BSS
Baltic Satellite Service

GeoHub
https://app.geohub.net

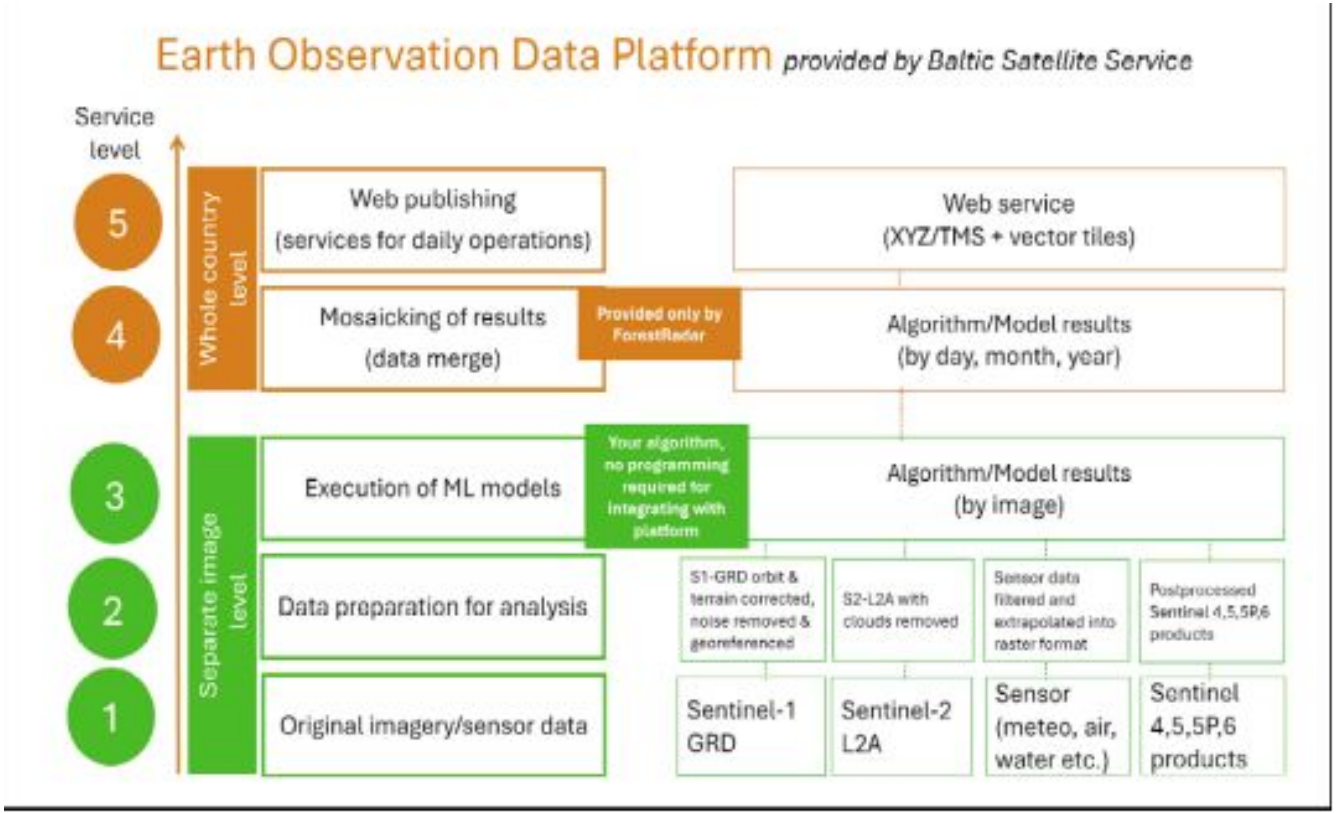
EO Data Platform for Governments, R&D Institutions and Multi Sector Applications

SATSDIFACTION 6th LDD in Riga

11.09.

FORESTRADAR
Advanced Forest Intelligence
https://
www.forestradar.com

EO BALTIC PLATFORM FOR GOVERNMENTAL SERVICES (EO-BALP), https://app.geohub.net



EO-BALP web page:

https://www.forestradar.com/projects/esa-eo-balp

GeoHub

https://app.geohub.net

Agricultural Land Monitoring Service

The main purpose of the application is to improve the management of agricultural land by effectively addressing fire and flooding problems. Key objectives include increasing efficiency through automated mapping using satellite imagery, supporting regulatory compliance processes and rapid response, and centralizing operations for better resource optimization. The application allows users to identify, monitor, analyze, download and manage agricultural areas affected by fires and floods.

