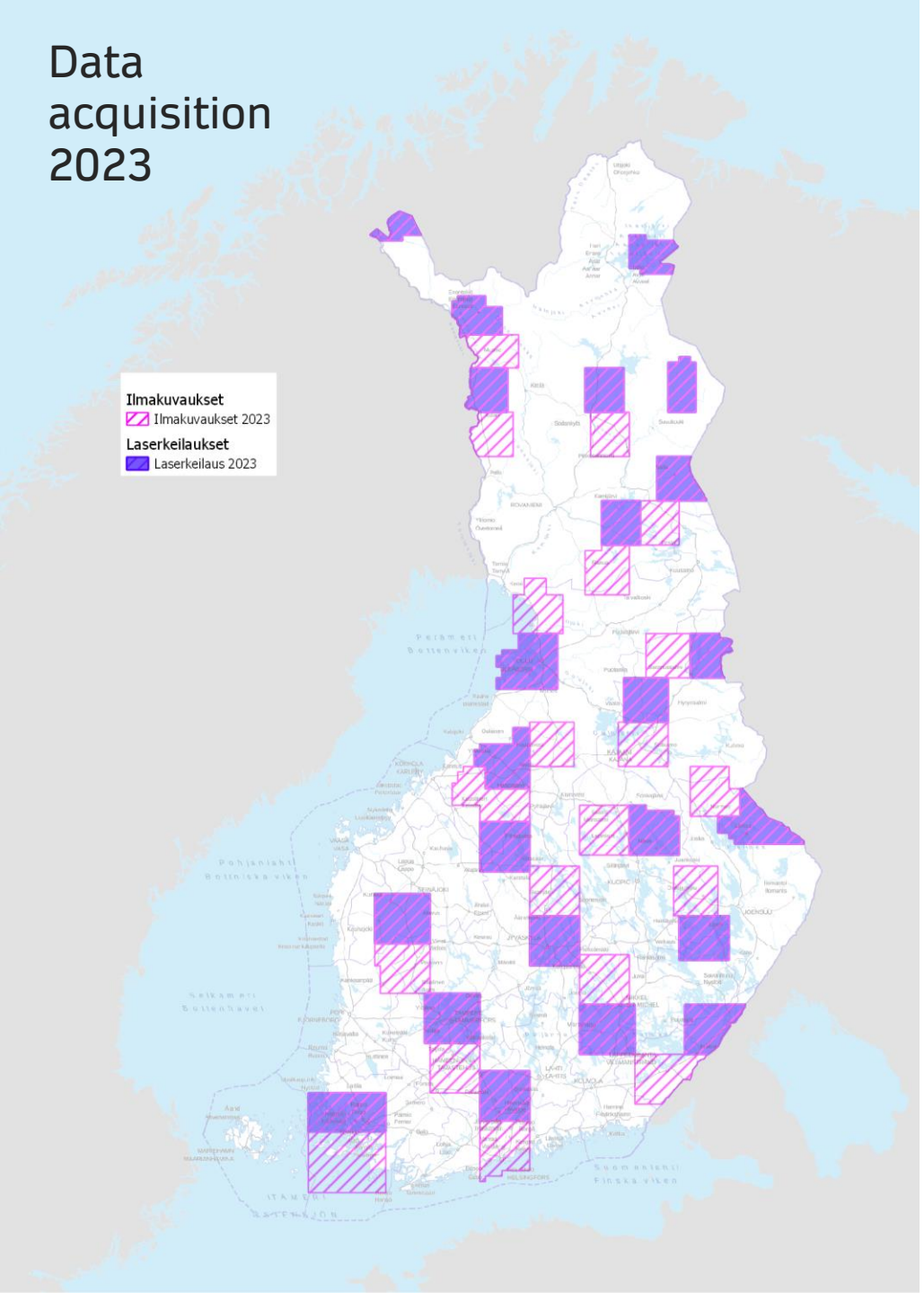
- NLS Finland
- Finnish Forestry Centre
- Finnish Forest Agency
- Finnish Food Authority
- Finnish Environment Institute

The new model of collaboration was first launched in 2020.

These organizations are not only sharing the data but also different kind of **know-how**.

