EMSA
Satellite monitoring of the Mediterranean Sea

IV International Space Forum

Leendert Bal

Head of Operations

05/09/2019

EMSA
European Maritime Safety Agency

EMSA overview

Provides technical and operational support

to

28 EU Member States and the Commission

Staff: ~ 250 people

~ 24 nationalities

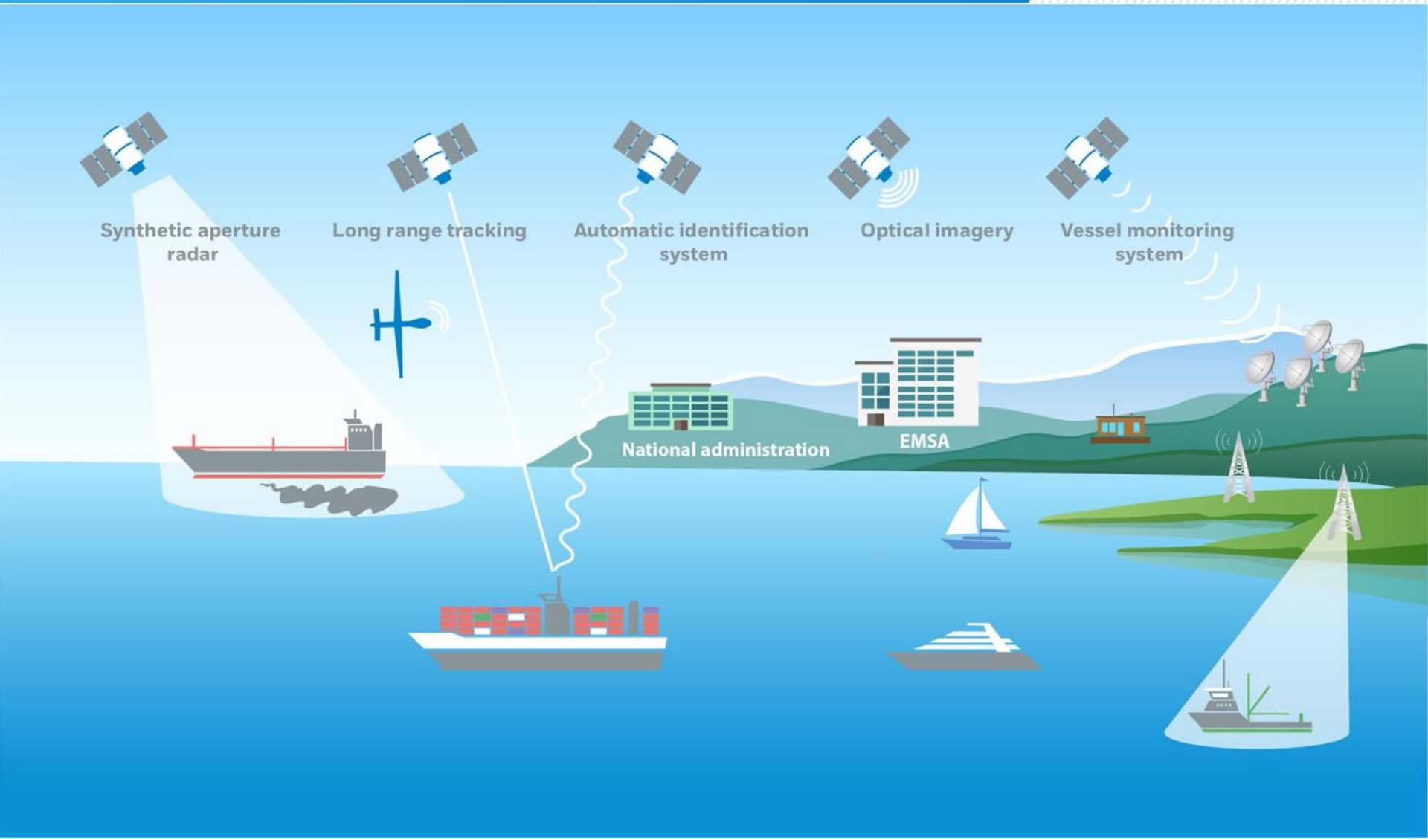
Annual Budget:

