## The EU Navigation Satellite Programmes in the new financial perspective 2014 -2020

## EGNSS Applications – Opportunities in H2020

Alberto Fernández Wyttenbach Market development- European GNSS Agency





#### **GSA role within EU GNSS programmes**





## The European GNSS Agency (GSA)



- Nationalities: 18
- Headquarters: Prague



# The European GNSS Agency mission is to exploit the EGNOS and Galileo system

- to the full benefit of users in the European Union,
- to maintain the system and services in the most cost-efficient manner,
- to promote the development of applications and value addedservices towards defined user segments.





#### **GSA Market Development**

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User segment development

#### Segments:

Road

• LBS

• Aviation

- Agriculture
- Surveying/Mapping

Maritime

Rail

#### Services:

- Galileo OS
- Galileo CS
- Galileo PRS
- EGNOS OS
- EGNOS SOL

## Application development

- R&D project management
- Leveraging R&D results



#### **Market monitoring**

- Market analysis & forecast (incl. public benefits, APPAP KPIs)
- Technology monitoring launch
- Monitoring EU share in global GNSS

















## **EU-GNSS** potential





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\* <u>.</u>

GALILEO

## European satellite navigation programmes-EGNOS



- increases the accuracy of GPS positioning and provides information on its reliability
  - **3 services** (OS, SoL, EDAS)
    - open service is operational since October 2009
    - Safety of Life service declared operational in March 2011
  - Designed primarily for Aviation, widely adopted in other segments:
    - 159 EGNOS approach procedures in 87 airports
    - 2/3 of farmers using GNSS adopted EGNOS
    - EGNOS inside the EU largest road user charging scheme deployed after 2009 service declaration
  - Available in over 70% of commercial receivers models
  - An **enhanced version of EGNOS** is currently under development. It will offer Galileo corrections and a wider coverage area expanding into Africa and the Middle East





## European satellite navigation programmes-Galileo

#### Autonomous infrastructure

- Highly accurate global positioning services worldwide
- Under civilian control and wholly interoperable with GPS, GLONASS, and BeiDou
- 4 services (OS, CS, PRS, SAR)
- Galileo is currently finalising its In-Orbit Validation (IOV) phase using an initial group of 4 satellites launched during 2011-2012.
- Already 30% of receiver models are Galileo ready









# 12<sup>th</sup> March 2013: Galileo starts transmitting the navigation signal...





## ...the same day, all over the world the first "position fix" with Galileo is computed



Source: European Space Agency



Source: NavSAS - Politecnico di Torino

 The first positions computed confirms the excellent expected performances, at the state-of-the art in satellite navigation.

The satellites also transmit a time reference of atomic standard.



## 14<sup>th</sup> May 2013: Joint achievement by EC/ESA/GSA

#### **European GNSS Service Centre helpdesk (GSC Nucleus)**

#### Website

#### Provide information to users and capture user's feedback

- Static content: general system and services information
- Dynamic content: including scheduled maintenance activities

#### **Customer interaction functionality**

- Helpdesk ticket management
- Skilled people
- User's database population
- Procedures involving all actors

GSA is setting a preliminary Customer assistance

Helpdesk Our experts will provide answers to your questions about Galileo







## Galileo services Implementation Plan









## Many EGNSS opportunities in different market segments













## **GNSS FP7- experience and results**







## **GNSS FP7 results in a nutshell**

## GNSS FP7 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Calls



- 6 Patents
- 31 Products
- **39** Working prototypes
- 27 Proofs of concepts



- **3** calls for proposals on GNSS Applications
- Portfolio of ~90 R&D projects with a budget of ~€70 mln
- 425 beneficiaries

40% of GNSS funds to SMEs vs. EU FP7 average <15%

Business coaching for SMEs: Business expert support





### **GNSS FP7 in numbers:** Budget

**Budget and projects funded per Call** 





#### **GNSS FP7 in numbers:** Awarded projects

#### Number and percentage of proposed projects awarded funding





### **GNSS FP7 in numbers:** Average projects' costs









#### **GNSS FP7 in numbers:** Countries participation



**GNSS FP7 support the industry progress** 

~50% of projects realised/expected commercial results

Based on sample of **26 GNSS FP7** projects that realised/expected commercial outputs:

- Almost 15,000 units have already been sold, to over 13,000 clients, yielding revenues of € 4.0 million;
- Overall, by end-2015 they are expected to have generated
  200,000 unit sales, to over 23,000 clients, yielding revenues of €
  27.1 million.



