UCP 2025 Minutes of Meeting EU Border and Internal Security market segment Session

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Meeting Called By	EUSPA, User Consultation Platform (UCP) 2025		
Minutes Taken By	Claudia PAPARINI, FDC Antonella DI FAZIO, FDC Jakub STEINER, EUSPA Guillaume TERLINDEN, EY		
Representatives & Speakers	**EUSPA Representatives** Elena LIPPI, Session moderator Yannick FELICI Vasileios KALOGIROU Javier SIMON Vincent CHATELÉE **Speakers / Moderators** Antonella DI FAZIO, FDC, Panel moderator Federico FILIPPONI, National Research Council of Italy/IMPEL Network Margherita VOLPE, Zabala Innovation (*online*) Marta KRYWANIS, Frontex Bartel MEERSMAN, JRC Valentina BOSCHIAN, Port Network Authority of the Eastern Adriatic Sea (*online*) Maria ANGELUCCI, WSense Martin REUTER, European Union Customs Alliance for Borders Axel KEREP, Parc Solution (*online*)		
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AGENDA

Agenda Items	Presenter
1. Opening and Introduction of the User Consultation Platform & Welcome to "EU Border and Internal Security" UCP presentation and objectives; Updates on relevant space services	Elena LIPPI, Javier SIMON, Vincent Chatelée
2. Main applications & use cases – Internal Security	• Federico FILIPPONI (National Research Council of Italy/IMPEL Network, Research Scientist) • Margherita VOLPE (Zabala Innovation, Security, Space & Defence Knowledge Area Leader, *online*)
3. Main applications & use cases – Borders surveillance & maritime security	• Marta KRYWANIS (Frontex, Senior Research Officer, Innovation and Demonstration Sector) • Bartel MEERSMAN (JRC, Head of Unit E.4) • Valentina BOSCHIAN (Port Network Authority of the Eastern Adriatic Sea, *online*) • Maria ANGELUCCI (WSense, Sales Manager)
4. Main applications & use cases – Customs operations	• Martin REUTER (European Union Customs Alliance for Borders, Head of EUCAB) • Axel KEREP (Parc Solution, archaeologist, *online*)
5. User needs and requirements – Presentation of consultation findings	• Antonella DI FAZIO, FDC, Principal
6. User needs and requirements – Discussion panel with attendees	Elena LIPPI, EUSPA Antonella DI FAZIO, FDC
7. Remarks and conclusions	Elena LIPPI, EUSPA

SUMMARY

Summary

The EU Border and Internal Security session of the User Consultation Platform (UCP) 2025 took place on 4th December 2025 in Prague, with participants joining both in-person and online.

The session focused on how GNSS (Global Navigation Satellite System) and EO (Earth Observation) technologies/services contribute to the fulfilment of users' needs within the EU Border and Internal Security market segment. This market segment encompasses (non-military) activities aimed at protecting people, the environment, and the organisation of our societies by increasing situational awareness, deterring and mitigating activities undertaken by hostile actors and managing other threats, risks and hazards that could endanger EU assets and people. In particular, the EU Border and Internal Security market segment includes the following clusters:

- Border Management,
- Customs Operations,
- Internal security (Law Enforcement and Justice Actions),
- Democracy and Human Rights

To introduce the agenda of the event, during the morning session selected relevant use cases relaying on GNSS, EO, and their synergies were presented. During the afternoon session, the consolidated user needs and requirements identified during the consultation process were shared and discussed to shape the follow-on actions.

The event gathered representatives from EC, EUSPA and other EU Agencies as well as representatives from the EU industry, and the EU user community providing a broad spectrum of perspectives on operational needs and challenges in the EU Border and Internal Security market segment.

Prior to the UCP event, the UCP consultation phase was carried out. The UCP's consultation focused on 20 applications (10 for GNSS and 10 for EO); 31 experts were interviewed for a total of 65 interviews (31 on GNSS and 31 on EO, several interviewees were able to contribute to both surveys' on GNSS and on EO). The objective of the consultation phase was to gather detailed user needs and requirements as well as innovative use cases to better shape the future evolution of the EU services. The consultation phase provided the base user feedback which was presented, discussed, and complemented during the UCP event.

In the opening act of the UCP event, EUSPA welcomed the participants underlining the increasing relevance of space-based services for supporting border-surveillance and internal security as well as highlining how this segment is becoming more strategic and a wider domain. The segment is, characterised by diverse operational needs, multiple institutional stakeholders, and growing demand for resilient solutions.

