Sayı : 38591462-720-2021-2015 09.07.2021
Konu : Galileo Uydu Sistemi Hk.

Sirküler No: 743

Sayın Üyemiz,

Uluslararası Deniz Ticaret Odası'ndan (International Chamber of Shipping - ICS) alınan 07.07.2021 tarihli Ek'te sunulan yazıda, Galileo Küresel Navigasyon Uydu Sisteminin (Global Navigation Satellite System-GNSS) Ocak 2021 tarihinden itibaren tam kapasiteyle hizmet vermeye başladığı ve çoklu sinyal alıcılarının kullanılabilir durumda olduğu ifade edilmektedir.

Yazıda, Uluslararası Denizcilik Örgütü (International Maritime Organization - IMO) aracılığıyla ilave uydu sistemlerinin tanınmasını sağlamak amacıyla ICS Sekretaryası tarafından çalışmalara devam edildiği bildirilmektedir.

Konuya ilişkin detaylı bilgi Ek'te sunulmaktadır.

Bilgilerinize arz/rica ederim.

Saygılarımla,

İsmet SALİHOĞLU
Genel Sekreter

Ek:ICS'ten alınan 07.07.2021 tarihli yazı ve Eki. (22 sayfa)

Dağıtım:
Gereği:
- Tüm Üyeler (WEB sayfası ve e-posta ile)
- Türk Armatörler Birliği
- S.S. Gemi Armatörleri Motorlu Taşıyıcılar Kooperatifi
- GİSBİR (Türkiye Gemi İnşa Sanayicileri Birliği Derneği)
- VDAD (Vapur Donatanları ve Acenteleri Derneği)
- KOSDER (Koster Armatörleri ve İşletmecileri Derneği)

Bilgi:
- Yönetim Kurulu Başkan ve Üyeleri

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07 July 2021 **RN(21)10**

TO: RADIO AND NAUTICAL SUB-COMMITTEE
Copy: All Full & Associate Members (for information)

EU GALILEO GNSS

Action required: Members are to note the information provided by the European Union Agency for the Space Programme (EUSPA) regarding the Global Navigation Satellite System (GNSS) Galileo.

The information provided in the PowerPoint comes after the ICS secretariat had a meeting with EUSPA regarding Galileo and its uses in the maritime sphere.

In particular, members are to note the system is fully operational of January 2021 and multi-signal receivers are available.

The secretariat continues work on recognition of additional GNSS systems through the IMO and will update members accordingly.

Please find the PowerPoint on Galileo from EUSPA attached at **Annex A.**

Any additional comments on the above should be addressed to the undersigned Gregor.Stevens@ics-shipping.org

Gregor Stevens
Senior Marine Adviser

Galileo in Maritime

Teleconference with ICS - 30th June 2021

Prof. Dr. Manuel Lopez, Market Development Dept, EUSPA

María Mota, User Services, GNSS Service Centre

EUSPA
European Union Agency for the Space Programme

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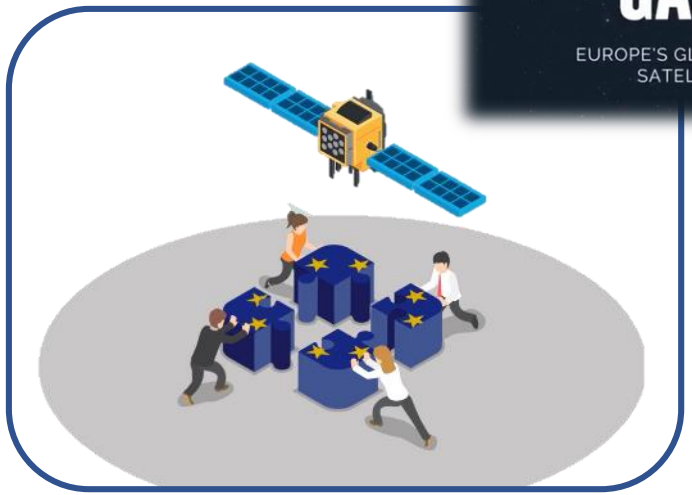
2. Galileo services
   - OS-NMA
   - HAS
   - SAR
3. Galileo users support
4. Galileo in maritime

