

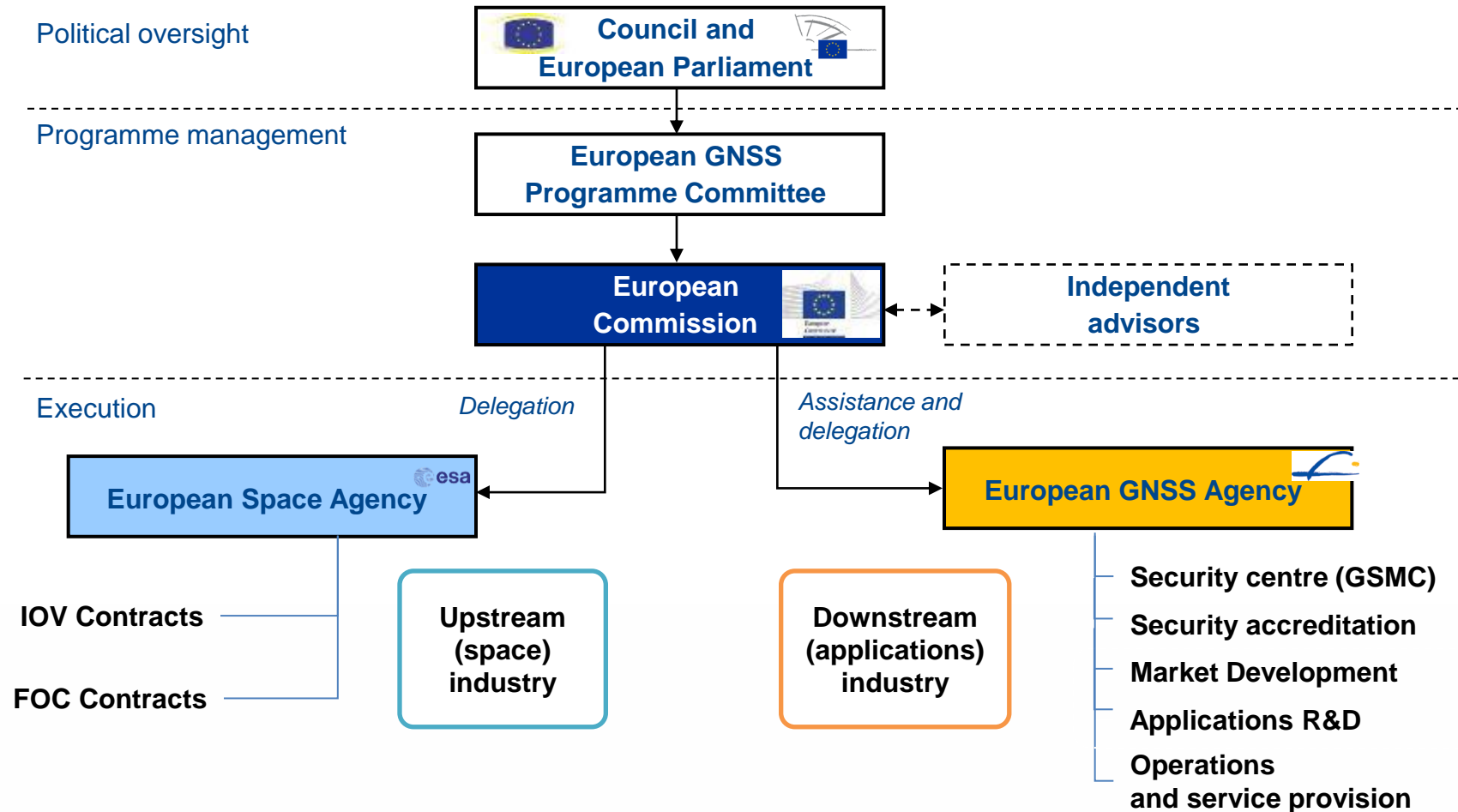
# **Automatic Emergency Call Systems**

## *Navigation module and GNSS*

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# Galileo program & European GNSS Agency



# Why GNSS for Automatic Emergency Call Systems ?

- ✓ In outdoor environments satellite navigation systems are today and will continue to be in the future the **most efficient (= cost effective) and accurate way** to calculate the position.
- ✓ In fact, both Russia ERA-Glonass and European Union eCall **require satellite navigation**.
- ✓ GNSS can be complemented with other sensors or network based techniques, but the **public owned and free of charge GNSS signals** are the core of location services.



