

More than one year operational

HIGHLIGHTS

- **Initial SERVICES** declared on Dec 15 2016
- **22 Satellites flying**
- **Next launch (4 satellites) in mid-July!** with ARIANE V
- Contracts signed for third batch of GALILEO satellites
- Mission Scenarios agreed for Galileo 2nd Generation



GALILEO – NEW SERVICE INFRASTRUCTURE

**Galileo Reference Center
Noordwijk (The Netherlands)**



**Galileo SAR Center
Toulouse (France)**



**Galileo Integrated Logistics Center
Transinnes (Belgium)**



**Galileo Service Center
Madrid (Spain)**

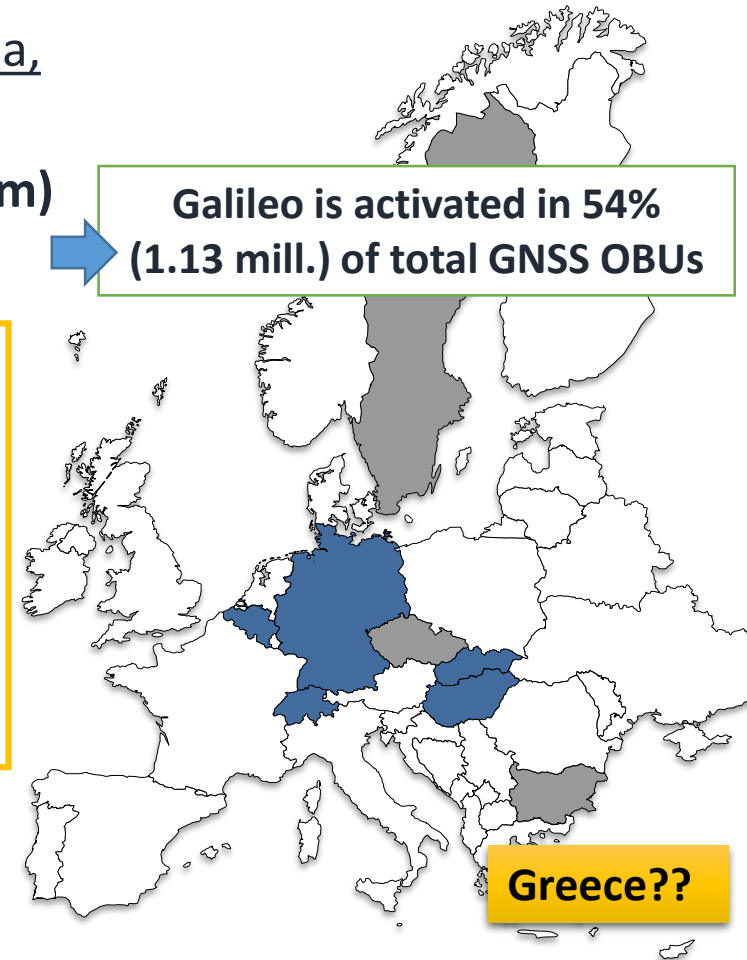
Europe understands the benefits of GNSS for heavy trucks-tolling



- GNSS for tolling HGV in Europe: Germany, Slovakia, Belgium, Hungary and Switzerland.
- **58% from the EU total tolled roads (ca. 43,000 Km) correspond to a GNSS-based scheme***

Galileo is activated in 54% (1.13 mill.) of total GNSS OBUs

- **2018:** GNSS-based RUC system for c. 16,000 km procured in **Bulgaria**
- **2020:** GNSS technology is a strong candidate for the update of the current system in **Czechia**
- **2021:** GNSS-based system in all national and municipal roads of **Sweden**



**excluding e-Vignette and analysing only EETS-compliant EU28 countries*

<http://www.gsa.europa.eu/ruc-brochure.pdf>

- GNSS (also in conjunction with other technologies)
- GNSS planned (currently under development)

Galileo is used today on majority of professional devices and consumer platforms



AUTOMOTIVE

STMicroelectronics CSR u-blox QUALCOMM

MASS MARKET

intel QUALCOMM ROADCOM MEDIATEK SAMSUNG

HIGH PRECISION

JAVAD THALES unicorecomm 和芯星通 FURUNO septentrio TOPCON EOS CHC Leica Geosystems Trimble NAVCOM

TIMING

spectracom MEINBERG

USE GALILEO.EU
FIND A GALILEO-ENABLED DEVICE TO USE TODAY

Galileo is Europe's Global Satellite Navigation System (GNSS), providing users with improved positioning and timing information.

