

**e-geos**

AN ASI / TELESPAZIO COMPANY

# **Geo Information Services (GIS) and control of the pandemic situation**

**Towards a bilateral and European Space cooperation between Latvia and Italy in the  
light of the emerging global challenges**

**Webinar – 2021, May 31<sup>st</sup>**

 **TELESPAZIO**  
a LEONARDO and THALES company **80%**

 **LEONARDO** 67%

**THALES** 33%

**20%**

 **ASI**  
Agenzia  
Spaziale  
Italiana

**e-geos**

AN ASI / TELESPAZIO COMPANY

**100%**

**GAFAG**  
an e-GEOS (ASI / Telespazio) Company

# e-GEOS Premises



**170** People

ROME

Headquarter



**111** People

MATERA

Space Centre



**3** People

SCANZANO

Space Centre



**204** People

MUNICH

GAF Headquarter



**32** People

NEUSTERLITZ

GAF/DLR Station

# GEOINFORMATION IN NUMBERS



INTERNATIONAL  
MARKETS

80%



MARKETS

DOMESTIC  
MARKETS

20%

**10+**  
SATELLITE MISSIONS  
DATA ACQUIRED.

**70millions**  
AGRICULTURAL PARCELS

**1000+**  
MARITIME REPORTS/ YEAR

**100m €+**  
REVENUES

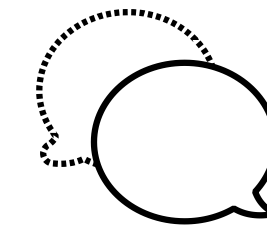
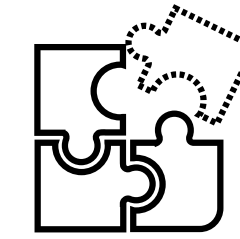
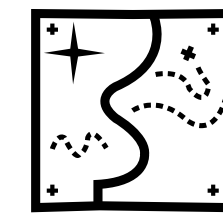
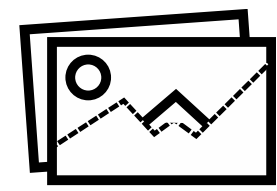
**9+**  
COMMERCIAL USER TERMINALS  
AROUND THE GLOBE

**6000+**  
MAPS PRODUCED  
IN 4 YEARS

**320+**  
ACTIVATIONS OF THE e-GEOS  
EMERGENCY MANAGEMENT SERVICE

**500+**  
PEOPLE

# GEO-INFORMATION HUB



DATA

DATA

CONTENT

SERVICES AND

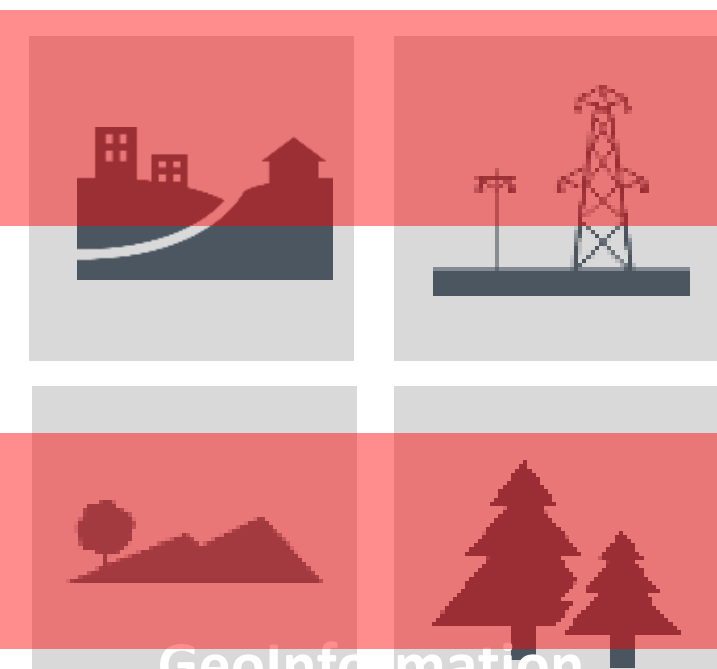
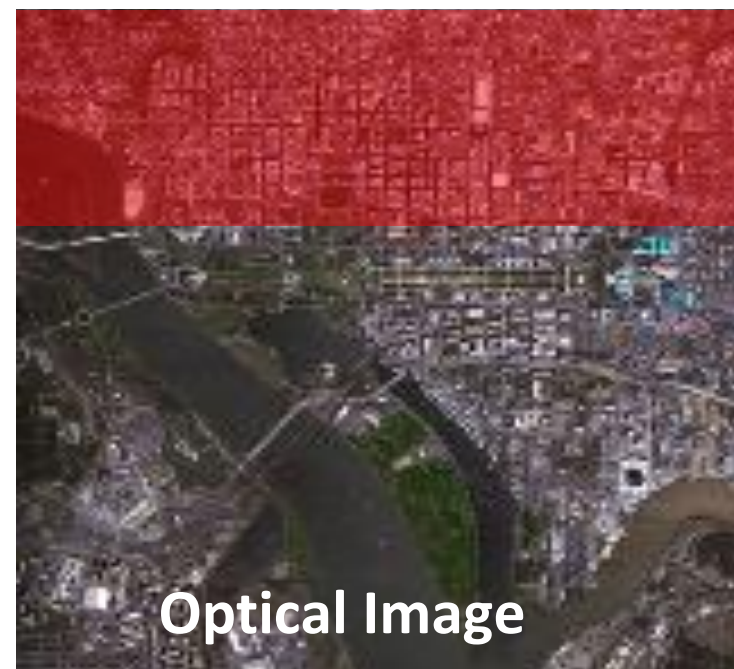
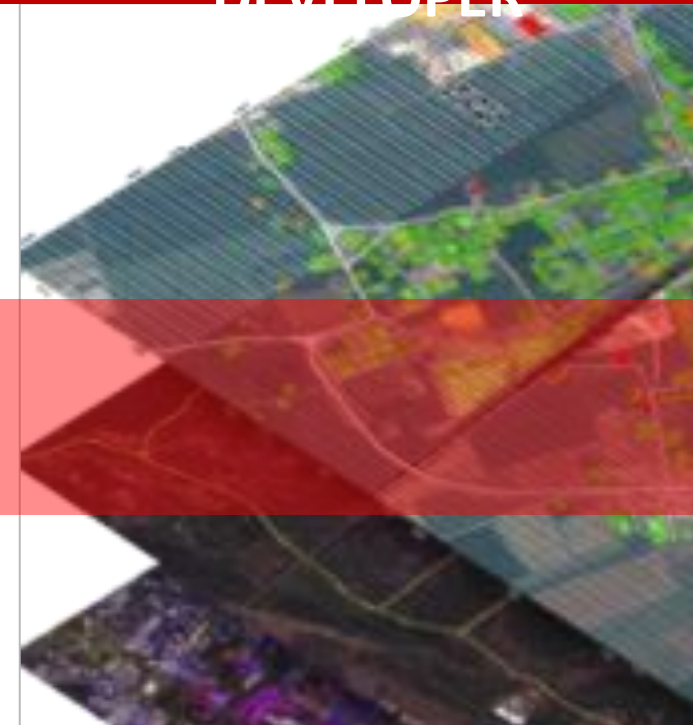
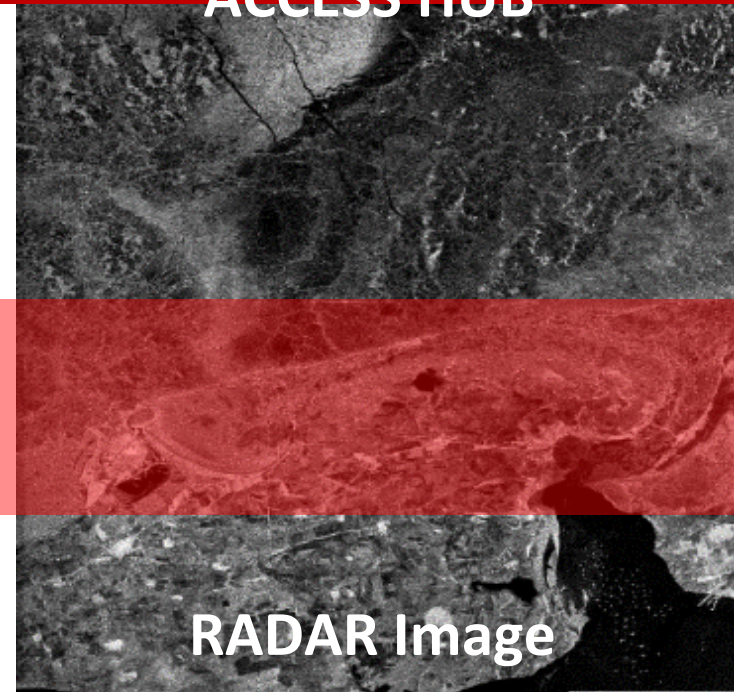
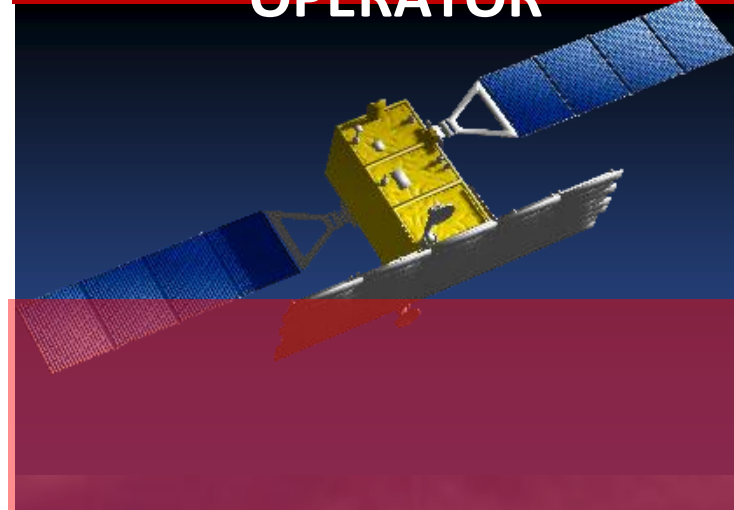
CONSULTANCY

