

# **EMSA satellite oil spill monitoring exercise**

**23.03.2007**

**Workshop on the implementation of  
Directive 2005/35 on sanctions for ship-  
source pollution**

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**Unit F - Pollution Response**



## Legal basis

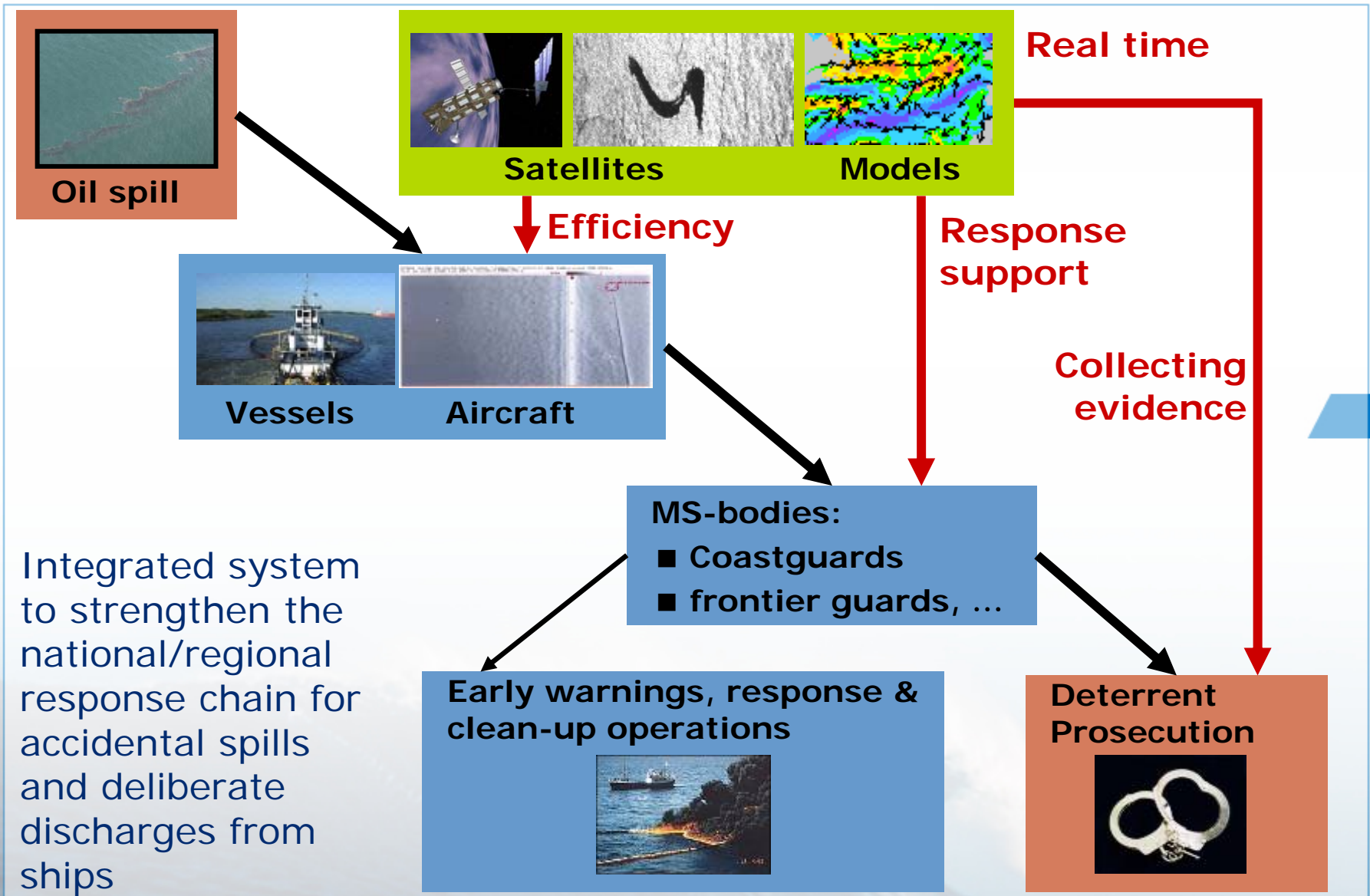
Mandated by Directive 2005/35/EC of 7 September 2005 on  
Ship-source pollution and on the introduction  
of penalties for infringements

