

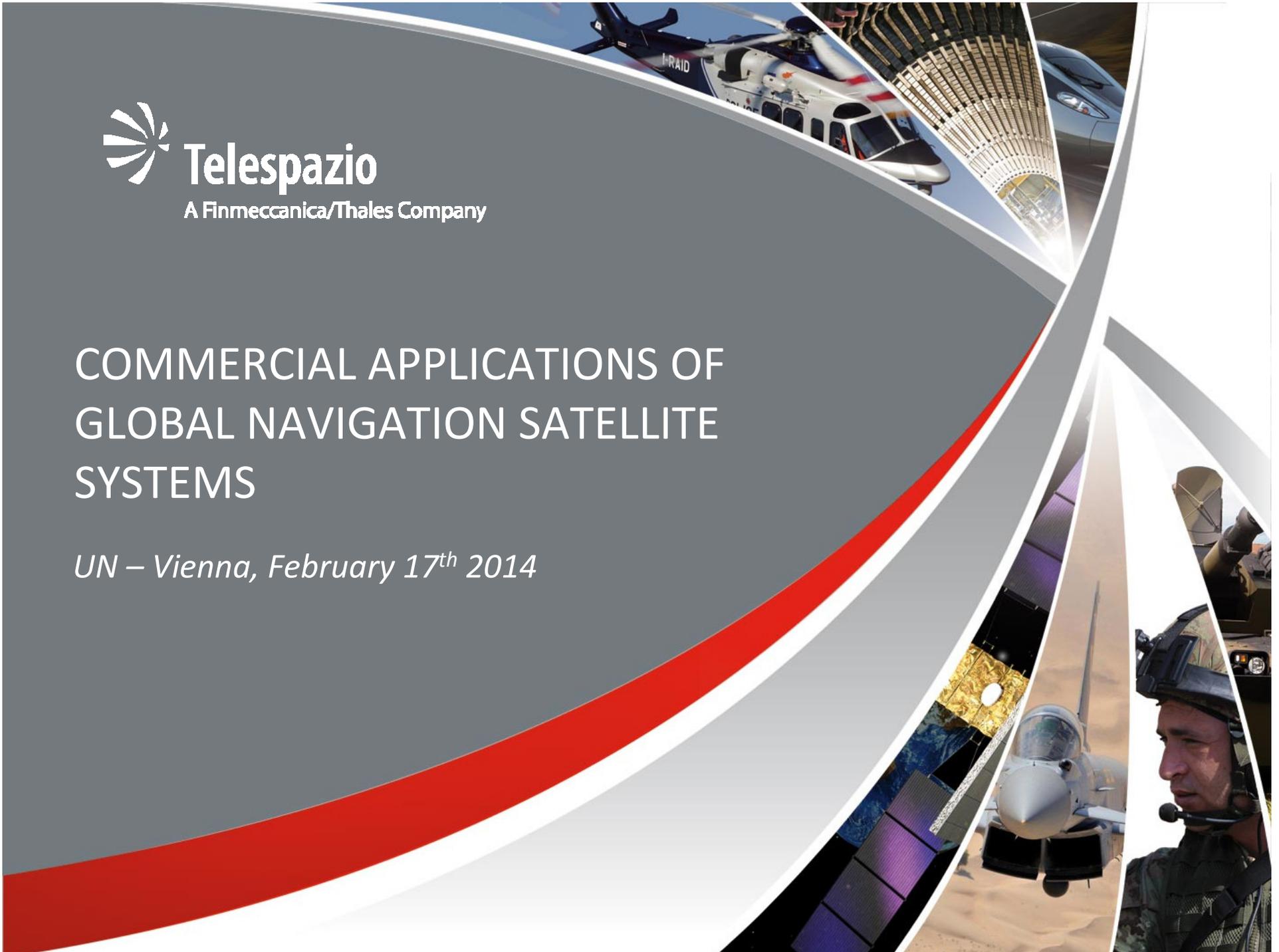


**Telespazio**

A Finmeccanica/Thales Company

# COMMERCIAL APPLICATIONS OF GLOBAL NAVIGATION SATELLITE SYSTEMS

*UN – Vienna, February 17<sup>th</sup> 2014*



The logo graphic consists of a grey triangle on the left, a red curved line starting from the bottom left and arching towards the top right, and the word 'Telespazio' in a bold, teal-colored sans-serif font.

# Telespazio

Telespazio, a joint venture between Finmeccanica (67%) and Thales (33%), is one of the world's leading players in satellite services. Telespazio is a leading company in sectors that are becoming increasingly important for public institutions, business operators and consumers, with activities ranging from the design and development of space systems to the management of launch services and in orbit satellite control; from Earth observation services, integrated communication, satellite navigation and localisation, to scientific programmes.

Telespazio relies on a wealth of experience of the highest level, stemming from technological expertise acquired over 50 years of business practice. The Company's experience is also drawn from the management of space infrastructure - including the Fucino Space Centre, the world's largest civilian teleport - as well as from its involvement in major space programmes, including: Galileo, EGNOS, Copernicus, COSMO-SkyMed, SICRAL and Göktürk.

The company covers the whole space market value chain through its four business units: Satellite Systems & Applications, Satellite Operations, Geoinformation and Networks & Connectivity.

