

USER CONSULTATION PLATFORM 2020

MINUTES OF MEETING OF THE AGRICULTURE AND FORESTRY PANEL

Meeting Date	01.12.2020	Time	09:00 – 13:30
Meeting Called By	GSA	Location	Online event
Minutes Taken By	Eleftherios Mamais (Evenflow) & Daire Boyle (Evenflow)	Next Meeting Date	UCP 2022
Attendees	<p>Joaquin Reyes Gonzalez – Panel Moderator (GSA) Eleftherios Mamais (Evenflow) – Panel coordinator Michal Babacek (GSA) – Supporting moderation Daire Boyle (Evenflow) – Supporting moderation</p> <p>User Community Representatives Pablo Olmos (Leica Geosystems) – Panel users’ chair</p> <p>Participants See Annex</p>		
Distribution (in addition to attendees)	UCP Plenary, GSA, Public		

Agenda Items	Presenter
Welcome and introduction of all participants	Joaquín Reyes González (GSA)
User needs and requirements	Eleftherios Mamais (Evenflow) Marco Fermi, (Freelancer) Klaus Herbert Rolf, (CLAAS)
Summary of the year: activities done and initiatives launched - Success stories coming from the users and help-desks	Sofia Cilla (ESSP) Eva Ramirez, GNSS Service Centre (GSC)
Summary of the year: activities done and initiatives launched - State of the art: Farm to Fork Strategy (European Green Deal) and CAP	Michal Babacek (GSA)
GNSS for Agriculture and Forestry - Test campaign preliminary test results (anonymized)	Jacopo Capolicchio, (Thales Alenia Space)
	Jimmy Bruzual (ESSP)
GNSS for Agriculture and Forestry - EGNSS adoption and its advantages	Pablo Olmos (Leica Geosystems)
	Michael Mahieu (CNH Industrial)
	Isaac Hoyas (Rokubun)
	Christophe Aubé (AgreenCulture)
GNSS for Agriculture and Forestry - EGNOS and Galileo roadmap update	Joaquín Reyes, (GSA)

Agenda Items	Presenter
Research and Development projects - GREENPATROL, GALIRUMI and SCORPION	Raúl Arnau (Centro Tecnológico CTC)
	Esther López (Acorde)
	Filipe Neves (Inesc TEC)
Copernicus and its synergies with EGNSS - Farming Management Systems, Variable Rate Technology and Land Monitoring	Marcel Foelsch (CLAAS)
	David Koltizus (Geoville)
	Teresa Martinez (ESSP)
Final Q&A	

Summary
<p>The User Consultation Platform (UCP) took place online on the 1st of December 2020. It was organised as a forum for the interaction between representatives of the different parts of the value chain. In that context, the UCP for agriculture and forestry brought together 107 participants from organisations and institutions dealing, directly and indirectly, with the use of Galileo, EGNOS, Copernicus and complementary solutions in different applications in agriculture and forestry. The main outcomes of the discussions can be summarised as follows:</p> <ul style="list-style-type: none"> <p>EGNSS and Copernicus continue to play a significant role for a wide range of applications and can bring high value when it comes to implementing the Farm to Fork Strategy of the EU Green Deal.</p> <p>The added value of each of the programmes, Galileo, EGNOS and Copernicus was showcased for a number of applications in agriculture and forestry and backed by concrete quantification of the produced benefits (thanks to the test campaigns). Strong emphasis was placed on the evolving landscape which is driven by the Farm to Fork Strategy of the EU Green Deal, and which can greatly benefit from the use of EGNSS and/or Copernicus-based services.</p> <p>The evolution of user requirements is directly tied to the increase in the adoption of EGNSS and Copernicus in various agricultural and forestry applications.</p> <p>New features brought forward by Galileo (e.g. Authentication service) will be reflected onto appropriate user requirements once users are fully aware of the value proposition of these features. In addition, key policy initiatives (e.g. Farm to Fork Strategy and CAP post 2020) are promoting the adoption of EGNSS and Copernicus, thus shaping future user requirements</p> <p>The discussion on user requirements focussed on aspects related to jamming, integrity and authentication. Klaus Herbert Rolf introduced a particularly interesting example of where integrity is required to ensure sensitive areas, such as draining ditches around the perimeters of fields, remain protected. Attendees made it clear that the applicability of these parameters varies on the operational context.</p>

