

European
Global Navigation
Satellite Systems
Agency

Update on European GNSS

4th EUPOS[®] Council and Technical Meeting

Alina Hriscu

Market Development
European GNSS Agency (GSA)

Bratislava, 20 November 2017



GALILEO **EGNOS**
NAVIGATION SOLUTIONS
POWERED BY EUROPE

Agenda



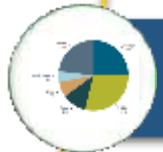
GSA: Who We Are and What We Do



E-GNSS: State of the Play



Engagement with Surveying Market Stakeholders



Market and Technology Trends



Funding Opportunities

Agenda



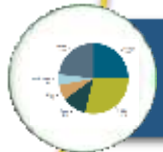
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GSA in a nutshell



What?

Gateway to Services

- Galileo & EGNOS Operations and Service Provision
- Market Development of the applications and the receivers

Gatekeeper of security

- Security Accreditation
- Operation of Galileo Security Monitoring Centre, governmental service (PRS) activities



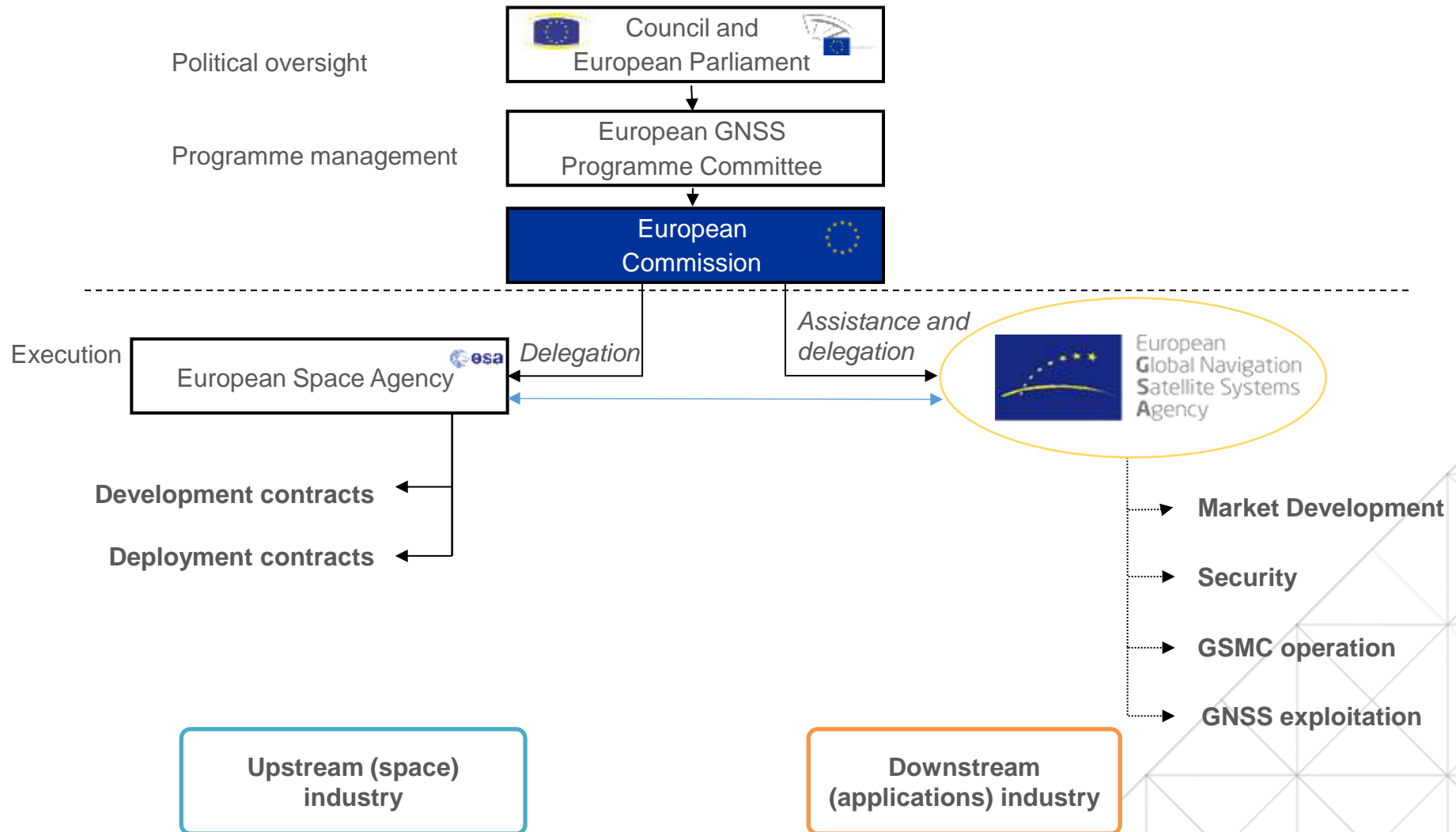
Who and where?