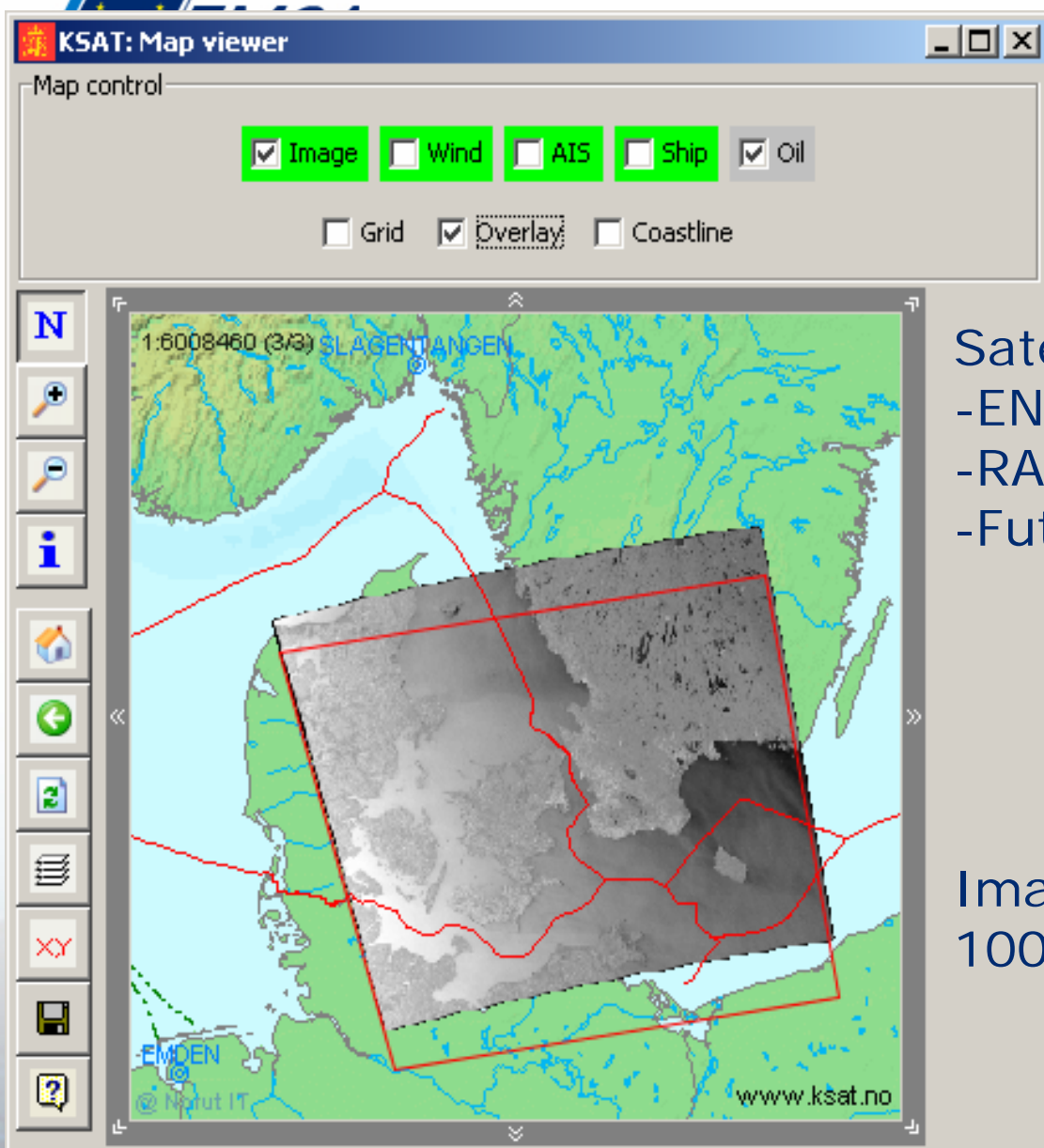
Article 10

(entering into force on 1 March 2007)

