



EU SPACE FOR AGRICULTURE

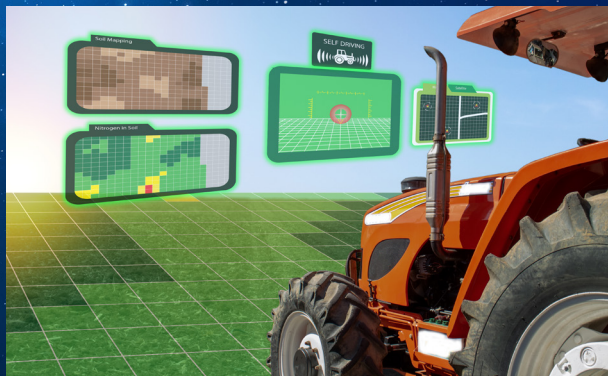
Greener, leaner and more profitable agriculture

#EUSpace 





The EU Space Programme driving precision agriculture forward



The increasing use of digital technologies in agriculture is helping to address a host of challenges, improving farm profitability and resource efficiency whilst contributing to sustainability goals. Technologies contributing to these evolutions, such as Earth Observation (EO) and Global Navigation Satellite Systems (GNSS), drive value for not only farmers and agricultural cooperatives but also for key decision-makers and governments.

EO refers to the gathering of information about the planet's physical, chemical and biological systems through use of remote sensing and in situ technologies. EO is used to monitor land, water and the atmosphere. Once processed, EO data can be assimilated into complex models to produce information and intelligence, such as forecasts, behavioural analysis and climate projections. GNSS refer to constellations of satellites providing signals that transmit positioning, navigation and timing data to GNSS receivers' users.

At the farm scale, Earth Observation data give farmers powerful means to screen the state and health of their crops and optimise the use of inputs such as fertilisers (ultimately reducing soil devastation and water squandering, wasting less and saving more). At the level of decision-makers, EO provides vast amounts of smart data, which public authorities, advisors and economists, can use to better inform their analysis and decision making, especially related to the Common Agriculture Policy (CAP).

For their part, GNSS help farmers to precisely steer machinery and therefore avoid the over application of pesticides and chemicals. This leads to make farms more profitable and sustainable. GNSS also keep tabs of farmers' livestock, ensuring farm operations remain as efficient as likely.

Together, EO and GNSS allow stakeholders to efficiently address the needs of the agriculture industry and help in guiding it towards a green future.

The EU Space Programme and its components Galileo, EGNOS and Copernicus support the provision of sustainable, precision farming solutions by supplying accurate and reliable positioning, navigation and timing information and frequent, high-quality EO data.

Galileo, EGNOS and Copernicus support:

- Variable rate applications
- Manual and auto guidance
- Carbon capture and content assessment
- Organic farming
- Yield and biomass monitoring
- Livestock tracking
- Virtual fencing
- Post-harvest pick-up
- Field measurement and boundary mapping
- Asset management
- Precision irrigation
- Vegetation and soil monitoring



The EU Space Programme's direct benefits to farmers

Optimise crop yields and increase productivity

Save time and increase profit margins

Eliminate waste and the over-application of fertilisers and herbicides by relying on Copernicus service, EGNOS corrections and Galileo's highly accurate signals to support variable-rate technology.

Extend equipment lifetime by optimising its use

Reduce environmental impact and comply with EU policies

What is the added value of EU Space technology?

EGNOS is the “go-to source” for farmers who look to invest in precision farming, with almost 100% of new tractors in Europe incorporating its corrections.

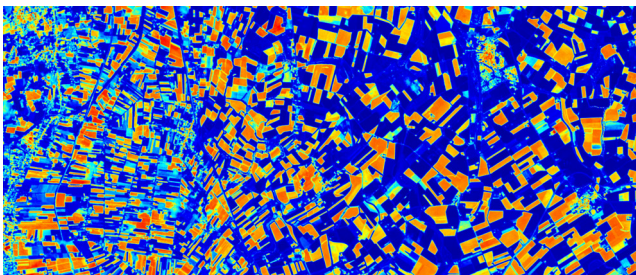
Galileo Authentication services are considered as one of the most relevant key features for the CAP in order to fulfil the Paying Agencies requirements. In the same line, the High Accuracy Service (HAS) is proposed as the entry-point for precision farming, providing a high-level overview to end-users.

Copernicus is enabling crop monitoring and nutrients management, reducing the use of chemicals and allowing for more sustainable farming practices.

