ForestRadar technologies

developed by

Baltic Satellite Service

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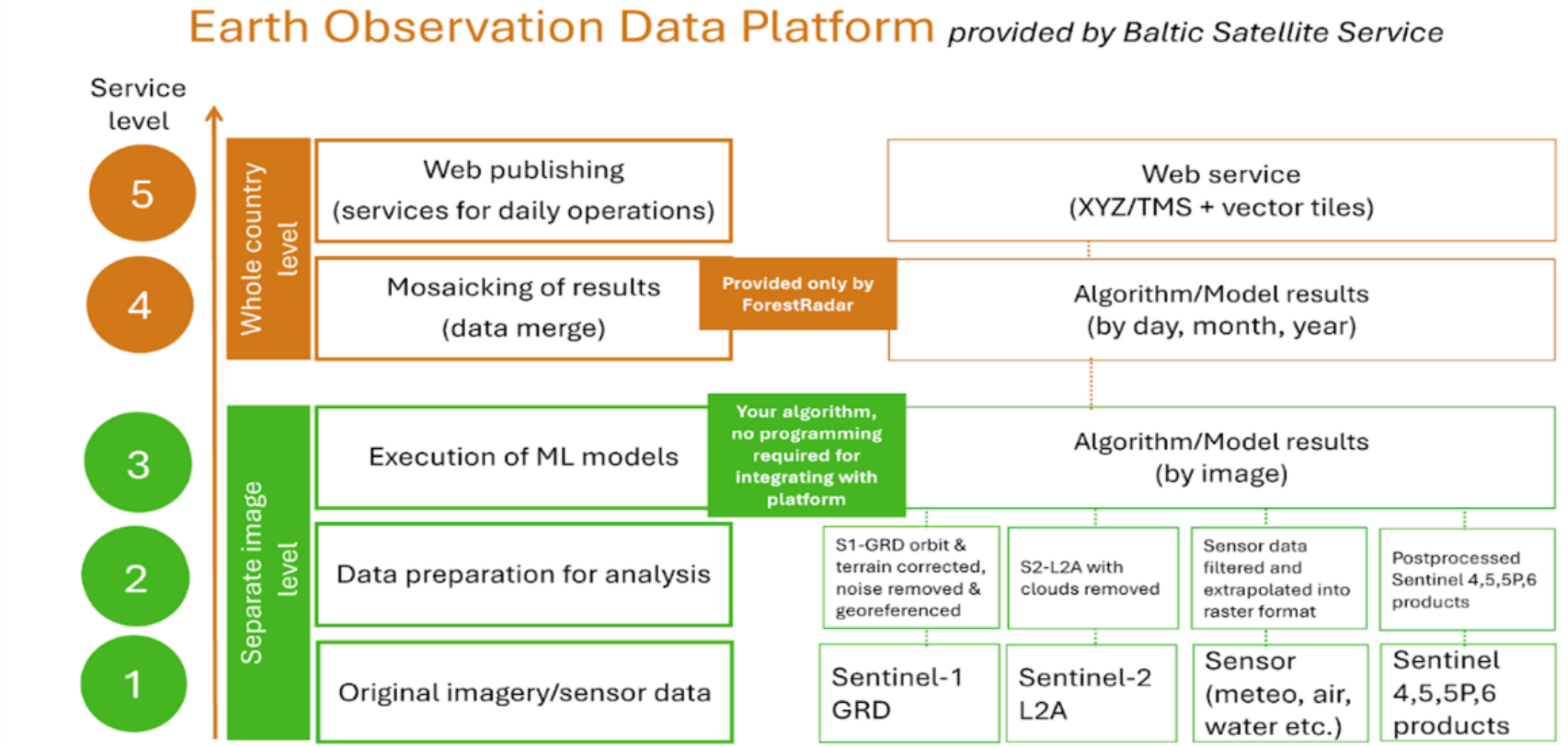
Company overview

ForestRadar

BSS
Baltic Satellite Service

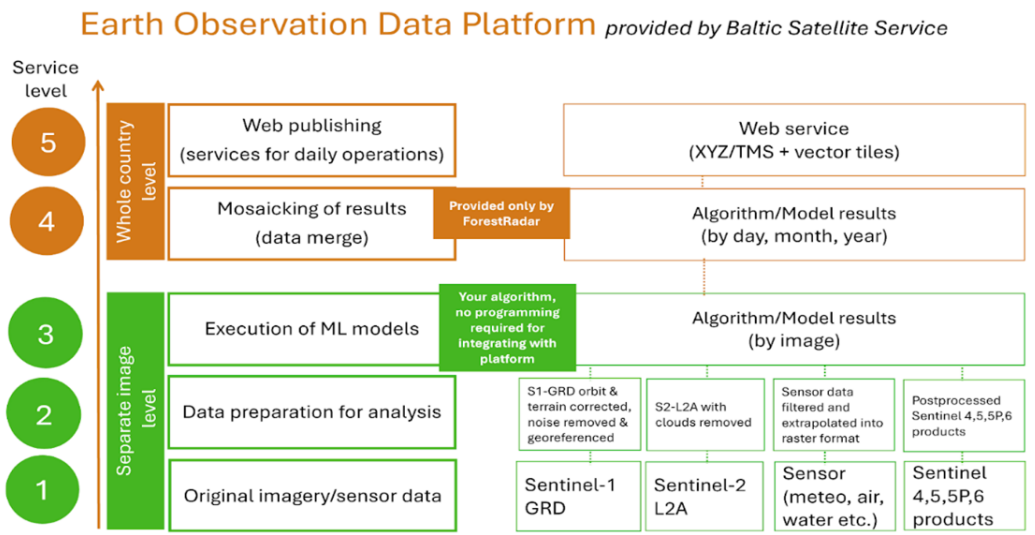
- **20 years experience in GIS** (building enterprise GIS systems, delivering spatial data, automating data production, conversion and other processes)
- **7 years focus on satellite imagery** derived data services (forestry, agriculture, utilities, municipalities, R&D)
- **Owns geospatial infrastructure/EO data paltform** to provide imagery cloud services, data analytics and web applications
  - forest.forestradar.com
  - flood.forestradar.com
  - fire2.forestradar.com
  - app.smartagro.lv
- Many years experience in EU (ERAF, INTERREG, EUROSTARS-2, Horizon 2020) and **ESA funded projects**

