AgriBIT
NEWSLETTER

So that you don't miss a single thing about AgriBIT

A GLIMPSE OF THE PAST 6 MONTHS

Many things have been happening in the past six months, and the AgriBIT consortium is now happy to share our latest achievements with you! Overall, we've been working on the AgriBIT requirements and design, we've released the first AgriBIT integrated services and the on-site farming operations connectivity, and we have made the first integration of a GNSS receiver, with RTK GNSS module from u-Blox and custom PCB boards developed to test in different scenarios such as areas with Wi-Fi coverage, areas with cellular networks coverage and standalone function. We've also crafted a practical user-oriented evaluation framework for the project pilots, outlining the pilots' plan and schedule for each site! Excited to learn more? Here is the second edition of the AgriBIT Newsletter so that you don't miss a single thing!

PROJECT, INNOVATION AND DATA MANAGEMENT

The coordination actions of AgriBIT involve the assurance that all partners are fully engaged with the project, and the several plenary meetings are a crucial channel to keep track of project achievements and progress! The monitoring of the whole project tasks, the updating of the action points and risk registers are in progress, the control of the expected deliverables to submit and the supervision of the review procedure. The coordination team has also conducted synergy activities with other sister projects and Wikifarmer - a global platform with the mission of empowering farmers by educating them and offering them access to the open market to sell their products at fair prices - as to build up the community and gain more visibility.

AGRIBIT REQUIREMENTS AND DESIGN

WP2 "AgriBIT requirements and Design", consists of fundamental tasks whose outcomes actively define the substance of our solution. Initially, we identified the core use cases of our system, having selected user groups across three European countries, collected and organized their opinions and thoughts on topics of Precision Agriculture (PA). Subsequently, we produced a list of macro requirements for AgriBIT to fulfil. The derived system-wide technical specifications were formally reflected in D2.2, available soon on our website!

In more recent developments, the first revision of AgriBIT Open APIs and interfaces was submitted. This document contains the initial version of AgriBIT Open APIs and interfaces that depict the communication and interaction protocols among the individual systems, comprising the solution as a whole. That work showcases the importance of WP2 for AgriBIT, as interconnectivity among subsystems is a central notion in our project and a crucial parameter for its success.

As "AgriBIT requirements and Design" follows the agile methodology, with lots of user input to be retrieved throughout the project's lifecycle, these documents are considered "living" and they will be regularly updated. For this reason, our next steps will regard the establishment of a feedback collection mechanism to ensure that the components that will be made available to the end-users adhere to serving their requirements.

TOWARDS THE CUSTOM GNSS RECEIVER

RFSAT has made the first integration of its GNSS receiver, with RTK GNSS module from u-Blox and custom PCB boards developed to test in different scenarios such as areas with Wi-Fi coverage, areas with cellular networks coverage and standalone function. A LAN module with an RJ45 connector is being developed for scenarios where a wireless RTCM stream is not possible. The module for obtaining the speed and direction of the vehicle from the CAN bus for the Dead Reckoning capability has been tested and demonstrated to be fully operational. Power delivery is considered to be very important and a few options were deployed and provisioned, such as battery power, 12/24V vehicle onboard power and solar panels for the backup. All the tests carried out so far in open sky as well as city areas, have successfully demonstrated compliance with the initial specifications. The current development targeted a very small form factor (3x4x5cm), suitable not only for use on agricultural machinery but also for general-purpose applications in other domains. Hence, a credit card-sized GNSS receiver device has been set as a target. Compliance with GNSS specifications.

The first prototype already satisfies most of the GNSS specifications, in some cases exceeding the initial user requirements. Future work will focus on further reduction of the form factor and weight, increasing the performance under difficult signal conditions and specifically in dynamic RTK-less operation in the field. The formal compliance of the prototype GNSS receiver under development by RFSAT has been preliminarily assessed against GNSS specifications from AgriBIT end-users, including in the table below. After the completion of more detailed testing where the system will be used in modular form, another new custom PCB could be designed. Such a new PCB would be customised to the desired specification such as LAN, Wi-Fi, Bluetooth, USB or battery-powered versions, various cellular connection possibilities and ingress protection (IP). Different antenna types (patch, helix, active or passive) will also be tested to suit different scenarios such as open sky areas, city canyon areas or mixed environment spaces. A new module for a direct connection to reference stations, such as LORA or ZigBee will be needed for areas without cellular coverage.

Constellations	GPS, Galileo, BeiDou, Glonass, QZSS	
SBAS support	EGNOS, WAAS, GAGAN, MSAS, SDCM	
Accuracy (auto)	<1m ± 25% (static), <2m (dynamic)	
Accuracy (RTK)	=>1cm static, =>2cm dynamic	
Accuracy (SBAS)	<30cm ± 25% (static) <60cm (dynamic)	
RTK corrections	any RTCM correction service	
TTFF	<60sec (cold), 1sec (reacquisition)	
Update frequency	1, 5, 10, 20 and 30 Hz	
Datum	WGS-84	
Antenna connector	SMA-F	
Interfaces	Bluetooth, USB and Serial	
Output protocol	NMEA-0183	
Connectivity (RTK)	Wi-Fi, LAN (RJ45) and LoRa	
OS support (apps)	Android and MS Windows	
Device configuration	Any device running web browser	
Target form factor	3 x 4 x 5 cm	
Target weight	<400g	
Target price	<500 euros (volume)	
Max altitude	80.000m	
Max speed	500m/s	
USB power	5 - 15V DC, < 1A	
Battery power	6Hrs (Li-Ion 3.7V, 4500mAh) @ 5Hz	
Power supply	Refer to GNSS-spec-21	
Durability	IP67 temperature, splash/dust-proof	