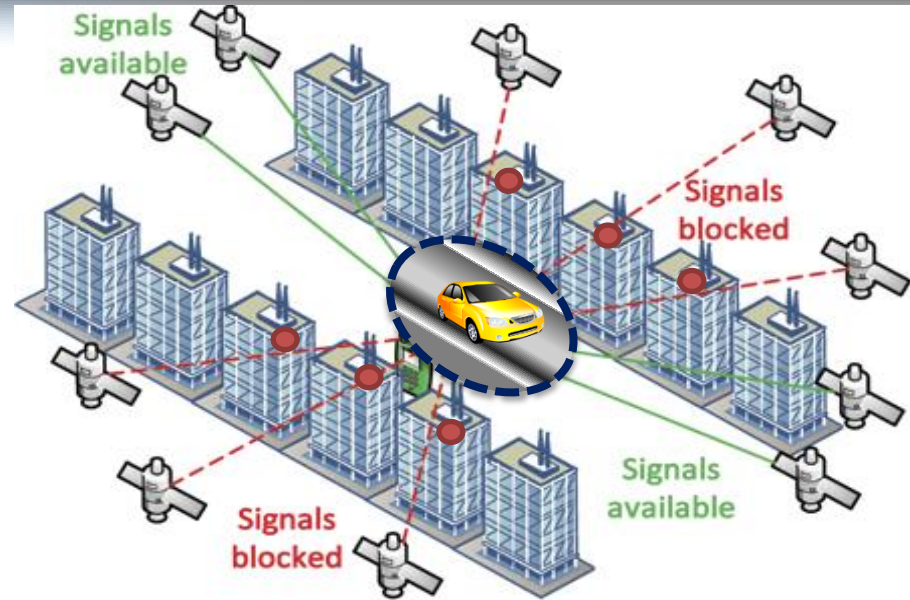
# GNSS for emergency caller location goes beyond In Vehicles Systems

- ✓ In the United States **911 emergency caller location**, handset techniques typically use GNSS that is considered by many operators the best methods in outdoor situations.
- ✓ **European Emergency Services and industry representatives require the use of GNSS:** during the European Emergency Number Association Conference in April 2014, 94.2% of respondents indicated that GNSS data from mobile devices should be used for locating callers.



# Why multiple GNSS?

✓ When buildings block the signal and reduce the number of visible satellites, the availability of more constellations ensures a **much more accurate final position**



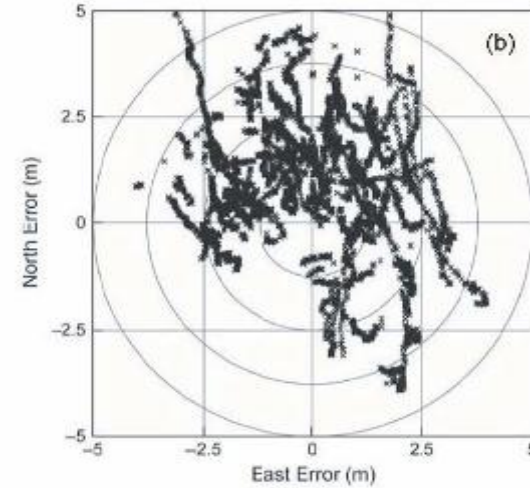
✓ Having more satellites in view has beneficial effect on **reducing the time to the first fix**

✓ The **robustness of the position is improved**, and even if a satellite or constellation are not available or providing incorrect data, a reasonable accuracy will continue to be provided.

