EO4SEE: Pathfinder assessment for regional high volume data access, processing and information service delivery platforms - South East Region

EO4SEE - THE PATHFINDER OF OPERATIONAL SATELLITE MONITORING FOR THE REGION OF THE BLACK SEA AND CENTRAL EUROPE

FINANCED BY EUROPEAN SPACE AGENCY (ESA) (2016 – 2018)

Consortium

The challenge of shaping the future platform was entrusted by ESA to an international consortium with organizations from Romania, Czech Republic and Poland

TERRASIGNA (Romania)
West University of Timisoara (Romania)
GISAT (Czech Republic)
CleverMaps (Czech Republic)
Creotech Instruments (Poland)
Sigma Games (Poland)
WASAT (Poland)

Sentinels – European EO satellites constellation

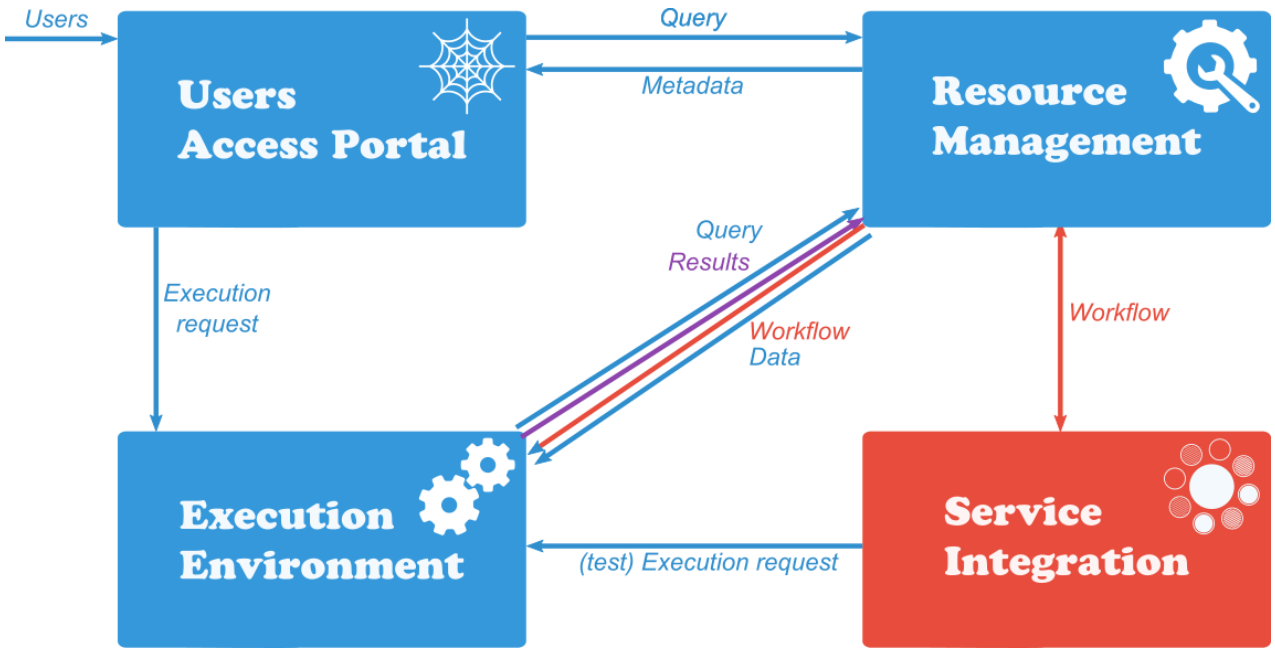
Sentinel-1 is a two satellite constellation with the prime objectives of **Land and Ocean monitoring**. The goal of the mission is to provide **C-Band SAR data** continuity following the retirement of ERS-2 and the end of the Envisat mission.
To accomplish this the satellites carry a **C-SAR sensor**, which offers medium and high resolution imaging in all weather conditions. The C-SAR is capable of obtaining night imagery and detecting small movement on the ground, which makes it useful for land and sea monitoring

The **Sentinel-2** mission is a land monitoring constellation of two satellites that provide high resolution optical imagery and provide continuity for the current SPOT and Landsat missions.
The mission provides a global coverage of the Earth's land surface every 10 days with one satellite and 5 days with 2 satellites, making the data of great use in on-going studies.
The satellites are equipped with the state-of-the-art MSI (Multispectral Imager) instrument, that offers high-resolution optical imagery.