BSS (space-related) experience



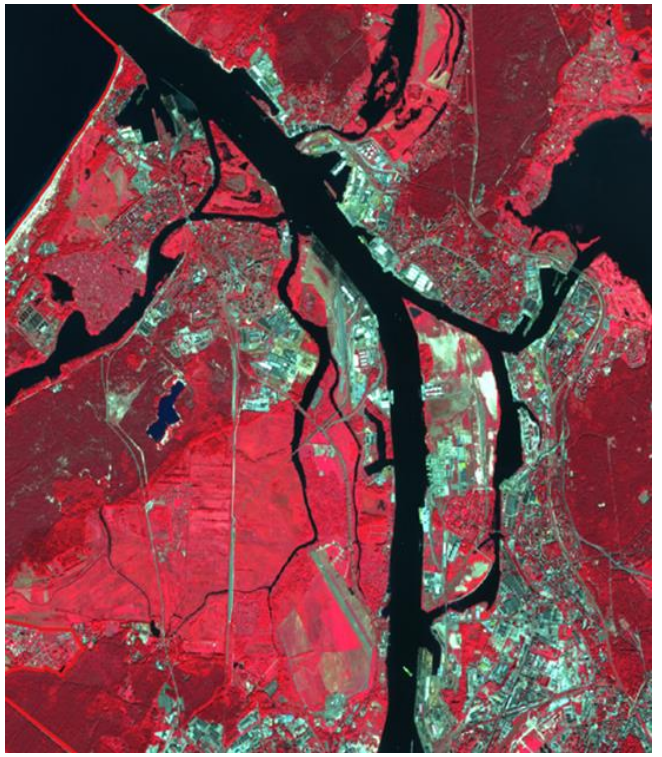
Users of the EO Data Platform

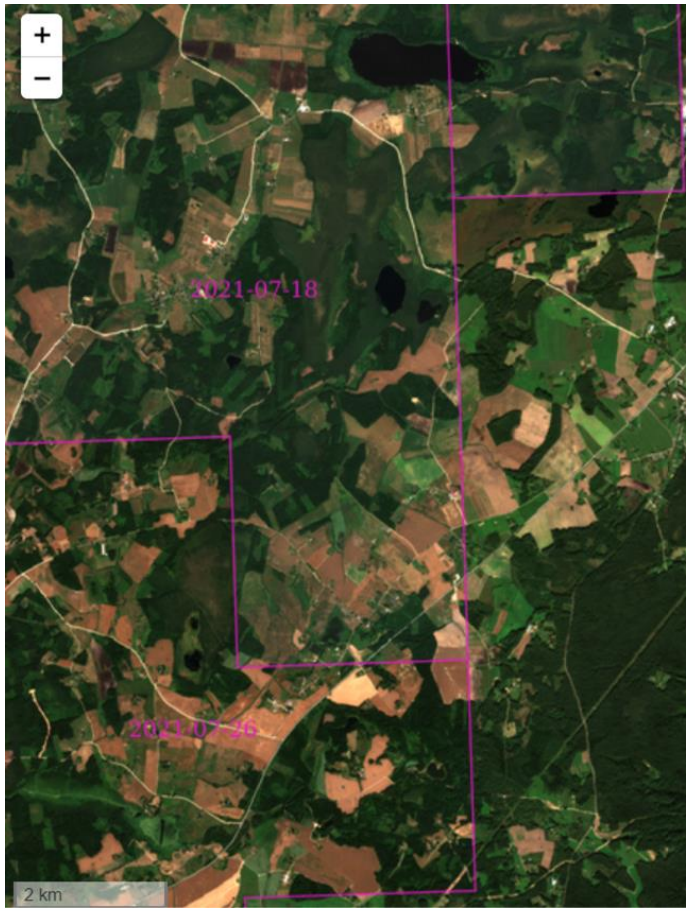
BSS
Baltic Satellite Service



- OCRE (Open Clouds for Reserch Environment) project (https://www.ocre-project.eu/eo-catalogue) – Platform supports **research institutes in Latvia and Sweden** in 2023.
- Forest Research Institute «Silava» – Platform supports the institute since 2021. It was adjusted and is constantly developed to satisfy changing needs of the **forest research institute**.
- BSS supports daily business of the **forest companies** in relying on the EO Data Platform.
- All **BSS monitoring applications (floods, fires, clear-cuts, windfalls, agriculture fields, city area** etc.) are supported by the platform (forest.forestradar.com, flood.forestradar.com, fire2.forestradar.com, app.smartagro.lv)

The most actual cloud-free basemap with metadata - https://www.forestradar.com/demo.html



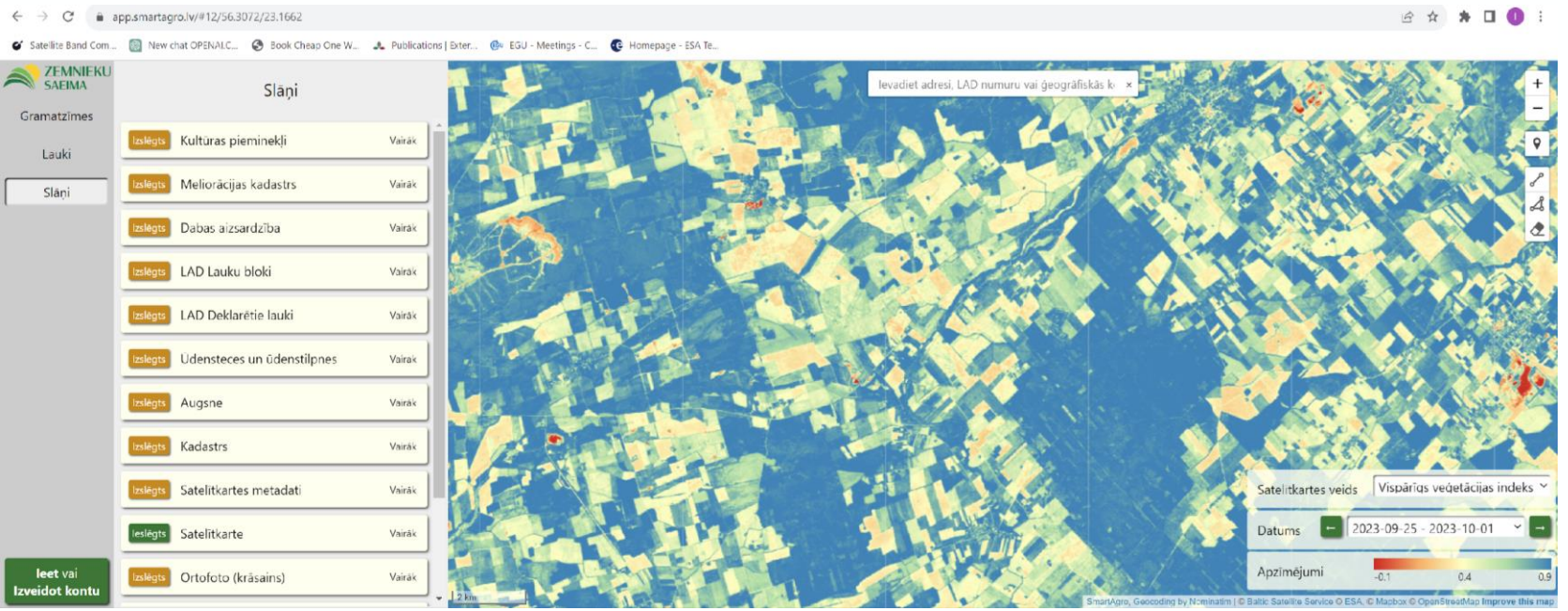


- **Frequent data updates:** every day for areas without cloud cover
- **Extensive history:** go back in time to see how a specific area looked like at a different date
- **Fully automated mosaicking**
- **Easy integration with enterprise GIS/IT:** service has already been commercialized
- **Wide coverage:** all European countries and more

