

UCP 2023 MINUTES OF MEETING OF THE AGRICULTURE AND FORESTRY MARKET SEGMENTS PANEL

Meeting Date	07.11.2023	Time	10:00-17:00
Meeting Called By	EUSPA	Location	Seville (hybrid event)
Minutes Taken By	Paola Testa	Next Meeting Date	N/A
Attendees	<p>Michal Babacek, Jacopo Ovarelli, EUSPA, Panel moderators Stefan Schneider, EUSPA, Panel coordinator Emanuela Cervo, Paola Testa, EY, UCP User Needs and Requirements moderator</p> <p>User Community Representatives (UCRs) Michal Babacek, EUSPA Javier de Blas, EUSPA Javier Ostolaza, EUSPA Jacopo Ovarelli, EUSPA Stefan Schneider, EUSPA Emanuela Cervo, EY Paola Testa, EY</p> <p>Esther López, ACORDE Tamme Van Der Wal, Aerovision Jaskula Patryk, Airbus Sebastian Vogler, BeetleforTech Helene Koch, CEPF Georg Larscheid, CLAAS Rolf Schmitz, Collective Crunch Samuel Almond, ECMWF Cristina Ananasso, ECMWF Delphine Deryng, ECMWF Stijn Vermoote, ECMWF Usue Donezar, EEA Adrian Tistan, DG ENV Tabinda Khurshid, Fjeldskov-Ttrimber Fabian Enssle, GAF Juan Pablo García, Integrasys Frederic Achard, JRC Maurizio Laterza, Planetek Italia Dr. Sanna Härkönen, Sitowise Hanaa AL BITAR, TAS Leo Bibollet, TAS</p> <p>Complete list of attendees is in Annex 1: List of Attendees.</p>		
Distribution (in addition to attendees)	UCP Plenary, EUSPA, Public		

Agenda Items	Presenter
Morning Agriculture session	

0. Session Agenda presentation	Stefan Schneider, EUSPA
1. EU Space Programme Components current state and future services for users	Javier de Blas, EUSPA
2. Horizon Europe EGNSS Mission and Service-related R&D activities and Contribution to Ionospheric Prediction Service	Javier Ostolaza, EUSPA & Leo Bibollet, Hanaa AL BITAR, TAS
3. Copernicus for Agriculture: CLMS for Agriculture	Usue Donezar, EEA
4. Copernicus for Agriculture: C3S/CAMS for Agriculture	Cristina Ananasso & Delphine Deryng ECMWF
5. Developing requirements from automation to autonomy & discussion	Georg Larscheid, CLAAS
6. GALIRUMI R&D project – EGNSS based robots for organic farming & discussion	Esther López, ACORDE - GALIRUMI H2020
7. The EU SPACE opportunity for small and medium size farmers & discussion	Maurizio Laterza, Planetek Italia
8. EU SPACE role within Regenerative Agriculture & discussion	Tamme Van Der Wal, Aerovision
9. SPACE4GREEN R&D project - EU Space and block chain for traceability and sustainability & discussion	Juan Pablo García, Integrasys
10. Conclusions and next steps: EUSPA	Stefan Schneider, EUSPA
Afternoon Forestry session	
11. Session Agenda presentation	Stefan Schneider, EUSPA
12. Setting the scene: EU Space Programme Components Status and future services for users	Stefan Schneider, EUSPA
13. Setting the scene: CLMS contribution to forestry	Usue Donezar, EEA
14. Setting the scene: C3S/CAMS contribution to forestry	Samuel Almond / Stijn Vermoote, ECMWF
15. New EU Forest Strategy for 2030: Monitoring Framework for resilient European forests	Adrian Tistan, DG ENV
16. New EU Forest Strategy for 2030: Promoting sustainable forestry by satellite monitoring	Dr. Sanna Härkönen, Sitowise
17. EUDR (Deforestation-free Products Regulation): The EU Observatory on deforestation and forest degradation	Frederic Achard, JRC
18. EUDR (Deforestation-free Products Regulation): EO/GNSS for EUDR – use cases	& Jaskula Patryk, Airbus & Sebastian Vogler, BeetleforTech & Fabian Enssle, GAF
19. EO/GNSS for carbon market (use case)	Rolf Schmitz, Collective Crunch
20. EU forest owners' perspective	Helene Koch, CEPF
21. EU forest owners' perspective: Challenges and needs of forest owners	Tabinda Khurshid, Fjeldskov-Trimmer
22. Conclusions and next steps	Stefan Schneider, EUSPA