An introductory presentation was given by EUSPA on the current status and evolution of key Galileo services relevant for the EU Border and Internal security stakeholders, being Open Service Navigation Message Authentication (OSNMA), Galileo Early Warning Service (EWSS) and Signal Authentication Service (SAS).

With regard to Galileo's OSNMA, EUSPA reported the recent declaration of OSNMA, highlighting its relevance for improving the resilience of navigation solutions against spoofing. The presentation also introduced the upcoming SAS. This service will build on the existing authentication framework, with progressive activation planned and detailed specifications (including interface documents and receiver guidelines) expected to be published in the coming year.

With regard to the upcoming satellite-based emergency warning capability, the Galileo EWSS will allow authorised authorities to transmit alert messages directly through navigation signals, providing a communication channel that is global, free of charge, and independent of terrestrial mobile networks. EWSS will ensures that alerts can reach affected populations even when conventional communication infrastructure is unavailable or disrupted. EUSPA described the service concept, potential user devices, and typical operational scenarios such as natural hazards, industrial incidents, or crisis-management situations. Key benefits include broad reach, high reliability, complementarity with existing alert mechanisms, and scalability.

Standardised message formats and protocols are being defined, together with cooperation frameworks for partners such as civil-protection authorities.

During the morning session, the invited speakers presented their use cases and applications in the domains of Internal Security/Law Enforcement, Border Management and Maritime Security, Customs Operations (*please refer to Annex 1 to this MoM for the presentations summary*).

Within their specific domain, speakers gave in-depth view of use cases and applications specific needs, and how satellite services and satellite-based technologies, are enhancing their activities.

In particular, the presentations illustrated how standalone GNSS and EO, as well as in combination with other technologies, such as drones, the Internet of Underwater Things (IoUT), or with AI[1], ML[2], Big Data analytics, are currently used to improve risk assessment, increase resilience and situational awareness, and assist enhanced decision-making process and operations.

When introducing the speakers, the relevance of the presented topic to the session was presented to the audience. It was also explained that the speakers were involved in the consultation phase and they contributed to the user requirements. The consultation phase targeted 20 priority applications of the market segment, 10 for GNSS and 10 for EO. From the pool of the interviewees, the speakers were selected for presentation at the UCP event based on the following criteria:

- Relevance to current practice: Selected speakers were associated with applications that reflect the current utilisation of satellite technologies and services, as well as solutions that are already available or demonstrably mature.
- Strategic interest and future potential: Priority was given to speakers presenting use cases of high relevance for satellite-based technologies and services, with a particular focus on emerging opportunities driven by key trends and technological evolution. The selection process also considered the ability of these use cases to highlight innovation gaps or areas requiring targeted follow-up actions.
- Already demonstrated added value (exclusion criteria): Applications related to UXO (Unexploded Ordnance) risk assessment and clearance were not retained, as they did not show substantive progress or added value compared to those presented at UCP 2023.
- Feasibility of open discussion (exclusion criteria): Based on feedback from interviewees, applications addressing sensitive topics—such as irregular migration, smuggling of persons, or activities under the Common Security and Defence Policy (CSDP)—were excluded due to limitations in obtaining sufficiently detailed and open contributions within the consultation framework.

The consultation phase methodology and the approach used to analyse the feedback were introduced to the audience, emphasising that interview responses were treated in an aggregated manner. It was further highlighted that the consultation phase identified important opportunities related to Galileo OSNMA, and that initial considerations regarding the potential of Galileo EWSS have begun. The consolidated recommendations and suggested actions resulted from the consultation phase were presented and validated during UCP event as presented below.

MAIN COMMONALITIES

During the consultation and the UCP event, commonalities for use of satellite (GNSS and EO) technologies and services were identified in the EU Border and Internal Security market segment and across the numerous different applications. The main identified commonalities are:

- Satellite technologies and services (particularly GNSS and EO) are widely used and increasingly integrated to complement each other: GNSS for accurate positioning and EO for detailed observation improving resilience, reliability, and situational awareness. Combining these with other technologies such as AI/ML and Big Data analytics enhances automation, intelligence, and operational effectiveness.

[1] Artificial Intelligence
[2] Machine Learning

Shared technologies across applications reduce development costs for providers and lower operational complexity and costs for users.

