

GeoHub platform (<https://app.geohub.net/>)







The **Baltic Satellite Service (BSS)** has developed **GeoHub**, a platform for integrating, processing, and publishing geospatial data. GeoHub supports satellite and drone imagery, government datasets, and sensor data, using industry-standard protocols (XYZ/TMS, WMS, MVT, S3) for seamless data access.

All geospatial and sensor data are stored in interoperable formats such as **GeoJSON**, **SQLite**, **Shapefile**, **GeoTIFF**, and **CSV**, ensuring compliance with the **FAIR (Findable, Accessible, Interoperable, and Reusable) principles**. Data is accessible via **S3 storage and direct web downloads**, with APIs ensuring cross-platform compatibility.

To ensure security and reliability, data is **securely stored, automatically duplicated across independent EU locations, and backed up daily with full edit history tracking**. Robust metadata standards further enhance interoperability and long-term usability.

GeoHub supports a variety of applications, some of which can be explored here: <https://app.geohub.net>



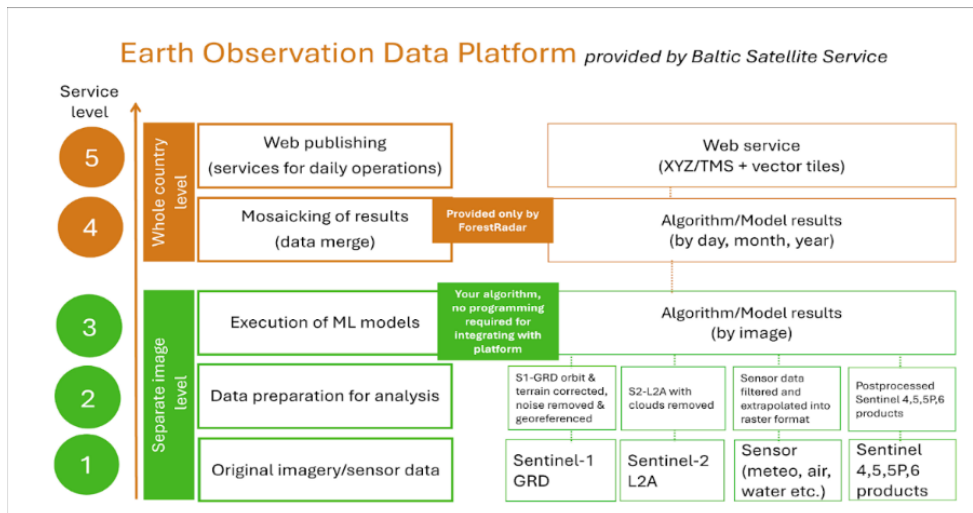
<p>Agricultural land monitoring service</p>  <p>The main purpose of the application is to improve the management of agricultural land by effectively addressing fire and flooding problems. Key objectives include increasing efficiency through automated mapping using satellite imagery, supporting regulatory 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.</p>	<p>Forest monitoring service</p>  <p>The Forest Monitoring Service provides 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.</p>	<p>Infrastructure and settlement monitoring service</p>  <p>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.</p>
<p>Marine monitoring service</p>  <p>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.</p>	<p>Natural resource extraction monitoring service</p>  <p>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.</p>	<p>Water quality monitoring service</p>  <p>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.</p>

BSS Platform: Overcoming Remote Sensing Constraints

The BSS platform addresses key challenges in wide-area coverage, cloud interference, and the integration of various remote sensing data types. It provides a comprehensive solution with the following capabilities (see Picture 1 below):

- **Level 1: Automated Data Acquisition** – Seamlessly acquires satellite imagery and other source data.
- **Level 2: Data Preprocessing** – Prepares data for analysis through orbit and terrain correction, noise removal, georeferencing, cloud removal, and more.
- **Level 3: Machine Learning Model Execution** – Runs ML models and presents results as separate images. No programming is required to integrate your ML model with the platform.
- **Level 4: Result Mosaicking & Data Merging** – Combines ML model outputs into seamless datasets by day, month, or year without restrictions on the area of interest.
- **Level 5: Web Publishing** – Provides results as web services (XYZ/TMS + vector tiles) for operational use.

Levels 1–3 operate at the individual image level, while Levels 4–5 scale up to the national level. The platform is highly flexible and supports automated processing of various remote sensing data types, including satellite imagery, drone data, orthophotos, LiDAR, and more.



Picture 1

Platform Usage Scenarios

1) Key Functionalities:

- Satellite Imagery Access – Provides Sentinel-1, 2, 3, 5, and 6 data for the Baltic region, with commercial imagery available upon request.
- Data Storage & Filtering – Unlimited storage with filtering by source, date, and area of interest (Aoi).
- Customizable Processing – Supports job prioritization based on user role, project, and task type.
- Geospatial Data Tools – GDAL/OGR integration for raster and vector processing, reprojection, and calculations.
- Seamless EO Workflow – Enables discovery, processing, visualization, and publishing of EO data with intuitive tools.
- Support for National Projections – Stores and processes data using Estonia, Latvia, and Lithuania's national projections.
- End-to-End Workflow Execution – Automates EO data processing and service development.

2) Published Applications:

- GeoHub Apps (<https://app.geohub.net>)
- Infrastructure and settlement monitoring (<https://app.geohub.net/datel>)
- Forest Monitoring (<https://app.geohub.net/forest/>)
- Habitat Monitoring (<https://app.geohub.net/dap>)
- Agricultural Digital Innovation Hub (<https://app.smartagro.lv>)

3) Publishing EO Data Results:

- Share project results using industry-standard methods for raster and vector data.
- Each user gets a dedicated web interface for managing projects, data, and tools.

4) High-Performance EO Processing & Visualization:

- Deploy services in a powerful environment for geospatial data analysis and publishing.
- Share EO data via web applications, APIs (REST, S3, XYZ/TMS, WMS, MVT).
- Export in multiple formats (GeoJSON, CSV, Excel, Shapefile, SQLite) without local downloads.

5) Research & Education:

- Ideal for student projects, hackathons, and R&D initiatives.

6) Government Data & Algorithm Sharing:

- Acts as a distribution channel for government applications, models, and datasets.