Galileo Introduction



European Commission

esa

EUSPA
European Union Agency for the Space Programme

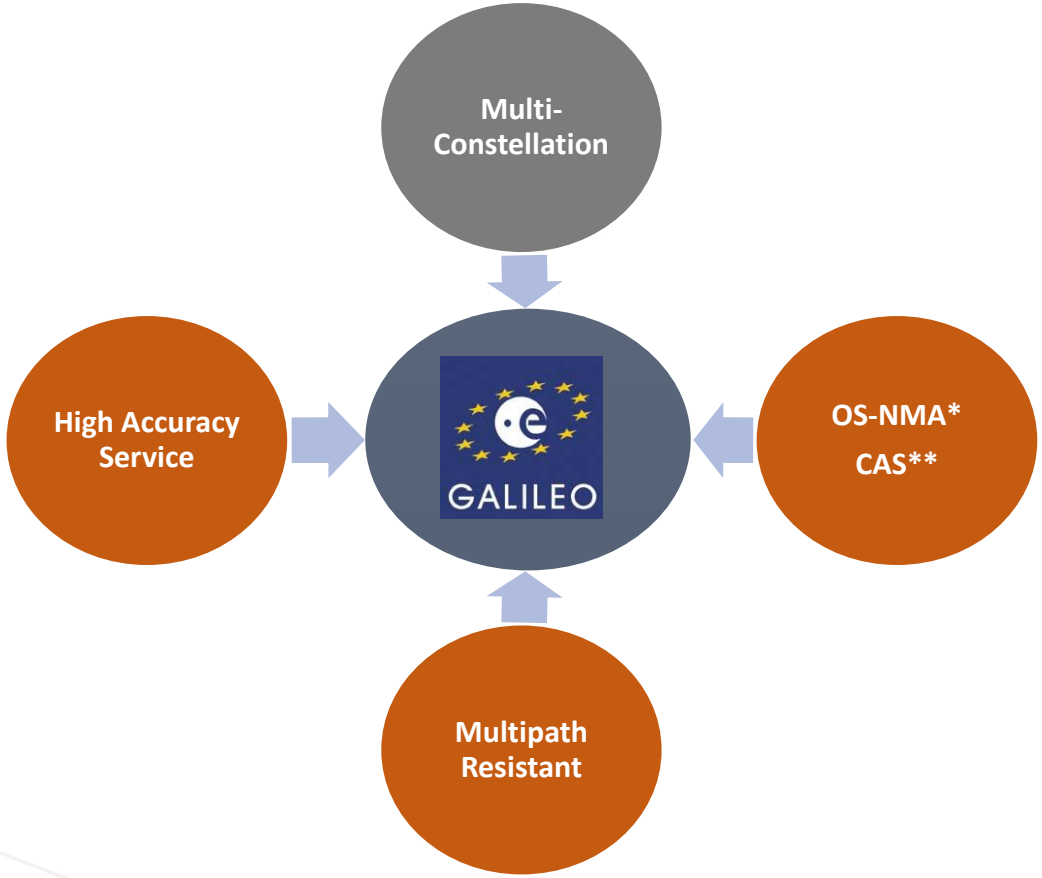
GPS

BeiDou

GLONASS

Galileo Introduction

- Galileo is the European global satellite-based navigation system (GNSS)
- Worldwide navigation system "**made in EU" under civilian control**
- Fully **interoperable** with other GNSS constellations
- Open service **free of charge**, delivering multiple frequencies
- Modern signal is more **resistant to multipath**
- Only constellation that provides **Signal and data authentication**, offering trustability for civilians
- Global **high-accuracy** service for free, delivering down to 20 cm accuracy



Galileo differentiators

Galileo + other GNSS

Galileo Services

Freely accessible service for positioning, timing and **navigation message authentication**

Open Service (OS)

OS-Navigation Message Authentication (OS-NMA)

Encrypted service for registered users designed for greater robustness and higher availability

Public Regulated Service (PRS)

Assists locating people in distress and confirms that help is on the way

Search and Rescue Service (SAR)

Freely accessible global **high accuracy positioning** service

High Accuracy Service (HAS)

New services on the horizon

Authentication service based on the E6 signal code encryption and OS-NMA, allowing for increased robustness of professional applications

Commercial Authentication Service (CAS)

