Update on EGNSS

6th EUPOS COUNCIL AND TECHNICAL MEETING

ESCALONA ZORITA Eduard
Market Development

Budapest, 30th October 2019
The GSA in a Nutshell

- 202 Staff
- 21 Nationalities

Delivery of safe and secure satellite services

Provide market development for EGNSS programmes

Stimulate the development of business and companies
The GSA is evolving to EUSPA

A unique know-how of delivering satellite services and reaching the users

Synergies between the different components of the EU Space Programme

The European Parliament and the European Council agreed on a new EU Space Programme Regulation and enlarge the responsibilities of the GSA

January 2021: GSA is becoming the EU Space Programme Agency (EUSPA)

Copernicus
GovSatCom
Space Situational Awareness (SSA)
Linking Space to User Needs
EGNSS is a European success

Galileo is used today on the majority of professional devices and increasingly many consumer platforms
GSA GNSS Market Report

Comprehensive source of knowledge and information on the dynamic, global GNSS market.

The report is published every two years since 2010.

Provides comprehensive, in-depth analysis of global trends, and the latest developments in terms of shipments, revenues and the installed base of GNSS devices and applications in key GNSS market segments.

The report is free (650,000 downloads in 2017)
GSA GNSS Market Report

Just released!

5,000 Downloads
User driven E-GNSS

- The interaction with users is essential for the success of E-GNSS
- User needs drive E-GNSS
- During the UCP all available knowledge on user needs shared
- Discussed with industry leaders, users and experts to shape the future of Galileo Services

https://www.euspaceweek.eu/
European Space Week

Leading event for the European Space Programmes

WHERE
Helsinki Congress Paasitorni
Helsinki, Finland

WHEN
Tuesday to Thursday
December 3 to 5, 2019
The Galileo Reference Centre (GRC)

- Perform **independent monitoring** and assessment of service provision
- When feasible, assess the compatibility and **interoperability** between Galileo and other GNSS
- Provide service **performance expertise** to Programme
- Support **investigations** of service performance and service degradations
- Archive service performance data over nominal operational lifetime of system
- Integrate **data and products** from EU Member States, Norway and Switzerland (MS)

**23 organisations from 14 countries**
- Worldwide network of reference stations
- Reference products
- Timing labs
- Radio telescopes
- Laser ranging
- Vehicles, vessels and airplanes
The European GNSS Service Centre (GSC)

Single and unique interface with users

GSC Nucleus
- Web portal
- Information on:
  - system status
  - almanacs
  - and user notifications
- Electronic Library
  - Iono Doc, OS SIS OSD, OS SIS ICD, future SDD
- Helpdesk:
  - User queries
  - Galileo incident reporting
- EGNSS Dissemination Platform
- User surveys
- Galileo performance reports

www.gsc.europa.eu
Galileo: the European GNSS

• Freely accessible service for positioning, timing and navigation message authentication

• Encrypted service designed for greater robustness and higher availability

• Assists locating people in distress and confirms that help is on the way

• Freely accessible high accuracy positioning service

• Authentication service based on the E6 signal code encryption and OS-NMA, allowing for increased robustness of professional applications
Commercial Service (CS) intended for broadcast of value added data, such as high accuracy and authentication

March 2018: EC implementing decision

→ Galileo High Accuracy Service (HAS) FREE of charge

• Allow innovation in consolidated and emerging markets.
• Minimize disruption to the current business models of established providers

→ Galileo will be the first constellation able to provide such High Accuracy service globally
HAS will be based on the provision of accurate satellite data (clocks, orbits and biases) and atmospheric data (mainly ionospheric corrections) to enable PPP.

HAS PPP corrections data will be transmitted through an open format in the Galileo E6B signal, using 448 bits per satellite per second (also, planned to be available through auxiliary channels).

The format is based on RTCM-CSSR adapted to the Galileo E6B channel.

Multi Constellation (at least Galileo + GPS)

Enabling GLOBAL Positioning with Accuracies < 20 cm (H) / 40 cm (V)

Improved Convergence for the Regional Service

2 HAS Service Levels:
Global Service Area (SL1)
Regional Service Area (SL2)
The Galileo High Accuracy Service will be gradually rolled out as of 2020

**Phase 0**
- Validate dissemination capabilities
- HA SIS tests including pre-recorded data
- Leverage lessons learned for following phases

**Phase 1**
- Use of Galileo System data only (from GSS)
- New facility at GSC re-using CSP interface
- Relaxed performance targets

**Phase 2**
- Full service provision
- External data use targeted to improve performance

Tests started by mid Feb’19 and continued

Under procurement Based on existing infrastructure
By 2021 (signal)
2022 (service)
Not global - relaxed performances

Under design Global (SL1), full accuracy service, possibly including ionospheric information to improve convergence regionally (SL2)
Spoofing, an emerging threat

The importance of protecting against vulnerabilities was strongly highlighted as a common theme of user demands across all segments.
Support the increasing use of GNSS within safety, security, governmental and regulated applications

The aim of STRIKE3 was to develop international standards in the area of GNSS threat reporting and GNSS receiver testing.