Summary

The Agriculture and Forestry panel of the User Consultation Platform (UCP) 2023 took place on 7th November 2023 as a hybrid event, with more than 70 participants attending in person in Sevilla and a further 40 participants joining through the on-line platform. The panel brought together participants from different end-user communities active in the areas of Agriculture and Forestry applications, including precision agriculture and forestry EO/GNSS/SATCOM solutions manufacturers and service providers, Farmers associations, forestry associations, forestry owners, universities and research institutions.

The main objectives of the UCP are to present and discuss space technology user requirements and needs in Europe, including GNSS, EO and SATCOM, to showcase success stories of companies and projects using GNSS and EO data and services in the field of Agriculture and Forestry, as well as collecting feedback and relevant first-hand information from the participants on the emerging trends, relevant needs, potential barriers and useful way forward, with a specific focus on the actions that EUSPA can undertake to support the flourishing of this market.

Two sessions were organised: one during the morning on GNSS and EO user requirements of the Agriculture segment, and the second one during the afternoon on GNSS and EO user requirements of the Forestry segment.

During the morning session on **Agriculture**, the discussion was structured around the following main key areas: automation and autonomy in the farming sector, the opportunities that space data can provide for small and medium farmers, carbon farming and how EO and GNSS can increase traceability and sustainability in the agriculture sector.

Concerning the first topic, key user needs were identified, such as continuity and accuracy in GNSS, cost-efficient EO solutions, and the importance of addressing funding and skills gaps to enhance the uptake of precision agriculture practices. The role of education, collaboration with farmers' associations, and the ongoing need for human intervention in farming despite increasing automation was emphasized. Regarding opportunities for small and medium farmers, funding and skills gaps were identified as major barriers to the uptake of space data and services in agriculture. These challenges appear to be relevant also to regenerative agriculture, which currently suffers from a lack of skills, funding, and affordable integrated solutions. Finally, the important enabling role of space technologies, and the contributions offered by Galileo and Copernicus to the uptake of more efficient, sustainable, and transparent farming practices were presented and discussed.

During the afternoon session of **Forestry**, the presentations and discussions revolved around four main key areas, namely the New EU Forest Strategy for 2030, the Deforestation-free Products Regulation (EUDR), EU space for carbon market and finally the EU forest owners' perspective.

Various initiatives, key EU policy areas and services related to forest monitoring, climate change, and sustainable forestry in the EU were discussed. Concerning the New EU Forest Strategy for 2030 and the proposal for Monitoring Framework for Resilient European Forests, the importance of data harmonization between Member States was stressed, together with the potential differences in extra costs for compliance in different Member States.

Additionally, challenges identified by the participants, especially within the EUDR context, include shaping EO data into due diligence reports and collecting geolocation coordinates. Also, the need to increase automation in monitoring forests and monitoring forest variation emerged, together

with the necessity to combine data from multiple sources, namely Copernicus, complemented by commercial data offering higher accuracy and revisit frequency. This allows to delineate small parcels and precise boundary recognition for deforestation monitoring. Another essential aspect mentioned was in-field data collection to validate the results or for finetuning the algorithm. Finally, it was stressed that the EUDR enforcement timeframe is perceived as too short for forest owners to equip themselves properly.

EO and GNSS are essential tools for efficient forest inventories, bark beetle monitoring, large-scale biodiversity tracking and carbon analytics. The main existing challenges concerning carbon markets are identified in the lack of transparency in carbon projects, “greenwashing” of projects, and the lack of alignment for mandatory and voluntary activities. To foster this type of market in Europe, more focus needs to be devoted to the market value of land in general, being scarce, and forested land in particular. Increased awareness might attract investments and enhance market growth.