Forest Monitoring Service

The Forest Monitoring Service provides monthly monitoring of forestry activities, such as clearcuts, and detects windfalls, along with annual monitoring for less visible forest damage, including excess water, insects, disease, and fire, across the Baltics. This service reduces the need for manual surveys, allowing human resources to focus on damage prevention and enabling timely updates to the State Forest Registry.

Infrastructure and Settlement Monitoring Service

DATEL

Infrastructure and settlement monitoring application allows to observe subsidence in cities with population more than 60 thousand. The service supports monitoring and analyzing how construction activities affect nearby buildings/infrastructure, identifying and preempting potential issues. InSAR analysis shows vertical displacement grids for the biggest 10 Baltic cities. The grids are derived from the persistent scattered interferometric analysis (PS-InSAR) of Sentinel-1 satellite radar images. Multitemporal InSAR analyzes for the time period of one year are calculated monthly. The precision of InSAR derived displacements is 2 mm on average.

Marine Monitoring Service

This service by using synthetic aperture radar (SAR) technology complements the monitoring of marine vessels in the waters of the exclusive economic zone of the Baltic States, and allows the detection of vessels not connected to the automatic identification system (AIS), especially under harsh weather conditions. Such data can assist in identification of illegal activities such as fishing in protected areas or during prohibited periods, illegal dumping and water pollution.

Natural Resource Extraction Monitoring Service

The Natural Resource Extraction Monitoring service is intended to produce classified maps of Natural Resource Extraction sites using Sentinel-2 imagery and available reference information. Monitoring of the licensed extraction sites is performed by observing the changes of their geographical extent and comparing the licence data with the classification results.

Water Quality Monitoring Service

Satellite data based Water Quality monitoring application significantly expands water monitoring for surface waters in time (weekly observations) and in space (on the scale of almost the entire water body) enhancing the assessment of water quality, the number of problematic water bodies, their change in time and the locations of hot spots. Combining such data with agricultural land monitoring data makes it possible to identify possible sources of impact and develop environmental measures to improve water quality.