~80 million EUR

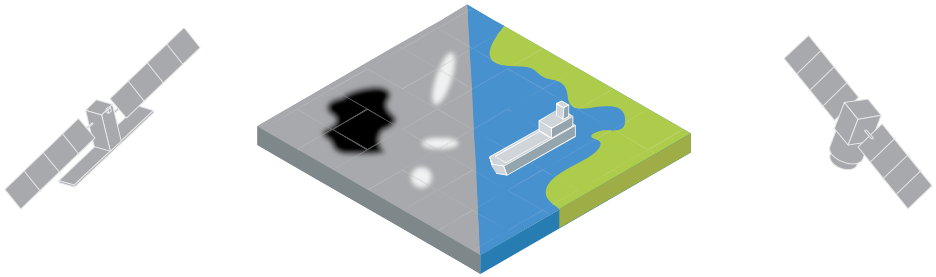
Headquarters:

Lisbon, Portugal

Maritime Data Sources



EMSA Earth Observation Services



Radar (SAR) Satellites

- Access to 6 satellites: *Radarsat-2, Sentinel-1A/1B, TerraSAR-X, TanDEM-X, PAZ*
- All weather capability
- Day and night operations
- Broad range of resolutions and coverage
- Quasi real time (20 minutes after satellite pass)

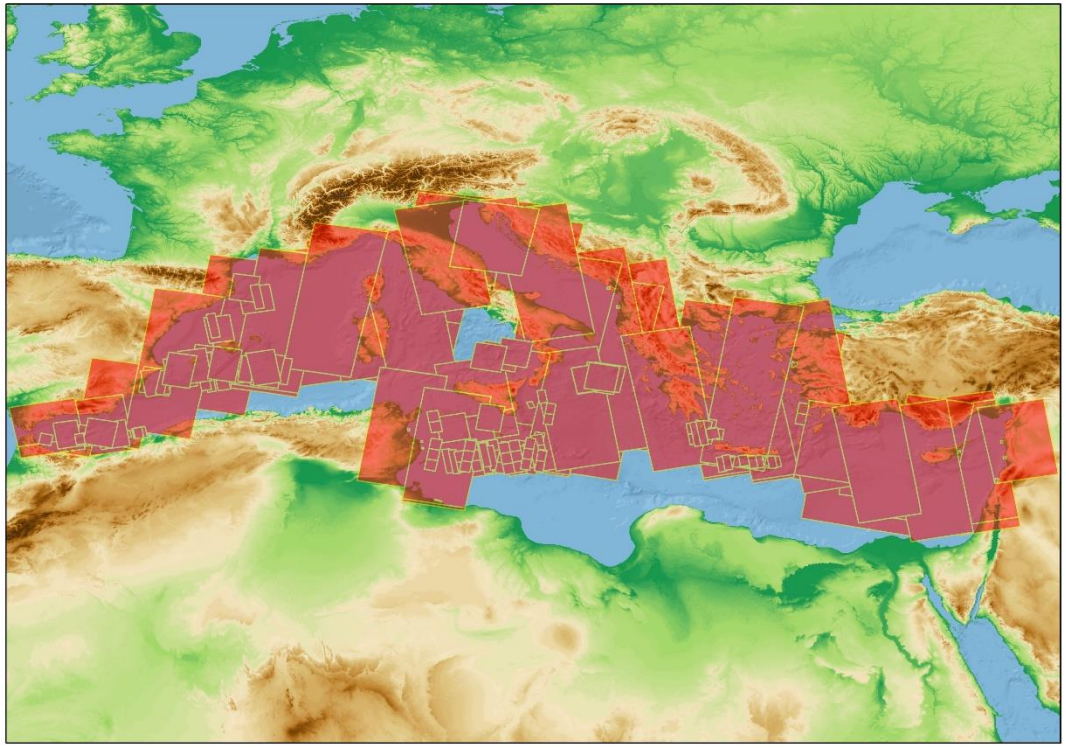
Optical Satellites

- Access to 14 satellites: *GeoEye-1, WorldView-1/2/3, Pleiades-1A/1B, Deimos-2, SPOT 6/7, SuperView-1/4, EROS-B*
- Enable target/activity identification
- Wealth of data in different spectral bands
- Focused on very high resolutions (0.3m to 10m)
- Neal real time (30 minutes after satellite pass)

Mediterranean Sea

Satellite monitoring

- 400 satellite images delivered
- 35 million km2 covered (around 14 times the area of the Mediterranean sea)
- Different satellite images used depending on the function
- Wide range of Member States activities supported

