FINDR provides easy access and integration of satellite imagery

In next year's growing season, the FINDR platform will already be used by our Value Added Service Provider (VASP) in a field trial on several farms in Brabant, Limburg and Flevoland, Netherlands. However, what are the benefits and one of its main features, the FINDR platform provides?

In this project, a team consisting of ConstellR, Cyfronet, eLEAF, Fraunhofer EMI and Helmholtz Centre Potsdam GFZ develops the Information and Communication Technology (ICT) platform FINDR.

FINDR is a highly scalable Web service running on a cloud infrastructure and is using cutting-edge technology like Kubernetes, OpenFaaS and Onedata. Its aim is to provide universal, transparent, and unified access to EO data critical for sustainable and resilient food production in the agri-food sector. It offers a comprehensive and transparent overview of available data from major EO providers to enable faster and better-informed decision making. Furthermore, it enables accurate near-future forecasts on data availability to manage data ingestion and a homogenization approach to allow for obstacle-free integration of EO data from different providers:

FINDR will generate analysis-ready data through the automated and scalable homogenization of all level 2 input imagery. Its principle is shown in the figure below. The data will be spatially, and spectrally adapted to a common specification depending on the requirements of subsequent analysis steps. For spatial homogenization, the input data is co-registered and spatially resampled to a common coordinate grid and geographic projection. In the spectral domain, ML techniques allow for adjusting the spectral band positions and widths as well as predicting unilaterally missing spectral information.
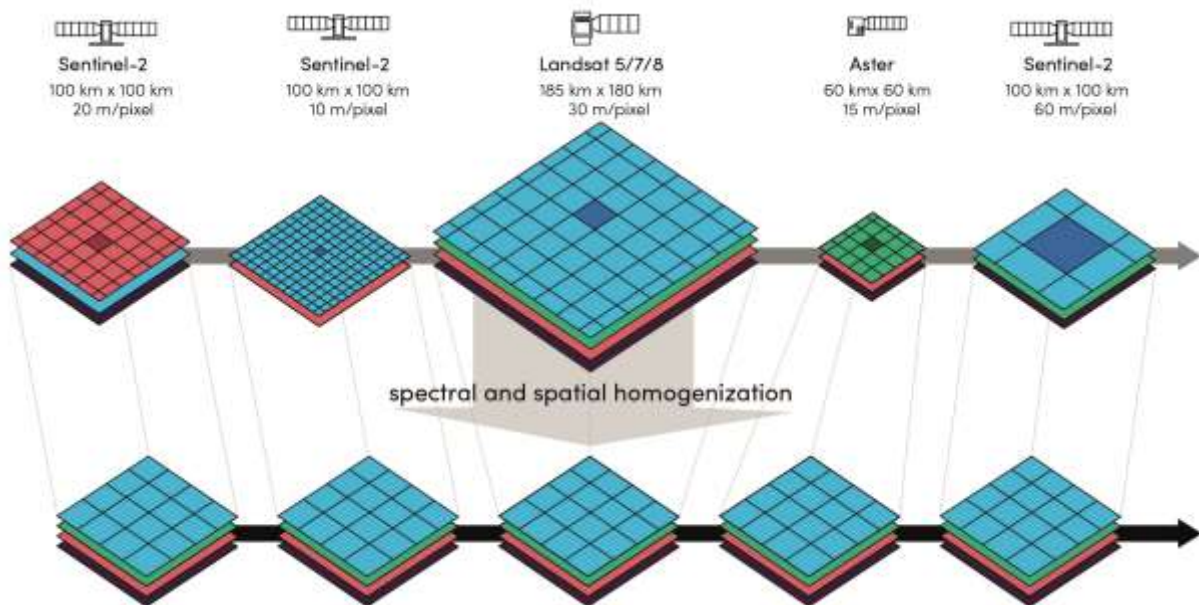
Figure 1: Principle of the homogenization of earth observation products as a feature of the FINDR platform: Imagery of sensors with different spatial resolution (represented by grids) and spectral bands (represented by coloured slices) are adapted to the same output format. © M. Thiele, GFZ Potsdam

FINDR's homogenization workflow will deliver the output data in data format independent of the source. It will include a common set of metadata, image masks and uncertainty estimates as a quality indicator, making VASPs provider-independent.

To test and evaluate the FINDR platform, field trials will be conducted during the growing season of 2022 in Brabant, Limburg and Flevoland, Netherlands. The selected end-users are mainly growing potatoes, onions, beet roots and sugar beet. Some have irrigation systems put into place, some farm according to organic techniques, they have different soil types to work with and all make their own management choices.

The field trials will involve extensive communication between eLEAF (our VASP), the farmers and the agricultural advisors. Management decision support based on the data, such as an irrigation schedule, planting date, harvesting date, application of fertilizers, etc. will be communicated directly or through phone or email between visits.

The VASP's project manager will keep working documents on all end-users to monitor and visualize anomalies. This could include extreme values occurring in the field, differences between treatments, crop performance differences, etc. The data and management choices will both be documented, not to rate performance but to find the relation between what the farmer can see and what remote sensing adds.

We are looking forward to see the results of the field trials and to demonstrate the benefits of the FINDR platform, which will be included in next year's newsletter.

Authors

Jonah Vincke, Fraunhofer EMI, Jonah.Vincke@emi.fraunhofer.de, https://www.emi.fraunhofer.de/en.html

Dr. Henk Pelgrum, eLEAF, Henk.Pelgrum@eleaf.com, https://eleaf.com

Jessica Snoek, eLEAF, jessica.snoek@eleaf.com, https://eleaf.com

Lukasz Dutka, Cyfronet, Lukasz.dutka@cyfronet.pl, https://www.cyfronet.pl

Dr. Daniel Spengler, GFZ Potsdam, daniel@gfz-potsdam.de, https://www.gfz-potsdam.de/en/home/

Daniel Scheffler, GFZ Potsdam, daniel.scheffler@gfz-potsdam.de, https://www.gfz-potsdam.de/en/home/

Dr. Max Gulde, ConstellR, max@constellR.space. https://constellr.space

Daniel Laun, ConstellR, daniel@constellr.space, https://constellr.space