



# EGNOS IN LAND APPLICATIONS MARKET UPDATE

EGNOS Service Provision Workshop 2015

Copenhagen, 30<sup>th</sup> September 2015

Carmen Aguilera  
Market Development Department



European  
Global Navigation  
Satellite Systems  
Agency



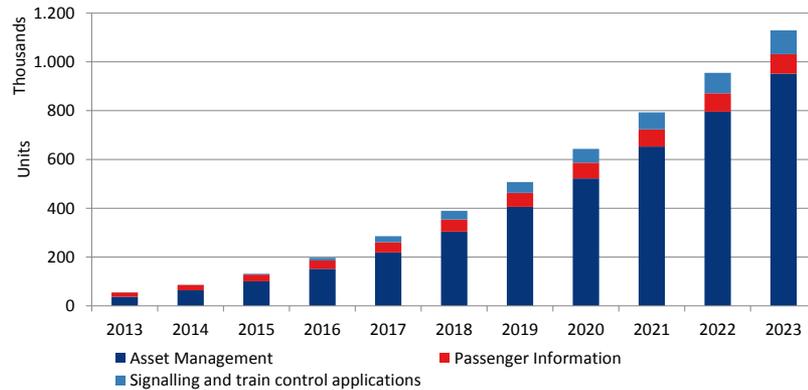
Precise navigation,  
powered by Europe



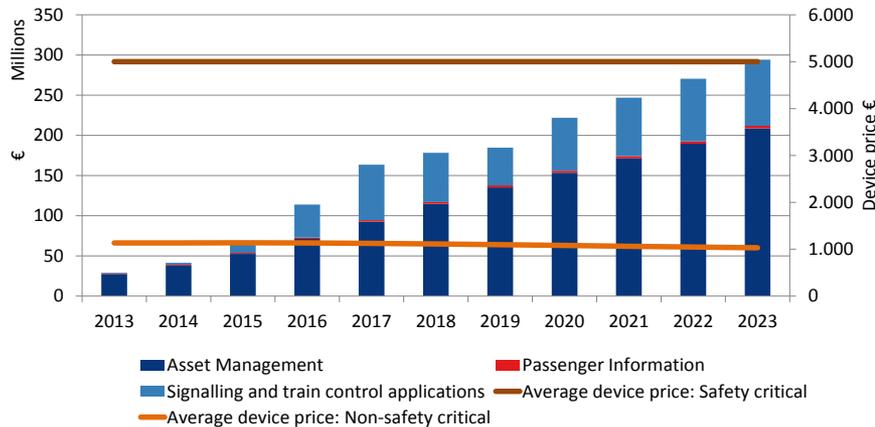
# RAIL

## Market Data and Key Trends

Installed base of GNSS devices by application



Core revenue of GNSS device sales by application



## MARKET AND TECHNOLOGY TRENDS

- Growing interest in GNSS use in rail applications
- Combination of GNSS and other technologies is starting to offer the required performance
- OPEX savings in comparison with legacy systems will play a major role forming future demand for GNSS
- GNSS systems are predominantly used for non-safety related applications
- Passenger information systems is the main application, with asset management is gaining importance
- Safety related GNSS systems are expected to complement traditional rail technologies
- Rail Signalling industry in/out of EU foresees benefits of GNSS used for signalling and train control (PTC in U.S. is influencing the core revenue development)

# RAIL

## Map of possible applications

### Signalling

Combination of E-GNSS with sensors for precise train positioning for use in safety of life CCS applications or with conventional communication technologies for logistics applications.

### Logistics

### Low density lines



Improve safety and **reduce the cost of signalling** (requires very few or no line side components).

### Asset management



Improve monitoring of the railway assets both for operators and IM's.

### Cargo monitoring



Improve availability of the supply chain visibility information to the LSP/LSC.

- Georeferenced cargo status monitoring
- Corridor, Geofencing

### Main lines



Reduce the number of physical balises and to improve the precision of the odometry.