OPERATOR

ACCESS HUB

DEVELOPER

PLATFORMS PROVIDER



Management of Earth  
Observation Receiving  
Ground Segment

Provision of Optical and  
Radar Satellite Data

Data analysis and  
integration &  
Geographic Layers  
production

Systems and Services

Projects fed by  
international funding  
institutions

Non EO data

• As a service

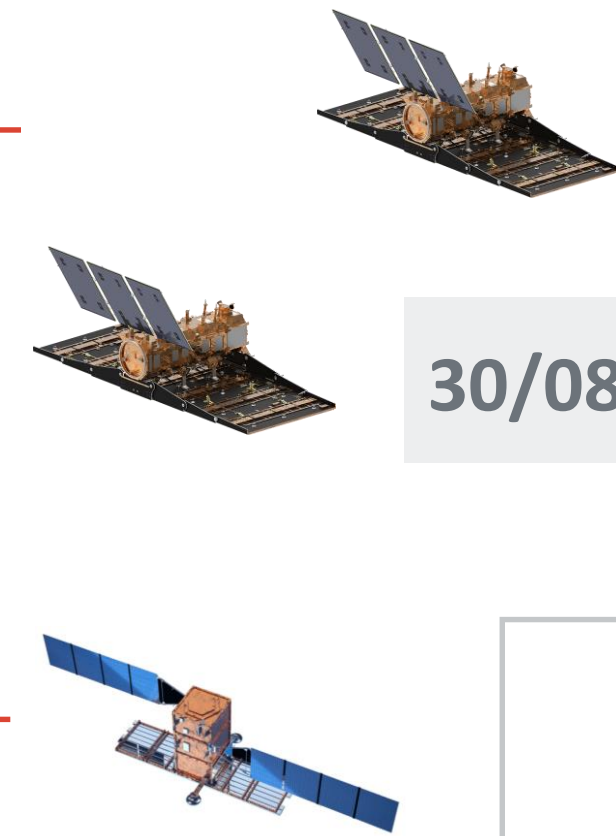
• On premises

Geodesy

# COSMO-SKYMED ROADMAP

2<sup>nd</sup> generation 3<sup>rd</sup> and 4<sup>th</sup> satellite

Exclusive  
Distributor  
TILL END OF  
**2026!**



08/10/2018 SAOCOM 1B

30/08/2020 SAOCOM 1A

2022 COSMO-SkyMed 2<sup>nd</sup> Generation

17/12/2019 COSMO-SkyMed 2<sup>nd</sup> Generation

