



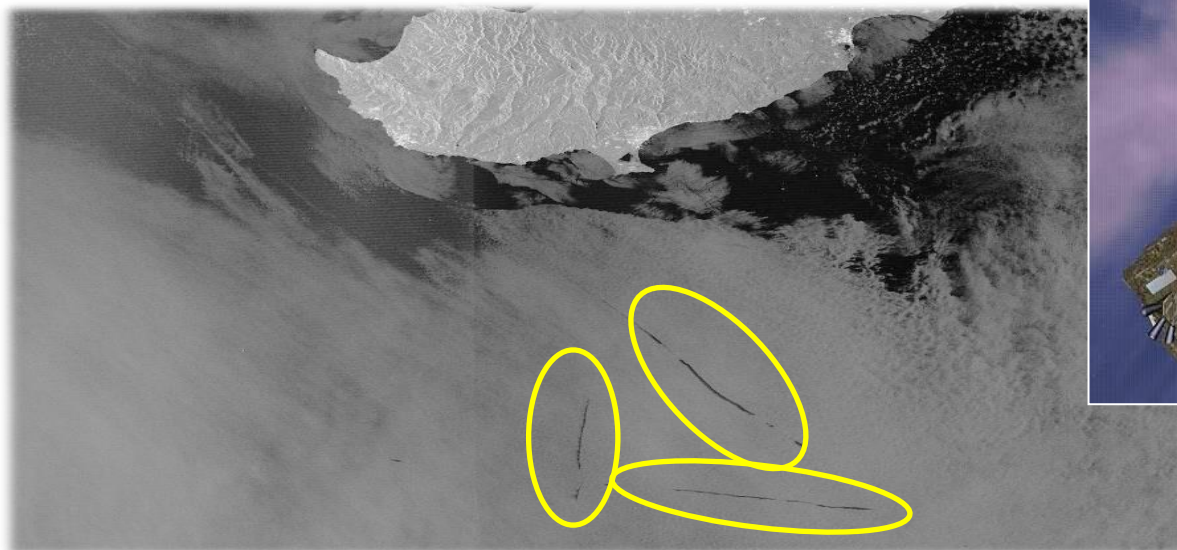
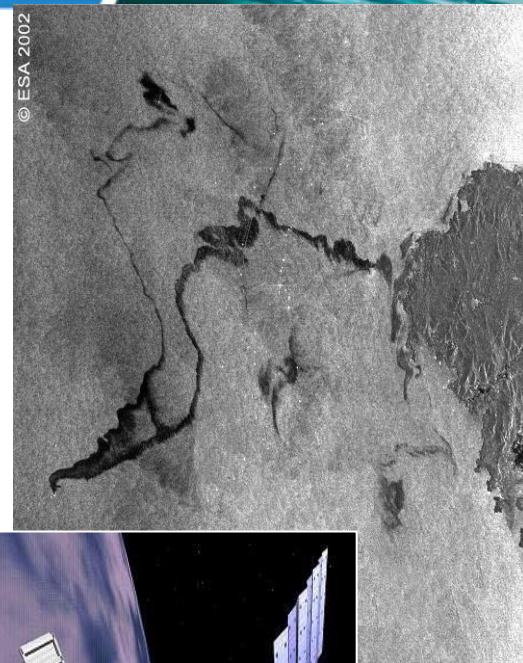
# CleanSeaNet Products and Requirements

Marc Journal

# CleanSeaNet

The European satellite oil pollution and vessel detection and monitoring system.

Linked into national/regional response chain strengthening operational pollution surveillance and response for deliberate and accidental spills.



**Directive 2005/35/EC\*** of 7 September 2005 on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences

## Article 10

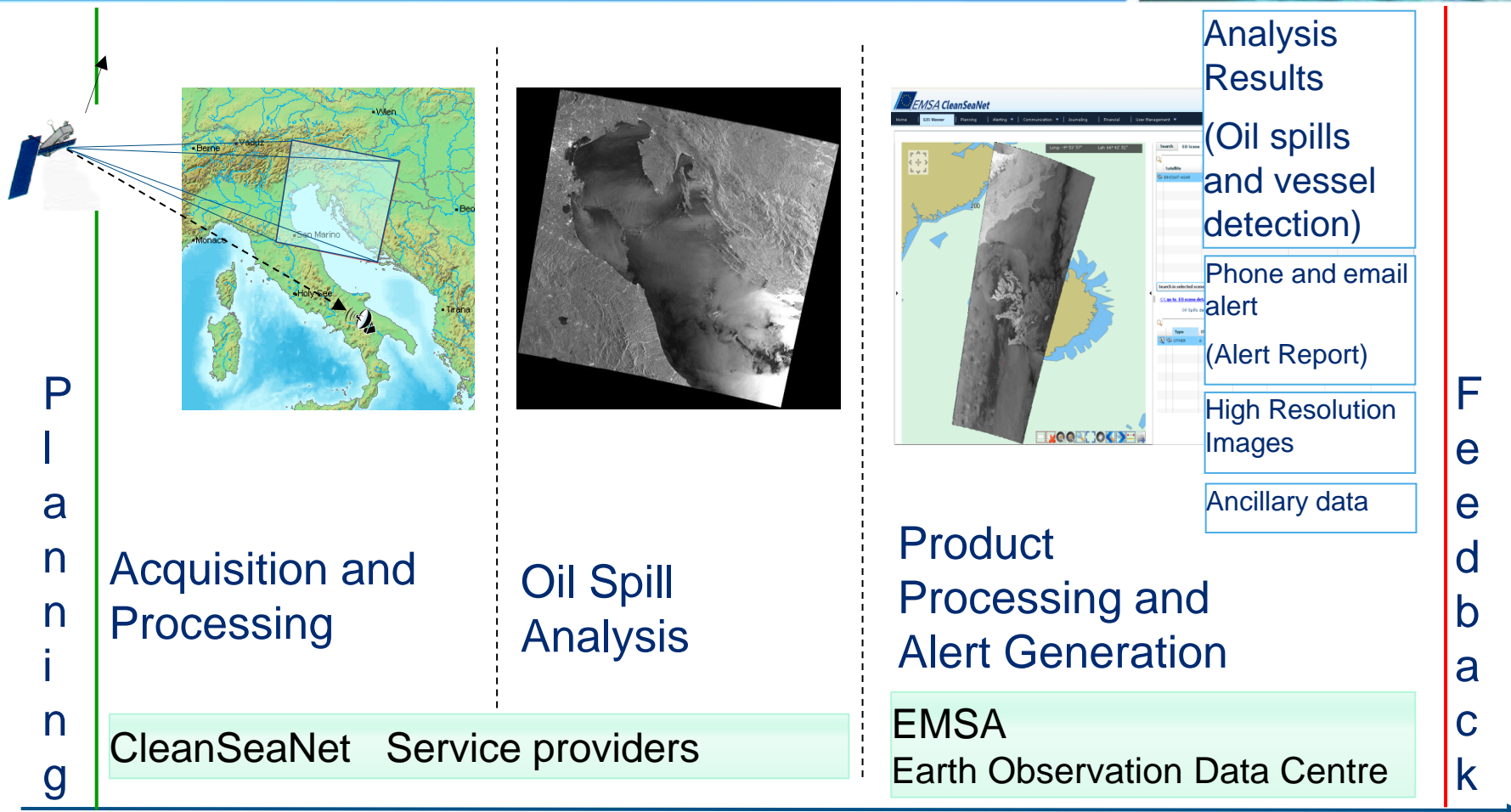
### Accompanying measures

2. In accordance with its tasks as defined in Regulation (EC) No 1406/2002, the European Maritime Safety Agency 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;
- (b) assist the Commission in the implementation of this Directive, including, if appropriate, by means of visits to the Member States, in accordance with Article 3 of Regulation (EC) No 1406/2002.

\* as amended by Directive 2009/123/EC of 21 October 2009

# CleanSeaNet : Near Real Time service – 30 min\*



T0 = End of scene acquisition

T = T0 + 30 min

\* Satellite images are acquired in segments up to 1400 km long. 30 min are for a 400 km long image

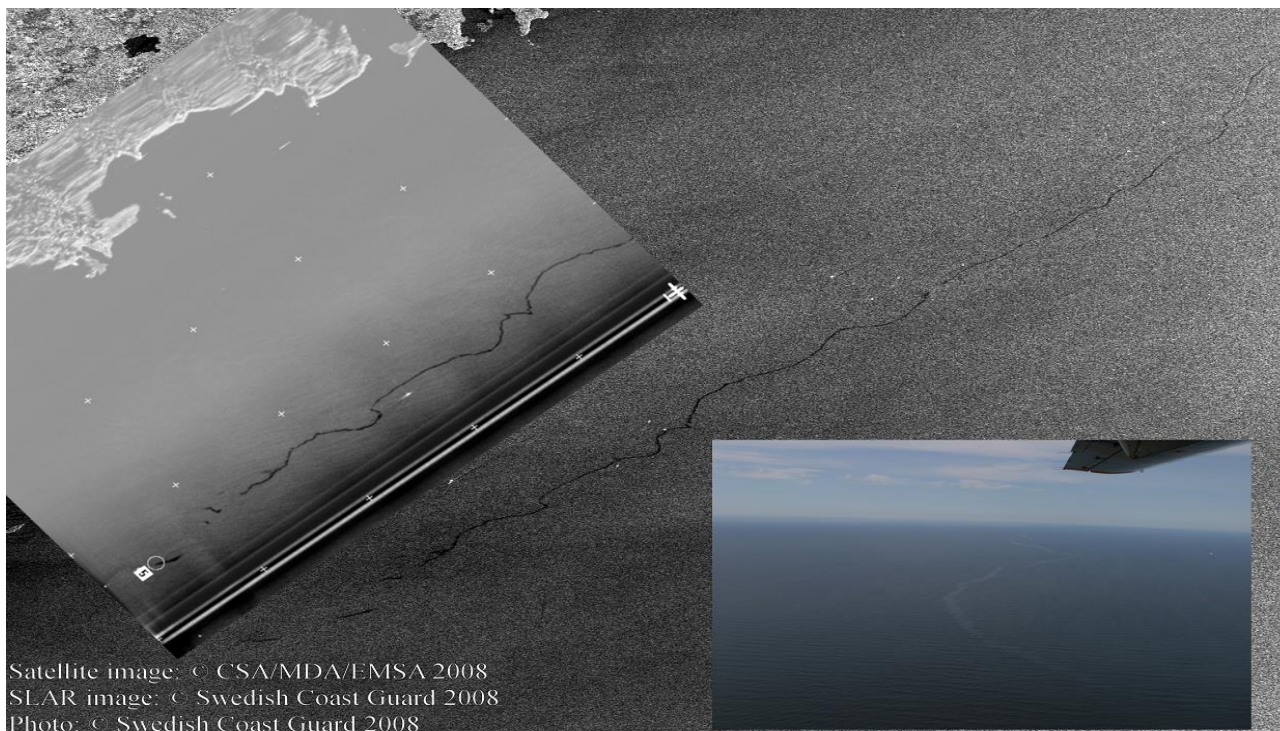


# Catching Polluters

- In case of a discharge detected by CleanSeaNet

PROVING A MARPOL VIOLATION REQUIRES COMPLEMENTARY EVIDENCE

- Evidence can be collected ON SITE AND/OR IN PORT



# Operational use of CleanSeaNet



Routine monitoring of all European waters looking for illegal discharges :

- Detection of possible spills
- Detection of vessels
- Identification of polluters by combining CleanSeaNet and Vessel traffic information available through SafeSeaNet

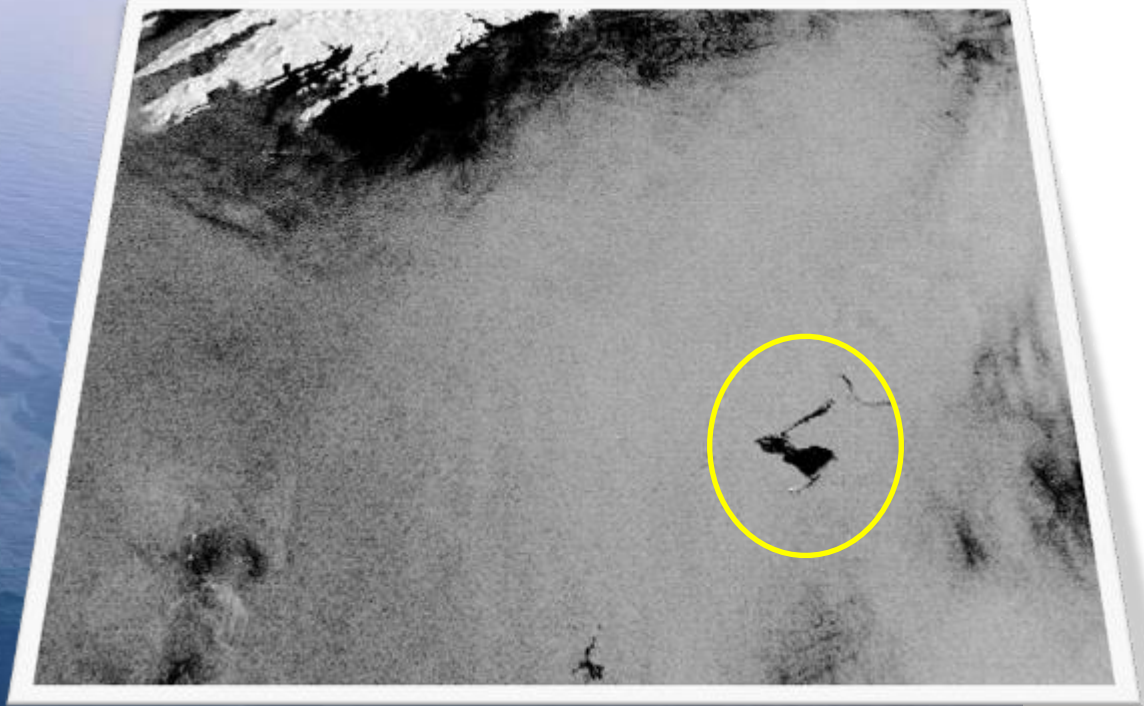
Supporting enforcement actions by the Coastal States

- On site verification and follow-up
- Inspection of suspected vessels in the next port of call

