Space-based solutions for logistics:

an example of Italian R&D activities in maritime sector

‘Space-Enabled Solutions for the Future of Logistics’ Workshop

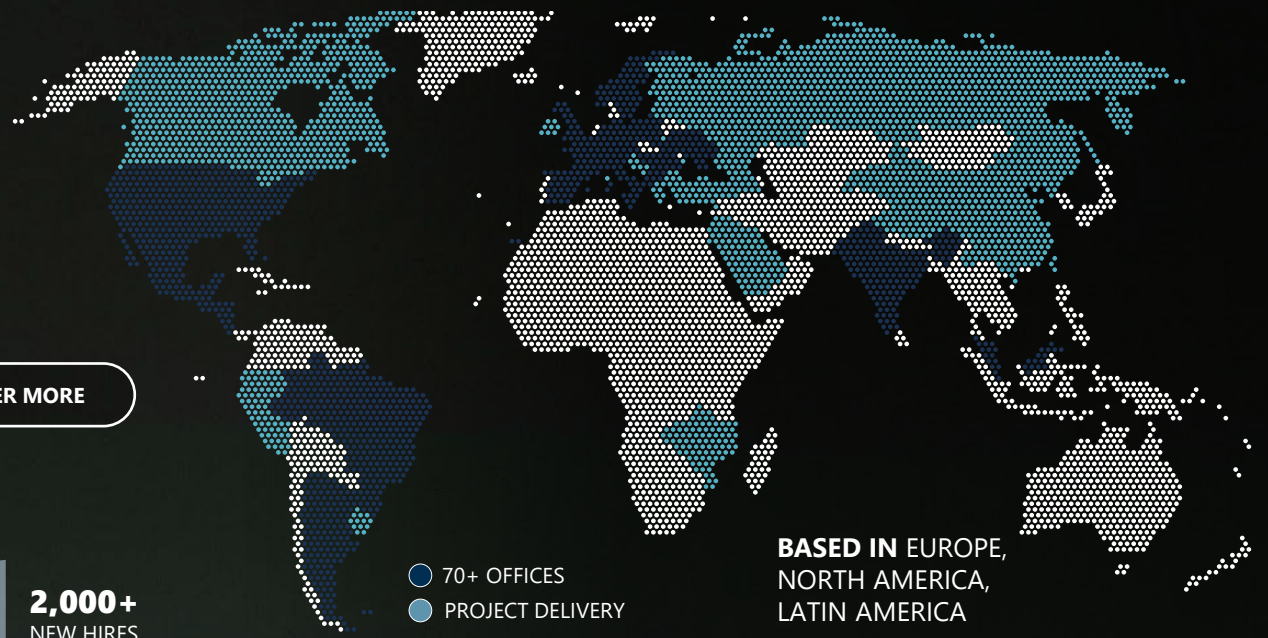
8th May 2025

At a Glance

REVENUE

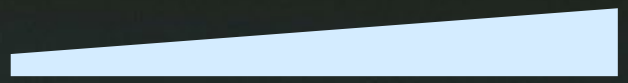
FY2021	FY2022	FY2023	83%
1.285 Bn€	1.460 Bn€	**1.7 Bn€**	IN ITALY

DISCOVER MORE



BASED IN EUROPE, NORTH AMERICA, LATIN AMERICA

EMPLOYEES



33%
OF ALL EMPLOYEES IN 2023 ARE WOMEN

2,000+
NEW HIRES IN **2023**

2017	2019	2023
10.273~	11.600~	**15.000~**

+ **ADVISORY**
+ **TECHNOLOGY & IMPLEMENTATION**
+ **MANAGED SERVICES**

CLIENTS

95%
ARE LARGE ORGANIZATIONS OR PUBLIC SECTOR

96%
OF SATISFIED CLIENTS

BainCapital | NB RENAISSANCE

49.8% * **49.8%**

Golden Power
SINCE 2020

* The share of Management Co-Invest accounts for the remaining 0.4%

Spaceexe is an Italian SME dedicated since 2013 to the design and development of IoT solutions based on GNSS devices and telecommunication technologies. Our innovation key is the positioning accuracy, telecommunications reliability and low energy consumption.

Spaceexe solutions are aimed at the maritime, territory and infrastructure monitoring and personal tracking sectors. We offer solutions designed on customer needs, at competitive prices and capable of operating even in critical environmental situations.

Spaceexe's technological excellence is guaranteed by its strong and continuous commitment to R&D activities in the space sector.