7 June '07 COSMO-SkyMed-1

9 Dec '07 COSMO-SkyMed-2

25 Oct '08 COSMO-SkyMed-3

5 Nov '08 COSMO-SkyMed-4

L-band

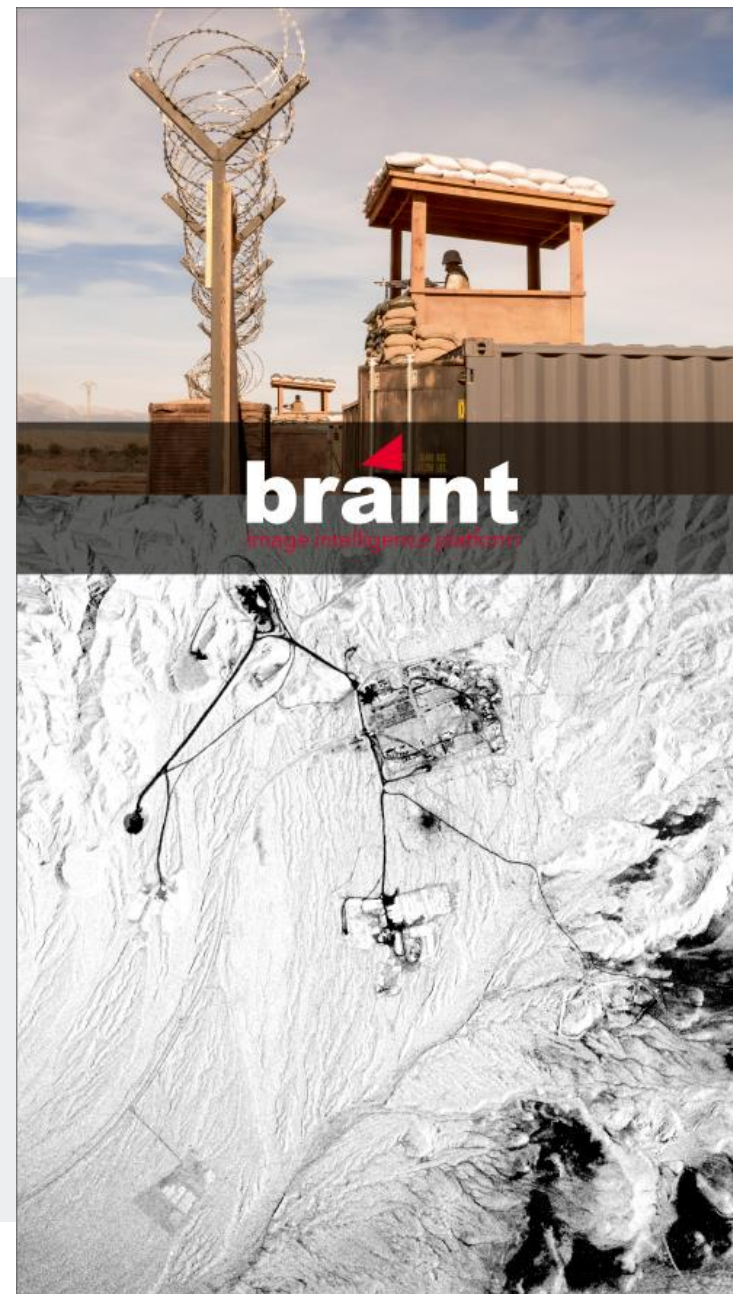
X-band



# e-GEOS DIGITAL PLATFORMS FOR VERTICAL SERVICES



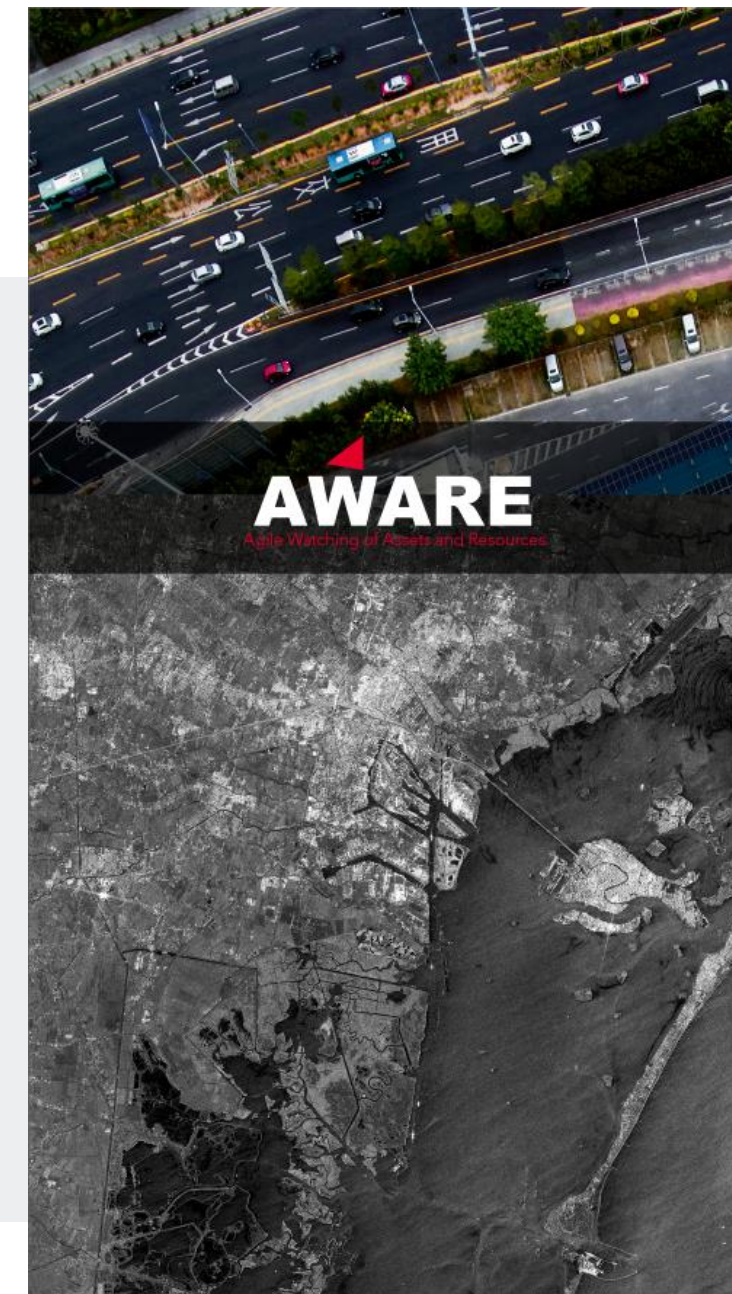
**MARITIME SURVEILLANCE**



**DEFENCE AND INTELLIGENCE**



**AGRICULTURE MANAGEMENT**



**ASSET MANAGEMENT**



**EMERGENCY MANAGEMENT**

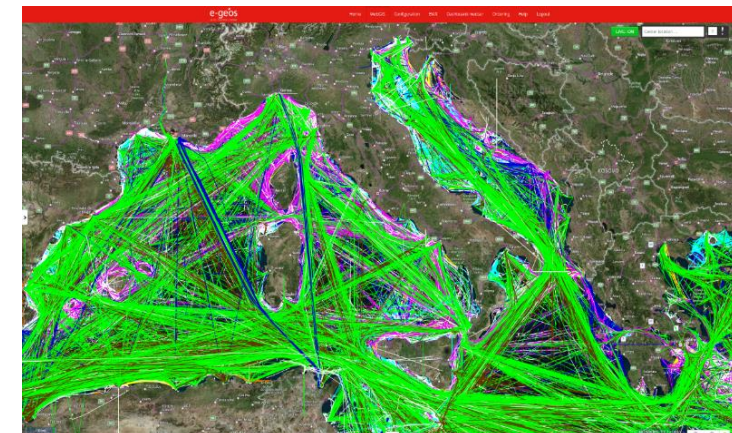
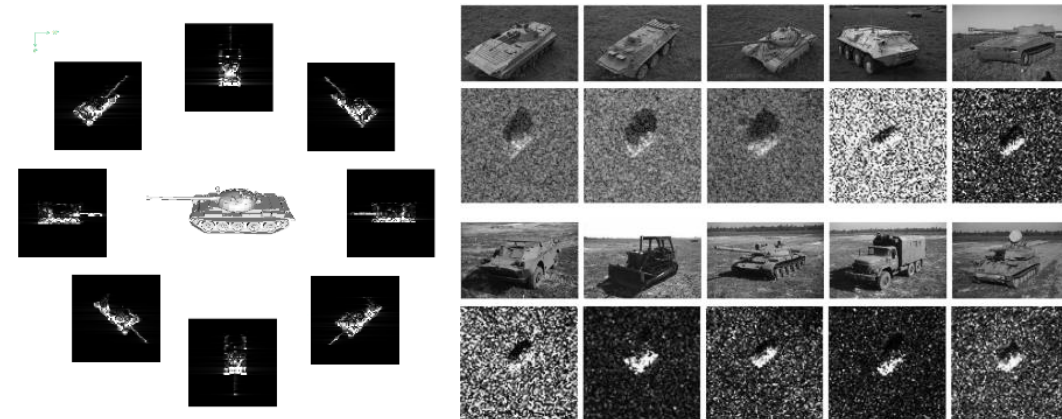
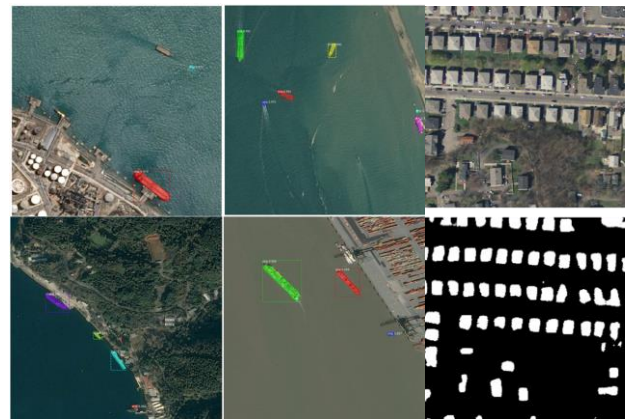


The online marketplace to access geo information Analytics & Geoinformation Digital Service, driving the e-GEOS digital transformation process of its portfolio

