AgriBIT NEWSLETTER

So you don't miss a single thing

WE ARE ALMOST THERE!

Welcome to the 4th Edition of the AgriBIT Newsletter! In this edition, we take pride in celebrating the unwavering dedication and collaborative spirit of our esteemed project partners. The impact of our collective efforts is now palpable in the fields, marking a significant stride towards a future where precision agriculture thrives. From the inception of advanced tools and systems to the seamless integration of cutting-edge technologies, AgriBIT continues to sow the seeds of sustainable solutions, addressing the contemporary challenges faced by modern farming. Join us as we delve into the milestones achieved and the promising developments that are shaping the landscape of agriculture for generations to come!

Warm regards,
AgriBIT Team

European Commission | EUSPA

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

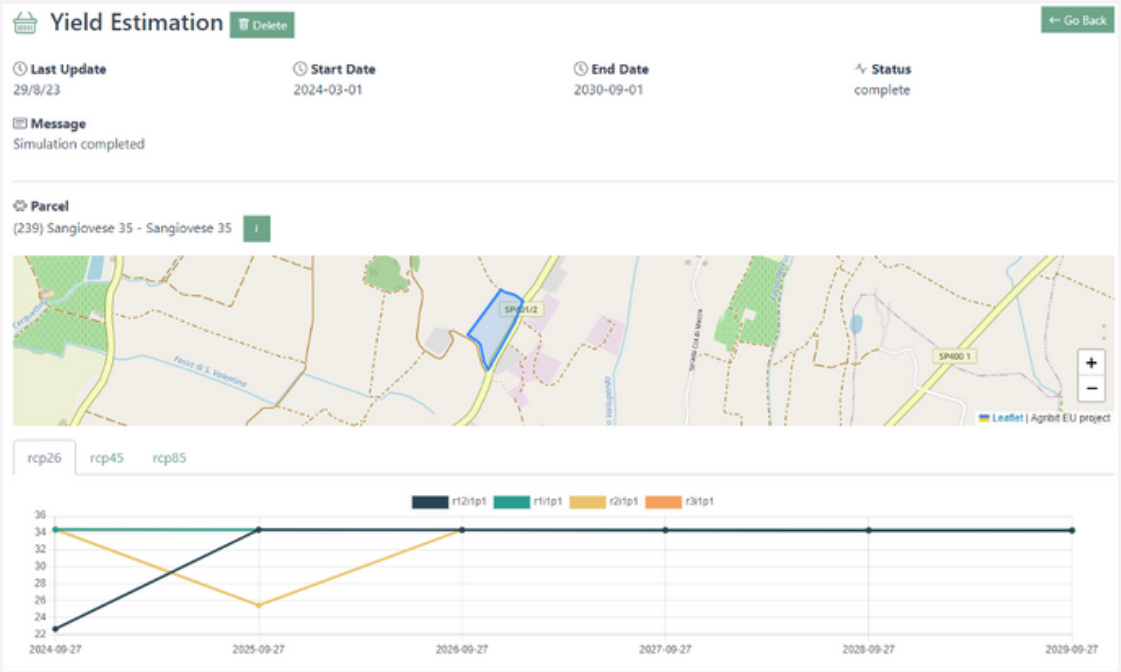
CROSS-PLATFORM VISUALIZATION

The latest progress of the AgriBIT platform is related to the integration of crucial services such as Yield Estimation, Crop Growth Monitoring and Drone Image Acquisition. The Yield Estimation service offers yield forecasts based on various climate scenarios, which can be viewed via an interactive map of the field. Crop Growth Monitoring provides detailed analysis of crop viability through satellite data, with regular updates and the ability to request data for specific dates. Additionally, we have implemented the Drone Image Acquisition feature, which allows users to upload custom images for a more detailed view of the fields. These tools represent a significant step forward for AgriBIT, aimed at improving decision-making and operational capabilities in crop management.

Yield Estimation: Innovation and Precise Prediction

Our Yield Estimation service, now fully integrated into the platform, offers a detailed simulation of crop performance under different climate scenarios. Using the AquaCrop model, the service analyzes 12 representative greenhouse gas concentration scenarios (RCPs), providing seasonal yield forecasts. This information is valuable to the user, allowing them to adapt irrigation and field management strategies based on future climate projections.