- **Automated calculation of indexes:** LAI, MSAVI2, NDBI, NDMI, NDVI, NDWI, infrared imagery and many others

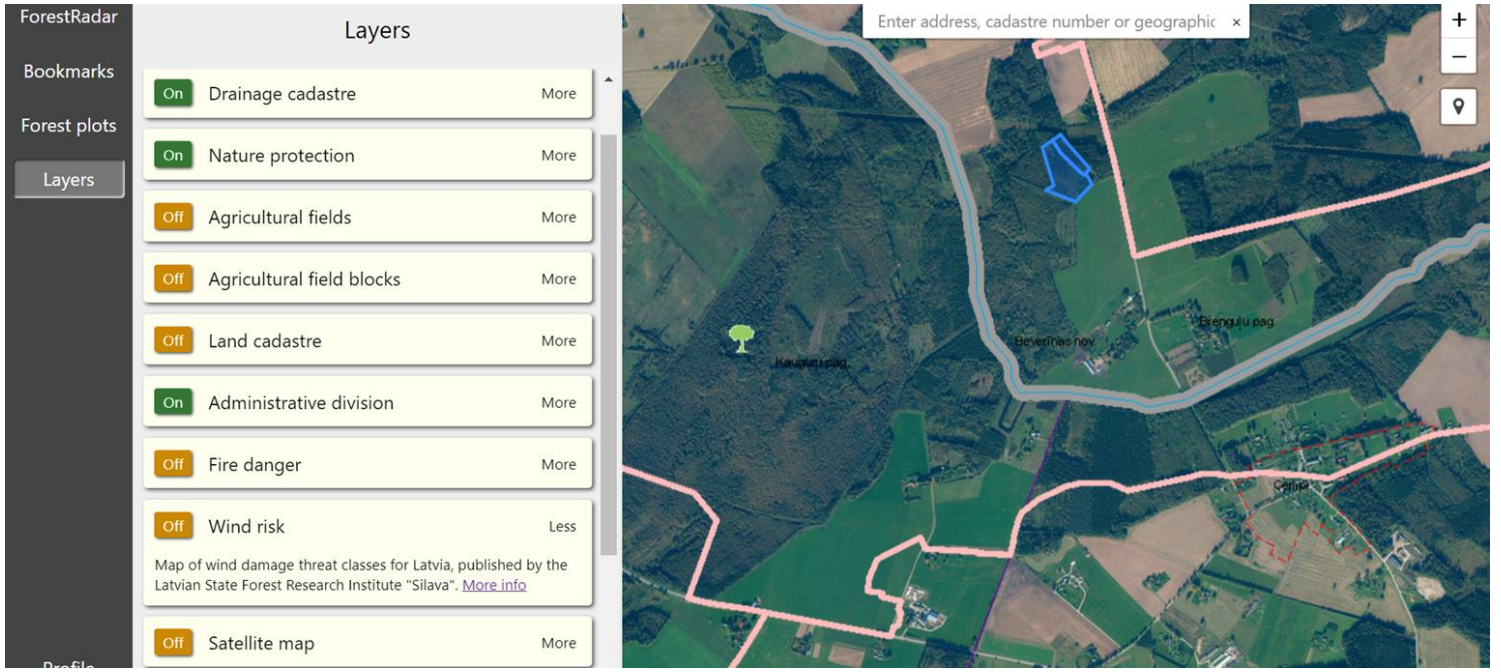
- **Complete metadata:** see precise date of acquisition for any area

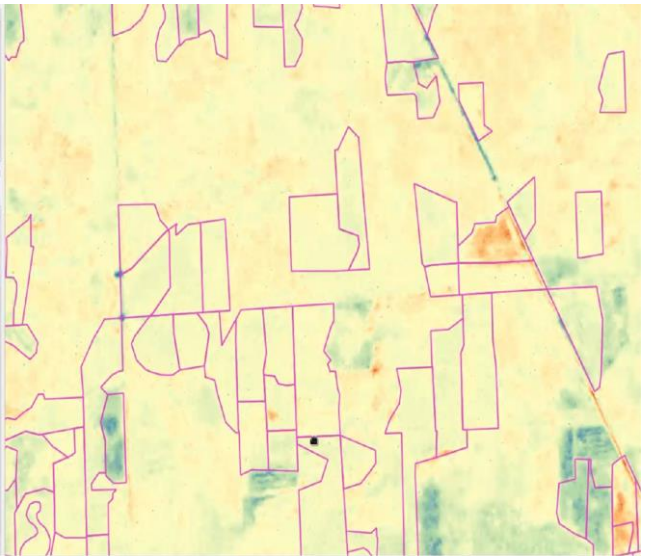
The most actual cloud-free Sentinel-2 basemap for Rural Support Service (https://karte.lad.gov.lv/) Farmer's Parliament (https://app.smartagro.lv)

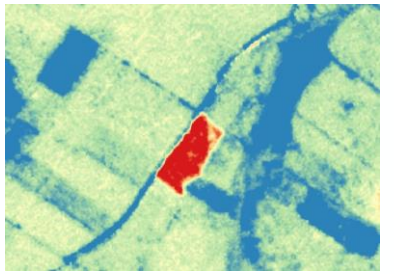


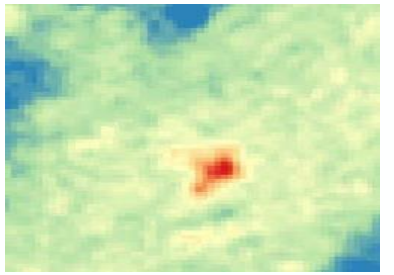
- **Integration with enterprise GIS:** WMS, XYZ/TMS services
- **Full image history:** a slider tool
- **Automated notification of new imagery inclusion:** e-mail
- **Access restriction:** user authorisation

Fully automated forest monitoring (clear-cuts, windfalls, damaged clusters of trees, excess water, etc.), https://forest.forestradar.com





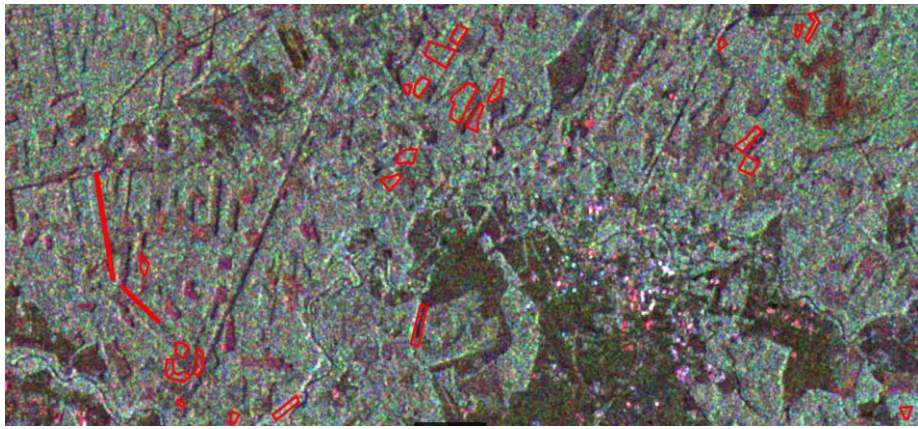




Different basemap layers to evaluate the forest property in the Web application and detection of forest health risk areas