**150
Staff**

**21
Nationalities**

Prague, CZ Rep – HQ
St. Germain en Laye, FR – GSMC
Swanwick, UK – GSMC
Torrejon, ES – GSC
Noordwijk, NL – GRC
Toulouse, FR – EGNOS
Brussels, BE – COMM

How GSA fits in the EU structure



Agenda



GSA: Who We Are and What We Do

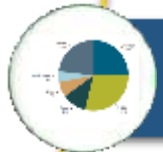


EGNOS

E-GNSS: State of the Play



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HORIZON 2020

Funding Opportunities

EGNOS already available serving EU citizens and industry



- Satellite Based Augmentation System (SBAS)
- Improves GNSS performance
- European coverage (under extension in other regions, e.g. North Africa)
- Available free of charge and widely adopted in off-the-shelf receivers





Open Service (OS)	Accuracy ~1m, free	Available since October 2009	
Safety of Life Service (SoL)	Accuracy ~1m, compliant to aviation standards	Available since March 2011	
EGNOS Data Access Service (EDAS)	Accuracy <1m, corrections provided by terrestrial networks	Available since July 2012	

Galileo is the European GNSS offering four services



- Worldwide navigation system “made in EU”
- Fully compatible with GPS
- Open service free of charge, delivering dual frequencies
- Signal authentication will provide trustability