Supporting response operations to accidental pollution



Admiral Kuznetsov  
off the Southern Irish coast  
17/02/2009



Satellite image: © ESA (European Space Agency) / EMSA 2009

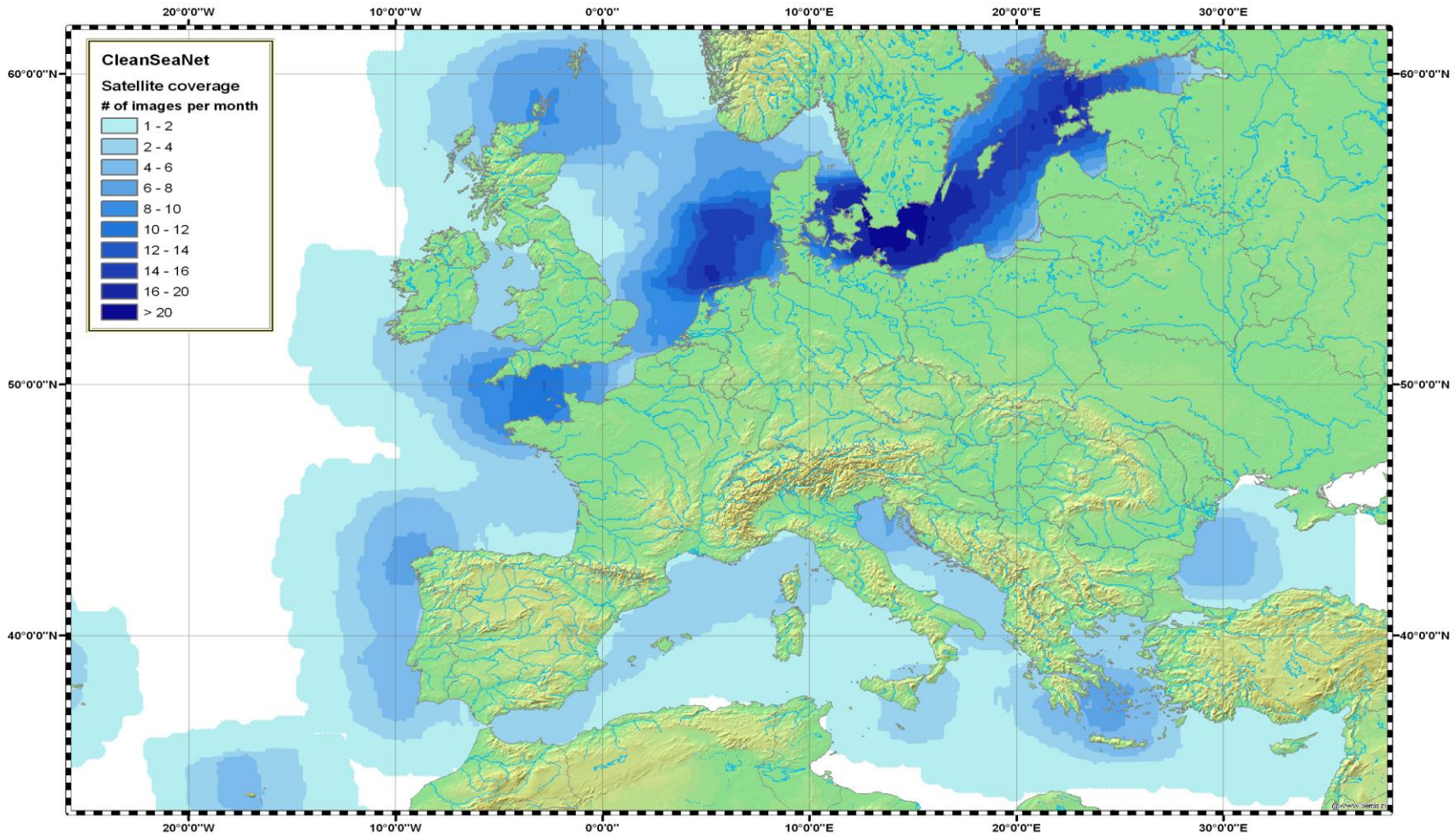
Photo: © MCA/Irish Coast Guard



- CSN V1 operational since April 2007
- CSN V2 started operations in December 2010 – Full operations 1 February 2011
- > 2,000 analysed satellite images per year - **2,521 in 2014**
- 27 countries (23 EU coastal states, Iceland, Norway, Montenegro, and Turkey) (Danish area extended to Greenland)
- Distributed Service-Network approach via regional service providers (acquiring and processing satellite data)
- NRT: 30 minutes end product delivery
- Alert passed to response authorities (Coast Guard, Customs, Navy, ...)