Maritime Autonomous Surface Ship

Landslide and critical infrastructures monitoring

Bridges and viaducts monitoring

GREAT - Next Generation GNSS REference stATions

GNSS on board units

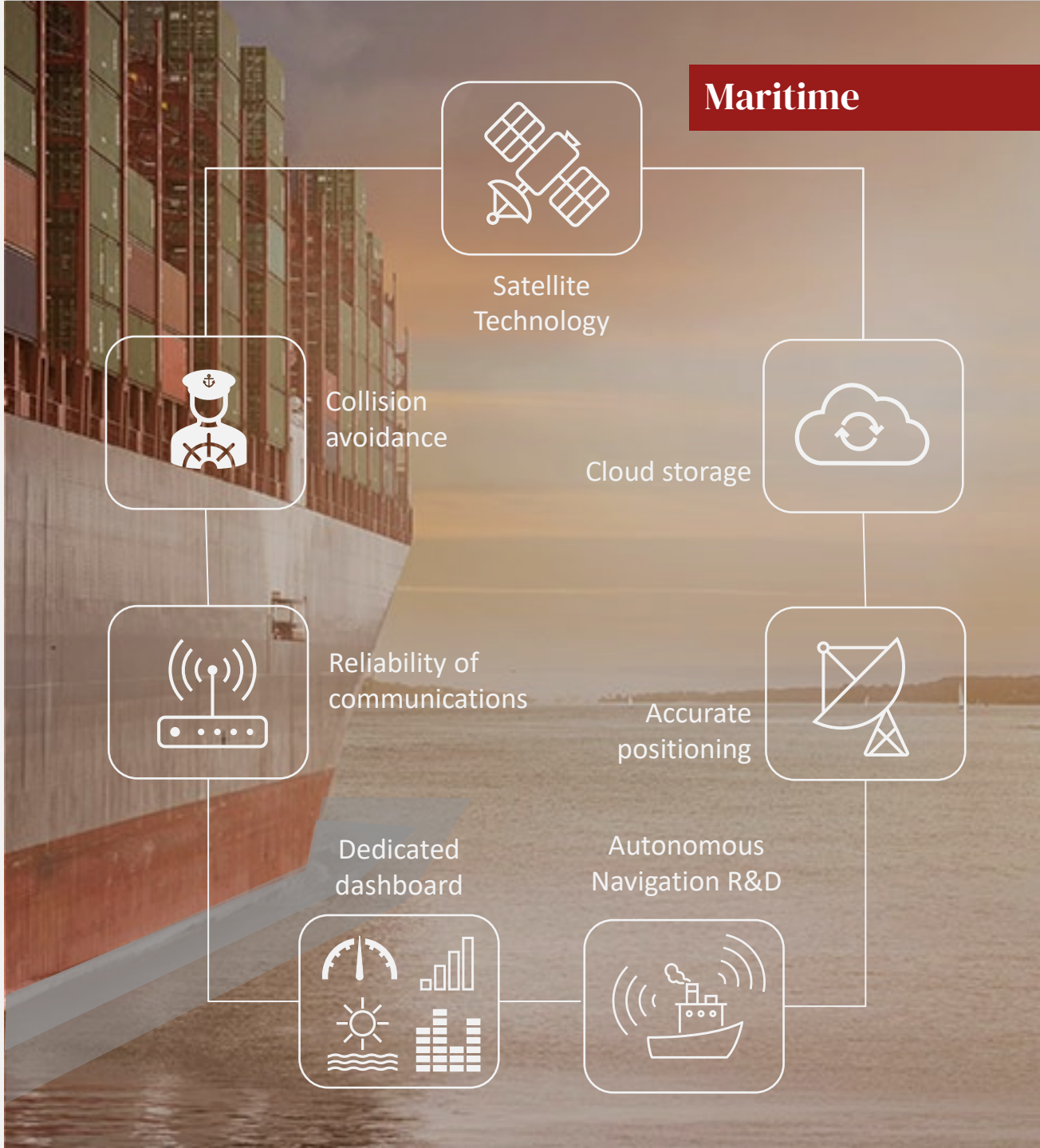
Real time team tracking platform

Agenzia Spaziale Italiana

Integrated port management with satellite-assisted port access.

The consortium has developed a high-accuracy satellite system to support operations during open sea and port area navigation.

The solution is composed by a distributed onshore/offshore architecture based on AIS-GNSS technology for accurate PNT (Position, Navigation, Timing) evaluation.



R&D on integrated port management with satellite-assisted port access.

The project objectives:

O.1 Demonstration of the GALILEO system's capabilities to meet the requirements set out by IMO regulations for the introduction of the World Wide Radio Navigation System (WWRNS) in various port operations, with particular reference to IMO Resolution A.915(22) and, more generally, to IMO Resolutions MSC.233(82) and A.1046(27).