Sentinel-3 is primarily an **ocean mission,** however, the mission will also be able to provide atmospheric and land applications. The mission will provide **data continuity** for the ERS, Envisat and SPOT satellites.
Sentinel-3 will make use of multiple sensing instruments to accomplish its objectives; SLSTR (Sea and Land Surface Temperature Radiometer), OLCI (Ocean and Land Colour Instrument), SRAL (SAR Altimeter), DORIS, and MWR (Microwave Radiometer).

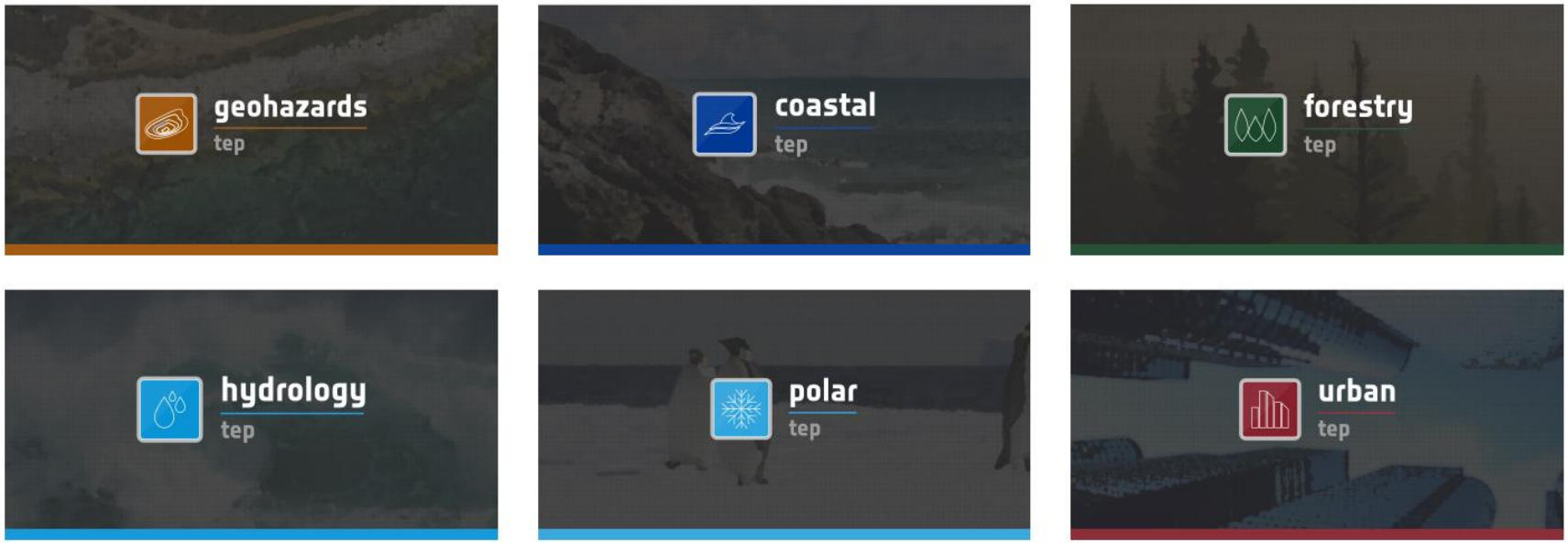
Platform architecture

ESA's "Exploitation Platform Open Architecture" specification document.



