

# e-geos

IS A GLOBAL LEADER  
IN GEOINFORMATION  
APPLICATIONS AND SERVICES

**Estrazione, trattamento ed analisi di Big Data:  
Maritime Patterns of Life da dati multi-sorgente**

Filippo DAFFINA' - Maritime Product Manager

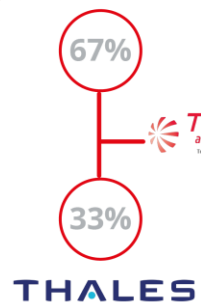


e-geos  
ANASTAS TELESPAZIO COMPANY



# Company presentation

LEONARDO



TELESPAZIO  
a LEONARDO and THALES company

Contracts  
People  
Assets

80%

e-geos  
AN ASI / TELESPAZIO COMPANY

20%



Cosmo-SkyMed  
exclusive worldwide rights

GAFAG  
an e-GEOS / Telespazio Company

100%

INTERNATIONAL  
MARKETS  
80%



DOMESTIC  
MARKETS  
20%

10+

SATELLITE MISSIONS  
DATA ACQUIRED.

70millions

AGRICULTURAL PARCELS

750+

MARITIME REPORTS/ YEAR

100m €+  
REVENUES

10+

COMMERCIAL USER TERMINALS  
AROUND THE GLOBE

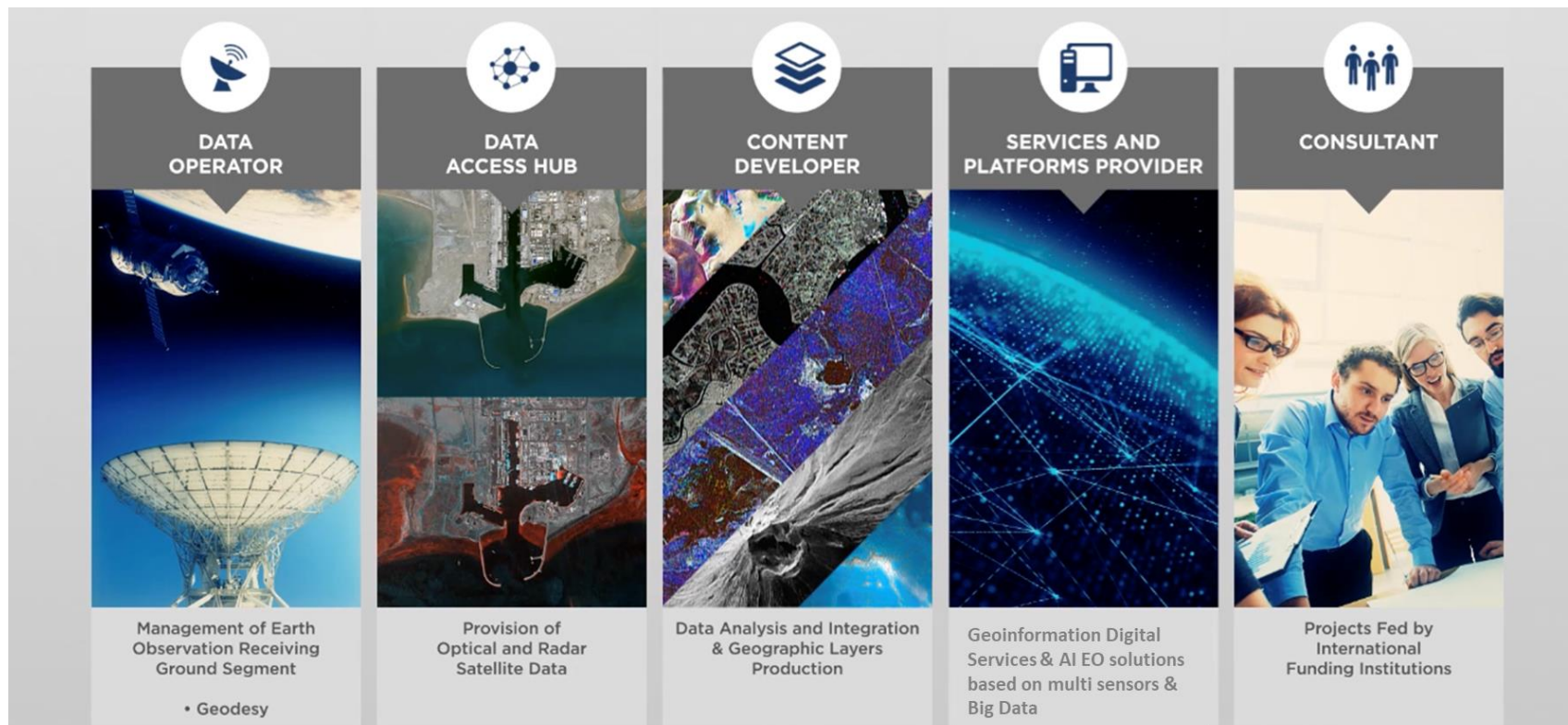
4100+

MAPS PRODUCED  
IN 4 YEARS

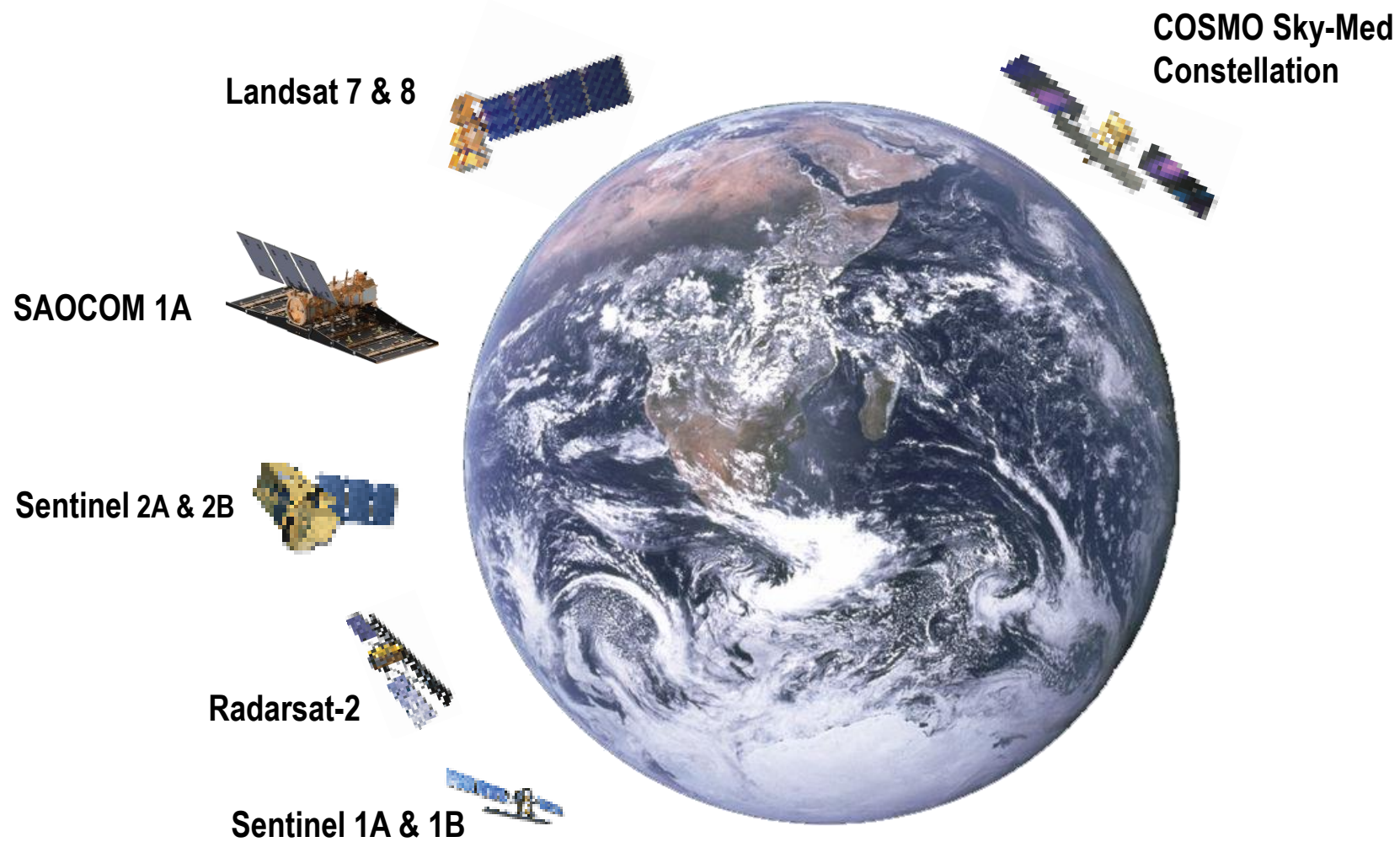
360+

ACTIVATIONS OF THE e-GEOS  
EMERGENCY MANAGEMENT SERVICE

500+  
PEOPLE



# Remote Sensing – Satellite data services

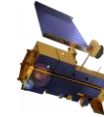


## Past satellites



ALOS

NOAA-X



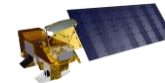
Terra

SeaWiFS



Envisat

ERS-1&2



Aqua

SAC-D



Landsat-5

Radarsat-1

Oceansat-2

**e-GEOS Matera Space Center**

**e-geos**  
AN ASTROTELESPAZIO COMPANY