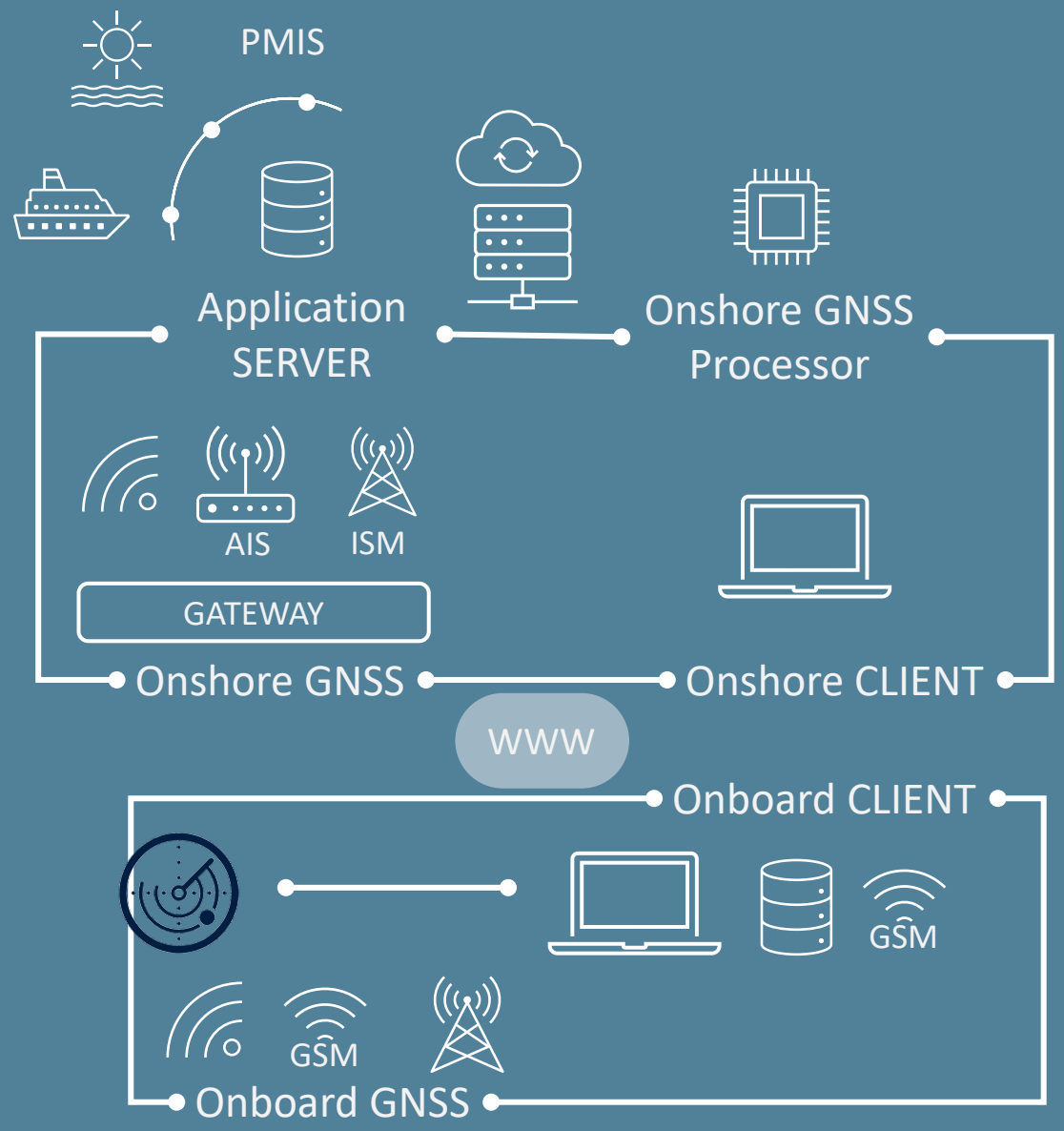
O.2 Study and prototype implementation of a centralized alert and alarm system for port operations.

O.3 Use of the AIS signal for the transmission of complementary information that can be useful for performance optimization; to improve decision-making and enhance safety in areas within or adjacent to the port.

Main system blocks

- An onshore AIS Base Station for differential corrections transmission.
- An onshore GNSS reference station.
- An onboard GNSS receiver to evaluate accurate position, heading, pitch and roll through satellite signal, with no need of magnetic calibration.
- An onboard AIS receiver (usually already installed) to receive differential correction from AIS Base Station .
- Internet connectivity onshore and onboard.
- An ISM (869MHz license free) transceiver onboard and onshore to transmit and receive differential corrections on a backup channel (optional).