The KALLIO collaboration builds **trust** between the member organizations. Trust has been boosting even more co-operation between the organizations, such as common development projects.

Data acquisition 2023



More.

The National Aerial Image Program: 3 year interval, 50 cm orthophotos.

The National Lidar Program: 6 year interval, 5 points/m2 resolution.

Use Cases of the data by KALLIO collaboration organizations are for example:

- production and updating forest data
- regulating agricultural subsidies and forest law
- flood mapping
- updating the national topographic database

With less.

None of the KALLIO organizations could afford to acquire all the aerial image and/or lidar data by themselves – the data acquisition costs approximately **4,3 million euros** per year!

NLS Finland is the expert and operative lead of the collaboration:

- Procurements, project lead and own data acquisition
- Quality control of the data
- Data security issues
- Data delivery and arhiving.

Other organizations can trust the data quality and concentrate on their own work - not on data acquisition issues.

Large procurements also keep the costs (€/km2) reasonable!

Co-operation that benefits the private sector as well

- Interesting business opportunities for private contractors in data acquisition
  - 60 000 km2 Lidar data and 110 000 km2 aerial photos / year
  - 2022: 5 companies working in 2 framework agreements (aerial imagery and lidar)

- All data as public data - to boost research and private innovation

Developing a Common Knowledge Base for Monitoring Land Use and its Changes - Project Partners

Finnish Environment Institute

National Land Survey of Finland

Natural Resources Institute Finland

Finnish Food Authority

Finnish Forest Centre

Project Duration: 2021-2023

Developing a Common Knowledge Base for Monitoring Land Use and its Changes - Project Goals:

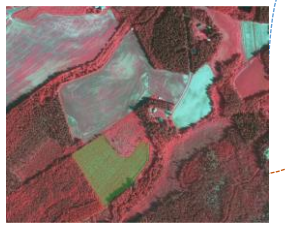
- Improve the **Geospatial Knowledge Base** describing land use and its changes as a basis for reporting, planning, monitoring and decision-making regarding land use
- Produce data sets describing land use and its changes, **combining and further processing data produced by different actors**
- Develop a **common governance model for land use data production**, to enable regular monitoring of land use and its changes

Project Results

Peat production areas and after-use

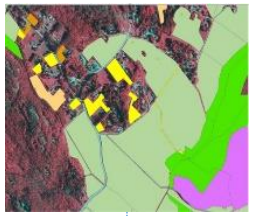
Restored mires/swamps

Change Mask of forests 2015-2021



Forest mask

Updated objects in the Topographic database



GHGI-computation

Disused agricultural land

Annual agricultural land (2020, 2021)

Built-up land cover

Built-up land use

- **Governance model**: Proposal for roles and responsibilities for different organizations for the production and maintenance of data sets
- **Development proposals**: for the materials and processes used by the project

Issue? Market disturbance

- The Competion Authority (in Finland) has relatively strict interpretation on what authoritites can do without risk of disturbing the market..

Current interpretation:

NLS **is not allowed to sell products or consultation services** that can be provided by the private sector (unless specifically mandated by law).

2026 ->. EVEN MORE?

The first KALLIO program will end 2025 with whole of Finland lidar coverage in 5 points/m2 (and 50cm aerial twice).

A new KALLIO program is under planning to be launched starting 2026.

The goal is to expand the KALLIO collaboration to involve more organizations and to collect more detailed data.

Planned datasets include point density of 20 points/m2 (laser scanning) and aerial images with resolution of 20 centimeters.

With detailed datasets and information there are more use cases, such as:

- Digital Twin of Forests
- Carbon sink & other Green Deal analysis
- Digital Twins / Smart cities/municipalities
- Digital Twin of Freshwater network
- Digital Twin of Traffic infrastructure
- Metaverse applications
- Other Data ecosystems and Data Spaces??

