EGNOS Market Strategy and Achievements

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24 September 2019
EGNOS Service Provision Workshop, Rome

Integrated approach towards EGNSS adoption

At all levels of the value chain

Bodies influencing the market → Navigation Signal Providers → Chipset, receiver → Devices → Content & applications → Service providers

For each market segments

Market & User Knowledge

Market and technology monitoring and forecasting (i.e. market and tech reports)

User and industry consultations (i.e. user consultation platform, receiver workshops)

User satisfaction monitoring (i.e. EGNOS and Galileo surveys)

Demand Support

Definition of roadmaps with key stakeholders

Cooperation with receivers and apps developers

Technical support to EC to ensure EGNSS use in regulated applications

Offer Creation

Creation of new "made in Europe" products and services

HORIZON 2020

Fundamental Elements

AVIATION GRANT PROGRAMME EGNOS

NAVIGATION MADE IN EUROPE

EGNOS adoption overview

- IALA published Guidelines for the transmission of SBAS corrections via marine radiobeacons and AIS
- ~ 85% EGNOS OS penetration in receivers models

- 646 EGNOS based approach procedures
- > 40000 LPV capable flights/month
- >30% Rx models suitable for drone navigation with EGNOS/Galileo in the market

- GNSS included in the ERTMS roadmap
- GNSS in non safety relevant applications growing

- EGNOS leadership with 85% of farmers using GNSS

- >75% of surveying and mapping receivers are EGNOS compatible

- 72% of EU tolled roads are GNSS-based.
- Regulated applications: eCall and Digital Tachograph regulations leveraging EGNSS

EGNOS-LPV capability on board and market offer is growing

Airbus Wide-body family

Customer Option in A350
Under development for A330

ATR 42, 72

-600 series
Customer Option

Airbus Narrow-body family

Standard in A220
Under development A320 (2020)

Embraer ERJ Family

Embraer ERJ-135/140/145
Customer Option

Boeing 777X

Customer Option
Under development (mid-2020)

Bombardier

Q series / CRJ
Customer Option

By 2024
All airports with EGNOS approaches

By 2030
Full PBN environment

Growing equipped traffic due to:

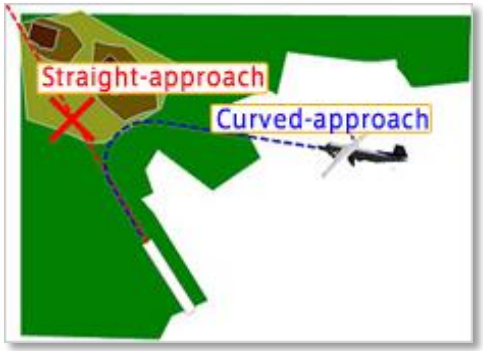
- Increased availability of avionics, also for regional and commercial fleet
- New equipped models entering into service, e.g A350
- SBAS in new models for commercial airlines:
  - Airbus: A320/A330 by 2020/2021
  - Boeing: 777X by 2020

SWISS airBaltic FINNAIR AIR NOSTRUM LINEAS AEREAS Bristow FLYINGGROUP ESSP NAVIGATION MADE IN EUROPE

New airspace users, new operations powered by EGNOS

EGNOS enabler of Pins and LLR (HEMS, Police, Rescue)

EGNOS geometric altitude for curved segments (RNP-AR)



EGNOS for General aviation and secondary airports
>30 of IFR GA traffic is LPV capable, > 2000 non IRE

Enhanced and Synthetic vision systems minima below 200ft & low visibility ops

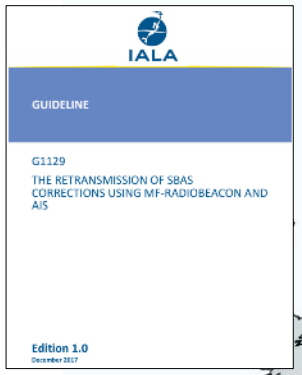
GNSS a must for **RPAS/UAV** BVLOS operations -> accuracy and integrity
Air taxi and package delivery coming soon