The image below shows the AgriBIT Yiedl Estimation interface. On the page it is possible to see a Yield Estimation simulation which shows a detailed map of the field, enriched by a timeline chart, the chart shows lines corresponding to each yield estimation scenario. This visual tool provides an immediate and in-depth understanding of various projections and their impact on the crop.

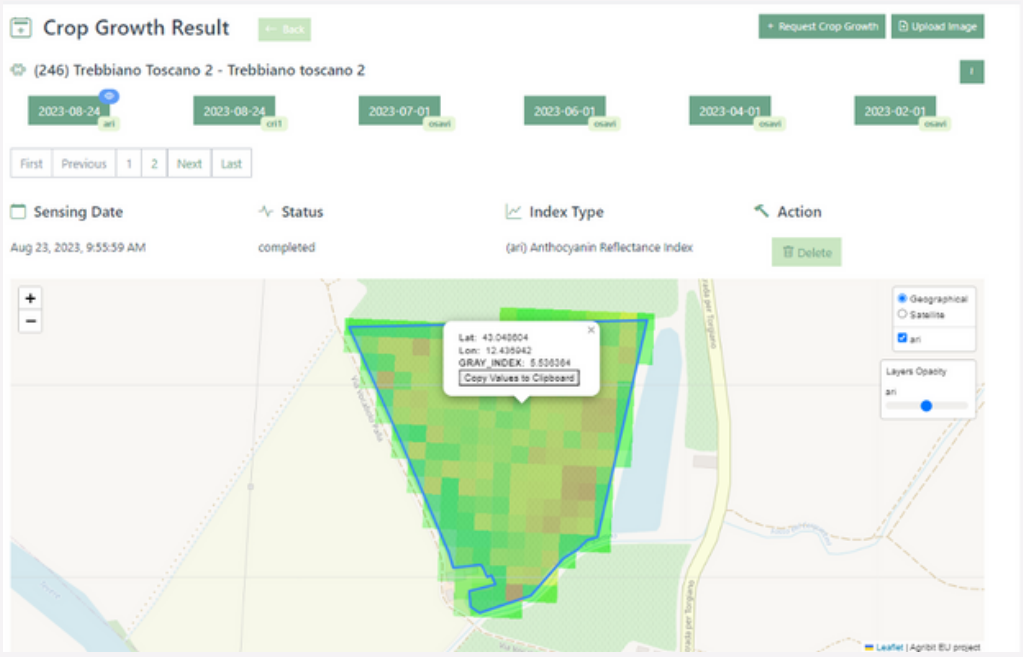


Crop Growth Monitoring: Advanced Vision and Control

The recently integrated Crop Growth Monitoring service provides a detailed analysis of crop vitality through vegetation indices derived from satellite observations. With frequent updates (2-5 days), the service allows users to promptly identify biotic or abiotic stresses, optimize the use of fertilizers and pesticides and analyze crop performance for future planning.

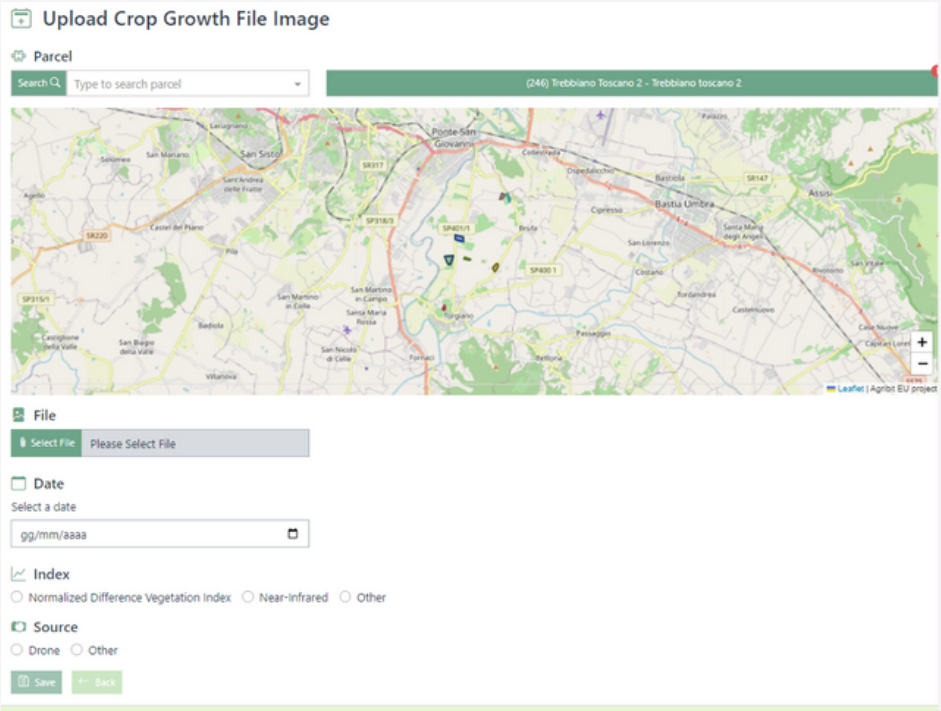
This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