Regional Platforms vs. Thematic Exploitation Platforms

Started in 2014 the EO Exploitation Platforms (EPs) initiative, a set of R&D activities that in the first phase (up to 2017) aims to create an ecosystem of interconnected Thematic Exploitation Platforms (TEPs) on European footing.



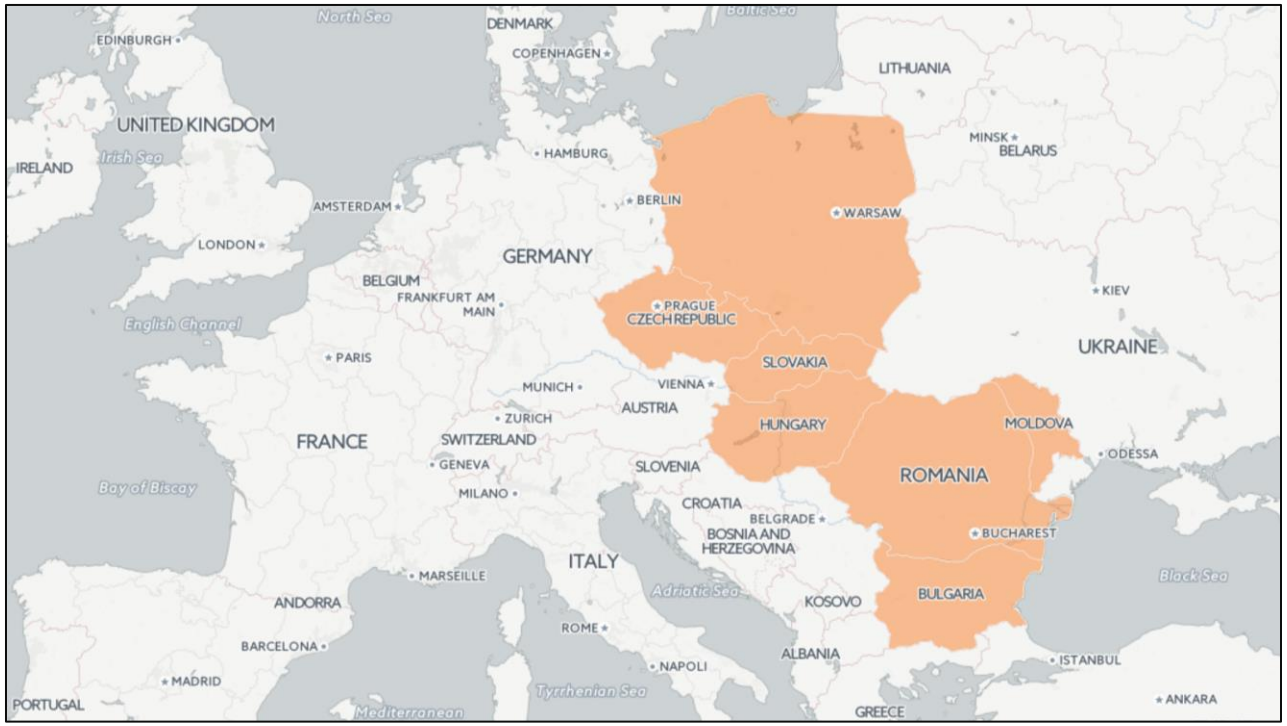
Regional Platforms vs. Thematic Exploitation Platforms

Two Pathfinders started by ESA to evaluate informational needs of regional programs and policies and design ways of their satisfaction:

EO4Atlantic (Atlantic region)

EO4SEE (Black Sea, Danube basin, Carpathians, Central Europe) which supports following regional initiatives:

- The South East Europe Transnational Cooperation Programme,
- EU Strategy for the Danube Region,
- Black Sea Basin Joint Operational Programme
- Framework Convention on the Protection and Sustainable Development of the Carpathians