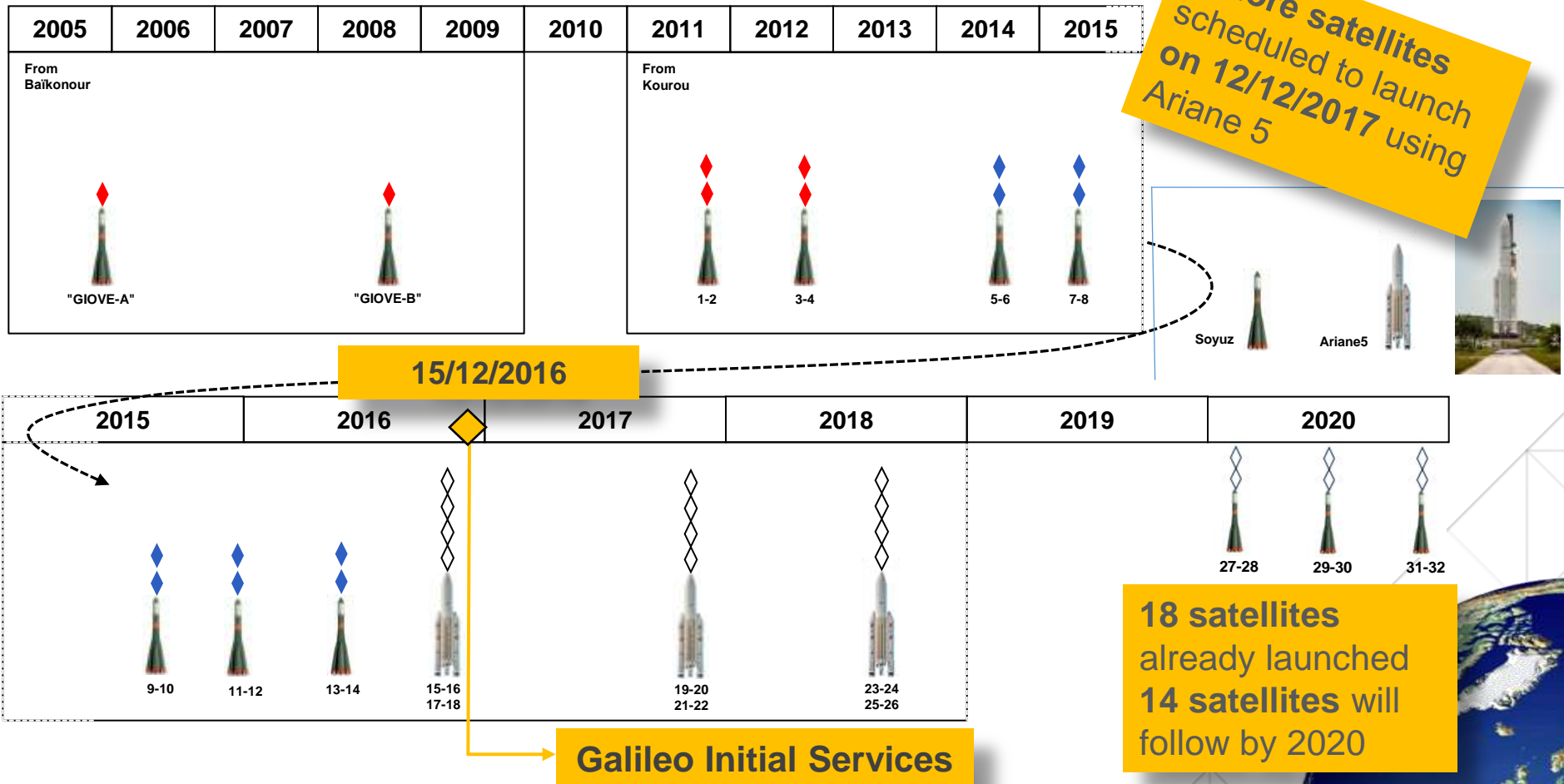


Open Service (OS)	Freely accessible service for positioning and timing	
Public Regulated Service (PRS)	Encrypted service designed for greater robustness and higher availability	
Search and Rescue Service (SAR)	Assists locating people in distress and confirms that help is on the way	
Commercial Service (CS)	Delivers authentication and high accuracy services for commercial applications	

Galileo's implementation is progressing with Full Operation Capability in 2020



4 more satellites
scheduled to launch
on 12/12/2017 using
Ariane 5



Galileo officially moved from a testing phase to the provision of live services



Galileo goes live

Initial Services are the first step towards full operational capability and reflects Europe's achievement to satisfy evolving user needs leveraging on more performant GNSS signals

Upgrading devices

Already today, leading GNSS companies representing more than 95% of the GNSS chipset market produce Galileo-ready chips

www.useGalileo.eu

Users can keep track of Galileo-enabled devices in the different market segments, and be informed as soon as new ones become available



Galileo is used today on majority of professional devices and several consumer platforms