The company, headquartered in Rome, Italy, employs approximately 2500 people. It relies on an international network of space centres and teleports and operates worldwide through many subsidiaries, in France, Germany, UK, Spain, Hungary, Romania, and has consolidated its presence in South America with Telespazio Brasil and Telespazio Argentina. It operates in the US via Telespazio North America. In Italy, the company is also present through e-GEOS (in which the Italian Space Agency holds a 20% interest).

# Telespazio in the World



# Our Customers

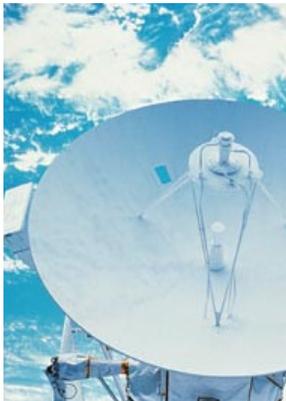


Public Administration



# Telespazio on EGNOS and GALILEO

- Main Telespazio activities and competences



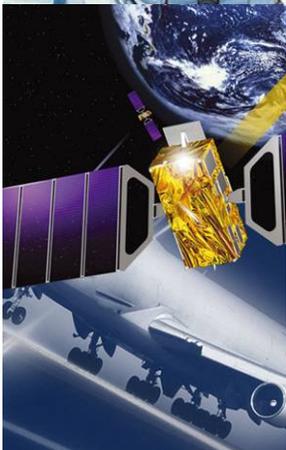
## Operations

- ✦ EGNOS SERVICE PROVISION 2014-2021
- ✦ EGNOS NLES Services
- ✦ HISTB and SPEED OPS
- ✦ EGNOS V3 OPS leader (Phase A, B)
- ✦ GIOVE-B OPS
- ✦ Galileo IOV/FOC1 WP6 (Spaceopal)
- ✦ GCC O&M



## EGNOS Service Provision & Applications

- ✦ Several internal R&D activities
- ✦ Top SP user of EDAS
- ✦ Service prototyping leader on Road (SCUTUM, EGNOS2Road), Maritime/Rail/Multimodal (MENTORE, Medusa), Aviation (SENECA) in EU
- ✦ International relations outside EU such as Africa (METIS, Medusa, SIRAJ)



## Simulation Engineering Tools

- ✦ Galileo System Simulation Facility (GSSF)
- ✦ Galileo GMS AIV Platform (AIVP)
- ✦ Galileo GCS Constellation Simulator (CSIM)
- ✦ Galileo Virtualisation & Training Platform
- ✦ GIOVE/Galileo Performance Centre
- ✦ Test Preparation and Validation Facility (TPVF)



## Engineering & Consultancy

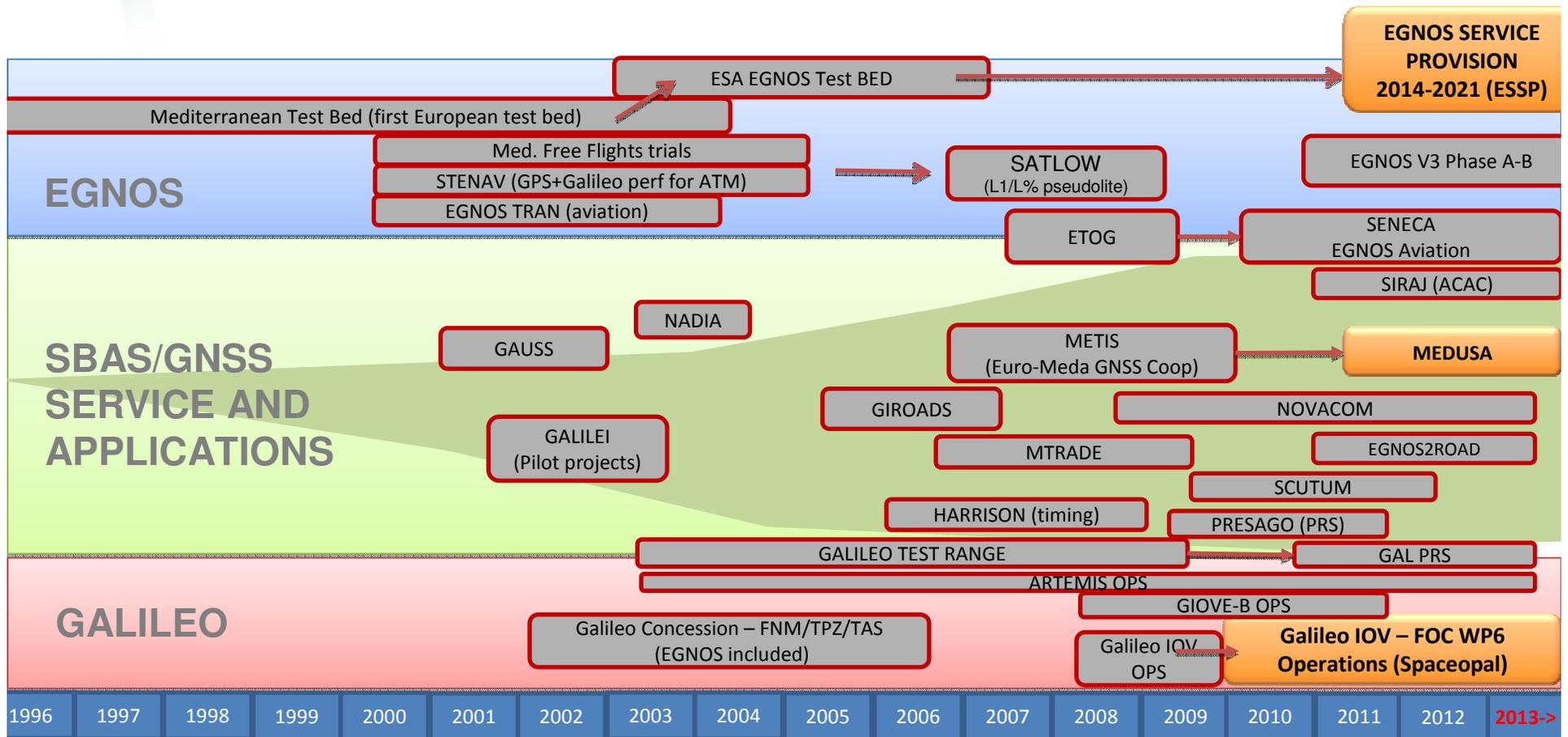
- ✦ Support to ESTEC & main National Space Agencies on GNSS/SBAS
- ✦ Engineering support at ESOC Navigation Facility
- ✦ Support to German, UK, France & Italy GNSS industrials (Galileo system, GMS, security)
- ✦ GIOVE-M support (e.g. TGVF)