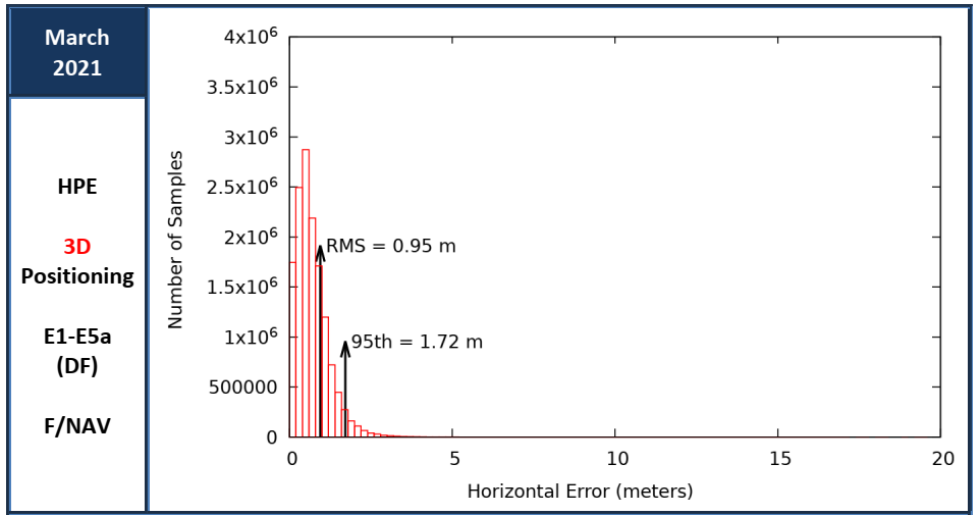
Galileo OS Accuracy

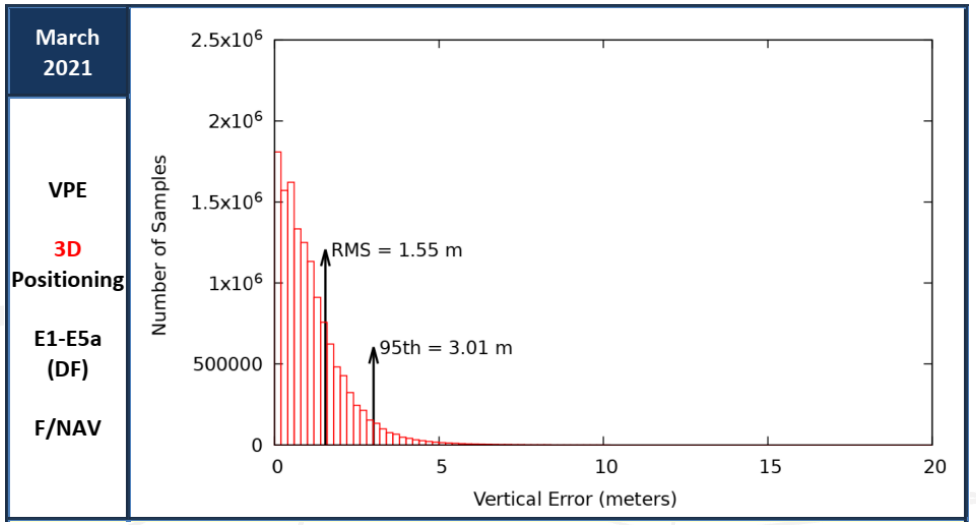
EUROPEAN GNSS (GALILEO) SERVICES

OPEN SERVICE

QUARTERLY PERFORMANCE REPORT

JANUARY - MARCH 2021





https://www.gsc-europa.eu/electronic-library/galileo-service-performance-reports

Galileo Navigation Message Authentication (OS NMA)

Galileo OS-NMA is a new public and free of charge **antispoofing service** within Galileo that:

- will authenticate the Galileo data using the navigation message
- will allow to detect spoofing attacks
- will be free of charge to Galileo Users

This mechanism provides users with an additional safety layer to trust the Galileo signals.

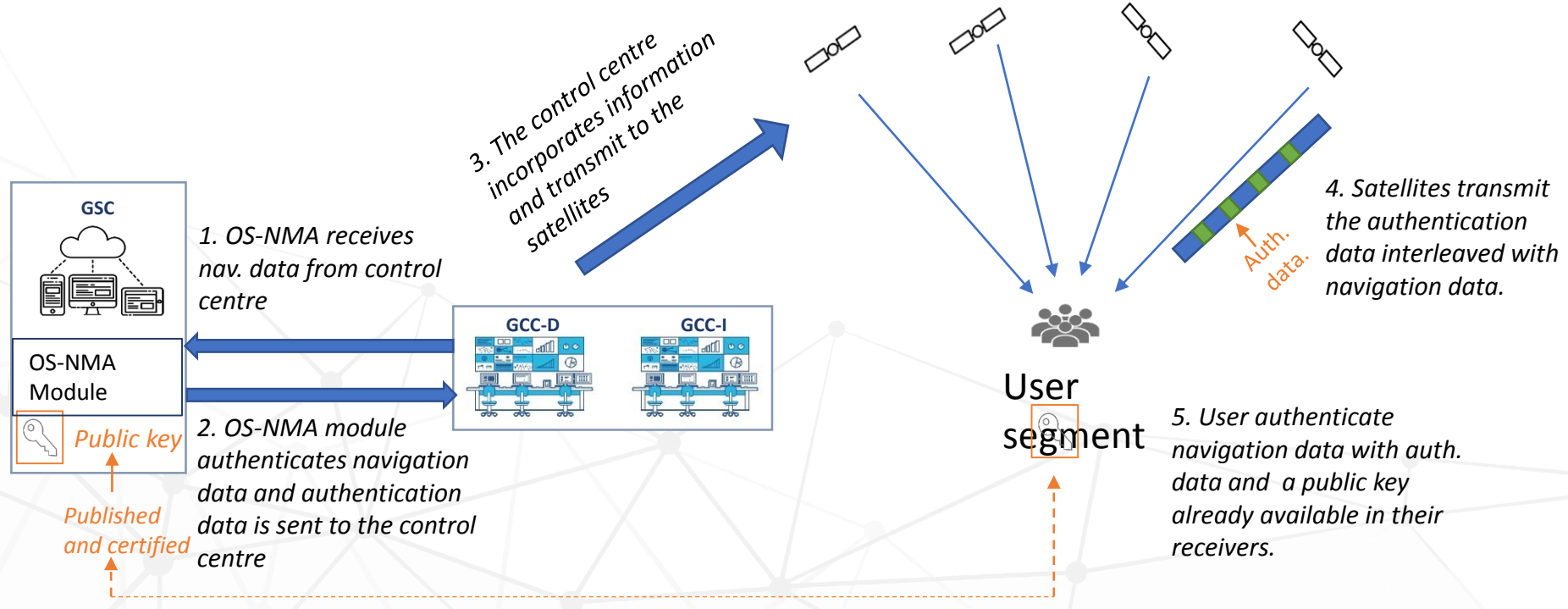
Initial OS-NMA Signal-in-Space transmission in test mode started in 2021 while service provision is planned for 2022.

Galileo Navigation Message Authentication (OS NMA)