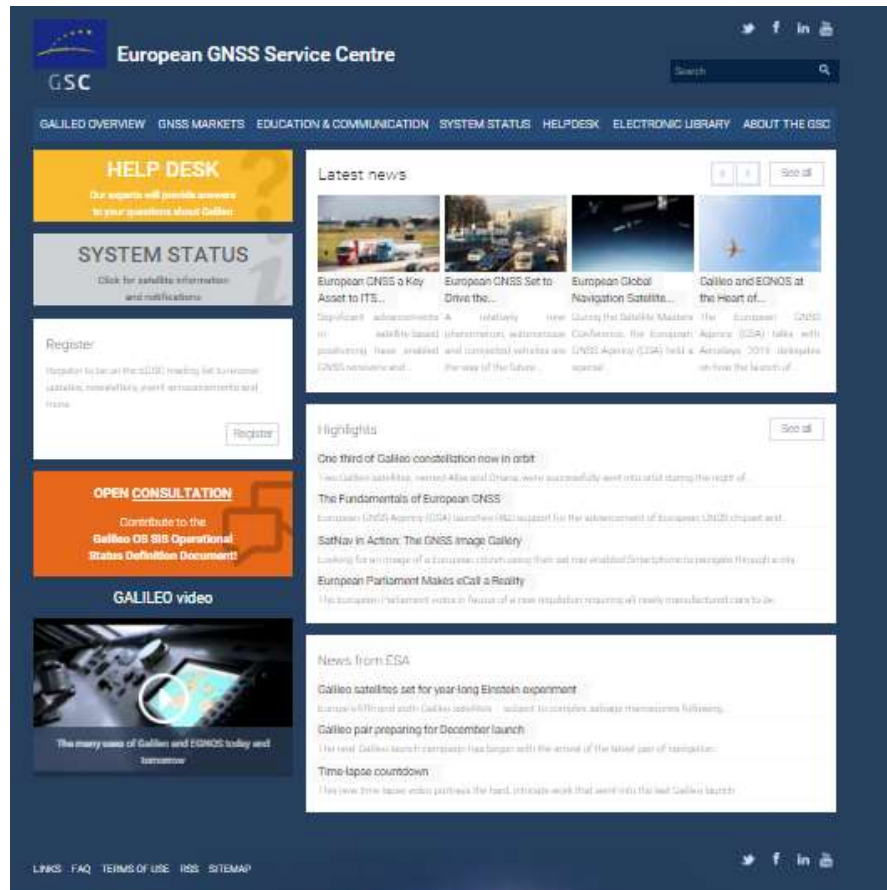


The European GNSS Service Centre provides a single and unique interface with the users



GSC Nucleus

- Web portal
- Information on:
 - System status
 - Almanacs
 - 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



**Galileo Initial Open Service (IS OS)
Public Quarterly Performance Report
confirms good performance of Galileo**

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Funding Opportunities

1st GALILEO USER ASSEMBLY

28-29 NOVEMBER 2017 MADRID





Surveying User Requirements Document

The GSA receiver manufacturers workshop after Initial Services declaration saw high industry participation



**4th workshop for Receiver manufacturers,
21st March - Prague**

Information shared on:

- ✓ Market update
- ✓ Galileo system status
- ✓ User consultation platform
- ✓ Space strategy
- ✓ Funding opportunities
- ✓ Concluded and upcoming testing campaigns
- ✓ Update on Galileo OS NMA, CS and INAV improvements

Example of Industry participants:



Augmentation service providers are accelerating the adoption of Galileo



RTK



PPP

VRS NOW and
CENTERPOINT RTX
support Galileo

- Majority of RTK providers upgraded or have started to upgrade

- SWEPOS (SE), GeoSoft (ET), SAPOS (DE), SOGEI (IT), GEONET (JP), TERIA (FR), etc.

“Based on our test results, we clearly recommend Galileo corrections to our customers needing reliable high precision”



President and CEO of NovAtel, Michael Ritter stated
“Our OEM customers are already benefiting from the **enhanced reliability, availability and accuracy** the Galileo constellation adds to the GNSS.”



Anders Haneborg, Fugro commercial manager said
“Galileo’s Initial Services operations [...] a **key consideration** for our customers during critical positioning operations”



Graham Purves, President and CEO of Veripos stated

“As an European company, we are **particularly proud and excited about the opportunities the Galileo services create** for our customers. The **reliability and safety enhancements** made possible to continue to expand the capabilities of our cutting edge safety critical positioning solutions.”

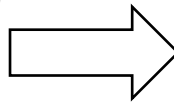


GSA workshops “Integrating Galileo in RTK networks: success stories and open challenges” during CLGE GA



Invited speakers

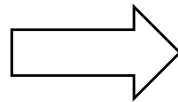
- Roberto Capua from **Sogei**
(Italian public augmentation service provider)
- Paul Chambon from **Terria**
(French private RTK service provider)



- ✓ Usability of the Galileo constellation in high-precision RTK applications
- ✓ Show **improved availability, reliability, and accuracy and time-to-fix in difficult measuring environments** (urban canyons and under tree canopy).