## Telespazio's role in GNSS

- Telespazio is developing a wide range of applications based on Galileo, for civilian use (Open Signal and Commercial Services), as well as government use (Public Regulated Services).
- Galileo and EGNOS (European Geostationary Navigation Overlay Service), infrastructure that guarantees satellite navigation enhancement in Europe, will foster the development of applications for land, air, rail and maritime transport, telecommunications, Earth mapping, oil exploration and mining.
- For several years, Telespazio has been participating in satellite navigation projects. These include the SENECA programme supported by the Italian Space Agency and ENAV, for preparing Italian Aviation for the widespread use of satellite navigation based on EGNOS, and MEDUSA, a European program for introducing such services in the countries of the Mediterranean basin.
- Telespazio has also developed solutions for the tracking and tracing of hazardous materials, that has been longly tested by Italy's leading oil & gas company, ENI, for the management of over 300 vehicles, in the European projects such as SCUTUM for which Telespazio acted as coordinator.

# Telespazio on Satellite Navigation (since 1996)





# Telespazio on EGNOS

## Service Provision contract (2014-2021)

EGNOS SERVICE  
PROVISION  
2014-2021 (ESSP)

- In July 2013 Telespazio won with ESSP the EGNOS Service Provision contract with European Commission for the period 2014-2021 (8 years, >€500M total budget)
- Telespazio is the key ESSP subcontractor for:
  - Maintenance (managing industry sub-contracts: Thales Alenia Space and British Telecom )
  - EGNOS promotion and user support (with a focus on road, maritime, rail, multimodal transport)
- The Telespazio Group is involved in this contract: TPZ Italy as prime (Rome), TPZ France (Toulouse) and TPZ Spain (Torrejon/Madrid)
- Telespazio is now on a unique position to support the EU effort in exploiting EGNOS including extension and evolutions
- Telespazio is supported by FINMECCANICA and THALES Companies for each specific market sector
- The Space Alliance with THALES ALENIA SPACE is a key element

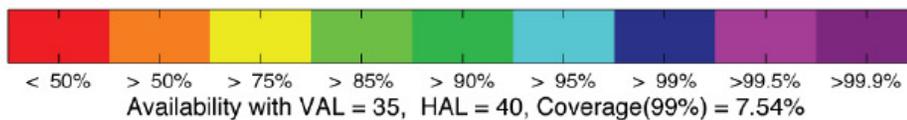
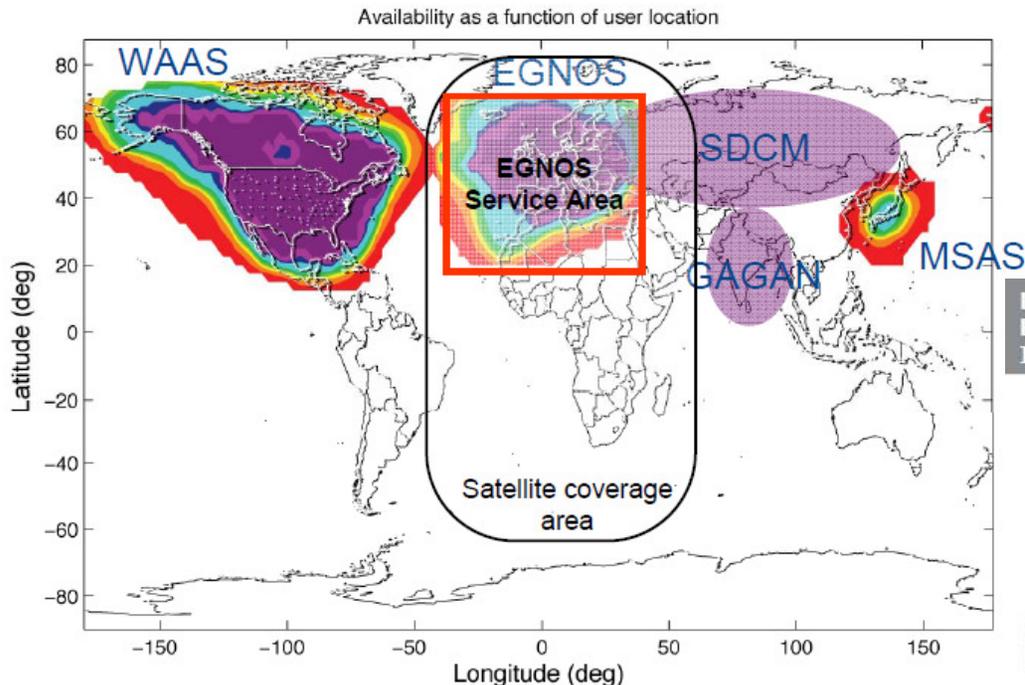