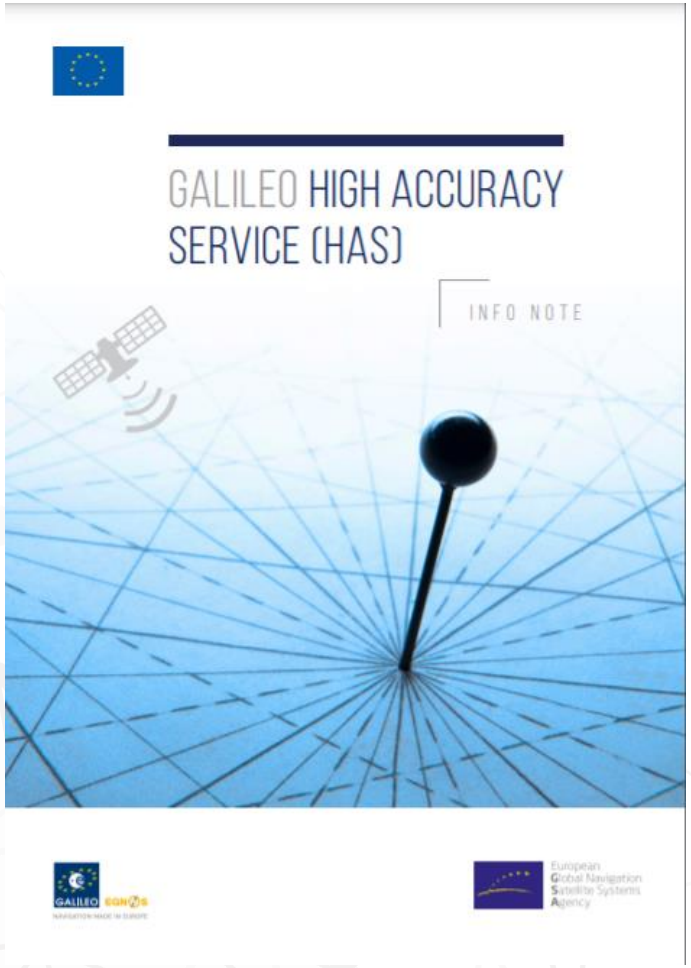
Galileo OS-NMA is based on:

1) the publication of public keys, to be stored in GNSS receivers, allowing the authentication of the Signal In Space E1 I/NAV data through a hybrid symmetric/asymmetric scheme; and

2) the transmission of data to authenticate the Galileo OS navigation message (e.g. Digital Signatures, Message Authentication Codes and associated Keys) through the E1 I/NAV (20 bits in E1-B currently unused)



Galileo High Accuracy Service



- The **Galileo** High Accuracy Service (HAS) will provide free of charge **high accuracy Precise Point Positioning (PPP)** corrections through the Galileo signal (E6-B) and by terrestrial means (Internet).
- **Galileo HAS** will offer real-time improved user positioning performances with accuracy less than 20 cm (in nominal conditions).

Galileo will be the first constellation able to provide such High Accuracy Service Globally

www.gsc-europa.eu/sites/default/files/sites/all/files/Galileo_HAS_Info_Note.pdf

Galileo HAS

- **HAS** will be based on the provision of accurate satellite data (clocks, orbits and biases) and atmospheric data (for Europe) to enable PPP
- **HAS** PPP corrections data will be transmitted through an open format in the Galileo E6B signal, using 448 bits per satellite per second (also, planned to be available through auxiliary channels)
- The format is based on RTCM-CSSR (Compact State-Space Representation messages) adapted to the Galileo E6B channel
- Multi-constellation (at least Galileo + GPS)
- Enabling GLOBAL Positioning with **Accuracies < 20 cm (H) / 40 cm (V)**
- Improved Convergence for the Regional Service in Europe