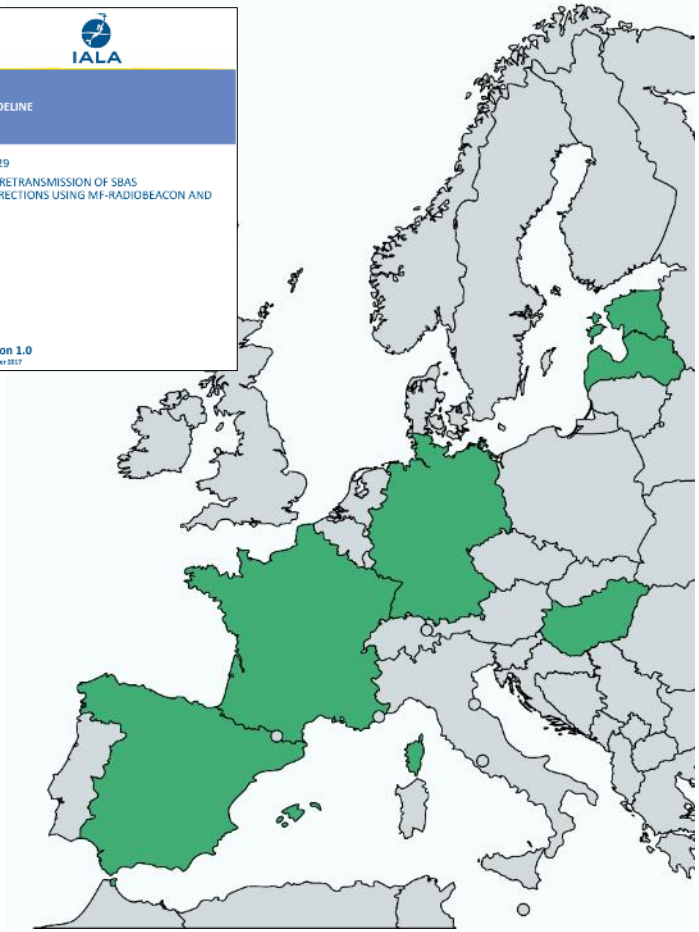
EGNOS GSA ESSP NAVIGATION MADE IN EUROPE

EGNOS in Maritime and Inland Waterways:
EGNOS contributes to resilient PNT, by providing a source of differential corrections

✓IALA, with GSA contribution, published Guidelines for the use of SBAS as a source of differential corrections in IALA beacons and AIS stations to provide a DGNSS service.

- ✓**6 Cou**ntries have implemented this solution
- ✓**All SOLAS vessels** in their waters can benefit from this service, with an IALA beacon Rx or a AIS Rx on board
- ✓Pilot Project website → egnosforaton.eu





- ✓90% of manufacturers have a SBAS-enabled product
- ✓**85% of GNSS receivers** are EGNOS enabled (not following specific standard for the use of integrity)

EGNOS GSA ESSP NAVIGATION MADE IN EUROPE

EGNOS as an enabler of resilient navigation: a stepwise approach

EGNOS complementing Differential GNSS shore infrastructure for inland and coastal waters (L1/2019)

EGNOS complementing Differential GNSS infrastructure providing integrity information for inland and coastal waters (compliant with IMO Res. A1046)

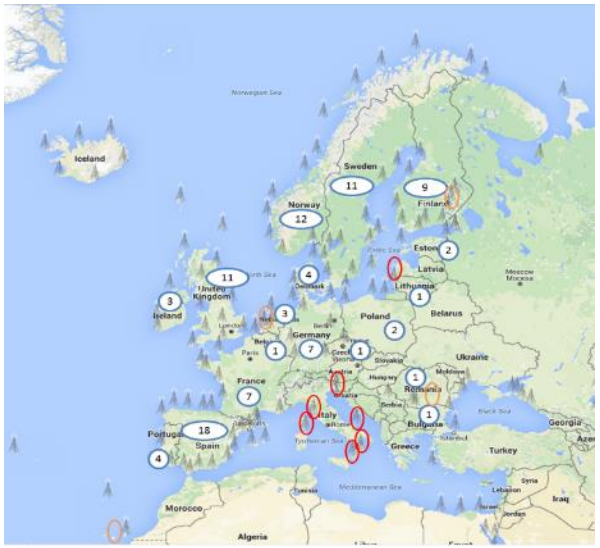
- Successful test campaign in Norway
- Ongoing test campaign in Finland