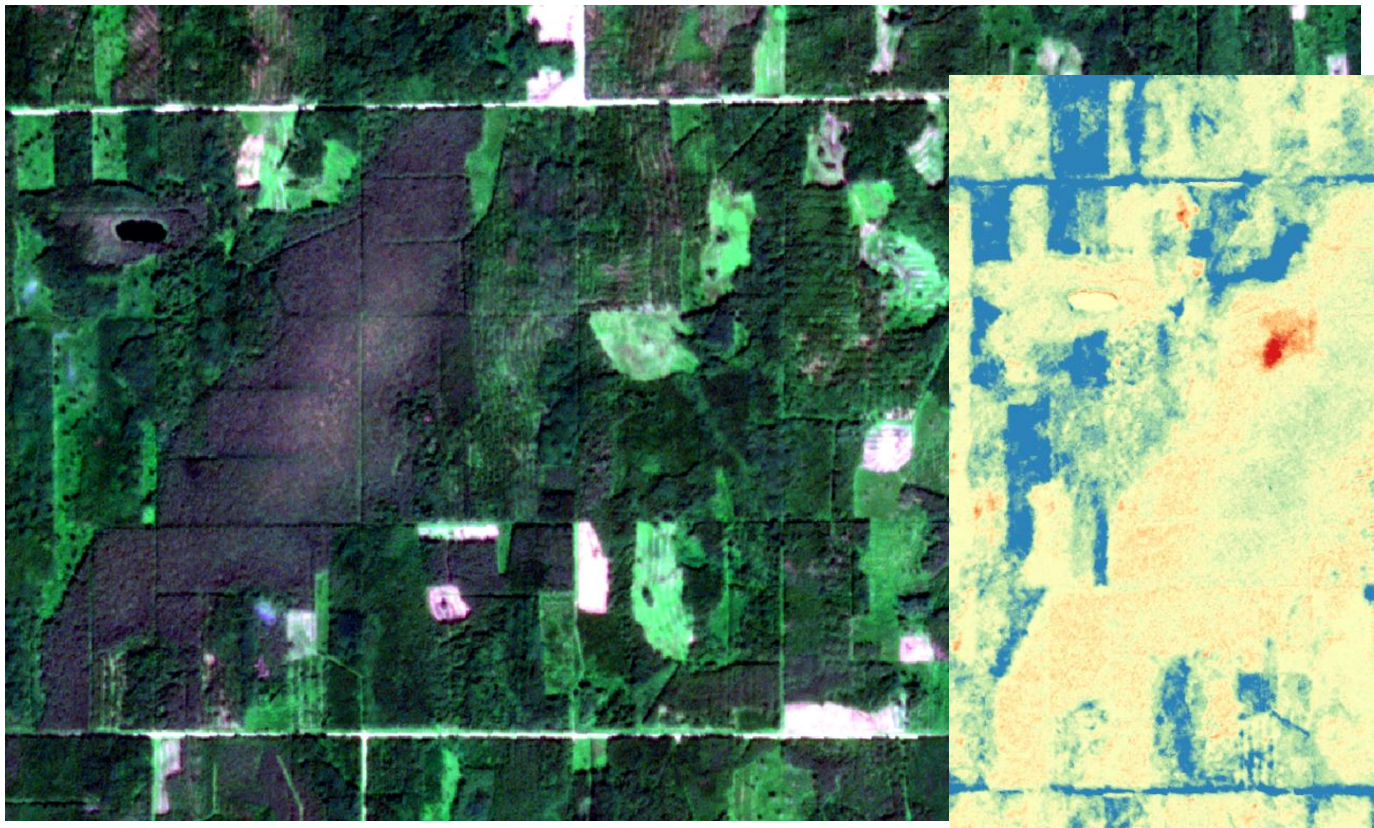
Automated upload and editing of forest plots (including atributes) in the Web application

Detected status (% of forest area) and change of the forest plot in the Web application