# COSMO-SkyMed

e-GEOS is the **exclusive commercial worldwide distributor** of COSMO-SkyMed and COSMO-SkyMed Second Generation constellation data.

System owners, ASI and IT-MOD, want to maintain and further improve Italian leadership in Radar technology with CSG keeping the 4 sat configuration stable in the future

4

Synthetic Aperture  
Satellites Radar

300+

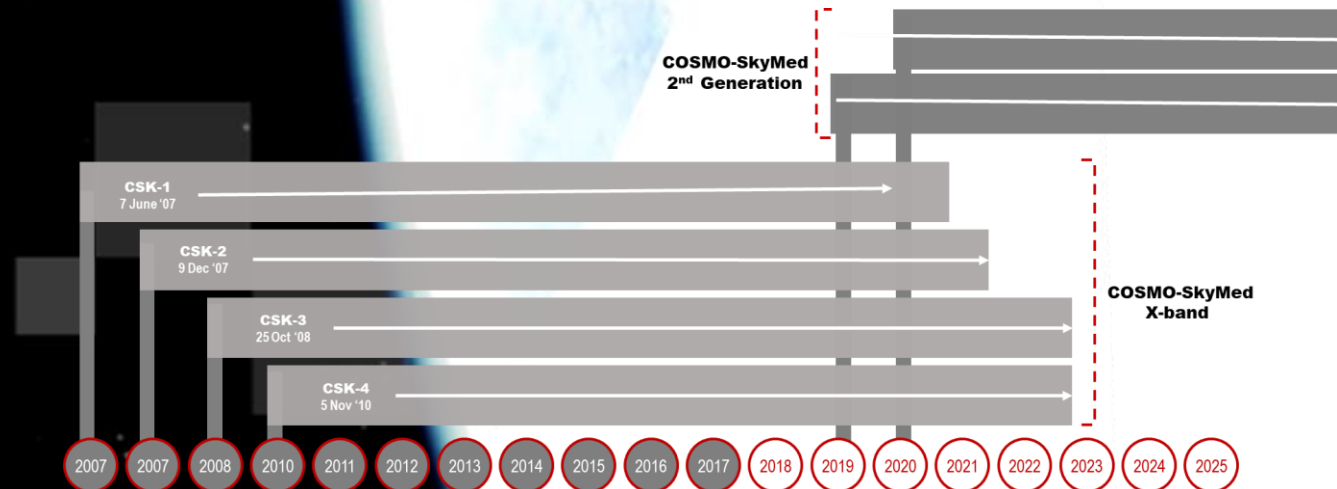
Spotlight per day

1800

Scenes per day

1500+

Stripmap per day



All-weather day/night



Left/Right Looking



Large area coverage at global scale

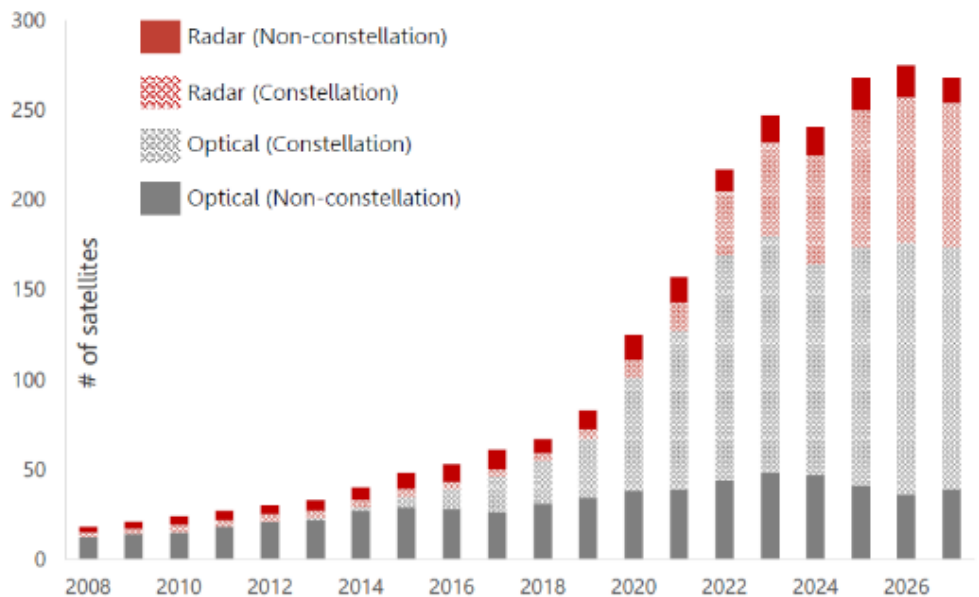


Fastest Revisit Time

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e-geos  
AN ASI / ILLIAPAZO COMPANY

COMMERCIAL EO SATELLITES IN OPERATION\* (50+ KG)



despite delay in some announced programs the number of EO satellites in orbit and the corresponding amount of generated data starts to grow fast ....



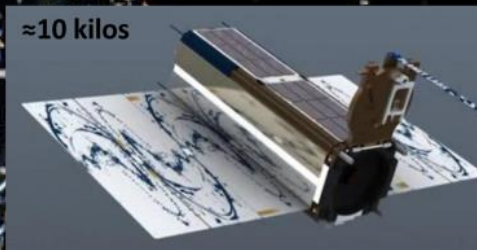
evolution of large infrastructure (high end sensors few sats)

≈2 tons



emerging constellations (low end sensors/many sats)

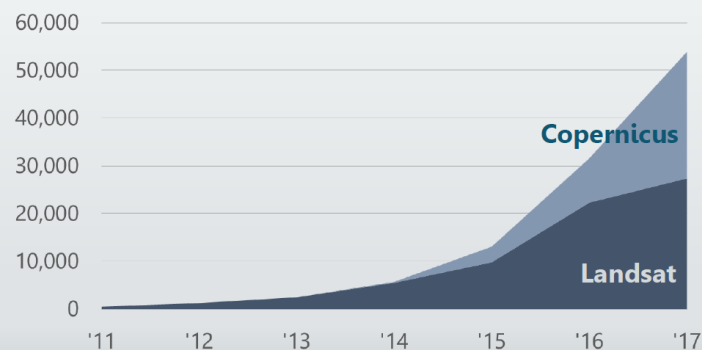
≈10 kilos



≈100 kilos



TB



Downloads of free satellite data & products accelerating

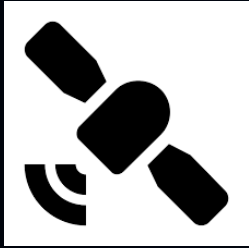
Only a fraction of that data may already be turned into operational applications