EGNOS enabled in shipborne receivers' models with integrity (L1/2022)

- SBAS Guidelines for shipborne receivers including tests specifications acknowledged by manufacturers and maritime authorities at RTCM.
- Ongoing proposal for standardization at IEC
- Kongsberg is implementing the guidelines in 2 commercial receivers

KONGSBERG

Fundamental Elements



IALA DGNSS Stations in Europe

DFMC SBAS enabling safety of life applications and maneuvering in ports

EGNOS GSA ESSP NAVIGATION MADE IN EUROPE

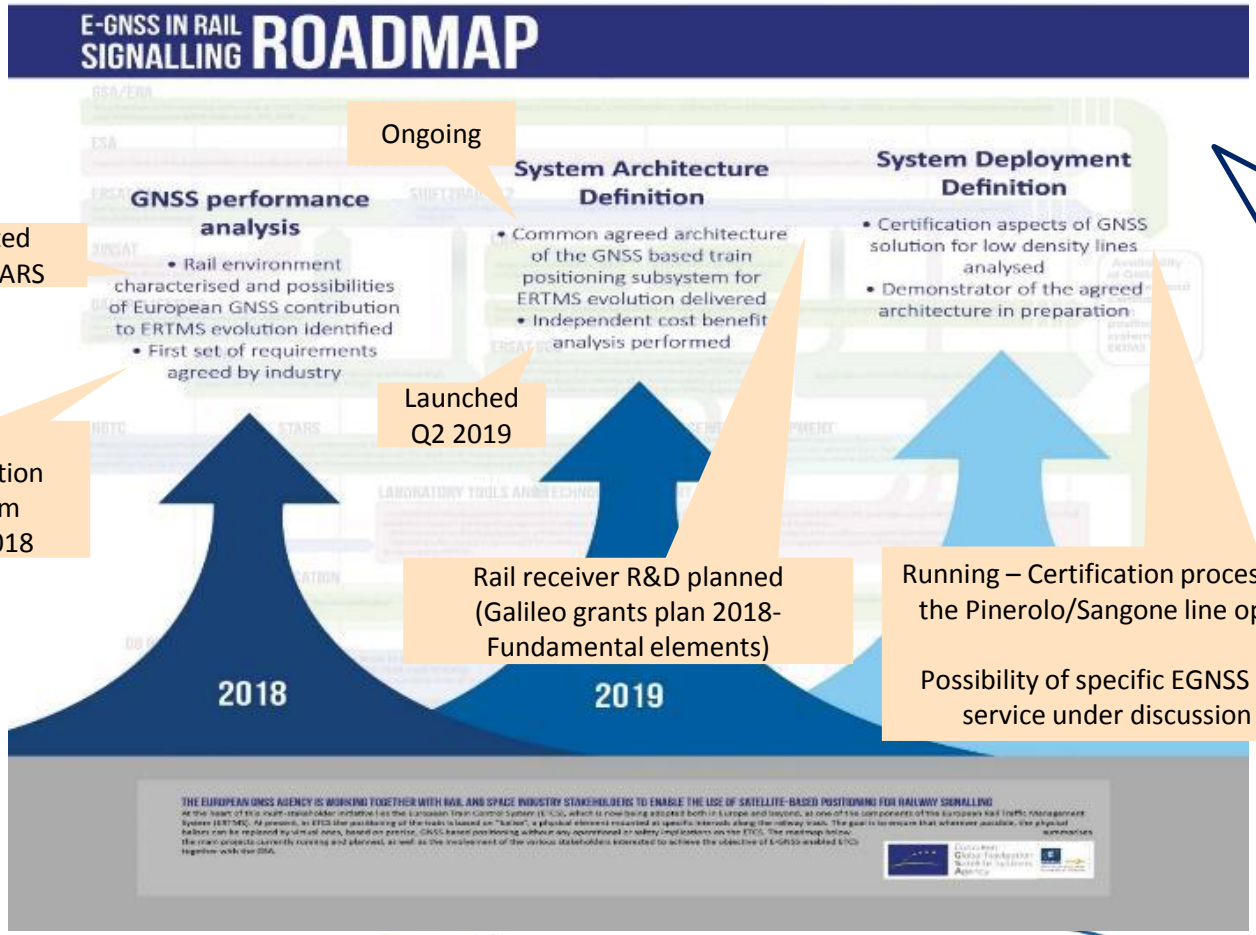
EGNOS contributes to rail operations safety and efficiency