System overview



Agenzia Spaziale Italiana

ENGINEERING
THE DIGITAL TRANSFORMATION COMPANY

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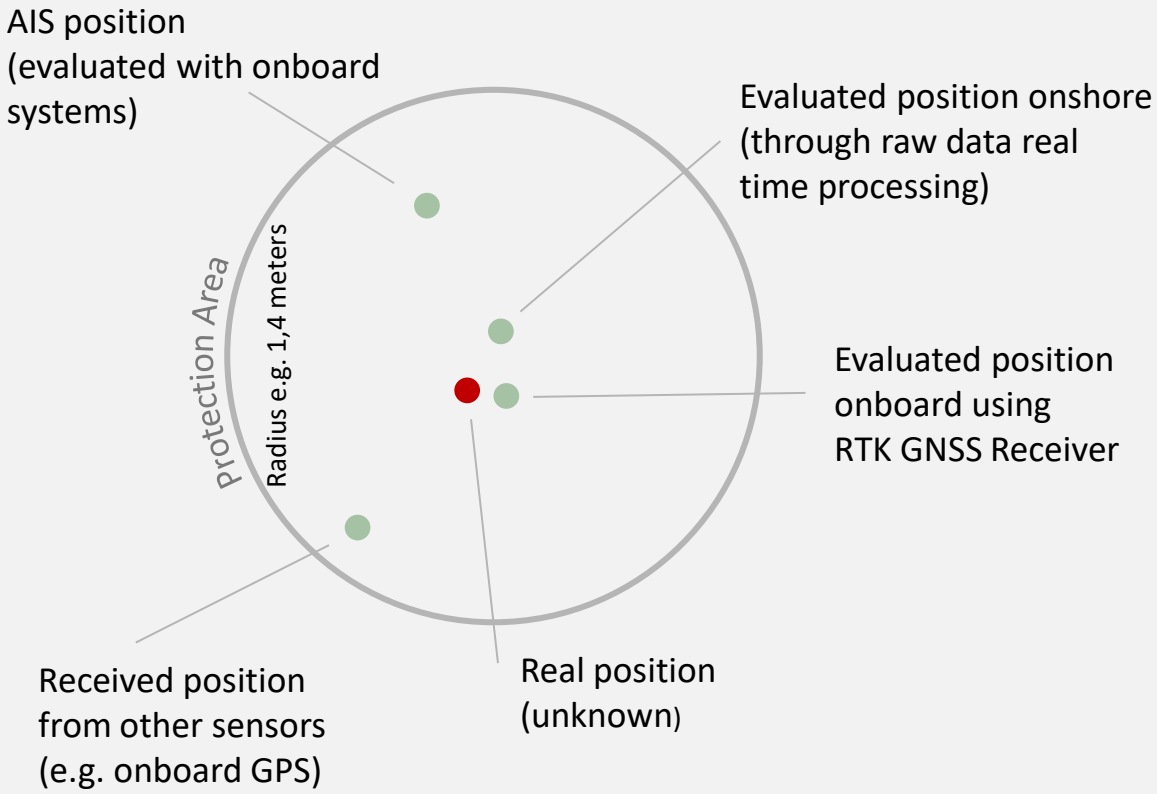
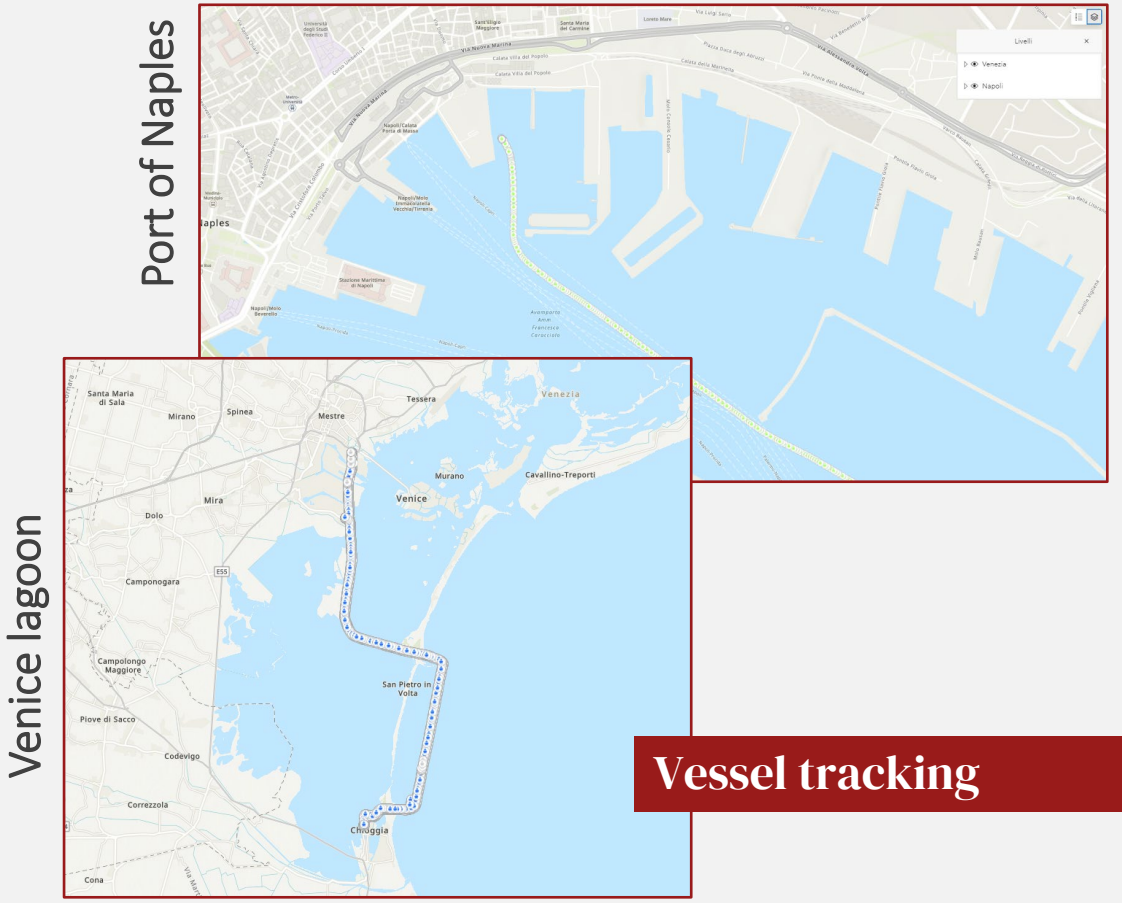
Accuracy Results