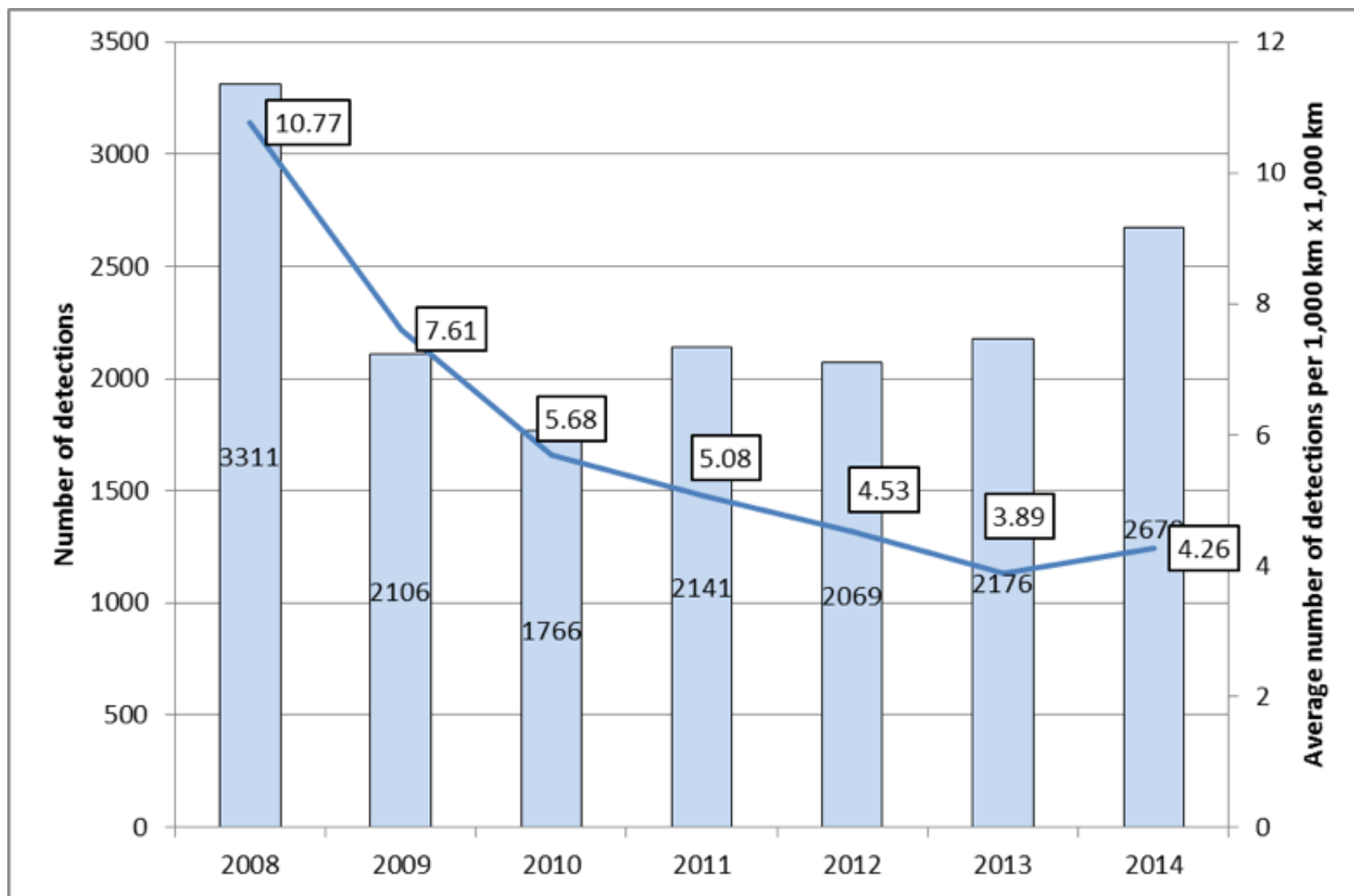


# CleanSeaNet Coverage Density

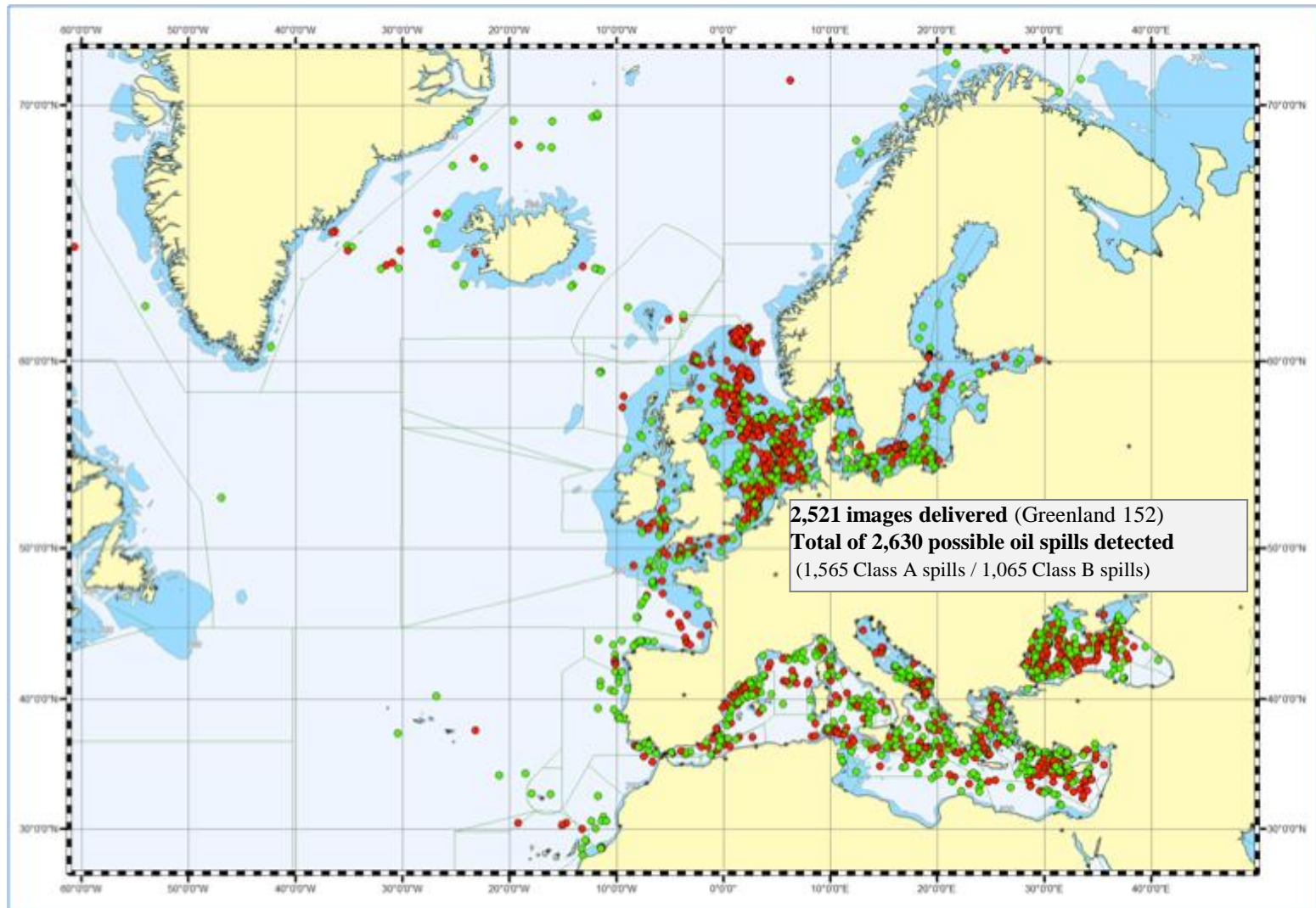


Coverage density from 1-2 images to more than 20 images per month

# CleanSeaNet Detections – Trends



# CleanSeaNet Detections - 2014



**Class A – detection is probably a spill (mineral /vegetable/fish oil or a chemical product)**

**Class B – detection is possibly a spill (mineral/vegetable/fish oil or a chemical product)**

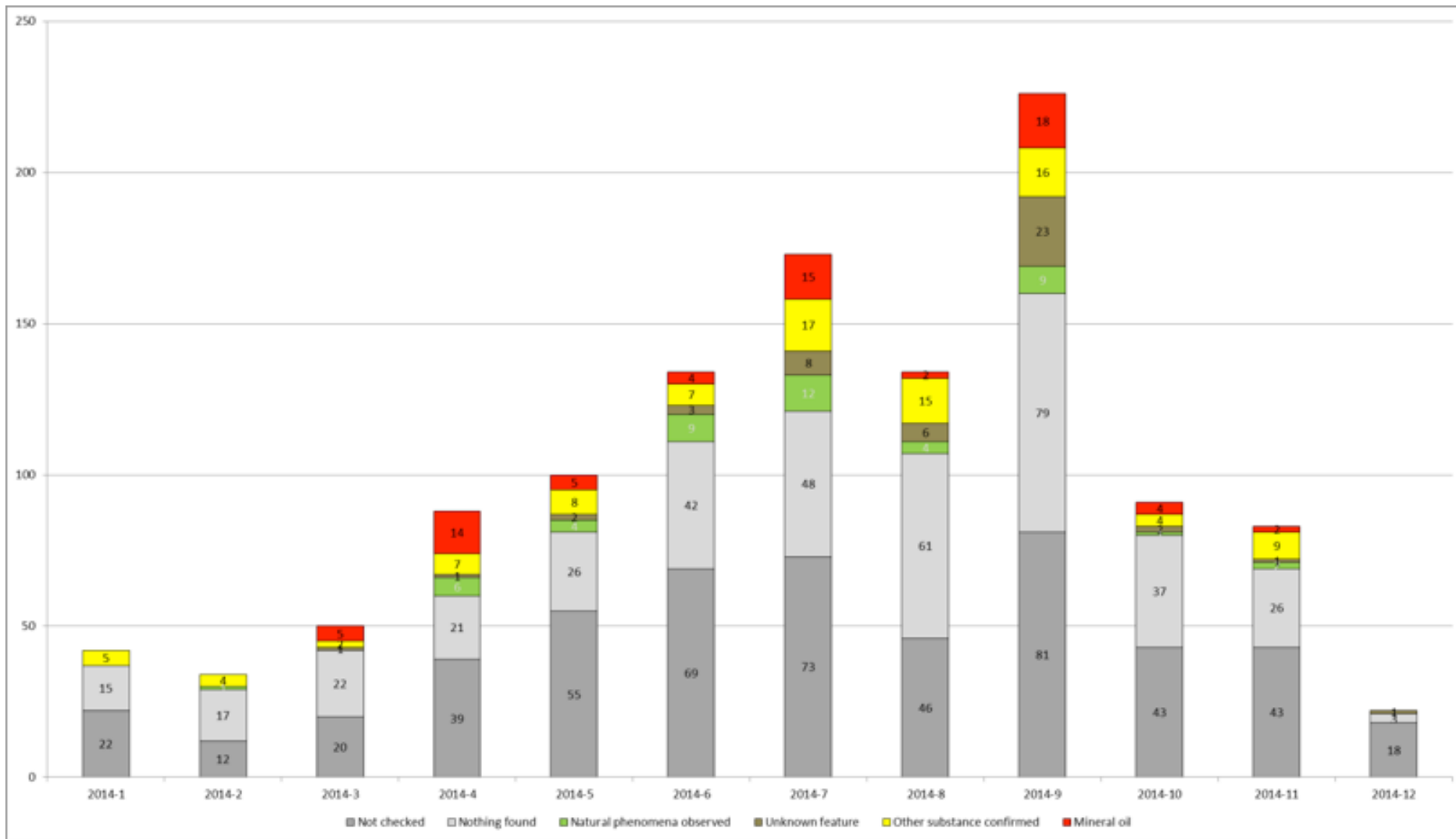
# CleanSeaNet Verification Results



	<i>2014</i>		<i>2013</i>	
<i>Detections</i>	<b>2630</b>		<b>2030</b>	
<i>Feedback</i>	<b>1177</b>		<b>1081</b>	
<i>Checked</i>	<b>656</b>		<b>494</b>	
<i>Mineral oil</i>	<b>69</b>	<b>11 %</b>	<b>50</b>	<b>10 %</b>
<i>Other substance</i>	<b>94</b>	<b>14 %</b>	<b>48</b>	<b>10 %</b>
<i>Unknown feature</i>	<b>48</b>	<b>7 %</b>	<b>30</b>	<b>6 %</b>
<i>Natural phenomena</i>	<b>48</b>	<b>7 %</b>	<b>31</b>	<b>6 %</b>
<i>Nothing observed</i>	<b>397</b>	<b>61 %</b>	<b>335</b>	<b>68 %</b>



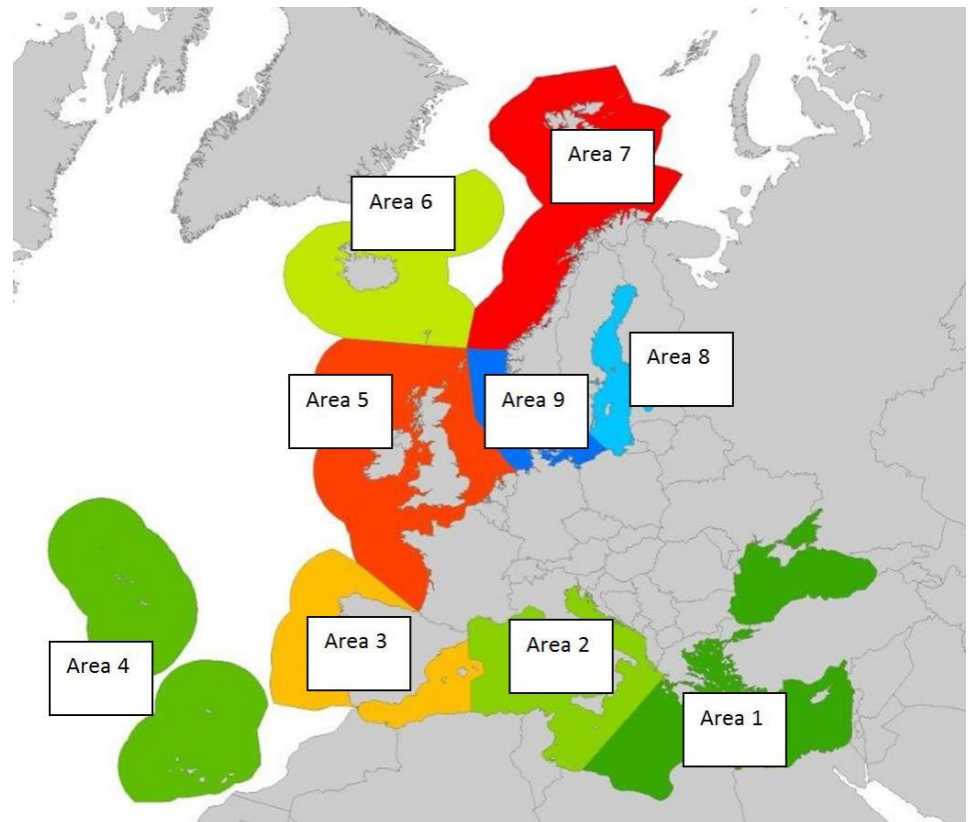
# CleanSeaNet Verification Results



# New CleanSeaNet contracts

Tasking areas for ordering of services

<b>Area</b>	<b>Service provider</b>
<b>1</b>	<b>eGEOS</b>
<b>2</b>	<b>CLS</b>
<b>3</b>	<b>CLS</b>
<b>4</b>	<b>Edisoft</b>
<b>5</b>	<b>KSAT</b>
<b>6</b>	<b>KSAT</b>
<b>7</b>	<b>KSAT</b>
<b>8</b>	<b>KSAT</b>
<b>9</b>	<b>KSAT</b>



# CleanSeaNet service architecture



## Satellites (synth. aperture radar)

Radarsat-2

Sentinel-1

TerraSAR-X

CSK ?  
RISAT ?



## Service providers

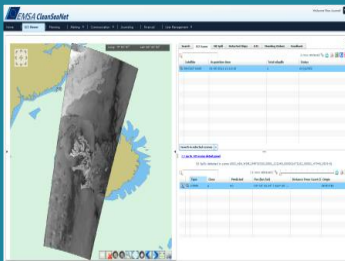
CLS

EDISOFT

EGEOS

KSAT

MDA



## EMSA

Earth Observation Data Centre (ex-CSNDC)

>>> 26 Coastal States <<<

>>> EU / EC <<<

# New contracts for oil spill monitoring and vessel detection services



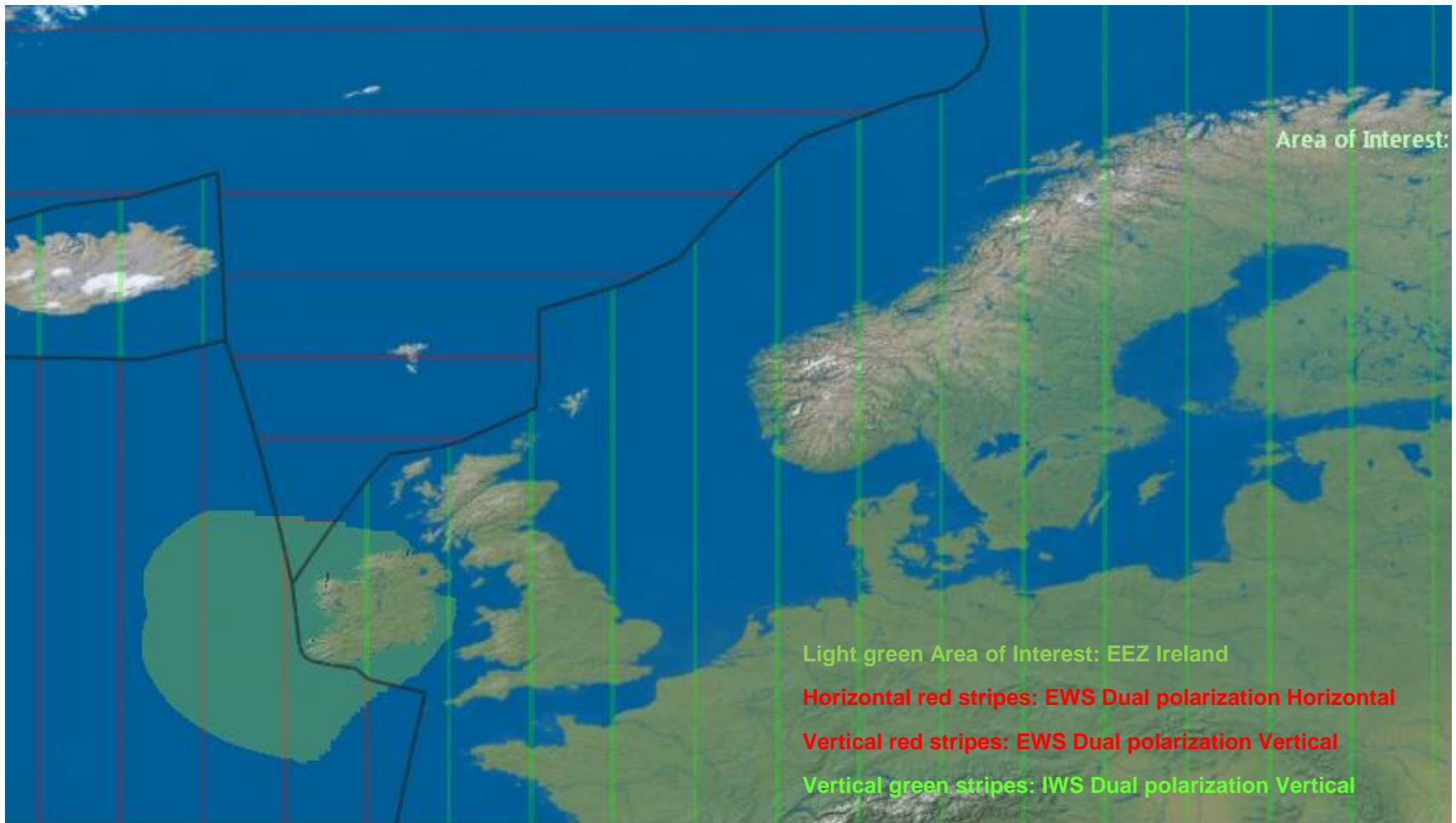
- Near Real Time service coverage is required within all Tasking Areas
- Services may be ordered for any sea area worldwide
- Services may be ordered outside Tasking Areas, and outside Service Provider Ground Station masks
- By using the on-board recorded of the satellite, when the satellite enters into the Ground Station coverage of the contractor, the acquired images may be downloaded and processed
- For these services NRT delivery is preferred but not mandatory
  - CS can define a maximum accepted delivery times for these acquisitions



# EMSA satellite product classes for CleanSeaNet

EMSA product class (Resolution.Area)	Resolution Class Description	SAR product examples (Azimuthal Resolution)	Swath
HR2	<i>High Resolution 2 where resolution: <math>10m &lt; x \leq 30m</math></i>	<i>RADARSAT-2 STANDARD (24.7)</i>	<i>100 Km</i>
		<i>COSMO SCANSAR WIDE (30m)</i>	<i>100 Km</i>
MR1.1	<i>Medium Resolution: <math>30m &lt; x \leq 100m</math></i>	<i>RADARSAT-2 ScanSAR Wide (100m)</i>	<i>500 Km</i>
MR1.2		<i>RADARSAT-2 ScanSAR Narrow (60m)</i>	<i>300 Km</i>
MR1.3		<i>SENTINEL-1 INTERF. WIDE SWATH MR (90m)</i>	<i>250 Km</i>
MR1.4		<i>SENTINEL-1 EXTRA WIDE SWATH HR (50m)</i>	<i>400 Km</i>
MR1.5		<i>SENTINEL-1 EXTRA WIDE SWATH HR (92m)</i>	<i>400 Km</i>
MR1.6		<i>COSMO SCANSAR HUGE (100m)</i>	<i>200 Km</i>
	<i>TERRASAR-X Wide ScanSAR (40m)</i>	<i>200 Km</i>	

# Zoning North Europe Sentinel-1

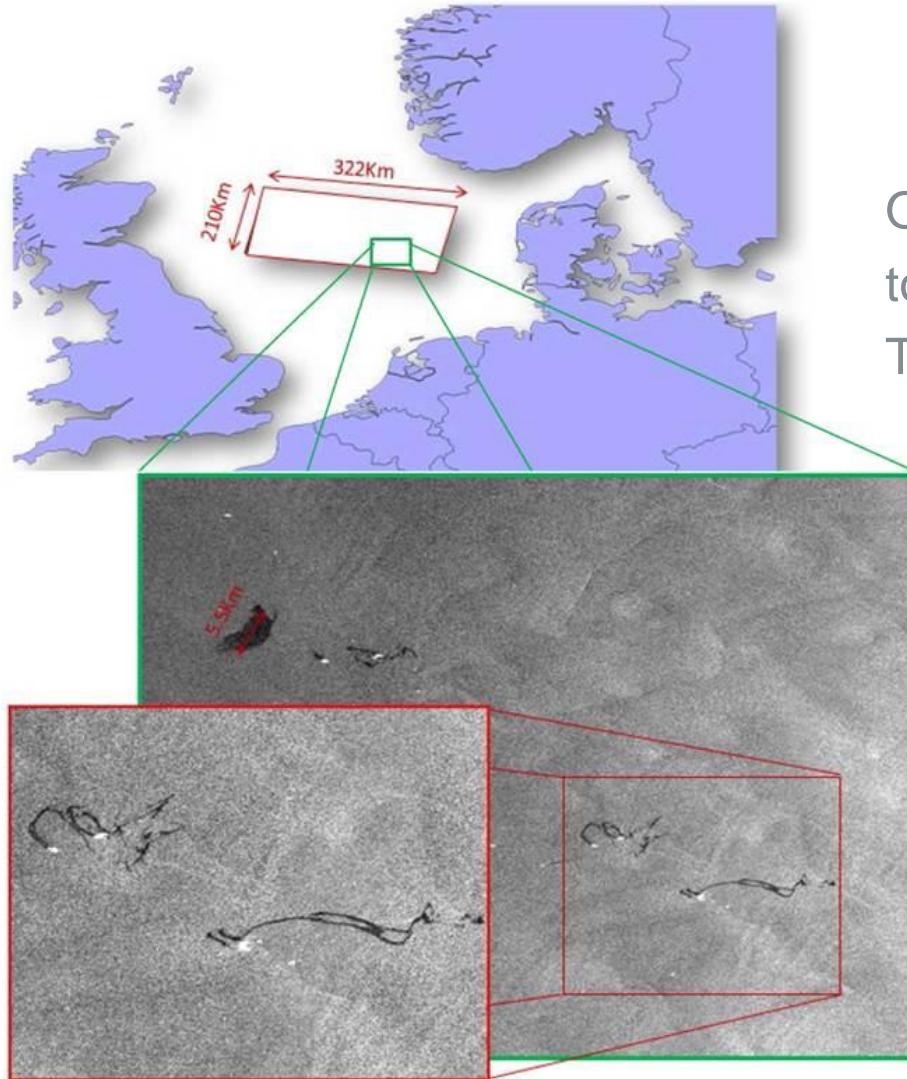


Light green Area of Interest: EEZ Ireland

Horizontal red stripes: EWS Dual polarization Horizontal

Vertical red stripes: EWS Dual polarization Vertical

Vertical green stripes: IWS Dual polarization Vertical



Only KSAT is currently able to acquire and process TerraSAR-X images

Figure 3-8: Image Sample Mono-static Pursuit Mode

# New contracts for oil spill monitoring and vessel detection services – standard services



No major changes in terms of products, information content, and delivery time

- Oil spill detection
- Vessel detection
- Polluter identification
- SAR derived wind
- Production of an alert report (warning and notification of detected spill or clean sea)