Upcoming solutions to combine commercial fresh, commercial archived and free data

use of EO data is exponentially growing and large potential through analytics exists to feed new information driven services



# Earth Observation and Space Democratization



- Constellations/Mega Constellations
- Trains Clusters Formations of mini/micro/nanosat
- Satellite as a service / Hosted payloads
- Autonomous cooperative systems



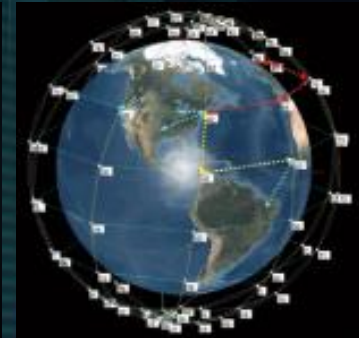
- Virtualized cloud-based mission control center
- Autonomous satellite tasking & optimized resource management
- New Mission Control Center solutions using D/M Learning
- AI & deep learning for predictive and prescriptive request patterns



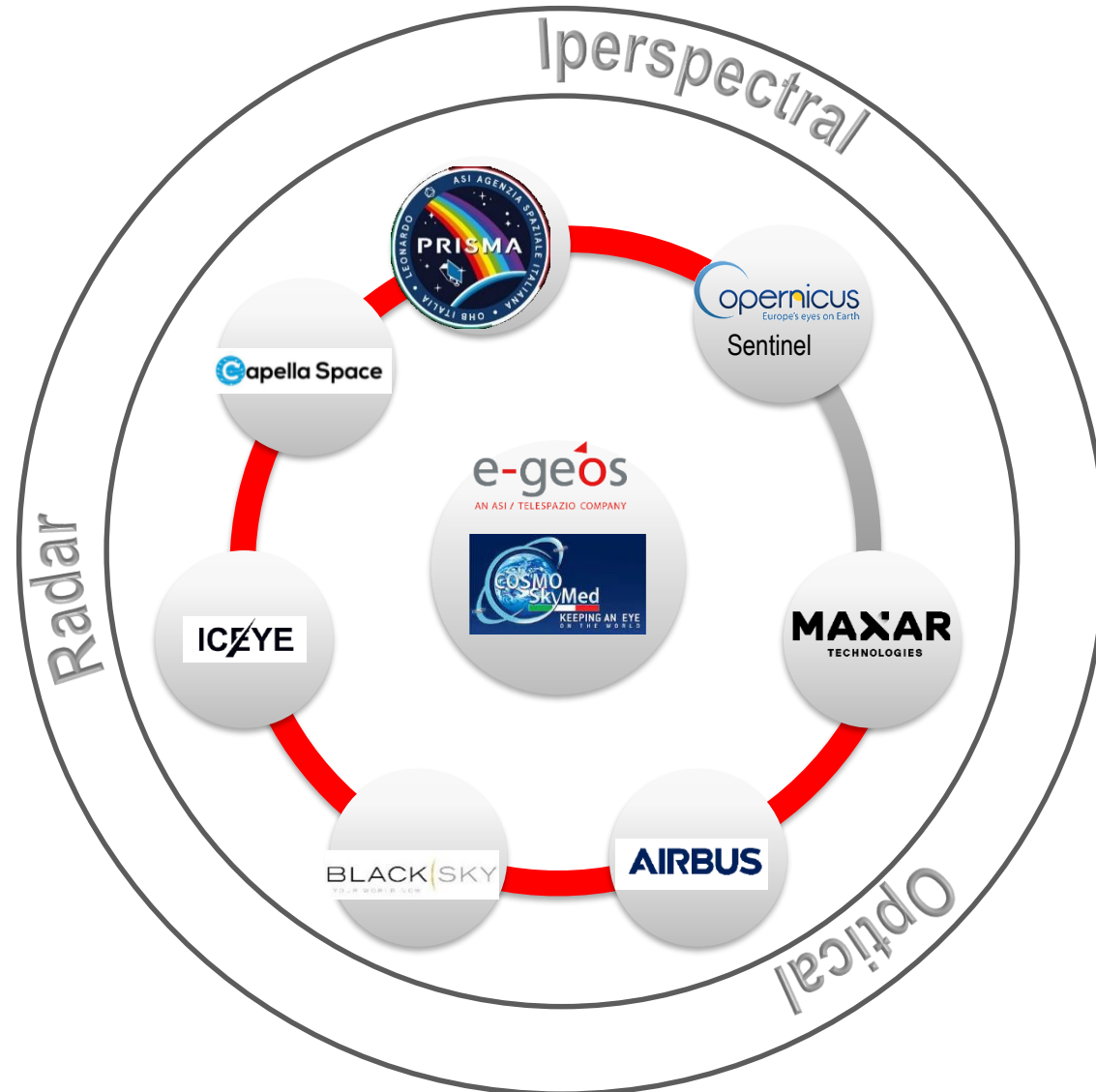
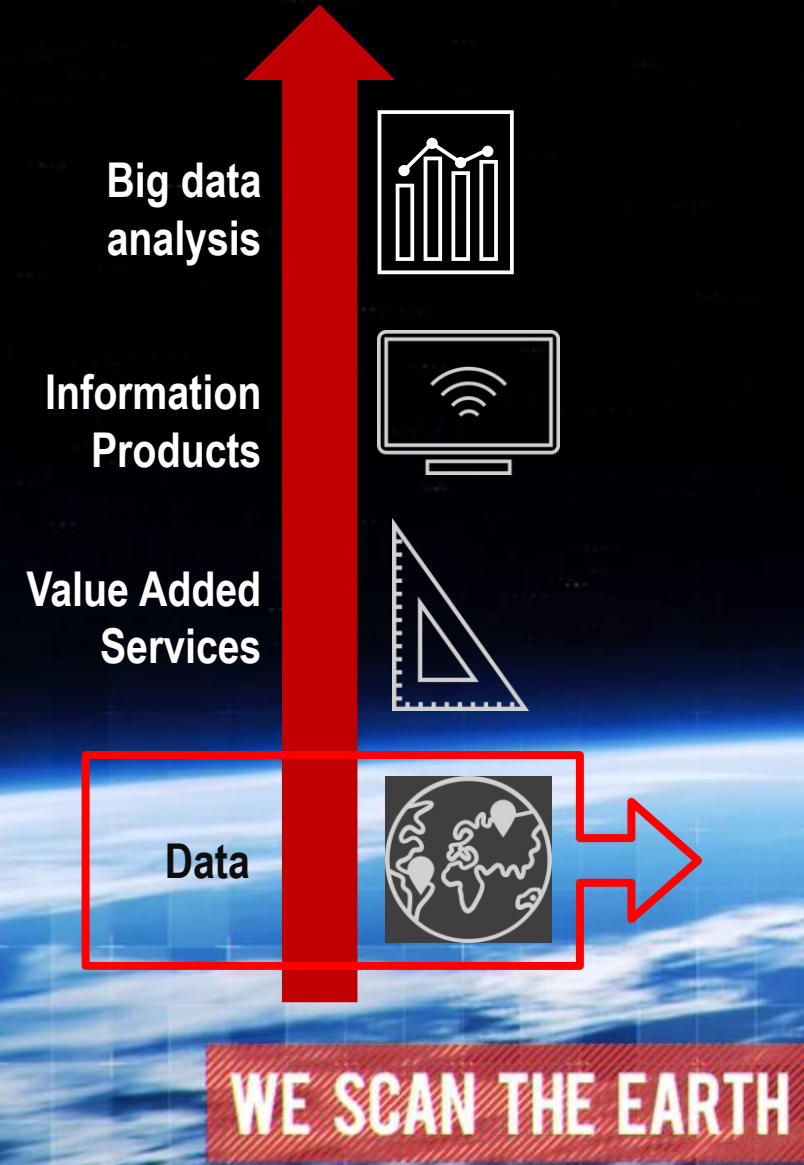
- Cloud-based secured platform infrastructure
- Big data for processing / advanced analytics functions to support information driven products
- AI & deep learning for predictive and prescriptive request patterns
- Open API principle to scale platform reach and interconnect different platforms