### Passenger information systems



Improve precision and availability of positioning for on board PIS

# Continued support to develop E-GNSS applications in Rail through H2020



- Enable dedicated E-GNSS performance tests in frame of R&D supporting railway stakeholders to prove the operational performance
- Support UNISIG and Next Generation Train Control project in their effort to define virtual balise and performance requirements
- Foster implementation of technical solution into ERTMS specifications

## For non safety relevant applications:

- Support the establishment of standardised, E-GNSS enabled asset and cargo tracking solutions for positioning of rail as a key player in the future European multimodal transport

4

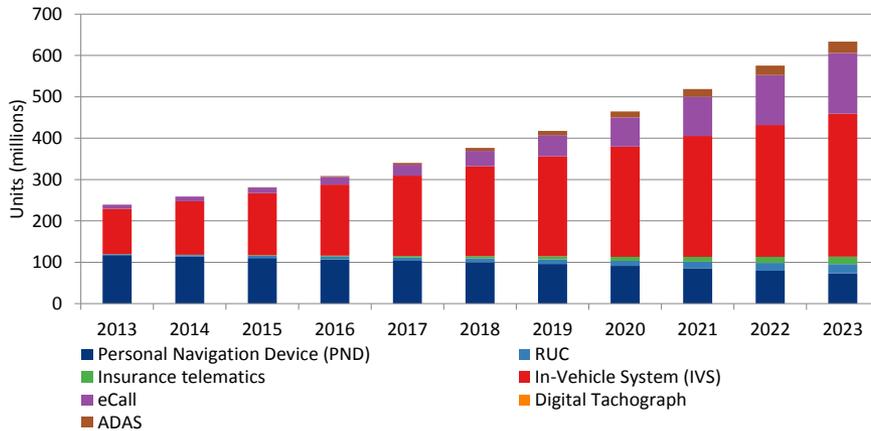


**ERSAT** project will leverage the achievements of FP7 and help to ensure inclusion of E-GNSS into future evolutions of ERTMS

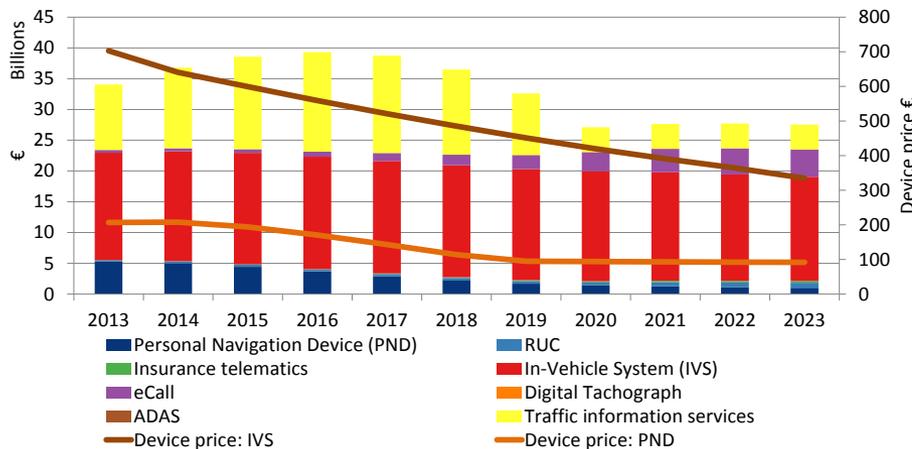
# ROAD

## Market Data and Key Trends

Installed base of GNSS devices by application



Core revenue from GNSS device sales and services by application



### MARKET AND TECHNOLOGY TRENDS

- Increased regulatory pressure for emergency location sharing (i.e. eCall) and safety-related applications (i.e. Digital Tachograph) drives the demand for telematics equipment, which serve as a platform for innovative applications
- Personal Navigation Devices (PND) are becoming redundant with increasing use of smartphones and increasing affordability of In-Vehicle Systems (IVS)