**Real Time
Questionnaire**



- ✓ End-users' understand Galileo added value: **69% of the respondents** are convinced that Galileo will improve their work.



Ongoing **issue with the inter-operability between the different brands of RX manufacturers within RTK-network**



Inclusion of Galileo into RTK network is cost demanding.

Ongoing discussion for the new scheme of the Commercial Service High Accuracy



Ongoing discussions between stakeholders of the Galileo Programme have outlined the opportunity to consider offering the **High Accuracy Commercial Service (HA CS)** to all interested users **on a free of charge basis**, with content and format of data **publicly and openly available on a global scale**.



**Stakeholder Consultation
GSA/SC/30/17 on Galileo
Commercial Service High Accuracy
Provision**

Agenda



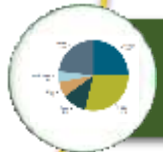
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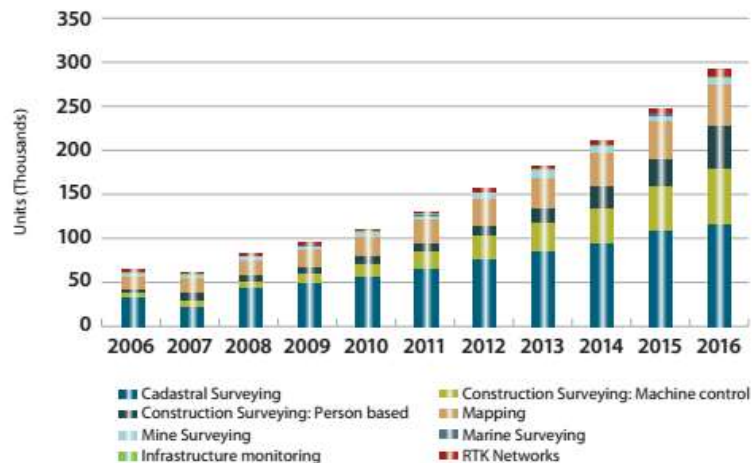


Funding Opportunities

Construction, mapping and cadastral industries stimulated growth in shipments of GNSS surveying equipment

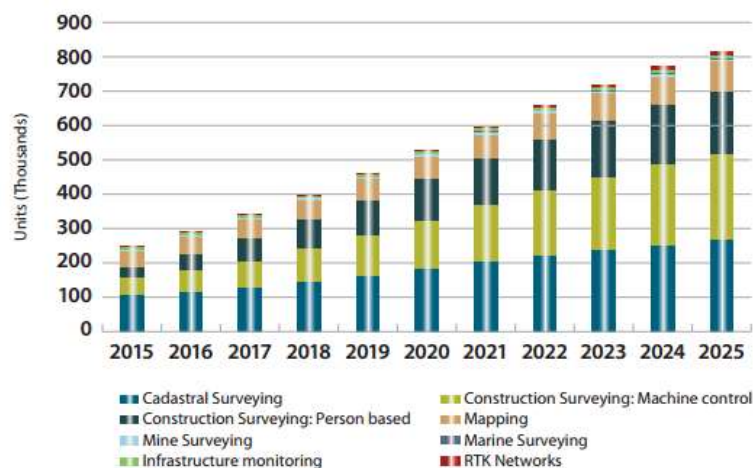


Shipments of GNSS devices by application



Surveying, Mapping and Construction (both person-based and machine control), together, accounted for **95% of the shipments of GNSS devices in high precision market in 2016**