## **GNSS** is a large and growing market



## 7 bln GNSS devices by 2022 – almost one for every person on the planet



MARKET REPORT

## GNSS FP7 is supporting GNSS industry progress Most segments covered in the proposals



Although LBS and road dominate, there were many hi-tech proposals in the area of science, high precision, indoor and robust positioning.

European GNSS Agency



## **FP7** is supporting E-GNSS adoption

#### **Example in Road Market Segment**

#### **SCUTUM for dangerous goods transportation**



#### Position accuracy & confidence guarantee for tracking services

- ✓ ENI is tracking +300 operating vehicles in Italy, France, Germany, Switzerland and Austria
  ✓ SCUTUM specifies the standard for the implementation of EGNOS commercial services in ITS and mobility applications (CEN Workshop Agreement SCUTUM).
- Italy's and France's Ministries of Transport validated the technical standard for the implementation of EGNOS commercial services, as part of a shared vision for EGNOS adoption.

www.scutumgnss.eu



## **FP7** is supporting E-GNSS adoption

**Example in Maritime Market Segment** 

#### **SAFEPORT: Safe Port Operations using EGNOS**

#### Safe Pilot Ploting Buffware for Part / Table





- EGNOS improves Vessel traffic management
- Development of EGNOS enabled **Portable Pilot Unit (PPU)**
- Successful prototype demonstration in Dublin port
- Implementation of the EGNOS based PPU in: Riga, Harwell, London ports and Medway River

#### SafePilot - A new Commercial Release in May 2013:

- Docking with automatic distances with depth contours
- Predictions, history & replay functionalities
- Route, passage planning and meeting points
- Full vessel tracking services integration with real time data
- Online chart purchase and update





#### **FP7 is supporting E-GNSS adoption** Example in LBS Market Segment

#### **INCLUSION: Innovative LBS for Social/Public Dimension**



**Inclusion** is a location-based service (LBS) solution offering motor-impaired persons improved mobility in safe conditions, helping them navigate traffic safety problems and limited accessibility of public transport.

During the **European Space Solution 2012** in London, the INCLUSION solution was tested by Peter Norfolk, British wheelchair tennis player.



#### www.inclusion-fp7.org



## **FP7** is supporting E-GNSS adoption

**Example in Professional Market Segment** 

#### **CIGALA: Challenging the Solar Maximum in Brazil with PolaRxS**

#### Understand the cause and implication of IS disturbances at low latitudes:

- develop models for signal propagation prediction and perturbation tracking
- deploy multi-frequency multi-constellation Ionospheric Scintillation Monitoring (ISM)
  network
- design and implement novel IS mitigation techniques in GNSS receivers

#### Project outcomes:

- Establishment of 8 ISM stations
  - Latitudinal and longitudinal distribution over Brazil
- Upgrade of **4 SSN AsteRx2e/2eL/3** and **PolaRx4** products





## The FP7 projects not only produce results but also build new knowledge...

#### **GNSS Education Network for Industry and UniversitieS**

"The GNSS Education Network for Industry and UniversitieS (GENIUS) project is concentrating on forging strong links between the GNSS applications industry and universities and research institutes"1



#### The results of the network

- 10 sessions of the GNSS Professional Training
- 4 PhDs with Industry
- 2 PhD training events
- 1 PhD Workshop
- 16 internships with
- 4 MSc scholarships.
- Continuous management of the MSc in GNSS