Monitoring stations in 23 countries around the globe.

About 73,000 interferences identified and classified as major impact on GNSS, whereas 59,000 of these were identified as jammer signals.

A central data base defined to store the characteristic parameters of the detected interference signals.

Six different receivers from four categories such as mass-market, professional, integrated, and timing receivers tested.

The draft standards on receiver testing against threats has been generated and issued and can get downloaded from this webpage.
FE: Development of an Advanced Interference Detection and Robustness Capabilities System

Design, develop the IT infrastructure and relevant software for a worldwide advanced interference detection system.

Run a pre-operational testing phase to verify the functionalities of the system.

The purpose of the procurement is to improve GNSS interference detection capabilities of spectrum management authorities, which are currently limited (either geographically and in reporting capabilities).

Budget: 3,2 Mil Eur

Deadline: Thursday, January 23, 2020

OS-NMA

Ability of the system to confirm to the users that they are utilising navigation data, which comes from Galileo satellites (and not from any other sources).

Contributes to mitigate GNSS vulnerabilities

Clear differentiator w.r.t. other GNSS available to the civil community

Disseminated on Galileo E1B, fully backward compatible

Follows crypto standards and recommendations

No need to store secret keys in the GNSS receiver, just public key

2019: Testing  →  2020: Service declaration
Is a smartphone the next generation of GIS mapping tool?

Android 7+ access to raw GNSS measurements  |  Dual frequency E1/E5 mass market receivers  |  Over 1 billion phones with Galileo

To engage with leading experts in navigation and positioning, and **boost innovation around this new feature:**

- Workshops
- White papers
- Testing results
- Guidelines

Mobile apps are becoming increasingly important in Geomatics
Is a smartphone the next generation of GIS mapping tool?

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Leads to:

- Advanced positioning techniques
- Open the door to use of augmentation techniques in smartphones
- (3GPP) standardisation of PPP-RTK corrections for assisted data in mobile phones

Mobile apps are becoming increasingly important in Geomatics.
EGNSS R&D Programmes

Aims to foster adoption of EGNSS via content and application development and supports the integration of services provided by these programmes into devices and their commercialisation.

Fundamental Elements projects focus on fostering the development of innovative Galileo and EGNOS enabled receivers, antennas and chipsets technologies.
H2020 GIMS Project

Build and commercialise an advanced low-cost system based on EGNSS, Copernicus SAR and other in-situ sensors, like inertial measurement units for the purpose of monitoring ground deformations with a focus on landslides and subsidence.

- mm level accuracies
- Daily acquisition rate
- real-time alerts in case of sudden movements
## New Call: EGNSS market uptake 2020
### H2020-SPACE-EGNSS-2020

<table>
<thead>
<tr>
<th>Type of Action*</th>
<th>Topic</th>
<th>Indicative budget (EUR mln)</th>
<th>Funding rate</th>
<th>Indirect costs</th>
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<tbody>
<tr>
<td>IA</td>
<td>EGNSS applications fostering green, safe and smart mobility</td>
<td>10</td>
<td>70%</td>
<td>25% of the total eligible costs excluding:</td>
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<td>PCP</td>
<td>EGNSS applications for public authorities pilot</td>
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**Overall indicative budget:** 21,000,000

*IA*: activities aimed at producing plans and arrangements or designs for new, altered or improved products, processes or services.

**PCP**: Pre-Commercial Procurement actions aim to encourage public procurement of research, development and validation of new solutions that can bring significant quality and efficiency improvements in areas of public interest, whilst opening market opportunities for industry and researchers active in Europe. It provides EU funding for a group of procurers (‘buyers group’) to undertake together one joint PCP procurement, so that there is one joint call for tender, one joint evaluation of offers, and a lead procurer awarding the R&D service contracts in the name and on behalf of the buyers group.
Survey: Galileo Readiness of RTK providers

GSA targets to update the information regarding the status of the readiness of RTK providers for Galileo and to better understand the needs and evolution of the RTK providers
Questions?

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