9:05 – 9:30 Update on EU regulations/standards:
- EGNOS and Galileo adoption, new R&D projects and EU regulations
  Alberto Fernández-Wyttenbach, GSA
- CEN standards in GNSS for Road/Automotive
  Miguel Ortiz, Univ. Gustave Eiffel/ Karim Benmeziane, BNAE

9:30 – 10:00 Update on new Galileo services features
- OSNMA update and requirements on authentication
  Flavio Sbardellati, GSA
- Update on HAS: schedule, how they can test, support tools
  Eduard Escalona, GSA

10:00 – 10:30 Update on EGNSS evolution studies:
- EPICURE: study on EGNOS service for payment and liability road applications
  Hélène Défours, Thales Alenia Space
- I4HAS: study on integrity service complementing EGNSS High Accuracy
  Silvia Porfiri, GSA

10:30 – 11:15 Cooperative, connected and automated mobility (CCAM)
- GNSS integrity and high accuracy in automotive
  Dennis Killan, Bosch
- Multi-frequency GNSS antenna for automotive
  Evgenii Filatov & Pere Mogas, Ficosa
- GNSS extension in Datex II
  Jean-Philippe Meech, CEREMA
AGENDA

11:15 – 11:30  Break

11:30 – 12:00  eCall in Motorcycles
   - H-GEAR: eCall and Anti-theft system based on Galileo for motorcycles
     Daniele Strippoli, Honda
   - sAFE – After-Market eCall for Europe
     Martin Grzebelius, NavCert

12:00 – 12:30  Copernicus data in road transport applications
   Cristina Ananasso, EC / Sascha Klement, Bareways

12:30 – 13:00  Review of the User Requirement Document for Road
   Alberto Fernández-Wyttenbach, GSA / Marco Bolchi, VVA

13:00 – 13:10  Public consultation on EGNSS R&D priorities
   Alberto Fernández-Wyttenbach, GSA

13:10 – 13:15  Conclusion
   Alberto Fernández-Wyttenbach, GSA
EGNOS and Galileo adoption, new R&D projects and EU regulations

3rd EGNSS User Consultation Platform
Alberto Fernandez-Wyttenbach Market Leader - Road, GSA

Organised by:
Under the auspices of:
EU Space Programme:
Regulated applications in Road/Automotive

Introduced by the EU due to the benefits on safety and transport network operations:

- **eCall** system will send an emergency call to 112 in case of accident, including precise location, accelerating assistance to drivers
- **Digital tachographs** will facilitate registration of starting-ending time of the journey
- **Dangerous goods tracking**: robust positioning requirements uptake in EU Member States
- **Road User Charging GNSS**, supporting toll operators in charging levies in compliance with the updated EETS Directive EU 2019/520
- **Cooperative ITS/Autonomous Driving**, integrating GNSS, other sensors and communications systems to enhance road safety and comfort for the driver

### Valorization of the eCall system in new types of cars
- GNSS Tolling for passengers cars
- Congestion charging in Smart Cities
- eParking, traffic information
- Road safety and environment

### Valorization of the Smart Tachograph in commercial vehicles
- Custom control and cross-border enforcement
- Cabotage and freight activities

### Integration of GNSS/5G capabilities in the EU ITS corridors

NEW
EGNOS and Galileo adoption

**Commercial vehicles**

73% from the EU total tolled roads (+82,000 Km) correspond to a GNSS-based scheme

Soon?: Bulgaria, Sweden, Greece, Lithuania...

**EU Regulations**

- Updated EETS Directive mandates EGNOS and Galileo in free-flow tolling using satellite positioning in EU from Oct. 2021
- Smart Tachograph regulation mandates EGNOS and Galileo to control driving time from Jun. 2019

**Motorcycles??**

- 3.28 Million EGNOS (97% of total GNSS)
- 3.18 Million Galileo (94% of total GNSS)
- 3-5 Million vehicles (influenced by COVID)

**Passenger cars**

- eCall regulation (EU) mandates EGNOS and Galileo in every new type of car/van sold in Europe from Apr. 2018
- 32 car brands, +100 models

Source: European GNSS Agency
Demonstrate Galileo benefits in AV

- Contribution to Multi-constellation
- Dual frequency L1/E1 – L5/E5

GSA/EC invested on a dedicated R&D effort targeting automotive industry aiming to fully take Galileo innovations

- Develop a robust GNSS-based engine that can power AV since the early commercialization
- Engage the automotive industry that is still not investing enough in these innovations:
  -> RX manufacturer -> Tier 1 -> OEM
ESCAPE project

ESCAPE’s positioning software advanced algorithms will be adapted to meet BMW’s performance/safety requirements.