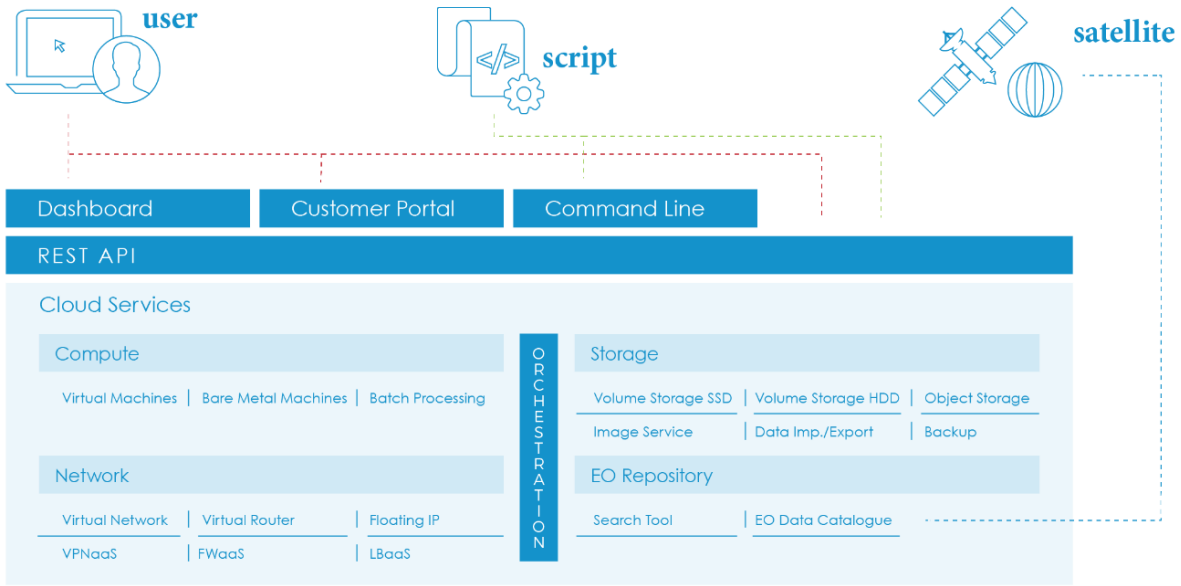
EO Innovation Platform Testbed - Poland

EO4SEE Pathfinder was established on the Polish EO processing cloud infrastructure – EO Innovation Platform Testbed, Poland / EO Cloud , co-financed by ESA, and operated by one of the project partners.

EO CLOUD
Earth Observation Data

The infrastructure provide its users with:

- Locally stored newest and archive satellite data
- Cloud processing based of different setups of virtual servers (Windows/Unix), with EO pressing and GIS, data management and publication software
- Storage for users' resources



Informational support for the Carpathian Convention

Cooperation with the CC Secretariat consortium

Mapping component (provision of new and refinement of existing spatial information on natural values of the selected pilot areas in the Carpathians)

- Land use maps and forest footprint mapping
- Forest stratification process
- Forest volume and biomass modelling
- Assistance in biodiversity and forest related indicators refinement and development

Monitoring component (attempt of development of continuous monitoring satellite mechanism)

- Platform data archive establishment
- Satellite monitoring service design and development
- Analysis of changes characteristic
- Information provision and platform interaction
- Reference data update

- Cooperation and communication already established
- Informational support scenario provisionally accepted
- Works initiated – design and development of processing and analytical chains, collection and integration of input data
- To support development of specific products and services – in-situ data and reference data of better quality needed
- Platform and consortium could support the process of collection and harmonisation of this resources
- Informational support for CC will be provided starting from October (we count on feedback)

Informational support for the Carpathian Convention

Mapping component - forest footprint / LULC mapping / forest stratification process