The successful use of EGNOS and Galileo was showcased through various use cases such as Teejet, where EGNOS helps automatic steering applications used on rice farms in Northern Italy. Galileo's utility was particularly exemplified in the case of Ixorigue, an application which tracks the position, behaviour and health of cattle in Spain.

The need to modernise and simplify the CAP through the use of EU space data was emphasised. Geotagging of farmer and inspector pictures through the EGNSS4CAP initiative was one example presented as something that will drive the new CAP forward in terms of efficiency. In turn this will help to contribute to some of the EU's Farm to Fork Strategy goals.

Preliminary results of test campaigns were presented by industry professionals which compared both Galileo and EGNOS to other technologies in real world applications. These campaigns demonstrated Galileo and EGNOS's utility and showcased the benefits and added value Galileo and EGNOS can bring.

Concrete examples of the advantages associated with the adoption of EGNOS and Galileo in precision farming were also discussed. This was then embedded into the overall context of the EGNOS and Galileo roadmap, setting out how both technologies' adoption will evolve in agriculture and forestry and how the systems will progress over time.

The second part of the session focussed primarily on R&D projects. The GREENPATROL project showed how Galileo is used to help autonomous robots better control pests in greenhouses, whilst GALIRUMI showcased how increased profitability and sustainability on dairy farming is achieved through the use of Galileo-assisted robots. Finally, the newly-funded SCORPION project discussed how EGNSS allows for cost effective solutions in smart precision agricultural robot spraying applications.

The last part of the event focussed on synergies between Copernicus and EGNSS and how these can be exploited in agriculture and forestry. Applications for the adoption of Copernicus and EGNSS in potato farming and soil zoning were highlighted.

The messages, concrete uses cases and hard numbers provided across the various presentations have once again underlined the value proposition of EU space programmes. Thus, despite having moved to an online environment, the UCP "family" has reaffirmed its interest to regularly exchange on further subjects related to the adoption of European space programmes in the fields of agriculture and forestry. The group has been enthusiastic to follow up with the work done in this online environment over the coming year and meet again at the next UCP.

Election of the users' chairperson:

Pablo Olmos (Leica Geosystems) was elected as chairperson.

General discussion notes

The 2020 edition of the User Consultation Platform for Agriculture and Forestry has provided a strong link with the activities undertaken by various stakeholders over the past years and has provided a glimpse of what can be expected in the future. Thus, stakeholders representing different parts of the value chain had a chance to exchange on **current and evolving user requirements** across different applications, be informed about some of the latest **activities and initiatives** launched by GSA and its partners, discuss the results of the **test campaigns** and look deeper into **EGNSS adoption**

and its advantages. In addition, participants had the opportunity to see how EGNSS supports the aims of different **research projects** and how it brings extra value **together with Copernicus**.

Welcome and introduction of all participants

The discussions kicked off by GSA's Joaquin Reyes Gonzalez who presented the agenda along with the overall scope, objectives and expected outcomes of the UCP. The session was organised in different segments as per the agenda presented on top of this document. The specific feedback for each agenda topic is presented below.

User needs and requirements

The floor was opened by Lefteris Mamais who explained how the 2020 edition of the UCP is connected to the process of collecting, analysing and validating user needs and requirements. He went on to briefly present the current status around the Report on User Requirements and its continuous reviewing. For this, experts Klaus Herbert Rolf and Marco Fermi have gone through the set of requirements and provided a fresh update for some of them. The discussion then carried on with specific focus being placed on Authentication, Jamming and Integrity. In that regard, Klaus Herbert Rolf provided a concrete example where farmers need to avoid spraying over restricted areas and for which integrity becomes crucial. Throughout this part of the session, participants were asked to provide their insights on sli.do. The results for each of the raised questions are shown below:

- **Slido Question 1:** For which applications is authentication relevant?

