

Towards a Green Deal in Ports and Airports

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Outline



Towards Green Deal in Ports

- Introduction
- GNSS contribution to Green Ports
- EGNSS differentiators
- Emerging applications in Ports



Towards Green Deal in Airports

- Introduction
- GNSS contribution to Green Airports
- Emerging applications in Airports (and vertiports)



Introduction



Green ports are to be seen as multimodal hubs for sustainable and smart mobility of goods and people.

The future:

- Vessels approaching the port will continuously communicate automatically with other vessels around and with the VTS in Ports to adapt its speed, course and thus minimize fuel consumption and reduce emissions based on the traffic and weather conditions.
- Pilotage, docking and mooring operations will be done relying on automatic control systems that use GNSS receivers and other sensors data.
- Containers loading and unloading will be done as well with the support of automatic control systems, allowing teleoperation of cranes and straddle carrier vehicles in a first evolution.



GNSS contribution to Green Ports

Type of action: **Innovation Action**
Indicative topic budget: **€ 100 million**



- GNSS positioning is crucial for navigation and pilotage operations in ports, supports logistics operations, asset and fleet management, and enables smart multimodal transportation.
- GNSS contributes to improve efficiency of operations while maintaining safety, enabling the reduction of fuel consumption and the reduction of emissions to the atmosphere.
- Intelligent vessel traffic monitoring services, fed by authenticated GNSS data, will allow to improve routing and scheduling of operations, to minimize accidents but also the ship time at port.
- Digitalisation of management tools for port logistics operations, using GNSS data provided by, connected automated vehicles and cranes, will optimize resources to load and unload containers, store them in the yard and minimize accidents.



E-GNSS differentiators useful for Port/Airport operations



EGNSS contributes to increased resiliency of navigation solution:

- **Multifrequency** (E1 and E5):
 - Offers large bandwidth and new modulations (AltBOC, CBOC) resulting in a better resilience to multipath and environment-related effects.
 - Improves accuracy and availability.
- New Galileo **High Accuracy Service (HAS)** (E6 or via internet): will improve enhanced accuracy down to 20cm. The service is offered for free.
- New Galileo **OS-Navigation Message Authentication (OS-NMA)**: Authenticated position for geoawareness, surveillance and accident investigation. It will also allow to detect spoofing attacks.
- EGNOS provides **Integrity** checks to support safety critical applications.



Emerging applications in Ports

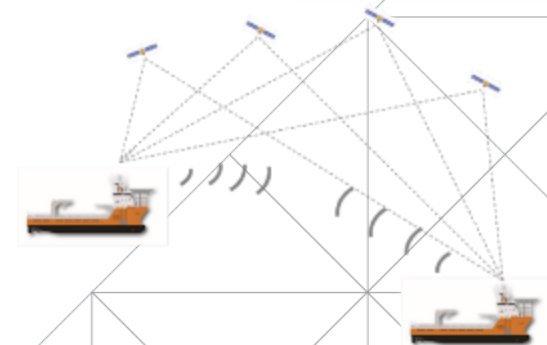
Type of action: **Innovation Action**
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- **Pilotage Operations** for safe entrance to ports:
 - New developments needed in Portable Pilot Units to integrate **HAS** (E6 or via internet connection (wifi/mobile network)).

- **Autonomous vessels (MASS)** – EGNSS contributes to operations where resilient PNT is key.
 - ✓ *E.g. Autonomous navigation*
 - ✓ *E.g. Autonomous docking*
 - ✓ *E.g. Port surveying operations (e.g. Bathymetry)*

- **New Vessel Traffic Services** – EGNSS contributes to the attitude characterisation of Digital Ship Twins, useful for situational awareness systems integrated with interacting objects in port, that allow safe trajectory planning.
 - ✓ *E.g. VDES implementing Galileo OS-NMA and output authentication*



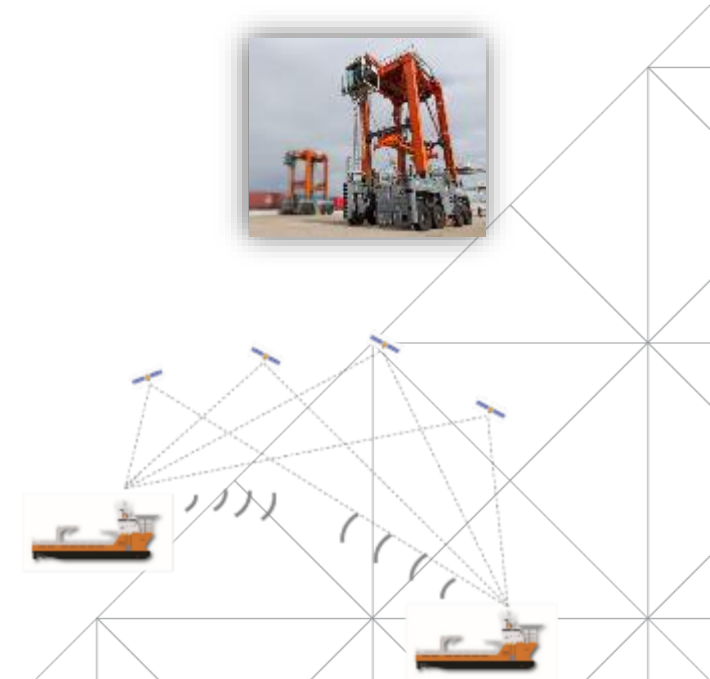


Emerging applications in Ports

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- **Surveillance and Accident investigation** benefitting from Galileo Authentication
- **Port Terminal Automation** – Straddle Carrier automation and port terminal container yard management
- **UAVs integration** to support operations in ports:
 - ✓ *E.g. Vessels emissions inspections,*
 - ✓ *E.g. Pilotage – including delivery of PPU to the vessel.*
 - ✓ *E.g. VTS and surveillance,*
 - ✓ *E.g. Container port yard monitoring*