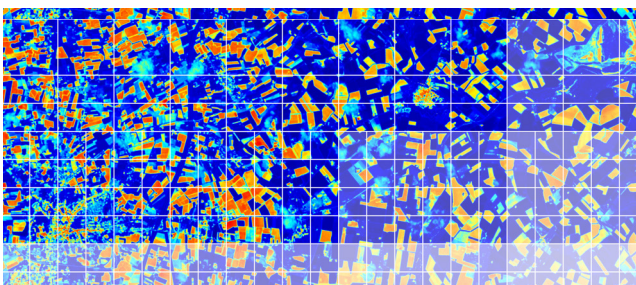
EO and GNSS synergies

By combining different satellite technologies (EO and GNSS), the EO businesses can create new value-adding applications in the field of smart farming. Following the fifth revolution in agriculture, EO data, combined with Galileo's centimetre accuracy and boosted by EGNOS, can enable accurate and efficient variable rate applications. Users can optimise their time and effort, enabling the development of more sustainable processes, which ultimately demonstrates how the Farm to Fork strategy is a key component of the European Green Deal. Sustainable nutrient management, protection of soils, reduction of the use of fertilisers and pesticides, monitoring of greenhouse gas (GHG) emissions and preservation of biodiversity are only examples of the objectives which are reached by the EU Space Programme.

Leveraging the synergies created by the tandem use of EO and GNSS, a new frontier for agriculture will soon be a reality. Smart data will enable “a less is more” approach: with less fuel, water and chemicals, agriculture will evolve into a more efficient, profitable and sustainable sector.



This Copernicus Sentinel-2 image represents moisture index which is ideal for finding water stress in plants



Galileo and EGNOS offer higher accuracy for smart data analysis and synergies with Copernicus

Making agriculture greener with the power of EU Space

According to EUSPA estimations on the use of Galileo, EGNOS and Copernicus, the synergies between these programmes lead to benefits for the farmer, the consumer and the environment:

- **Variable Rate Technology (VRT):**
 - Application of inputs at a precise location
 - Efficiency raise by 10-15%, reducing the application without impact on crop yield
- **Precision Livestock farming (PLF):**
 - Automatic monitoring
 - Overall reduction potential of agricultural methane emissions by 30%
- **Controlled Traffic Farming (CTF):**
 - Lower energy for cultivation
 - On average, up to 50% saving in fuel per tonne of crop harvested
- **Precision Irrigation:**
 - Saves water, improving yields and fruit quality
 - Enables 25% water savings (savings greater than 45€/ha)



EU Agency for the Space Programme

EUSPA provides safe and secure European satellite navigation services and promotes the commercialisation of Galileo, EGNOS, and Copernicus data and services. It also coordinates GOVSATCOM, the EU's governmental satellite communications programme and, as of 2023, is responsible for the Programme's **Space Surveillance and Tracking (SST) Front Desk** operations service. By fostering the development of an innovative and competitive space sector and engaging with the entire EU Space community, EUSPA contributes to the European Green Deal and digital transition, the safety and security of the Union and its citizens while reinforcing its autonomy and resilience.

The EU Space Programme

The EU Space Programme, composed of Galileo, EGNOS, Copernicus, GOVSATCOM, Space Situational Awareness (SSA) and IRIS², is the first integrated space programme created by the European Union to support its space policy, address societal challenges such as climate change and technological innovation, support the EU internal market – and more.

Galileo

Galileo is Europe's Global Navigation Satellite System. It provides accurate, reliable and precise positioning, navigation, timing and safety services. Galileo is designed to provide Europe and European citizens with independence and sovereignty while creating a multitude of services and applications across sectors, ranging from aviation and maritime to agriculture and location-based services.

EGNOS

The European Geostationary Navigation Overlay Service (EGNOS) is Europe's regional satellite-based augmentation system (SBAS) used to improve the performance of global navigation satellite systems like GPS and soon, Galileo. EGNOS uses a set of geostationary satellites and a network of ground stations to increase the accuracy of existing Global Navigation Satellite Systems.

Copernicus

Copernicus is the European Union's Earth Observation programme, looking at our planet and its environment to benefit all European citizens. It offers information services that draw from satellite Earth Observation and in-situ (non-space) data.

IRIS²

The IRIS² Satellite Constellation is the European Union's answer to the pressing challenges of tomorrow, offering enhanced communication capacities to governmental users and businesses while also ensuring high-speed internet broadband to cope with connectivity dead zones.

GOVSATCOM

The EU GOVSATCOM initiative will ensure the long-term availability of reliable, secure and cost-effective governmental satellite communications services for EU and national public authorities managing security critical missions and infrastructures.

Space Situational Awareness

To mitigate collision risks between EU Space satellites and other spacecraft and debris, the EU established a set of capabilities through the Space Situational Awareness (SSA) component of the EU Space Programme. An integral part of SSA is Space Surveillance and Tracking (SST). SST uses a network of ground- and space-based sensors and other infrastructure to survey, track and protect EU Space assets from artificial space objects orbiting Earth (mostly debris from launchers or satellites).

Interested in learning more about EU Space for agriculture?

Download the EUSPA EO and GNSS Market Report here:



LINKING SPACE TO USER NEEDS

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