In the platform's interface, users can view a central map of a field, showing the level of NDVI, a key indicator of crop growth. Above the map, there are boxes with selectable dates to request specific mappings via the "Request" button. This feature allows users to acquire updated and personalized information for each field.



Drone Image Acquisition: Integration and Flexibility

Alongside these features, the platform now also supports uploading images acquired externally, such as those from drones. Through the Crop Growth page, the user will be able to access the form which is visible in the image below. Through this form, it is possible to upload the image or images of the drone by specifying the main information. This image will be shown on the map in the Crop Growth section. This allows users to integrate custom observation data into field views, offering additional detail and customization.



This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

GNSS RECEIVER PROTOTYPE FOR PA LOCALIZATION AND GEOGRAPHICAL INFORMATION

The GNSS forms an integral part of a Precision Agriculture system developed for AgriBIT. The precise positioning and localization, as well as derived speed and orientation information is used for physical components and vehicles, forming part of the integrated PA infrastructure. The positioning acquired from GNSS receivers with optional hybridising with other types of wireless triangulation (Cell-ID, Wi-Fi, UWB or other) and/or dead-reconning compensation (in case of shaded and/or sky-obstructed areas) shall be primarily required for precise localisation and manoeuvring of agricultural vehicles both on (ground vehicles) and over the field (aerial vehicles).

Secondly GNSS-derived position shall be used for geo-coding and/or geo-localisation of PA sensors and any other components and points of interest. Furthermore, services derived from precise positioning shall be offered that may directly control the previously mentioned equipment or establish precise geographical information about areas being cultivated, areas filled with different vegetations, identified problem areas etc., thus offering opportunities for development of derived type of services.

The positioning acquired from GNSS receivers with optional hybridising with other types of wireless triangulation (Cell-ID, Wi-Fi, UWB or other) and/or dead-reconning compensation (in case of shaded and/or sky-obstructed areas) shall be primarily required for precise localization and manoeuvring of agricultural vehicles both on (ground vehicles) and over the field (aerial vehicles). Secondly, GNSS-derived position shall be used for geo-coding and/or geo-localisation of PA sensors and any other components and points of interest.
Furthermore, services derived from precise positioning shall be offered that may directly control the previously mentioned equipment or establish precise geographical information about areas being cultivated, areas filled with different vegetation, identified problem areas etc., thus offering opportunities for development of derived type of services.

GNSS SYSTEM ARCHITECTURE FOR AGRIBIT

A generic on-field GNSS deployment architecture combines a range of GNSS constellations offering reference signals for the calculation of the position by the GNSS receiver. Such satnav services include SBAS augmentation that can be used to increase positioning accuracy to an average of 30cm. Beyond this point, ground-based corrections are needed to increase accuracy to the level of 1-2cm as requested by AgriBIT users. The commonly adopted approach is to use RTK corrections, offered either by commercial service or by self-deployed, very high-accuracy and hence also very expensive reference GNSS receiver. Both approaches have been put to the test in AgriBIT. The latter one, an Arrow Gold receiver from EOS was used to stream RTK corrections to nearby AgriBIT GNSS receivers. The former option uses any of the commercial RTK streaming services that can cover all pilot areas.