**GNSS is the core of the multi-sensors architecture, targeting Level 4 of automatization**

- Hybridization of cameras, maps, vehicle sensors, and GNSS integrated in a tight coupling filter
- Provision of an integrity layer to the exploited technologies
- Also compatible with Galileo E6 service
- GNSS/Galileo multi-constellation multi-frequency chipset for road applications
- Ability to exploit the Galileo OS authentication service

Dec. 2019 - first autonomous vehicle powered by Galileo:
- Live demonstration of the Renault ZOE electric car autonomously driven on tracks and public roads in the world-first for the Galileo programme
Stimulate demand of Galileo

- Contribution to Multi-constellation
- Dual frequency L1/E1 – L5/E5
- High Accuracy Service
- Navigation Message Authentication


- Threats related to GNSS spoofing
- GNSS authentication is required as mitigation

Industrial organizations, standardization bodies and UNECE and EC experts groups recently started to support the design of new proposals for **harmonized rules internationally**.

**Table B1**

<table>
<thead>
<tr>
<th>Table A1 reference</th>
<th>Threats to &quot;Vehicle communication channels&quot;</th>
<th>Ref</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Spoofing of messages (e.g. 802.11p V2X during platooning, GNSS messages, etc.) by impersonation</td>
<td>M10</td>
<td>The vehicle shall verify the authenticity and integrity of messages it receives</td>
</tr>
</tbody>
</table>
Development of base standards in relation on C-ITS Secure Communications and VRU:

CEN/ISO TS 21176: Cooperative ITS – Position, Velocity and Time service in the ITS station

ETSI TS 103 300: Intelligent Transport Systems – Vulnerable Road Users

GNSS authentication will be widely used in urban mobility services, which require trustability:

ETSI TS 103 246: Satellite Earth Stations and Systems; GNSS based location systems: Functional requirements, Reference architecture, Performance requirements

Relevant European standards for GNSS

EN 16803: Use of GNSS-based positioning for road Intelligent Transport Systems (ITS)

- Part 1: Definitions and system engineering procedures for the establishment and assessment of performances: overall framework and operational procedures for the establishment of GNSS-based performances for ITS
- Part 2: Assessment field tests for basic performances of GNSS-based positioning terminals: testing procedures to assess the basic performances (Availability, Accuracy and Integrity)
- Part 3: Assessment field tests for security performances of GNSS-based positioning terminals: testing procedures to assess the performances submitted to RF attacks such as spoofing or jamming
- Part 4: Methodology for the recording of relevant data sets (Record & Replay): define the way the data files are built and validated
Additional Galileo services providing Authentication

**Open Service Authentication (OSNMA)**
- provides *Navigation Message Authentication*, which allows the computation of a user’s position using authenticated data extracted from the navigation message.

**Commercial Authentication Service (CAS)**
- complements the OS, providing controlled access and *signals authentication (by signal pilot component)* function to users.

**Public Regulated Service (PRS)**
- provides the highest level of service continuity and authentication (on signal and message). In cases of malicious interference, PRS increases the likelihood of continuous availability of the Signal-in-Space (robustness).
- implements Governmental access control.
Trustable applications linked to the Automotive segment

Trustable applications provide the increased performance compared with standard positioning service, in the aspect of the guaranteed continuity and reliable position and timing information (according to Galileo Service SDD), are required to strengthen the strategic and critical systems of the society (e.g. blue forces operations or borders control).

These applications are accessible upon prior authorization by relevant authority and, dependently of User Requirements, could be served by any of Galileo Service providing Authentication (OSNMA, CAS or PRS).

Possible areas of application

- Governmental vehicles
- Police cars
- Firefighters
- Ambulances
- Civil protection
- Dangerous goods tracking
- Humanitarian aid operations
- Satellite road traffic monitoring

Based on your knowledge and the public information available:

1. Are there additional applications which require increased level of trustability?
2. Are you involved in current or future initiatives in this field?