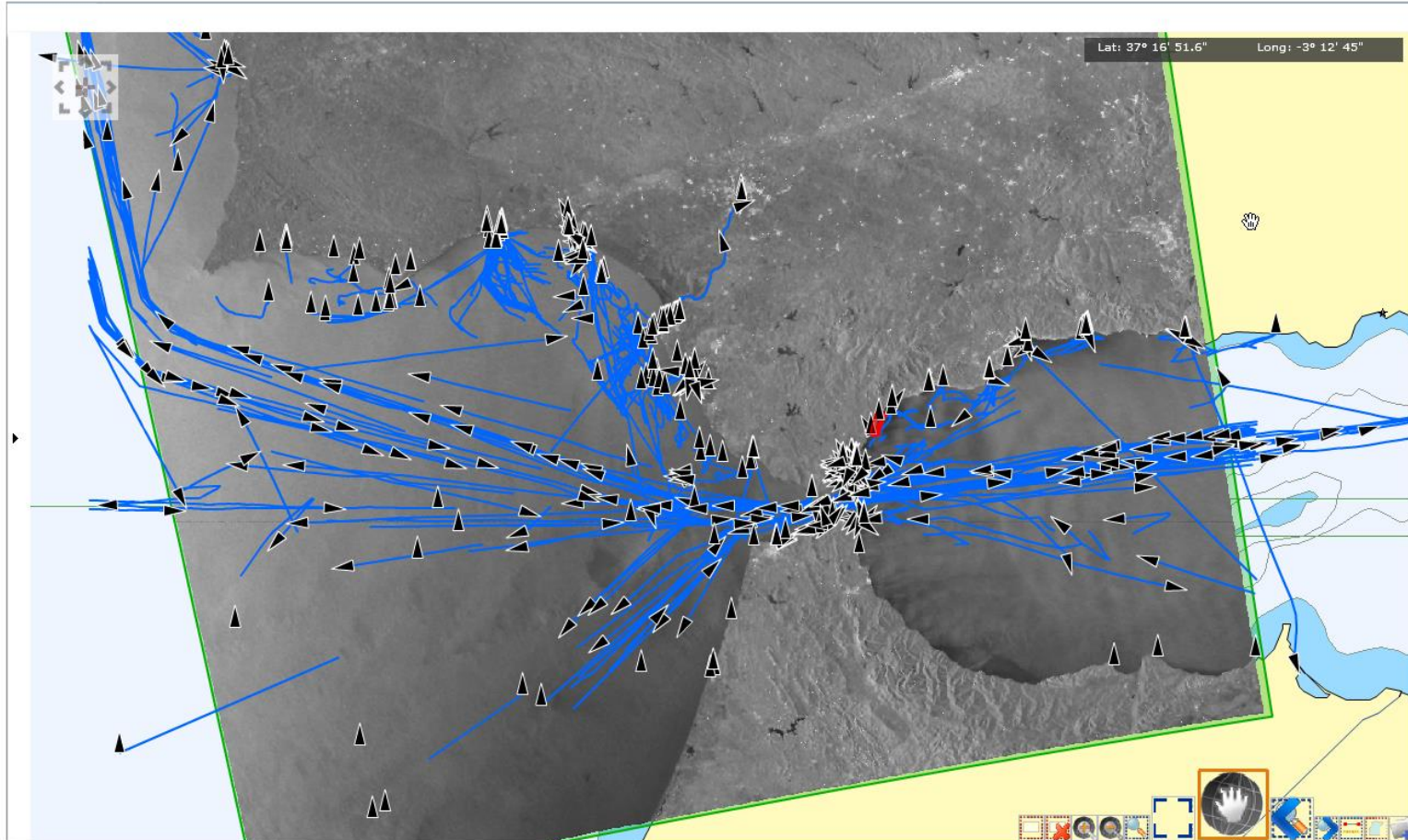
Quality improvement in particular in the field of polluter identification

AIS data available to service providers since release 1.7 of the EODC



# Support to polluter identification

CSNDC SIBILLA JSP CSNDC SIBILLA JSP



# Support to polluter identification



CleanSeaNet Alert Report

**BONN AGREEMENT**

Acquisition:

2015-04-03 17:38:20 UTC

Scene ID: 1000891

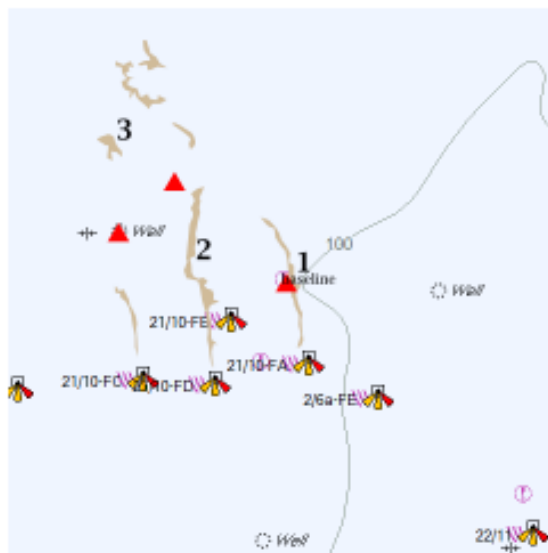
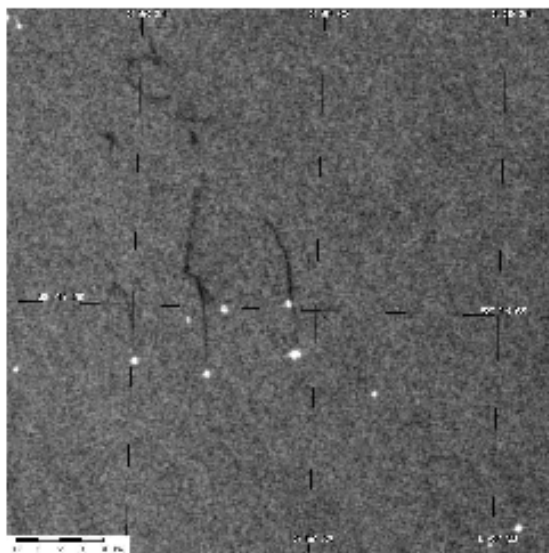
RADARSAT-2 - SCWA - SCWA

List of Spills

GIS Viewer

Details of possible Spill n°1 - OS\_1000891\_1

Centre Position		SAR Wind at Center		Area (km²)	Length (km)	Width (km)	Class (A/B)	Alert Level	Number of slicks	Oilspill Warning Issued
Latitude	Longitude	Direction (From)	Speed (m/s)							
57° 45' 43" N	000° 57' 41" E	118.00	2.82	1.11	6.34	1.22	A	Red	1	YES



Meteorological and Ocean Data			
Sea State	N/A	Wave Height	1.9
Met.Wind	Direction (from)		112
	Speed (m/s)		3.5
Current	Direction (from)		N/A
	Speed (m/s)		N/A

Note: Grey fields are parameters set as "invisible" in the Print Parameters matrix or not available

Comments from Service Provider

Possible source information

N.	Detected	Dist.(Km)	Identified	Type	IMO	Name	MMSI	C/S	Latitude	Longitude	Time (UTC)	Track
1	No	N/A	Yes	OFFSHOR	N/A	forties oil field	N/A	N/A	N/A	N/A	N/A	No

# Support to polluter identification



## CleanSeaNet Alert Report

EUROPEAN UNION

Acquisition:

2015-03-17 17:33:00 UTC

Scene ID: 1000617

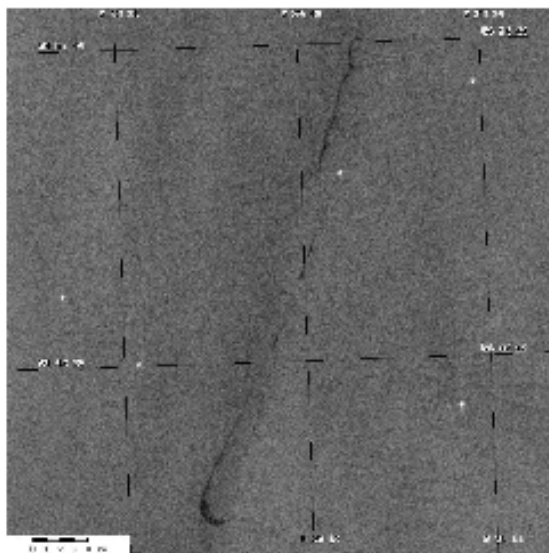
RADARSAT-2 - SCWA - SCWA

List of Spills

GIS Viewer

Details of possible Spill n°3 - OS\_1000617\_3

Centre Position		SAR Wind at Center		Area (nm <sup>2</sup> )	Length (nm)	Width (nm)	Class (A/B)	Alert Level	Number of slicks	Oilspill Warning Issued
Latitude	Longitude	Direction (From)	Speed (m/s)							
54° 43' 57" N	005° 23' 28" E	90.00	3.55	1.45	20.24	1.53	A	Red	4	NO



### Meteorological and Ocean Data

Sea State	N/A	Wave Height	0.8
Met.Wind	Direction (from)		93
	Speed (m/s)		4.4
Current	Direction (from)		N/A
	Speed (m/s)		N/A

Note: Grey fields are parameters set as "invisible" in the Print Parameters matrix or not available

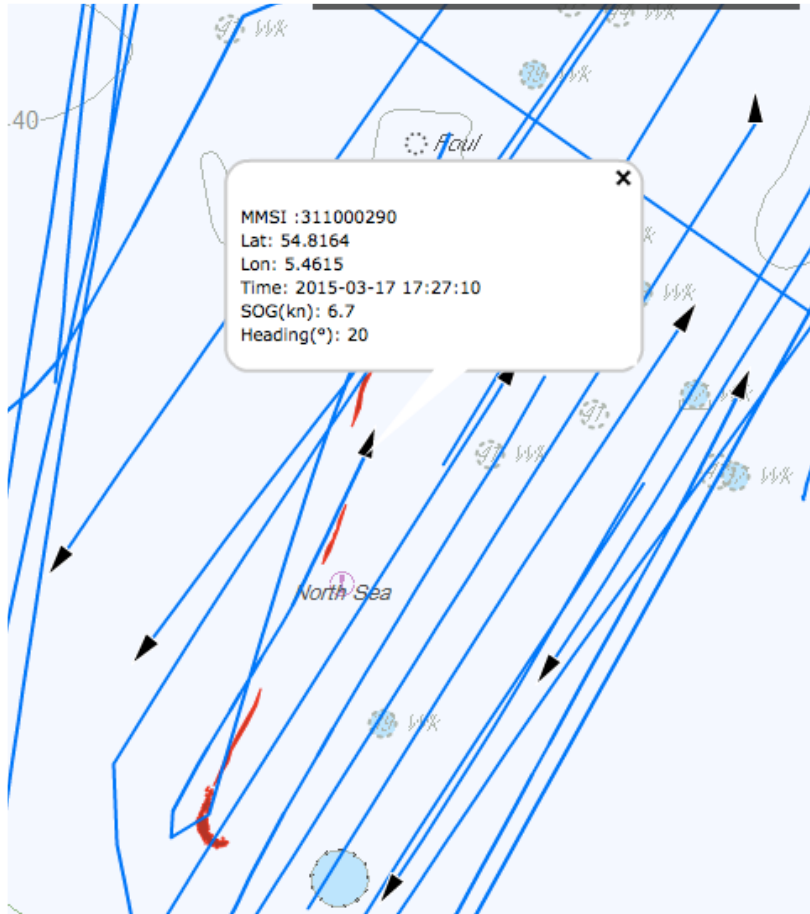
### Comments from Service Provider

### Possible source information

N.	Detected	Dist.(Km)	Identified	Type	IMO	Name	MMSI	C/S	Latitude	Longitude	Time (UTC)	Track
1	Yes	1.0576006	Yes	VESSEL	N/A	RIMAR	N/A	N/A	54° 49' 03" N	005° 27' 46" E	17:33:30.100Z	No



# Support to polluter identification



1 rows retrieved

Item Identifier	Satellite	Acquisition Time	Total Oil S	Status
1000617_RS2_20150317_17333...	RADAR...	2015-03-17 17:33...	8	Delivered

Search in selected scenes

<< go to EO Scene Detail Panel

Load animation

Filter by Area and Time

Show

7909 rows retrieved

MMSI	IMO	Name	Callsign	Length (m)	Type	Draught (m)	Hazard	Destina
311000290	912...	RIMAR	V7HQ3			310		LTKLJ
232001060		unknown	unknown					
227006690		unknown	unknown					
244630606		MARIA D	PI4393	133	79		U	



## A new approach implemented at service providers'

- ◆ Polluter identification not always simple in dense traffic areas with current and wind
  - EMSA forwarding spill data to modelers that in return provide hind casting information. Only available with SMHI.
  - By using the replay function, the user may identify visually which vessel could be the possible source.
- ◆ New approach developed under the SeaU project
  - A fake spill is generated for all possible candidates (vessels in range of the maximum drift of the spill) using AIS position messages
  - The drift is calculated for each faked spill until the time of acquisition. An automatic correlation process returns the best candidate
- ◆ New approach implemented at CLS and KSAT
  - Fully automatic but not fast enough to have the results available in time for the alert report
  - Manual analysis by the provider and if required, delivery at a later stage of the results of automatic polluter identification tool
  - Implementation foreseen at EMSA as a tool directly available to the end user via the future SafeSeaNet ecosystem common graphical user interface



# 22 March 2013 - The whole chain in action



1. CleanSeaNet detection on 22 March in Croatian waters. Analysis shows that the spill was detected approximately 5 hours after the discharge.
2. Possible source (MMSI) reported by the CSN service provider. Track available in alert report based on AIS information available in CSNDC
3. Slovenia enters an overriding factor message in Thetis regarding a possible pollution in Croatian waters
4. Inspectors found (source: feedback in CSN and Thetis) evidence of a discharge of oily products:
  - An OWS line containing oil residues
  - Oil spots on starboard side hull (about 10 square meters)
5. The master and the company were fined 4,600.00 Euros. The ship was not detained.