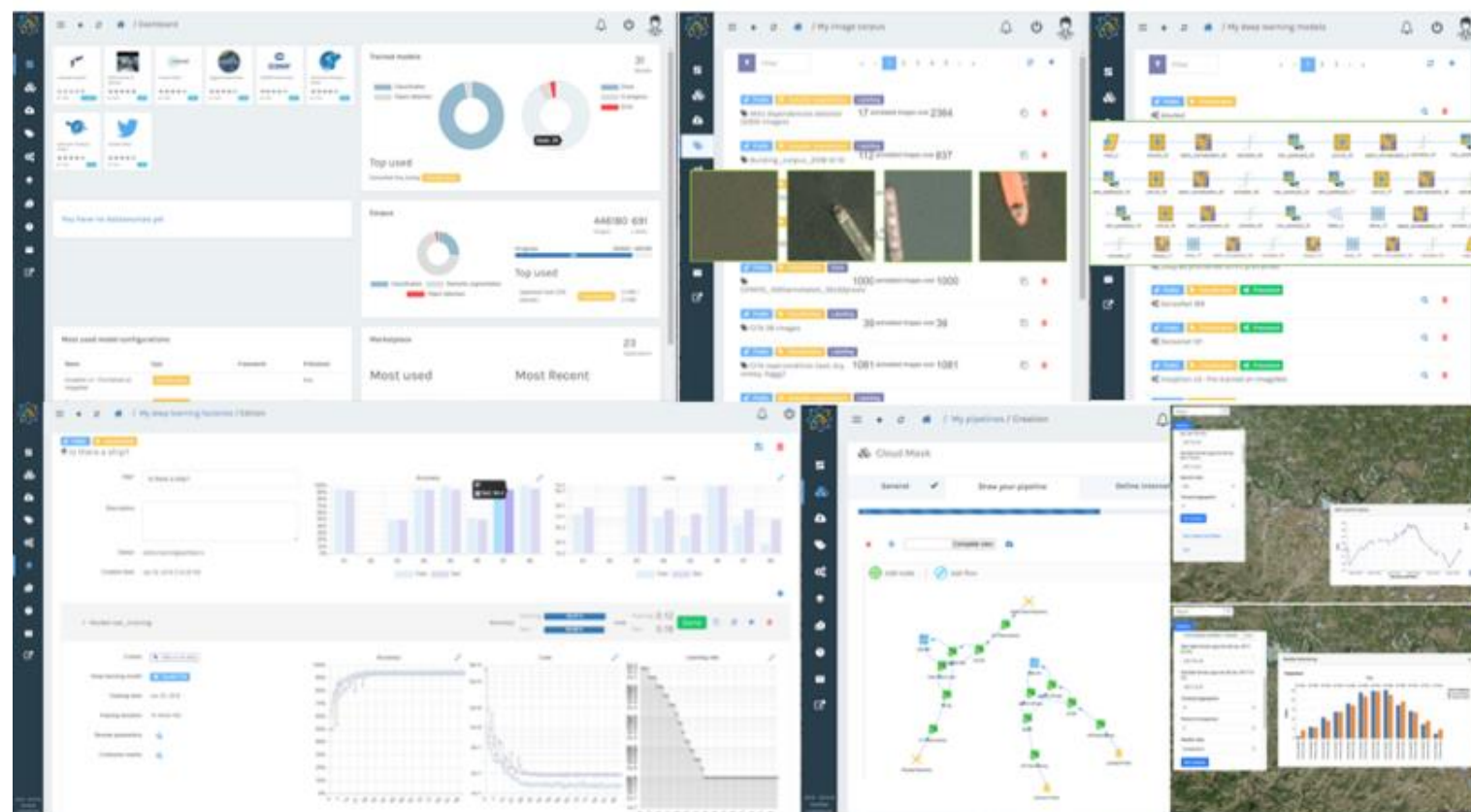


# GeoAI Activities

## 1. Object Detection 2. Automatic Target Recognition 3. Anomaly detection



## AI Factory



### Collaborative Platform for:

- AI Models development
- Training datasets management
- Simple annotation tools
- AI Models benchmarking
- AI Models versioning
- Transfer learning, fine tuning, ...
- Seamless AI model integration in Data Pipelines



Typical Data Analytics pipeline



- 68** positions available for researches in AI, HPC, BDA
- 800+** candidatures received
- 6** Leonardo Labs (L2), covering all Leonardo business areas
- 30** Research Units (RU), distributed in several Leonardo premises in Italy and abroad

e-GEOS/TPZ lead the **Space Technologies Lab** in Rome

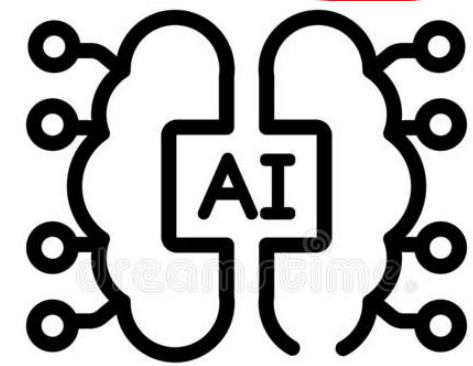
- **5** AI Experts + **3** Big Data Engineers
- Already established cooperation with ESA Phi Lab
- Main Research Areas:
  - Object detection/classification
  - Time series analysis
  - Small training datasets
  - Drone storms management
  - AI Explainability
  - Neural Architecture Search
  - ...

Ongoing interviews, operational by end of 2020



# What is CLEOS

CLEOS (Cloud Earth Observation Services) is the e-GEOS Digital Platform enabling the digital transformation to **boost the GeoInformation business in the new Space Economy framework.**



**AI and Hybrid Cloud Service** CLEOS makes knowledge, capabilities and product sharing **easy** to build and **enables Earth Observation services exploitation** for new business applications.



**COSMO-SkyMed and EO data access.** CLEOS represents e-GEOS strong technological and business move into the **Platform Economy**



**Digital Marketplace** that allows to present and sell all the GeoInformation portfolio through a user-friendly graphical user interface



**Developer Portal/AI Factory** which is unleashing the ingenuity of internal and external software developers/architects to develop/exploit robust and scalable, AI-powered, processing infrastructures over a multi-cloud environment

# COVID-19 economic impact assessment from Space in Italian Ports and Logistic Centers

Project funded by



# The Project in a nutshell

## CHALLENGE

During **emergencies** or long term area monitoring, it is very important for decision maker to collect and have access to a set of precise and **up-to-dated information**.

## AVAILABLE DATA

**Satellite data**, together with **on-ground data** (as sensor and mobile phones) offer an unprecedented opportunity of monitoring and analyzing continuously many features.

## TECHNOLOGIES

Thanks to **big data technologies** and infrastructures, it possible to perform long time series analysis and to produce new output with a very high frequency and **timeliness**.

## SELECTED TEST PORTS: Genoa and Gioia Tauro



Figure 1 - Taranto Port Area – Identification of different activities

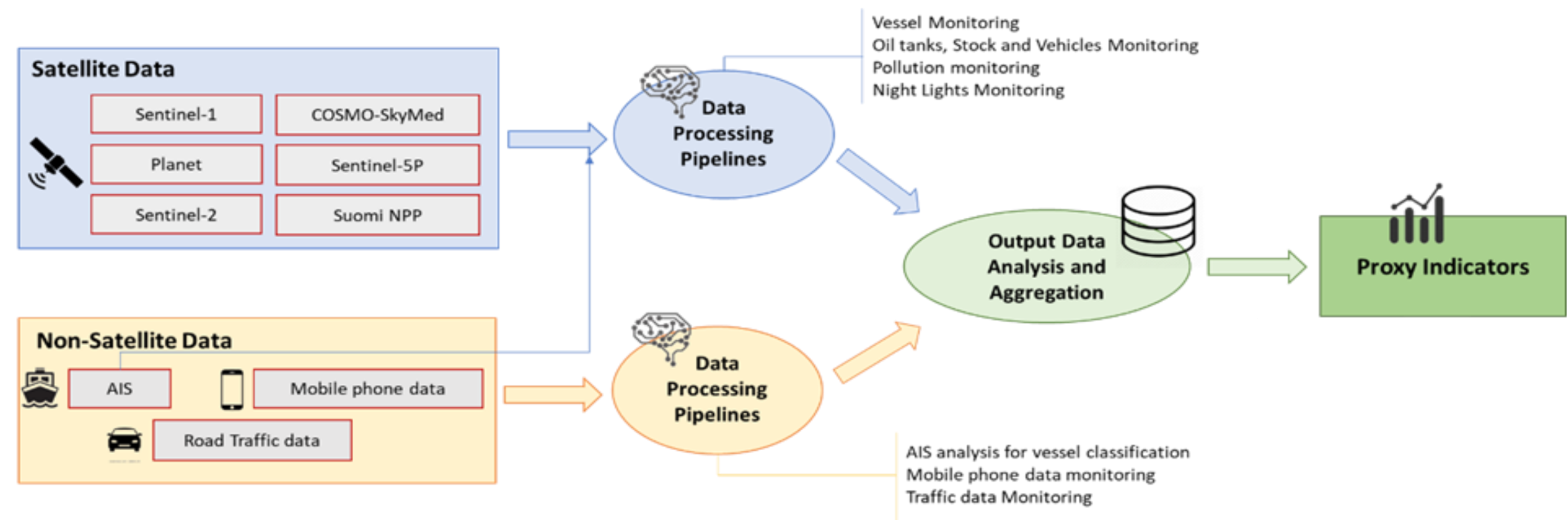


Figure 2 - Taranto Port Area – Terminals and industrial activities (ILVA SPA, OIL REFINERY ENI SPA) Source: Taranto Port Authority