...the European Maritime Safety Agency shall:

- (a) **'work with the Member States in developing technical solutions and providing technical assistance ...in actions such as tracing discharges by satellite monitoring and surveillance'**





## Image

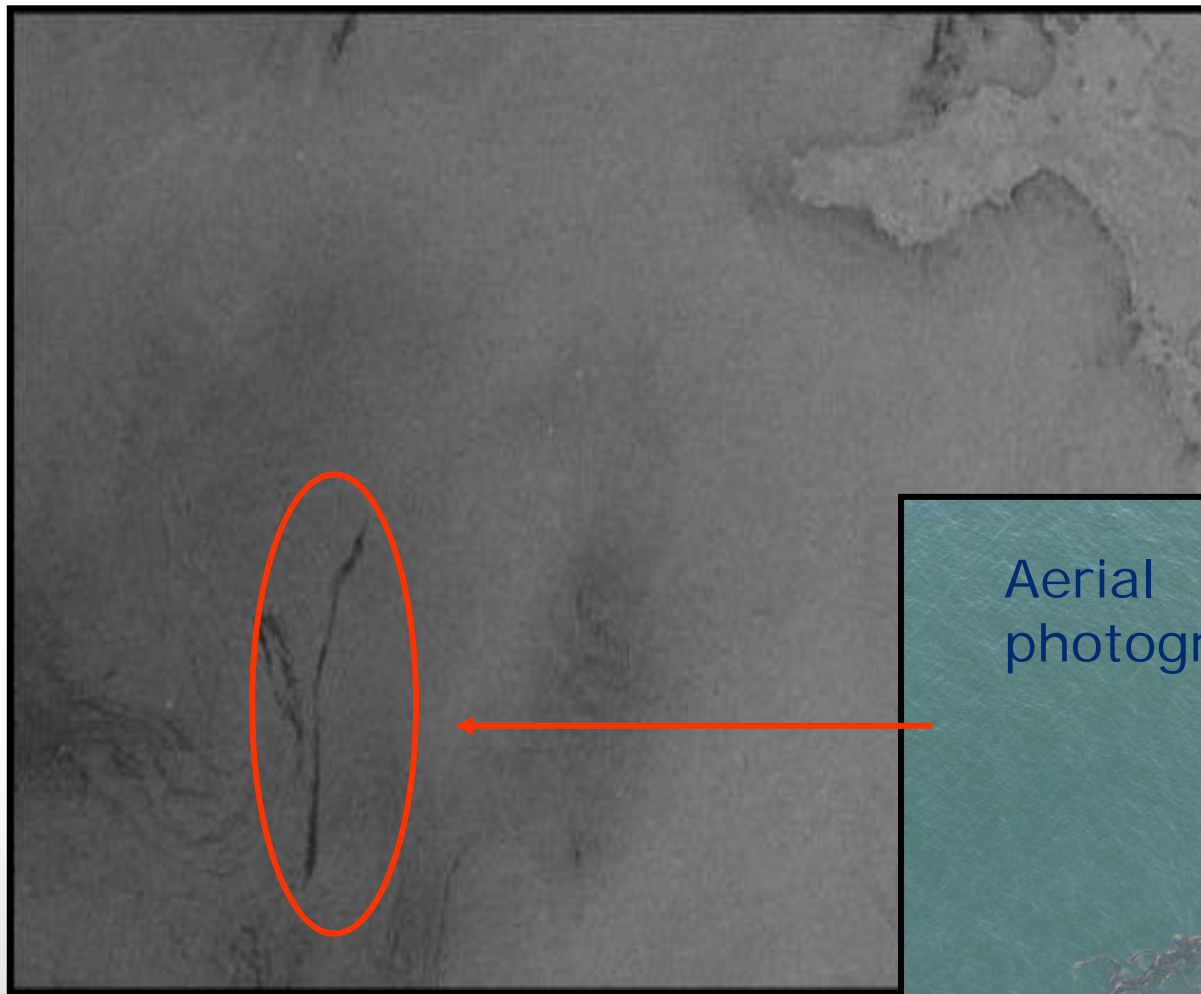
Satellite in use

- ENVISAT
- RADARSAT
- Future missions:
  - ALOS
  - TerraSAR
  - Cosmo-Skymed
  - ...

Image size from 100km x 100km to 400km X 400km



**A detected oil slick from a ship which has been verified by aerial surveillance. The photographic image below was collected as evidence**



**Aerial  
photograph**



## Advantages of satellite monitoring for oil spills

- The Satellite based Synthetic Aperture Radar (SAR) images can detect oil slicks on the sea surface discharged from ships or drilling fluids from offshore oilrigs