Finally, concerning the perspectives of the forest owners, it has been stressed that forestry management is incredibly specific and depends on the type of forest and its uses. The lack of understanding of new technology and lack of technological maturity are perceived as barriers.

The lack of transparency in the timber trade and the fact that forestry owners and associations struggle to combat illicit activities in the industry due to this lack of transparency was discussed. As European forestry regulations around traceability, transparency, biodiversity, certifications, and the climate impact of forestry are becoming stricter, there is a push for digitization of timber trading.

1 MINUTES OF MEETING

Morning Session: Agriculture

Session Agenda presentation for Agriculture - by Stefan Schneider (EUSPA)

Stefan Schneider (EUSPA) opened and introduced the session. The goal of the session is to present, discuss and validate the GNSS and EO user requirements in the domains of Agriculture. This session creates the opportunity to connect different relevant players by giving the possibility to present solutions and to hear about the user community.

The goal of this event is to pave the way for the building of a comprehensive community, allowing all the contributors to share and discuss how GNSS and EO are used in Agriculture and their evolving needs and existing gaps, so to offer a communication channel that is intended to remain permanently open.

EU Space Programme Components current state and future services for users - by Javier de Blas (EUSPA)

An overview of state of the art and the future evolution of the EU space programme components was given, namely, Copernicus, Galileo and EGNOS, IRIS², and Space Surveillance and Tracking (SST).

No questions arise from the audience.

Horizon Europe EGNSS Mission and Service-related R&D activities and Contribution to Ionospheric Prediction Service - by Javier Ostolaza (EUSPA) & Leo Bibollet (Hanaa AL BITAR, TAS)

An overview of the project E-GIANTS was given. Its main objective is to increase the security of ENGSS, to measure the level of protection and the impact on users. Six companies partnered on the project. Also, the IDEEAS project was presented, which aims at analysing and defining the cost-effective potential data delivery means complementary / alternative to the current EGNOS and Galileo HAS ones, improving the current dissemination capabilities in terms of potential users and enhanced commitments (e.g. provision of integrity through EDAS) and perform a proof of concept of the service.

For further information on the projects, the audience is invited to refer to the following point of contacts:

Contacts	E-GIANTS	IDEEAS
TAS	Leo.Bibollet@thalesalieniaspace.com	Hanaa.AlBitar@thalesalieniaspace.com
EUSPA	javier.OSTOLAZA@euspa.europa.eu	javier.OSTOLAZA@euspa.europa.eu

Since many farmers are already using RTK, the audience was interested in understanding if the outcomes of the project would have been relevant and beneficial also for those farmers. It is the case, as the project objectives include the assessment of potential EGNSS authentication solutions that exploit the synergies between EGNOS and Galileo in order to improve the performance and security of the authentication services provided by EGNSS, while supporting the definition of optimal authentication solutions for EGNSS, measure the level of protection achieved and the impact on the EGNSS service for non-aviation users. Therefore, the achievements of the project will be relevant for farmers, on the one hand, to gain increased robustness against interferences; on the other hand, to have better accuracy than GNSS standalone which can be useful for some applications.

Concerning GNSS, the more relevant needs were identified in integrity, availability and accurate positioning, namely, GNSS signal that is reliable and globally available with cm-accuracy positioning. More affordable SATCOM availability was also stressed.

In more specific terms, when concerning EGNOS and RTK, it was stressed that newer and more advanced technologies were not needed, as in rural areas 5G and even 4G can be unreliable, and enhanced coverage of 5G does not solve issues in remote areas. Greater coverage with EGNOS is needed as RTK-outages in rural areas can be an issue. It was stressed that fostering the uptake of the pre-existing technologies must first take place.