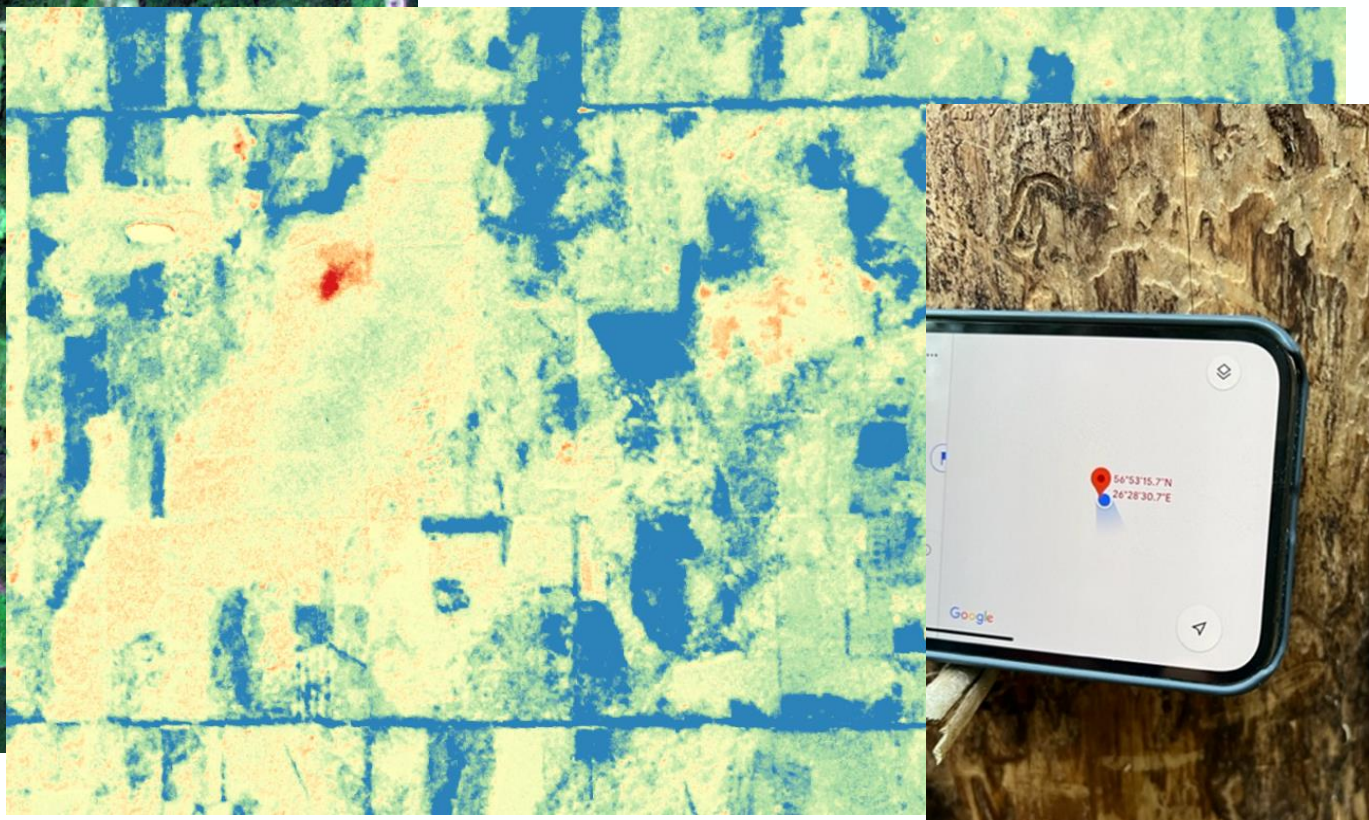


Automated clear-cut and windfall detection in the Web application (weekly/monthly/quarterly)

Fully automated forest risk monitoring



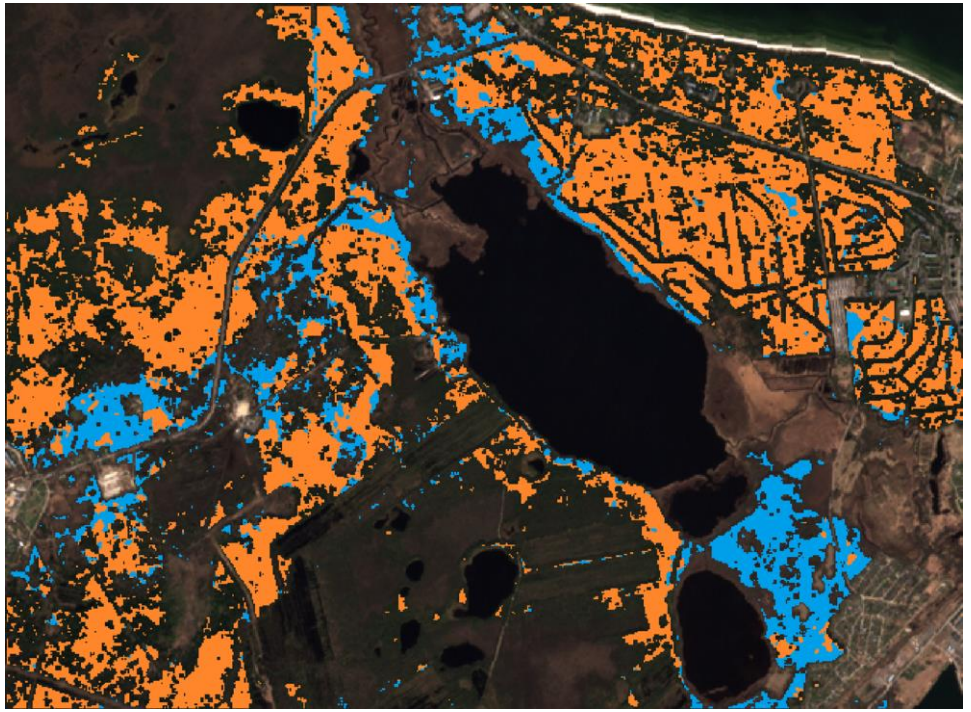
Accurate detection of forest change (clear-cuts, wind-falls, fires, floods, pests, diseases, excess water etc.)



Detection of forest health risk areas and damage during the vegetation season (May – October)

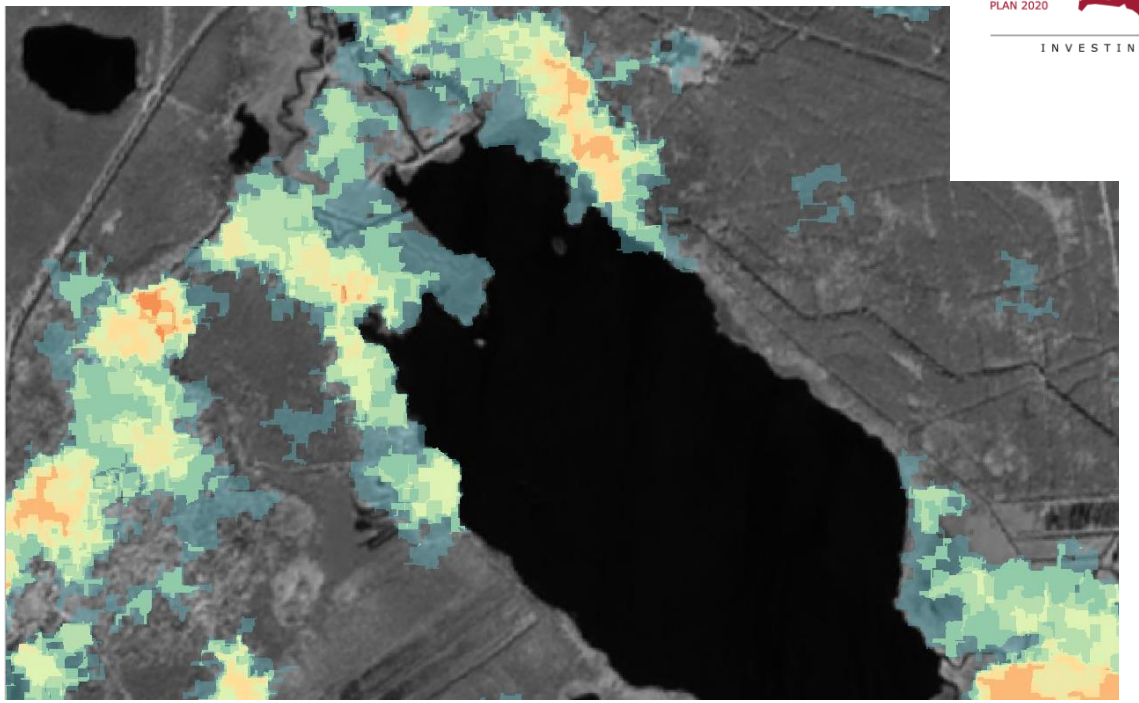
R&D project ForestRisk – developmewnt of remote sensing based forest risk factor monitoring system (ERDF project nr. Nr.1.1.1.1/21/A/040)

Detection of excess water in the forest from S1&S2



	Water detection analysis is possible in no-leaf period
	Analysis most likely is not possible
Transparent	Water detection analysis is possible

Areas of excess water by months



Analysis of S-1 time series:

number of months when excess water was observed

Automated overhead power lines vegetation management service for energy DSO company