# European effort on

- EGNOS is the Europe's first venture into satellite navigation, improves the open public service offered by the USA's GPS
- EGNOS has been designed to address multi modal transport domain and based on international ICAO standard for SBAS (Satellite Based Augmentation System)
- It makes GPS suitable for safety critical applications (flying aircraft or navigating ships through narrow channels, accurate positioning of assets)
- EGNOS is operational since 2009 and delivers:
  - Open Service (OS): free access most of GPS receiver on the market
  - Safety of Life service (SoL): SBAS compliant, mainly aviation users
  - Commercial Service (CS): raw and processed data provision via terrestrial data link for added value services)
- EGNOS is fully integrated with GALILEO: the EU global Navigation System under completion
- See [www.egnos-portal.eu](http://www.egnos-portal.eu)

# The context: “SBAS patchwork”

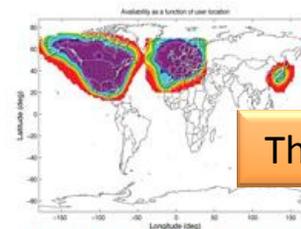
- EGNOS is part of a “patchwork” of SBAS Regional Services
- WAAS in USA, EGNOS in Europe and MASA in Japan
- Others SBAS under development



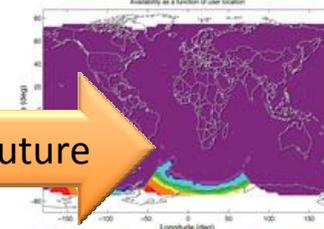
Source: Stanford University

Long term (2020-2025) plan – Global SBAS  
Extract of joint presentation SBAS provider  
IWG23

Current Coverage WAAS-EGNOS-MSAS



Dual Frequency / dual GNSS  
WAAS-EGNOS-MSAS-SDCM-  
GAGAN  
with expanded network of  
stations in South hemisphere

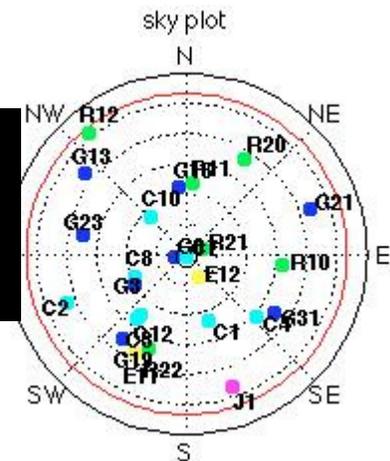
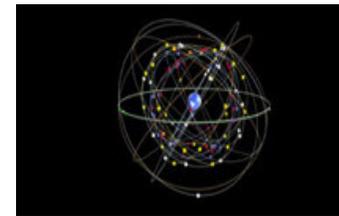


The future

# The context: “System of Systems”

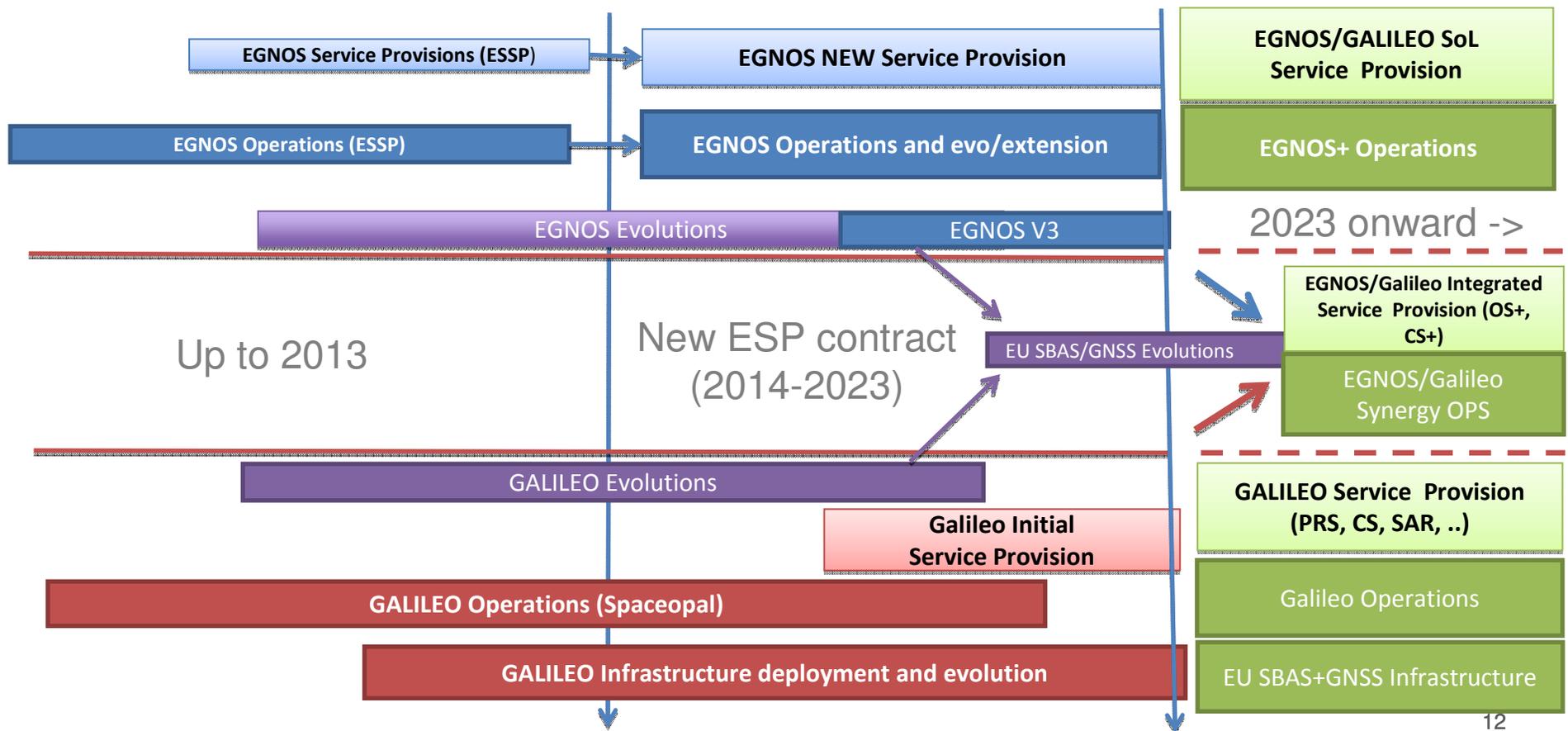
In the next year the GNSS context will evolve as follows:

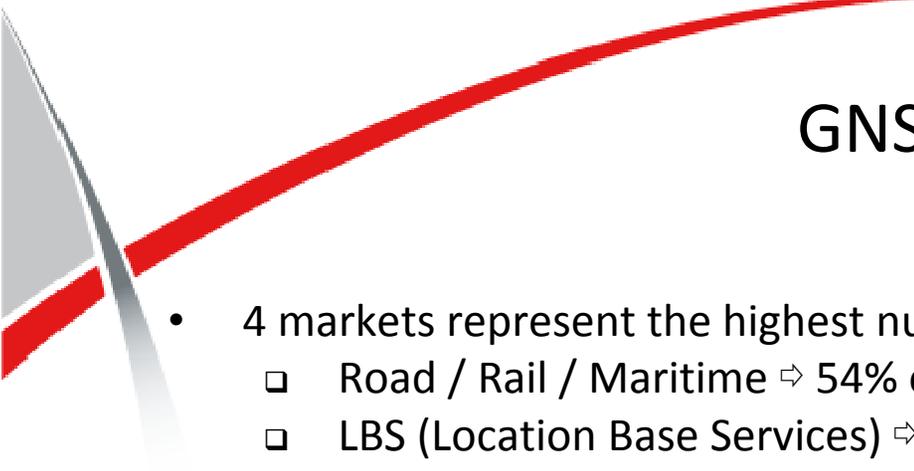
- 4 constellations (GPS, GLONASS, GALILEO, BEIDOU)
- More than 80 satellites
- Different Frequencies and signals
- Interoperability
- Full integration with SBAS regional services