Digital Twin of the Freshwater (network)

FRESHWATER COMPETENCE CENTRE

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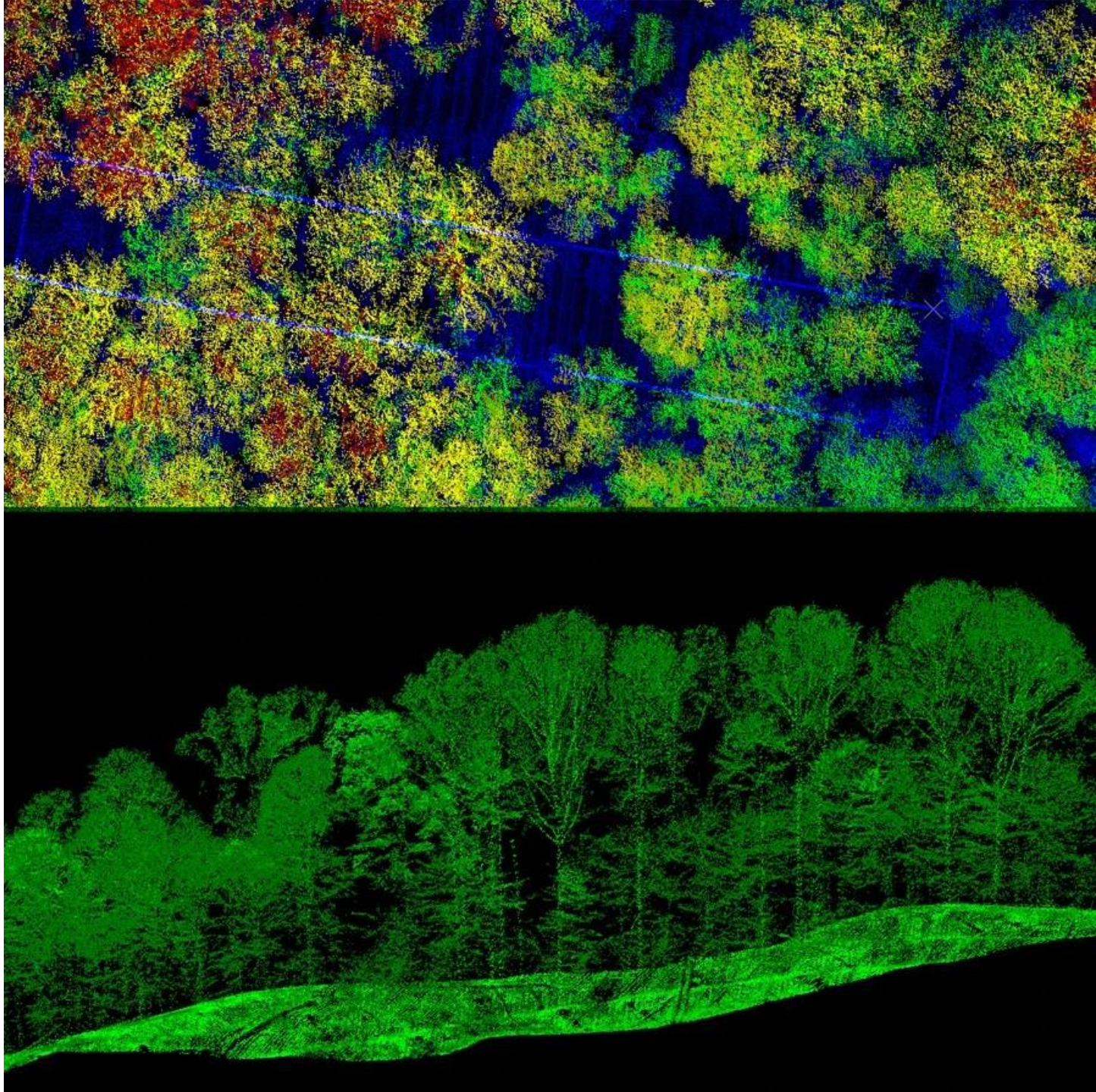
Finnish Environment Institute