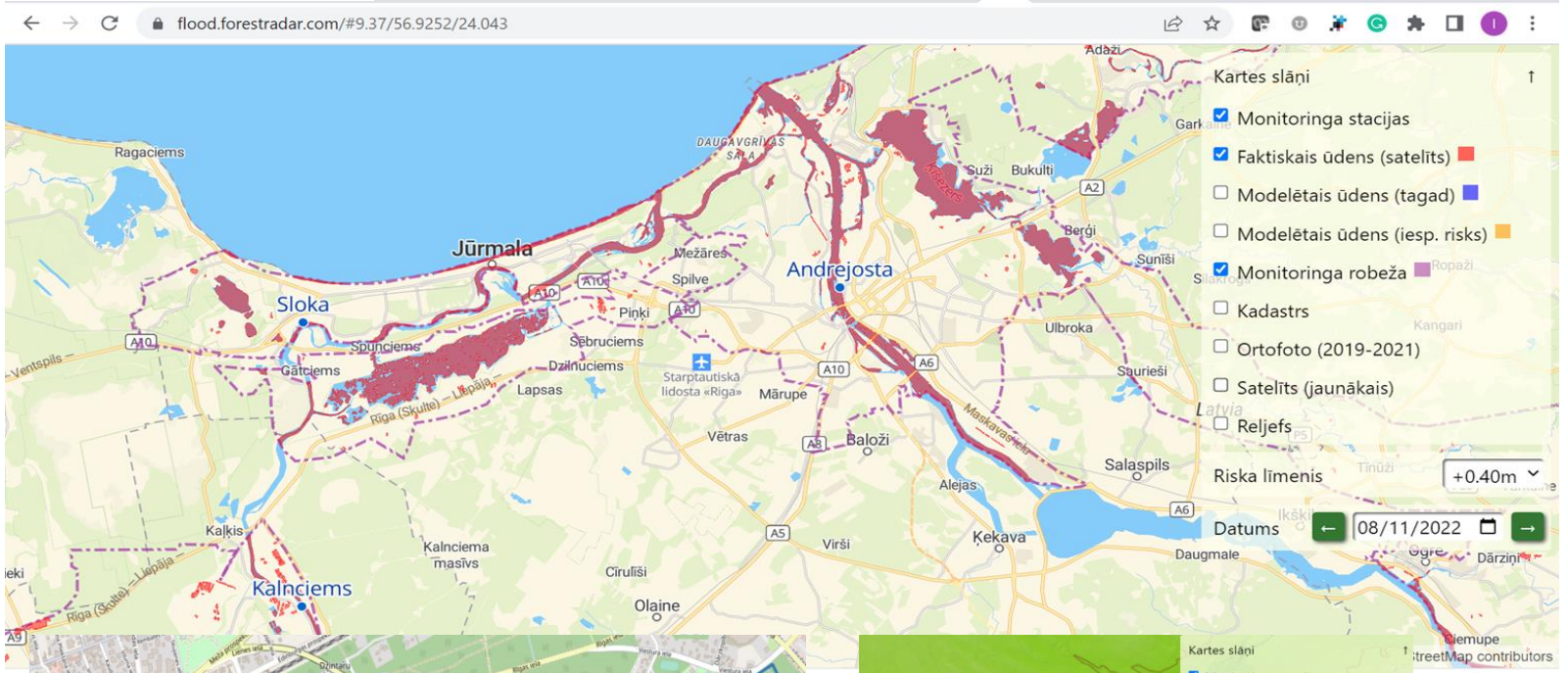
The company sees the following advantages of the new service:

- remote sensing risk detection (without personnel driving in field)
- improved safety of electrical network infrastructure
- quality control of subcontractor work performance
- quick reaction in case of windfalls
- and many others.

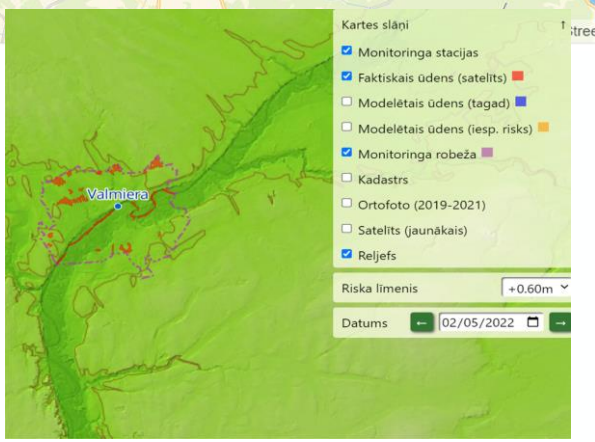
The proposed monitoring services:

1) Monthly monitoring from Sentinel-2 (all network, 60 000 km)
2) Yearly monitoring from 3m PlanetScope data (all network, 60 000 km)
3) On-demand requests (floods, storms, construction, etc.) monitoring from 3m PlanetScope data (particular high risk territories)
4) Yearly monitoring from 0.5m Planet SkySat data

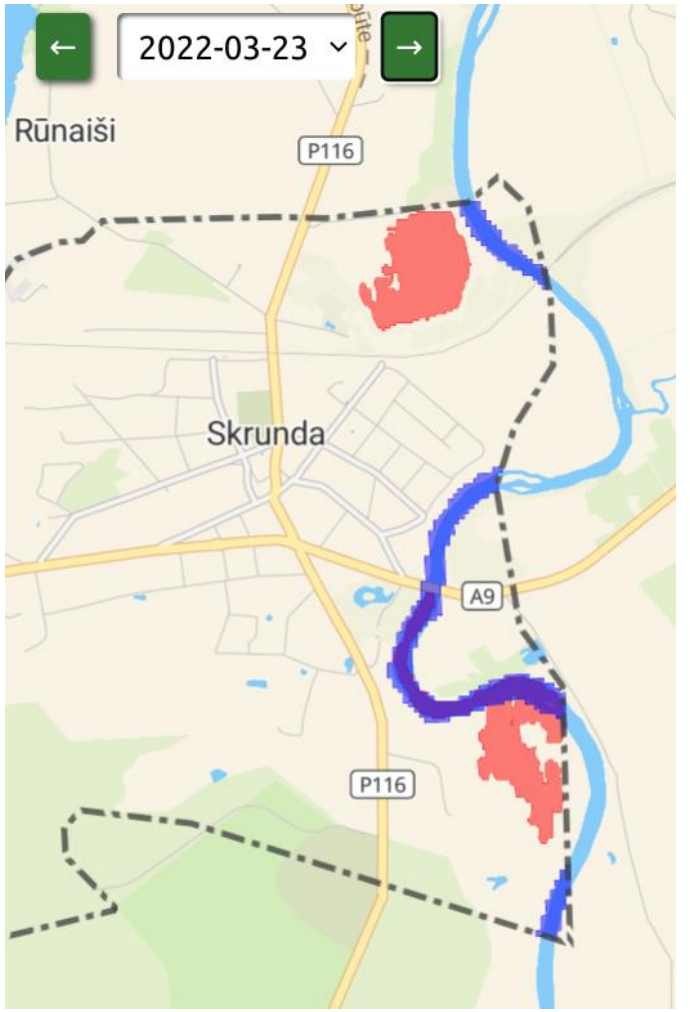
Flood monitoring service - https://flood.forestradar.com