Copernicus for Agriculture - by Usue Donezar (EEA), Cristina Ananasso & Delphine Deryng (ECMWF)

An overview of some of the available Copernicus services was provided, including Copernicus Land Monitoring Service (CLMS) which is run by the JRC and EEA, Copernicus Climate Change Service (C3S) and the Copernicus Atmosphere Monitoring Service (CAMS) both run by the European Centre for Medium Range Weather Forecasting (ECMWF). Moreover, a new web portal and products based on Sentinel 2, such as vegetation monitoring and drought monitoring were presented to the audience.

The discussion following the presentation was focused on the potential target users of the products and services presented. The speaker explained that they can be many, and that's why the products are meant to be multipurpose, and this approach is also supported by many European policies. In particular, high-resolution phenology data are products that can be used by different actors, sometimes even very different from the intended ones.

Developing requirements from automation to autonomy & discussion - by Georg Larscheid (CLASS)

An overview of digital solutions for agriculture automation was given by the presenter from CLASS, and examples of their product portfolio were displayed. Some examples include combine harvesters, tractors, mowers, software and service and parts. An overview of global agriculture trends was reviewed, highlighting that precision farming offers great possibilities and abilities to meet these trends.

The presenter then gave an overview of their EO and GNSS user needs and requirements for precision agriculture and the undergoing automation journey. The main needs were outlined, including continuity, availability of accurate positioning, and stressing that new technologies are not needed, but increasing the uptake of existing technologies is.

The speaker also stressed the importance of SATCOM affordability and availability, especially in remote areas, as an enabler to other technological solutions, including machine tracking and RTK availability.

It has been clarified that the technologies presented are applicable to both extensive and intensive farming, including vineyards or root crops, with a different resolution.

Higher revisit time was identified as a need, and better performance is typically associated with higher prices. Affordability is a sensitive topic for farmers as they are operating with low margins. The best option would be to have integrated solutions of data and insights, so to optimise the investment. This is particularly relevant to enhance the adoption of PA practices by small farmers, which are the majority in Europe.

It has also been highlighted that there is no risk for farmers to become redundant as automation increases. In fact, farming has a lot to do with natural elements, and local resources are highly variable. Technology can help address this complexity, but human intervention will remain essential.

GALIRUMI R&D project – EGNSS based robots for organic farming & discussion - by Esther López, (ACORDE - GALIRUMI H2020)

The H2020 project GALIRUMI project aims at developing Galileo-assisted robot to tackle the weed *rumex obtusifolius*, a poisonous problematic weed that expands and covers large parts of the farm if uncontrolled, and increase the profitability and sustainability of dairy farming. Robotic weeding will eliminate herbicide use and reduce dangerous exposure of farm workers and livestock, while also removing obstacles for organic production.

The discussion following the presentation focused on the financial viability of the machines, as well as their technology, stressing that farmers must learn to use and trust such technologies. If the robot is ever to be commercially viable, then an effort must be made to enhance technology acceptance.

The discussion then turned to the practical aspects of the machine and how it performs over variable terrain and how quickly it can be trained to identify different types of plant species. The speaker clarifies that the machine is adaptable and would be built as needed for the terrain. It is further clarified that the machine learning algorithm of the robot is trained with photos of the species it needs to identify, and it is already fully equipped to learn identifying any type of species necessary.

The EU SPACE opportunity for small and medium size farmers & discussion - by Maurizio Laterza (Planetek Italia)

An overview of the space opportunities for small and medium sized farmers was given, as well as Planetek Italia's agriculture business sector and how they operate in this field. The EUGENIUS project was presented as an example of their work. In this project, Planetek Italia partnered with Tormaresca, an Italian winery; they showed how the incorporation of EO data can help wine production by supporting the selection of sampling points for laboratory analysis, improving cost-effectiveness and efficiency, providing agronomic advice on fertilization and irrigation and help the identification of structural criticalities.

Further examples of success stories were presented to the audience, including professional training at ISMEA (Istituto di Servizi per il Mercato Agricolo Alimentare), EO AFRICA, a water resource management initiative to support farmers and planners to improve irrigation water management, and engagement activities to enhance the uptake of EO by small farmers.