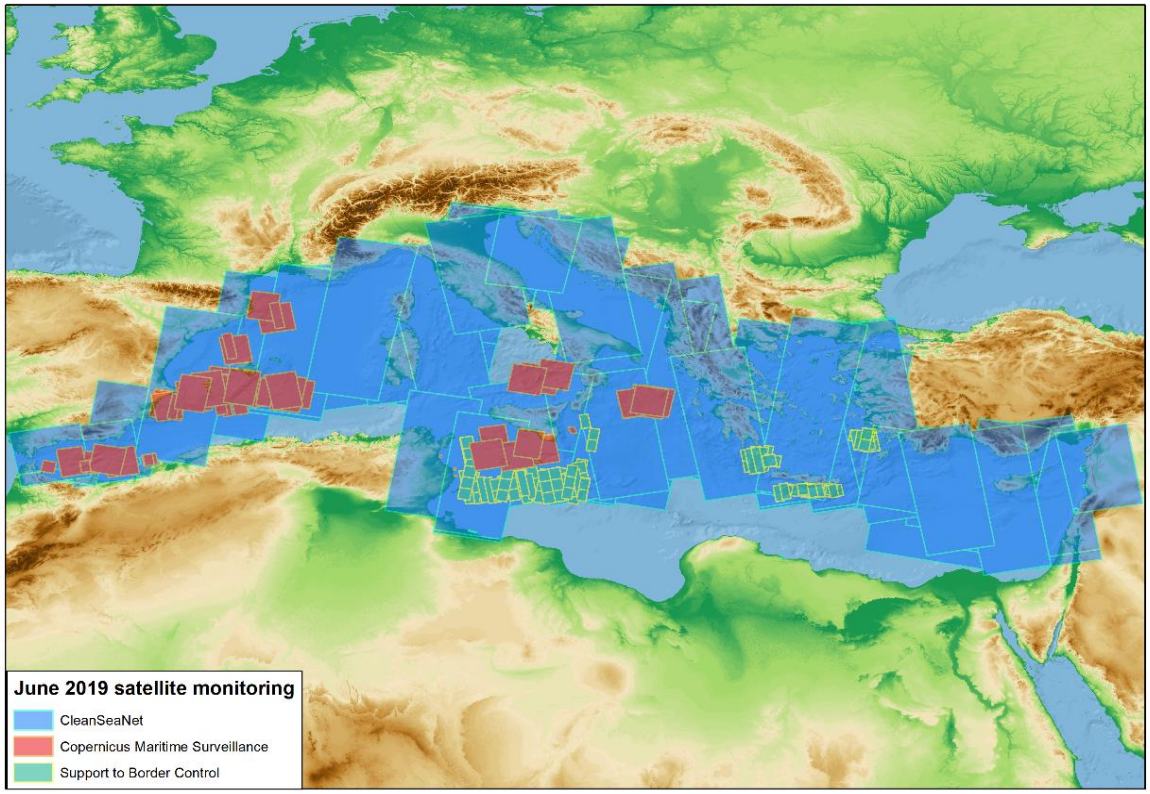


June 2019
Satellite monitoring in the Mediterranean

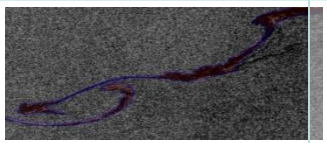
Mediterranean Sea

Wide range of activities monitored

- **CleanSeaNet**
  - Oil spill monitoring
- **Copernicus**
  - Fisheries control
  - Law enforcement
  - Customs
  - Maritime Safety
- **Support to Border Control**
  - Illegal immigration
  - Search and rescue