Constellations



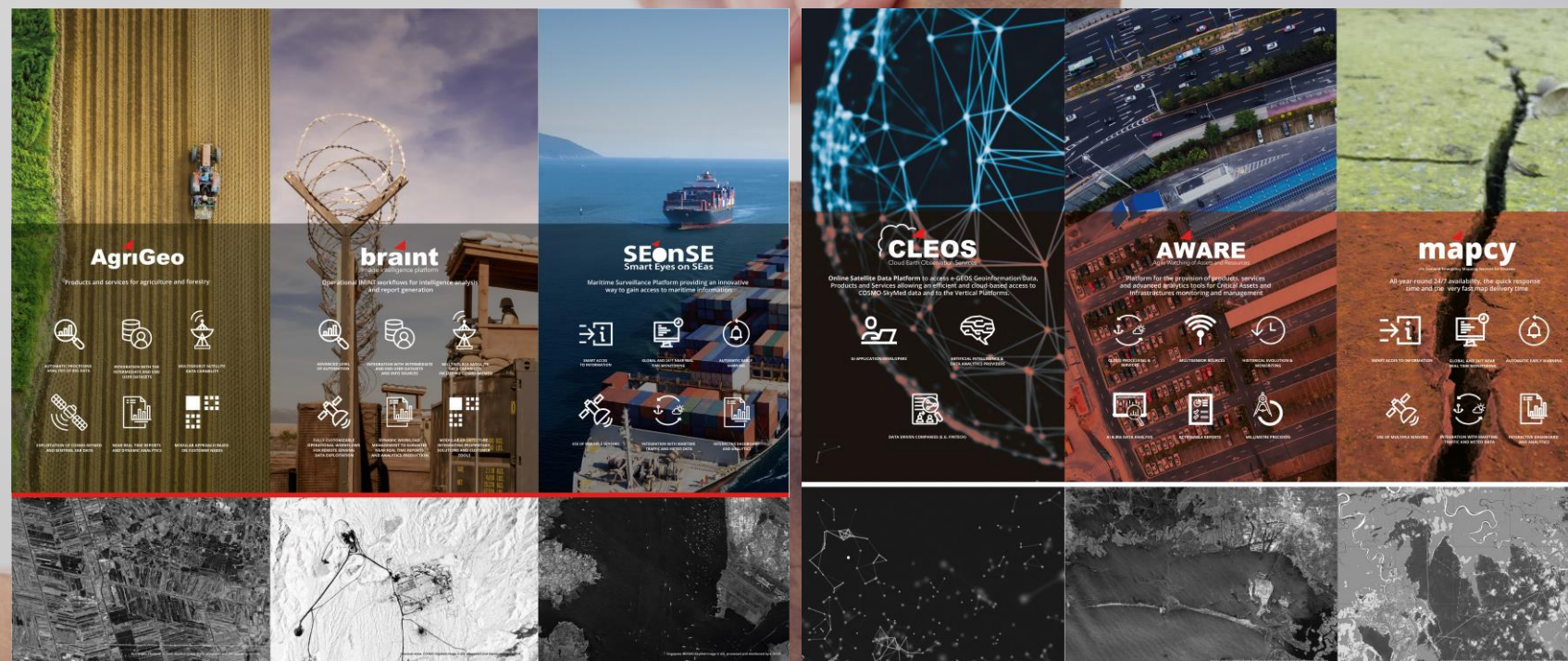
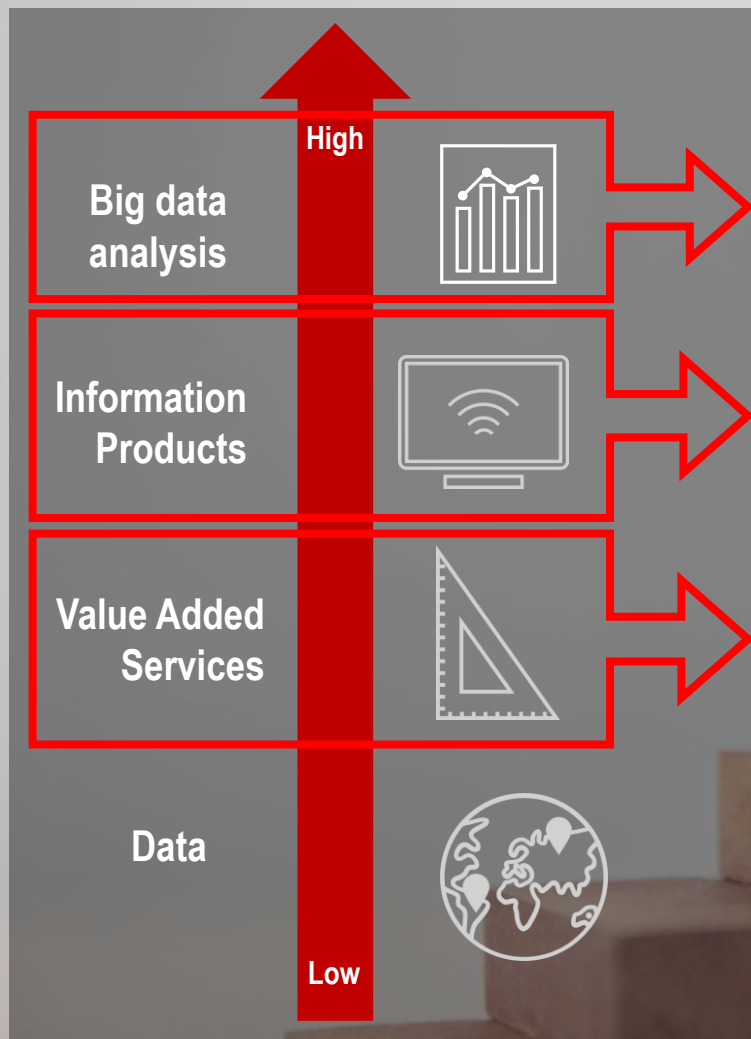
Federation of assets is a fundamental feature of our application platforms and the evolution path of information products and Geospatial digital services





# THE VALUE CHAIN FOR THE NEW VALUE ADDED SERVICES

More value addition/processing to the raw data





## MARITIME SURVEILLANCE



SMART ACCES  
TO INFORMATION



GLOBAL AND 24/7 NEAR REAL  
TIME MONITORING



AUTOMATIC EARLY  
WARNING



USE OF MULTIPLE SENSORS



INTEGRATION WITH MARITIME  
TRAFFIC AND METEO DATA



INTERACTIVE DASHBOARD  
AND ANALYTICS

For supporting **international environmental protection organizations**, defense and marine forces in Maritime Situational Awareness services, for Coast Guards, Enterprises and Governments for **on/off shore activities**; also for **safety, environmental protection, resources management organization**.