Click on the icons to find Galileo-enabled devices.

- ON THE ROAD
- ON THE WATER
- ON THE TRAIN
- IN THE AIR
- GOING MOBILE
- ON THE FARM
- ON THE MAP
- DURING AN EMERGENCY

186 Mill. Galileo phones shipped

in 2nd. half 2017...

SAMSUNG



SONY

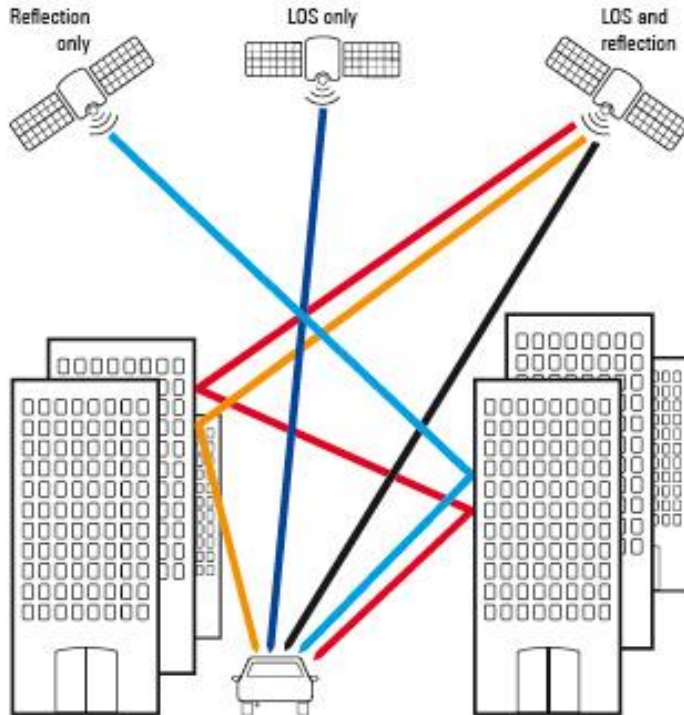


World's first dual-frequency GNSS smartphone hits the market



Xiaomi Mi 8, launched on May 31, is the world's first smartphone providing up to decimetre-level accuracy for location-based services and vehicle navigation

Galileo Open Service improves positioning performance **WORLDWIDE** for **FREE**



Multiple GNSS and multiple frequencies increase availability, continuity and reliability

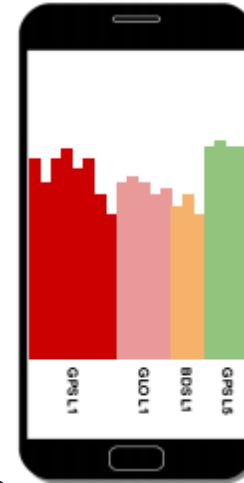
Better results in **harsh environment** (urban canyons, tree canopy, etc.)

Critical contribution of Galileo to the performance of a dual frequency mobile



Dual frequency L1/E1 – L5/E5:

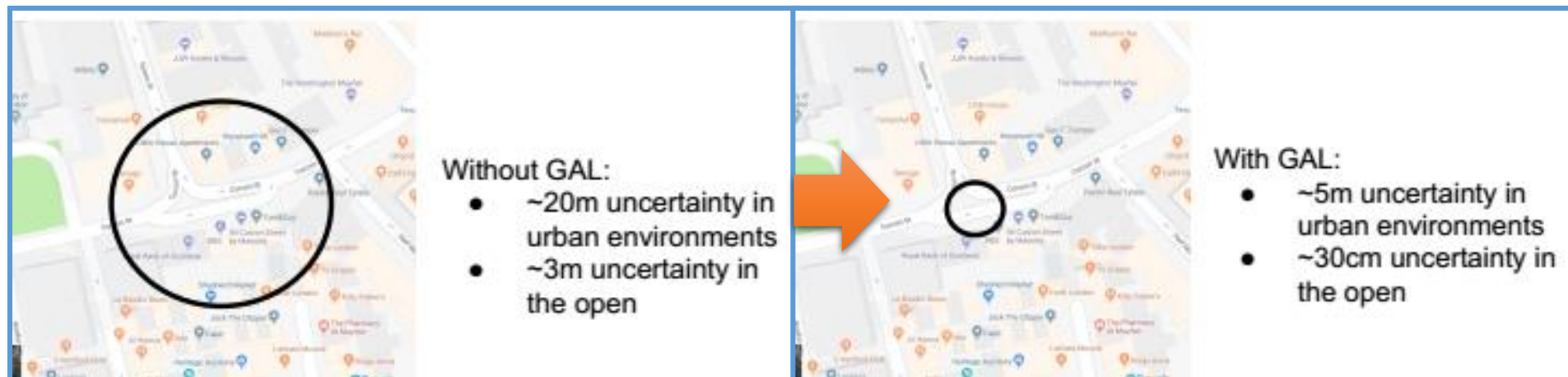
- European manufacturers are launching their new chipset
- Double frequency addressing the challenging environmental conditions:
 - ✓ Removal of ionospheric errors thanks to the comparison of two different carrier frequencies
 - ✓ Multipath mitigation due to E5/L5 higher chipping rate