- There is strong interest in advanced, trustworthy solutions such as multi-GNSS and Galileo OSNMA, which are seen as adding essential value and should become default features. Users seek mature, ready-to-market products (TRL 7+) and would want to be involved in finalizing technologies before operational deployment. However, key gaps remain, including poor interoperability across systems and data formats and limited awareness among specialists, practitioners, and LEASs, which hinder wider adoption.

The consultation also looked at each considered domain/application, in terms of specific utilisations, needs, case studies, gaps and obstacles, novelties and recommendations.

The presentations showed these elements for some key applications in the domains of Internal Security, Border Management and Maritime Security, Customs Operations. Moreover, conclusive remarks resulting from the discussion and common recommendations were also drawn.

INTERNAL SECURITY (LAW ENFORCEMENT AND JUSTICE ACTIONS)

GNSS-based positioning and timing via vessel AIS and asset tracking combined with EO imagery support the prevention and suppression of international drug trafficking in maritime and port operations. EO data helps detect route deviations, while integration with in-situ information (such as IoUT, Internet of Underwater Things), geospatial indicators and RF[3] enhances monitoring, intelligence, risk assessment and situational awareness.

GNSS provides accurate positioning and timing to geolocate data from satellites, drones, and sensors, while EO imagery supports the identification, verification, and documentation of environmental crimes (i.e. land-use changes, illegal emissions, or damage) for enforcement and legal action. EO and GNSS also enable planning and secure tracking of movements and shipments involving dangerous, nuclear, or radioactive materials.

Furthermore, GNSS also enables precise geolocation of data from satellites, drones, and sensors, and supports tracking of transboundary waste shipments. EO imagery helps identify and monitor waste disposal sites and detect illegal dumping activities.

For Internal Security the main recommendations outlined from the discussion are:

- Market related aspects:
    - Support is needed for developing reliable, ready-to-market products and preparing for the 2026 implementation of the EU Waste Shipments Regulation by integrating EO and GNSS services.
- Harmonised protocols and guidelines:
    - Priorities include creating harmonised, interoperable data platforms, promoting the legal admissibility of EO evidence, establishing working groups for shared guidelines, and developing case studies to raise awareness and mobilise resources.
    - Develop standardised procedures for geospatial evidence collection to ensure reproducibility, transparency, and legal admissibility.
    - Draft shared protocol frameworks for handling drone imagery, EO data, and in-situ measurements across Member States.
- Legal-technical requirements and judicial integration:
    - Ensure evidence collection maintains accuracy, integrity, and chain of custody.
    - Define clear legal-technical requirements for using EO, UAV, and GNSS data as admissible

[3] Radio Frequency

evidence.

- Data integration and interoperability, Open Data and commercial datasets:
    - Integrate multi-source technologies (satellite EO, UAV/drone mapping, GNSS, AI analytics, IoT/IoUT sensors) into unified operational platforms.
    - Promote interoperable and harmonised data platforms across authorities and networks (e.g. IMPEL, ENPE, EUFJE).
    - Promote the use of open EO data while clarifying the role, limitations, and licensing constraints of high-resolution commercial datasets.
    - Recognize the lack of a fully harmonised EU-level environmental crime database and promote easier access to existing resources.
- Cross-border and multi-stakeholder cooperation:
    - Strengthen collaboration with international bodies (e.g., International Association of Prosecutors) and private-sector contributors.
    - Enhance knowledge sharing, cross-border alignment, and operational coordination in transnational investigations.
- Capacity Building and Technical Expertise:
    - Support law enforcement authorities in developing expertise in complex geospatial assessments and multi-source data integration.
- Situational Adaptation and Case-Specific Assessment:
    - Evaluate suitability of EO and GNSS datasets on a case-by-case basis to meet specific investigative and operational needs.

BORDER MANAGEMENT

Based on input from several interviewees, particular attention was given to use cases related to border surveillance, both land and maritime, enhanced situational awareness, and the use of drones for border patrol and monitoring tasks. These areas were consistently identified as high-priority operational needs where satellite-based technologies and services already provide tangible benefits.

With specific regard to drones, they form an integral part of modern airborne surveillance systems together with satellites based technologies, and have become indispensable tools in contemporary border security management. By integrating advanced sensing, positioning, and communication technologies, drones significantly enhance monitoring and intelligence-gathering capabilities. Their flexibility and rapid technological evolution allow border control authorities to improve situational awareness and to respond more effectively to a wide range of challenges, including irregular border crossings and smuggling activities.