- The SAR can offer wide area surveillance coverage in darkness, and independent of cloud cover and weather conditions
- This technology is best used as a complement to the airborne surveillance and vessel patrols of Coastal States in order to maximise the use of assets (cueing of aircrafts)
- Increasing the area surveyed in a given period leading to more effective deterrence

EMSA developed **CleanSeaNet**, which will become operational by **16 April 2007**

#### Scope of CleanSeaNet:

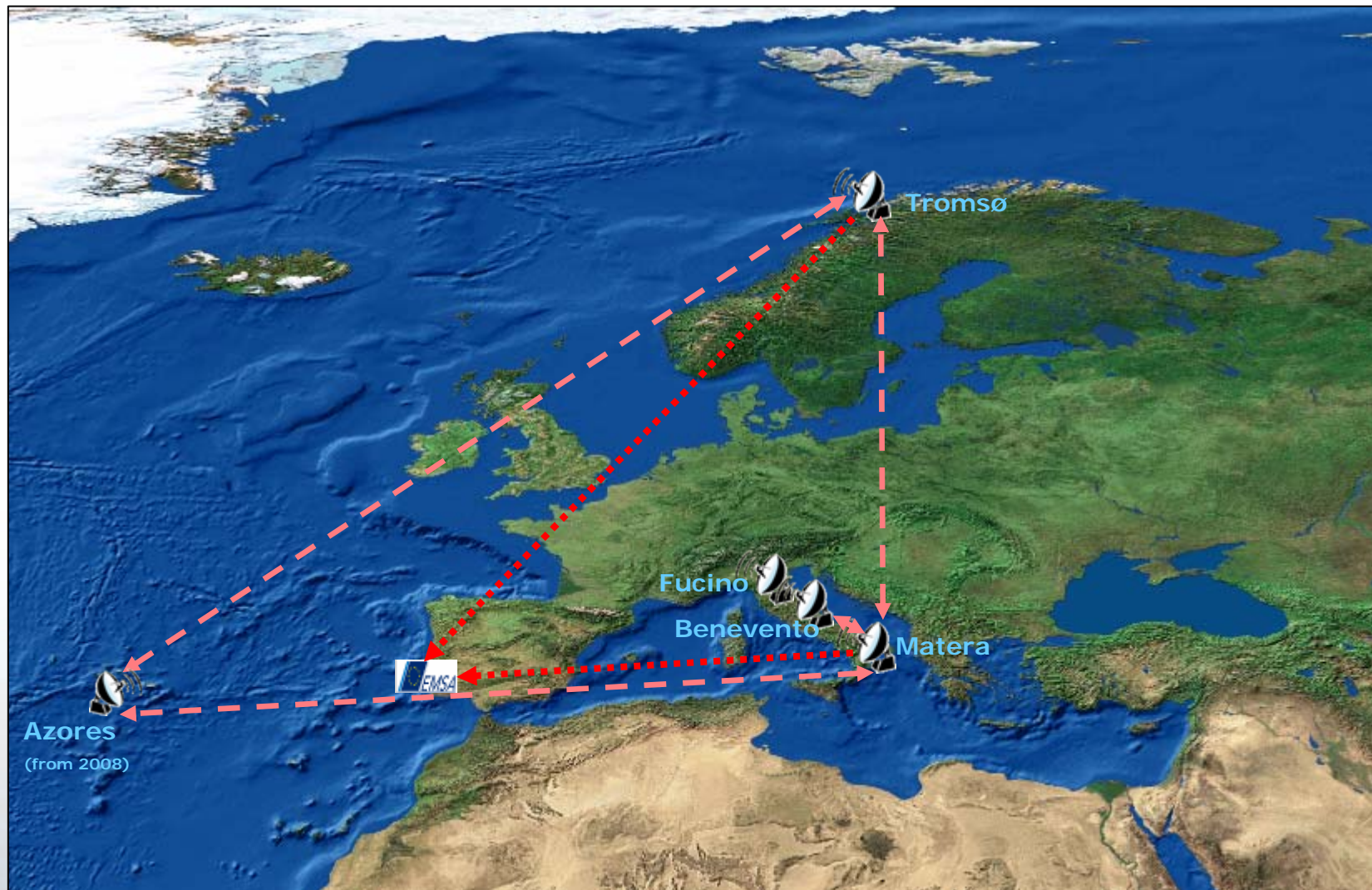
- Monitoring illegal discharges in EU Seas on a regular basis
- Assisting all coastal Member States to locate and identify polluters in areas under their jurisdiction
- Monitoring accidental spills (e.g. under activated Charter)
- Systematic monitoring and surveillance by EMSA (hot spots)