# Regulations in Europe are accelerating the business case for EGNOS in road applications

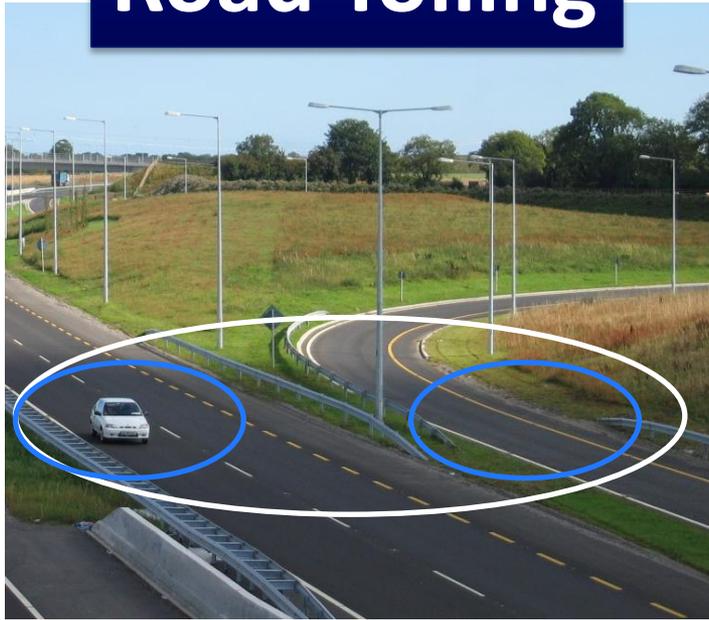


- **eCall** system will send an emergency call to 112 in case of accident, including precise location, accelerating assistance to drivers
- **Road User Charging** GNSS supports toll operators in charging levies in compliance with the European Electronic Tolling System Directive
- **Digital tachographs** will facilitate registration of starting-ending time of the journey
- **Dangerous goods tracking:** robust positioning requirements uptake in EU Member States



# During the last months, Road Tolling and eCall applications have demonstrated interest on EGNOS value added

## Road Tolling



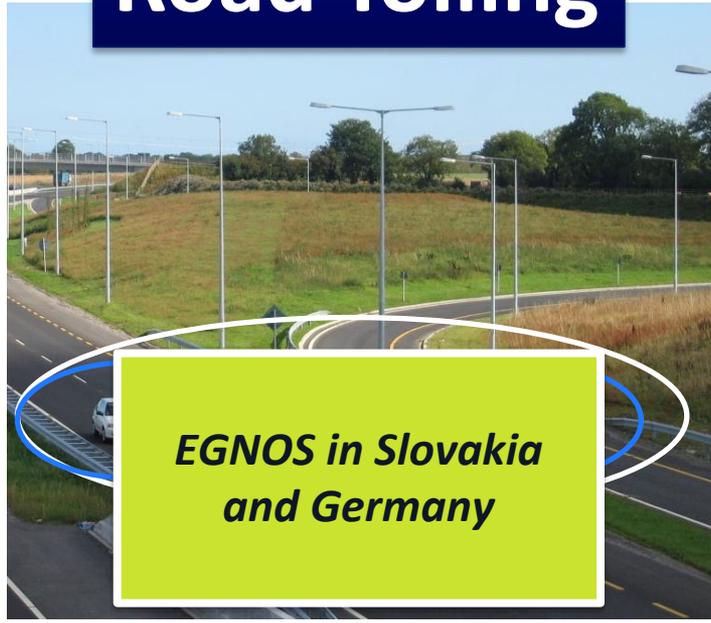
## eCall



**EGNOS** makes the difference!

# During the last months, Road Tolling and eCall applications have demonstrated interest on EGNOS value added

## Road Tolling



*EGNOS in Slovakia  
and Germany*

## eCall



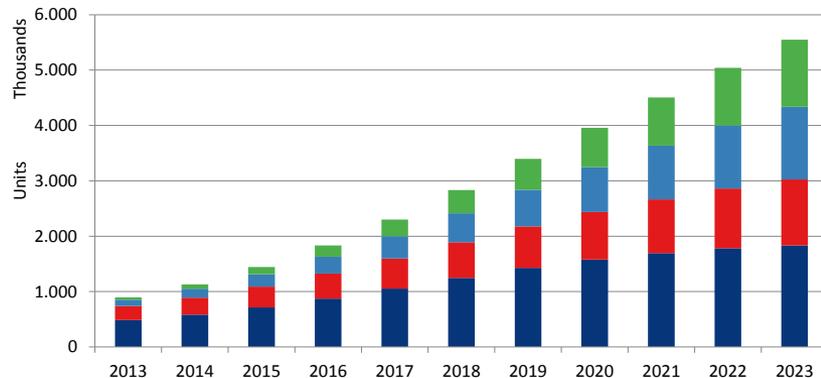
*EGNOS in all cars  
from April 2018  
13,000.000 cars/year*