#### <sup>1</sup> http://www.gnss-education.eu







#### **OBJECTIVES**

#### An Intranstional: Cooreanor









## ...and support to the internationalisation of EU businesses

#### Launch of EU-Japan industrial cooperation in GNSS 13-15 May in Tokyo

**GNSS.Asia Japan workshop** (13-15 May 2013, Tokyo) triggered strong interest from Japanese market players and stakeholders. 400 participants in SPAC workshops and 4 meetings with industry:

- willingness to promote Galileo via joint ventures with EU companies
- availability to foster Galileo and QZSS adoption

#### Conference on GNSS applications in Sub-Saharan Africa 30-31 May in Dakar

- Strong promotion of technological and scientific competences that have a clear potential for Galileo and EGNOS in Sub-Saharan Africa
- Launch of the competition for the Best African Student Paper Award by Awareness in Africa consortium





#### Agenda

## H2020 opportunities







### Space in H2020





### E-GNSS in H2020

Across the societal challenges of H2020 the possible additional relevant research topics for funding development of E-GNSS applications could be found:

- smart, green and integrated transport
- marine and maritime research
- inclusive, innovative and secure societies
- food security, sustainable agriculture
- health, demographics changes and well being
- bio-economy
- secure, clean and efficient energy
- climate action and resource efficiency including raw materials





## Galileo Call in H2020

#### Horizon 2020 Framework Regulation:

Union level action and investment in space research are required in accordance with Article 189 (TFEU), in order to maintain the competitive edge, **to safeguard Union space** *infrastructures and programmes such as Copernicus and <u>Galileo</u> and to sustain a <i>future role for Europe in space*.

Horizon 2020 will accompany the infrastructure deployment by

- 1) fostering the further uptake of EGNSS in applications
- 2) preparing the secure utilisation through the development of PRS
- 3) foreseeing the future evolution of the EGNSS infrastructure

This call should result in the development of **applications** with a potential to contribute to the **growth and strengthening** of the European GNSS market and to have an impact on sectors where the EU's added value and cost effectiveness are the greatest





\* infrastructure and the operations of the EGNSS, will be funded through the budget of the Regulation of the European Parliament and of the Council on the implementation and exploitation of European satellite navigation systems.

#### Horizon 2020 GNSS focus

#### **Projects should be focused on:**

- Development of innovative <u>applications</u>, products, feasibility studies, market <u>tests</u>
- Fostering development of innovative applications within <u>international</u> context and related <u>standards</u> with high international <u>impact</u>
- Exploitation of <u>synergies</u> with other space-based services and systems
- Validation of <u>Early Services</u>
- Implementation of <u>pilot projects</u>
- Supporting standardisation, certification, legal and societal acceptance
- Organization of <u>awareness</u> campaigns





## Horizon 2020 GNSS topics and funding

- 1 EGNSS applications (15-20 M€)
- 2 SME based EGNSS applications (5-10 M€)
- 3 Releasing the potential of EGNSS applications through international cooperation (5-8 M€)
- 4 EGNSS awareness raising, capacity building and/or promotion activities in and outside of EU (5-10 M€)

E-GNSS Apps development

**Innovation: 70% funding** 

Promotion of E-GNSS use by using various means

Coordination and Support Actions (CSA): 100% funding

Flat rate: 25% with some exceptions e.g. subcontracting



### Schedule

### 11 December 2013 publication foreseen

ec.europa.eu/embrace-space

http://ec.europa.eu/ (new participants portal for H2020)

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		Home	FP7 Calls	FP7 Doc	My Organisations

- Early April 2014 deadline
- Selection in 6 months
- Signature of Grant Agreements in December 2014





December 2013							
SUN	MON	TUE	WED	THU	FRI	SAT	
1	2	3	4	5	6	7	
8	9	10	11)	12	13	14	
15	16	17	18	19	20	21	
22	23	24	25	26	27	28	
29	30	31					

## **E-GNSS concrete opportunities for industry –**

## Road

- Connected vehicles: robust and accurate lane level positioning for navigation, in-vehicle infotainment, safety and eco-driving
- ✓ **Dangerous goods tracking**: robust positioning requirements uptake in EU Member States
- PNDs, replaced by multi-function devices
- Automatic emergency assistance: eCall regulation will accelerate the business case
- Pay as you drive, Distance based road pricing: more accurate and trustable positioning enhance the performances









## E-GNSS concrete opportunities for industry -

#### LBS

#### **Recent developments:**

- Augmented reality an information overlay on top of the physical world in mobile devices.
- Indoor positioning location of people and objects inside large buildings, such as airports and shopping centres.