GAL contribution is critical in a dual freq receiver:

-the GAL E1 signals are more accurate than the classic GPS, GLO or BDS L1 signals due to the BOC modulation

-the GAL E5 signals are higher in number than the GPS L5 signals



Smartphone platforms join GNSS



- Depending on the manufacturer, Google Android makes available **raw GNSS measurements**: pseudoranges and carrier phase observables
- Having access to such additional information would allow sophisticated users to use **precise positioning**



“New possibilities for Apps developers!”

**Do smartphones represent the state of the art in GNSS?
Will new “value added services” arrive to ITS as well?**

EU Policy framework: paving the way for European GNSS

■ Policy makers understand that **European GNSS could better support automated vehicles** in particular for cooperation between vehicles and for better positioning:

- The **2016 Declaration of Amsterdam** worked along these barriers and developed a shared strategy within Member States.
- **GEAR 2030 (EC)** recommendations to address the main challenges and opportunities
- March 2018: European Parliament adopted the **European Strategy on Cooperative Intelligent Transport Systems (C-ITS)**



New Services – EN ROUTE !

Authentication service will provide a secure and reliable location, by detecting interference (spoofing) attacks:

- E1 Navigation Message Authentication: integrated in the E1 signal of the Open Service, aimed at consumer users and already prototyped/under testing
- E6 Spreading Code Authentication: based on the E6 signal Spreading Code Encryption

High Accuracy service will be based on PPP transmission in the E6b signal.



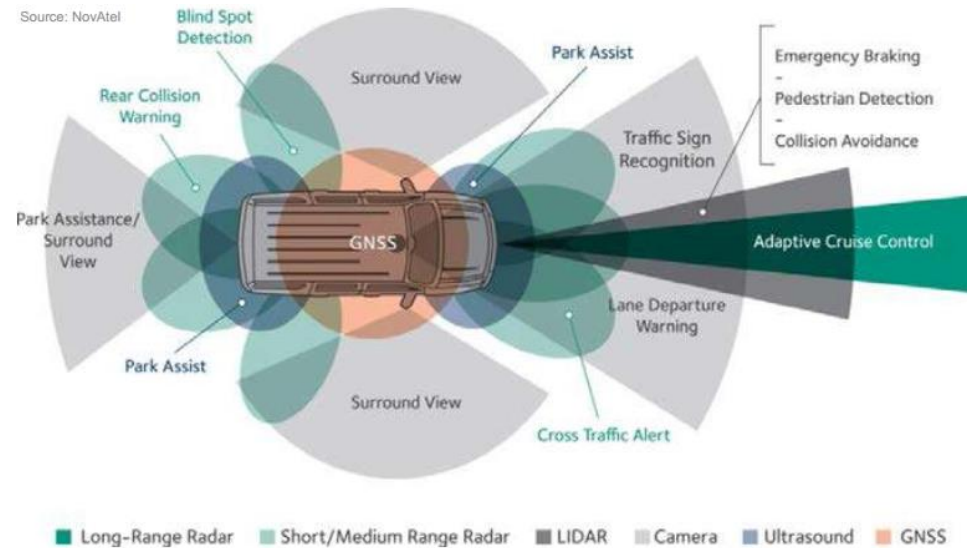
NEW: Free provision

**Gradual implementation
2018-2020**

Enhanced GNSS is already playing a role in the design of Cooperative and Autonomous Driving