**EGNOS** makes the difference!

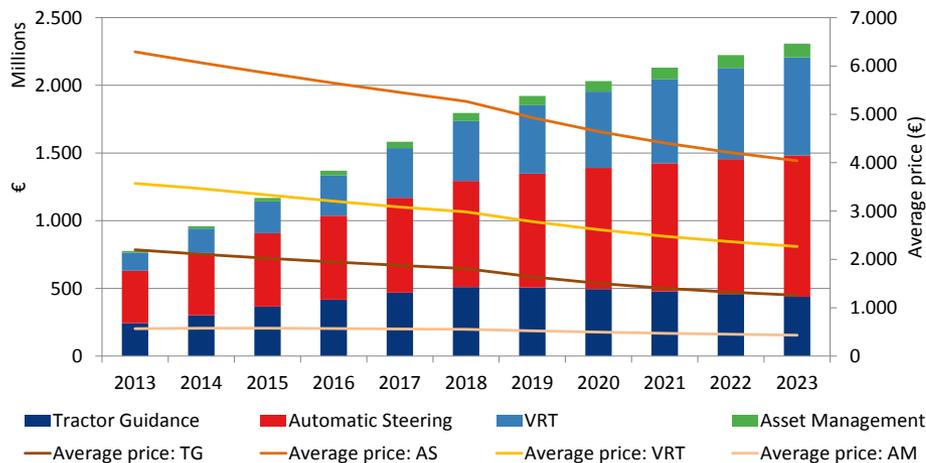
# AGRICULTURE

## Market Data and Key Trends

Installed base of GNSS devices by application



Revenue of GNSS device sales by application



## MARKET AND TECHNOLOGY TRENDS

### Market trends

- **Increased demographic pressure** on yield with limited resources available
- Market reaction:
  - **Consolidation** of farms foster Precision Agriculture
  - GNSS-based solutions in farms show measureable **cost savings** and while increasing the yield

### Technology trends

- **SBAS** solutions opening markets at entry-level prepare users for more advanced solutions
- **Dual frequency** and dual-constellation with Galileo and GPSIII (L1/L5 resp. E1/E5)
- Emerging role of **PPP** solutions vs. traditional RTK
- Use of **big data** for integrated farming across different equipment supplied by different hardware brands

# AGRICULTURE

## Map of possible applications

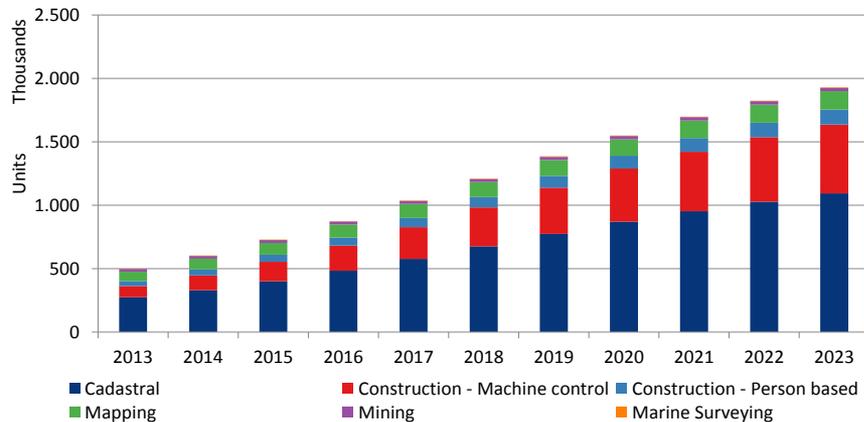
Application	Description	Target Users	Value Proposition
Machine Guidance	<ul style="list-style-type: none"> <li>Use of a digital display assisting drivers to follow a predetermined path, minimizing risks of overlap/gap</li> </ul>	<ul style="list-style-type: none"> <li>Farmers</li> <li>Public authorities</li> </ul>	<ul style="list-style-type: none"> <li>High accuracy (close to 0,1m) : Galileo CS</li> <li>Medium accuracy OS dual Frequency (&lt; 1m)</li> <li>Basic accuracy: EGNOS (basic accuracy for low cost, entry level)</li> <li>Galileo Authentication (Potential upside tbc)</li> </ul>
Automatic Steering	<ul style="list-style-type: none"> <li>The most advanced form of tractor guidance, used mainly on large farms, allowing farm vehicles to be automatically steered along a predetermined path</li> <li>The operator can concentrate solely on monitoring the overall process</li> </ul>		
VRT (Variable Rate Technology)	<ul style="list-style-type: none"> <li>Leverages local conditions on the field for precise control over farming inputs (e.g. fertilizers, nutrients)</li> <li>It identifies areas with similar levels of yield-limiting characteristics in a field and enables site-specific treatment</li> </ul>		
Asset Management	<ul style="list-style-type: none"> <li>Involves the use of real time information for monitoring the location and status of farm equipment</li> </ul>		
New potential applications	<ul style="list-style-type: none"> <li>Harvest monitoring; Biomass monitoring; Soil sampling; Land consolidation; Livestock monitoring; Virtual fencing; Geo-traceability; Environmental Mgmt</li> </ul>		