# 22 March 2013 - The whole chain in action



## CleanSeaNet Alert Report

**CROATIA**

Acquisition: 2013-03-22 05:16:37 UTC

Scene ID: 124923

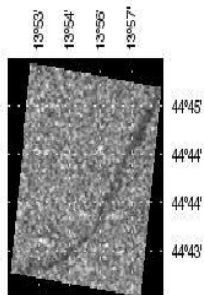
**RADARSAT-2 - SAR\_R - SCWB**

List of Spills

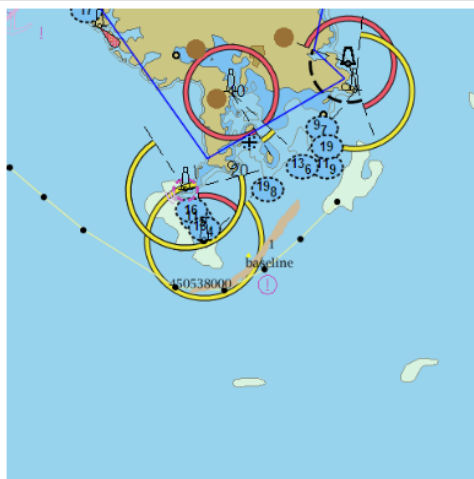
GIS Viewer

Details of possible Spill n°1 - OS\_124923\_1

Centre Position		SAR Wind at Center		Area (km <sup>2</sup> )	Length (km)	Width (km)	Class (A/B)	Alert Level	Number of slicks	Oilspill Warning Issued
Latitude	Longitude	Direction (From)	Speed (m/s)							
44° 43' 43" N	013° 56' 14" E	64.00	3.91	3.44	7.61	0.45	A	Yellow	1	NO



RSAT-2 - 2013-03-22 05:17:20



Meteorological and Ocean Data		
Sea State	Wave Height	0.2
Met.Wind	Direction (from)	64
	Speed (m/s)	4.2
Current	Direction (from)	N/A
	Speed (m/s)	N/A


Note: Grey fields are parameters set as "invisible" in the Print Parameters matrix or not available

Comments from Service Provider

### Possible source information


N.	Detected	Dist.(Km)	Identified	Type	IMO	Name	MMSI	C/S	Latitude	Longitude	Time (UTC)	Track
1	Unknown	60.5	Yes	N/A	N/A	unknown		unknown	45° 08' 27" N	013° 25' 30" E	03:23:32Z	N/A

# 22 March 2013 - The whole chain in action



Home | **GIS Viewer** | Planning | Alerting | Communication | Journaling | Financial | User Management | Help | Release Notes

CSNDC Sibilla JSP **CSNDC SIBILLA JSP**










Search EO Scene Oil Spill Detect

Satellite	Acquisition time
Radarsat-2-SAR-...	22-03-2013 05:17:20

Search in selected scenes

[<< go to EO scene detail panel](#)

MMSI	IMO	Name
		unknown
	247293400	unknown
	247278900	unknown
	563176000	unknown
	667005027	unknown
	305671000	unknown
	247138800	9304... GIUSEPPE R...

# Caught by CleanSeaNet



## CleanSeaNet Alert Report

UNITED KINGDOM

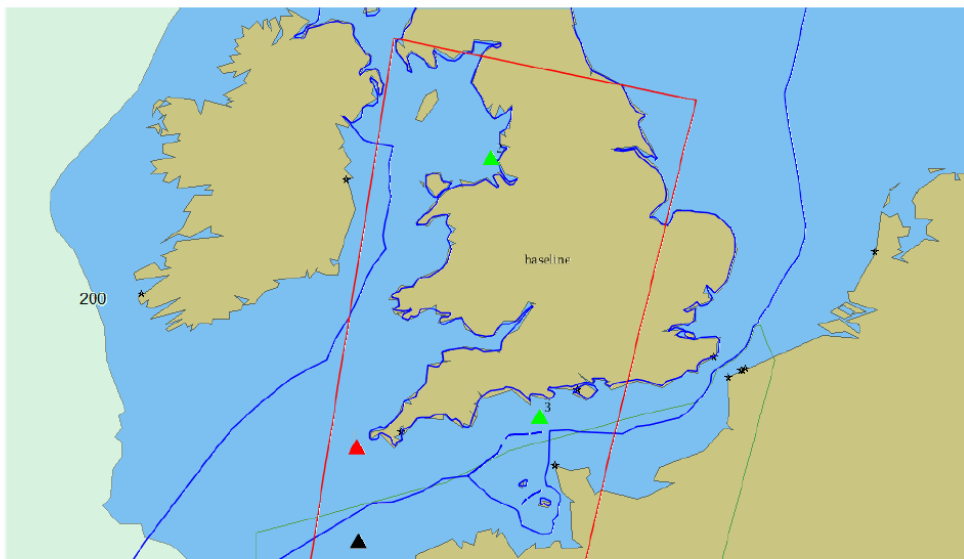
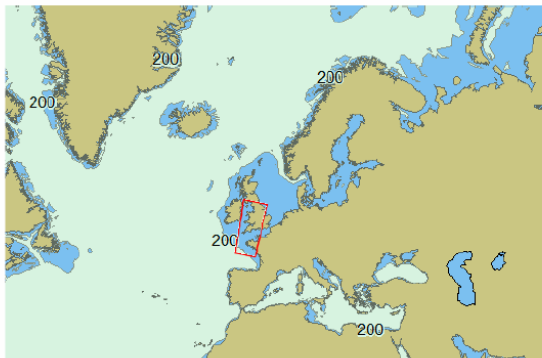
Acquisition:

2012-02-25 10:37:49 UTC

Scene ID: 19294

ENVISAT - ASAR/WS

[GIS Viewer](#)



**Comments**

### List of possible spills

Spill # on map	Spill Identifier	Centre Position		Area (km <sup>2</sup> )	Length (km)	Width (km)	Alert	Oil Spill Warning Issued	Possible Source	
		Latitude	Longitude						Detected	Identified
1	OS_19294_2	49° 59' 37" N	006° 00' 12" W	20.79	36.4554	8.8846	Red	N/A	Yes	No
2	OS_19294_3	53° 38' 47" N	003° 14' 03" W	7.34	4.1814	2.5221	Green	N/A	Yes	No
3	OS_19294_4	50° 22' 58" N	002° 14' 32" W	1.72	5.396	0.7452	Green	N/A	Yes	No

Note: Possible spills outside alert area are presented on map as

▲ - Additional spills may also have been reported outside the map - Please consult GIS Viewer

# Caught by CleanSeaNet



CleanSeaNet Alert Report

UNITED KINGDOM

Acquisition:

2012-02-25 10:37:49 UTC

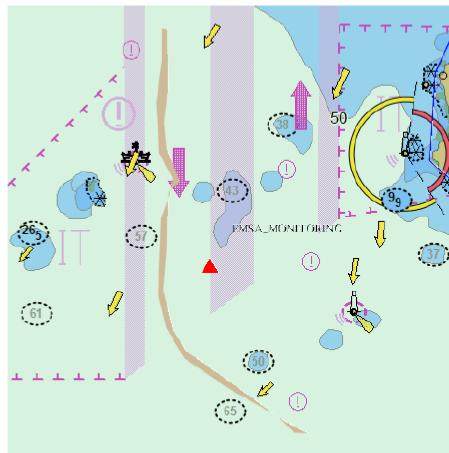
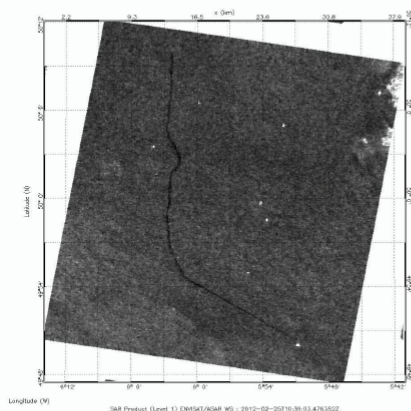
Scene ID: 19294

ENVISAT - ASAR/WS

[List of Spills](#) [GIS Viewer](#)

Details of possible Spill n°1 - OS\_19294\_2

Centre Position		SAR Wind at Center		Area (km <sup>2</sup> )	Length (km)	Width (km)	Class (A/B)	Alert Level	Number of slicks	Oilspill Warning Issued
Latitude	Longitude	Direction (From)	Speed (m/s)							
49° 59' 37" N	006° 00' 12" W	0	0	20.79	36.4554	8.8846	A	Red	1	Unkown



Meteorological and Ocean Data			
Sea State	N/A	Wave Height	0
Met.Wind	Direction (from)		0
	Speed (m/s)		0
Current	Direction (from)		N/A
	Speed (m/s)		N/A

Note: Grey fields are parameters set as "invisible" in the Print Parameters matrix or not available

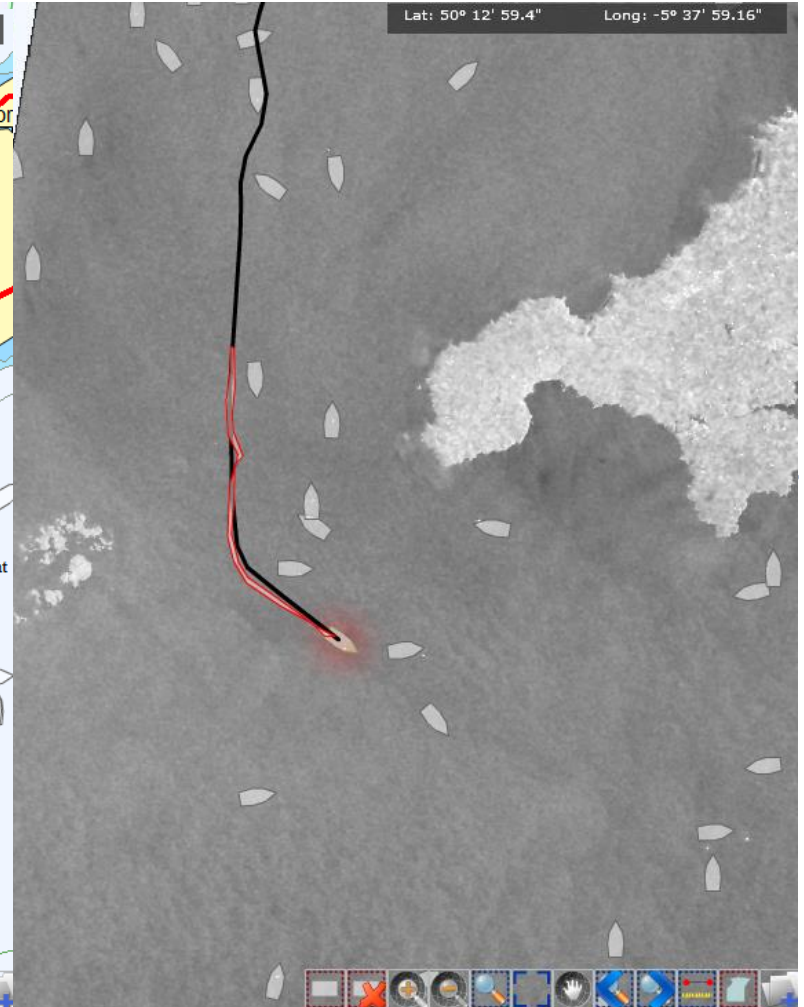
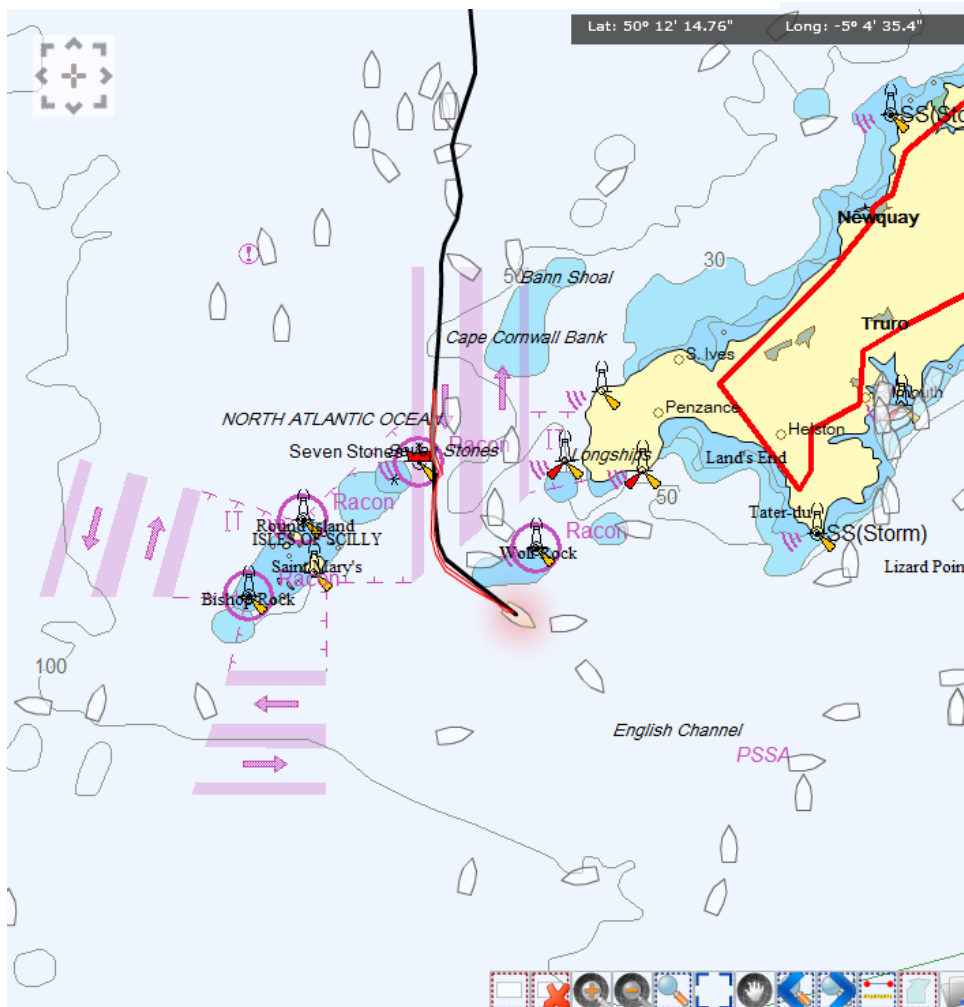
Comments from Service Provider