#### Added value at EU level:

- Achieving economies of scale
- Providing Continuity of Service
- Improving technical capabilities

- Alerting in near real time of MS and EMSA in parallel, on any possible spill together with associated confidence information (maximum of 30 minutes),,
- Full access to images in full resolution and the associated information (wind, current) in near real time mode
- At special request of Member States and/or the Commission near real time SAR satellite images of any sea area surrounding the European Union,
- Number of images provided will be according to Member States requirements, image availability and image cost,
- Ordering of images will be requested at highest priority level from the satellite providers to ensure image availability.
- Analysed images and information are provided **free of charge** to CS





## Oil spill alerts to Coastal States

Notification	by email, FAX, SMS, or phone to the responsible Coastal State and neighbouring countries
Alert time	Nom. 30 min after satellite overpass (penalties for satellite operators after 30 min) CLEAN AREAS shall be reported
Images	Full and reduced resolution images available at the time of alert <ul style="list-style-type: none"><li>- All images to be geo-referenced</li><li>- Images in common format (GeoTIFF)</li></ul>

This report together with the H5-image will also be available at your web-account:

Satellite: ENVISAT  
Acquisition Date: 27 FEB-2005  
Acquisition Time: 20:46:06.039

Corner coordinates:

58°59'08"N / 007°33'05"E 59°48'01"N / 014°46'53"E  
55°34'30"N / 009°17'21"E 56°21'14"N / 015°52'50"E

Number of detected oilspills: 1

Oilspill ID 1 Confidence: Medium

Country: SWEDEN

Latitude/longitude: 58°09'03"N / 011°10'36"E

Height/width: 0.3 / 2.1 km

Orientation: N-S

Wind direction: NW-SE

Wave speed: 3 m/s

Power to source:

Source position:

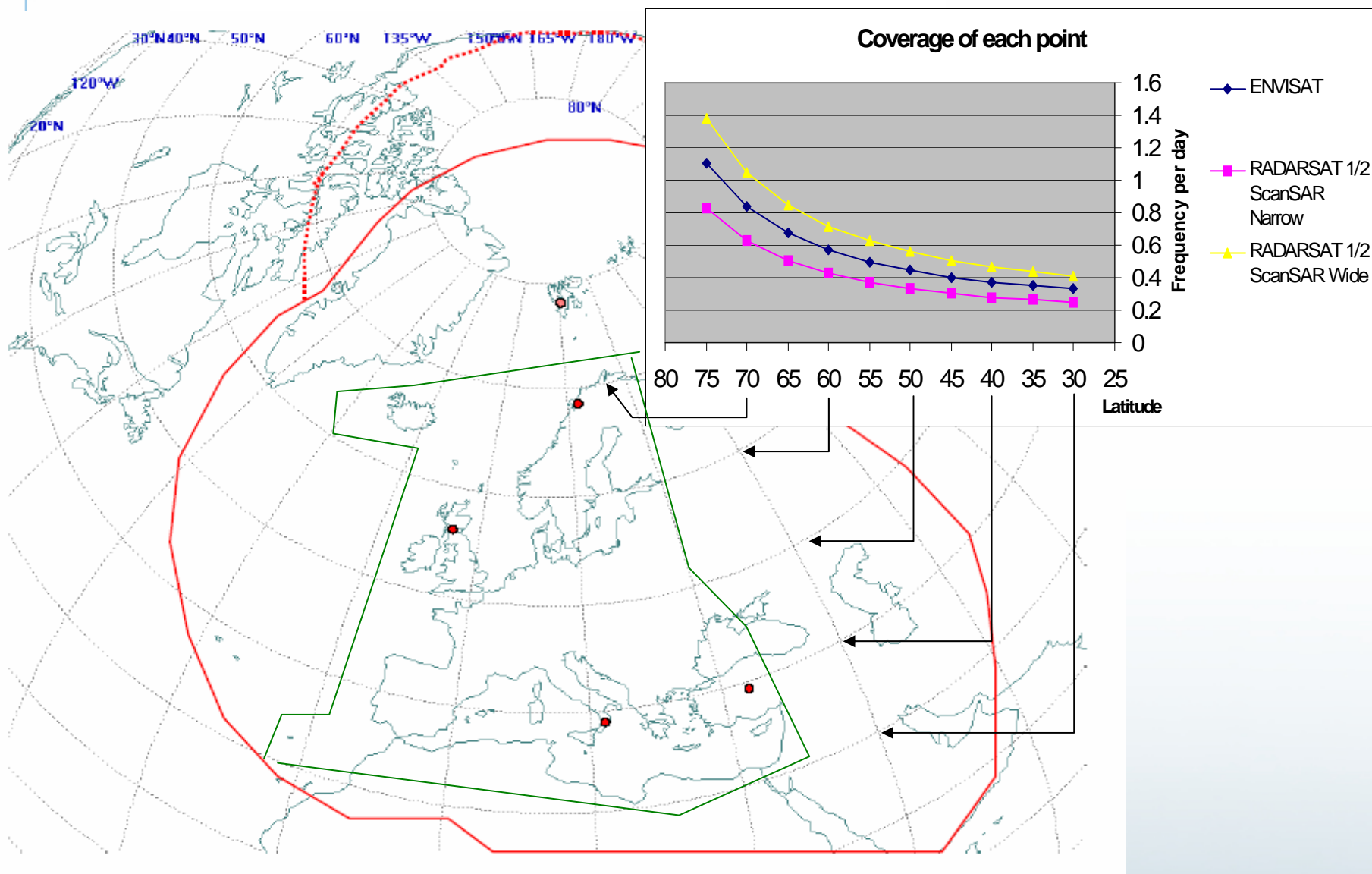
Comment:

Possible oil spill with good contrast nearby a low wind area.

to be reported

- All information e.g. imagery, analyses and feedback shall be stored in an EMSA controlled database
- All information will be accessible to the entitled Coastal States
- Database information will be used
  - **for collecting evidence**
  - for in-house documentation and reporting
  - for training of operators and users, performing independent validation activities, and
  - for running statistical analysis