# EU SBAS/GNSS Long Term vision

- EGNOS and GALILEO: a single effort, a single future



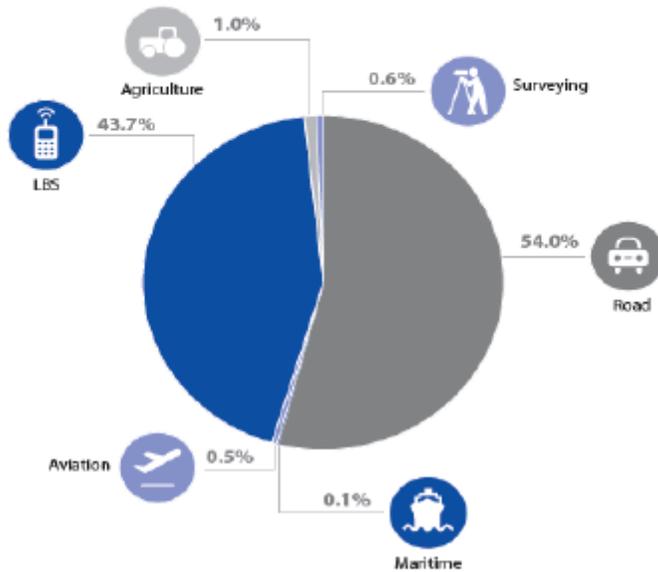


## GNSS services

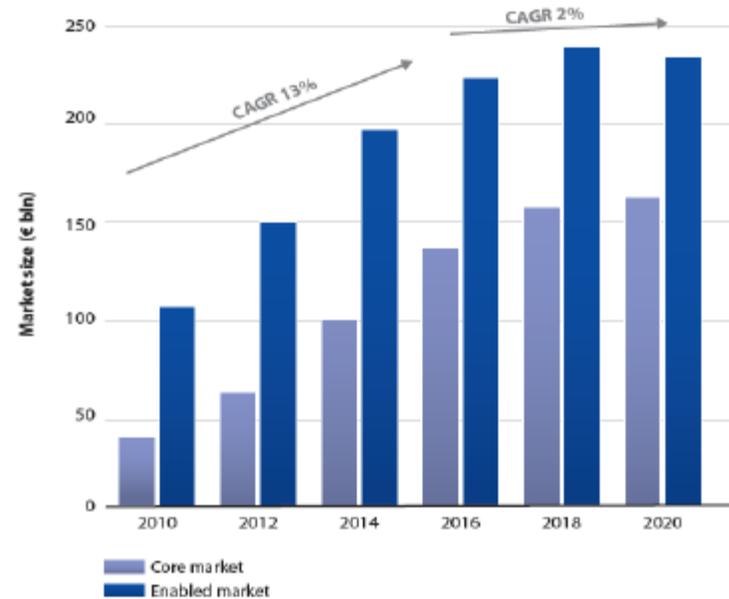
- 4 markets represent the highest number of users:
  - ❑ Road / Rail / Maritime ⇨ 54% of the market
  - ❑ LBS (Location Base Services) ⇨ 44% of the market
  - ❑ Agriculture ⇨ 1% of the market
  - ❑ Aviation ⇨ 0,5% of the market
- The choice of market segment is a function of the type of industry involved and of the related associated know-how
- Telespazio is positioning itself in particular:
  - On the most important market (Road, Rail & Maritime)
  - On more complex although with more limited % of the market (Avionics)
  - On the Galileo PRS (Public Regulated Service), the navigation service restricted to authorized governmental users in order to ensure high availability, reliability and continuity of service

# GNSS Market Analysis

Global core GNSS market by segment (cumulated revenues 2010-2020)



Global GNSS market size (EUR bln)

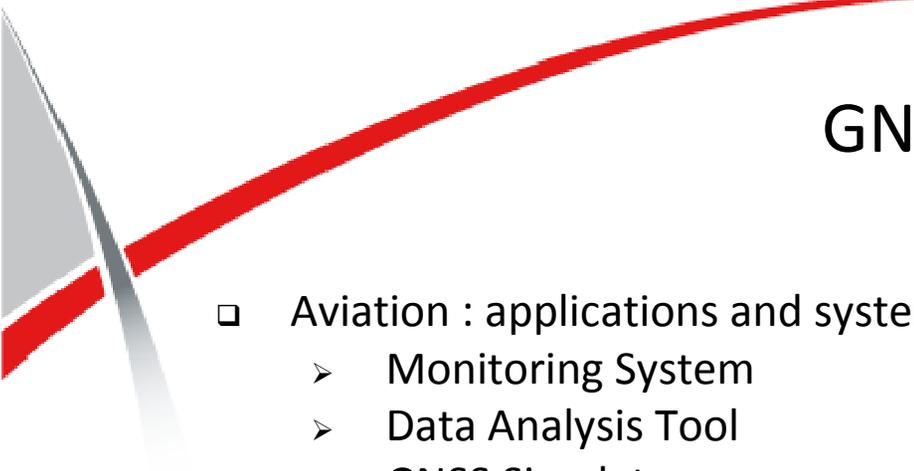


EGMER (European GNSS Mission Evolution ) Consolidation Workshop , Brussels, 26-27 March 2013



# GNSS services

- ❑ Road : applications and services for
  - Safety
    - ✓ e-call
  - Logistics
    - ✓ Transport of dangerous goods
    - ✓ Urban fleets regulated / fleet professional
    - ✓ Freights / logistics
  - User demand
    - ✓ Tolling and pay-per-use
  
- ❑ Rail : applications and services for
  - Safety
  - Logistics
    - ✓ Transport of dangerous goods
    - ✓ Freights / logistics
  - Increasing of capacity and efficiency for all rail users
  
- ❑ Maritime : applications and services for
  - Safety / Navigation and Pilotage
  - Logistics / maritime logistics efficiency



# GNSS services

- ❑ Aviation : applications and systems for
  - Monitoring System
  - Data Analysis Tool
  - GNSS Simulator
  - Apron Management