### Possible source information

N.	Detected	Dist.(Km)	Identified	Type	IMO	Name	MMSI	C/S	Latitude	Longitude	Time (UTC)	Track
----	----------	-----------	------------	------	-----	------	------	-----	----------	-----------	------------	-------



# Caught by CleanSeaNet



# Caught by CleanSeaNet

1. CleanSeaNet detection on 25 February 2012 in UK territorial waters
2. Master indicates a tank cleaning operation of palm oil that stopped at 13.5 nautical miles from the coast
3. CleanSeaNet clearly shows the ship discharging within the 12 nautical miles limit
4. Company pleads guilty
5. Fined £15,000 + £7,500 costs





## CleanSeaNet Alert Report

**DENMARK**

Acquisition: **2014-09-13 17:29:26 UTC**

Scene ID: **136250**

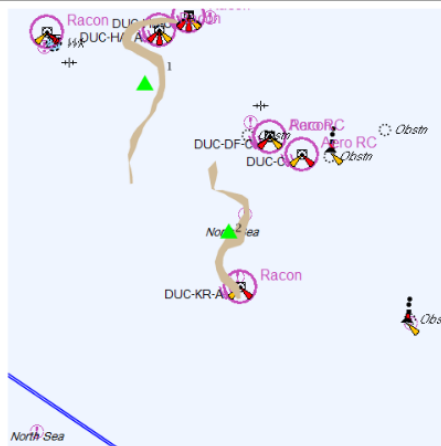
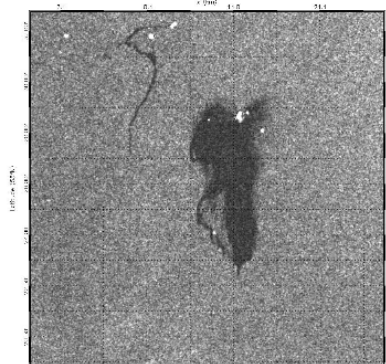
**RADARSAT-2 - SAR - SCWA**

List of Spills

GIS Viewer

Details of possible Spill n°2 - OS\_136250\_2

Centre Position		SAR Wind at Center		Area (km <sup>2</sup> )	Length (km)	Width (km)	Class (A/B)	Alert Level	Number of slicks	Oilspill Warning Issued
Latitude	Longitude	Direction (From)	Speed (m/s)							
55° 25' 51" N	005° 04' 09" E	218.00	3.80	4.16	8.05	2.15	A	Green	1	YES



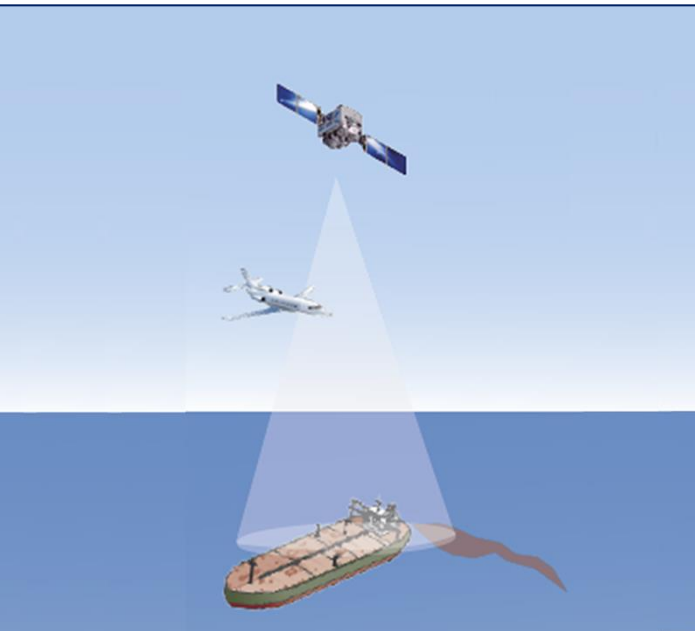
Meteorological and Ocean Data			
Sea State	N/A	Wave Height	0
Met. Wind	Direction (from)		217
	Speed (m/s)		6.5
Current	Direction (from)		N/A
	Speed (m/s)		N/A

Note: Grey fields are parameters set as "invisible" in the Print Parameters matrix or not available

Comments from Service Provider

### Possible source information

N.	Detected	Dist.(Km)	Identified	Type	IMO	Name	MMSI	C/S	Latitude	Longitude	Time (UTC)	Track
1	Yes	110	No	VESSEL	N/A	N/A	N/A	N/A	55° 24' 04" N	005° 04' 46" E	17:30:43Z	No

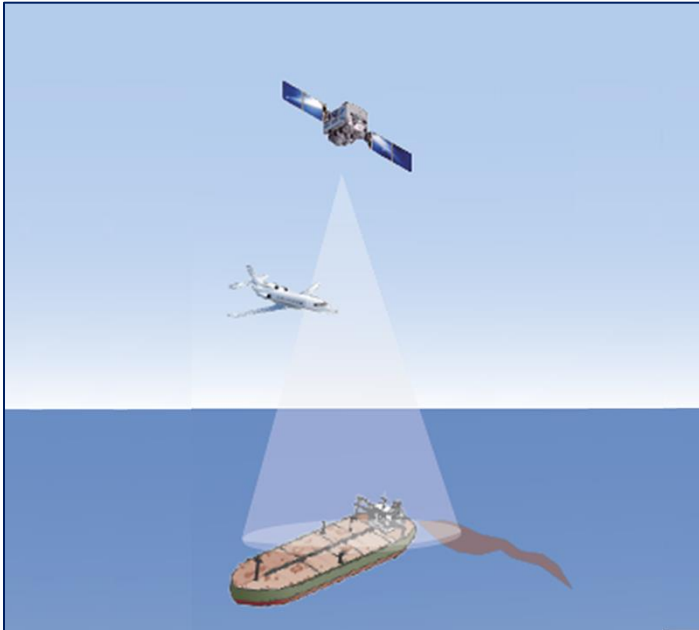


## Addressing Illegal Discharges in the Marine Environment

Introductory overview and guidance document

8<sup>th</sup> CTG Meeting  
23 October 2013  
EMSA, Lisbon

# Addressing Illegal Discharges in the Marine Environment



Introductory overview and guidance document



# Development of the document



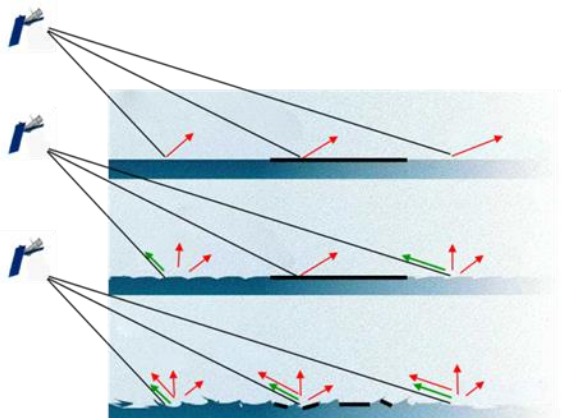
Workshop 2011

Working Group Meetings

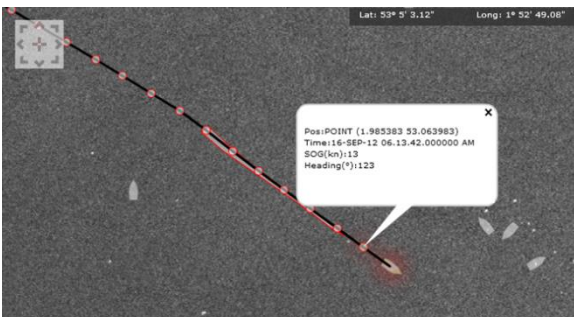
Workshop 2013



# Objective



Promote the use of existing tools



Provide complete overview for authorities involved in the enforcement chain



Provide useful information for supporting effective prosecution of offenders

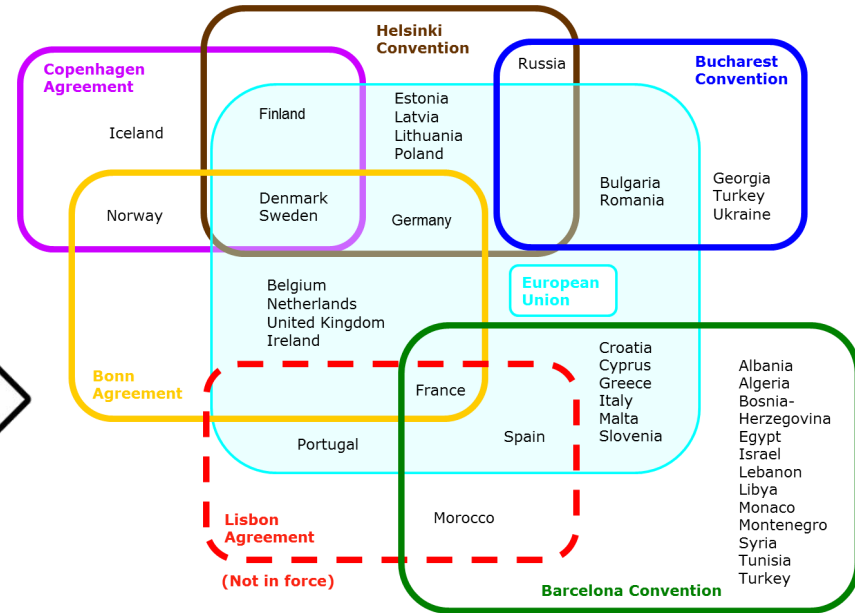
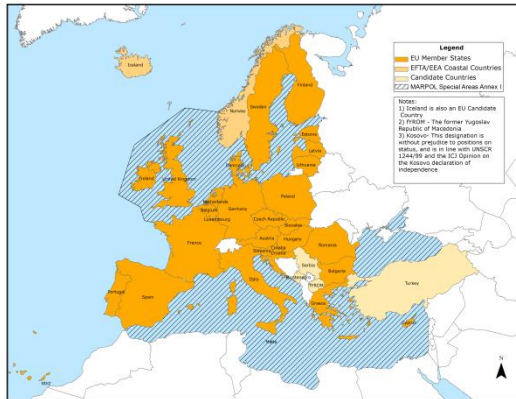
Support harmonised enforcement







# Part 1: General information

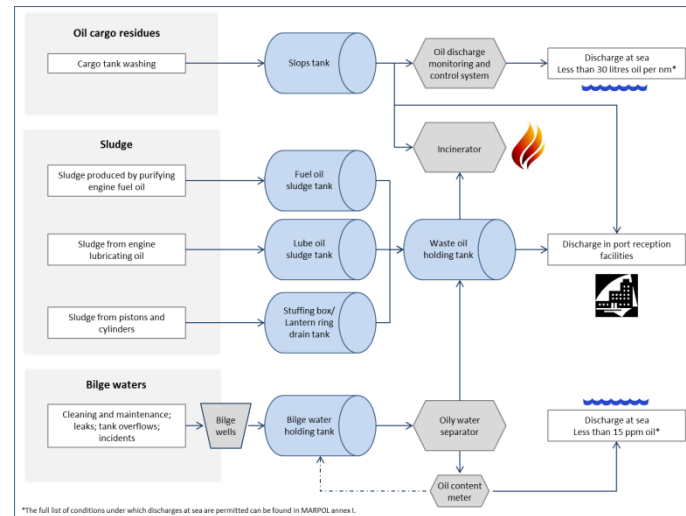
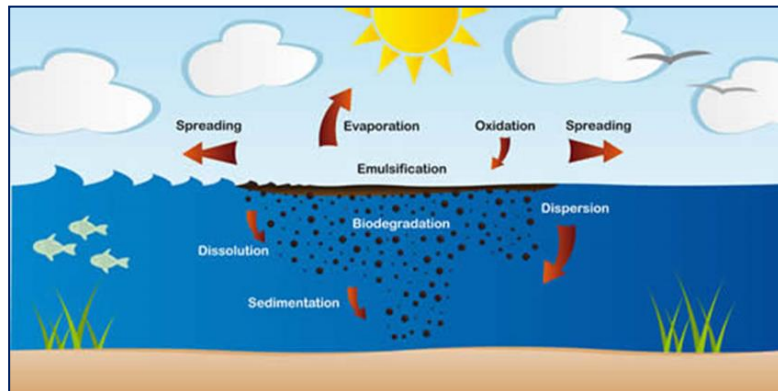