- Oil spill 'look alike' = false alarm = false positive
  - Natural surface films e.g. phytoplankton bloom
  - Rain cells, cold upwelling, bathymetry, internal waves, wind shadow
- Optimal wind speed (2-10 m/sec)
  - Under very high wind speeds the oil may mix rapidly leaving no surface effects visible
  - Similarly, heavy oil may sink below the surface after the initial spill
- Confidence levels attributed to every spill
- Analysis is a semi-automatic process
  - Algorithms
  - Trained operator to interpret the images



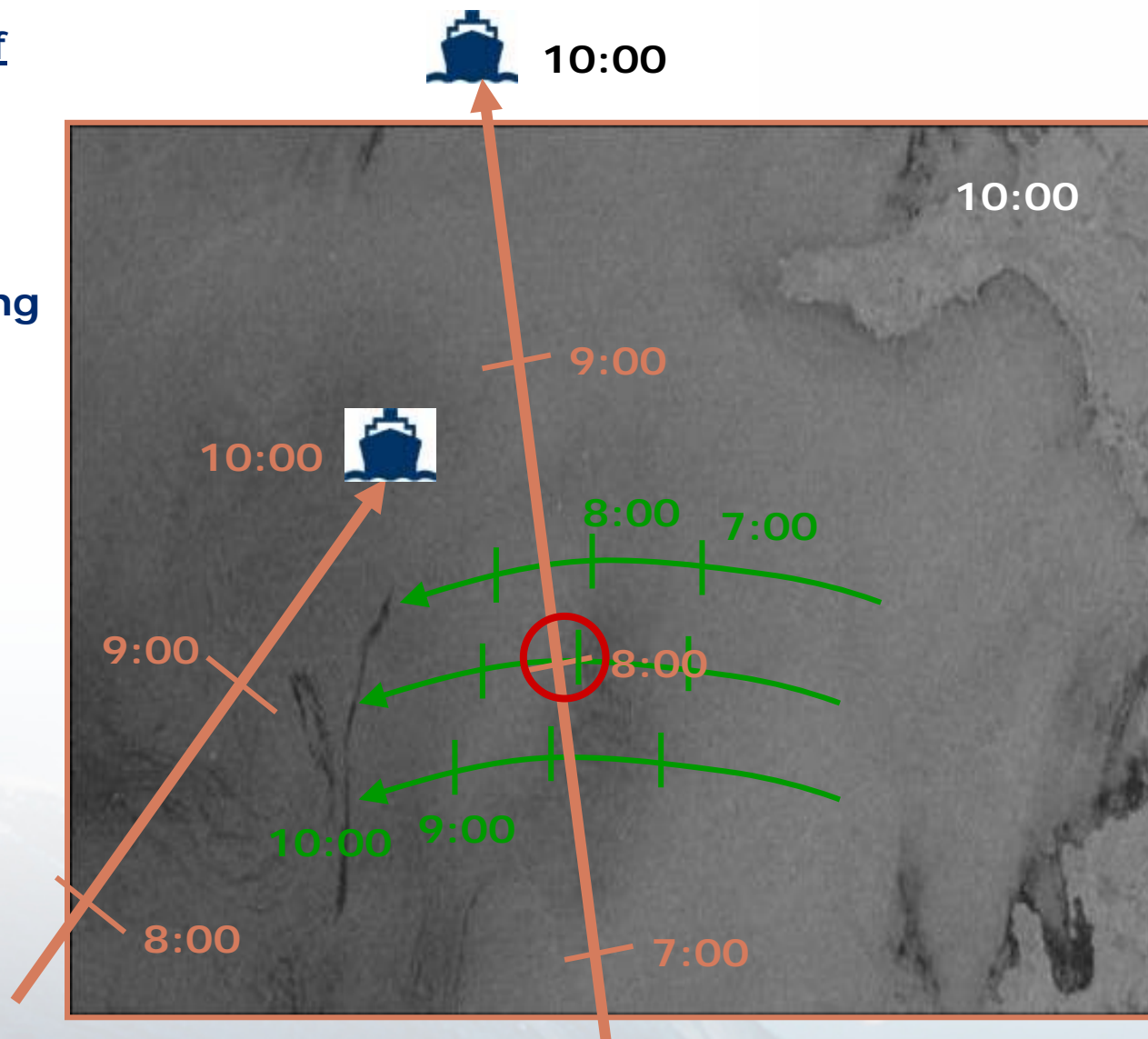
## EMSA requests for all Coastal States

- Service integrated into the national response chain
- CS should attempt to verify as many spills as available aerial or vessel resources allow
- Defining the use of satellite images and defining what is an appropriate follow-up should be decided by the Coastal State
- The Agency should not provide satellite images to CS that are not capable of any appropriate follow-up
- EMSA needs feedback on verification results and service quality

- Development of collateral information (2007-2008)
- In-house capability of combination with AIS+ (SafeSeaNet) (2008)
- capability of for- and hind casting, aging of spills (2008)
- Correlation of vessel tracks and spill movements needed ((pre-)operational products of MARCOAST)
- **EMSA service might be the first operational end-to-end service for Member States under GMES**
- **Service could be further developed for vessel detection/identification by satellite**