# GNSS applications and services - Road



LCS



SCOTUM



EGNOS2road

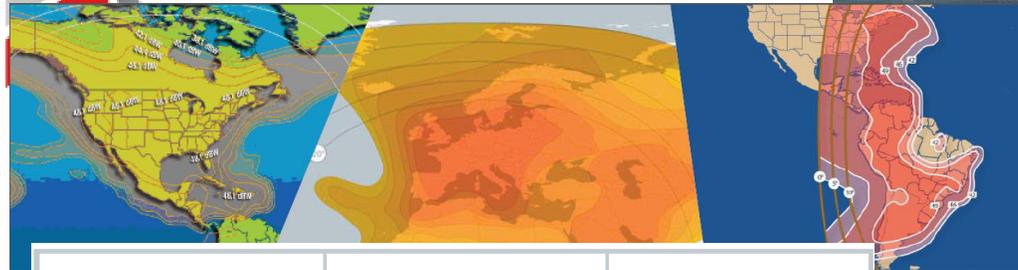


# GNSS applications and services - Rail





# GNSS applications and services - Maritime



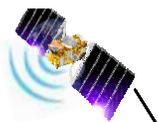
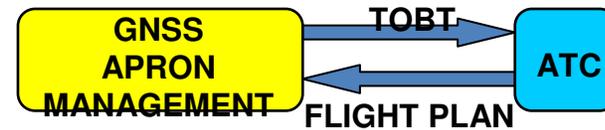
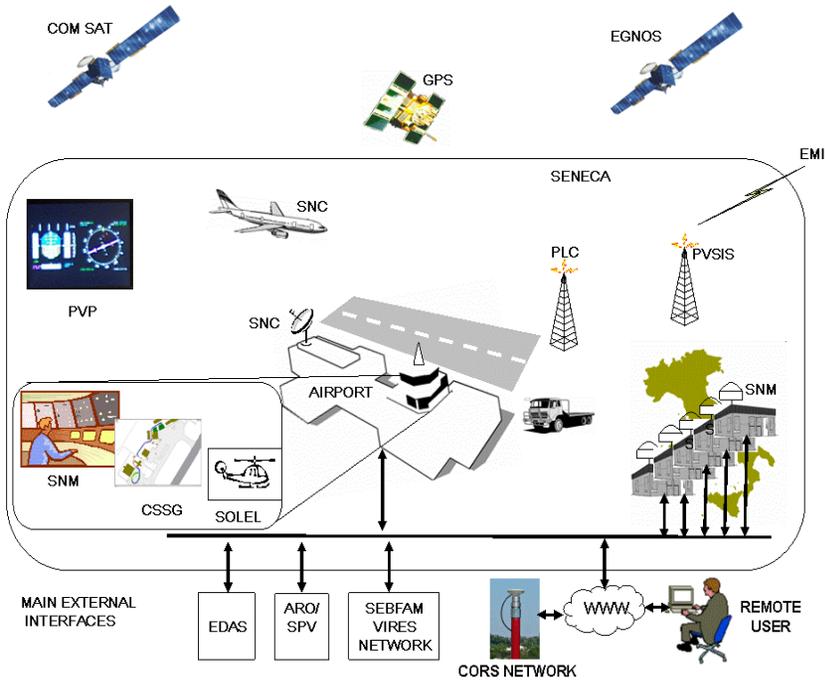
USER PROFILE	TYPE OF SERVICE	PERFORMANCE
Broad@Sea 50	Internet Access	128 - 640 Kb/s
Broad@Sea 100	Internet Access+VoIP	128 - 640 Kb/s
Broad@Sea 200	Internet Access+VoIP	256 - 1024- Kb/s
Broad@Sea 500	Internet Access+VoIP	512 - 2048- Kb/s



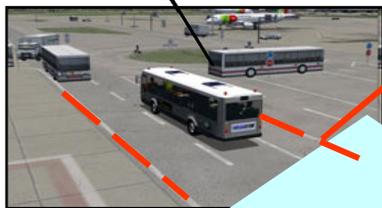
Maritime Broadband  
**Broad@Sea**



# GNSS applications and systems - Aviation



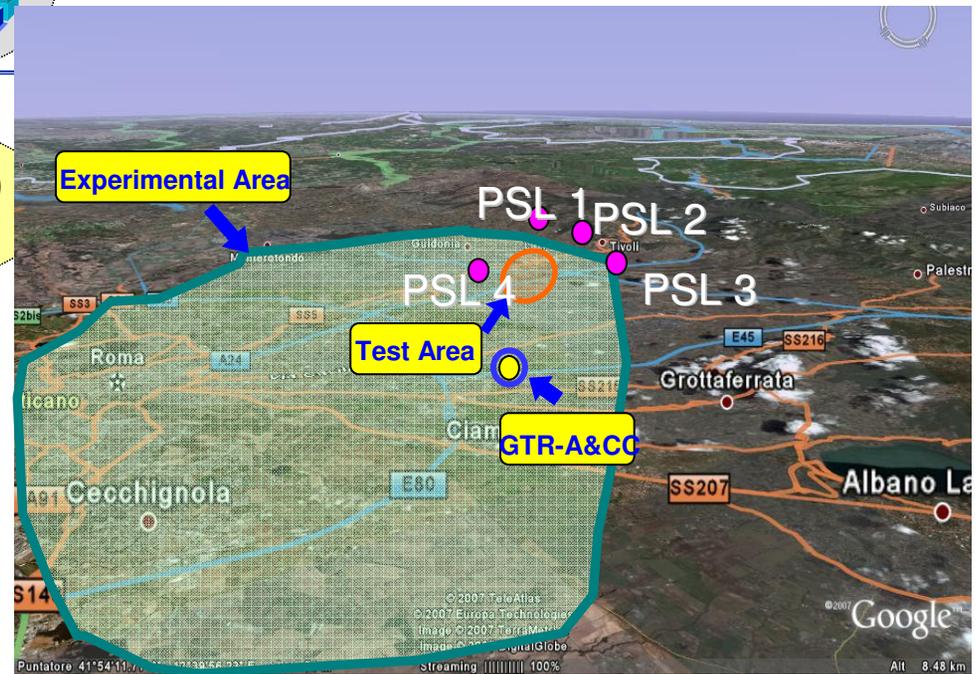
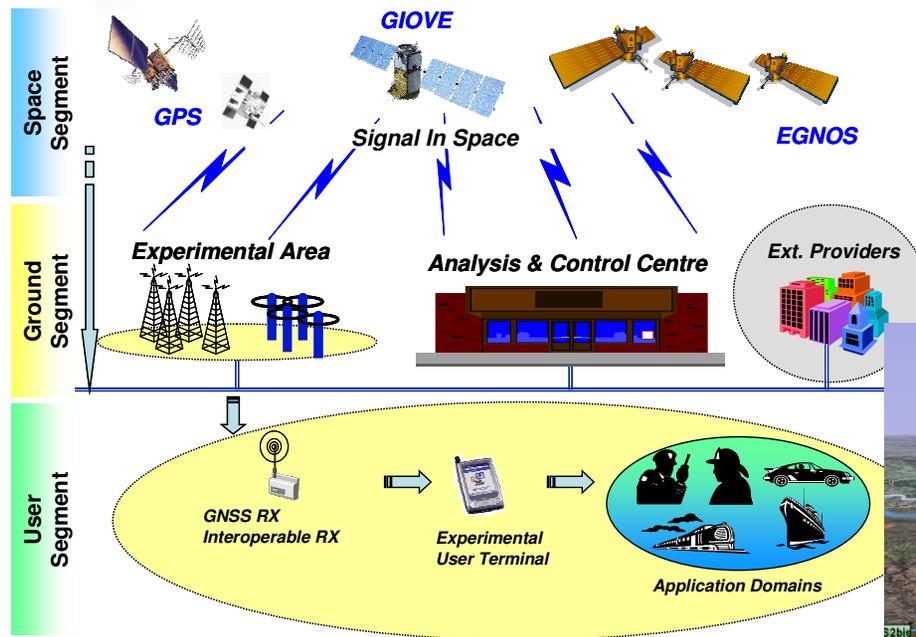
GPS/EGNOS  
CORRIDOR MONITORING  
GEO FENCING  
COLLISION AVOIDANCE