The speaker also presented the bottlenecks they identified to the uptake of space technology in agriculture:

- The capacity of innovation, SME farmers have limited capacity of innovation. Possible mitigations: working with agronomics and farmers associations and working in the whole supply chain;
- Credit facilities are very few or absent for farmers. Provide associations means to lobby for credits for credits for digital technological solutions.
- Lack of awareness, the mitigation is that the service providers should provide training for the farmers.
- Lack of certification from independent parties, mitigation identify independent actors and work with them to get third party certification.

EU SPACE role within Regenerative agriculture & discussion – by Tamme Van Der Wal (Aerovision)

An introduction to the topic was given, highlighting the trends in regenerative farming, especially in protecting soil quality and improving carbon levels of the soil. An overview of the ways EO can assist farmers in participating in regenerative agriculture was reviewed, outlining that first, farmers must be made aware of these technologies and that monitoring them must create value for the farmer.

The ideal targets for regenerative agriculture have been discussed. The speaker clarifies that they do work with agronomists as well as farmers. Agronomists, despite typically being more technologically advanced and on average younger than farmers and therefore are keener to new technologies, often face the same difficulties as farmers.

General EO needs were outlined as affordable solutions. A serious lack of uptake of EO technology is due to a skills gap between data that is valuable for agriculture insights and the user. Access to the data is not enough if the user does not know how to process the data for solutions. If the user is to know how to apply the data for agriculture usage, education of data interpretation and usage of software is needed. Farmers have a limited capacity for innovation, and a lack of awareness of the technologies that exist for free. It was stressed that service providers should also provide training for their users. An option for mitigation is to work closely with farmers associations and agronomists. Often budget constraints (10 euro per hectare) are keeping farmers from changing and adopting new technologies, including the transition to regenerative farming.

In fact, lack of funding appears to be the most relevant barrier to the uptake of space data and space data-based services. Subsidy programs to farmers to encourage retrofit installations of older machine populations are welcome. As outlined in the discussion, there are very few credit facilities for farmers and more should be provided. In order to facilitate the uptake of these technologies it is recommended to address the entire value chain, rather than just the farmers, adopting a comprehensive strategy. It was further clarified that forestry is out of the scope of the proposed carbon monitoring system for the time being.

SPACE4GREEN R&D project - EU Space and block chain for traceability and sustainability & discussion - by Juan Pablo García (Integrasy)

The SPACE4GREEN project aims at seamlessly combining blockchain technology and Galileo OS-NMA signals to provide a comprehensive solution that effectively tackles common challenges across multiple sectors. This fusion of technologies is intended to boost operational efficiency, reduce costs, and empower a more self-reliant and dependable certification process. Specifically, for the agricultural domain, relevant applications include the provision of transparency, traceability and rust in local food production -including oil, wine, and the enhancement of the CAP rules monitoring and auditing.

The systems authenticate the position and timing of the pictures inputted by farmers through OSNMA, then the sustainability criteria are assessed also relying on many other sources relevant for the area of interest.

Conclusions and next steps - by Stefan Schneider (EUSPA)

Stephan Schneider closed the session thanking the speakers for their presentations and attendees for their participation and interesting discussion.

Afternoon Session: Forestry

Session Agenda presentation for Forestry – by Stefan Schneider (EUSPA)

Stefan Schneider (EUSPA) opened and introduced the session. The goal of the session is to present, discuss and validate the GNSS and EO user requirements in the domains of Agriculture. This session creates the opportunity to connect different relevant players by giving the possibility to present solutions and to hear about the user community.

The goal of this event is to pave the way for the building of a comprehensive community, allowing all the contributors to share and discuss how GNSS and EO are used in Agriculture and their evolving needs and existing gaps, so to offer a communication channel that is intended to remain permanently open.

No questions were raised by the audience.

Setting the scene: EU Space Programme Components Status and future services for users – by Stefan Schneider (EUSPA)

A presentation provided a snapshot of the current and future services that EUSPA will offer, and highlighted that all EU space activities are now under one umbrella. The presentation also provided an overview of Copernicus services.

No questions were raised by the audience.