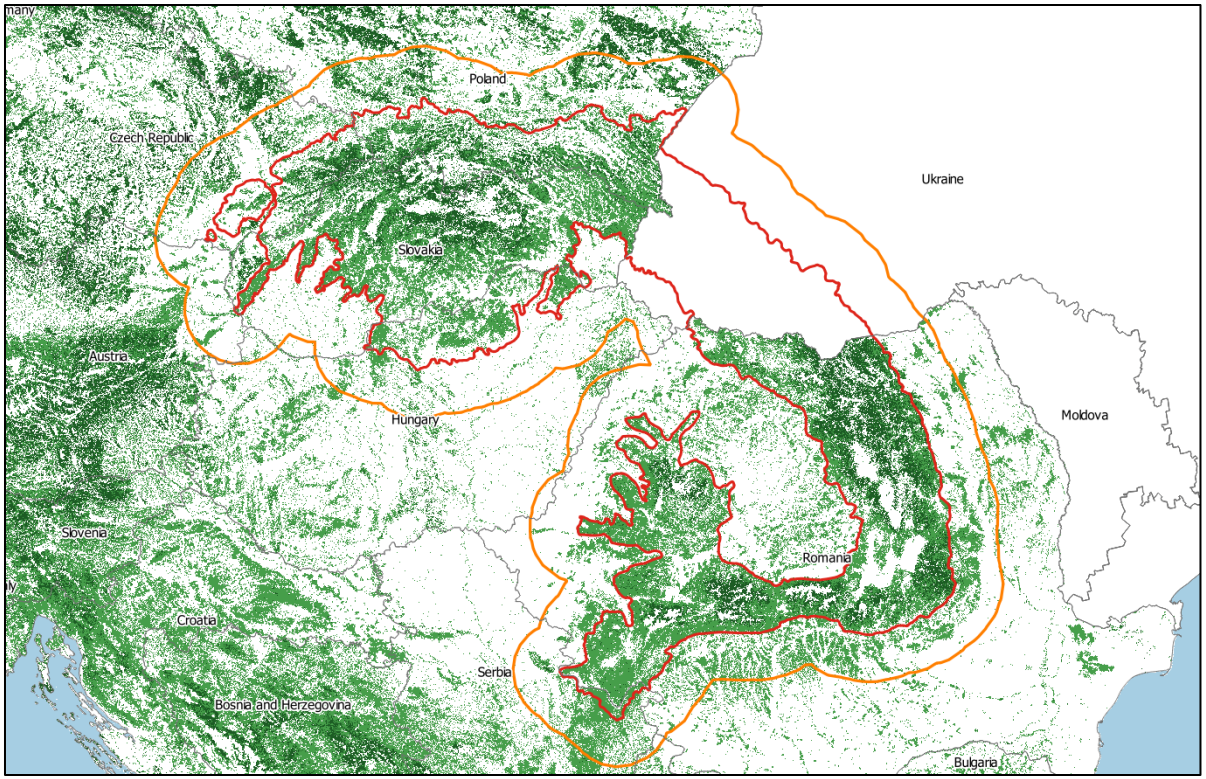
EU / International data sources

- Outdated
- Not detailed enough
- Not complete coverage
- Quality differs across resources