Introduction - Aviation



Green and efficient operations are one of the main priorities of Aviation

The future:

- Optimised use of the airports and airspace capacity: by implementing flexible and efficient operations enabled by Performance Based Navigation and therefore GNSS.
- Air Traffic management supported by Big Data and Artificial intelligence to improve traffic predictability, optimize aircraft routing and update trajectories in real time.
- Thousands of interconnected and automated air vehicles: manned and unmanned vehicles, drones, air taxis, offering advanced mobility services.
- Digital and automated tools for airport operations management and interconnected with the on board equipment.
- Synthetic and enhanced sensor technologies to support landing in difficult weather and coordinate operations with air traffic control at the airport.



GNSS contribution to Green Airports

Type of action: **Innovation Action**
Indicative topic budget: **€ 100 million**



- GNSS positioning is crucial for Performance based navigation and efficient use of the airspace, asset and fleet management, and enables smart multimodal transportation.
- Efficient operations enabled by GNSS contribute to optimise the airport capacity and increase safety.
- GNSS contributes to reduce fuel consumption while reducing emissions.
- Drone integration in the airspace, airports and future vertiports, require robust and resilient positioning relying on high accuracy and authenticated GNSS data.
- Digitalisation of air traffic management using GNSS data provided by, connected automated vehicles and airport infrastructure, will optimize flight planning and asset management.



Emerging applications in Airports

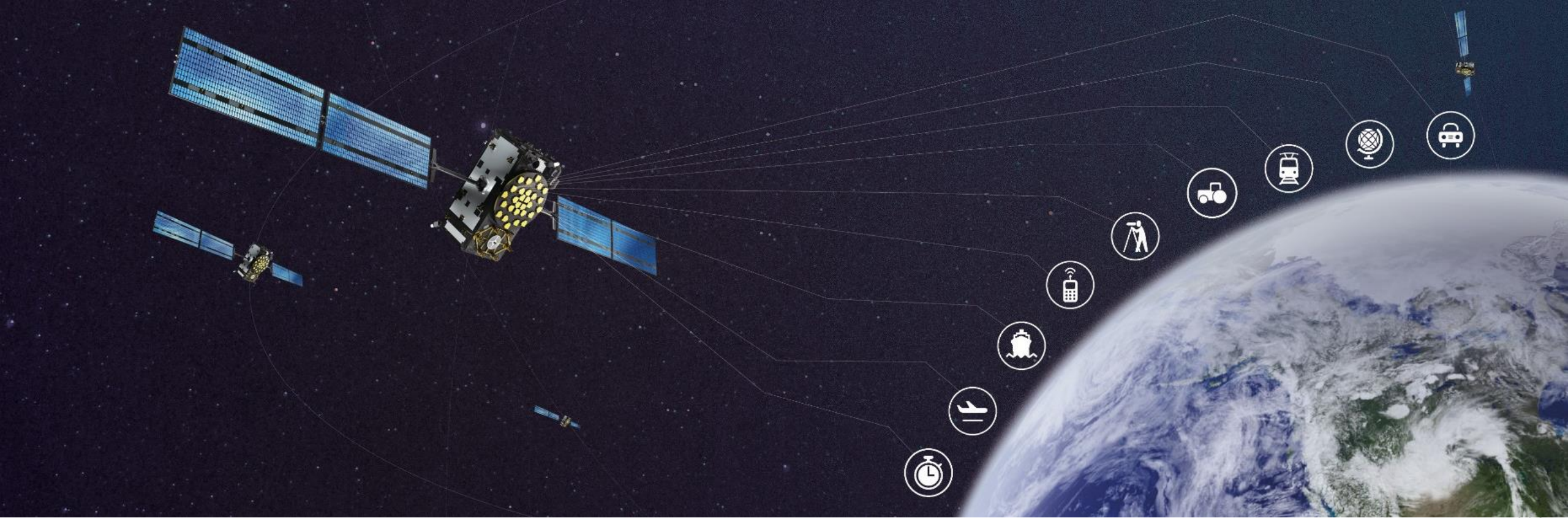
Type of action: **Innovation Action**
Indicative topic budget: **€ 100 million**



- Efficient and sustainable operations supported by EGNSS to optimise the capacity use
 - ✓ *E.g. Flexible glide slopes*
 - ✓ *E.g. Curved segments to reduce noise*
 - ✓ *E.g. Simultaneous non-interfering operations for helicopters*
- Enhanced / Synthetic Vision systems to support all weather operations on board and facilitate Air Traffic control.
- Interconnected airport services and assets, with accurate position for tracking and handling, evolving towards the SWIM concept.
- Digitalised Integrated Air Traffic management for Manned aviation and drones.
- Future vertiports for drones.
- E-GNSS timing for ground infrastructure synchronisation. E.g. radar



<https://www.urbanairmobilitynews.com/>



Thanks !, Questions?

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