Galileo HAS in Maritime & IWW

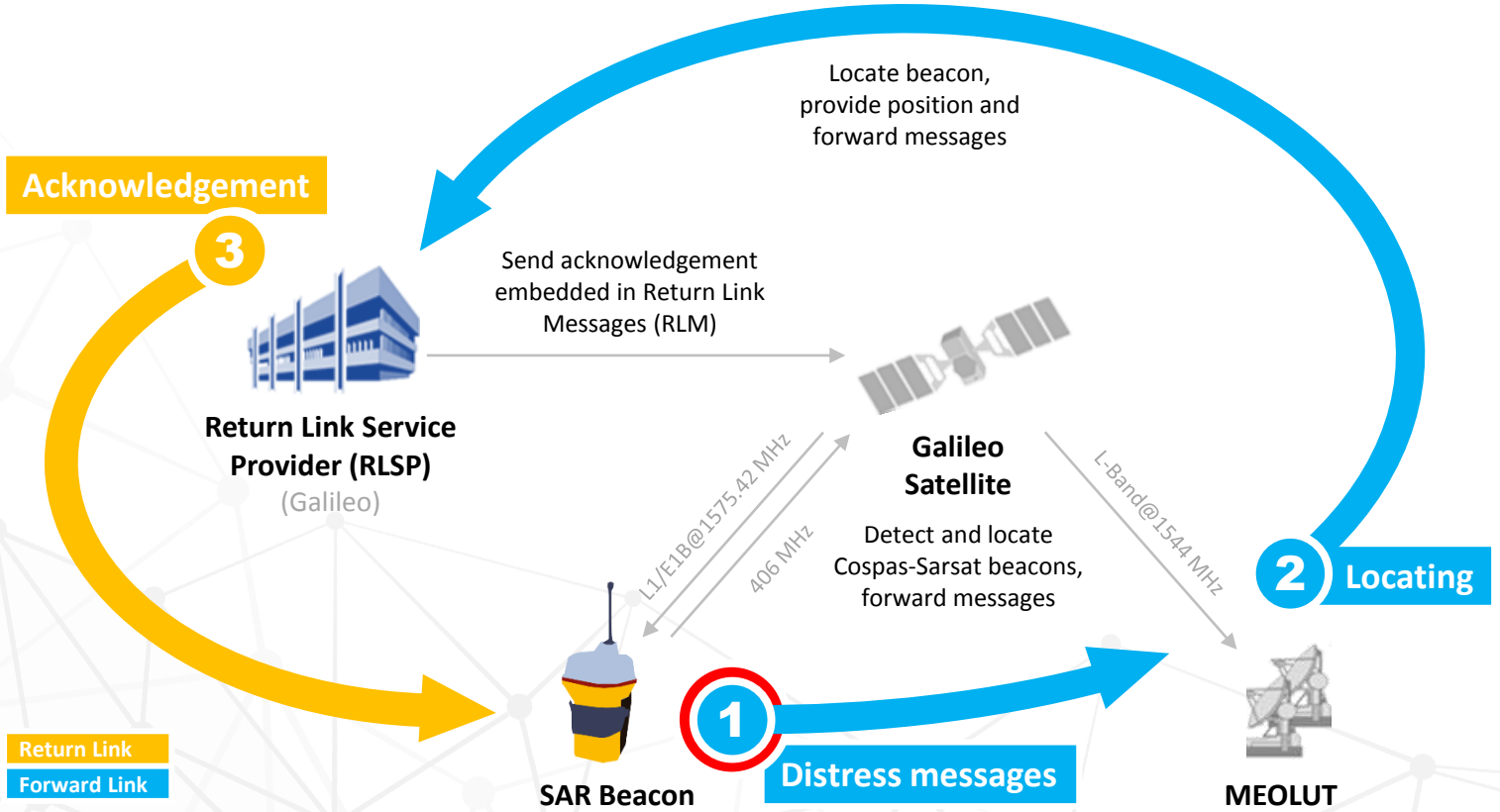
MARITIME & INLAND WATERWAYS

- MERCHANT NAVIGATION IN PORTS
- PILOTAGE OPERATIONS IN PORTS
- PILOTAGE OPERATIONS IN IWW
- PORT OPERATIONS
- PORT BATHYMETRY
- RIVERBED SURVEY
- COASTAL SEABED SURVEY
- OFFSHORE SUPPLY VESSELS WITH DYNAMIC POSITIONING
- PORT TERMINAL CRANES AND STRADDLE CARRIERS NAVIGATION
- AUTONOMOUS SURFACE VESSELS

Waterborne transportation (passengers and cargo) and engineering operations will benefit in terms of efficiency and safety thanks to the increased level of accuracy provided by the HAS, especially in those applications where the cost of a three-frequency receiver and antenna is negligible in comparison with the savings in operational costs.

Galileo Search And Rescue (SAR)

SAR/Galileo Forward Link and Return Link (FL/RL)



SAR – Search and Rescue,
MEOLUT – Medium Earth Orbit Local User Terminal

The SAR/Galileo **Forward Link** detects and locates people in distress and makes their position known to Rescue Coordination Centres worldwide. The **Return Link** Service provides an automatic confirmation to the beacon **acknowledging** that the localisation of the alert has been confirmed by the Cospas-Sarsat system.

1. Activated beacon sends **distress alert messages**
2. Messages are detected and beacon is **located** by Galileo
3. Receipt of distress messages is **acknowledged**

Galileo Search And Rescue (SAR)