DATEL30

Klaipeda University

BSS Baltic Satellite Service

Lauku atbalsta dienests

ELEKTRONIKAS UN DATORZINĀTŅU INSTITŪTS

Applications supported by the platform

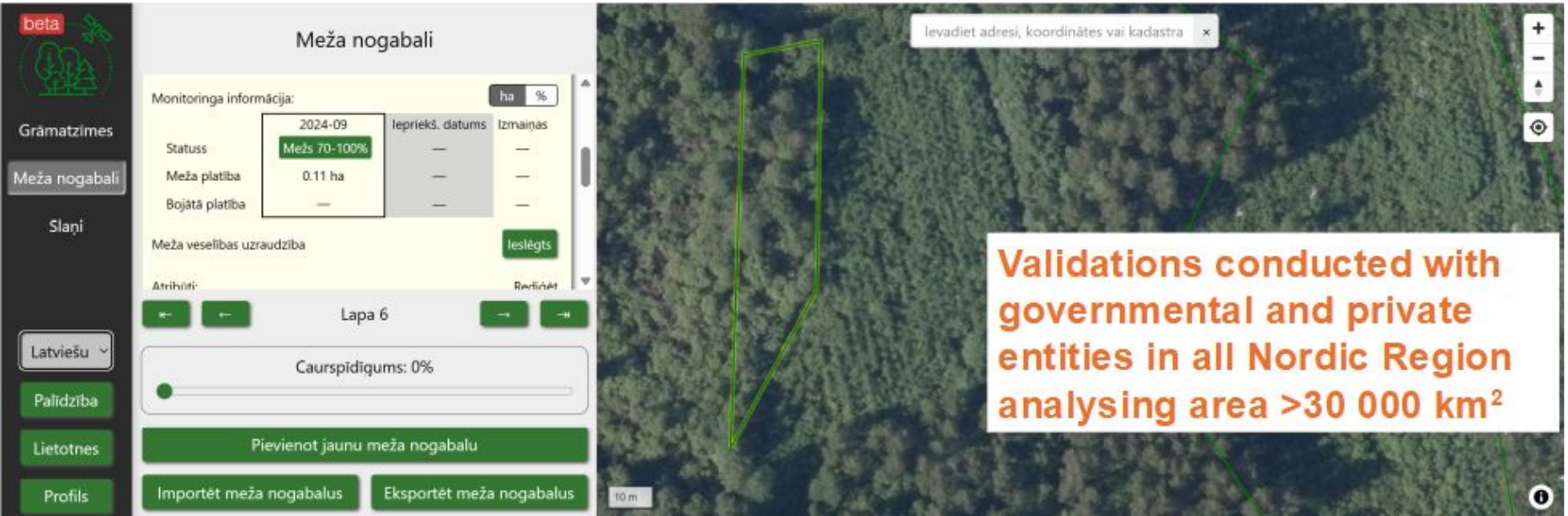
Few examples

1. Tree cover damage monitoring
2. Tree cover within powerline bufferzones
3. Identifying forest stands that require thinning
4. Data support for agriculture applications

1. Tree cover damage monitoring

Scenario 1: Automated clear-cut monitoring system in the Baltics

Register → Upload forest plots with attributes and edit them in the web app if needed → Review the plot analysis: 1) current status (0-30%; 30-70%; 70-100%) 2) forest area (%, ha) 3) damaged area (%, ha) 4) previous monitoring date 5) change since last monitoring time → Evaluate the area using various spatial data (all Baltics) → Download the result in GeoJSON, CSV, Excel, ShapeFile, SQLite

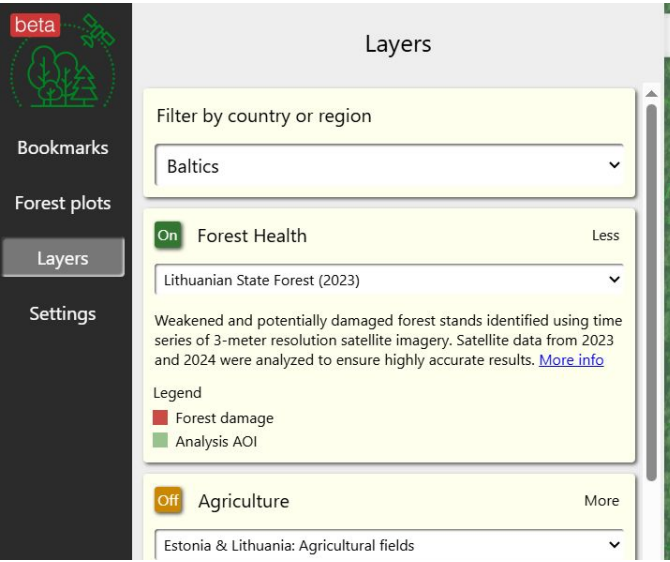


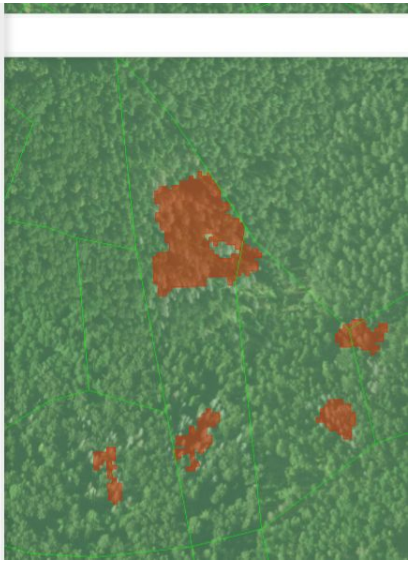
1. Tree cover damage monitoring

Scenario 2: Automated forest health risk monitoring

(clear-cuts, windfalls, fires, pests, illnesses, increased moisture, etc.)

Register → Specify forest plots for analysis or send as shapefile to info@forestradar.com → Specify the time period of the analysis (year) → Receive risk areas in the app after the end of the vegetation season → Evaluate the area using various spatial data (all Baltics) → Download the result in GeoJSON, CSV, Excel, ShapeFile, SQLite





95% accuracy accomplished!