Shipments of GNSS devices by application

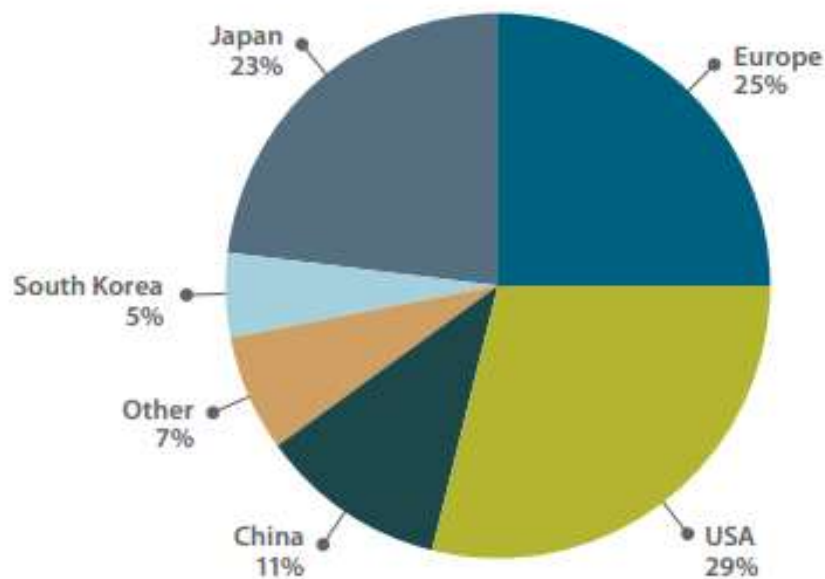


In the coming decade, the total **amount of shipments** is expected to reach 815,000 units worldwide, representing **almost a 4-fold increase over 2015**

European GNSS industry accounts for a quarter of global GNSS revenues

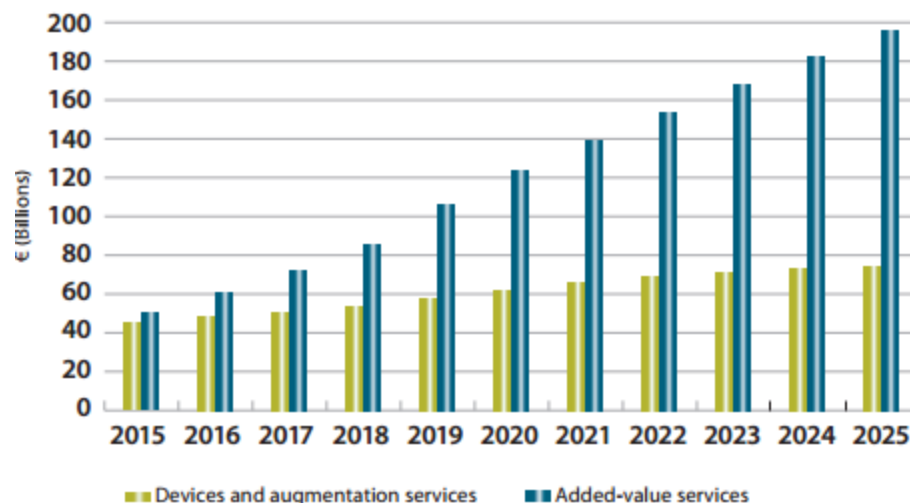


Revenue generation in the GNSS industry by key countries
(% split of revenues 2015)