Applications

- **Safety relevant applications**
  - Main Line Command & Control Systems
  - Low Density Line Command & Control Systems
- **Non safety critical applications**
  - Asset Management
  - Passenger Information Systems
  - Driver Advisory System

GSA is focusing on **inclusion of European GNSS** into the **future evolution of European Rail Traffic Management System** (ERTMS)

Short term roadmap for EGNSS in rail signalling



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UNISIG

CER

GSA

Shift2Rail

EUROPEAN UNION AGENCY FOR RAILWAYS

esa

ERTMS USERS GROUP

EGNOS

GSA

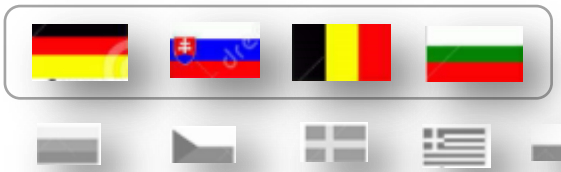
ESSP

NAVIGATION MADE IN EUROPE

EGNOS is used today in the majority of road professional devices and consumer platforms

Commercial vehicles

72% of EU total tolled roads (+79,000 Km) use GNSS



Soon: **Bulgaria, Czech Republic, Sweden, Greece, Poland…**

EU Regulations

Smart Tachograph regulation mandates EGNOS and Galileo to control driving time ***from Jun.2019***

Updated EETS Directive mandates EGNOS and Galileo in free-flow tolling using satellite positioning in EU ***from Oct.2021***

- **1.48 m EGNOS Rx** (71% of total GNSS)
- **1.28 m Galileo Rx** (62% of total GNSS)

Passenger cars

eCall regulation (EU) mandates EGNOS and Galileo in every new type of car/van sold in Europe ***from Apr.2018***

- **3 Million vehicles** *(end-2019)*

18 car brands, +25 models

Autonomous vehicles

Coming soon

HEADSTART GEOSAT Valeo CENELEC ETSI EUROPEAN STANDARDS ORGANIZATIONS RENAULT AKKA HORIZON 2020 Fundamental Elements ESSP NAVIGATION MADE IN EUROPE

EGNOS GSA

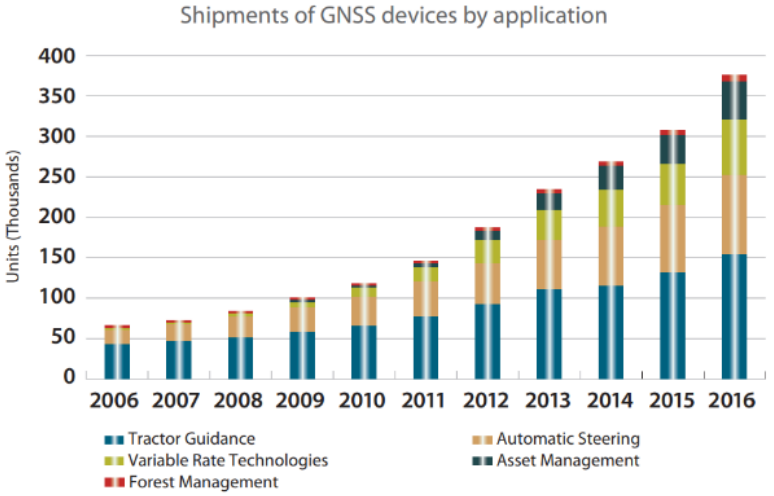
EGNOS provides affordable solutions for precision farming over Europe