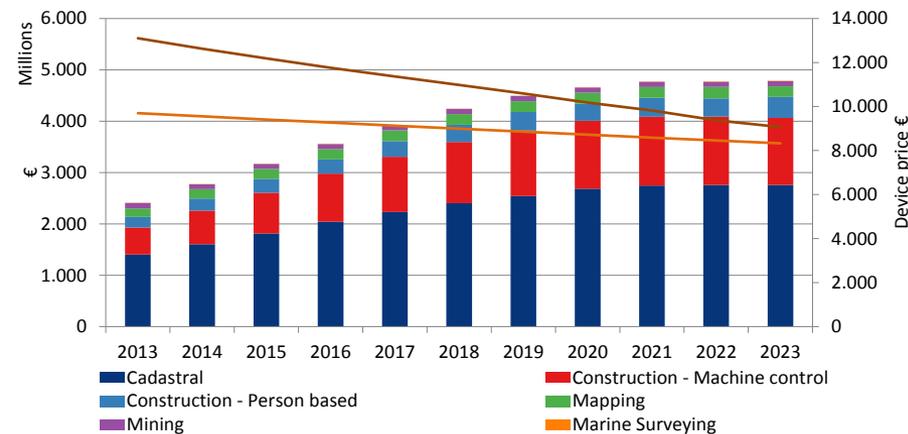
# SURVEYING & MAPPING

## Market Data and Key Trends

Installed base of GNSS devices by application



Core revenue from GNSS device sales and service by application



## MARKET AND TECHNOLOGY TRENDS

### Market trends and drivers

- Regulatory requirements remain in “traditional” surveying applications such as cadastral surveying
- Strong dependence on general economic situation (mainly impacting construction surveying) driven by emerging countries
- New customers “insourcing” surveying operations (e.g., municipalities, utility companies) to map infrastructure and networks

### Technology trends

- Continued use in conjunction with other surveying technologies (e.g. laser scanning, LIDAR)
- Emerging role of PPP solutions vs. traditional RTK
- Dual frequency and multi-constellation expected by Galileo and GPSIII (L1/L5 resp. E1/E5)
- Increased use of entry-level equipment by non-surveyors
- Crowd-sourcing for mapping applications

# SURVEYING & MAPPING

## Map of key possible applications

Application	Description	Target Users	Value Proposition
<b>Cadastral surveying</b>	<ul style="list-style-type: none"> <li>Physical delineation of property boundaries in parcels and the determination of dimensions, areas and certain rights associated with properties</li> </ul>	<ul style="list-style-type: none"> <li>Public and private surveyors</li> <li>Construction companies, marine operators</li> <li>O&amp;G Exploration and Production Offshore players</li> <li>Small/Medium sized municipalities (for Mapping)</li> </ul>	<ul style="list-style-type: none"> <li>High accuracy (close to 0,1m), continuity and resistance against multipath: Galileo CS (HP surveying)</li> <li>Reliability with Authentication (TBC): Galileo CS</li> <li>Basic accuracy/ low cost for mapping:               <ul style="list-style-type: none"> <li>➤ EGNOS</li> <li>➤ Galileo OS Dual Frequency</li> </ul> </li> </ul>
<b>Mine surveying</b>	<ul style="list-style-type: none"> <li>Measurements, calculations and mapping with the purpose of ascertaining and documenting information at all stages from prospecting to exploitation and utilizing mineral deposits</li> </ul>		
<b>Construction surveying</b>	<ul style="list-style-type: none"> <li>Precise drawing of the future work site for buildings and infrastructures; taking out of reference points that will guide the construction of new structures</li> </ul>		
<b>Mapping</b>	<ul style="list-style-type: none"> <li>Plot maps and charts that contain locations of point of interest (roads, pipelines, planning of public works, forestry management, etc.)</li> </ul>		
<b>Marine surveying</b>	<ul style="list-style-type: none"> <li>Measurement and description of features which affect maritime navigation, marine construction, dredging, offshore oil exploration, etc.</li> </ul>		
<b>CAP Field Boundary measurement</b>	<ul style="list-style-type: none"> <li>Common Agriculture Policy uses GNSS for on-the-spot checks performed by paying agencies to verify subsidy claims</li> </ul>		



# THANK YOU FOR YOUR ATTENTION



**Carmen Aguilera**

Aviation and R&D Market Development Officer, GSA

[Carmen.Aguilera@gsa.europa.eu](mailto:Carmen.Aguilera@gsa.europa.eu)

[www.gsa.europa.eu](http://www.gsa.europa.eu)