June 2019
Satellite monitoring in the Mediterranean

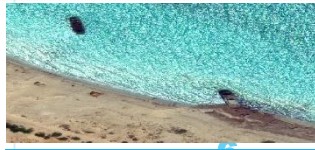

Pollution Monitoring

Fisheries Control

Maritime Safety and Security

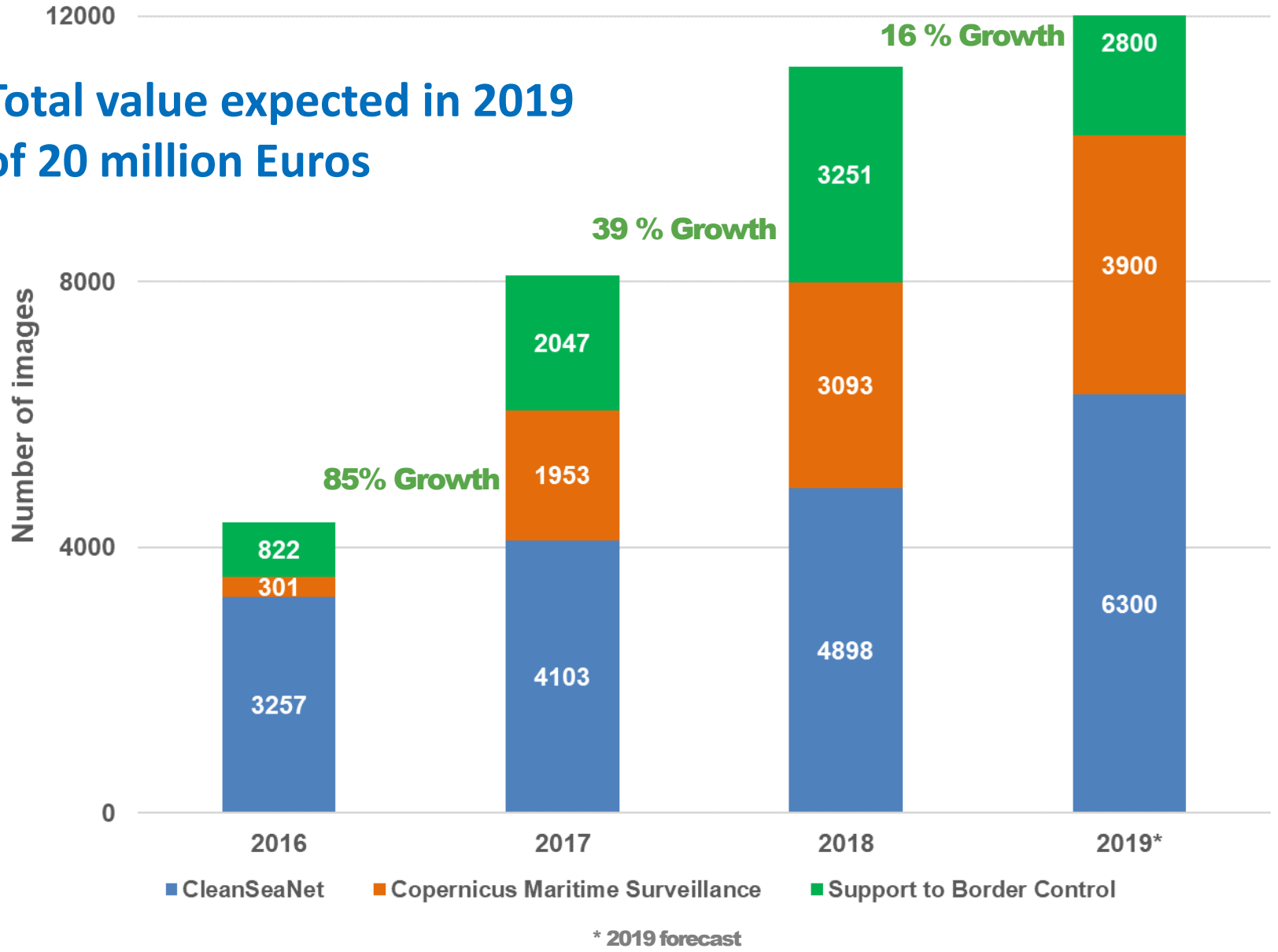
Law Enforcement

Customs


Border control

Earth Observation Services
Images delivered

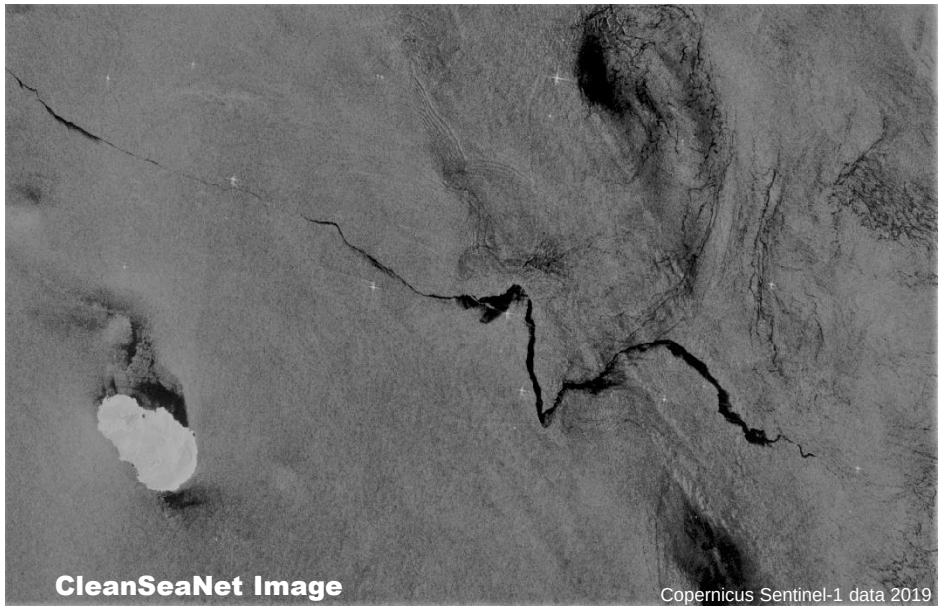
Total value expected in 2019 of 20 million Euros



Use Case: Pollution monitoring