The most popular answer was "Geo-tagged photos", followed by "geofencing", "safety", "IACS" and "zone based spraying".

- **Slido Question 2:** Are you aware of any jamming incidents in your country? (if yes, please provide a short description of the incident)

The majority of the answers given were "no", but the people who answered "yes" added that the incidents were "in fields near military airports" and "high power Military and police radars that affects GNSS signal".

- **Slido Question 3:** For which applications are jamming threats relevant?

The most popular answer was "autonomous tractors/machines/steering" followed by "UAVs/drones".

- **Slido Question 4:** For which applications is integrity relevant?

The most popular answer was "safety" followed by "geofencing", "automatic steering/machine guidance" and "drone/UAV flight".

Summary of the year: activities done and initiatives launched

Sofia Cilla and Eva Ramirez presented success stories for EGNOS and Galileo respectively:

- **Teejet** – A case study into rice farming in Northern Italy – Automatic steering systems which use EGNSS allow the farmers to never overlap when conducting work in their fields and applying farming inputs, thereby reducing costs and making their lives easier.
- **Proxima Systems** – EGNSS allows irrigation solutions to increase their accuracy and save costs.
- **Ixorique** – Livestock monitoring using Galileo data allows cows to be tracked, their movements and health monitored and geofencing planned.

Michal Babacek presented Farm to Fork and CAP and how EO and GNSS can help the new CAP evolve. His key messages included:

- Modernising and simplifying the CAP is of high importance for the post-2020 CAP
- EU space services support this transition
 - Possibility to replace on-the-spot checks by Copernicus (Checks by Monitoring), leading towards complete area monitoring
 - Copernicus is complemented by EGNSS-based geotagging photo application used by both inspectors and farmers → GSA developed an open source EGNSS4CAP geotagging photo application that is available to all MS Paying Agencies
- Both EGNSS and Copernicus, either separately or in synergy, significantly contribute to achieve ambitious goals of F2F such as reducing pesticides and fertilisers

Michal then asked the audience the following question through slido:

- **Slido Question 5:** What are the other use cases where geo-tagged photos can potentially be used (within and beyond CAP)?

The most popular answer was “pest identification” followed by “damage from wildlife”, “forestry”, “soil nutrient analysis” and “hail damage”.

GNSS for Agriculture and Forestry

Two test campaigns for the efficacy of Galileo and EGNOS were presented by Jacopo Capolicchio of Thales Alenia Space and Jimmy Bruzual of ESSP. Both were able to provide hard numbers that underline the performance of EGNSS. Thus, Jacopo noted, for instance, that

- Galileo is a reliable alternative to GPS for Agriculture activities, achieving sub-metre horizontal and pass-to-pass accuracies in Open Sky Scenario
- the Testing Campaign showed how the majority of manufacturers has properly implemented Galileo, both for standalone and augmented positioning mode (RTK and PPP)

Similarly Jimmy noted that:

- EGNOS supports in pass-to-pass up to 28cm percentile 95% and to 14cm mean values, which is line with the 15cm to 30cm pass-to-pass specification for SBAS in agriculture
- EGNOS is the BEST free-of-charge main GNSS correction for manual or autoguidance systems

Industry representatives have then shared their own insights. Pablo Olmos of Leica, focussed on the added value on handheld solutions both for traditional applications but even for less known ones such as mushroom picking. Michael Mahieu of CNH Industrial has hailed the performance of EGNOS for many applications in agriculture and industry, noting that there is rarely any issue with customer support. Galileo adds a lot of value for CNH RTK service (roll out Galileo corrections in Sweden, UK, Benelux, Austria, Germany, Switzerland, France). The benefits include faster fixing, better 3D reliability of RTK fixing positions and improved availability under canopies. Rokubun presented a use-case whereby their “JASON” and “Argonaut” solution uses Galileo for smart drone photogrammetry. Agreenculture also presented how safe geofencing can be achieved through the use of GNSS.