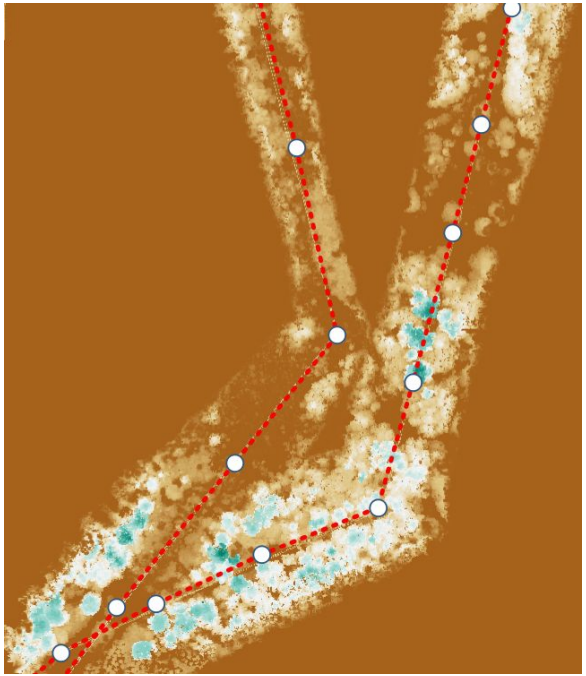
2. Tree cover in powerline bufferzones

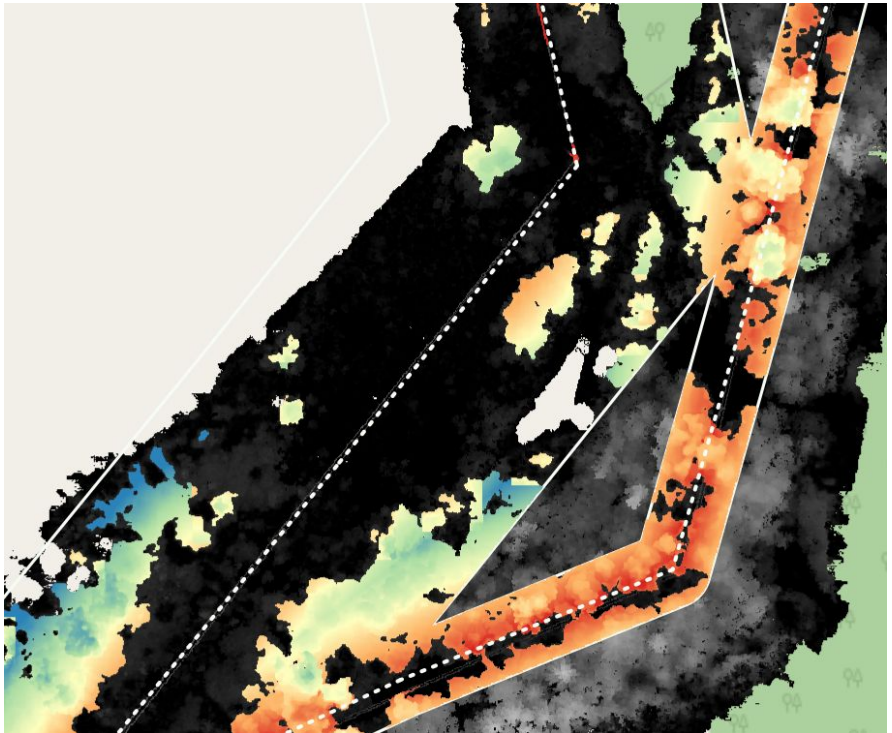
- ForestRadar Automated Overhead Power Lines Vegetation Management Service for Energy DSO Company
- **Practical objective of the project: tree cover monitoring in powerline buffer zones using Lidar and Sentinel2 data**

2. Tree cover in powerline bufferzones

- Lidar data provides information about 3D structure of tree crowns
- So we can analyse the distance between powerline and tree crowns