European Commission | EUSPA

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

The advantage of using a local RTK reference station is its close vicinity to the receivers, thus making sure that timing corrections are as accurate as possible, as opposed to commercial services that may in rare cases be distant by tens of kilometres. In such cases, conditions at locations where timing corrections are acquired concerning receivers' sites may vary in terms of time delays from satellites and might dilute the precision acquired by receivers. Nevertheless, assuming 1cm accuracy or better, as long as the maximum distance between the commercial reference station and the receiver is not more than 50km, the cost of such a service as compared to the cost of a custom reference station is significantly lower. Therefore, unless precision acquired using commercial services exceeds user positioning requirements, the recommendation will be to avoid deploying custom GNSS reference stations locally in the field.

When using RTK corrections, the serious implication is the IP network connectivity, since such corrections have to be communicated from terrestrial stations. Therefore, the GNSS receivers, both COTS and custom-developed ones, will need to incorporate an IP modem, either a Wi-Fi, Mobile Broadband modem or other IP network adapter, enabling connectivity to the Internet. Most commercial receivers offer such capabilities, connecting directly to the mobile network or via external models (e.g., smartphone acting as a relay) to connect to the reference RTK service. The custom receiver to be built into the system will offer direct connectivity to the broadband mobile network and via Bluetooth (or Wi-Fi direct) to a smartphone, and form the latter one to the reference station.

GNSS RECEIVER PROTOTYPE FROM RSFAT

The GNSS receiver prototype(s) produced by RFSAT in the AgriBIT project integrates multiple augmentation options, from autonomous operation to SBAS and custom PPP-RTK corrections over both the mobile (3G and 4G, with 5G+ compliance still being validated), wireless (Wi-Fi) and (optionally) wired (Ethernet) networks.

The augmentation service has proven to be able to reach single-centimetre accuracies in RTK mode (subject to the quality of the 3rd-party services) and better than 20cm in SBAS mode. Its modularity enhances customization capabilities to the specific needs of a given application, minimizing the complexity as well as the cost to the customer for such custom deployments.

The receiver supports L1/L2/L5 GNSS frequencies and can be deployed locally on-site for providing RTK correction factors to receivers operating on agricultural machinery in the field as well as operated separately to provide accurate position in other contexts or operation, e.g. for personal localisation or other vehicles, including both ground and aerial ones. They are expected to be used as baselines for producing an integrated solution with a new foreground. Several prototypes have been constructed in modular ways, such as to offer easy customization to the specific needs of a given application, minimizing the complexity as well as the cost to the customer for such custom deployments.

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

The GNSS receiver prototype(s) produced by RFSAT in the AgriBIT project integrates multiple augmentation options, from autonomous operation to SBAS and custom PPP-RTK corrections over both the mobile (3G and 4G, with 5G+ compliance still being validated), wireless (Wi-Fi) and (optionally) wired (Ethernet) networks. The augmentation service has proven to be able to reach single-centimetre accuracies in RTK mode (subject to the quality of the 3rd-party services) and better than 20cm in SBAS mode. Its modularity enhances customization capabilities to the specific needs of a given application, minimizing the complexity as well as the cost to the customer for such custom deployments. The receiver supports L1/L2/L5 GNSS frequencies and can be deployed locally on-site for providing RTK correction factors to receivers operating on agricultural machinery in the field as well as operated separately to provide accurate position in other contexts or operation, e.g. for personal localisation or other vehicles, including both ground and aerial ones. They are expected to be used as baselines for producing an integrated solution with a new foreground. Several prototypes have been constructed in modular ways, such as to offer easy customization to the specific needs of a given application, minimizing the complexity as well as the cost to the customer for such custom deployments.