EGNOS and Galileo roadmap update

Joaquin Reyes Gonzalez of GSA reiterated some key points about authentication underlining the role that Galileo OS-NMA will play. Following a brief reference on the High-Accuracy Service, he went on to discuss the evolution of EGNOS and its specific features going forward (into v3). He wrapped up this part of the session by discussing timelines of deployment for the different systems and services and how GSA is carrying out a continuous process of gathering stakeholder inputs for both user requirements and downstream funding priorities.

Research and Development projects

- GREENPATROL – This project showed us how Galileo is used to help autonomous robots better control pests in greenhouses.
- GALIRUMI – Increased profitability and sustainability on dairy farming is the focus of the GALIRUMI project. These goals are achieved through the use of Galileo-assisted robots in weeding.
- SCORPION - The SCORPION project discussed how EGNSS allows for cost effective solutions in smart precision agricultural robot spraying applications.

Copernicus and its synergies with EGNSS

In this section farming management systems, variable rate technologies and land monitoring applications were some of the topics presented to demonstrate the synergies between Copernicus and EGNSS.

- CLAAS Crop View showed us how NDVI imagery can be used to help guide automatic farming input applications.
- Geoville presented its GEO4A solution which empowers potato farmers to utilise both satellite imagery and GNSS for optimum potato production.
- Telespazio/ESSP showcased how soil zoning and variables can be understood and mapped using Copernicus and EGNOS.

This was followed by a broader picture of Copernicus its contribution to various processes associated with agriculture and forestry provided by Cristina Ananasso of the European Commission. This included an account of how different services, i.e. CLMS and C3S provide different products (e.g. vegetation indices, HRL for small woody features) and support different projects (e.g. the global agriculture project) respectively. The session was concluded with two questions as follows:

- **Slido Question 5:** What are the main challenges to realise full synergy between Copernicus and EGNSS?

The most popular answer was “ISOBUS” followed by “understanding farming cycles and needs”, “quantity of data to show end user”, “interconnectivity” and “easy solutions for the farmer”.

- **Slido Question 6:** Which applications can benefit the most from such synergy?

The most popular answer was “climate change” followed by “zone identification”, “quantity of data to show end user”, “forestry”, “fertilizer maps”, “irrigation” and “pest

control”.

Answers to specific questions:

Aside from the questions raised by the panel organisers to panel participants through sli.do, several attendees raised questions concerning individual presentations via the webex chat. Of general application was a question on whether concrete efforts are undertaken to use EGNSS and Copernicus for sustainable forestry, on which Lefteris Mamais responded by giving examples of startups and established companies who do so.

Modifications to requirements already compiled in the Report on User Needs and Requirements (RUR):

Requirement ID	Proposed change
N/A	N/A

New requirements to be added to the RUR:

- The reviewers of the URD have proposed additional requirements related to
 - GNSS based automated Documentation
 - Agroforestry
 - Precision Agriculture mobile APP
 - Ionosphere scintillation mitigation
- Two further topics were identified:
 - In the future, “Farm2Fork” and the transparency of agriculture production request documentation including also position and time. This documentation needs sub-metre absolute accuracy at the entry level
 - The uptake of mobile apps by farmers will be driven by regulatory provisions such as those related to geo-tagged photos in the post-2020 CAP

Answers to the R&D questions:

- No feedback was provided to the R&D questions

Questions and requests from UCRs

- N/A

Conclusions

The third edition of the Agriculture and Forestry UCP session is successfully closed by the GSA. Key results of this working session were highlighted during the plenary UCP session on December 7th, 2020 by Pablo Olmos.



Actions					
ID	Action Description	Responsible	Due Date	Status	Comments

[Include Reference if Actions are traced at another location]



Other Notes & Information



Annexes & Attachments

- Attachment 1: UCP 2020 Day 1 – Agriculture session presentation
- Attachment 2: UCP 2020 Day 2 – Agriculture Q&A for the plenary
- Attachment 3: UCP 2020 – Participants list



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