In addition, several experts highlighted the importance of addressing counter-drone capabilities (C-UAS, Counter-Unmanned Aircraft Systems) in order to provide a comprehensive overview of current border security challenges at EU level. This perspective also enables a clearer identification of opportunities for satellite-based technologies and services in this emerging operational domain. In this context, Galileo EWSS was identified as a technology with potential added value for C-UAS operations, warranting further technical and operational assessment. Beyond counter-drone use cases, Galileo EWSS was also recognised as having a broader role in border management and law-enforcement activities, including support to deployed assets and the dissemination of information to the population in relevant operational scenarios.

Regarding maritime border management applications, some of the interviewed experts highlighted that ports are potential targets for crime because of their strategic role in international trade and logistics. Organized crime has increasingly integrated maritime domains, including ports, into its strategic operations. Illicit cargo, including drugs, typically enters ports concealed within contaminated containers or is transported via

merchant vessels operating in seaports. Illicit trade via ports poses significant threats to the safety, security, and quality of life in port areas and adjacent urban environments. Ports serve as transshipment zones where goods are temporarily stored and redirected from maritime to land-based routes.

Criminal activities in ports focus on the trafficking of illicit or counterfeit goods, drug and arms trafficking, waste trafficking, illegal wildlife and fish trafficking, human trafficking and smuggling. Ports are also vulnerable to cargo theft. Criminal networks often target high-value cargo such as electronics, luxury goods, pharmaceuticals, cars, and consumer products.

Enhancing cargo security in ports can be achieved through virtual security gates supported by GNSS-based vessel AIS data and GNSS-based asset tracking using e-seals and IoT/digital-twin technologies. EO imagery helps monitor vessel routes and detect deviations while combining data with in-situ sources such as IoUT, in order to extend the monitoring capability to detect potential underwater intruders, and RF improves situational awareness. Galileo OSNMA adds resilience and reliability to positioning and timing across these applications.

Cross-border transport of dangerous goods can be enhanced using EO imagery for safe route planning and post-accident damage assessment. GNSS-based tracking with e-seals and sensors improves asset monitoring and supports accurate localisation and coordination during incidents. Galileo OSNMA further strengthens the reliability and resilience of positioning and timing throughout these operations.

In this context, satellite-based technologies combined with other relevant technologies are key to accelerate the digitalisation and process transformation across transport and customs, including ADR[4]/RID[5]/ADN[6] regulations, the new Union Customs Code, and the eFTI (electronic Freight Transport Information) framework. Moreover, Galileo OSNMA enhances secure tracking and tracing, while future ports will rely on hybrid 5G/6G and satellite networks to support automation, IoT, and high-reliability, low-latency operations.

For Border Management the main recommendations as resulting from the discussion are:

- Strengthen GNSS-enabled digitalisation in customs and port operations is highly recommended by aligning with eFTI and telematics standards.
- The promotion of harmonised data and interoperable platforms while fully leveraging synergies between satellite technologies to enhance monitoring and counter illicit trafficking of drugs, firearms, hazardous goods, and waste is also essential.
- Develop harmonised cross-border protocols for data sharing between ports, customs, and law enforcement agencies.
- Integrate EO and drone surveillance with GNSS tracking to improve situational awareness and rapid response capabilities.
- Promote training and capacity building for port authorities and customs officers on advanced geospatial intelligence and GNSS-based monitoring tools.
- Encourage pilot projects for hybrid 5G/6G and satellite communications to support automated operations and low-latency security monitoring.

CUSTOMS OPERATIONS

Within the EU Border and Internal Security market segment, Customs Authorities play a central and strategic role. Customs clearance procedures pursue a dual objective: on the one hand, to facilitate legitimate trade, and on the other, to safeguard both external and internal security. Illicit trafficking, smuggling, and the import

[4] European Agreement concerning the International Carriage of Dangerous Goods by Road

[5] Regulations concerning the International Carriage of Dangerous Goods by Rail

[6] European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

of counterfeit goods pose significant risks, contributing to organised crime beyond the EU's external borders and reinforcing illegal activities within the Union.