Detection of illegal discharges

- On 6 August 2019 EMSA's CleanSeaNet detected an oil spill in Italian waters
- Italian authorities received the CleanSeaNet alert report after 20 minutes
- Spill was more than 100km long
- Few hours later EMSA's RPAS flight over the spill area
- RPAS verified the satellite detection



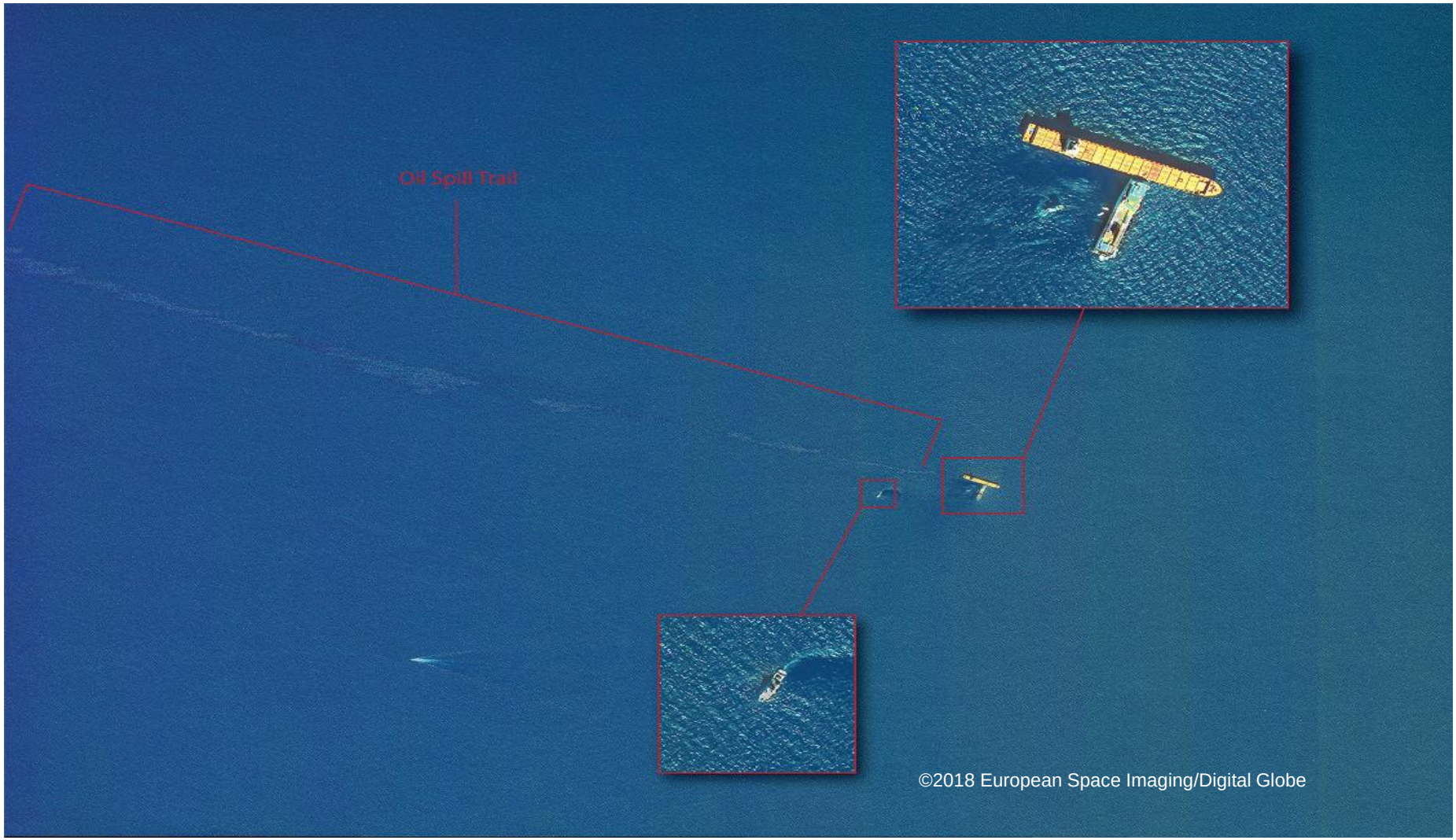
Use case:
Maritime Safety&Pollution Monitoring