Chapter 1: Legal framework

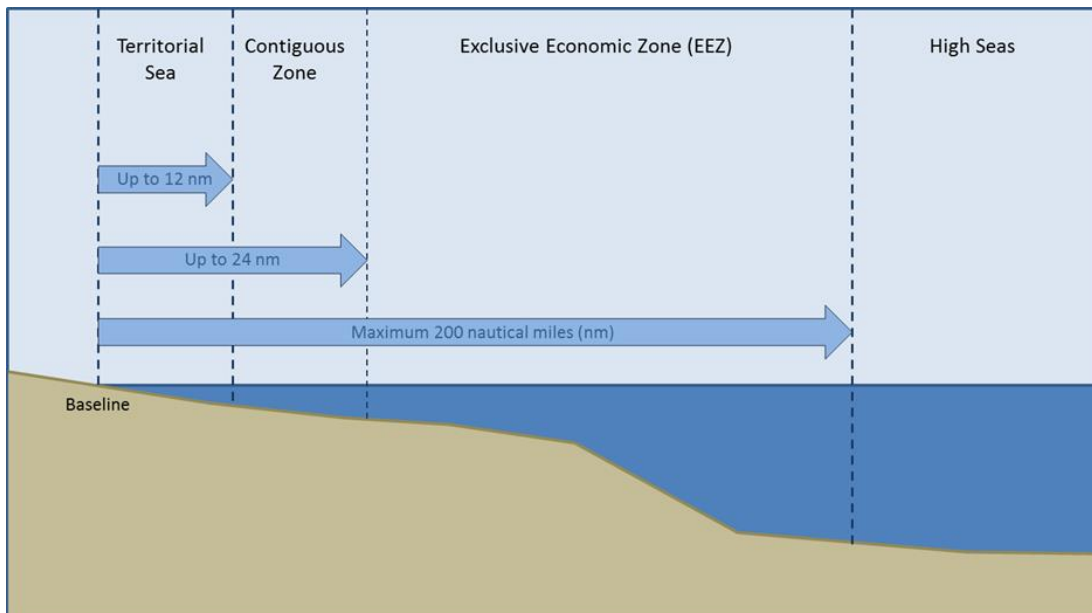
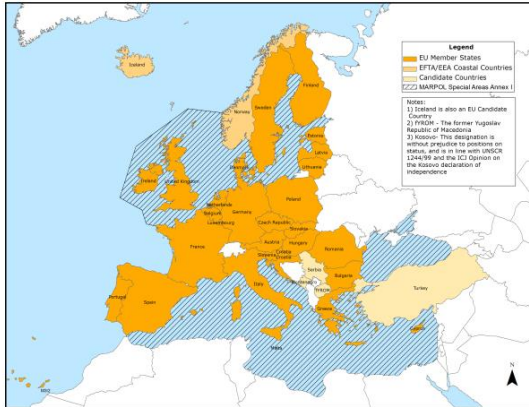
Chapter 2: International cooperation

Chapter 3: Pollution in the marine environment

Chapter 4: Production of oily waste by vessels



# Chapter 1: Legal framework



- UNCLOS
- MARPOL
- EU legislation



# Chapter 2: cooperation

# International

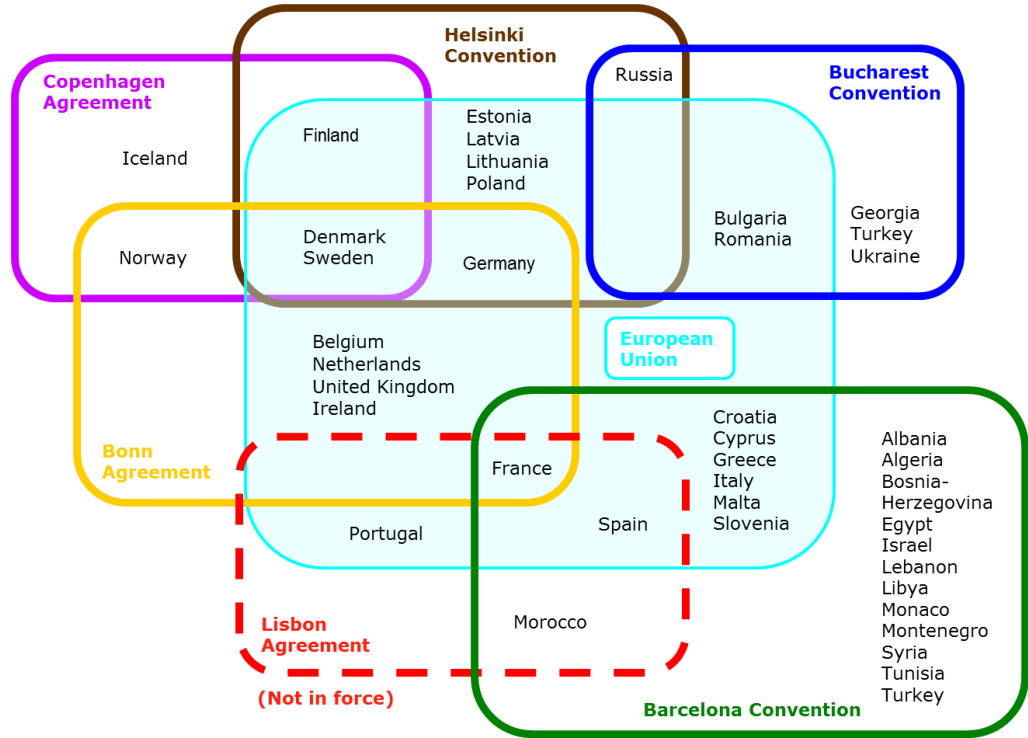


MENELAS

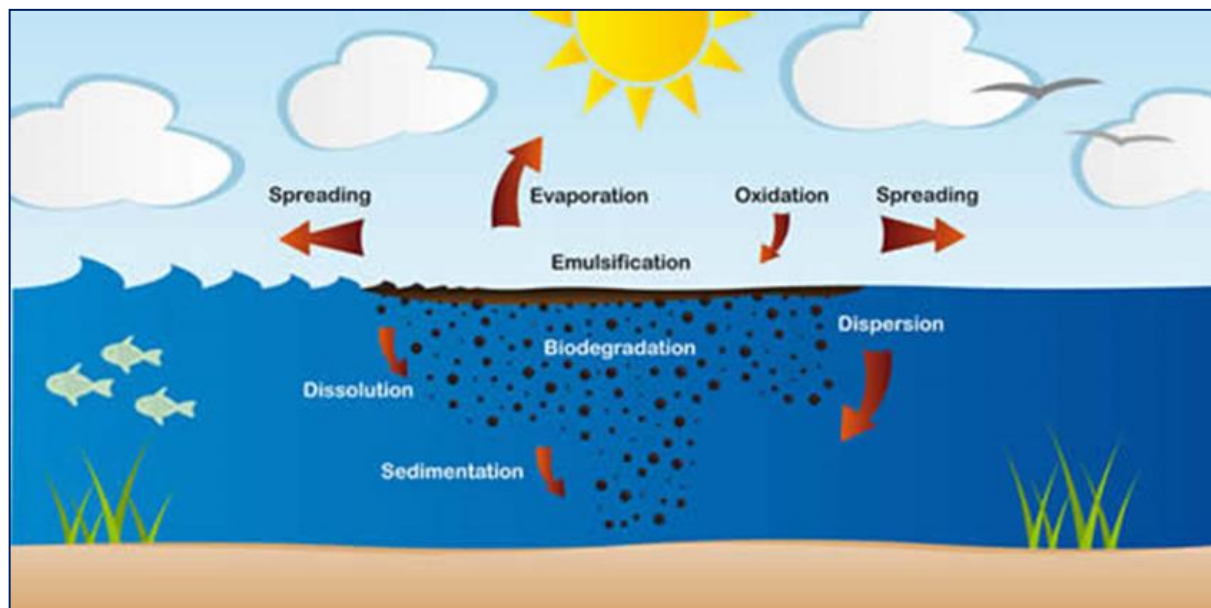


ENPRO

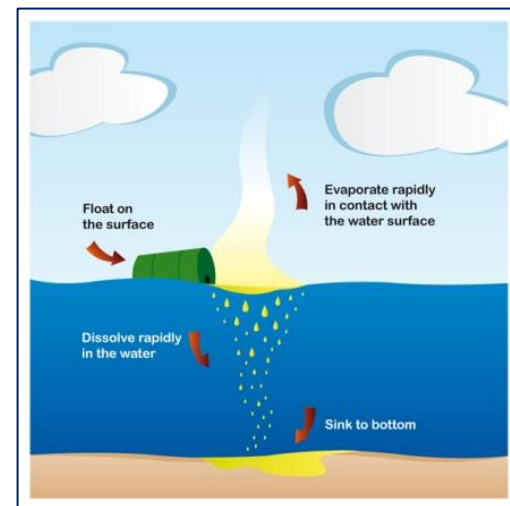
North Sea Network of  
Investigators and Prosecutors



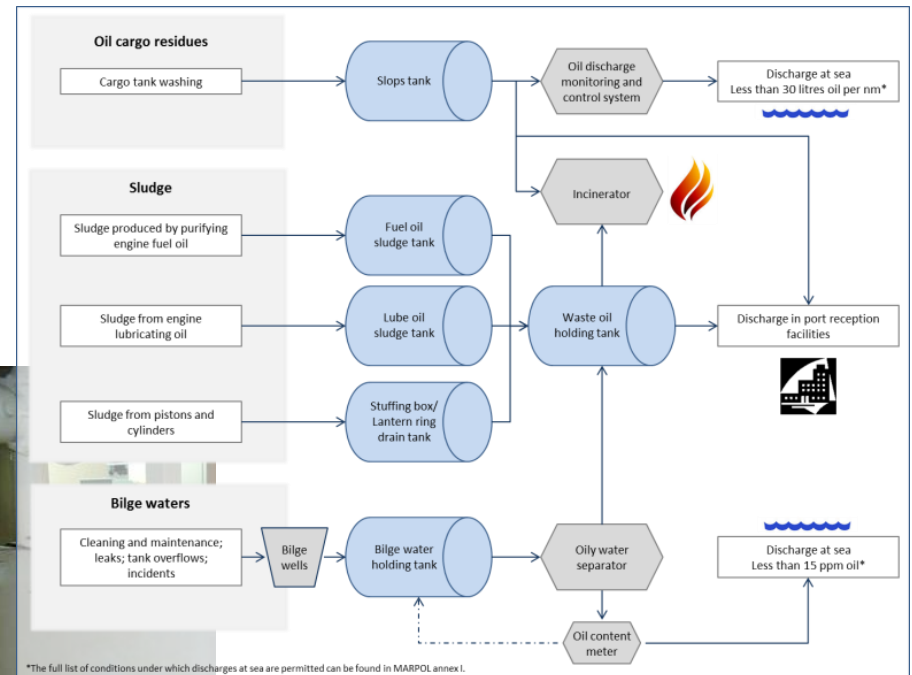
# Chapter 3: Pollution in the marine environment



- Annex I: Oil
- Annex II: Noxious Liquid Substances
- Annex III: Harmful Substances in Packaged Form
- Annex IV: Sewage
- Annex V: Garbage

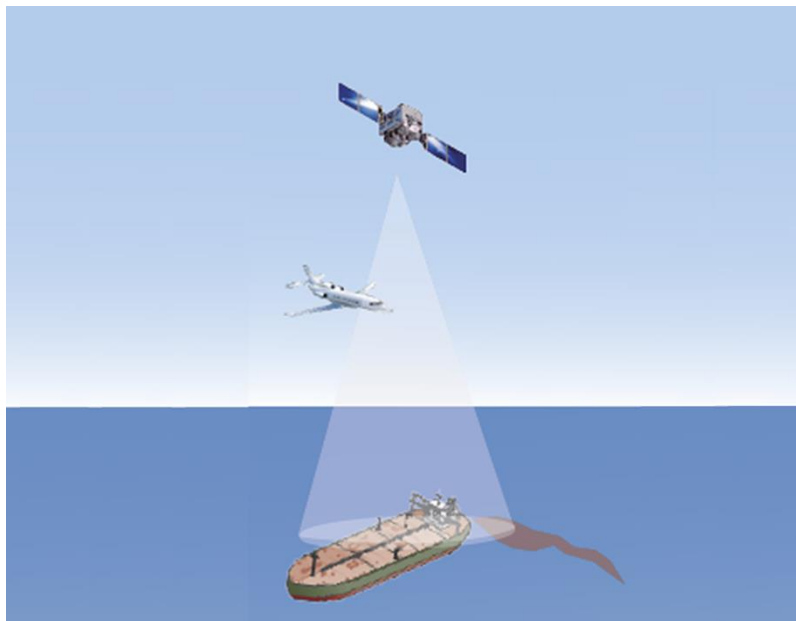


# Chapter 4: Production of oily waste by vessels



- How oily waste is produced
- Illegal disposal of waste
- Reasons for discharging illegally

# Part 2: The enforcement chain



Chapter 5: The illegal discharge enforcement chain

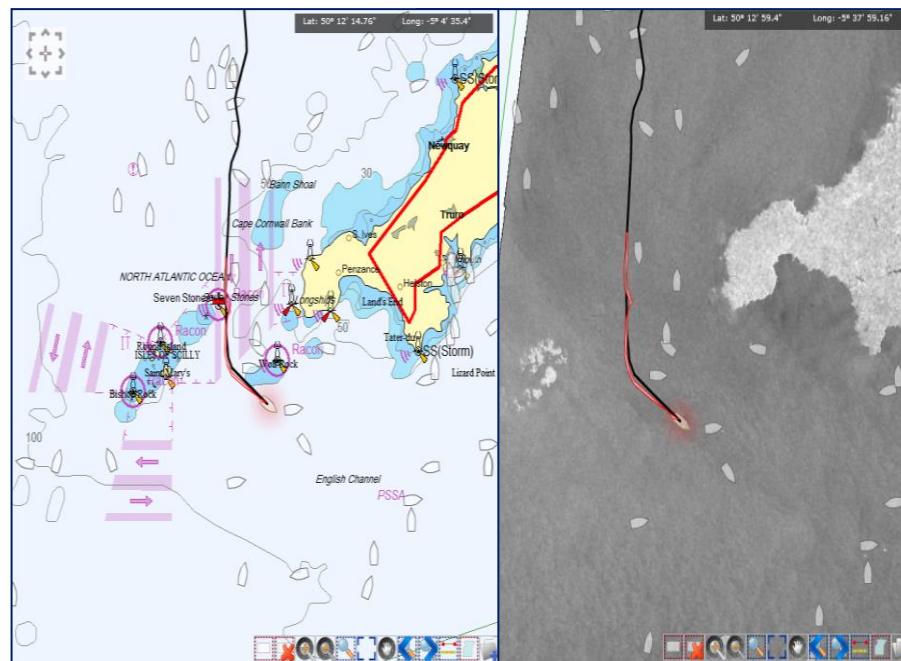
Chapter 6: Initial indication of a possible violation  
& decision to follow-up