CHM

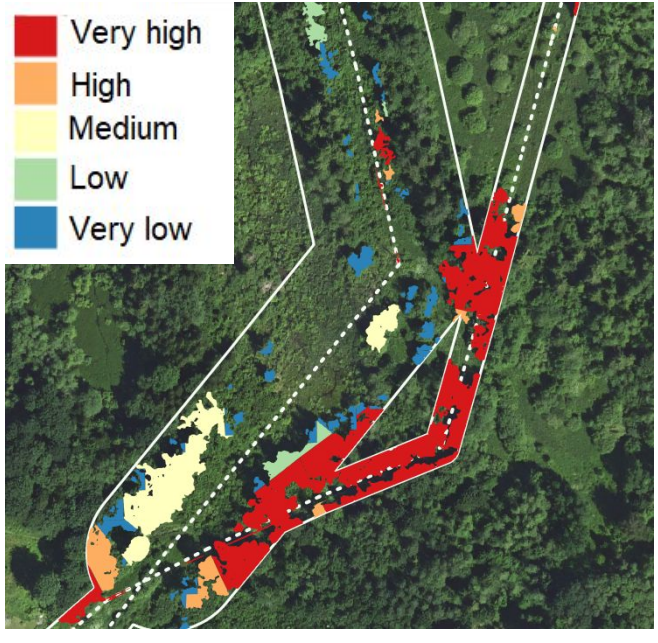




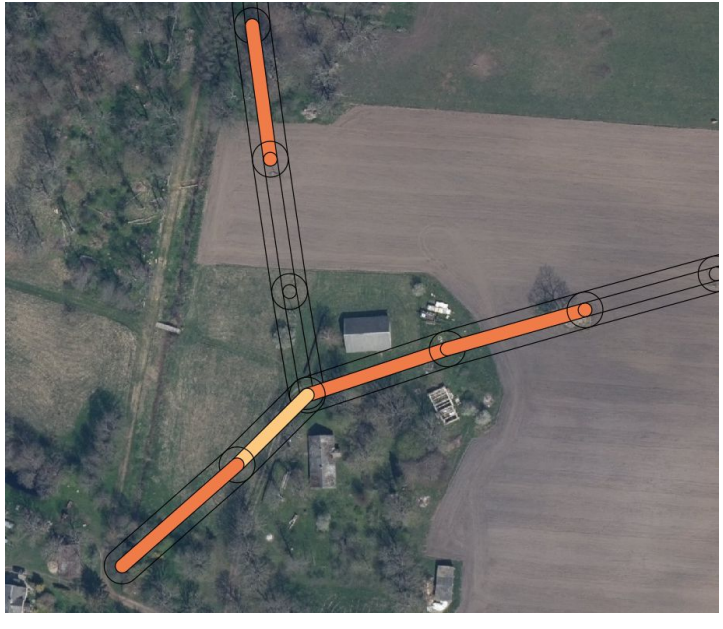
Closest areas to powerlines colored red

2. Tree cover in powerline bufferzones

Result 1: Tree crown areas in buffer zones labelled with priority classes depending on how close they are to powerlines