National and local administration

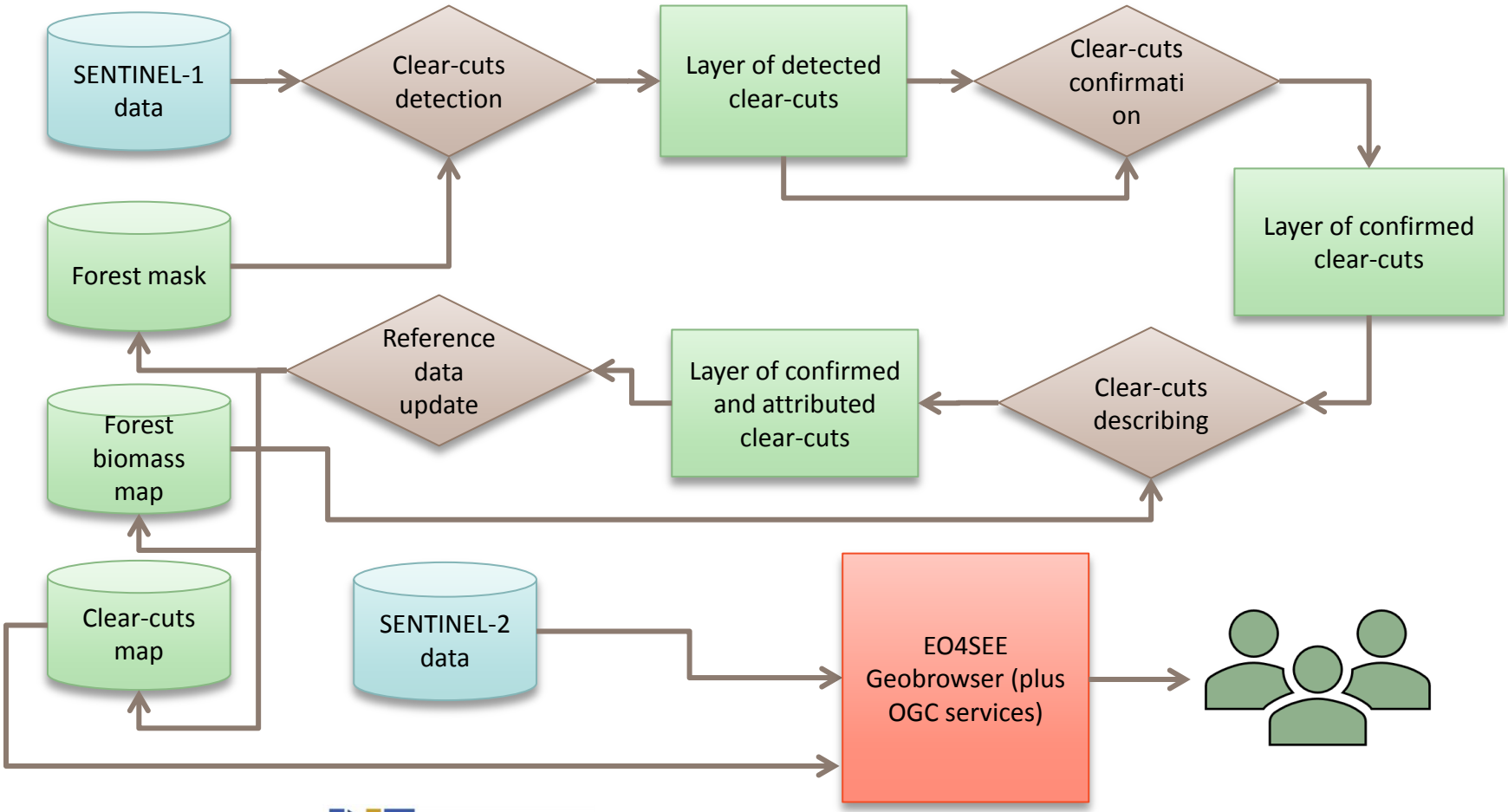
- Difference in methodologies and technical assumptions
- Semantic inconsistencies across different resources
- Country wide and local coverage gaps

Solution: data harmonisation, integration of ALL available resources, and improvement on the base of detailed and up-to-date EO data.