**Our services are:**

- **Ship detection and tracking**
- **Strategy Surveillance**
- **Oil spill monitoring and predictive evolution**
- **Ice monitoring**
- **Access to geospatial big data analytics and reports**

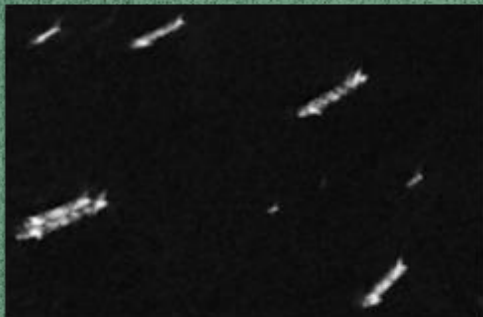
Maritime Surveillance Solution providing multi-sensor reports and analysis for:

- Near-Real Time Vessel Detection and tracking, Oil-spill detection
- Wind&Wave analysis
- Ice charting
- Geospatial Analysis and Alert Notifications
- On-Off shore platform / infrastructures Subsidence

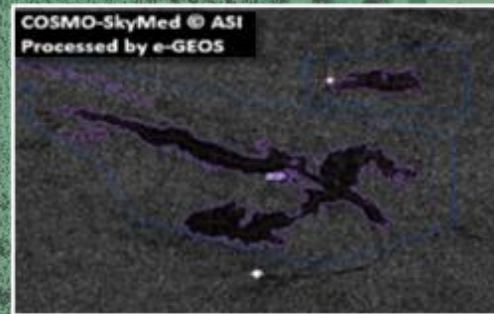


# Maritime Products

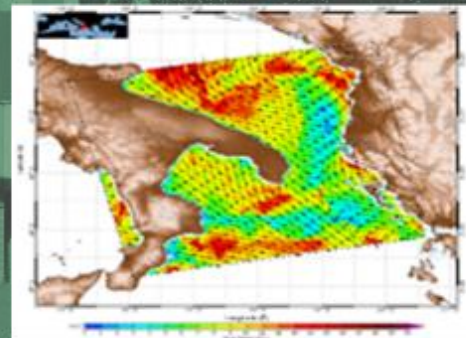
## Vessel detection



## Oil Spill Detection



## Wind & Wave



## Ice monitoring

**ICE monitoring**

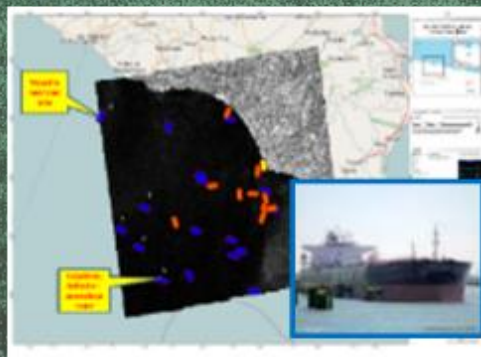
Thanks to an agreement with the Italian Navy Hydrographic Institute (IIM) e-GEOS was engaged in the monitoring of the ITS Alliance vessel from space, during the HIGH NORTH18 campaign 10-24 July 2018.

The mission was conducted by the Italian Navy crew, under the scientific coordination of the Italian Navy Hydrographic Institute (IIM).

During this campaign, e-GEOS acquired and made available COSMO-SkyMed radar images integrating AIS data provided by exactEarth. Moreover ESA Sentinel-1 data were used to experiment and develop innovative services in support of the Alliance safety of navigation in the Arctic.

ITS Alliance, from 10 July 2018 at 17:25 UTC  
COSMO-SkyMed/ASI, processed and distributed by e-GEOS

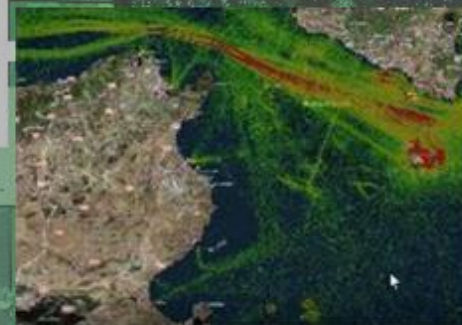
## Activity Report



## Geospatial Analysis and Alert Notifications

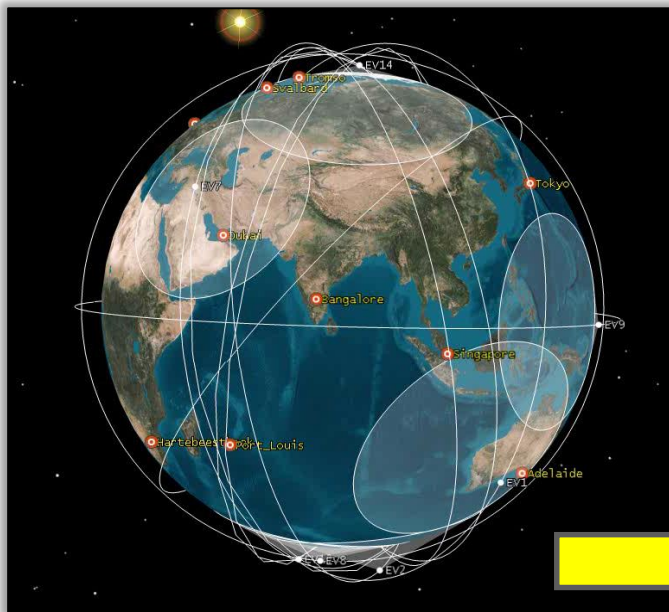


## Exact Earth

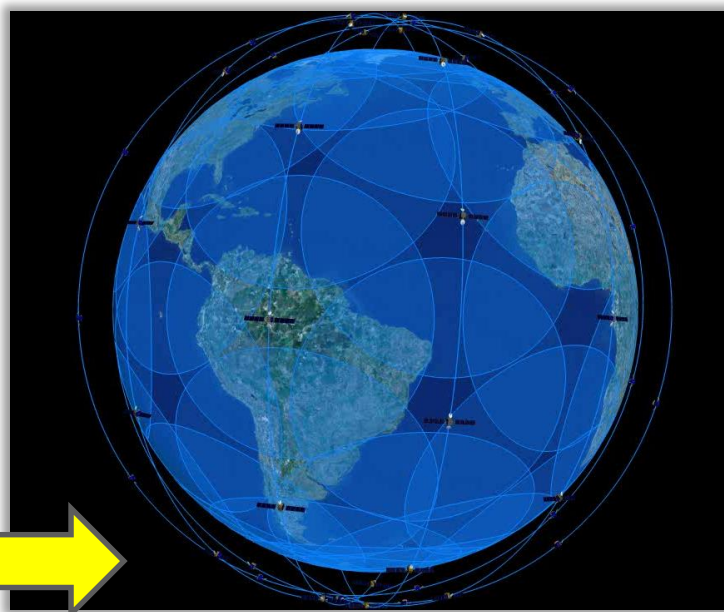




# exactEarth partnership



- **Current Gen 1 System: 8 Satellites**
- **9 years continuous operation**
- **45 Minute Average Update Rate**
- **30 Minute Data Latency**



- **exactViewRT: The only real-time Satellite AIS service**
- **All 58 payloads fully operational and in service**