- In Cooperative ITS: vehicles, infrastructure, and pedestrian are **location-aware and shall synchronize** the output data from sensors
- Development of **base standards** in relation on C-ITS Secure Communications Vulnerable Road Users
- GNSS is crucial for absolute location in combination with **inertial navigation, odometry and map matching**, with maps or cooperative navigation with the other road users
- Car manufacturers already start designing based on Galileo capabilities

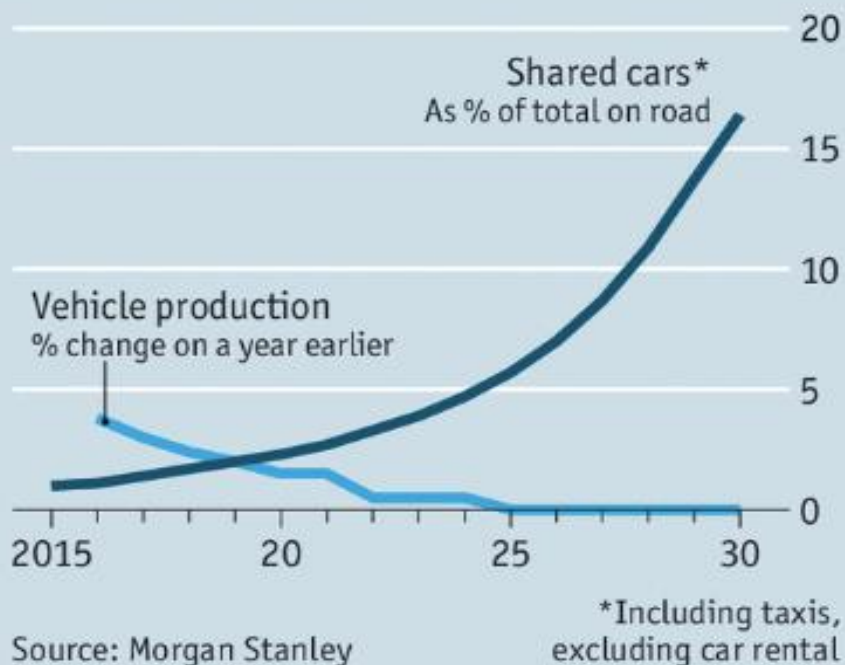


Demonstrating the benefits of Galileo for MaaS



Sharing, not growing

Worldwide forecast



- The European Commission and the European GNSS Agency are funding the project *Galileo For Mobility* from the Horizon 2020 programme.
- The aim is to demonstrate the benefits Galileo could provide within the MaaS context.
- It includes the analysis of the needs of geo-location for the different stakeholders and demonstrates the benefits of Galileo, including the International Association of Public Transport (UITP).

Advisory Board



Demonstrating the benefits of Galileo for MaaS

- Convergence of GNSS with other technologies/methods: IoT comm., MaaS platforms and Big Data analytics
- 6 big pilots across Europe, and additional call for 8 small-scale pilots



BARCELONA



THESSALONIKI



UK



PARIS



Funding call was just published

H2020-SPACE-EGNSS-2019



Type of Action	Topic	Indicative budget (EUR mln)	Funding rate	Indirect costs
IA	EGNSS applications fostering green, safe and smart mobility	10.00	70% (except for non-profit legal entities, where a rate of 100% applies)	25% of the total eligible costs excluding: <ul style="list-style-type: none"> • Subcontracting • Costs of resources made available by 3rd parties • Financial support to 3rd parties
IA	EGNSS applications fostering digitisation	4.00		
IA	EGNSS applications fostering societal resilience and protecting the environment	4.00		
CSA	EGNSS awareness raising and capacity building	2.00	100%	
TOTAL budget:		20.00	<div style="background-color: #4CAF50; color: white; padding: 5px; text-align: center;"> Opening: 16 October 2018 Deadline: 05 March 2019 </div>	

IA: activities aimed at producing plans and arrangements or designs for new, altered or improved products, processes or services

CSA: accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, policy dialogues and studies



Enhanced satellite navigation services empowering innovative solutions in Smart Mobility

Thank you!



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