## PROJECT OBJECTIVES

- 1) Define a set of **hybrid indicators** related to ports and logistic areas activities combining space and non-space observations.
- 2) Develop a **prototype** for data gathering and visualization
- 3) Demonstrate the **utility** of synthesizing heterogeneous source of data into proxy indicators to monitor and quantify the impact of COVID-19 outbreak.

## PROPOSED SOLUTION



# Assessing COVID-19 Impact – Observed phenomena



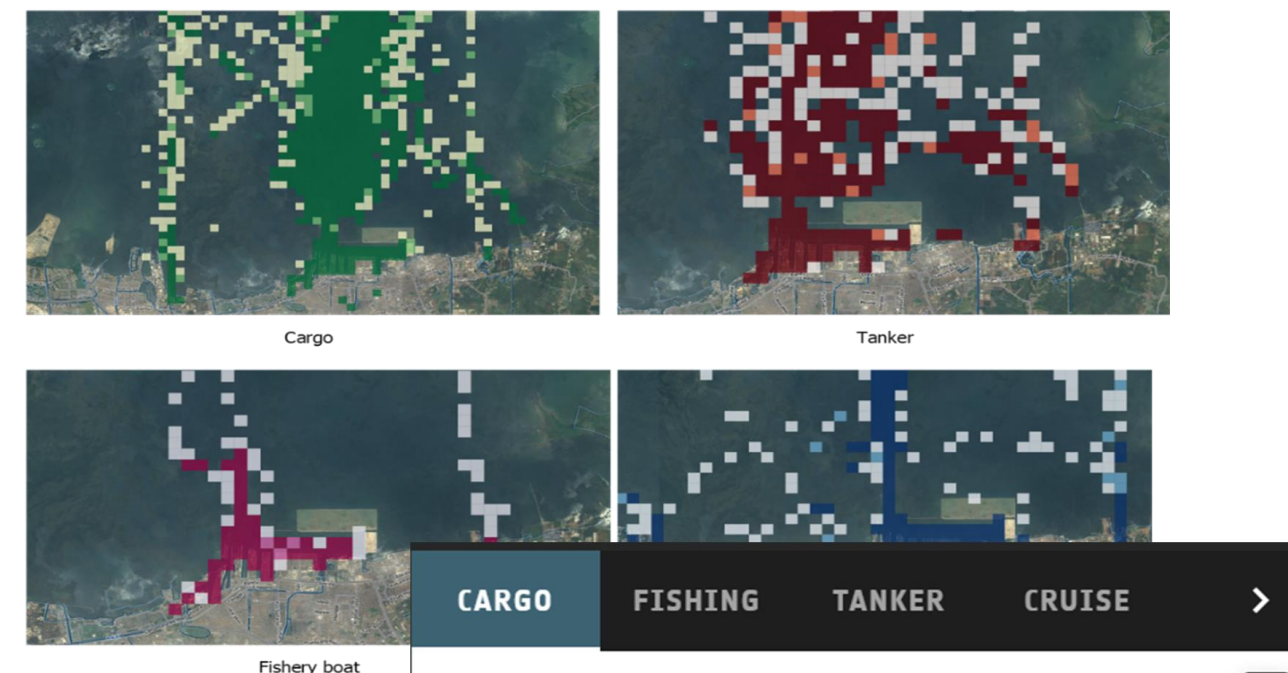
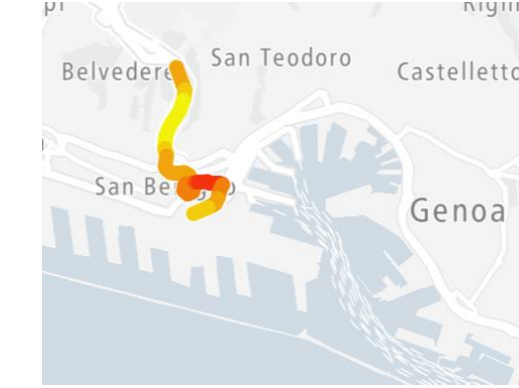
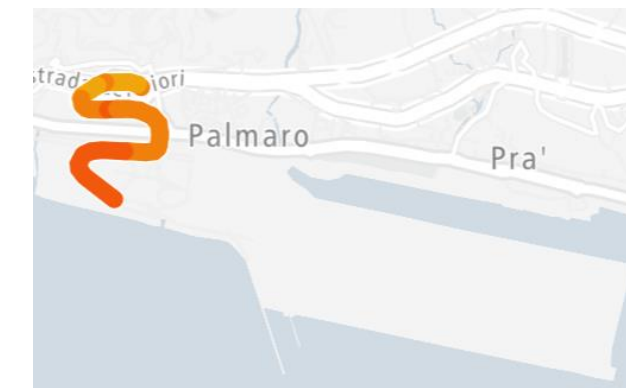
## Maritime traffic

Ship traffic in the main ports, trade routes, variation of volumes over the years/months, number of boats and activity at sea (e.g.: by AIS, by night lights detection, using both model based and AI approaches for vessel detection);