CSL Virginia

Ulysse

- On 07/10/2018, around 08:00 UTC, Tunisian Flagged Passenger/RO-RO cargo *Ulysse* collided with Cypriot flag general cargo *CSL Virginia*.
- EMSA monitored the situation for maritime safety and pollution concerns

Use case:
Maritime Safety&Pollution Monitoring



Corsica October 2017

Use case: Support to oil spill response operations

Greece September 2017

Use Case: Law Enforcement

Suez Bay - September 2017

- Monitor of transhipment operations
- VHR optical used to confirm position of vessels
- 1 ton of heroin was seized

Way forward
Additional radar and optical capacity

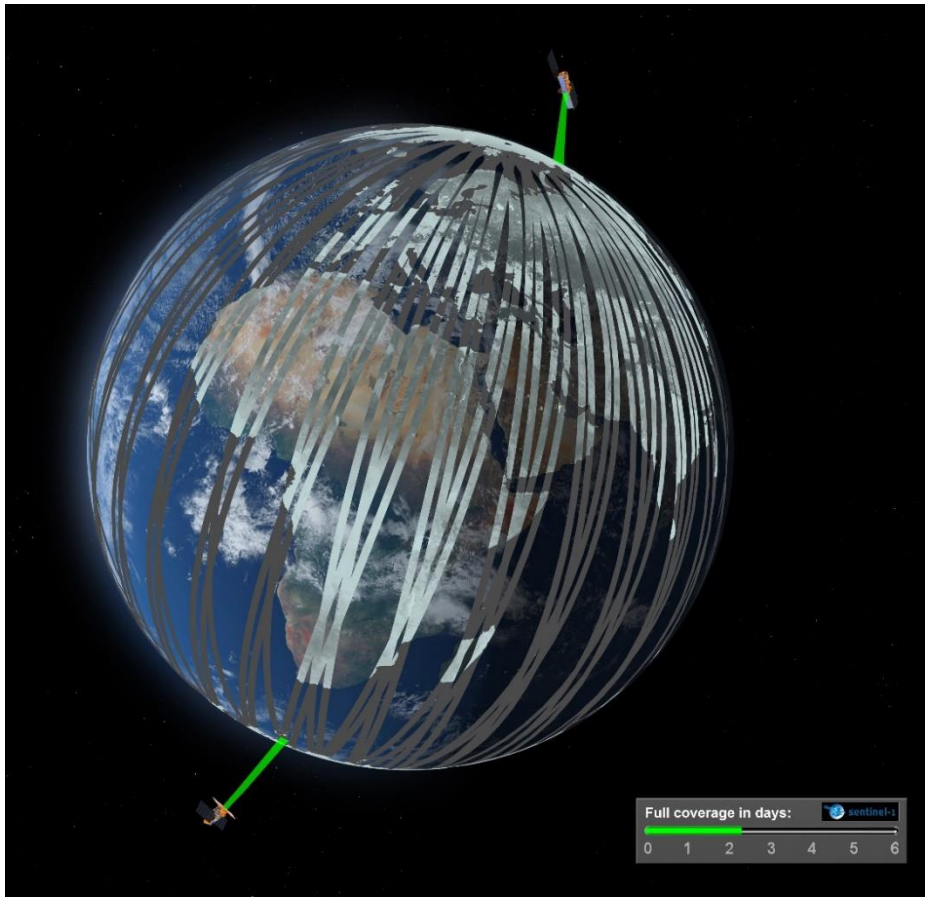
“small” radar missions

- Short term missions of “new space” initiatives

Classical radar missions

- Under preparation by “old space” companies

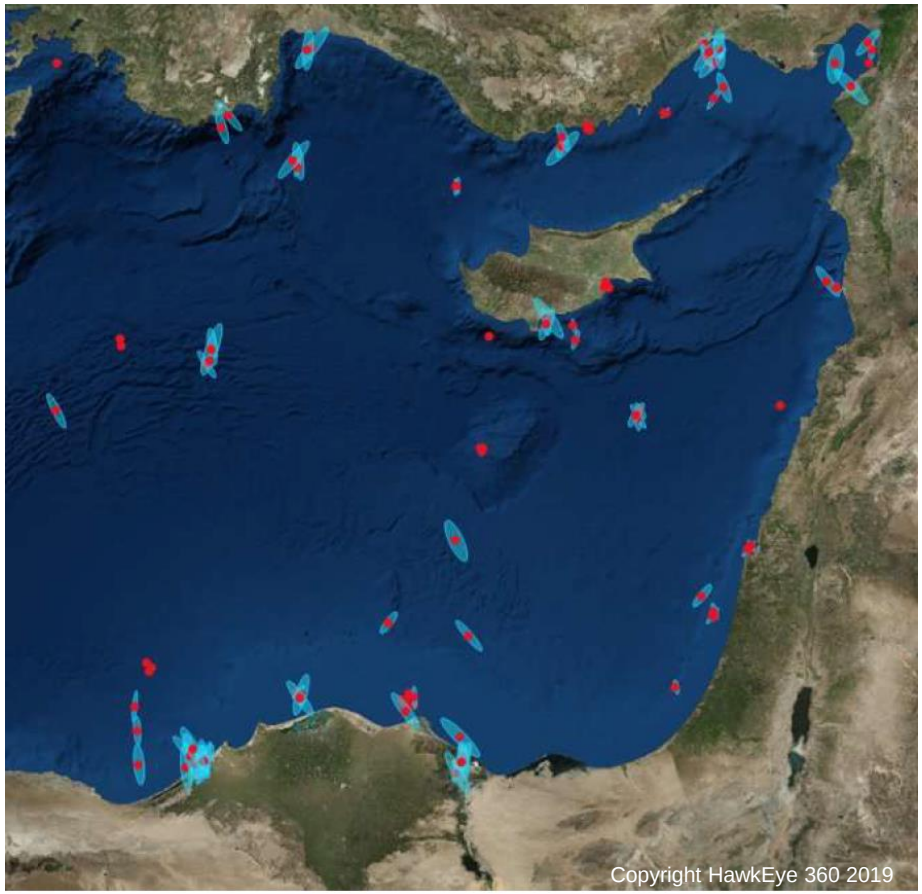
New very high resolution optical missions (30 cm)



Way forward
New data sources

Radio Frequency detection

- Ability to detect radio frequencies from space
- Detection capabilities include:
  - AIS emmitters
  - Marine radios (VHF16 and 70)
  - GSM and satellite phones
  - Maritime radar (X-Band)
- Key players
  - Initiatives by new companies



Way forward
Additional value – integration of data

Further integration with non-EO data sources

- Exploiting further synergies with RPAS/HAPS

Enhanced analysis capabilities

- Automatic vessel and oil spill detection/classificaiton using A.I.
- Extract knowledge from existing EO datasets (patterns of life)

Conclusions

- **Maritime Surveillance in the Mediterranean**
  - Space sources are heavily used, added value is proven (see use cases)
- **Satellite data capacity**
  - Sufficient SAR and optical constellations are needed (continuation and diversification needed)
  - New data sources from space will improve quality of the maritime picture (important for verification/validation)
- **Sea + Space = Perfect Partnership**
  - Space data is a necessity for the maritime picture