EMSA
Satellite monitoring of the Mediterranean Sea
IV International Space Forum

Leendert Bal
Head of Operations
05/09/2019
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

- Synthetic aperture radar
- Long range tracking
- Automatic identification system
- Optical imagery
- Vessel monitoring system

National administration

EMSA
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)
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
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**

- CleanSeaNet
- Copernicus Maritime Surveillance
- Support to Border Control
Earth Observation Services
Images delivered

Total value expected in 2019 of 20 million Euros

- 2016: 822 (85% Growth)
  - CleanSeaNet: 301
  - Copernicus Maritime Surveillance: 3257
  - Support to Border Control: 4103

- 2017: 1953
  - CleanSeaNet: 301
  - Copernicus Maritime Surveillance: 3257
  - Support to Border Control: 4103

- 2018: 3251
  - CleanSeaNet: 4898
  - Copernicus Maritime Surveillance: 3093
  - Support to Border Control: 3900

- 2019*: 2800
  - CleanSeaNet: 6300
  - Copernicus Maritime Surveillance: 3093
  - Support to Border Control: 3900

* 2019 forecast
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

- 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
Use Case: Law Enforcement

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

Suez Bay - September 2017

© CNES (2017), Distribution Airbus DS

© Reuters (2017)
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 emitters
  - 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/classification 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