# GNSS applications and systems

## GALILEO Test Range

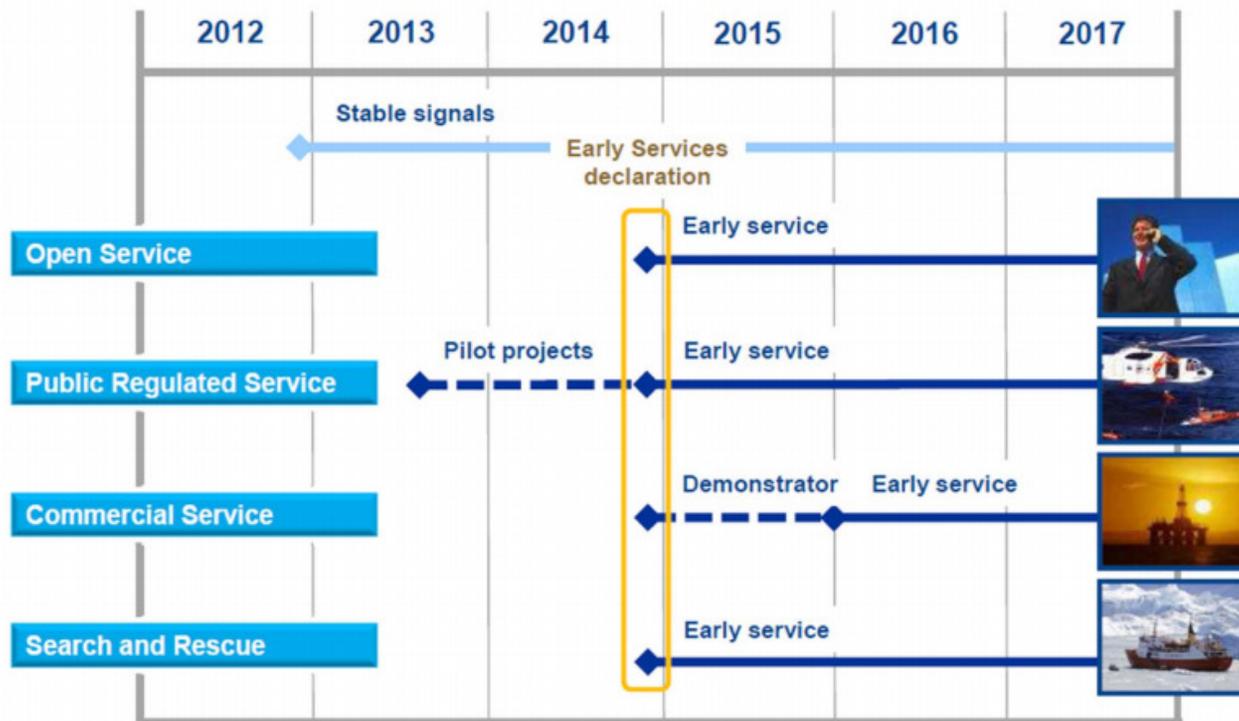
GNSS applications and systems developed and experimented also in the frame of the Galileo Test Range (GTR)





# Galileo Services Provision Timeline

Early services will be provided from 2014 with a gradual transition towards full services as more satellites become available



# What's next

## *From Technology Demonstration to Commercial Implementation*

### Key factors

- ❑ Continuous availability
- ❑ Security
- ❑ Certification

In order to be ready to provide value added services, the applications proposed by service providers should be subject to a verification and validation process, to check the compliance to regulations.



- A reference center should be needed to carry on the technical validation activities e.g. for road applications
- European networking with centres in other EU countries (such as in Germany)

EGNOS extension to East EU and Middle-East areas and Africa now under evaluation