

ITALIAN COAST GUARD HEADQUARTERS



COSTA CONCORDIA EMERGENCY:

**SATELLITE IMAGES AND OPERATIONAL OCEANOGRAPHY IN SUPPORT OF
ITALIAN COAST GUARD ANTI-POLLUTION AND OPERATIONAL ACTIVITIES**

**LUGIA CAIAZZO AND DARIO CAU – ITALIAN COAST GUARD SATELLITE MONITORING SECTION
MARKO PERKOVIC – UNIVERSITY OF LJUBLJANA, SLOVENIA**

**GLOBCURRENT User Consultation Meeting
IFREMER, Brest, France, 7-9 March 2012**



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THE ITCG'S ACTIVITIES ARE PERFORMED FOR:



PARTNERSHIP FRAMEWORK

ITCG and INGV official agreement

***ITCG technical group for operational oceanography
involving***

GNOO (National Group for Operational Oceanography)

***Official collaboration with e-GEOS, CSK service provider (CSN
service by EMSA, SeaU project) and Marko Perkovic (University
of Ljubljana)***

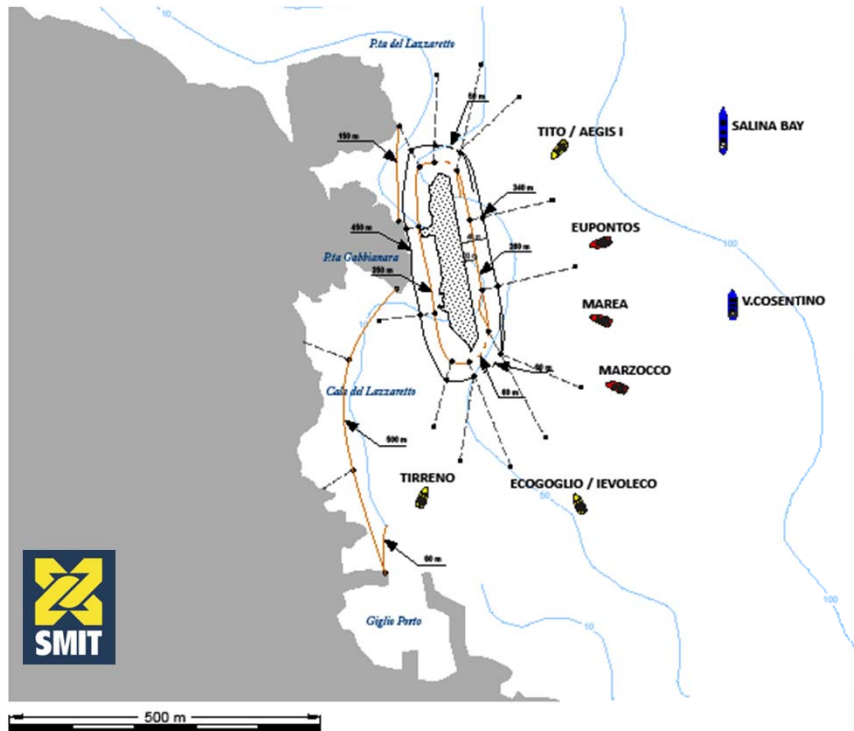