Setting the scene: CLMS contribution to forestry – by Usue Donezar (EEA)

The presentation gives an overview of the Copernicus Land Monitoring Service (CLMS), which is entirely based on satellite imagery, and its applications in the forestry segment, highlighting that the service is free to all users and manuals are provided. Examples of relevant use cases were provided, including monitoring of tree cover density and species classification, mapping peatland and monitoring of their CO₂ emissions, assessing drought impact and assessment of biodiversity conservation, habitat mapping and land cover classification.

A discussion on the possibility of modelling with historical data was triggered, in particular concerning the modelling of predictive patterns from historical data in order to contribute to climate change objectives. The computing capacity currently available is based on external work and deemed sufficient for these purposes, but at the time being the products are based on observations, not modelling. This can surely be an interesting future evolution, assuming interest from potential users.

Setting the scene: C3S/CAMS contribution to forestry – by Samuel Almond & Stijn Vermoote (ECMWF)

The presentation offered an overview of the services offered by Copernicus Climate Change and Atmospheric Monitoring Services that are applicable in the forestry sector. An overview of the effects climate change and certain pollutants have on the health of forests was reviewed. Examples of relevant use cases were provided, including prediction of future species distribution and productivity, monitoring of fire hazards, elaboration of information concerning soil conditions and its practicability for vehicles to access plantations, and estimation of wildfire emissions.

A discussion was raised about predicting forest fires and the service's connection to similar services of different EU countries and if there were any lessons that were learned through these connections, as fires are an ever-increasing threat in Europe. It was questioned if it was observed that people were adapting and adjusting resources for fires based on the predictive model offered by C3S.

The discussion continued about how timber inventory was accessed and if it could be predicted in 3-5 years, also in terms of impact force major, and it was made clear that the service does not offer this but an application such as this would be incredibly useful and is in high demand. The discussion turned to investigating sources of the fires, such as illegal dumping, or if the service just monitored them from a climate change perspective. The speaker clarified that they do not look at the source but only under which conditions fires are more likely to occur, and how much fuel [timber] is present, including areas where peat fires are happening.

New EU Forest Strategy for 2030: Monitoring Framework for resilient European Forests – by Adrian Tistan (DG ENV)

A presentation was given for a proposal of the Monitoring Framework for resilient European forests. This can be done by building a comprehensive database of the conditions of forests in the EU currently, through existing national systems, National Forestry Inventories (NFIs) and national data collection systems, new and improved Copernicus products and a balance and integration between remote-sensing technologies and in situ data.

The importance of data harmonization between Member States was stressed, so that the data can be useful across Europe, as well as increasing the frequency of the products.

A hot topic emerged during the discussion concerns the cost burden for users. The actual cost varies per Member State: some will have a national forest monitoring system that is already developed and won't need extra investment, in other States, the monitoring is not as well developed or not at all, and these are the States that will bear the highest portion of the costs. A discussion on funding support for those countries will be discussed. In addition to the Member States implementing the monitoring, forest owners can also take advantage of the Monitoring Framework.

New EU Forest Strategy for 2030: Promoting sustainable forestry by satellite monitoring – by Dr. Sanna Härkönen (Sitowise)

Satellite data represent an alternative to forest monitoring activity without the need for field work. The service presented is meant to aid authorities in monitoring the legality of forest cuttings and land use changes without field work. The service offers global coverage and can also be used for fire damage mapping and early warning risk mapping for insect infestations.

A decrease in forest violations has been observed since the deployment of the service. The reduction of illegal activity did not relate to illegal logging, but rather to administrative cases where a forest owner forgets to declare land use changes. The discussion turned to the fact that Scandinavian countries are very advanced at using EO for forestry, probably because, in Finland specifically, the forest is viewed as a valuable natural resource and a large part of the economy. Therefore, it is in the best interest of the country to use the technology available to the best of its abilities. This is also combined with the fact that Finland provides a lot of openly available data, and it is easy to use and combine with other sources.