- RTK: ~1 cm accuracy
- DGNSS (AIS Msg #17): ~1-2 meter accuracy
- GNSS: ~ 10 meters accuracy



Features

- Data collected at Naples and Venice
- Near-zero packet loss over an 8 hours period (99.9%)
- GNSS L1 Jamming recorded in Naples
- Continuous RTK and DGNSS fix positioning
- Differential corrections transmission through 3G/4G modem and backup channel (ISM band)



Vessel tracking

Installation onboard Tug «San Gennaro» of Rimorchiatori Napoletani

UHF Antenna (ISM)

Antenna GNSS

Onboard cabinet

UHF Antenna (ISM)

VHF Antenna (AIS)

GNSS Antenna Reference Station

GNSS Antenna (AIS)

Naples installation

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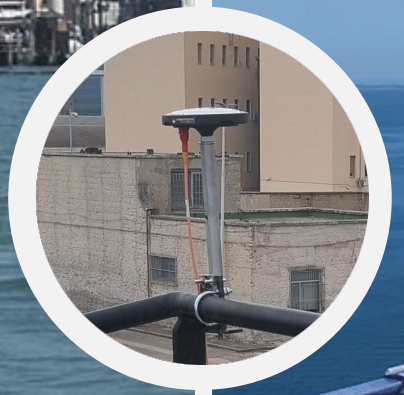


UHF Antenna (ISM)

VHF Antenna (AIS)

GNSS Antenna (AIS)

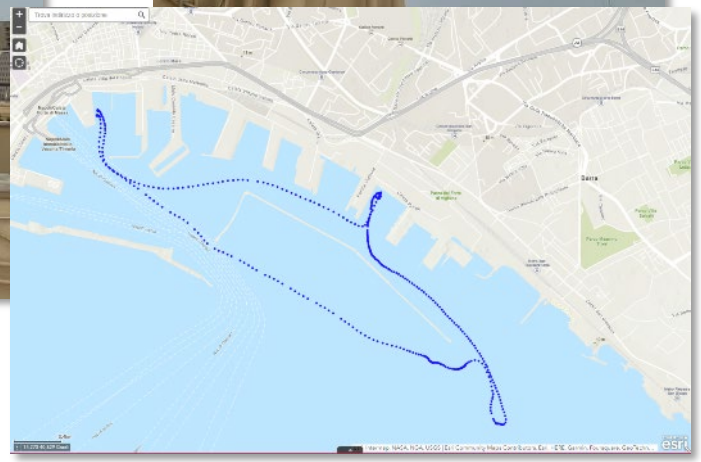
UHF Antenna (ISM)