GNSS and Earth Observation technologies and services are already being used to support customs operations. These technologies improve efficiency by automating and streamlining customs procedures, while also enhancing security by contributing to advanced risk assessment and targeting tools. Their role is increasingly recognised as an enabler of more effective and data-driven customs controls across the EU.

Several interviewees involved in the consultation phase highlighted additional opportunities arising from the planned EU Customs Data Hub, a single digital environment designed to collect, integrate, and analyse customs-related data for risk management purposes. This initiative is part of the broader EU Customs Union reform, which aims to modernise customs procedures, strengthen security measures, and enhance risk management in a more harmonised manner across Member States.

The EU Customs Data Hub is considered a cornerstone of the proposed EU customs law reform. It is intended to function as a centralised information technology environment that simplifies and standardises the submission of data by economic operators and other customs stakeholders involved in the movement of goods into and out of the EU. In this evolving framework, GNSS and EO-enabled data and services are expected to further support risk analysis, compliance monitoring, and operational decision-making.

Furthermore, EO imagery and GNSS are used to combat cultural heritage looting and illegal trafficking by monitoring archaeological sites, assessing damage, tracking vessels and containers, and geolocating endangered areas or anomalies. Their integration with IoUT supports monitoring of underwater archaeological sites.

For Customs Operations the main recommendations coming out from the discussion are:

- Promoting the development of reliable, market-ready products and advance GNSS-enabled digitalisation tools in customs and port operations. In this respect, the digitalisation and associated change of processes linked to the new UCC (Union Customs Code) establishing a centralised EU Customs Data Hub, represents an important novelty and opportunity.
- Other measure facilitating harmonised data and interoperable platforms while supporting initiatives that enable EO-based evidence to be accepted in legal proceedings, especially for cultural heritage crime cases are needed.
- Strengthen awareness and cooperation among law enforcement and legal professionals fostering working groups and case studies to share expertise and mobilise further effort are essential. In this respect, it is crucial to launch initiatives to validate the EO data potential for evidence/proof in court in cultural heritages crimes, also extending to other customs operational use cases.

DEMOCRACY AND HUMAN RIGHTS

In the domain of Democracy and Human Rights, based on input from several interviewed experts, the consultation addressed selected use cases involving the application of GNSS and Earth Observation technologies and services to support oversight and operational activities in this field. The applications discussed focused in particular on the monitoring of democracy and human rights conditions, including the mapping of conflict zones and the remote localisation, coordination, and support of humanitarian aid personnel and assets operating in complex and often high-risk environments.

In these applications, EO imagery and GNSS derived positioning and timing are already largely adopted. In addition, from the consultation it was found that there is a growing interest in Galileo OSNMA and the use of EO data both as a preventive tool and as legally admissible evidence in court.

The following main recommendations may be derived for Democracy and Human Rights:

- Focus on supporting the development of ready-to-market, trustworthy positioning, navigation and timing products and sustaining the establishment of harmonised, interoperable data platforms.
- Seek a EO wider utilisation in damage and conflict zone mapping, as well as for other humanitarian

operations, possibly through a dedicated Hub (as recommended in UCP 2024 for EMAid - Emergency Management and Humanitarian Aid).

- To conduct a further investigate into EWSS utilisation for enhanced situational awareness.

As suggested by some interviewed experts, applications in the area of crisis management operations in the field of CSDP were not addressed as part of the consultation, due to the potential sensitivity and confidentiality of the information.

CONCLUSIONS AND OVERALL RECOMMENDATIONS

The UCP event validated the outcomes of the consultation phase. Relevant findings, in terms of opportunities, gaps, and recommendations, were substantiated through the presentations and the discussions. Special focus was given to Galileo differentiators, like the OSNMA service bringing trustworthy position and time information, or the EWSS for early warning purposes, both of which open the door for new utilisation of Galileo in the market segment. Main opportunities for GNSS and EO per cluster are summarised below:

For **Internal Security,** Galileo OSNMA can contribute to trusted real time tracking and digital tools to ensure reliable and improved monitoring of transboundary waste shipments. Drones relying on GNSS for positioning and reference timing offer operational support. Data captured by sensors carried by drone is also using GNSS for geospatial and time referencing. EO can support forensic investigations, which is considered an important prospect for EO exploitation and further utilisation, not only for prevention, reaction and investigation, but also for prosecution.