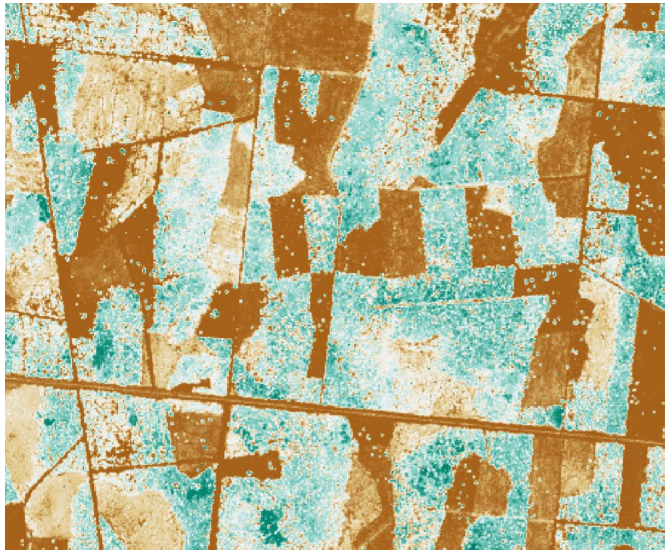


Result 2: bufferzones labelled with clearing work priorities

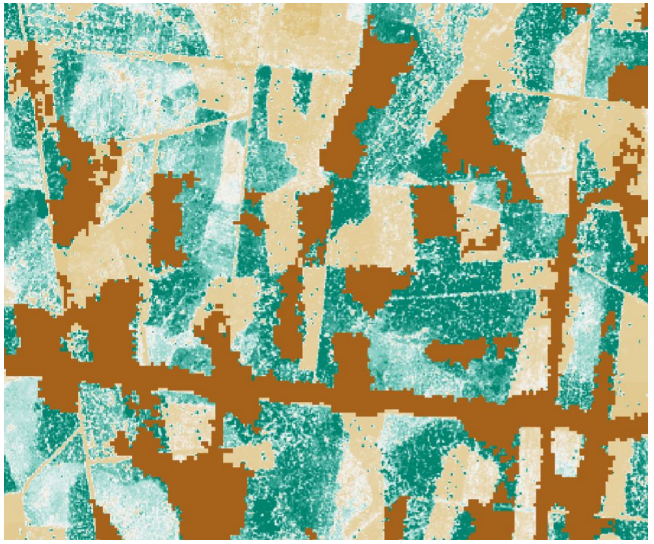


2. Tree cover in powerline bufferzones

- Advantages: remote sensing risk detection without personnel driving in field
- Lidar data outdation solved by 1) simulating tree growth using growth model, 2) detecting cutting using Sentinel-2 satellite images



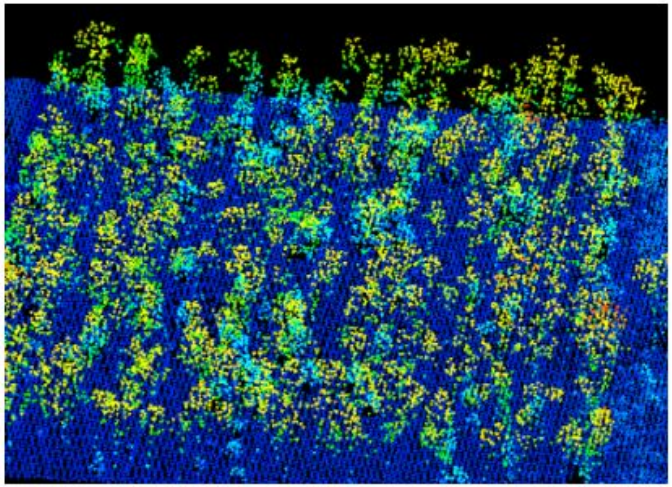
CHM 2016

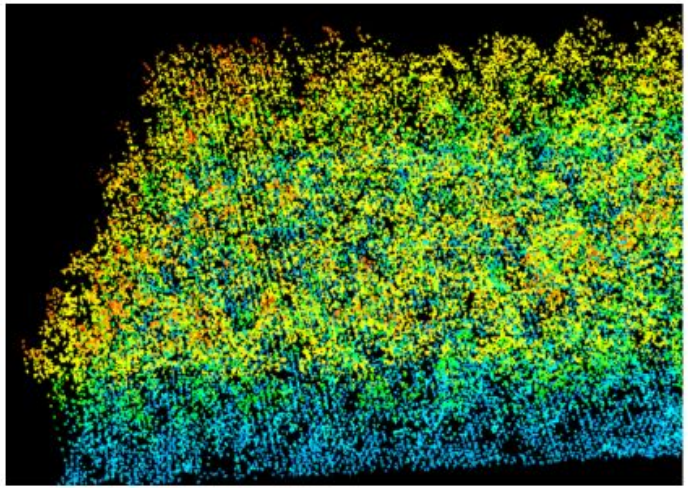


Modified CHM 2016 using tree growth model and clear cut detection from Sentinel-2

3. Identifying forest stands that require thinning

- **ML4HealthyForest**
- **Practical objective of the project:** estimate the need for commercial and young stand thinning using countrywide lidar data