Chapter 7: Collecting additional evidence

Chapter 8: Concluding the case

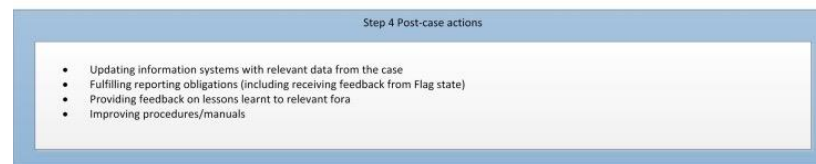
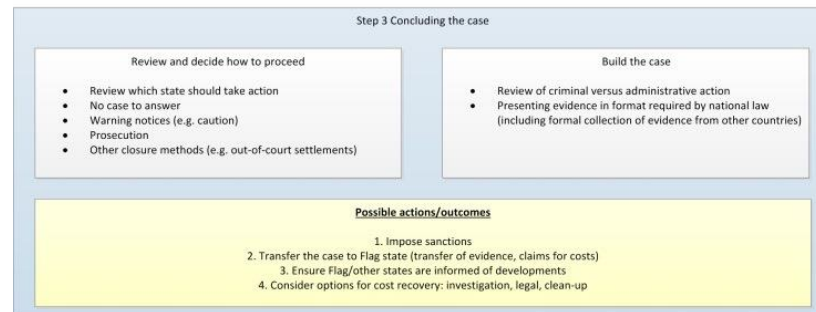
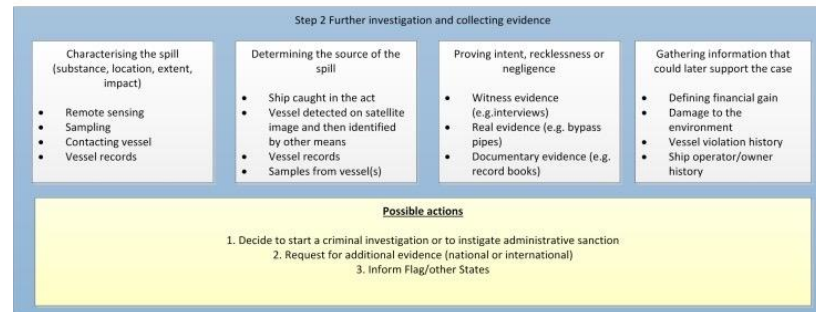
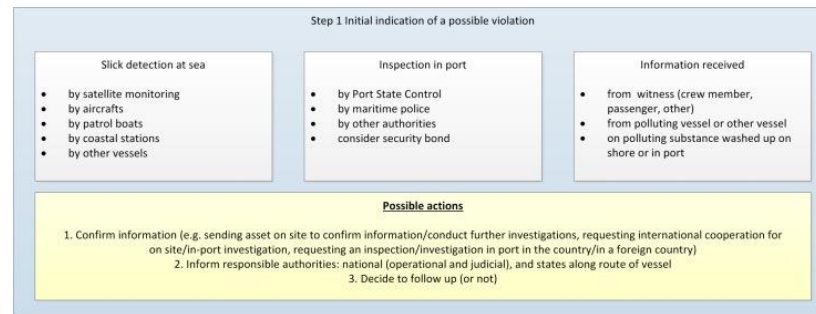
Chapter 9: Post-case actions

Chapter 10: Cooperation tools



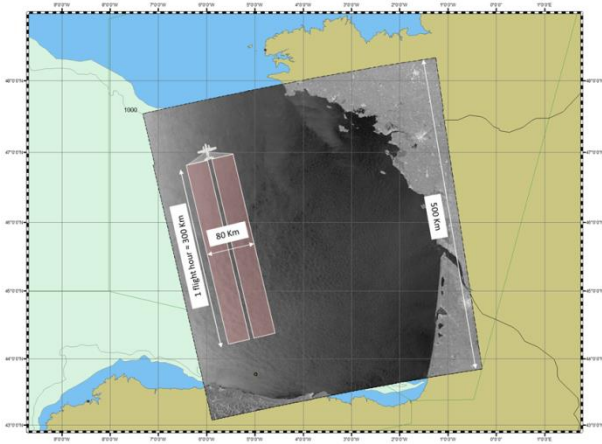


# Chapter 5: The illegal discharge enforcement chain





# Chapter 6: Initial indication of a possible violation & decision to follow-up

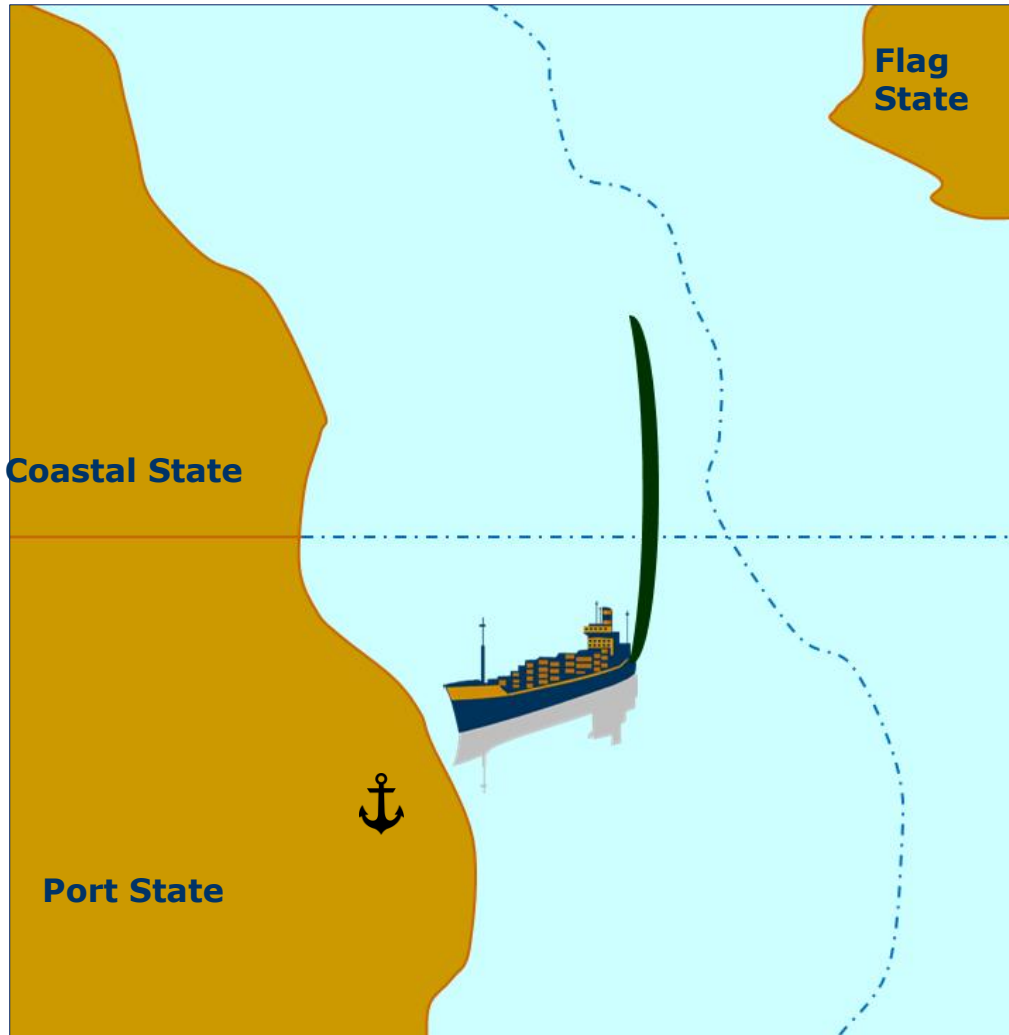


- Detection at sea
- Inspection in port
- Information received



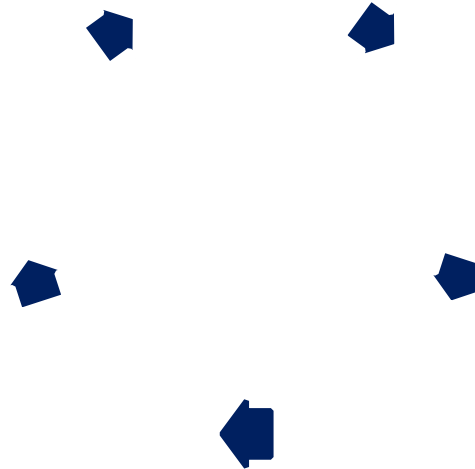


# Chapter 8: Concluding the case



- Actions to be taken:
  - Where should the case be brought?
  - Will there be a request for transfer?
  - Who should be prosecuted?
  - Criminal or administrative proceedings?
  - Any costs to be claimed?
- Feedback
- Documentation

# Chapter 9: Post-case actions

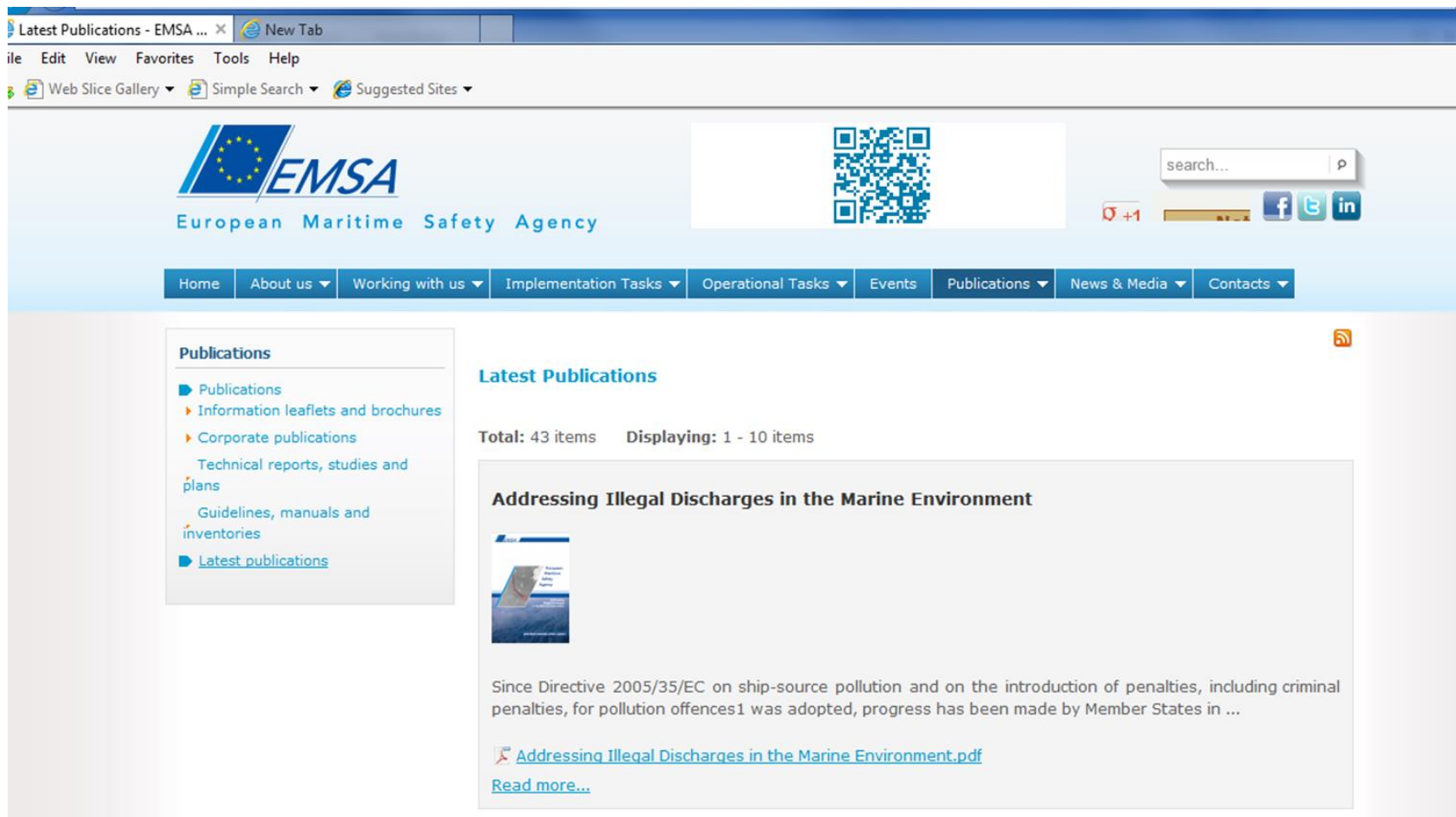


- Fulfilling mandatory reporting obligations and voluntary reporting procedures
- Providing feedback across the enforcement chain
- Disseminating information on particular lessons learnt or issues of interest
- Reviewing and improving existing procedures and updating guidance information
- Publicising information on the outcome of a case





# Available online




The screenshot shows a web browser window displaying the EMSA website. The browser's address bar shows 'Latest Publications - EMSA ...' and 'New Tab'. The website header features the EMSA logo (European Maritime Safety Agency) and a QR code. A search bar is visible with the text 'search...'. Below the header is a navigation menu with items: Home, About us, Working with us, Implementation Tasks, Operational Tasks, Events, Publications, News & Media, and Contacts. The main content area is titled 'Latest Publications' and shows 'Total: 43 items' and 'Displaying: 1 - 10 items'. A sidebar on the left lists various publication categories under 'Publications'. The main content area displays a publication titled 'Addressing Illegal Discharges in the Marine Environment' with a small image of the document cover. Below the title, there is a paragraph of text and a link to 'Addressing Illegal Discharges in the Marine Environment.pdf' with a 'Read more...' link.

Latest Publications - EMSA ... × New Tab

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European Maritime Safety Agency

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**Publications**

- Publications
- Information leaflets and brochures
- Corporate publications
- Technical reports, studies and plans
- Guidelines, manuals and inventories
- Latest publications

**Latest Publications**

Total: 43 items Displaying: 1 - 10 items

**Addressing Illegal Discharges in the Marine Environment**



Since Directive 2005/35/EC on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences<sup>1</sup> was adopted, progress has been made by Member States in ...

[Addressing Illegal Discharges in the Marine Environment.pdf](#)

[Read more...](#)

Thank-you