Digital Twin of Forests



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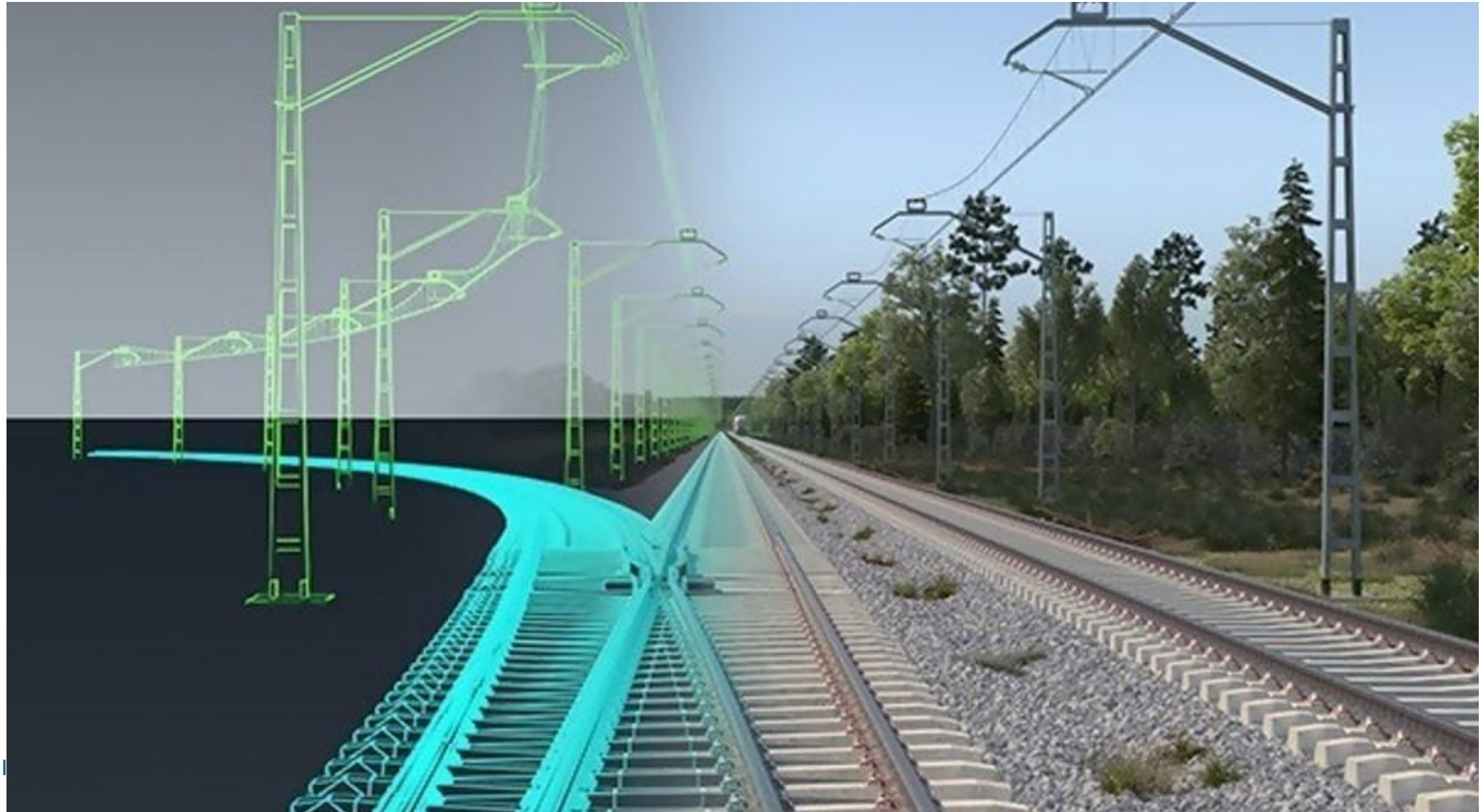
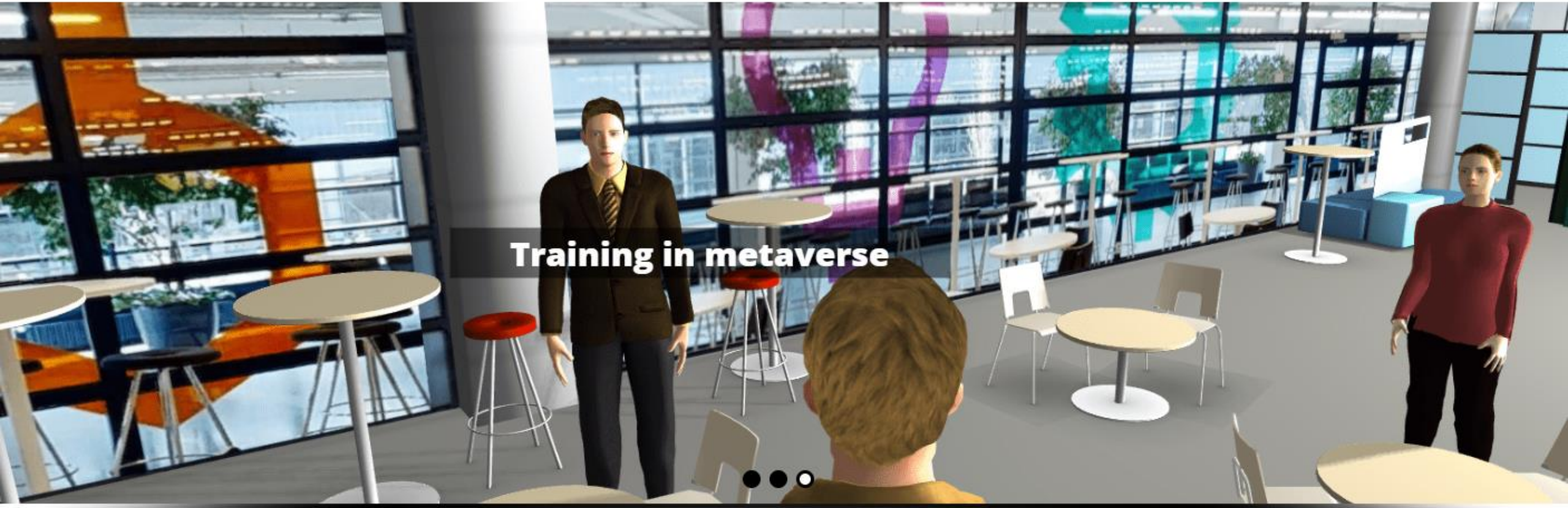
Digital Twin of Traffic Infrastructure – vision 2030