For **Border Management**, GNSS already plays a fundamental role in the geolocation of objects and operational assets, and is widely used to provide positioning capabilities within IoUT systems, thereby supporting maritime surveillance and crime detection through complementary in-situ data. When integrated with Earth Observation, GNSS becomes a key enabler of high-level situational awareness across border environments. In this context, Galileo OSNMA was identified as a suitable mechanism to enhance the resilience and robustness of border management solutions and systems. In parallel, C-UAS technologies are rapidly evolving, supported by several EU-led initiatives. Notably, the consultation discussed for the first time the potential role and added value of Galileo EWSS in border management and law-enforcement operations, including C-UAS and deployed asset operations, as well as for early warning purposes to support population alerting.

For **Customs Operations**, EU space services can support digital transformation driven by the new Union Customs Code and creation of a centralised EU Customs Data Hub. Particularly Galileo OSNMA can enable trustful position and timing information related to the shipment of goods, thus contributing to a trusted environment and data exchange. Similarly to the internal security use cases, EO data offers a great potential as evidence in cases involving cultural heritage crimes and other custom operational use cases.

For **Democracy and Human Rights,** EO enables effective damage assessment and conflict zone mapping, as well as assessment of other humanitarian operations. This damage and humanitarian operations assessment can possibly be supported through a dedicated Hub. Creating such Hub was previous mention in a UCP event 2024 in the session on Emergency Management and Humanitarian Aid. Multi-GNSS and Galileo OSNMA may enhance the safety and coordination of humanitarian aid operations by providing high availability tracking. Key Galileo services including OSNMA for trusted positioning, navigation and timing in localisation of personnel and assets, offer added value across security and emergency response applications.

Main recommendations and suggested actions are linked to the exploitation of the above opportunities:

- Maximising the synergies and complementarity of satellite technologies across applications—such as combating drug, firearms, hazardous goods trafficking and waste trafficking, illegal fishing, environmental crime, and deforestation—to strengthen monitoring, detection, and enforcement efforts.
- Galileo OSNMA effectively enabling resilient/reliable position and time information, across all applications. Making Galileo OSNMA a key for added value for security.
- Supporting harmonized, interoperable data platforms, based on common standards.

- Fostering collaboration among tech experts, practitioners, and LEAs.
- Pursuing towards advance legal acceptance of EO-derived evidence establishing working groups and developing case studies with legal professionals, in order to adequately exploit the yet unexploited potential of the satellite technologies and services, especially EO.
- During the plenary (post event), EC DEFIS suggested to explore the DRAFT POLICY ON ENVIRONMENTAL CRIMES (THE OFFICE OF THE PROSECUTOR (https://www.icc-cpi.int/sites/default/files/2024-12/2024-12-18-OTP-Policy-Environmental-Crime.pdf, see also article https://www.wy4cj.org/legal-blog/ecocide-a-new-avenue-for-climate-justice).
- Further exploring the perspective of Galileo EWSS in border management, law enforcement, and overseeing democracy and human rights.

Annex 1 – Presentations Summary

Agenda Item 1. Opening and Introduction of the User Consultation Platform & Welcome to "EU Border and Internal Security" UCP presentation and objectives; Updates on relevant space services

Elena LIPPI — Welcome to the EU Border and Internal Security UCP 2025 session

In the opening act of the UCP event, Elena Lippi welcomed the participants and underlined the increasing relevance of space-based services for supporting border-surveillance and internal security as well as highlighted how this market segment is becoming more strategic and wider domain. The participants were also introduced to the necessary organisational aspects of the session, and its agenda.

Javier SIMÓN — Galileo OSNMA & Signal Authentication Service (SAS)

Javier Simón provided an update on Galileo's authentication services, focusing first on OSNMA and then on the upcoming SAS. He recalled that OSNMA Initial Service was officially declared on 24 July 2025, and available for free, marking a major step in enhancing resilience against spoofing by authenticating the navigation message at user level. He presented the status of receiver uptake, the availability of cryptographic material, and the set of technical documentation now published for implementers.

He then outlined the Signal Authentication Service (SAS), which will allow users to benefit from authenticated E6-C encrypted pseudoranges without storing secret keys. SAS will rely on OSNMA for distributing encryption keys, with gradual activation starting from satellites E14 and E18. Specifications, including ICDs and receiver guidelines, will be released next year. Together, OSNMA and SAS aim to strengthen trust in Galileo-based PNT solutions for critical, security-sensitive applications.