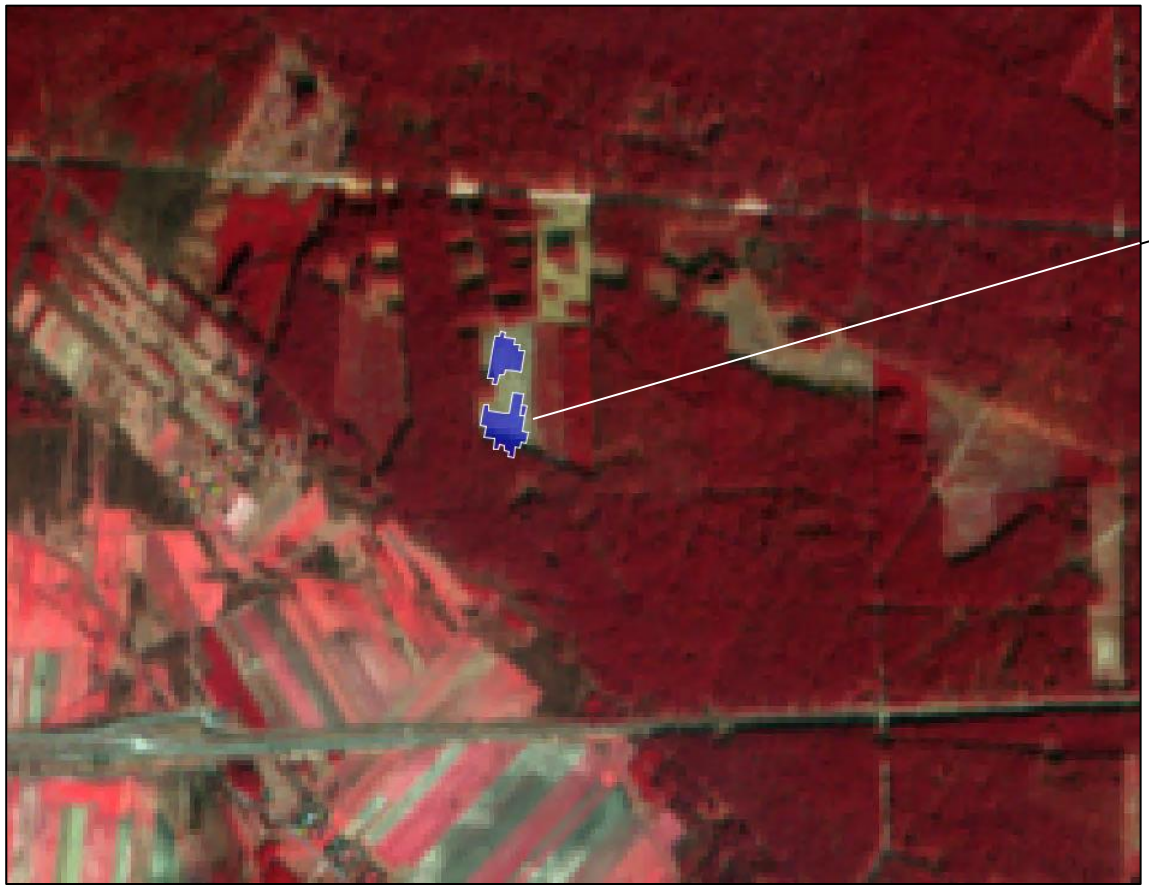
Informational support for the Carpathian Convention

Monitoring component – clear-cuts detection



Informational support for the Carpathian Convention

Monitoring component – clear-cuts detection / characteristics / information provision



Clear-cut

id [identification]:	00015842
date [date of detection]:	20170327
area [area in sqm]:	5782
country [country ISO code]:	PL
protect [type of env. prot.]:	n_a
species [for. type, species]:	coniferous
volume (for. volume in m^3]:	124
biomass [biomass in t]:	75
carbon [carbon stock in t]:	37,5