Flood monitoring for the Gas infrastructure poligons in the Web/Desktop GIS applications

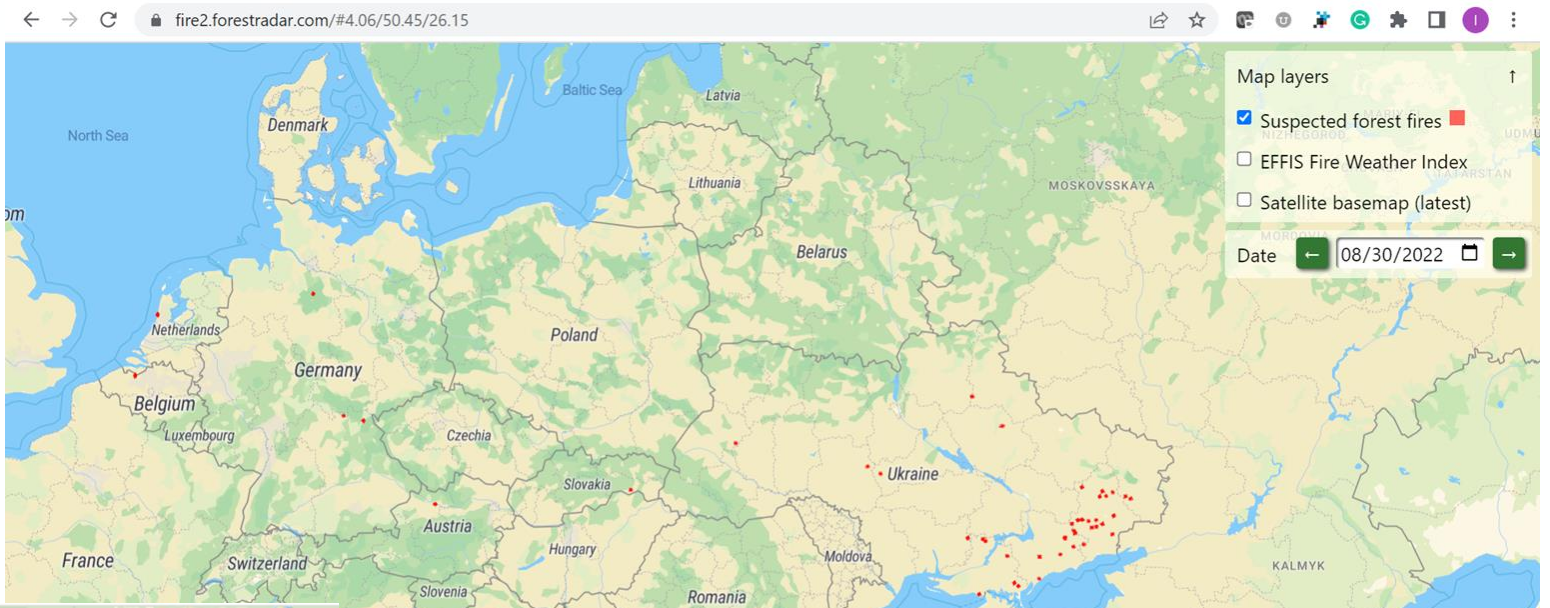


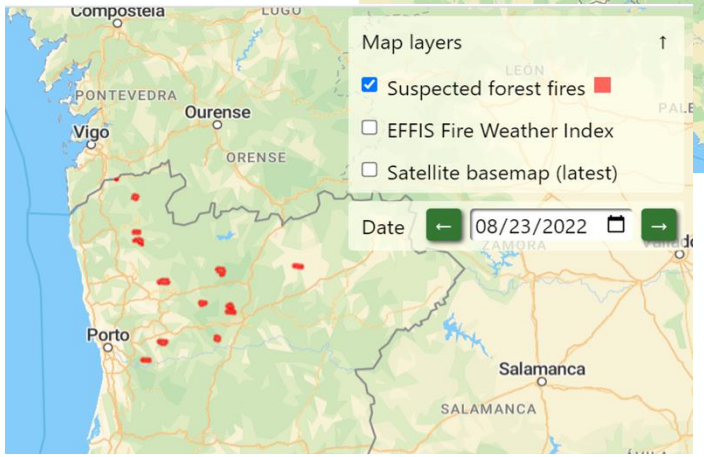
Flood monitoring from satellite imagery and LIDAR DTM in the Web/GIS applications



Flooding detected from satellites near Skrunda, Latvia in the Web/GIS applications

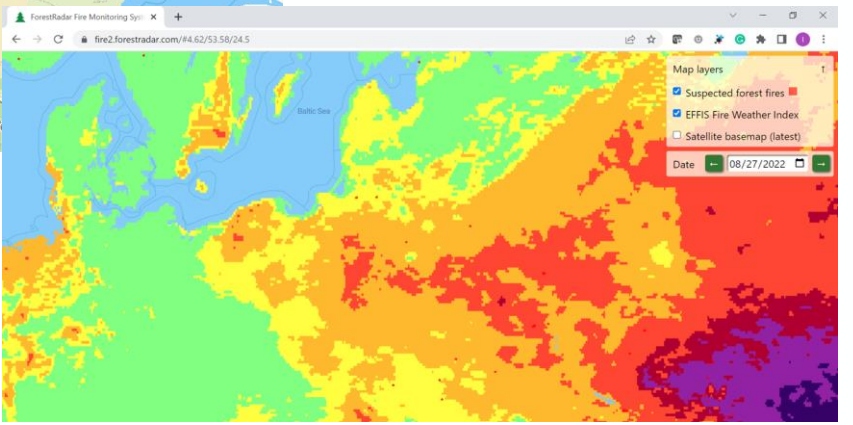
Wildfire early detection and management system (Sentinel-1,2 ,3 & integration of EFFIS indexes) - https://fire2.forestradar.com