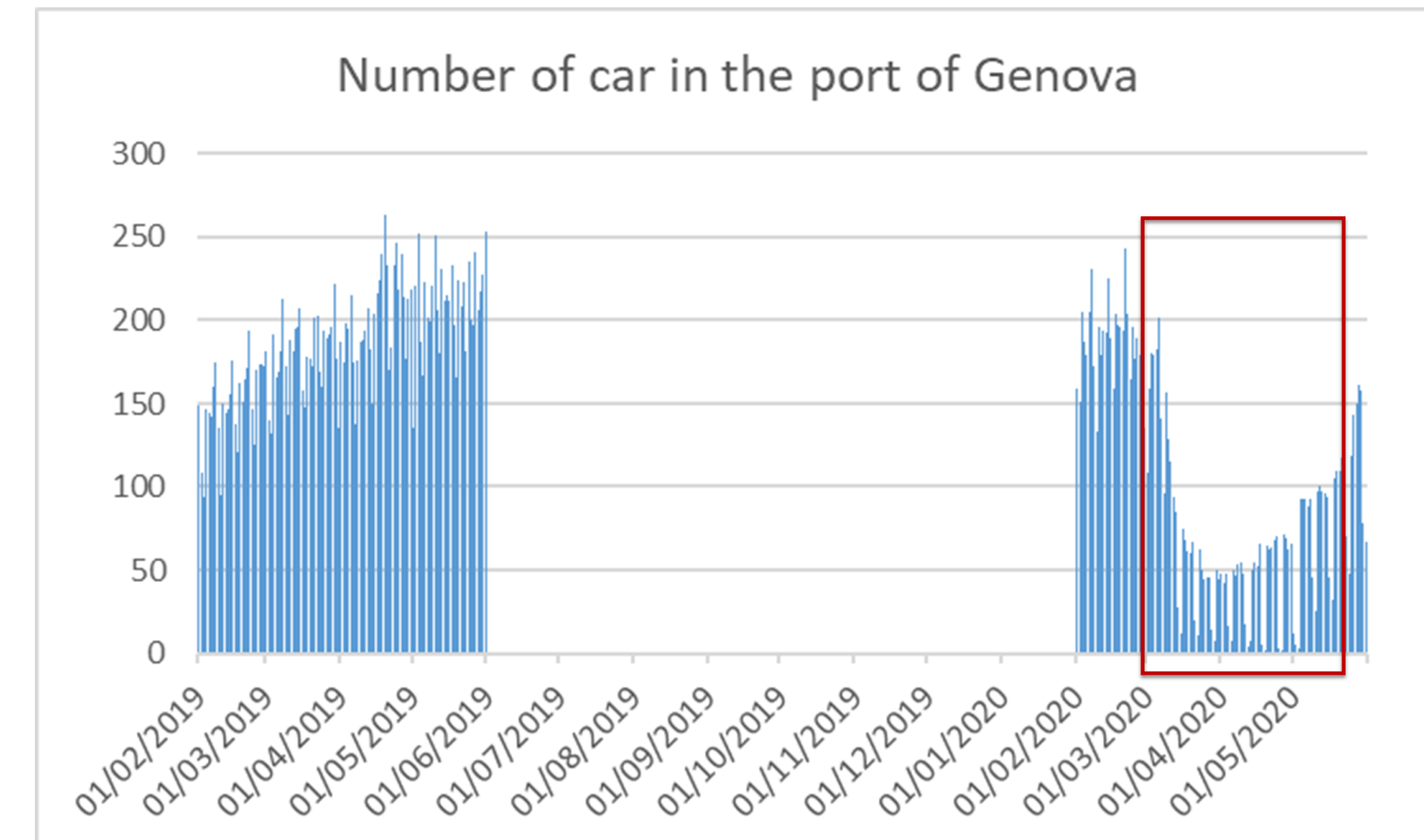
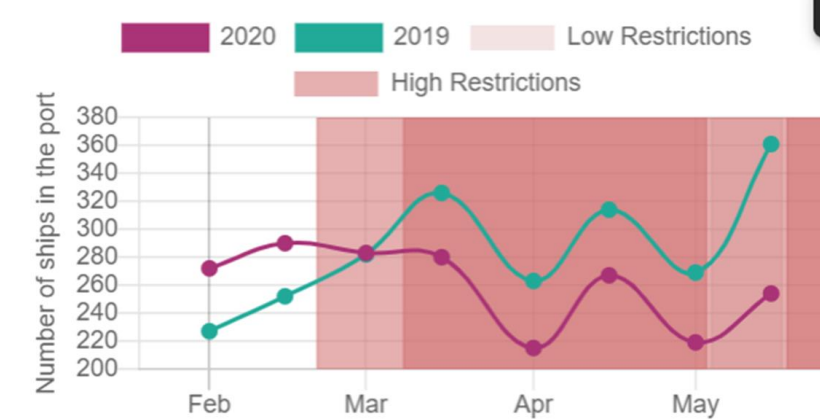


## Road traffic

Traffic between main cities (Italian and / or European) (e.g.: TomTom traffic data);

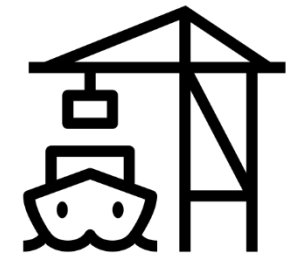


AIS data analysis & vessel classification



Vessel detection and counting for the 2 AOI

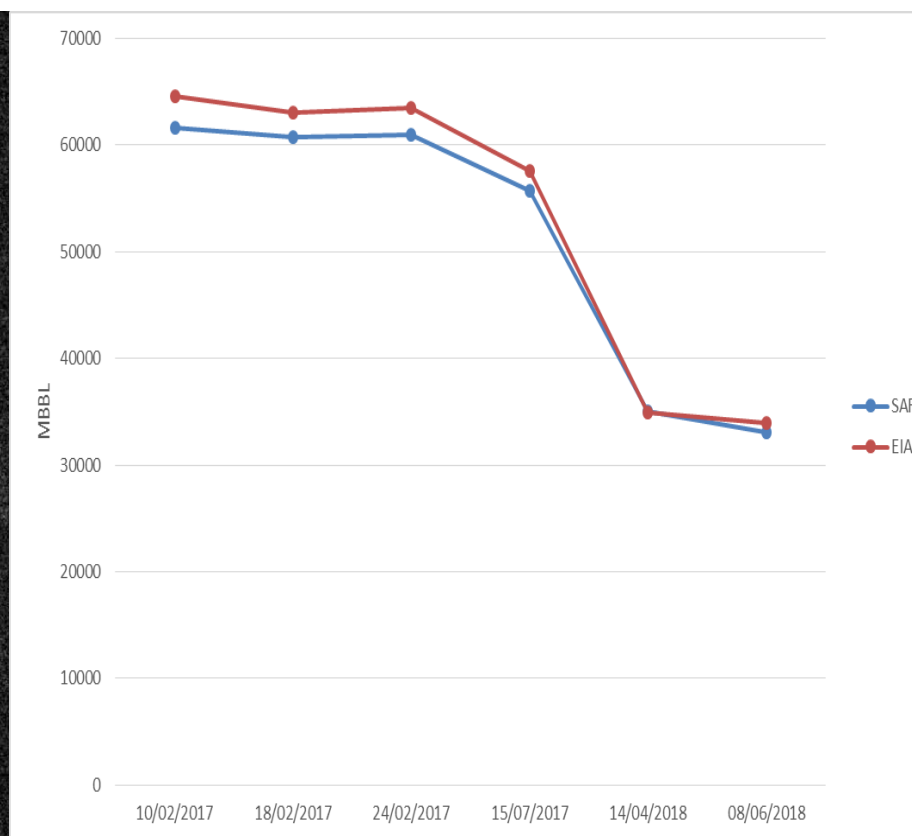
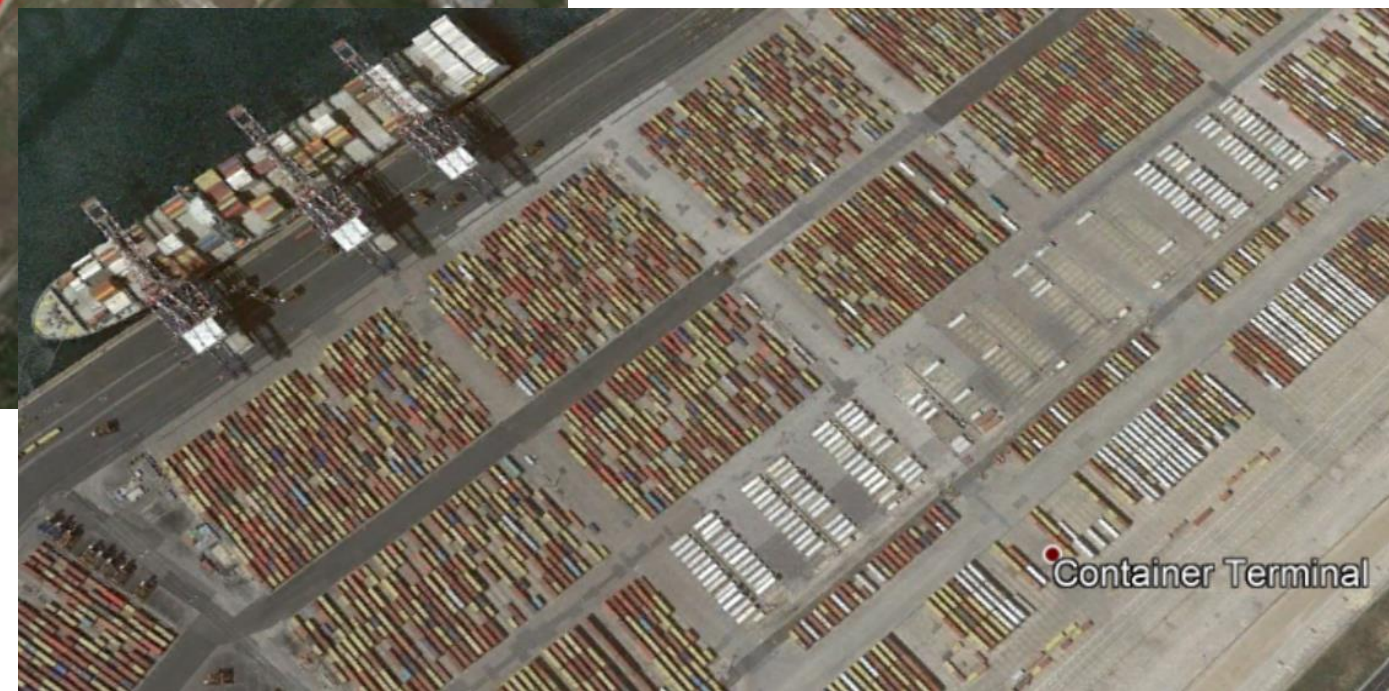
# Assessing COVID-19 Impact – Observed phenomena