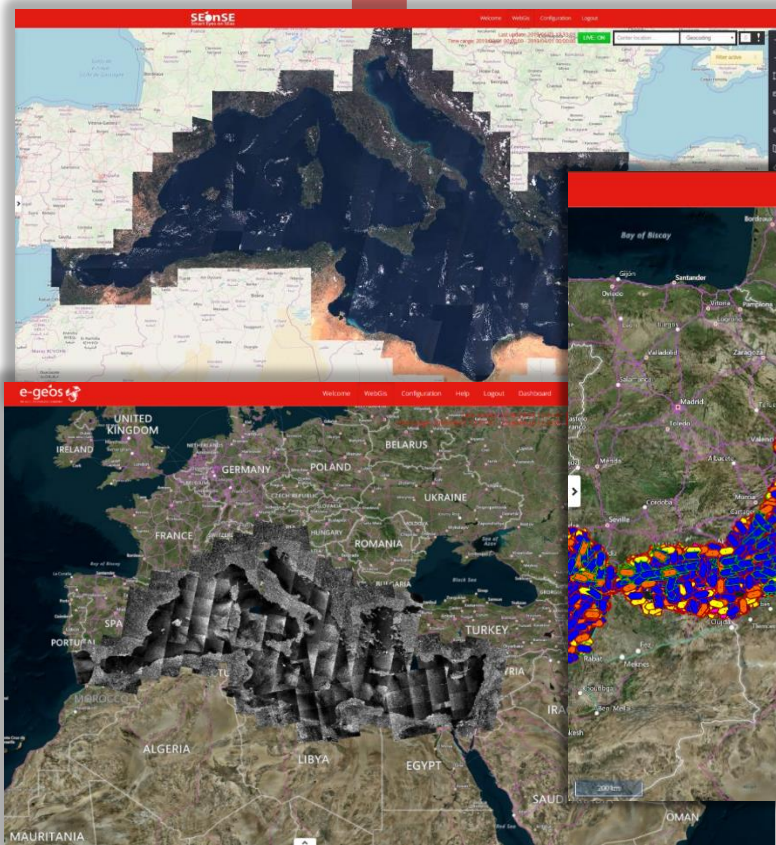
exactAIS™ Service – from Gen 1 to Gen 2



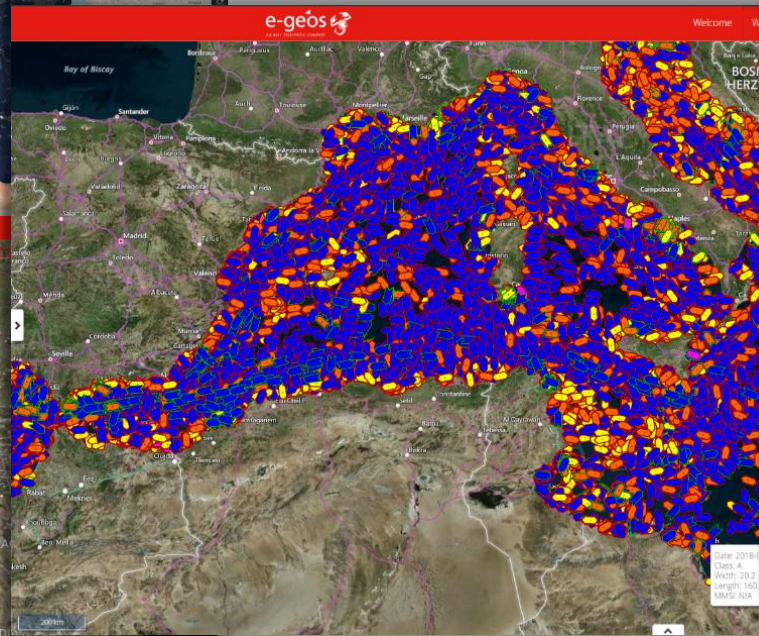


# Maritime Big Data Analytics

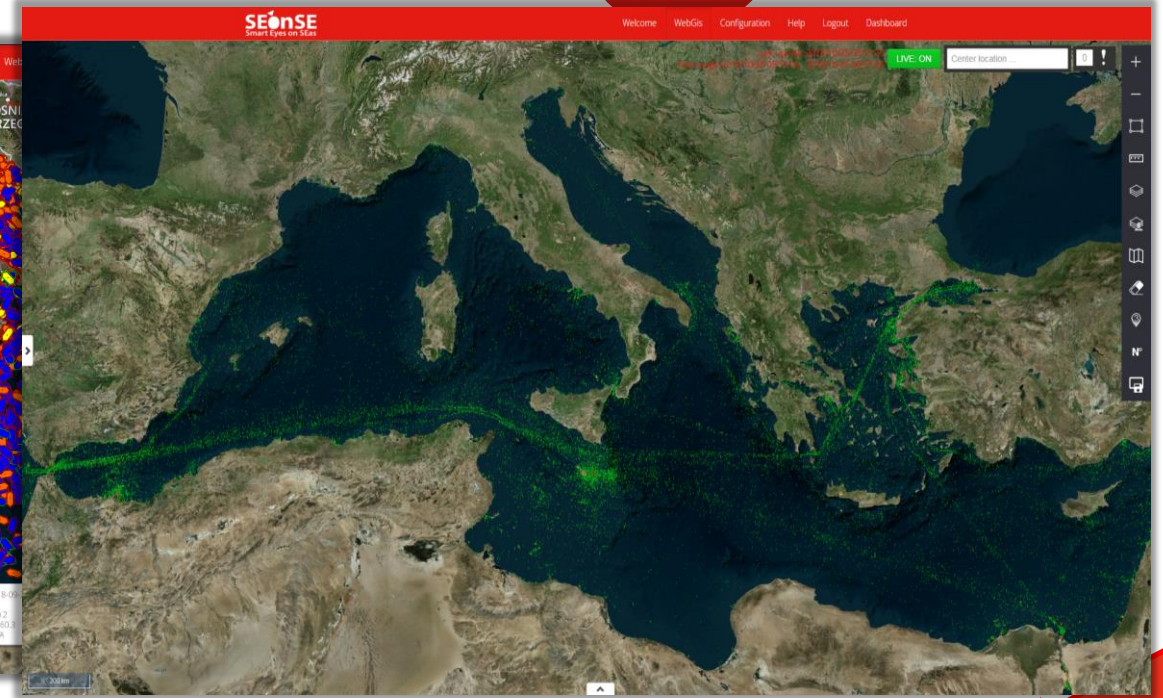
1



2



3



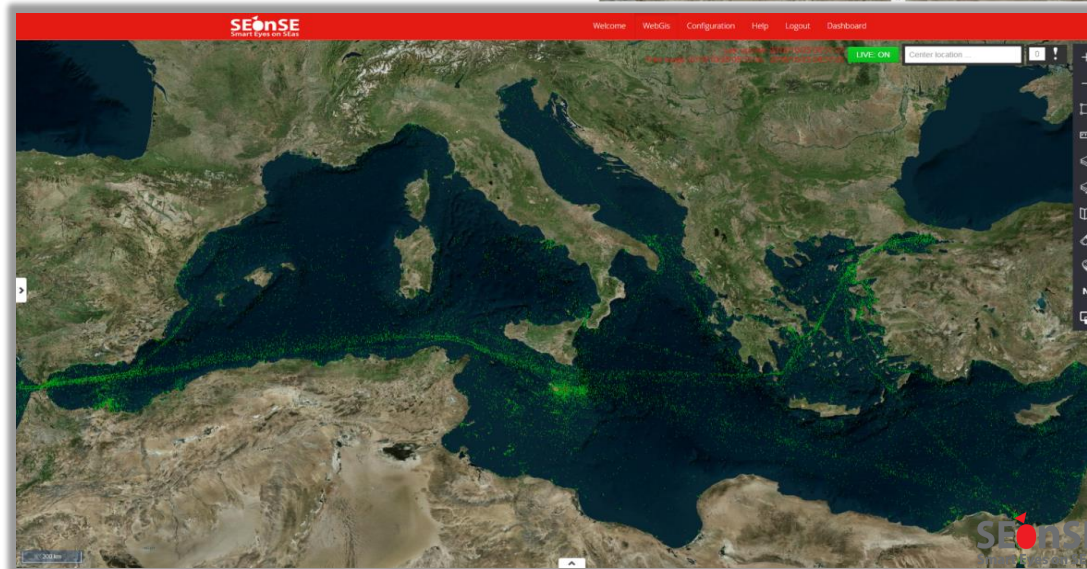
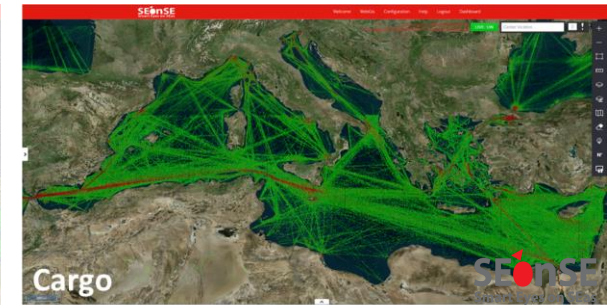
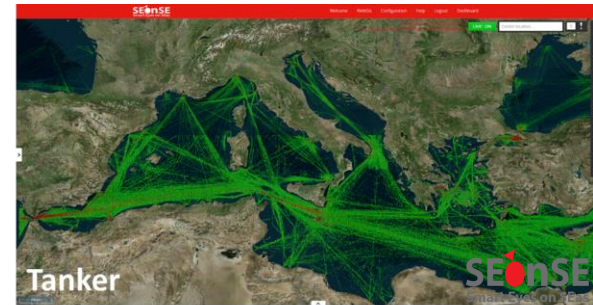
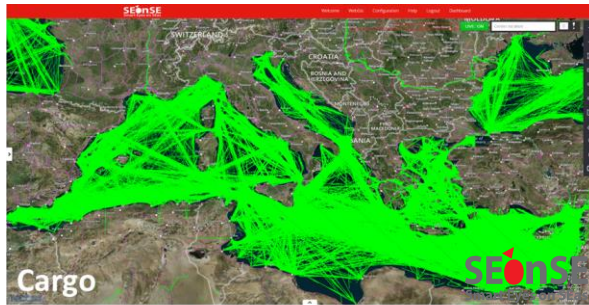
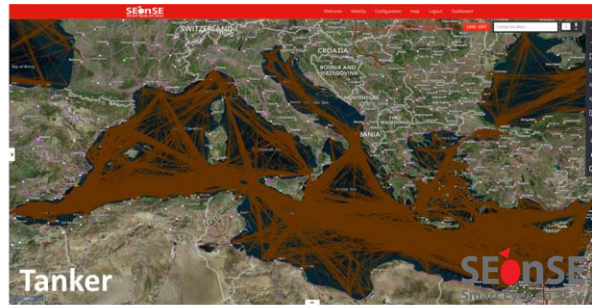
RAW SATELLITE DATA