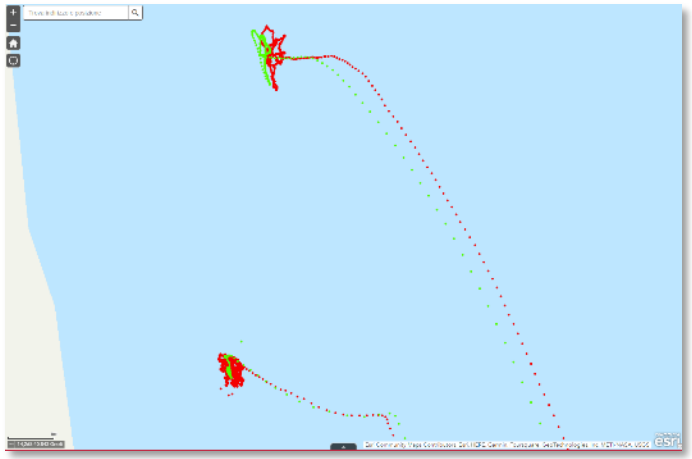
GNSS Antennas

Venice installation

Developments – Ground segment in Naples

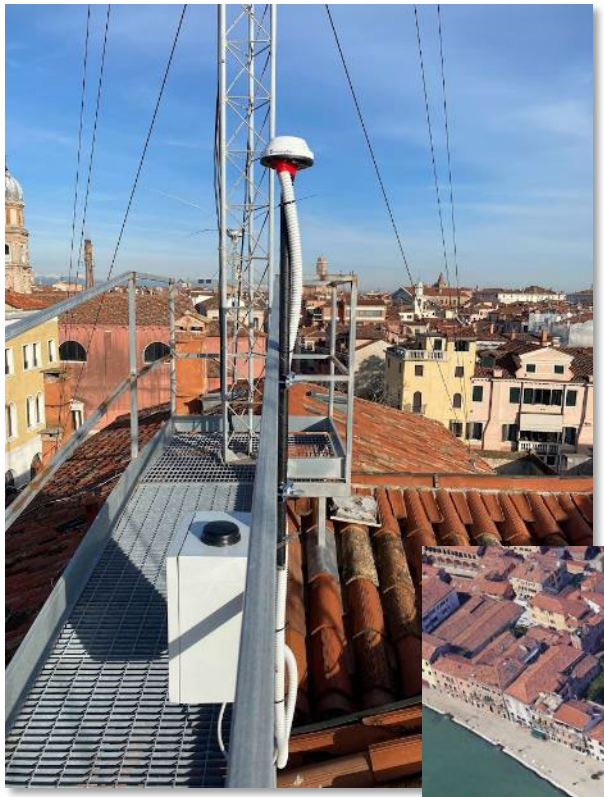
Antennas and equipment have been installed on the turret of the Naples Port Authority building.

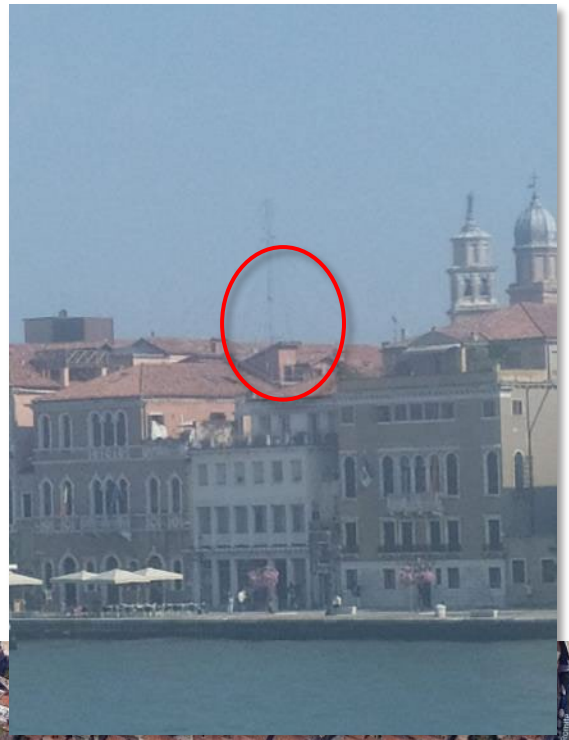




Developments – Ground segment in the lagoon of Venice (1/2)

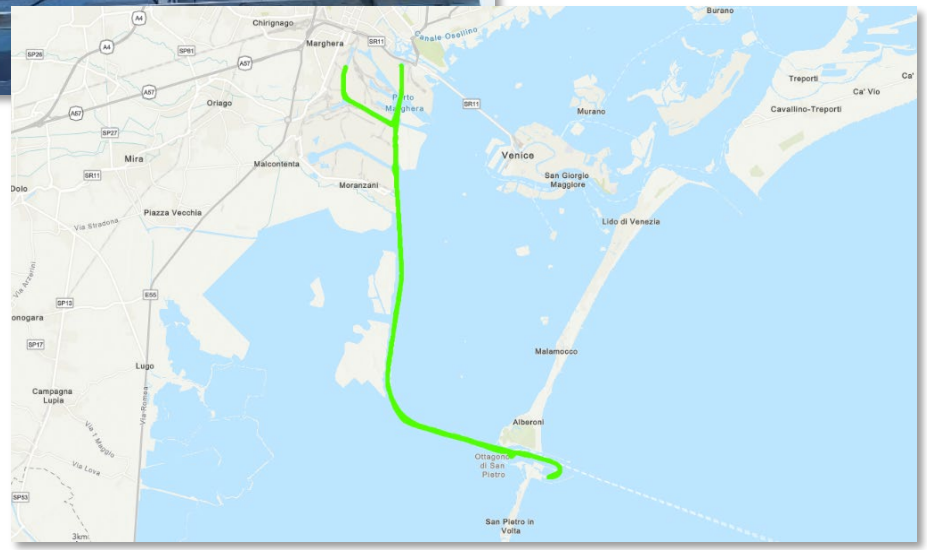
Antennas and equipment have been installed on building “Le Zattere” of the Venezia Port Authority.

