

EGNSS

New applications and services

A priority of the French authorities

GNSS.asia Australia Workshop

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Rational

- **User needs**

- Civil Aviation
- Rail
- Maritime
- Road
- Location-Based Services
- Other services

- **EGNSS offers**

- EGNSS services
- Confidence & Robustness
- High precision

**Market
Segments**



User needs

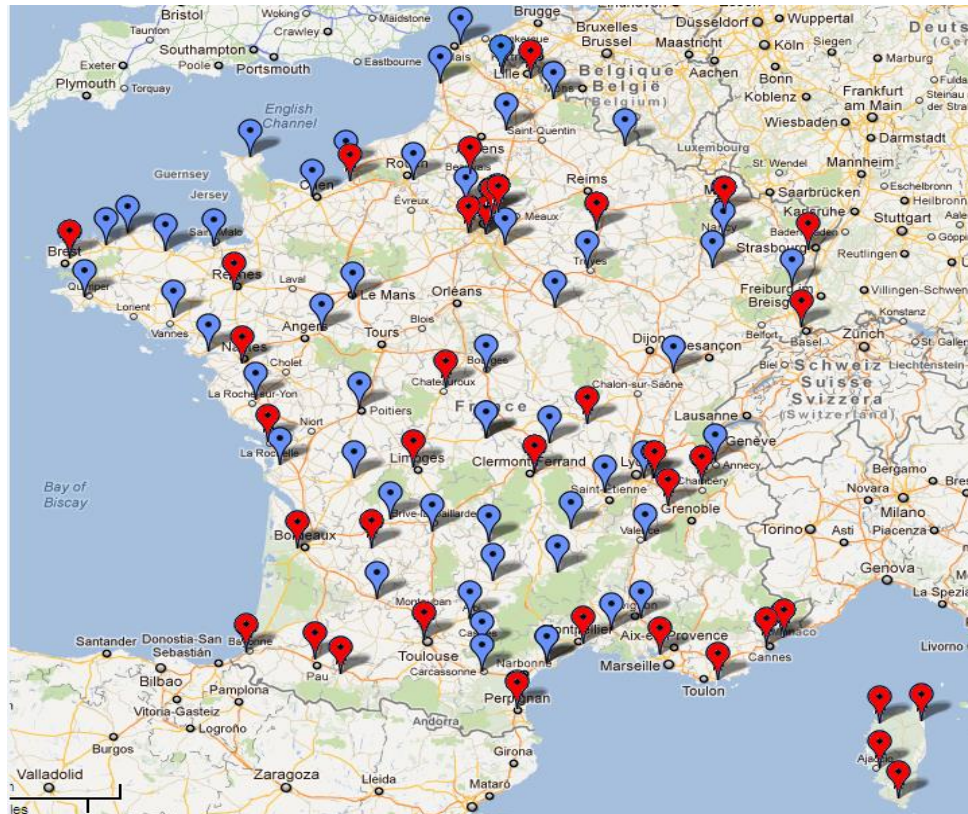
Civil Aviation (1)



- Civil Aviation => a 2 step strategy
 - 2018 : EGNOS => secondary airports
 - ⤴ Increased safety (vertical guidance on final)
 - ⤴ Increased accessibility (vs conventional nav aids)
 - 2025 : Galileo + GPS + EGNOS
 - ⤴ Improved robustness of the GNSS (bi-frequency, bi-constellation)
 - ⤴ Conventional nav aid network optimization

User needs Civil Aviation (2)

ILS CAT I rationalisation plan



Red: 2016 Airports with ILS reduced network maintained by DSNA

Blue: Airports where the existing ILS Cat I is proposed to be replaced by a PBN approach

EGNOS supports ILS Cat I equivalent performance and reduces DSNA infrastructure costs by 5 M€/year (source DSNA)

User needs Rail



■ Regional network

- CBA on introduction of ERTMS satellite in the regional European Network (about 15 selected countries):
 - ⤴ Generates benefits for some 35 billion€
 - ⤴ Costs sum up to 16 billion€
 - ⤴ Overall Benefit/Cost ratio is 2.2
 - ⤴ Figures in a 35-year time horizon
 - ⤴ CBA carried out by the Bocconi University (Milan Italy) in the frame of the EU FP7 R&D programme
 - ⤴ Refinement of the figures on a case-by-case analysis taking into account specific national features in terms of control systems
- Work in France with all the relevant stakeholders