An optional component is the ISOBUS-11783 compliance specifically "ISO 11783-9: Tractor ECU", thus supporting direct connectivity to CAN bus infrastructure of the common agricultural machinery. ISO 11783 as a whole specifies a serial data network for control and communications on forestry or agricultural tractors and mounted, semi-mounted, towed or self-propelled implements. Its purpose is to standardize the method and format of transfer of data between sensors, actuators, control elements and information-storage and display units, whether mounted on or part of, the tractor or implemented. ISO 11783-9:2012 describes the Tractor ECU, the control function that provides the gateway between the network's tractor and implements buses, as well as performing other functions. Considering the significantly larger physical size of ISOBUS-11783 compliant connectors as compared with the expected form factor of the custom GNSS receiver, a decision has been made to disassociate physically such a connector from the receiver. Instead, a custom wireless (e.g., Bluetooth or Wi-Fi) and/or wired (e.g., via USB) connected adapter shall be built on top of the micro-computer (e.g., Raspberry PI Zero W). Such an approach opens the custom receiver to a wider range of applications within the Agricultural domain and beyond it, such as transport, environment, energy and more!

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

ALONG THE ROAD...

CHALLENGES

Before the workshop of AgroGLOBAL, a minor technical issue, causing a functional deviation from the user requirements, was spotted. It affected the alignment between the GNSS Enablers and the cross-visualization platform so it was promptly addressed. Deliverables "AgriBIT requirements, architecture and APIs specification (rev. 2)" and "AgriBIT Open APIs and interfaces (rev. 2)" have been submitted. At this point, User and Technology Requirements and Design and Specifications are all well understood throughout the Consortium and documented in detail. Beyond blueprints, these specifications have materialized accordingly in the shape of the solution's components. Efforts will be directed to incorporating some lately requested functionality of the GNSS Enablers to the upcoming release, notably, the feature of the antenna placement offset w.r.t. an agricultural vehicle's centre-point, both transversely and longitudinally.

FLIGHTS UP!

The third UAV flight of the Project was carried out on the 7th of August, at the pilot sites of CCTI (tomato fields, Portugal). The results of the 1st Evaluation Report revealed that end users on the pilot sites have a rather positive perception towards the AgriBIT technical solution since perceptions among them seem to converge in characterizing our solution as valuable for the modern farmer. Further works pertain to actions carried out on the cultivation sites, most notably the drone flights in addition to the sensor-generated data flows. There has been an ongoing effort to support the end users in response to the validation results of the GNSS Enablers, where INOV identified some minor errors. Changes started and are underway!

Also, following the distribution of the high-accuracy GNSS receiver prototypes to the pilot partners, AGENSO has been actively assisting in the adoption of NTRIP technology. That task has been completed in the Italian and Greek pilot sites, and will soon be verified for the Portuguese one, too. The necessary steps consisted of enabling RMC sentences, configuration network and NTRIP services on the receivers' software.

More activities include assistance in the incorporation of the collected brixometer readings in AgriBIT via the use of Demarcator and the validation of the outcome on the Cross-Visualization platform.

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

EVENTS

FOSTERING COLLABORATION AT AGROGLOBAL2023

In a pivotal moment at this year's AgroGlobal event, which took place in Santarém, Portugal, from the 5th to the 7th of September, the spotlight shone brightly on AgriBIT. The AgroGlobal2023 gathering provided the perfect stage for AgriBIT to unveil its groundbreaking approach to farming and agribusiness. AgriBIT's booth at the event was a buzzing hub of activity, drawing the attention of farmers, industry experts, and enthusiasts alike. Precision agriculture, as a concept, has been steadily transforming the way we approach farming.

At the heart of AgriBIT's presence at AgroGlobal2023 was the opportunity to engage directly with farmers and end-users, sharing the project's core goals, remarkable results, and ambitious next steps. The project's vision is crystal clear: to empower farmers with cutting-edge technology, data-driven insights, and sustainable farming practices.

Workshop and Demo Day: Fostering Collaboration

Prior to AgroGlobal2023's grand opening, AgriBIT hosted an interactive Workshop and Demo Day that brought together not only farmers but also industry partners. This event served as an invaluable platform for knowledge-sharing and collaboration, strengthening the bonds within the agricultural ecosystem. During the Workshop and Demo Day, AgriBIT highlighted its core objectives, which include optimizing crop management, resource utilization, and overall farm efficiency. The project aims to reduce waste, increase yields, and ultimately enhance the sustainability of agriculture.