SERVICES INTEGRATION AND DEPLOYMENT

The "Services Integration and Deployment" activities for the last months focused above all on the first release of AgriBIT integrated services and on the on-site farming operations connectivity. AgriBIT integrated services allow for the acquisition and integration of the data coming from the pilots. Providing an acquisition endpoint, the integration services allow the different components that made up the AgriBIT system to send data to the data infrastructure, where the data are collected, grouped and made available for end users and third parties. In the first release of these interaction services delivered in September, the data taken into consideration are those of 3 GNSS services which concern the data collected in the fields and provided by the farmers such as the field boundary and the sample data.

The implementation of integrated services was achieved by exploiting the data infrastructure platform delivered in previous months which allows the management of the data life cycle, including transformation and integration. The core of the integrated services are data flows designed and delivered by Apache NiFi data flow management. Thanks to this first version of the integration platform it is now possible to test the first interactions between the different components that made up the AgriBIT system, giving way to start preparing the activities for the pilots.

The on-site farming operations connectivity ensures that all piloting needs are fully covered within the AgriBIT project, regarding the connectivity of services to actual machinery, sensors and actuators used on farms. In this project, a total number of 3 AgriBIT pilot sites are established in Portugal, Italy, and Greece with tomato cultivation, vineyards, and peach orchards.

The customized needs of the diversified pilot sites have led to the selection of specific sensors and technologies to be used and applied in each pilot site. In the last activities of the on-site farming operations connectivity task, for all three AgriBIT pilot sites in Portugal, Italy, and Greece, concrete information was provided regarding the location and the specifications of the fields that constitute the pilot sites. In addition to that, sufficient information was provided with respect to the needs of each distinct pilot site, and a detailed description of the sensors to cover these needs was performed. This way, the AgriBIT consortium aims to ensure that all piloting needs are fully covered, based on the differentiated customized needs of each cultivation in each region with the use of various sensors.

PILOTS DEMONSTRATORS

The recently initiated "Pilots Demonstrators" working group, concerns the transfer of technical solutions developed by the Consortium to fields for the purpose of trials in real production conditions, thus leaving no chance for errors to escape timely mitigation. To this end, an effective user-oriented evaluation framework for the project was crafted, covered in D6.1, which additionally outlines the Pilot Plan and its schedule for each site, those being:

• Portugal: tomato cultivations
• Italy: vineyards
• Greece: peach orchards

Pilot testing is certainly a critical phase, where a plethora of unforeseeable errors could manifest themselves. Communication is a key factor in detecting any problems early, enabling the technical partners to frictionlessly ameliorate any malfunctions.

Having geographically defined all pilot sites and drafted the Pilot Plan, our next steps shall mostly focus on the roll-out of hardware and sensors to the sites.

THE PILOTS:

PORTUGUESE TOMATOES

Focuses on the detailed management of diseases, speeding up the detection of diseases earlier during the growth period and delivering the ability to apply corrective measures earlier than without the use of GNSS services, i.e. before the harvest.

ITALIAN VINEYARDS

Focuses on the management of 200 ha of vineyards, with a focus on being able to improve automatic guidance, decrease water usage and connect AgriBIT services to other management platforms.

GREEK PEACH ORCHARDS

Focuses on the full management of peach orchards, benefiting from the capability to overcome the limitation of EO and UAV data which cannot provide accurate results in orchards crops due to tree canopy shape.

EVENTS

SMARTAGRIHUBS

AgriBIT was presented during the synergy days of the SmartAgriHubs project which took place from day 26 to 28 September in Lisbon.

SmartAgriHubs is a project for the digital transformation of the European agri-food sector that connected the Digital Innovation Hubs and the digital innovators of the sector. The project celebrated its achievements in the synergy days, the final event held in Lisbon where participants met to discuss and exchange knowledge about the sector.

During this event Engineering presented AgriBIT with a pitch on the 27th of September and also conducted a workshop on the 28th of September with the title: "AgriBIT: precision farming requirements and DSS user interfaces" interacting and exchanging information with different participants of the congress.

EVENTS

27TH KA AND BROADBAND COMMUNICATIONS CONFERENCE

Engineering and RFSAT presented the AgriBIT project at the KA conference. Our partners explained to the participants and to the EU Space Program Agency, the advantages and opportunities offered by the project in the head of precision farming, underlining the desire to enhance the Earth Observation data made available to the COPERNICUS program applied to precision farming and the precision positioning services linked to GNSS made available for the GALILEO program. During the session, the representatives of the different projects that have received funds from EUSPA exchanged important information on the sector.

AGROTICA 2022

AgriBIT was presented by AGENSO during the 29th International Fair for Agricultural Machinery, Equipment and Supplies, "Agrotica". The event was in October 2022 at the International Exhibition & Congress Centre of Thessaloniki, Greece. There we had the great opportunity to talk with the visitors and present them with the major ambitions of AgriBIT and our achievements so far.

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

Click in the logos to find out!