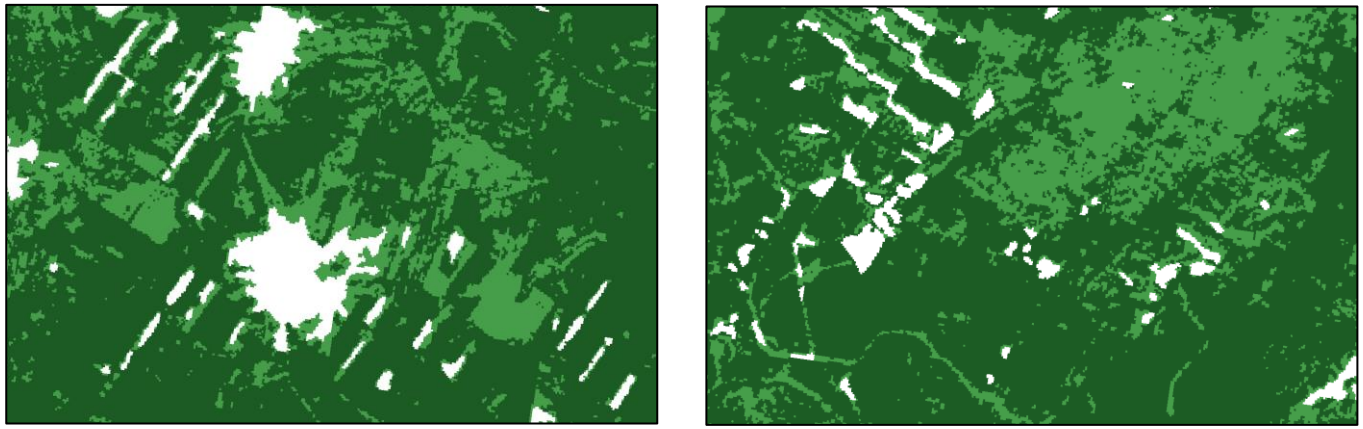
Clear-cuts detected on the base of InSAR Sentinel-1 analysis – weather independent, assuring predictable and short observation interval

Displayed on the Sentinel-2 orthophoto

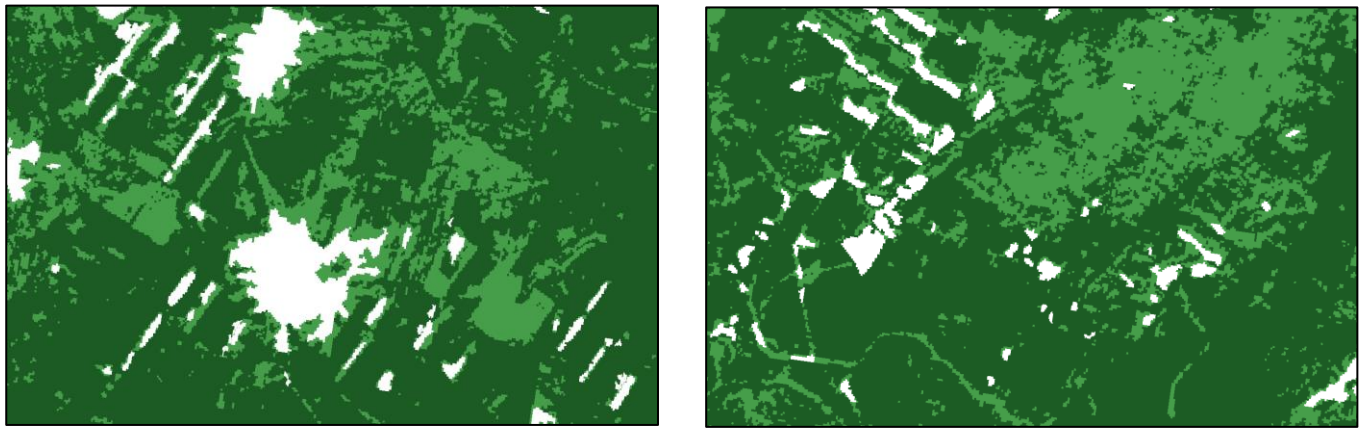
Informational support for the Carpathian Convention

Monitoring component - Reference data update

Forest Type 2012



Forest Type 2017
updated on
the base of InSAR
Sentinel-1 analysis



Thank you for attention

Contact: przemyslaw.turos@topologic.pl