Precision Farming -> Farm machinery & Automatic steering

Drones -> Variable rate application, monitoring

Swarm and Autonomous Machinery

IoT -> Agri logistic

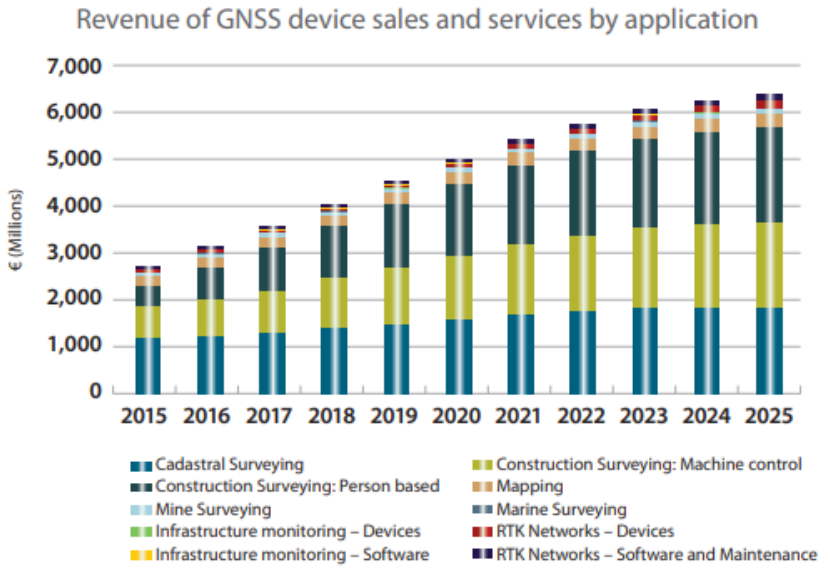


GNSS is **core** component or **complement other technologies** in the **digital farming ecosystem** (Agriculture 4.0) and **together with Copernicus** a **driver of the new CAP**

Around **85% of tractors** in Europe using GNSS are equipped with **EGNOS**, the preferred low-cost entry technology for precision farming in Europe

EGNOS is an effective option for mapping/GIS applications where metre accuracy is adequate

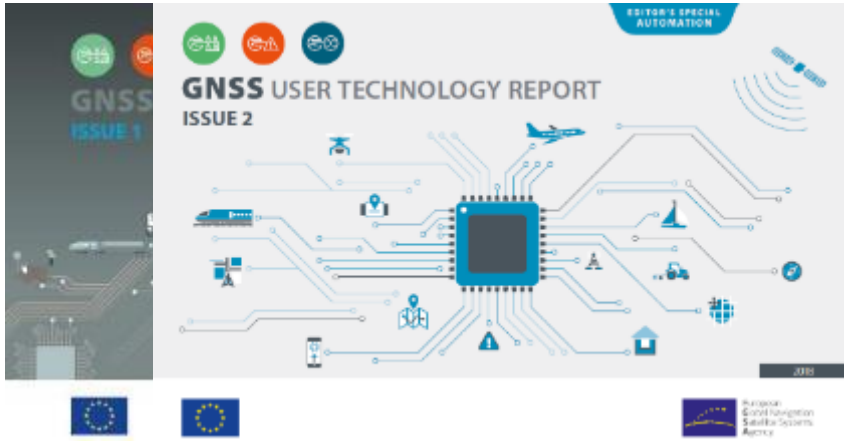
Cadastral surveying
Construction surveying
Machine control
Person-based applications
Mapping&GIS
Mine Surveying
Infrastructure Monitoring
Marine Surveying



Today, **more than 90%** of new mapping/GIS grade devices are **EGNOS enabled**

EGNOS widely used for **sub-meter mapping/GIS** applications

2019 GSA GNSS Market report coming soon!



The **2019 GNSS Market Report Issue 6**

- focuses on the market trends and drivers of the GNSS downstream sectors,
- Available on GSA websites **soon**

The **2018 GNSS User Technology Report Issue 2**

- an in-depth look at the latest state-of-the-art GNSS receiver technology
- Available **on GSA websites**

Sign up! at GNSS-Market-Report.gsa.space

THANK YOU!

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