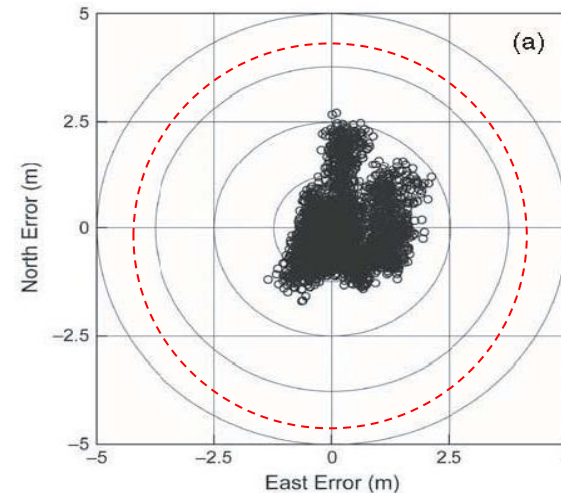




# Why satellite based augmentation system (SBAS) where available?



**GPS**



**GPS + SBAS**



# The European GNSS Programmes: EGNOS and Galileo

## Galileo

- Global Navigation Satellite Systems (GNSS)
- Fully compatible with GPS
- Open service free of charge and delivering dual frequencies (better performances)



## EGNOS

- Satellite Based Augmentation System (SBAS)
- Deliver corrections that improves GPS (ionosphere and system errors)
- European coverage (but under extension in other regions)



# EGNOS is operational since 2009

IP/09/1399

Brussels, 1 October 2009

## Commission launches EGNOS Open Service - free access to citizens and businesses

*The European Commission has declared today the official start of operations by EGNOS, the European Geostationary Navigation Overlay Service, with its Open Service now available for free to businesses and citizens. EGNOS is Europe's first contribution to satellite navigation and a precursor of Galileo, the global satellite navigation system that the European Union is developing.*

Antonio Tajani, Vice-President for Transport, said: "What we are doing today opens the door for European businesses and citizens to benefit from the myriad of better applications and new opportunities made possible by more precise navigation signals. We are laying the foundation stone of a very imminent future."

EGNOS is a satellite-based augmentation system that improves the accuracy of satellite navigation signals over Europe. The accuracy of current GPS signals is improved from about ten metres to two metres.

Both European businesses and citizens can greatly benefit from EGNOS. It can support new applications in a number of different sectors such as agriculture, like high-precision spraying of fertilisers, or transport, like automatic road-tolling or pay-per-use insurance schemes. EGNOS can also support much more precise personal navigation services, both for general and specific uses, for example systems to guide blind people

EGNOS will be certified for use in aviation and other safety-critical areas in compliance with the Single European Sky regulation. Through EGNOS a Safety-of-Life service is expected to be in place by mid 2010. This service will provide a valuable warning message informing the user within six seconds in case of a malfunction of the system. A Commercial Service is under test and will also be made available in 2010.