## Combination of

- Satellite detection
- Spill drifting
- Vessel tracking



## CleanSeaNet: Contacts with Member States

- Training sessions for Member States for using CleanSeaNet (June and ongoing)
- Technical assistance can be provided to Member States for setting up a response chain using satellite SAR imagery
- CleanSeaNet User Group (back-to-back with EGEMP) (June),  
will meet twice a year

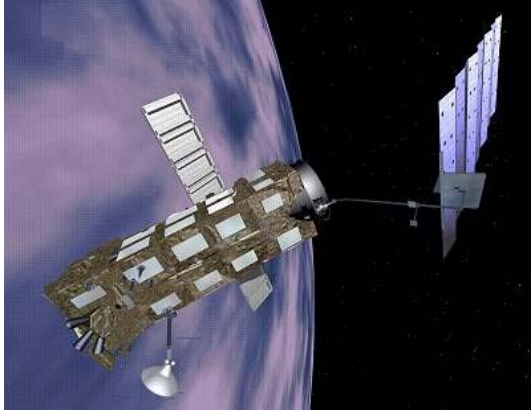
- Some CS already use satellite data (since the mid-nineties in some areas of the Baltic and North Seas) others have not taken action
- Industry and European organisations have developed and are running considerable services and projects (e.g. MarCoast) which have paved the way for the EMSA service
- Work within the framework of existing national and regional arrangements e.g. HELCOM and build on existing expertise and processes
- Aim to achieve complementarities of services (e.g. ESA MarCoast project)



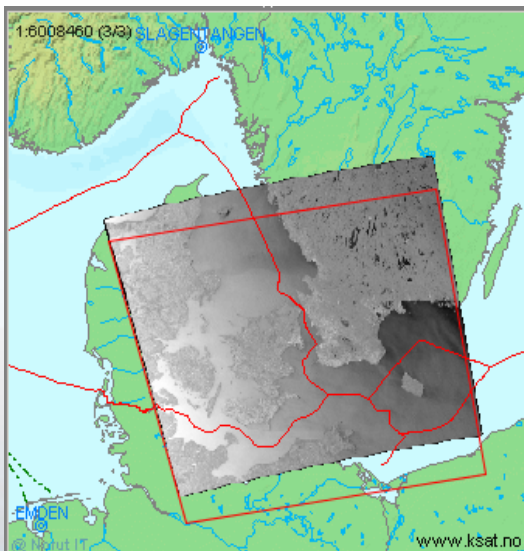
## International Charter on Space and Major Disasters

EMSA will operate as Project Manager under an activated Charter for all marine spills in European waters and adjacent seas

- In agreement with DG ENV and JRC (Commission)
- Support with optical images (JRC – MODIS; ESA; EUSC)
- Reporting to affected Member State(s) via MIC



# Thank you very much!



**EMSA Oil Pollution Response**  
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