**Port activity**



Container Analysis



Oil tank analysis



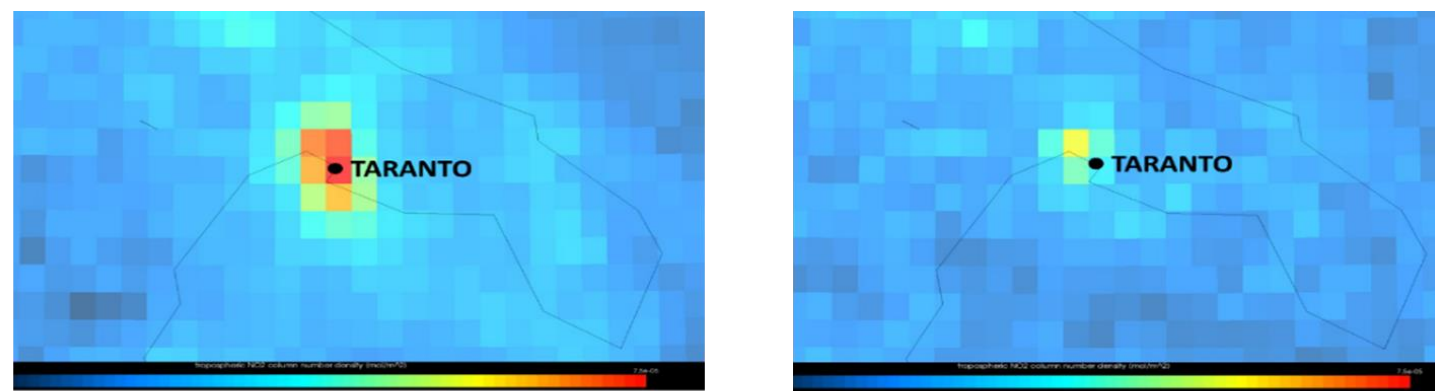
# Assessing COVID-19 Impact – Observed phenomena



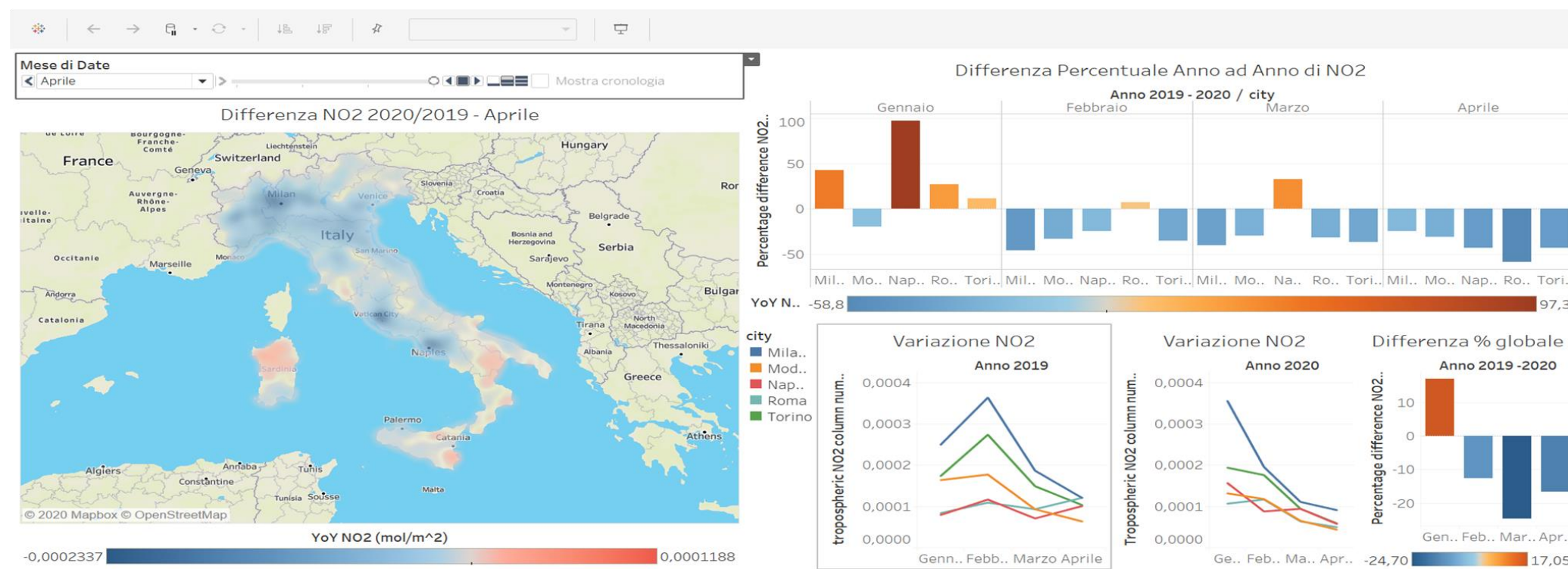
Highly related with human activity and industrial activity e.g.: Sentinel5, OMI, ground sensors



buildings, population layer, mobile phone data



NO2 concentration reduction in Taranto port due to COVID-19 using Sentinel 5P data



Dashboard created for the analysis of NO2 concentration over Italy and over some italian cities

**Economic variables**

- Import, export and trade balance
- GDP, household consumption and gross fixed investment

**COVID 19 diffusion and restrictions variables**

- COVID 19 diffusion
- COVID 19 restrictions with Oxford index

**Port activity variables**

- Port activity Genoa
- Port activity Gioia Tauro
- Economic performance Genoa(liquid bulk, containes, passengers)
- Economic performance Gioia Tauro
- People/car/ship mobility Genoa and Gioia Tauro
- Pollution