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CONCORDIA DISASTER

ANTI-POLLUTION OPERATIONAL PLAN



OIL RECOVERY SYSTEMS

BOOMS

SKIMMER

SWEEPING ARMS

Dedicated RADAR SLICK detection system



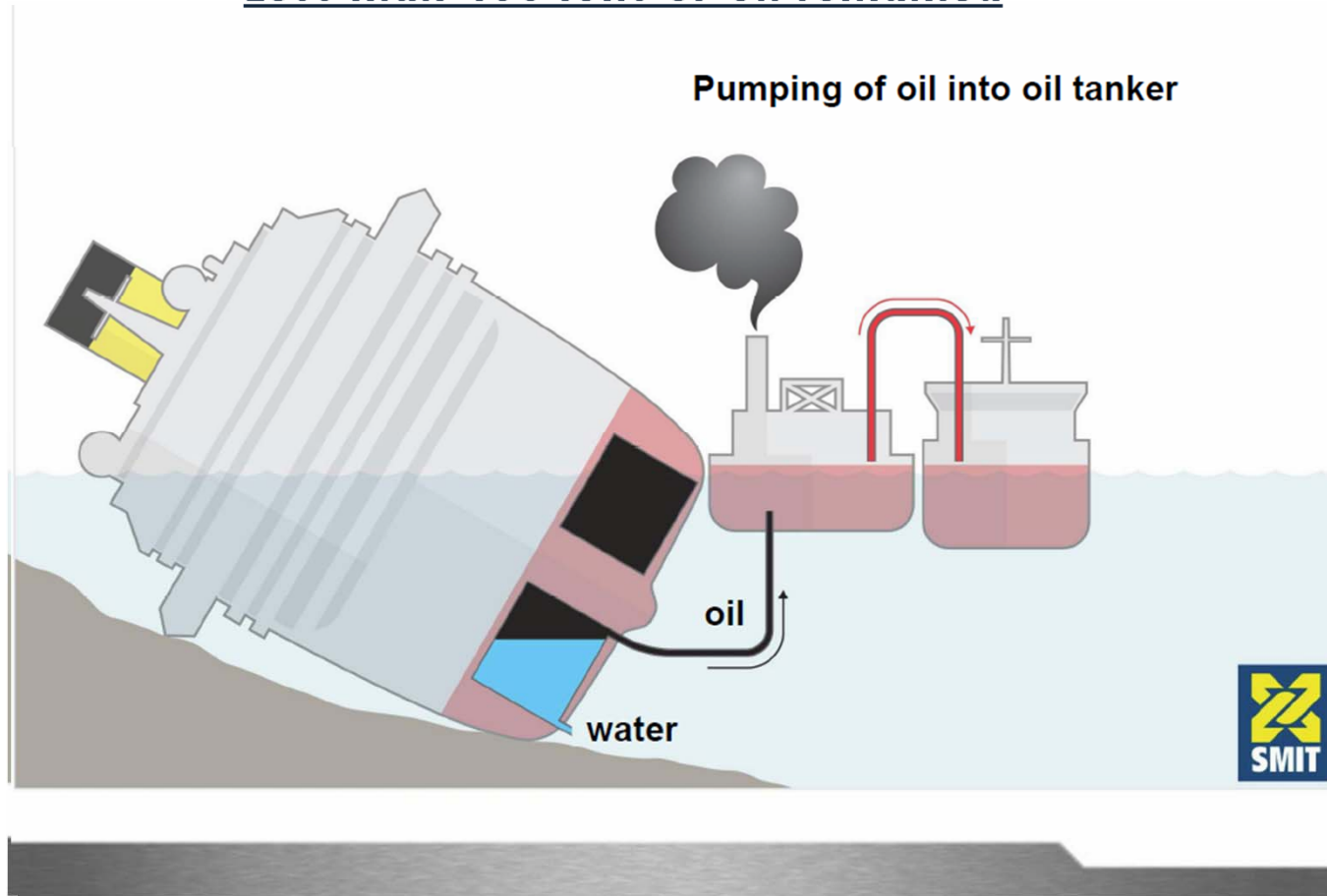
ON BOARD THERE WERE ABOUT:

- 2200 MC IFO (Intermediate Fuel Oil)
- 175 MC DOUBLE OIL
- 145 MC OIL
- 18 MC BILGE WATER

CONCORDIA DISASTER

Oil removal operations from Costa Concordia Started on the 30th of January

Less than 400 tons of oil remained



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CONCORDIA DISASTER

CleanSeaNet Service

CleanSeaNet additional planning for Costa Concordia

An additional acquisition request has been made, from the beginning of unloading operation until the 15th of March 2012

CleanSeaNet Notification ITALY Acquisition: 2012-02-02 09:43:53 UTC
Scene ID: 19153 ENVISAT - ASAR/WS [GIS Viewer](#)