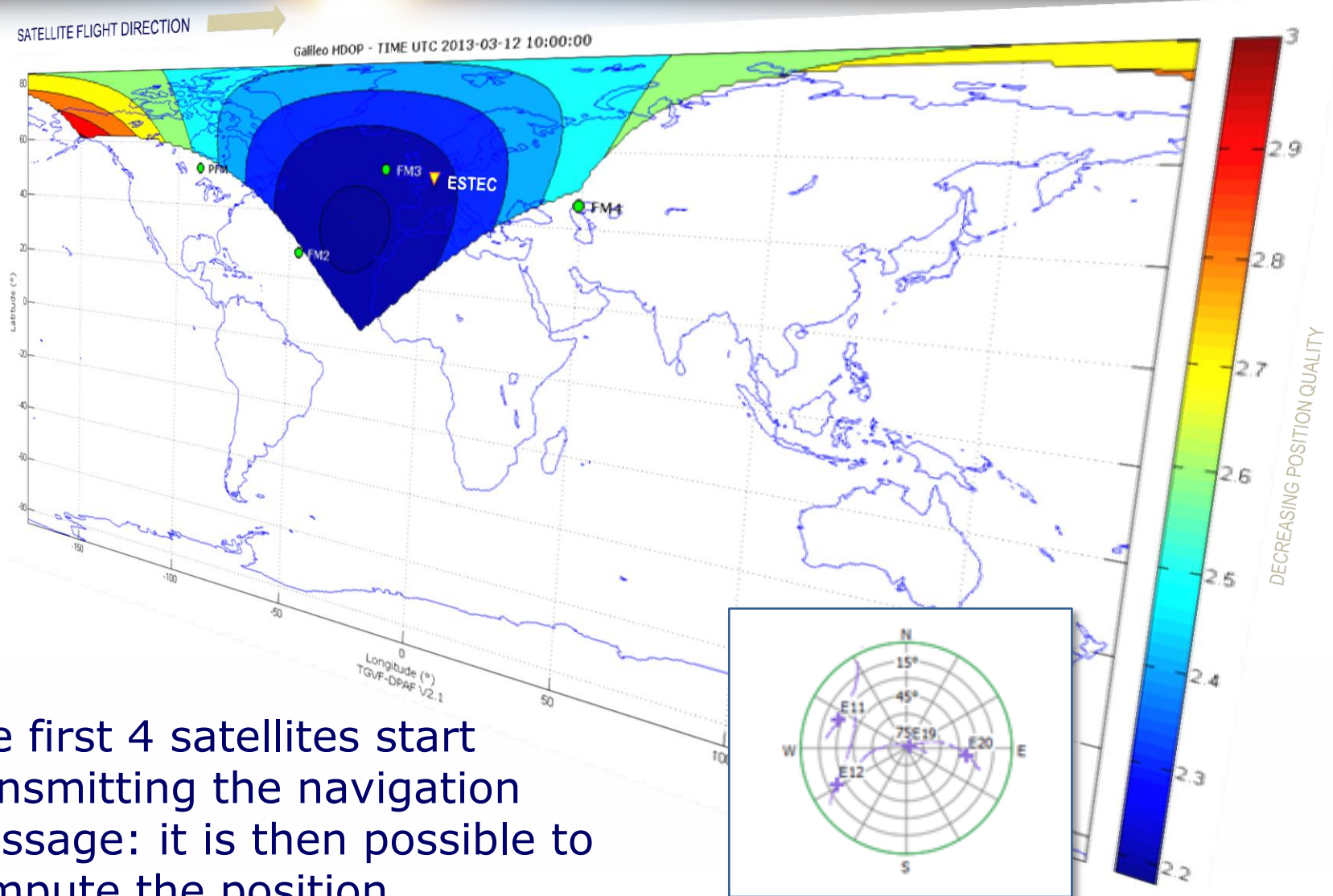
Both the Open Service and the Safety-of-Life Service are provided free of charge, and the European Union is committed to supporting EGNOS for the long term, even after Galileo has become operational. This includes extending its geographical scope within the coverage of the three satellites involved.

The operations of EGNOS are managed, through a contract with the European Commission, by the European Satellite Services Provider, ESSP SaS, a company based in Toulouse, France, founded by seven air navigation services providers. The contract between the Commission and ESSP SaS was signed yesterday, 30 September, and will ensure the management of the EGNOS operations as well as the maintenance of the system until the end of 2013.

- ✓ It is certified to be used in Civil Aviation and many airports in Europe are introducing approaching procedures based on EGNOS
- ✓ The performances are monitored constantly
- ✓ Additional information on [www.egnos-portal.eu](http://www.egnos-portal.eu)



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



The first 4 satellites start transmitting the navigation message: it is then possible to compute the position

# Galileo has already taken-off



- 4 **operational satellites** have been launched, as 12 October 2012
- **26 satellites** are in production:
  - ✓ 2 satellites ready for launch in summer 2014
  - ✓ additional 4 satellites ready for lunch by end of 2014
- Galileo will start **Early Operational Services** in 2014/2015

# Galileo Early Services



## Early Galileo Open Service

- ✓ Freely accessible service for positioning, navigation and timing
- ✓ fully interoperable with GPS
- ✓ used for mass-market applications, including smartphones and in-car navigation