EUDR (Deforestation-free Products Regulation): The EU observatory on deforestation and forest degradation – Frederic Achard (JRC)

An overview of the EUDR requirements and impacts was given. In particular, by promoting the consumption of deforestation-free products and reducing the EU's impact on global deforestation and forest degradation, the new EUDR is expected to bring down greenhouse gas emissions and biodiversity loss. In this context, Copernicus supports the analysis of deforestation, while Galileo enables the geolocation of land plots and the traceability of products.

This was followed up by a presentation on the EU Forest Observatory on deforestation and forest degradation (EUFO). The legal basis of the project was outlined. EUFO is meant to facilitate access to information on supply chains for public entities, consumers and businesses. The observatory is made of three main components:

- Global Forest Monitoring, which offers information on forest attributes, forest cover changes and drivers, tropical moist forest and will offer the Global Forest Cover 2020, a global map of the forests with tools for forest monitoring free of charge to all users;
- Production and Trade of Commodities, which concerns production from FAO and trade flows;
- Tools for Forest Monitoring, including near real time disturbance analysis, landscape pattern analysis, EU forest tree species distribution, and the impact toolbox.

The project will be open to receiving comments and any needed updates or changes will be made in one year. This is meant to produce an improved version of the service when the regulation will be applicable, and the feedback will be used to improve the map. The intention is to have a global approach to remain consistent.

EUDR (Deforestation-free Products Regulation): EO/GNSS use cases – Jaskula Patryk (Airbus), Sebastian Vogler (Beetle ForTech) & Fabian Enssle (GAF)

A presentation for **AIRBUS' service Starling** was given. It is an online platform that enables users to identify deforestation risks in the supply chain and verify non-deforestation commitments.

The base map is supplied by Copernicus data, and it can be combined with high resolution data from other sources, like Pleiades, to increase the revisit time of sensors and delineate small parcels.

The discussion moved to how the service approaches forest degradation: through satellite imagery and sometimes field work, performed through a partnership with companies operating in the area of interest. The level of automation in the monitoring of forests and monitoring forest variation was brought up, as well as the use of Starling is for monitoring timber stock for carbon credits. The service is fully automated, however, the monitoring for carbon credits is not fully developed. The service is mainly for monitoring commodities and ensuring the commodities come from not-deforested zones. Also, the audience was interested in the use cases when Copernicus data needs to be combined with commercial data offering higher resolution and revisit frequency. The combination of data from multiple sources is necessary to improve the services, in particular, this allows to delineate small parcels and precise boundary recognition.

The technologies offered by **Beetle ForTech's technologies** were presented, including a GNSS-based log tagging technology for timber tracking, and a GNSS-based coffee source tracker- 1 button GNSS-enabled route tracking tool to collect coordinates of plots of land, therefore very user-friendly and affordable.

Interesting questions were posed to the presenter, such as how the system proposed can prove the geolocation is authentic, and how it is possible to trace the wood once it's chopped. Concerning the former, the proposed system is planned to rely on the free Galileo authentication service and other data quality check approaches; while concerning the latter, the solution offered does not go down the value chain to cover those operations.

GAF's solutions were presented, covering the role of EO in the context of the EUDR and highlighting some challenges for producer countries, specifically in Africa. It was stressed that small farmers and plantation owners need help meeting EUDR regulations as they simply aren't aware that the EUDR exists. In response to these challenges, it is important that not only the 'operators' obtain the geolocation data for the commodities, but also the governments of producing countries and the farmers themselves need this information.

No questions were raised from the audience.

EO/GNSS for carbon market (use case) – Rolf Schmitz (Collective Crunch)

The AI-based forestry analytics as a SaaS model from Collective Crunches was presented. The relevant use cases include forest inventories, bark beetle monitoring, large-scale biodiversity tracking and carbon analytics. The main existing challenges concerning carbon markets are identified in the lack of transparency in carbon projects, "greenwashing" of projects, and lack of alignment for mandatory and voluntary activities.

In order to foster this type of market in Europe, more focus needs to be devoted to the market value of land in general, being scarce, and forested land in particular. Increased awareness might attract investments and enhance market growth.