SAT SHIP DETECTION

MARITIME PATTERNS

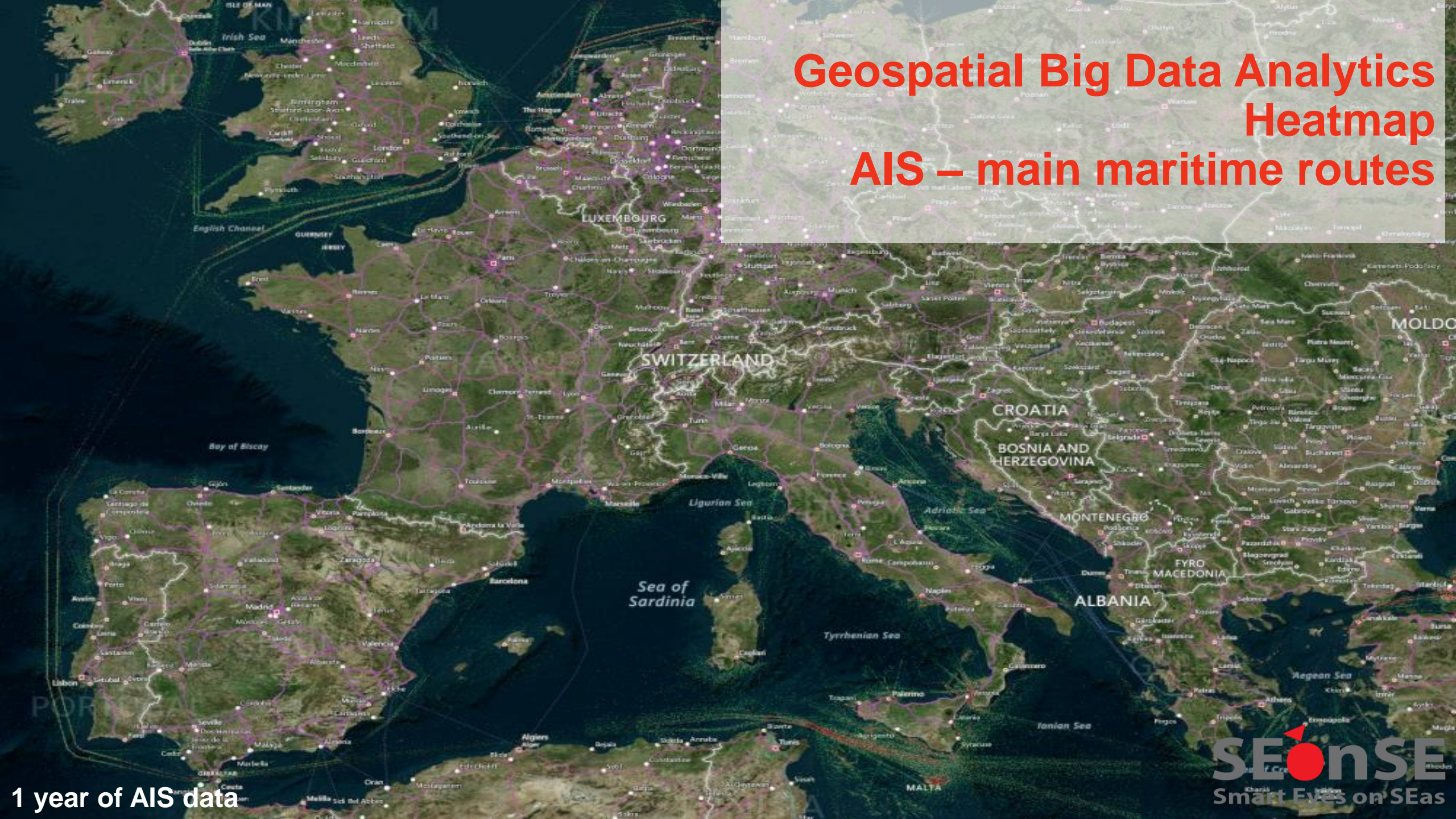


# Maritime Patterns of life extraction





# Geospatial Big Data Analytics Heatmap AIS – main maritime routes



1 year of AIS data



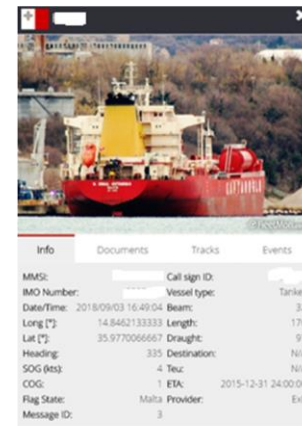
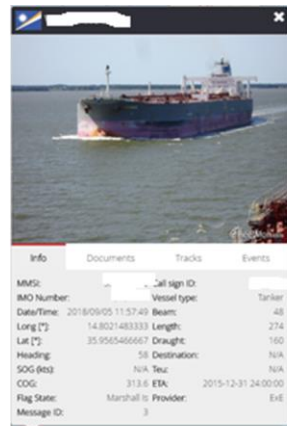
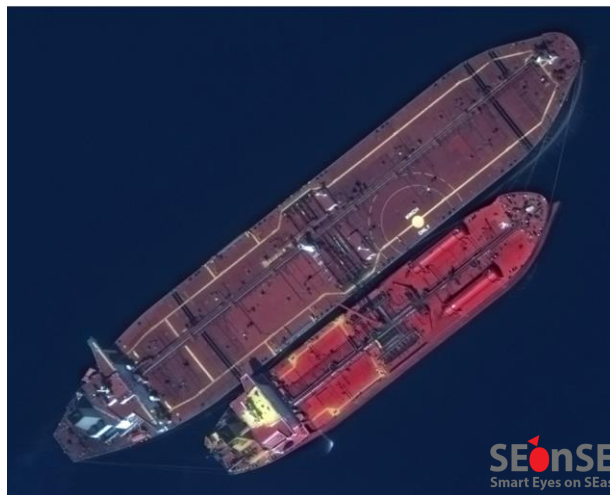
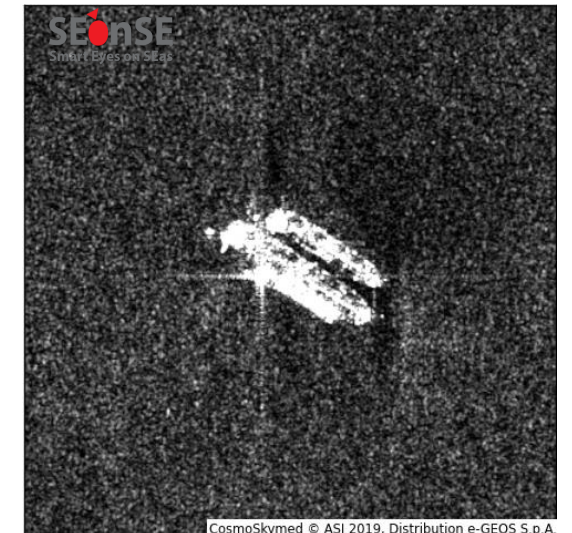
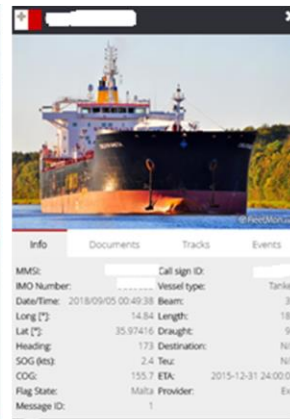
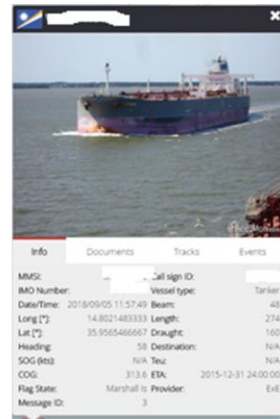
# Geospatial Big Data Analytics Heatmap VMS – intensive fishery areas