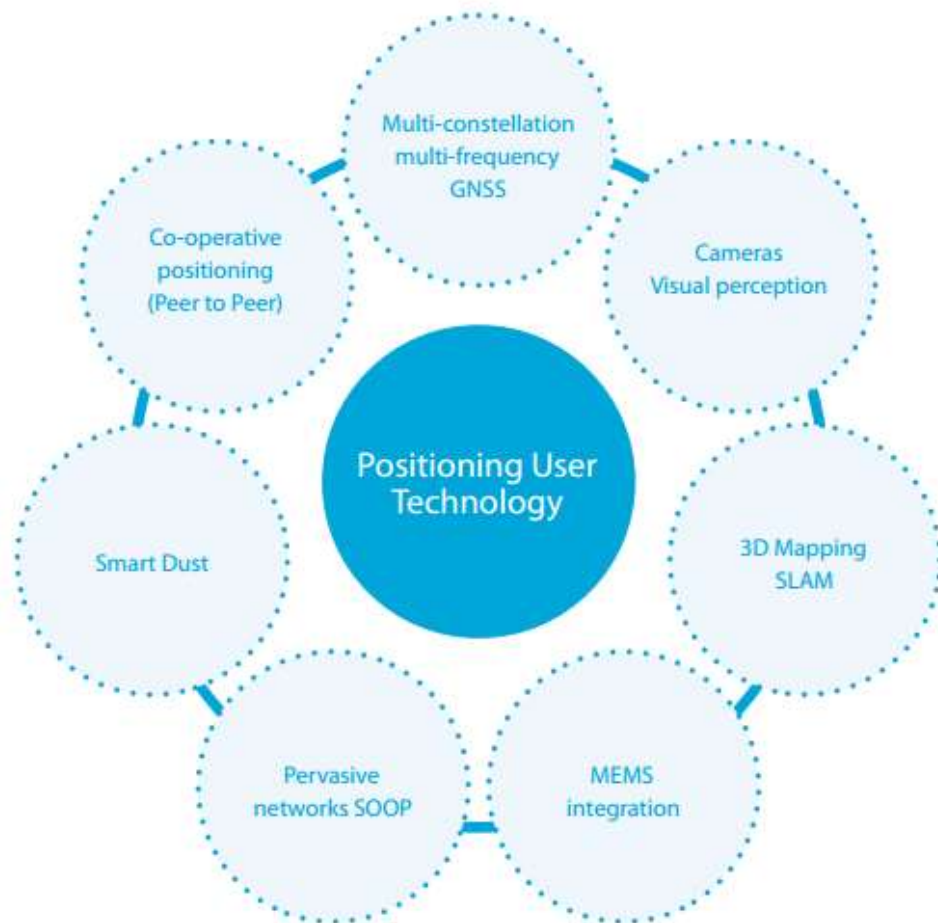


Added-value services will increasingly be the **largest source of revenues**

Global revenue by type



Innovation areas and emerging concepts likely to influence future positioning and navigation



GNSS is the **most cost-effective outdoor positioning technology currently available** – and **will remain** so for the foreseeable future



First dual frequency chipset for mass market – GIS democratisation



GNSS raw measurements on Android (Nougat version and higher):

- GSA has launched **the GNSS Raw Measurements Task Force** to engage with leading experts in navigation and positioning, and boost innovation around this new feature.



First **dual frequency GNSS chipset for mass market** devices (smartphones, tablets) in the market which will offer dm-level accuracy

- Better accuracy
- Ionosphere error cancellation
- Improved code tracking pseudorange estimates and faster transition from code tracking to phase tracking
-



**Mass market device
allowing cm or dm
level accuracy?**

A full analysis of GNSS receiver capabilities is available in the GSA's Technology Report



[HTTP://BIT.LY/2CGARXF](http://bit.ly/2CGARXF)



An in-depth analysis of 3 GNSS Macrosegments :

- MASS MARKET SOLUTIONS
- TRANSPORT SAFETY AND LIABILITY-CRITICAL SOLUTIONS
- HIGH PRECISION, TIMING AND ASSET MANAGEMENT SOLUTIONS

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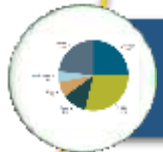
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Funding Opportunities

The GSA's funding mechanisms promote the development of Galileo compatible solutions



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

8 €mIn budget dedicated to high precision market in the 3rd H2020 call – under evaluation



Fundamental Elements

Fundamental Elements projects focus on fostering the development of innovative Galileo- and EGNOS-enabled receivers, antennas and chipsets technologies. The objective is to achieve products that address user needs in priority market segments

€75.5 M for non-PRS projects

Linking space to user needs



How to get in touch:



[GSA Newsletter](#)



[GNSS YouTube Channel](#)



[GSA Twitter - @EU_GNSS](#)
[EGNOS Twitter - @EGNOSPortal](#)



[European GNSS Agency LinkedIn Page](#)
[GNSS Market, Research & Development](#)



[GNSS Facebook page](#)



[GNSS Slideshare Page \(presentations\)](#)



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Thank you!

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