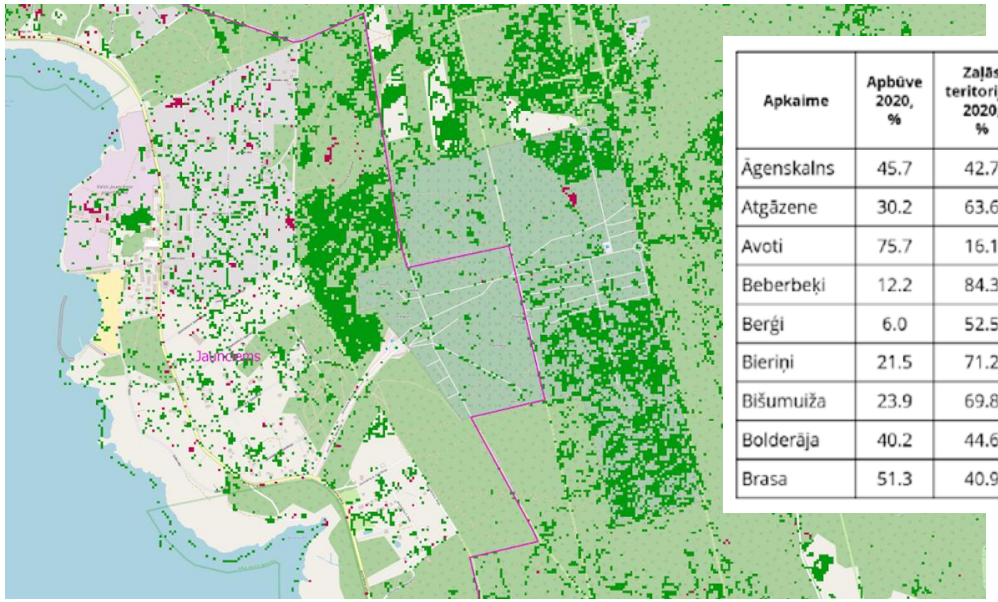
Fire detection from Sentinel-3 satellite in the Web app

The most current cloud-free Sentinel-2 basemap mosaic with metadata and forest/no forest data layer



Integration of Copernicus EMS EFFIS idexes in the Web app

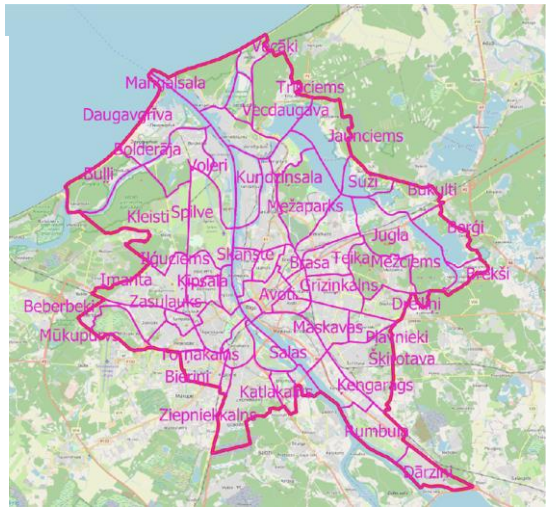
City monitoring per districts (green areas, indexes, heat islands, change detection, statistics, etc.)



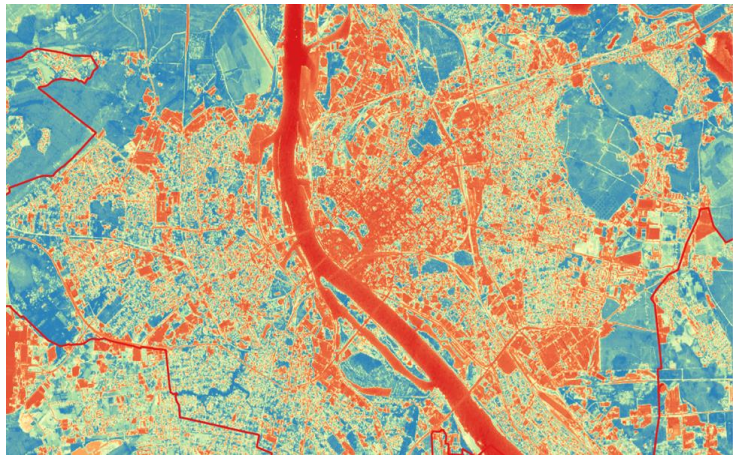
Detected change in green areas, Riga, summer 2022/2021

Apkaime	Apbūve 2020, %	Zaļās teritorijas 2020, %	Ūdens 2020, %	Apbūve 2021, %	Zaļās teritorijas 2021, %	Ūdens 2021, %	Apbūve 2022, %	Zaļās teritorijas 2022, %	Ūdens 2022, %	Zaļo teritoriju izmaiņas, 2022/2021, %	Zaļo teritoriju izmaiņas, 2022/2020, %	Zaļo teritoriju izmaiņas, 2021/2020, %
Āgenskalns	45.7	42.7	2.7	45.3	43.6	1.6	46.2	43.3	2.5	-0.3	+0.5	+0.8
Atgāzene	30.2	63.6	0.0	32.7	61.5	0.0	31.0	63.4	0.0	+1.9	-0.3	-2.1
Avoti	75.7	16.1	1.7	76.8	15.7	1.2	74.7	17.9	1.5	+2.2	+1.7	-0.5
Beberbeķi	12.2	84.3	0.0	17.1	79.8	0.0	18.6	77.2	0.0	-2.6	-7.1	-4.5
Berģi	6.0	52.5	17.8	7.4	42.1	22.6	6.1	45.6	31.7	+3.5	-6.9	-10.4
Bieriņi	21.5	71.2	0.0	25.5	68.0	0.0	22.7	70.9	0.0	+2.9	-0.3	-3.2
Bišumuiža	23.9	69.8	0.4	31.4	62.6	0.3	24.9	70.1	0.2	+7.5	+0.3	-7.2
Bolderāja	40.2	44.6	4.9	48.7	36.2	4.2	40.5	47.9	3.9	+11.7	+3.3	-8.4
Brasa	51.3	40.9	0.9	52.4	40.4	0.5	51.2	41.7	0.7	+1.3	+0.8	-0.5

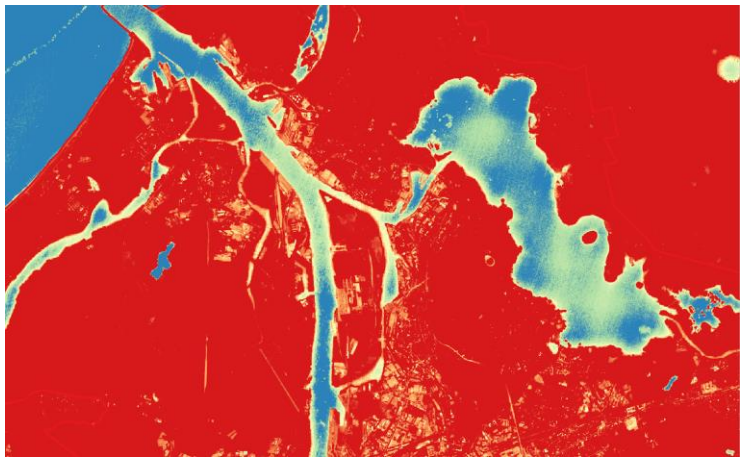
Riga districts representing gain or loss of green areas



Districts of Riga



Example of NDVI, Riga, summer 2022



Example of NDWI, Riga, summer 2022

DETECTION OF GREEN AREAS:

- NDVI
- MSAVI2
- LAI
- NDMI
- Infrared, NIR-G-B AND NIR-R-G BANDS

HEAT ISLAND ANALYSIS:

- NDWI
- NDBI
- VEGETATION INDEXES