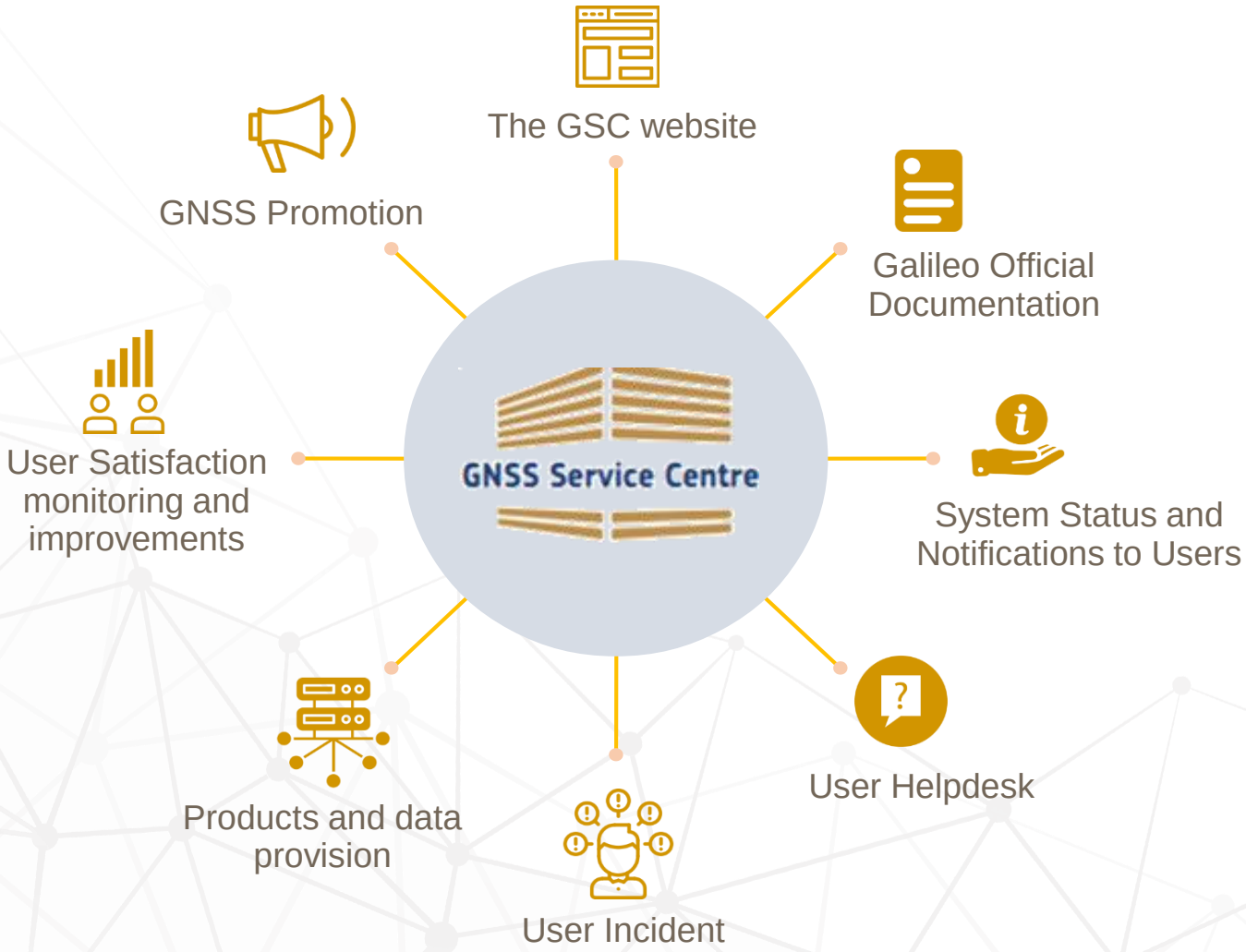
First Galileo Return Link SAR beacons

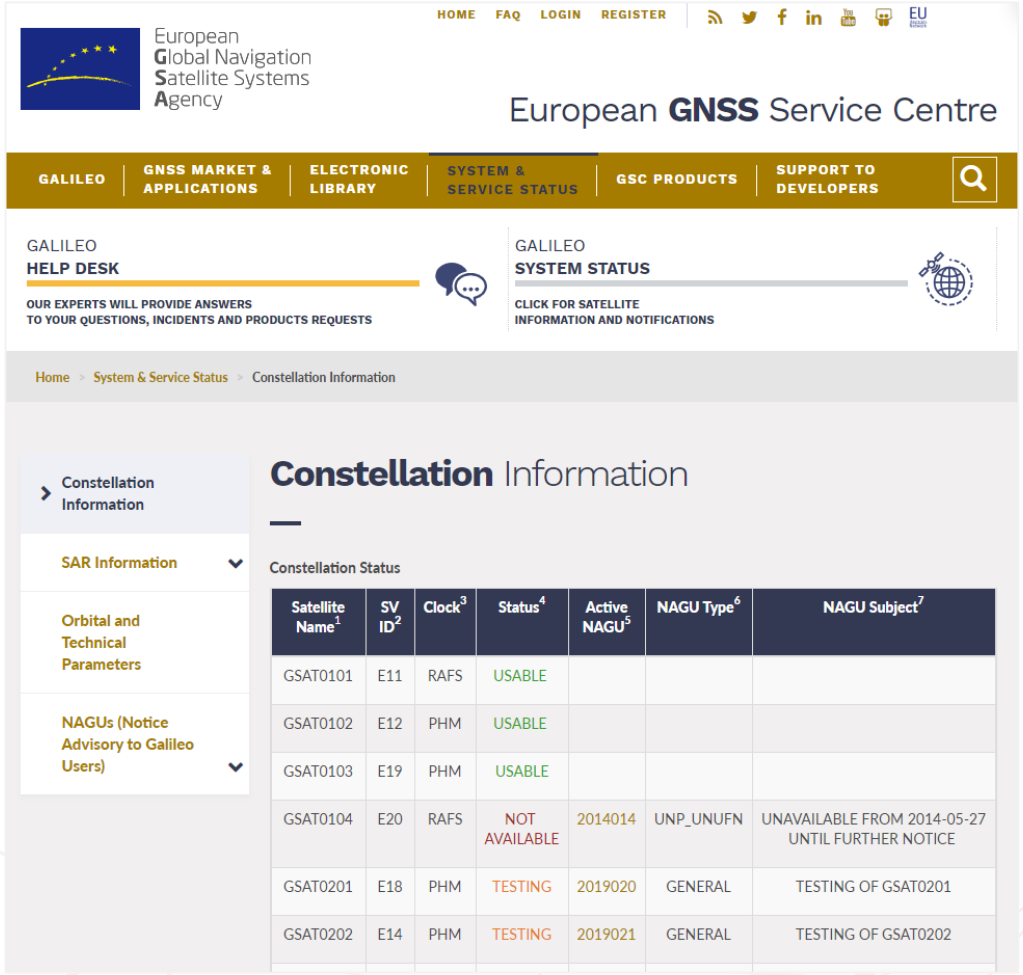
Orolia

- First Worldwide provider of distress beacons with Galileo
- Investment to consolidate positioning in global market

First shipment 1st March 2021

Galileo User Segment





Satellite Name[1]	SV ID[2]	Clock[3]	Status[4]	Active NAGU[5]	NAGU Type[6]	NAGU Subject[7]
GSAT0101	E11	RAFS	USABLE			
GSAT0102	E12	PHM	USABLE			
GSAT0103	E19	PHM	USABLE			
GSAT0104	E20	RAFS	NOT AVAILABLE	2014014	UNP_UNUFN	UNAVAILABLE FROM 2014-05-27 UNTIL FURTHER NOTICE
GSAT0201	E18	PHM	TESTING	2019020	GENERAL	TESTING OF GSAT0201
GSAT0202	E14	PHM	TESTING	2019021	GENERAL	TESTING OF GSAT0202

Galileo enabled equipment in the Market – UseGalileo.eu

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

ENGLISH (EN)