Traffica Data   Boat detection   **Economic Data**

### Solid bulks (tons) - 2019 2020



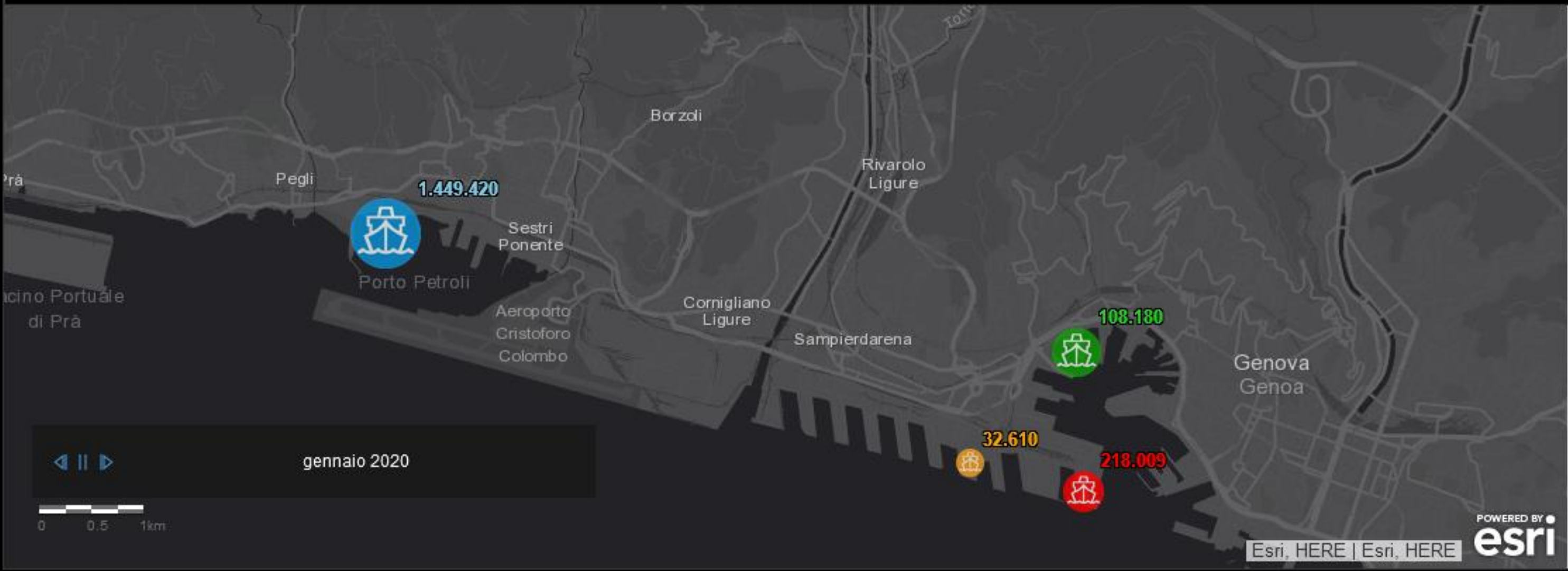
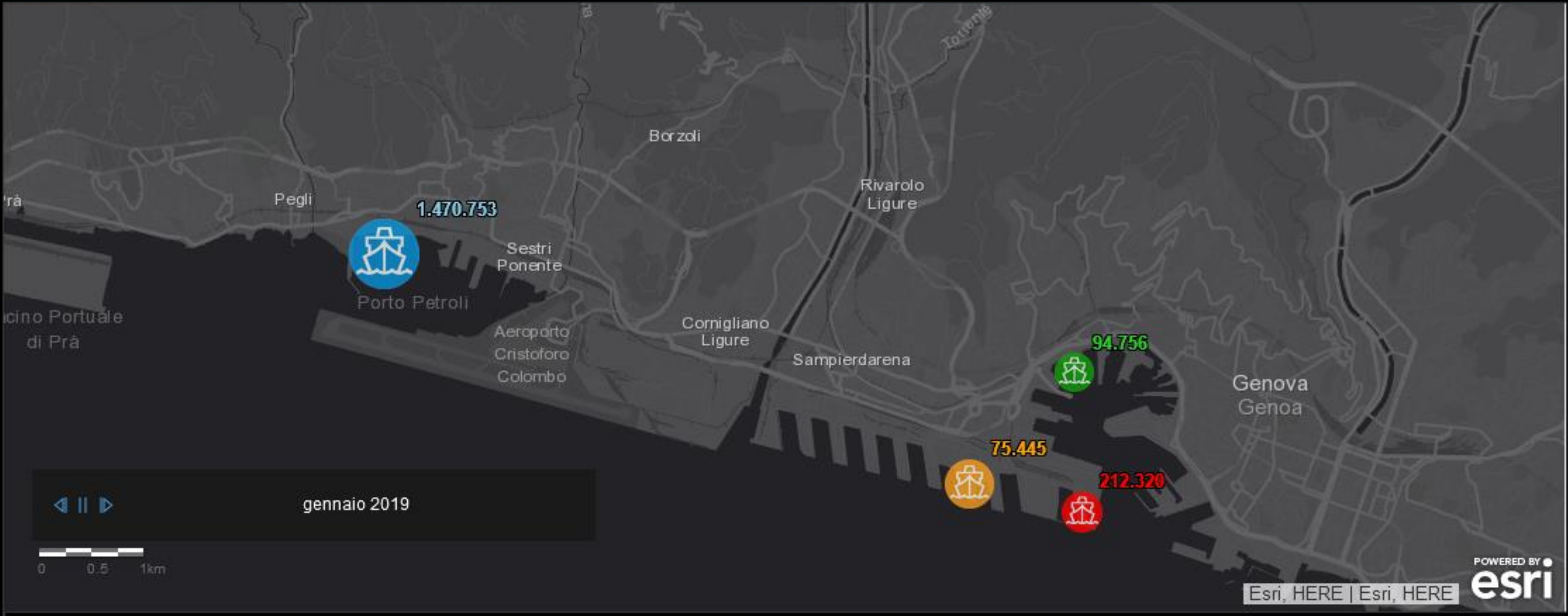
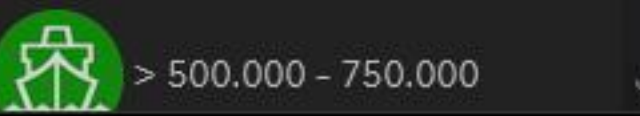
### Liquid bulks (tons) - 2019 2020



### Containers (TEUs) - 2019 2020



### Passenger movements - 2019 2020



### Solid bulks



Annual trend 2012 - 2020   Monthly trend 2019 - 2020

### Liquid bulks



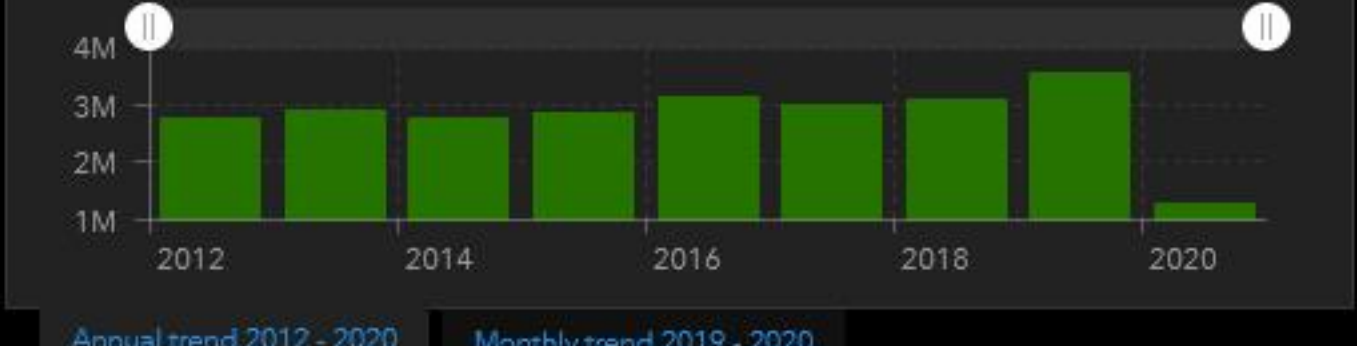
Annual trend 2012 - 2020   Monthly trend 2019 - 2020

### Containers



Annual trend 2012 - 2020   Monthly trend 2019 - 2020

### Passenger movements



Annual trend 2012 - 2020   Monthly trend 2019 - 2020

# e-geos

AN ASI / TELESPAZIO COMPANY

All COSMO-SkyMed images © ASI - Agenzia Spaziale Italiana

e-GEOS S.p.A – L.O. Contrada Terlecchie snc – Matera / HQ Via Tiburtina, 965 – Roma

 [domenico.grandoni@e-GEOS.it](mailto:domenico.grandoni@e-GEOS.it)

 [@e\\_geos](https://twitter.com/e_geos)

 [e-geos](https://www.linkedin.com/company/e-geos)

 [@egeosEO](https://www.facebook.com/egeosEO)

 [@e\\_geos](https://www.instagram.com/e_geos)