## Search and Rescue (SAR) contribution to the COSPAS-SARSAT service

- ✓ Forward link: Time reduction in the detection and localization of SAR alert

## Early public regulated service (PRS)

- ✓ Encrypted service designed for greater robustness and assured availability
- ✓ Signal resistant to interference, jamming, spoofing and meaconing

## Commercial Service demonstrator

- ✓ Added-value features for the development of applications for professional or commercial use: (e.g. High accuracy, Authentication)

# How can Galileo enhance emergency call location?

## Contribution to Multi-GNSS advantages

- Galileo in combination with other GNSS provides improved **accuracy, availability** and allows for a **faster time-to-first-fix\***

## Authentication

- Galileo is expected to be the only GNSS providing authentication to ensure the signal in space is not subject to spoofing interferences.

## Multipath Resistant

- The strength of Galileo signal, together with an advanced code modulations, makes Galileo **better mitigating multipath effects** (especially in E5, but also E1)\*\*

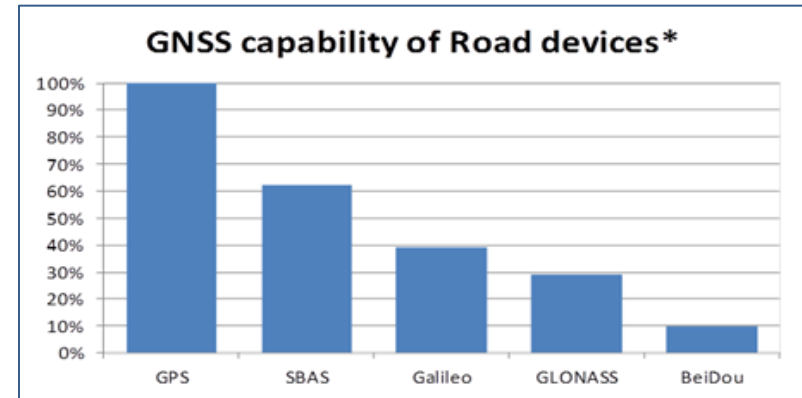
## Data-less signal

- Using the data-less signal, Galileo allows for an **enhanced indoor penetration, improved performances in urban canyon, better performances in noise measurements** and improved sensitivity in A-GNSS mode



# Satellite based augmentation (SBAS) and multi-constellation capability readiness

- SBAS (e.g. EGNOS) capability is commonplace in today's receivers
  - Extra accuracy when you need it at no cost
  - Level of confidence of GPS signal
- Multi-constellation (e.g. GPS/Galileo/Glonass) is rapidly becoming the baseline:
  - Much improved robustness and performance for users



Source: GSA analysis on GPS World Survey 2013.  
Percentages based on number of models available, not sales

# Galileo testing campaign for eCall manufacturers

In December 2013, modules manufacturers were invited to take part in a **specific test campaign for eCall modules**:

- To test the reception and processing of **Galileo Open Service Signals** for calculation of the position (also in combination with other GNSS)
- Coordinated by the European GNSS Agency and In cooperation with the **Joint Research Centre** of the European Commission (testing site in Ispra - Italy)
- **8 eCall in vehicle systems manufacturers** will participate in the tests
- This campaign follows the success of a **similar test campaign for GNSS chipset manufacturers**
- The testing will be performed starting in June 2014.