Vincent CHATELÉE — Galileo Emergency Warning Satellite Service (EWSS)

Vincent Chatelée presented the Galileo Emergency Warning Satellite Service, a new capability enabling authorised civil protection authorities to broadcast alert messages directly via Galileo navigation signals. He emphasised that EWSS is global, free of charge, and independent of terrestrial mobile networks, allowing alerts to reach populations within minutes even when communication infrastructure is compromised.

He described the service concept, target users (smartphones, vehicle navigators, public displays), and examples of relevant scenarios such as industrial accidents, natural hazards, UXO discovery, drone incursions, and EU crisis-management operations. The presentation highlighted the key benefits of EWSS—reach, reliability, complementarity with existing alert channels, and scalability - positioning it as a major differentiator for Galileo and a cornerstone of EU public-warning capabilities.

Agenda Item 2. Main applications & use cases – Internal Security

Federico FILIPPONI — Geospatial Intelligence for Environmental Crimes Investigations

A presentation was delivered on IMPEL (https://impel.eu) network's ongoing work to integrate geospatial intelligence, combining satellite Earth Observation, UAV imagery, and in-situ measurements, into environmental crime investigations and compliance monitoring. The speaker summarised the outcomes of the first project phase (GIEDA), which analysed real environmental-crime cases across Europe. The assessment highlighted several systemic needs: the lack of an official EU-wide database of environmental damage cases, restricted access to existing datasets, the absence of references to Copernicus data in the Environmental Crime Directive, and the widespread reliance on remote-sensing data as the primary information source. Case examples included monitoring sewage dispersal, illegal logging, water contamination, and waste-management violations, demonstrating how EO supports a-posteriori assessments and evidence reconstruction.
The presentation emphasised challenges related to methodological consistency, privacy constraints, and the need for harmonised protocols to ensure reproducibility, transparency, and acceptance of geospatial evidence in judicial proceedings. Strengthening communication between technical experts and legal practitioners was identified as essential to ensure a common understanding of methods, limitations, and error estimates.
Looking ahead to Phase 2 (GIECA), the work will focus on expanding the reporting of real cases under the Environmental Crime Directive, defining legal-technical requirements for geospatial evidence, enhancing interoperability among networks (IMPEL, ENPE, EUFJE), and supporting the admissibility of such evidence in court. The speaker also underlined the importance of promoting open data, clarifying the role of commercial products and potential third-party contributions, and improving the overall capability of competent authorities to use geospatial intelligence technologies effectively.

Margherita VOLPE — EMERITUS Project: Digital Intelligence for Environmental Crime Investigations
Margherita Volpe presented EMERITUS, an EU innovation project aimed at supporting Law Enforcement Authorities and Border Guard services in tackling waste-related environmental crimes. The project brings together multiple technologies—Copernicus Earth Observation, drone-based mapping, AI-driven analytics, and secure data-management tools—into a unified operational platform.
She underlined the key role of Galileo services (including HAS and OSNMA) and EGNOS in enabling high-precision navigation, drone operations, automated take-off and landing, and overall mission resilience. The drone component represents a central element of the system, complementing satellite data with very-high-resolution, site-specific information. Use cases include high-resolution mapping of suspected sites, periodic monitoring of waste-handling activities, rapid assessment during emergencies, and the implementation of georeferenced inspection workflows. Additional functionalities support the tracking and tracing of waste shipments through GNSS-enabled digitalisation processes. The presentation stressed the need to integrate terrestrial, aerial, and satellite data within a legally sound evidence-collection protocol, ensuring that outputs from EO, drones, and GNSS can be used in judicial proceedings with appropriate guarantees of accuracy, integrity, and chain of custody.

Agenda Item 3. Main applications & use cases – Border management

Marta KRYWANIS (Frontex) — How Satellites Are Serving EU Border Management
Marta Krywanis introduced Frontex, outlining its mission and operational scope, and highlighted the logistical challenges posed by coordinating large fleets of assets across diverse environments. She emphasised that these challenges are amplified in GNSS-denied or RFI-affected areas, noting the significant rise in jamming and spoofing incidents in recent years.
This growing RFI exposure requires more robust asset-tracking capabilities, which motivated Frontex to collaborate with EUSPA and FDC on a demonstration project deploying resilient Galileo-enabled receivers.Two receivers were tested in the Black Sea region, where they successfully maintained trusted position reporting even when legacy systems failed. The outcomes of this demonstrator will inform the development of a future Frontex Positioning System.
She then introduced Frontex's activities on digital twins, explaining how terrain models can be constructed through EO data and in-situ observations collected by drones or ground robots. Such models support operational planning by recommending suitable assets and equipment for specific environments.
Finally, Ms Krywanis addressed the relevance of C-UAS technologies and the need for border-management authorities to protect the integrity and availability of their own PNT information.