Source: Finnish Transport Infrastructure Agency

Source: FVS.fi



Finpeda Virtual Space (FVS) takes training and business meetings to metaverse in minutes with use of avatars, 3D assets and real-time content sharing.

Source: FVS.fi

finpeda virtual space
IMMERSIVE LEARNING EXPERIENCE

Multiuser collaborative virtual space

✓Supports distance presence

✓Visual access through **maps**

✓Combines physical and virtual worlds

Common European data spaces

Rich pool of data (varying degree of accessibility)

Free flow of data across sectors and countries

Full respect of GDPR

Horizontal framework for data governance and data access

- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

Location for European Data Spaces

Project concept v1

DRAFT

LOCATION FOR EUROPEAN DATA SPACES

The purpose is to make national geospatial data available as part of European data spaces, thus enabling and driving the use of national high value data sets in developing internationally scalable, integrated digital services for the European citizen

Goal 1: Develop a data space connecting framework and tools that enable utilization of organization's own (business) data combined with a high value data set (such as geospatial, statistical, environmental observation and meteorological data

INTEROPERABILITY

TRUST

Quality check tool

Interoperability map

Data FAIRness evaluator

Data quality dashboard

Semantic harmonization

Evaluation metadata

Goal 2: Suggest a business model for operating the framework and tools in the future, as a service provider for the data spaces

GOVERNANCE

Goal 3: Demonstrate combining high value data sets with geospatial data through example use cases

DATA VALUE

Energy efficiency of buildings

Urbanization/Smart cities

Circularity

Carbon sinks

SPINVERSE

Explanation: Data tool | DATA SPACE BUILDING BLOCK | Use case

Takeaways

Digital Transformation is not just about leveraging new technology – it is about new collaboration models for creating more value and impact with stakeholders.

Development of more mature Digital Twins in various data ecosystems and the immersive Metaverse applications drive the need for geospatial data development, further interoperability measures and collaboration to reduce cost.

Building Collaboration and Trust across silos and sectors is key to success of NMCAs!

Thank you!

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