User needs Maritime



- Working on a strategy to get benefits from using the European GNSS
 - EGNOS Step 1 : corrections received via existing telecom means of current Aids to navigation (DGPS, AIS), using EDAS server
 - ⤴ User equipment not impacted and improved coverage
 - ⤴ Cost saving per DGPS station (renewal) : 145K€ (75K€ instead of 220K€)
 - EGNOS step 2 : services from the EGNOS SIS
 - ⤴ Removal of the DGPS stations
 - ⤴ Improved services (using the EGNOS integrity)
 - Getting benefits from a robust multifrequency & multiconstellation GNSS
 - MEOSAR service

User needs Road



- 38% of the global core GNSS downstream market
 - Cumulative core revenue 2013-2023 – GSA market report 2015
- Improved “classical” navigation of the vehicles
- Several “safety” service levels
 - Warning & manoeuvring suggestions
 - Autonomous vehicles
- Liability services
 - Pay as you drive, Tachograph...
- Need for multiconstellation & multifrequency receivers + hybridization
- Authentication where needed



User needs

Location-Based Services



- 53% of the global core GNSS downstream market
 - Cumulative core revenue 2013-2023 – GSA market report 2015
- Predominance of the smartphones and tablets
- Strong integration of the value chain inside the smartphones and tablets
- Strong trend to hybridization (looking for indoor positioning)
- Constraint of the devices autonomy



User needs

Other services...

- Timing
 - Telecom, Energy, Banks & Stock exchanges
 - Critical infrastructure & applications
 - High level of confidence needed...
- Surveying
 - Increase in accuracy
 - Reduction of the costs of the GNSS receivers and the costs of the services
- Agriculture
 - Benefits from using EGNOS (fertilisers, pesticides, fuel)
 - 1000ha ~ 16K€/year (Source GSA)



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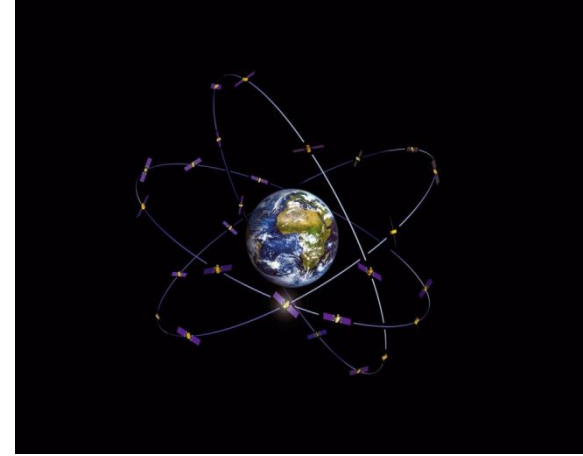
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**Market
Segments**



EGNSS offers The services



■ EGNOS

- OS, SoL, EDAS
- Today EGNOS V2 : mono frequency, GPS only
- Next version EGNOS V3 : bi-frequency, GPS+Galileo

■ Galileo

- Open Service
- Commercial Service (Authentication, High Precision)
- Public Regulated Service
- Search & Rescue

EGNSS offers

Confidence & robustness

- Integrity (RAIM technics, SBAS)
- Robustness against multipath : Galileo OS
 - Wide band, modulation (QPSK, BOC)
- Robustness against intentional or unintentional jamming
 - Increasing concern
 - Robustness of the user segment
 - Antenna processing, Hybridization
- Robustness against spoofing
 - Authentication OS (navigation message authentication)
 - Authentication CS (Code Authentication)

EGNSS offers High Precision

- Today High precision services already exist
 - GPS-Based
 - Dedicated infrastructure and operators
 - Require satellite or terrestrial telecommunication means
- Tomorrow with Galileo
 - Galileo CS will provide high precision
 - Infrastructure fully integrated in the Galileo system
 - No more need to use additional telecommunication means

Conclusion

- Approach based on a combined analysis of
 - User needs
 - EGNSS offers

=> *Market segments which could benefit from the EGNSS*

- EGNSS : publicly funded programmes for several end-user communities
- Public action aiming at the advent of GNSS solutions for the benefits of the citizens



Thank you...