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

AgriBIT didn't just talk the talk; it showcased tangible results achieved through its precision agriculture initiatives. Farmers and attendees witnessed firsthand how AgriBIT's technology had already transformed farms, leading to increased productivity and profitability. From soil health monitoring to automated irrigation systems, AgriBIT's solutions were a testament to the power of innovation in agriculture.

But AgroGlobal2023 wasn't just a showcase of past achievements; it was a launchpad for the project's future endeavours. AgriBIT's representatives discussed exciting plans for expanding their reach, introducing new features, and collaborating with more farmers to build a robust community of agribusiness excellence. As we move forward into an increasingly complex and challenging agricultural landscape, projects like AgriBIT serve as beacons of hope. They remind us that through innovation, data-driven decision-making, and collaboration, we can steer agriculture toward a brighter, more sustainable future.

🌍 Join AgriBIT Journey
Eager to be a part of AgriBITs' mission to transform farming practices sustainably and champion biodiversity? Join the community platform and be a catalyst for change.

7TH PLENARY MEETING

The AgriBIT 7th Plenary Meeting was held on the 4th and 5th of September in Portugal, where the consortium gathered to discuss the achievements and next steps towards more sustainable farming and innovation in precision agriculture.

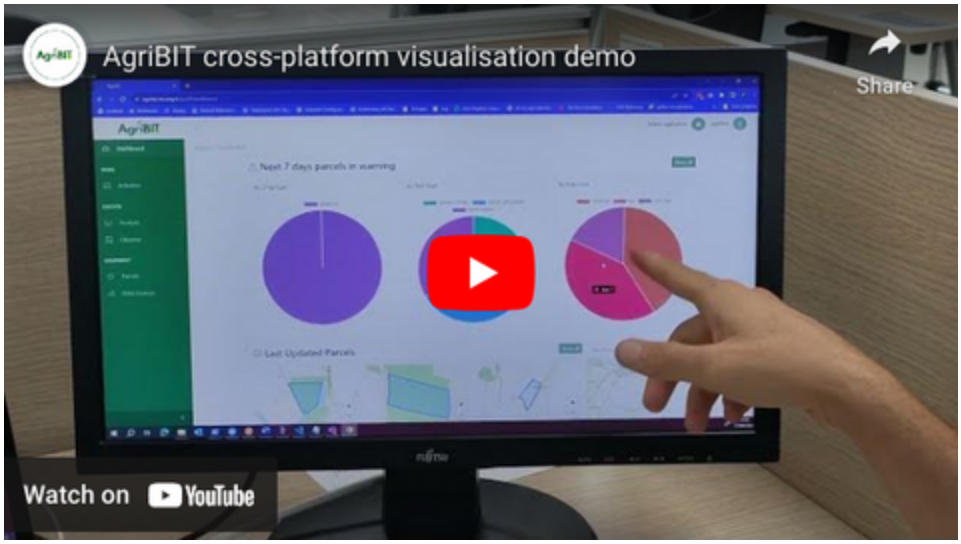
This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

VIDEOS

AGRIBIT AT "FALAR GLOBAL" PROGRAM

AgriBIT gained prominence in a recent episode of the Portuguese program "Falar Global," broadcasted on CMTV channel. The episode delved into cutting-edge technologies for precision agriculture and explored the various challenges confronting the farming industry. With an impressive debut, the program captivated an audience of 160,000 viewers.

HAVE A SNEAK PEAK AT THE PLATFORM'S FEAUTURES!



Subscribe to our youtube channel and stay updated with the latest news on the AgriBIT project!

AGRIBIT COMMUNITY PLATFORM

Self-register as an external user into the AgriBIT community platform to view the customers, fields, services, and analytics! Once registered, you can also join the Cross-Platform Visualization. Join us! https://agribit-khub.eng.it/

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259

WHO ARE WE? AND WHAT DO WE DO FOR AGRIBIT?

Click in the logos to find out!

ENGINEERING

INOV inesc

RFSAT Limited

AGENSO

AGRICOLUS

AgroApps

A.C. Pella since 1928

CCTi

This project has received funding from the European Union Agency for the Space Programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004259