#### Upsurge in number of applications:

- 775,000 in Apple App Store.
- 700,000 in Android Apps compared to 88,000 in 2011.
- An estimated 40% of applications use location information.
- Integration of positioning into devices such as cameras, watches, and binoculars
- Location information sent from devices to application layers to enable sharing and tracking (e.g. for recording the distance run, social networking).
- Various positioning technologies integrated into one device.
- GNSS as the primary positioning solution outdoors, offering better accuracy than Cell-ID and Wi-Fi.
- Technological developments concentrate on seamless integration and switch from outdoor to indoor positioning.





#### **Complexity of LBS segment**

Applications: personal navigation, point of interest search, LBS advertising, person and objects tracking, emergency caller location, location based gaming, sport and entertainment, weather information and news, social networking

#### **Application Stores:**

Apple App Store Windows Phone Store Google Play Amazon App Store

#### **Devices:**

Smartphones**,** tablets, digital cameras, fitness and tracking devices, binoculars

> Technology: Cell ID, Wi-Fi, GNSS, INS

#### E-GNSS concrete opportunities for industry – Aviation

- Better Performance for increasing number of more demanding applications (e.g. from 5 to 1 NM, LPV 200, ADS-B,..)
- Multiconstellation/multifrequency enables more robustness against vulnerabilities (iono, interferences)
- GNSS for the introduction of **Performance-Based Navigation (PBN)** in line with ICAO standards
- **Interoperability**, doing things better working together for a global aviation
- GNSS to increase safety, reduce congestion, save fuel, protect the environment, reduce infrastructure operating costs, and maintain reliable all weather operations, even at the most challenging airports.



European GNSS Ager

## **E-GNSS concrete opportunities for industry –**

EGNOS and Galileo can contribute to a more efficient train command and control as well as better asset management supporting multimodal logistics

- **Train signalling**: GNSS as an enabler of economically more viable signaling solutions providing more precision and saving valuable resources
- Asset Management, including functions such as fleet management, need-based maintenance, infrastructure charges, and inter-modal transfers. GNSS is increasingly seen as a standard source of positioning and timing information in these systems.
- **Passenger Information** systems on-board trains showing the real-time location of the train along its route.



Rail



## E-GNSS concrete opportunities for industry – Maritime

#### EGNOS and Galileo, can contribute to a safer and more efficient navigation

#### **Examples of applications:**

- Track control
- Portable Pilot Units
- Ship-to-ship coordination
- Port approach and navigation
- Ship-to-shore coordination



Port automation, such as the tracking of shipping containers and other goods

#### Galileo will efficiently contribute to international SAR operations

- Europe's contribution to the MEOSAR system of COSPAS-SARSAT
- "Return link" feature to send detection acknowledgement message from the SAR operator to the distress emitting beacon
- Detection of SAR alert in near real-time







## E-GNSS concrete opportunities for industry – Agriculture

## With the emergence of Galileo, multi-constellations and dual-frequency use will sustain current high growth rates

#### **Examples of business opportunities:**

- Farm management solutions involving the use of real-time information for monitoring the location and status of farm equipment.
- Tractor guidance
- Variable Rate Applications leveraging local conditions on the field for precise control over farming inputs (e.g. fertilisers, nutrients).
  Automatic steering solutions



#### Supporting trends creating a strong business case:

- Increasing average farm size (EU)
- Decreasing farming population vs. increasing world population
- Better access to agriculture machinery
- Central and Eastern Europe catching up quickly



## ANY OTHER IDEA?





Through H2020 you can turn it into practice

We are waiting for your proposals!!!