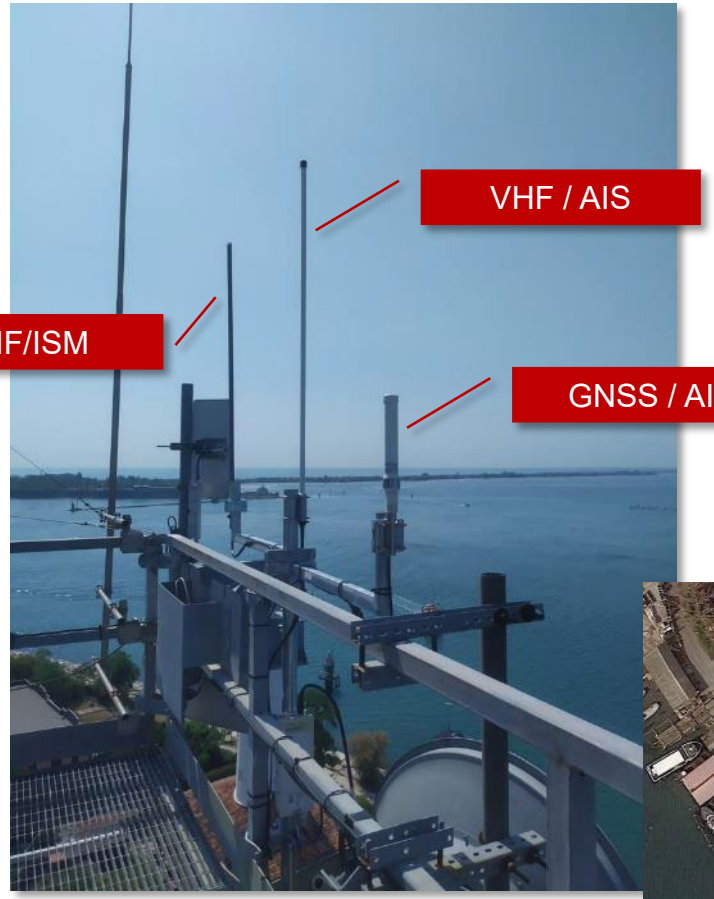




Developments – Ground segment in the lagoon of Venice (2/2)

Antennas and equipment have been installed on the pilot tower in Malamocco (Lagoon of Venice)



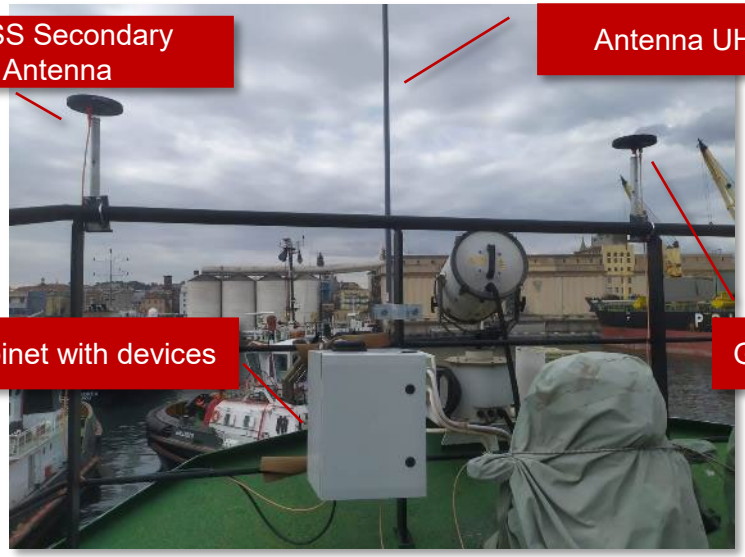


Developments – Shipboard segment Naples

Installation on the tug ship «San Gennaro» property of «Rimorchiatori Napoletani»