7.6k Shares

2 128 909 941

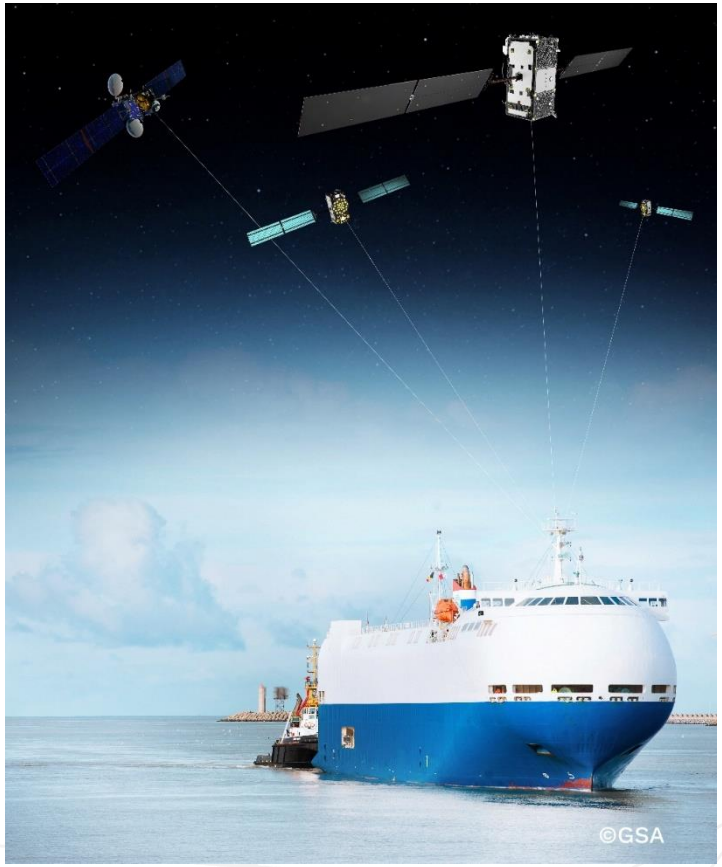
Estimated number of Galileo enabled smartphones sold until today.

Your smartphone is not alone, discover the other devices that are Galileo-enabled.

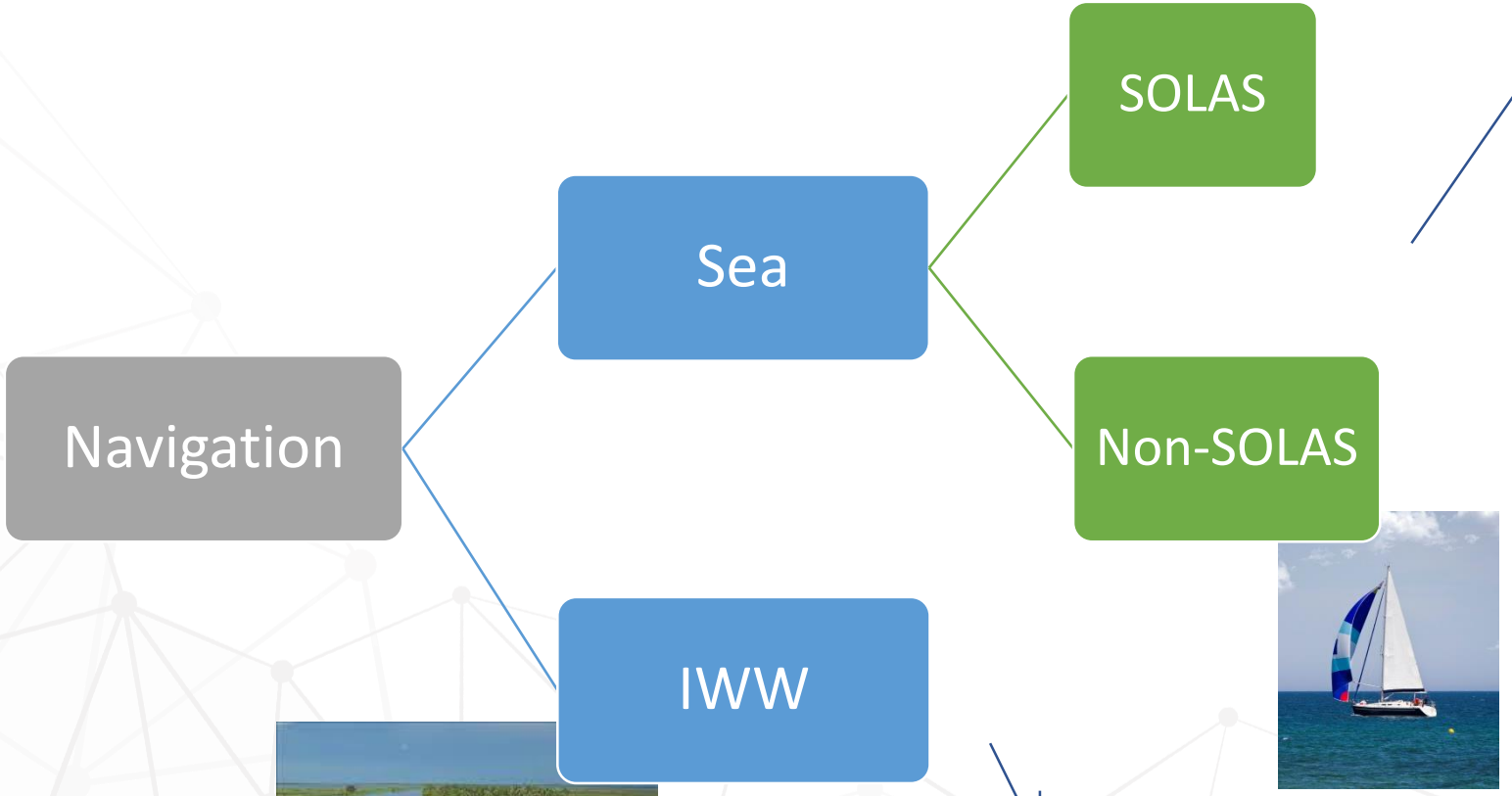
Galileo enabled equipment in the Market – UseGalileo.eu

Galileo in Maritime

- The Maritime community is one of the first communities to use GNSS systems
- Regulated vessels (SOLAS) equipped with GNSS receivers
- **Galileo was officially recognised by IMO as part of its Worldwide Radio Navigation Systems (WWRNS) in 2016**.
- Galileo plays an important role in maritime navigation. Whether at sea, in a busy port or moving through a narrow canal, Galileo helps ensure safer navigation on the water.
- Galileo enables many other positioning applications: surveillance , fishing vessels monitoring, port operations, search and rescue, marine engineering.