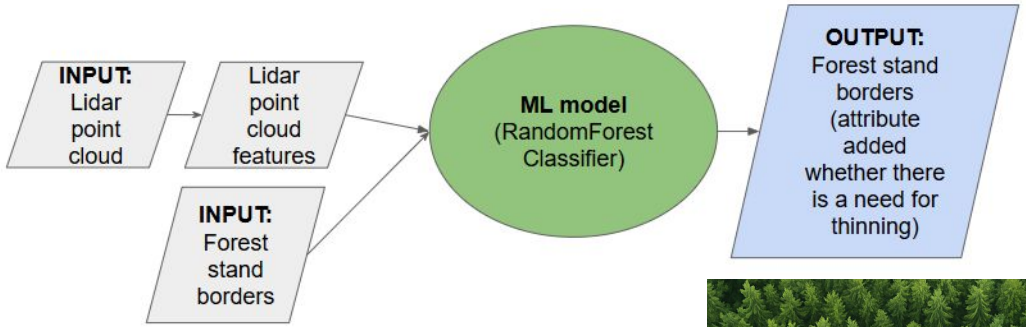


To the left: stand thinned one year before Lidar acquisition, to the right: stand needs to be thinned.

Interreg
Co-funded by the European Union
Estonia – Latvia

3. Identifying forest stands that require thinning

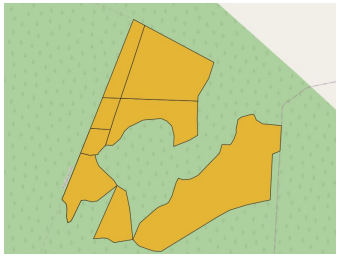
- **2 workflows:** 1) estimating the need for thinning directly from point cloud features, 2) following the decision logic from local provisions



3. Identifying forest stands that require thinning

- **How it works?**

User prepares stand polygons of interest in any GIS convenient



uploads

Cloud solution including ML model and Lidar features precalculated

Need for thinning added as a new attribute to the stand polygons

standOutput — Features Total: 1012, Filtered: 1012, Selected: 0

	id	thin_est	year
10	8817	1,00	2025
11	8817	1,00	2025
12	8818	1,00	2025
13	8820	1,00	2025
14	8842	1,00	2025
15	8683	2,00	2025