GNSS Secondary Antenna

Antenna UHF/ISM

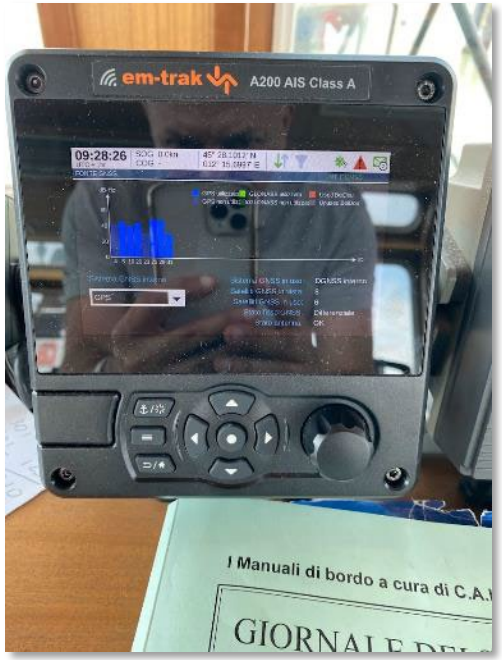


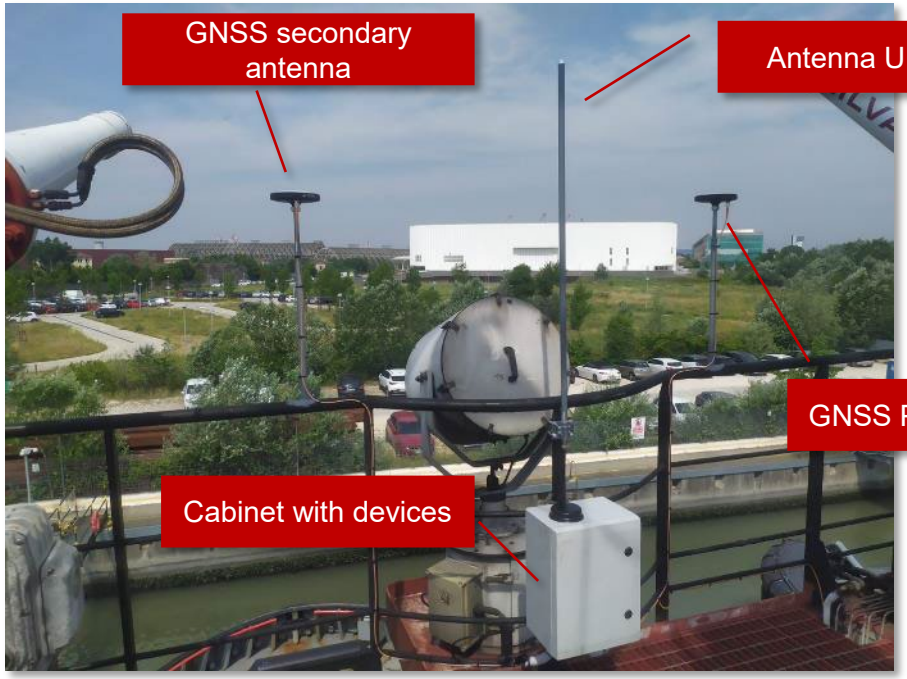
Cabinet with devices

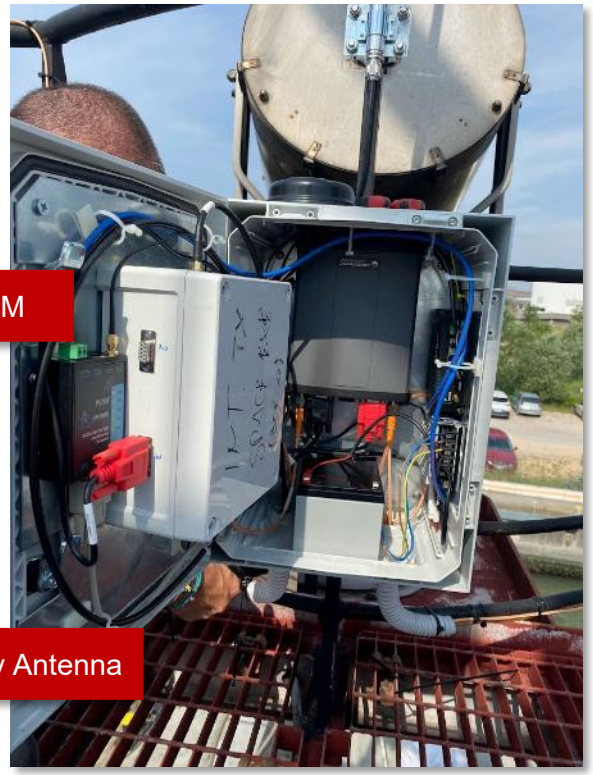
GNSS Primary Antenna

Developments – Shipboard segment in Venice

Installation on the tug ship «Angelina C» property of «Rimorchiatori Riuniti Panfido»







Main results and follow-up

- Differential corrections sent on message #17 of the AIS is the short term solution to drastically improve the positioning **accuracy of onboard installed AIS transceivers.**
- **VDES (VHF Data Exchange System)** is the next frontier. The standard is almost defined. It should include RTK differential corrections. It natively includes the satellite component that can assist with coverage beyond the range of Terrestrial infrastructures.
- Integration with MSA (Maritime Situational Awareness) per **jamming/spoofing monitoring** is needed for port operations.
- **I-MASTER** (Italian Maritime Autonomous Surface ships TEst Range) NAVISP-3 ESA funded project is ongoing.

Thanks for your attention

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