EU forest owners' perspective – Helene Koch (CEPF) & Tabinda Khurshid (Fjeldskov-Trimmer)

The speaker began the presentation by illustrating the diversity of EU forests, the diversity of the owners of these forests and the diversity of forest management. It was further stressed that forestry management is incredibly specific and depends on the type of forest and its uses. The presentation continued by explaining that forests are long-term ecosystems and that near-real-time tools, while useful in many forestry applications, do not apply to many others.

The presentation turned to the needs of forestry owners to comply with the complex EU policy context, such as the EUDR, and the Carbon Removal Certification Framework.

A question from the audience arose about the "Copernicus demonstrator" project for forest monitoring services for private forest owners and how this service can be adjusted to improve its function for forest owners. The presenter stated that they were a representative of a singular forestry organisation, but others must be engaged in order to answer this question.

The following presenter discussed how the current EO technologies are useful for applications associated with EUDR compliance but are not mature enough for all forestry owners to easily comply with all the prescriptions outlined by the EUDR. The topic of lack of transparency in the timber trade was brought up and that forestry owners and associations struggle to combat illicit activities in the industry due to this lack of transparency. As European forestry rules and regulations around traceability, transparency, biodiversity, certifications, and climate impact of forestry are becoming stricter, there is a push for digitization of timber trading. The discussion turned to how the digitization of timber trading cannot be completed with the current state-of-the-art technologies.

Conclusions and next steps - by Stefan Schneider (EUSPA)

Stephan Schneider closed the session thanking the speakers for their presentations and attendees for their participation and interesting discussion.

2 CONCLUSIONS

The **Agriculture and Forestry** UCP session was successfully closed by Stefan Schneider from EUSPA.

Key results of this working session were highlighted during the plenary UCP session on 9th October 2023 by Georg Larscheid (CLAAS).

These results are summarised below as well:

Agriculture

The session led to the identification of key user needs, such as continuity and accuracy in GNSS, cost-efficient EO solutions, and the importance of addressing funding and skills gaps to enhance the uptake of precision agriculture practices. The role of education, collaboration with farmers' associations, and the ongoing need for human intervention in farming despite increasing automation was emphasized. Regarding opportunities for small and medium farmers, funding and skills gaps were identified as major barriers to the uptake of space data and services in agriculture. These challenges appear to be relevant also to regenerative agriculture, which currently suffers from lack of skills, funding, and affordable integrated solutions. Finally, the important enabling role of space technologies, and the contributions offered by Galileo and Copernicus to the uptake of more efficient, sustainable, and transparent farming practices were presented and discussed.

Forestry

The session allowed to identify key user needs, existing challenges, and barriers to the uptake of space-based solutions. Concerning the New EU Forest Strategy for 2030, the importance of data harmonization between Member States was stressed. Additionally, challenges identified by the participants include shaping EO data into due diligence reports and collecting geolocation coordinates in relation to EUDR. The need to increase automation in the monitoring of forests and monitoring forest variation emerged, together with the necessity to combine data from multiple sources, namely Copernicus complemented by commercial data offering higher accuracy and revisit frequency. This allows to delineate small parcels and precise boundary recognition for deforestation monitoring. It also emerged that the EUDR enforcement timeframe is perceived as too short for forest owners to equip themselves properly.

EO and GNSS are recognised as essential tools allowing for efficient forest inventories, bark beetle monitoring, large-scale biodiversity tracking and carbon analytics. The main existing challenges concerning carbon markets are identified in the lack of transparency in carbon projects, "greenwashing" of projects, and the lack of alignment for mandatory and voluntary activities. Increased awareness might attract investments and enhance market growth.

Finally, it has been stressed that forestry management is incredibly specific and depends on the type of forest and its uses. The lack of understanding of new technology and lack of technological maturity are perceived as barriers. As European forestry regulations around traceability, transparency, biodiversity, certifications, and climate impact of forestry are becoming stricter, there is a push for the digitization of timber trading.

3 OTHER NOTES & INFORMATION

None