Bartel MEERSMAN (JRC) — EU Initiatives on Countering Threats Posed by Drones

Bartel Meersman (JRC) provided an overview of evolving EU actions related to drones and counter-UAS technologies. He described the regulatory framework (Regulations 2019/945–947 and U-Space), increasing misuse of drones, and the fast-changing technological landscape including swarming, autonomous systems, and RF/5G-enabled capabilities. Mr. Meersman presented JRC's C-UAS Living Lab in Geel, focused on research, stakeholder integration, and operational demonstrations. He detailed challenges for navigation security, including GNSS jamming/spoofing, and highlighted the need for resilient solutions, including Galileo differentiators, for critical infrastructure protection.

Valentina BOSCHIAN — Integrated & Extended Traceability in Port Operations (Port of Trieste)

Valentina Boschian presented the Port of Trieste's digitalisation initiatives, with a focus on integrated traceability and interoperability between the Port Community System (PCS) and customs authorities. She showcased the customs pre-arrival notice process, electronic entry visa, and modal integration mechanisms that reduce congestion and accelerate clearance. Looking forward, she highlighted opportunities for deploying GNSS—particularly authenticated Galileo signals—for automated verification of authorised movements, secure corridors, real-time operational dashboards, and digital twins. The presented port's approach demonstrates how GNSS and 5G/IoT integration can enhance efficiency, compliance, and supply-chain visibility.

Maria ANGELUCCI — EO & GNSS Integration with Internet of Underwater Things (IoUT)

Maria Angelucci (WSense) presented how underwater IoT systems combined with satellite EO and GNSS enhance maritime surveillance, infrastructure monitoring, and environmental protection. She described WSense's underwater communication network, cloud platform, and localisation tools, enabling continuous in-situ measurements, real-time alerts, and cross-validation with satellite observations. Use cases included diver localisation, pipeline oil-spill monitoring, underwater noise detection, harmful algal bloom early warning, and stability monitoring of semi-submerged structures. The presentation stressed the complementarity between EO (wide-area coverage) and IoUT (local real-time sensing).

Agenda Item 4. Main applications & use cases – Customs operations

Martin REUTER — GNSS & EO for EU Customs Administrations: Use, Needs, and Opportunities

Martin Reuter (EUCAB) outlined current and emerging customs use of GNSS and EO technologies. Present uses include officer safety via real-time tracking of operational units, coordination of interventions, and monitoring of goods requiring special controls. EO supports coastal surveillance, anomaly detection, and drone-based reconnaissance. Future opportunities involve automated customs clearance linked with GNSS-verified goods location, dynamic risk models, AI-enhanced analysis, detection of irregular accumulations of goods via EO, and monitoring of border crossings and terminals. Mr Reuter emphasised needs related to accuracy, interoperability, affordability, training, and secure data handling.

Axel KEREP — EO for the Fight Against Heritage Destruction and Looting

Axel Kerep presented how EO technologies support detection, monitoring, and evidence collection for cultural heritage protection. Examples included remote archaeological site identification, change detection for looting activities, and monitoring urbanisation and climate-related threats. He addressed emerging challenges such as smugglers using EO and image-matching tools to locate and commercialise artifacts. He highlighted the need for a permanent EO resource platform for LEAs, improved interoperability, sustained budgets, and multi-technology strategies (including GNSS and IoUT for underwater heritage). The presentation stressed transnational cooperation and standardisation to stay ahead of criminal techniques.

Agenda Item 5. User needs and requirements & Remarks and conclusions

Antonella DI FAZIO - User needs and requirements – Presentation of consultation findings

The outcomes of the consultation were presented and confirmed (*as reported in this MoM above*). Relevant findings, in terms of opportunities, gaps and recommendations, were substantiated through the presentations and the discussions. The participants acknowledged the need to proceed with the identified recommendations and actions, as detailed in the MoM.

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