Show All Features

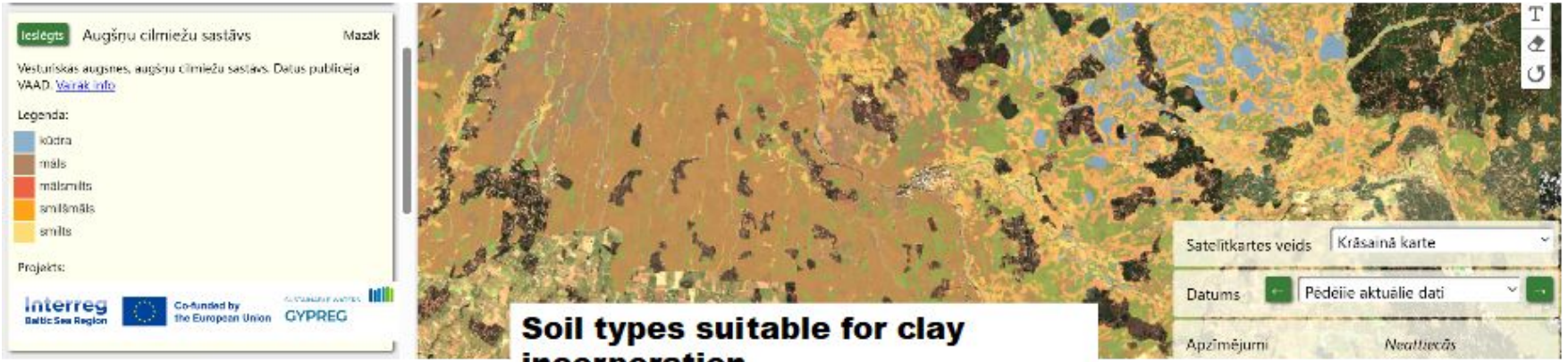
downloads results

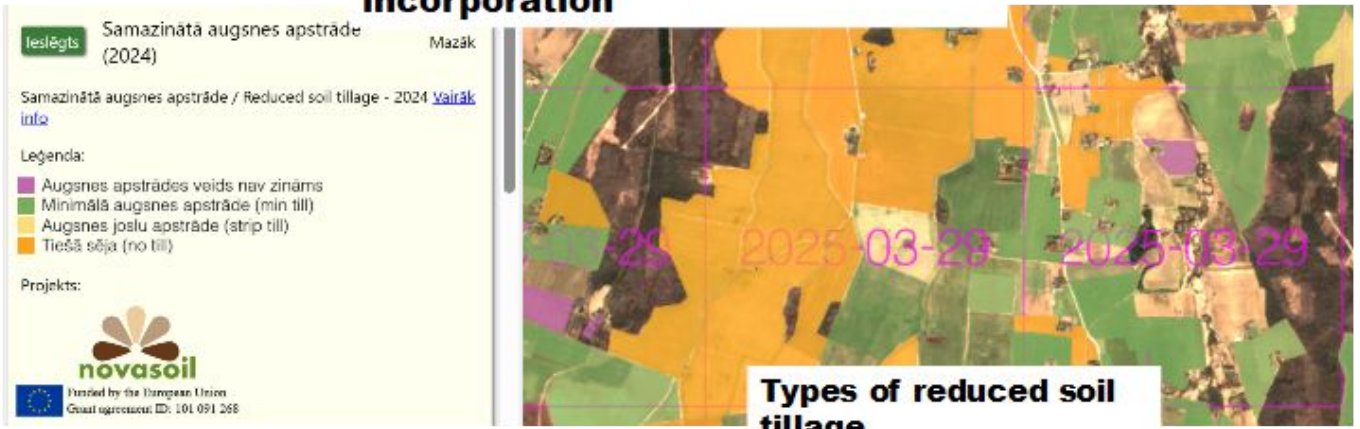
Interreg
Co-funded by the European Union
Estonia – Latvia

4. Data support for agriculture applications

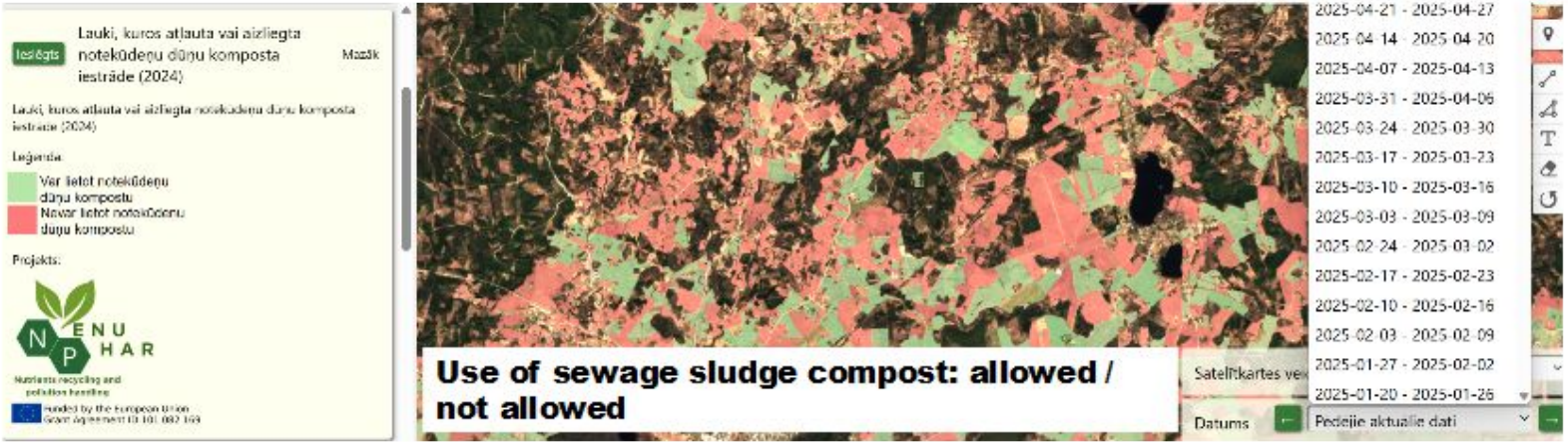
- Integration with enterprise **GIS:** WMS, XYZ/TMS services
- **Full History of Images and Vegetation Indices:** a slider tool
- Automated notification of new imagery inclusion: e-mail
- Access restriction: user authorisation

4. Data support for agriculture applications





4. Data support for agriculture applications



Looking towards cooperation!

Ilze Barga, ilze@baltsat.lv

BSS Baltic Satellite Service

https://www.baltsat.lv

FORESTRADAR
Advanced Forest Intelligence

https://www.forestradar.com/

GeoHub

https://app.geohub.net