Applications



GNSS is the main source of positioning in maritime navigation

- SOLAS: passenger or cargo ships over 500 tons are regulated and use GNSS to navigate (at least 3 devices).
- Non-SOLAS: use of GNSS is very widespread not only in commercial vessels, but also in recreational ones. They are used both abroad and in high traffic areas.

GNSS is used to ensure safe navigation on inland waterways (rivers, canals, lakes and estuaries).

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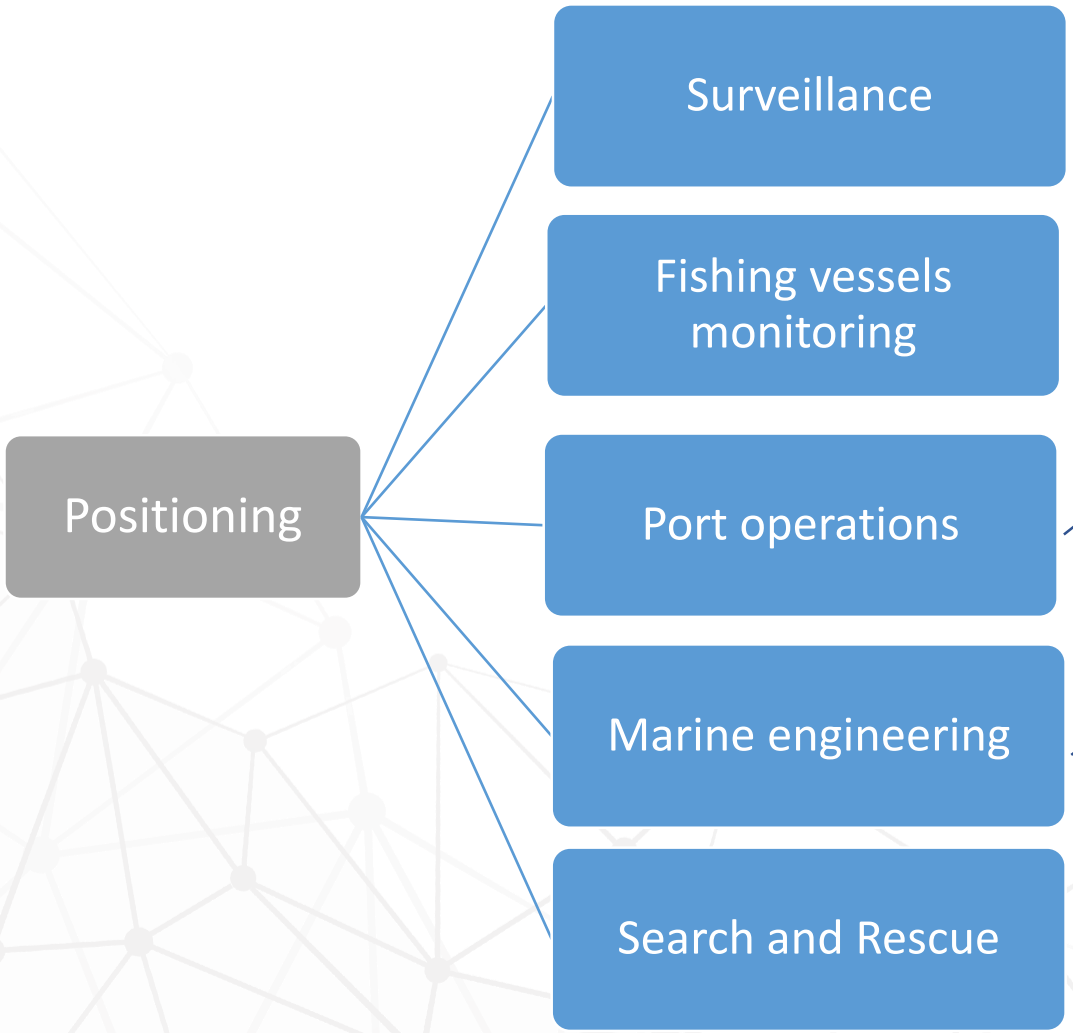
Applications



GNSS + AIS/VDES + LRIT -
in marine and continental waters.

GNSS allows VMS to verify the position of fishing vessels, their time in international and foreign waters, in protected areas,…

The traffic progress, docking, loading and unloading operations monitored with GNSS.

GNSS is used in marine construction activities (cable and pipe laying).

- EPIRBs and PLBs transmit the necessary information for rescue to authorities via satellite
- AIS-SART and AIS-MOB continuously transmit an alert message including GNSS-based location.

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EGNSS demand increases to enable new applications and resilient Maritime Navigation

Availability

Enhanced performance in challenging environments, thanks to more satellites in view

Accuracy

Increased accuracy thanks to Dual Frequency and High Accuracy Service

Integrity

Authentication

Increased safety and security thanks to integrity and Galileo Authentication

High accuracy, authentication and integrity for future Autonomous vessels

Galileo Search and Rescue for Vessels in distress

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Linking space to user needs

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