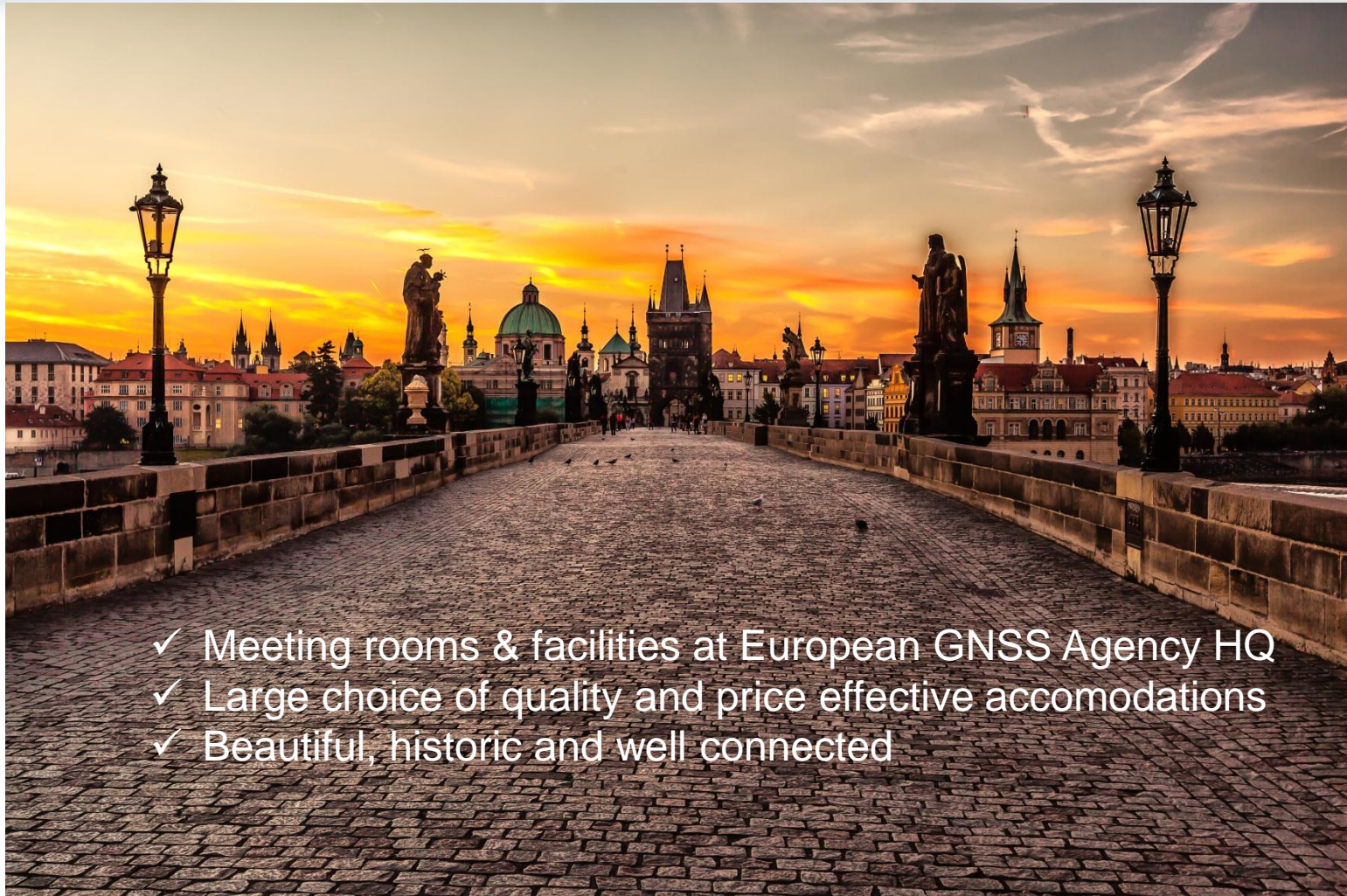


# Proposed approach for AECS

- ✓ Navigation module requirements: **multiple GNSS** is an essential requirement for an accurate and robust position of the accident. A GNSS system that is under civil control should be included in the multiple GNSS, to ensure the best availability of the signal in every region and under every condition.
- ✓ The European Commission eCall legislative proposal is requiring EGNOS and Galileo: we ask **to add Galileo** to the “**Test Methods** for the navigation module” of Annex 9 (necessary data provided in the amended document).



# Next meeting in the golden city?



- ✓ Meeting rooms & facilities at European GNSS Agency HQ
- ✓ Large choice of quality and price effective accomodations
- ✓ Beautiful, historic and well connected



**Thank you!**

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