The Central Command for Maritime Emergencies
Joint Institution of the Federal Government and the Coastal States

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The integrated European Satellite-Based and Aerial Oil Spill Surveillance and Vessel Detection Services

Interpill 2012
The oil pollution issue

- About 457,000 tonnes of oil are released into the ocean every year (GESAMP 2007):

- PriceWaterhouseCooper has calculated the annual costs (2005 prices):
  - European spills estimated to 50,100 tonnes/year
  - for clean-up around €120 million
  - for environmental degradation and all other economic and societal costs €149,600 per tonne;
    Multiplied with the estimated volume of oil spillage in European waters: €7.5 billion per year.
Integrated Surveillance System

- Surveillance of accidental spills
- Detecting illicit discharges
- Support in emergency situations
- Integration of MS and European response resources
What are the objectives of CleanSeaNet?


“... EMSA shall:

a) work with the Member States in developing technical solutions and providing technical assistance in relation to the implementation of this Directive, in actions such as tracing discharges by satellite monitoring and surveillance;”

1. To assist Coastal States to locate and identify polluters in areas under their jurisdiction
2. To strengthen national response and enforcement mechanisms
3. To maximise the use of allocated budget through economy of scale
CleanSeaNet: Near Real Time service – 30 min*

Satellite images are acquired in segments up to 1400 km long. 30 min are for a 400 km long image.
CleanSeaNet satellite based service delivery

- 22 EU Coastal States plus Norway, Island, Croatia and Turkey
- More than 2000 Satellite images/services per year
- Oil spill identification - alert report
- Vessel detection information
- Modelling data
  - Forward modelling
  - Backward modelling
- Electronic Nautical Charts
- AIS information via EMSA SafeSeaNet service
- Associated ancillary data:
  - meteorological wind and wave data,
  - SAR derived wind and swell data
off the Southern Irish coast
17/02/2009

Satellite image: © ESA (European Space Agency) / EMSA 2009
Photo: © MCA/Irish Coast Guard
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Vessel detection - Catching Polluters

- Ship detected on SAR image (Bright Spot) 1
- Long and linear possible spill trailing in the wake 2
- Vessel identified 3

CleanSeaNet is able to:

**DETECT AND IDENTIFY DISCHARGING VESSELS**

Remark: Similar vessels in vicinity at similar course and speed => not a wake
Enhanced alert reporting
CleanSeaNet Results

See EMSA report summarising operational results of the CleanSeaNet service covering the period between 16/04/2007 and 31/12/2011:

- 10,954 possible spills were detected and reported by CSN;
- Over 1,250 million km² were monitored. (equiv. to more than 62,000 flight hours);
- On average, the trend has been a global reduction in the number of possible spills detected in the images: from 10.77 per million km² in 2008 to 5.08 per million km² in 2011;
- 50% of spills checked by aircraft within 3 hours of satellite acquisition were confirmed;
- Of the confirmed spills, 80% were mineral oil and 20% were other substances;
- CSN provided emergency support for 16 accidental spills.
Radar detection is a result of reflection or the effect of wave dumping.

Several potential reasons for wave dumping:
- Current
- Glassy sea
- Shallow water, sand banks
- Algae bloom
- Fish oil
- Mineral oil etc

need of verification by national means, preferable surveillance aircraft or helicopter
Verification of detection by any national means
# Comparison of the aircraft sensor capabilities

<table>
<thead>
<tr>
<th></th>
<th>Visual</th>
<th>SLAR</th>
<th>UV</th>
<th>IR</th>
<th>MWR</th>
<th>LFS</th>
<th>Satellite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range @ 300m flight altitude</strong></td>
<td>Approx. ± 3km</td>
<td>Wide, ± 30km</td>
<td>Narrow, ± 250m</td>
<td>Narrow, ± 75m</td>
<td>Up to 500x500 km²</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Classification</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Sensitivity on oil spill thickness</strong></td>
<td>n/a</td>
<td>n/a</td>
<td>&gt;0.1µm</td>
<td>&gt;10µm</td>
<td>50µm to 2.5mm</td>
<td>0.1µm to 20µm</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Spatial resolution</strong></td>
<td>High</td>
<td>60m by 30m (perp.)</td>
<td>3.5m</td>
<td>3.5m</td>
<td>&gt;5m</td>
<td>10m pixel distance</td>
<td>50m</td>
</tr>
<tr>
<td><strong>Detection of oil below surface</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Operating at night</strong></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Measuring geometry</strong></td>
<td>visual</td>
<td>Line-by-line, 20Hz</td>
<td>Conical, 5Hz</td>
<td>Image</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Impaired by</strong></td>
<td>Nothing</td>
<td>Nothing</td>
<td>Clouds</td>
<td>Nothing</td>
<td>Clouds, flight altitude</td>
<td>Nothing</td>
<td></td>
</tr>
</tbody>
</table>
• If a possible polluter is caught red-handed evidence is collected

• Photographs and videos taken by a spotter aircraft proved to be enough evidence in some nations to bring the offence to court (e.g. France)
"Body of evidence"

- Photographs or videos of possible polluter made by patrol vessel, surveillance aircraft or helicopter
- Radio contact with possible polluter
- Witness report by authority representatives
- Control of logbooks
- Port State Control results
- Matching samples taken at sea and of the possible polluter
Judgement and penalties

• In some nations focused on the ship crew only (e.g. Germany)
  – sometimes even individual persons must be identified without any doubt
  – problem might be low penalties

• In other nations also the shipping company might be judged (e.g. Norway)
  – Shipping company has an overall duty to ensure that the construction and operation is in accordance with the rules and laws (Act 16, Feb. 2007, No 9)
Enhancing the effectiveness of the law enforcement chain in combating illegal discharges

Improvements needed on
- the overall efficiency of the illegal discharge response chain
- a feedback mechanism on follow-up actions

Objective
EU Guidelines should complement those established at regional and national level:
- To support the harmonised enforcement of anti-pollution regulations
- To provide non legally binding guidelines mainly for inspectors and investigators
- To provide useful information for effective prosecution of offenders
- To promote the use of existing information systems

Working Group to Draft EU Guidelines is established
Thank you very much
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