6 months of VMS data

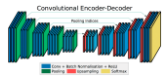


# Maritime Anomaly Detection

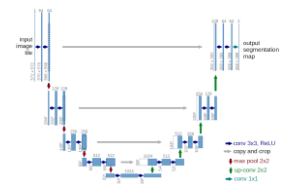
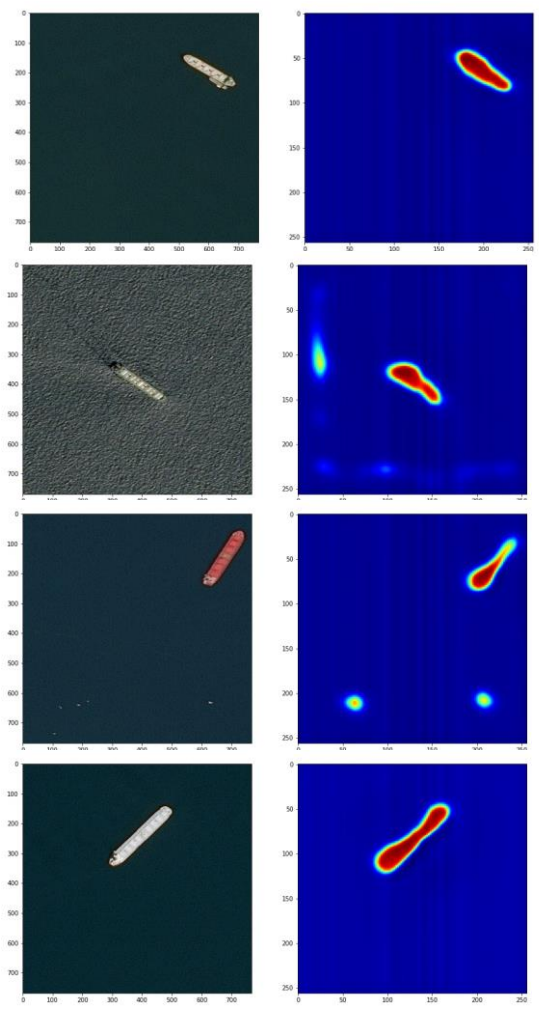




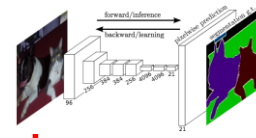
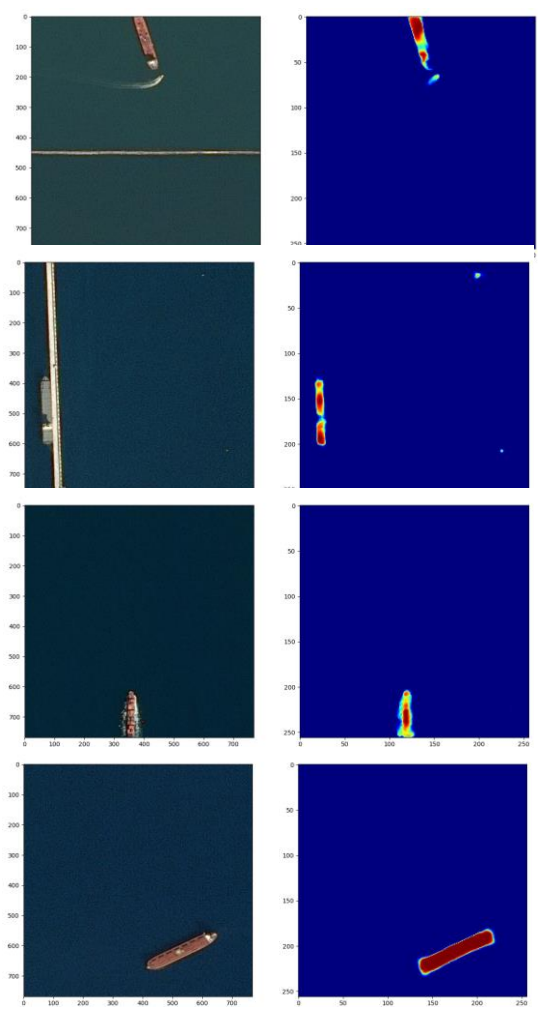
# AI4EO VHR Results



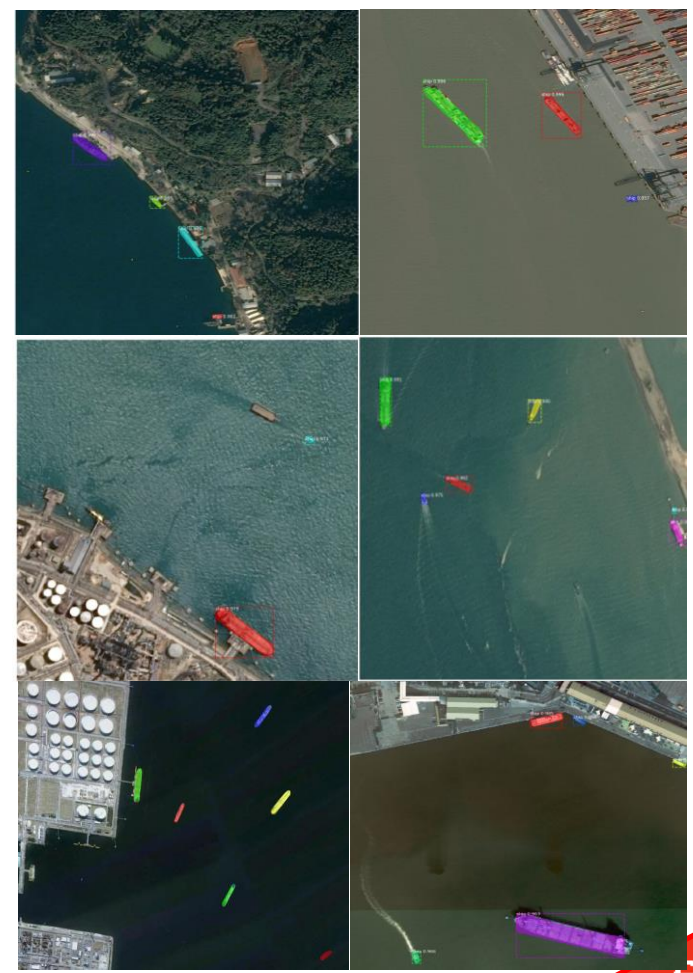
SegNet



Unet



Mask R-CNN





# Transfer Learning - HR Results

Sentinel2





**Thank you for your attention**

**EYES ON THE EARTH**

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