EO BASED SERVICE FOR FOREST MANAGEMENT

SAT4EST is a pre-operational web-based service dedicated to the management of privately-owned forest in Poland. This service improves the forest monitoring processes at regional level.

The challenge

The forest in Poland covers 9215 thousand hectares, which is 29.5% of the country. More than 80% of the forest is publicly-owned, including those administered by the State Forests (77%). Privately-owned forest accounts for around 20% of the total forest. Forest is managed according to the forest management plan, taking into account the sustainable forest economy. The privately-owned forest is managed by the local administration - district governor (at the second administrative level, NUTS 4). The governor acts as the controlling body for the private owners. The governor is responsible for preparation and verification of the simplified forest management plans and for continuous monitoring of the forest areas. Up to now, there has been a lack of an operational tool to support local administration in monitoring of forest cover and forest changes at regional level.

The space based solution

Satellites provide a cost-effective way to obtain systematic information on the forest status and properties. The SAT4EST offers to the users a large spectrum of satellite-based products. A time series of the European satellites Sentinel-2 and Sentinel-1 data is used to derive a set of EO products which meet the user requirements and obligations. For example, these products are forest and woodlands cover, forest change mapping on the regular bases, forest type, canopy coverage and forest condition. There are also products available on demand like assessment of forest damage due to windstorms, fires, insect infestations or estimation of forest aboveground biomass.

The EO based products are integrated into the SAT4EST system. The system consists of the remote sensed data component, ancillary data component, data processing and map server components. The web architecture and user-friendly interface running on the internet browser makes the service intuitive and ease to understand and navigate. The users are able to view current and archived satellite images (i.e. Sentinel-2 and Landsat), to compare various EO products with existing ancillary data, to upload own datasets, calculate statistics and generate reports.

The service is at the pre-operational stage. It is currently being tested in three pilot districts in Poland. The pilot districts vary in terms of geographical location: mountains (Nowy Targ), lowland (Sieradz) and suburban (Legionowo), anthropogenic pressure, and level of forest management maturity.
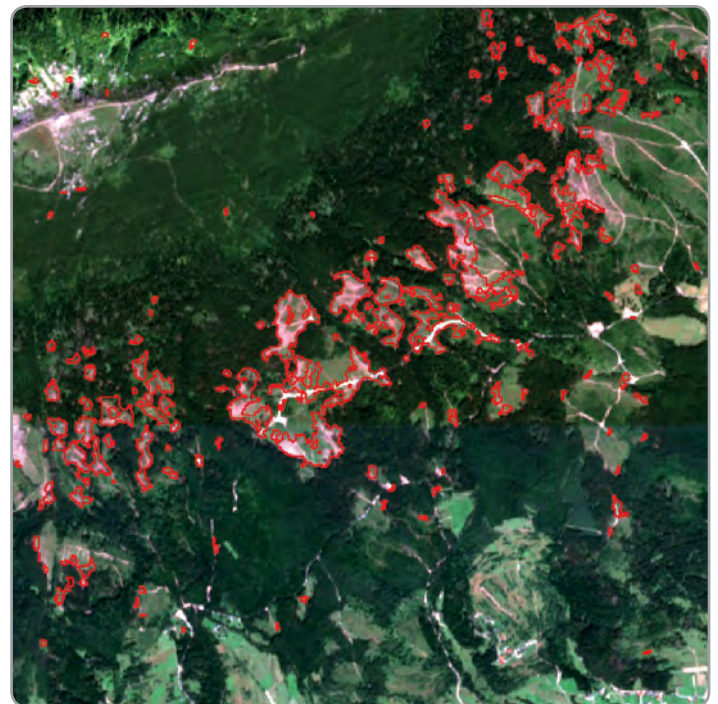
Forest clear cuts detected between 2015 and 2017 using Sentinel-2 data over the mountain forest in the Nowy Targ District, Poland.
Credit: Contains modified Copernicus Sentinel data [2015, 2017]

Thematic Area	Region of Application	Sentinel mission used	Copernicus Service used	Usage Maturity Level
AGRICULTURE, FOOD, FORESTRY AND FISHERIES	MAZOVIA (MAZOWIECKIE DISTRICT REGION)	S1 S2	–	3

Benefits to Citizens

The local administration tends to rely on the cadastral land records that show large discrepancies between the official records and forest on the ground. The traditional method of surveying is time consuming, expensive and challenging, particularly, in the remote mountain areas. The proposed EO based service serves the needs of local administration for a) preparation of tender for simplified forest management plans, b) verification and acceptance of those plans and c) control of the execution of the forest management tasks. Additionally, it can serve private forest companies dealing with preparation of the forest inventories private.

Generally, the proposed service will make administrative processes more efficient and transparent. It may also help to reduce the overall cost of the forest management at regional level. The project also involves training and promotion of the Copernicus data to the large community of end users.

A tree cover mask derived base on the analysis of multi-temporal Sentinel-2 data; fragment of the Legionowo District.
Credit: Contains modified Copernicus Sentinel data [2017]

"This satellite-based application can help us to manage the remote forest in the mountains."

Local administration in Nowy Targ, Poland

Outlook to the future

The Remote Sensing Centre of the Institute of Geodesy and Cartography will continue its successful collaboration with the Taxus.IT company in the system and service development. The ambition of the project consortium is to benefit from the constellation of Sentinels and to develop the fully operational service. The service is designed to be easily transferable to other regions and districts. More details on the SAT4EST system and service is available at www.sat4est.pl.

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