Clean sea
No possible spills have been detected in the alert area

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

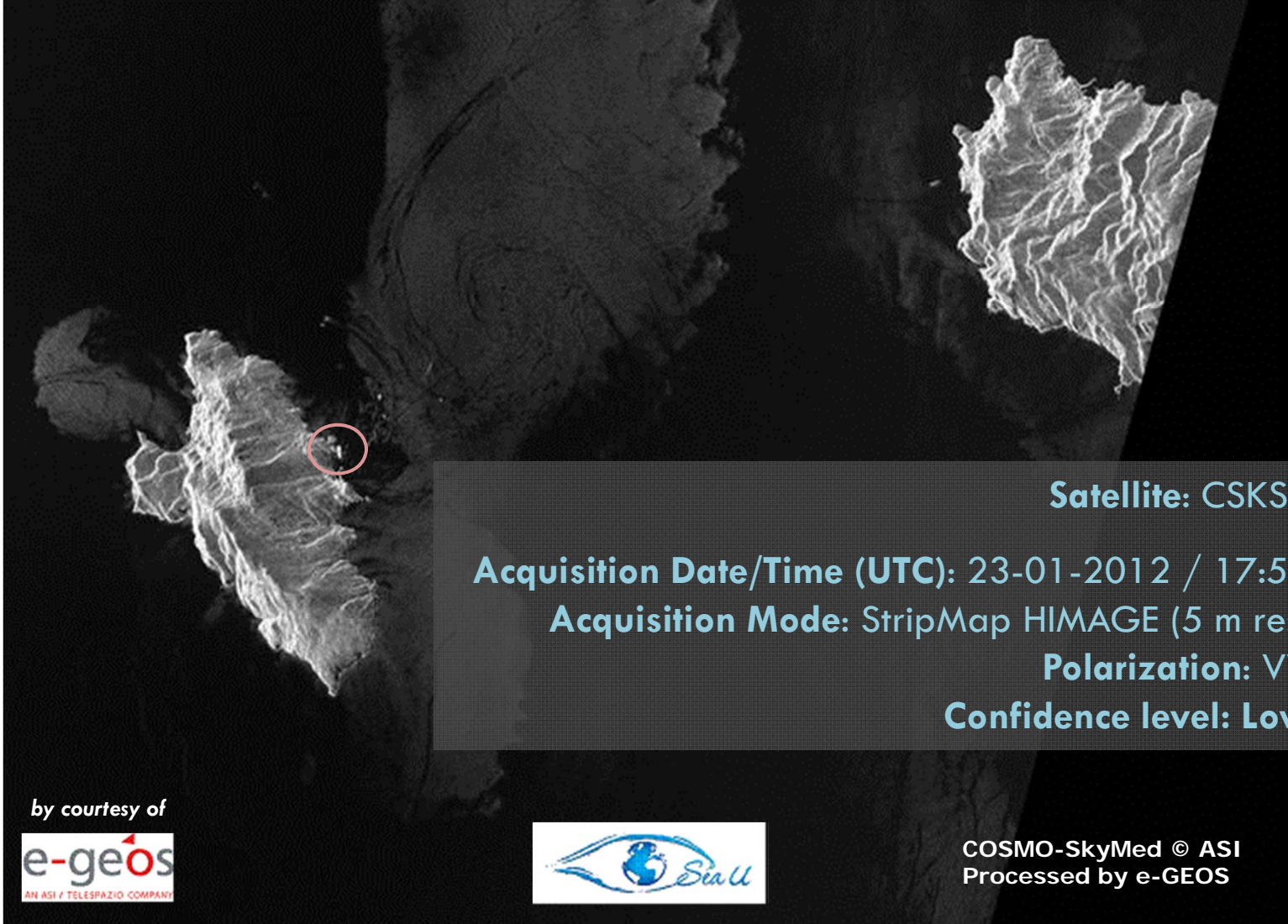
EMSA Maritime Support Services 24/7 - Tel: +351 21 1209 415 - Fax: +351 21 1209 480
Mail: MaritimeSupportServices@emsa.europa.eu

Satellite	Acquisition date and time
Radarsat-1	01-03-2012 at 05:25 UTC
Radarsat-2	02-03-2012 at 17:05 UTC
Radarsat-1	07-03-2012 at 17:09 UTC
Envisat	09-03-2012 at 09:24 UTC
Envisat	11-03-2012 at 21:05 UTC
Radarsat-2	13-03-2012 at 05:25 UTC

As EMSA is concerned the only (and official) point of contact regarding oil spill emergencies in Italy is the Italian Coast Guard. From the CleanSeaNet perspective the Italian Coast Guard is the point of contact for all operational issues (emergencies and otherwise).


CONCORDIA DISASTER

SeaU PROJECT: too dark an image for detecting oil spill



Satellite: CSKS4
Acquisition Date/Time (UTC): 23-01-2012 / 17:54
Acquisition Mode: StripMap HIMAGE (5 m res)
Polarization: VV
Confidence level: Low

by courtesy of
e-geos
AN ASI / TELESPAZIO COMPANY



COSMO-SkyMed © ASI
Processed by e-GEOS



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CONCORDIA DISASTER

Oil Spill Drifting Forecast

FORECAST OF THE POSSIBLE OIL POLLUTION SCENARIO IN CASE OF OIL SPILL FROM THE SHIP

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**Comando Generale del
Corpo delle
Capitanerie di Porto**



*In collaboration with Italian National Group of Operational Oceanography
Istituto Nazionale di Geofisica e Vulcanologia (INGV) – MyOcean Med MFC*



**Costa Concordia accident: forecast of the possible oil pollution scenario
in case of oil spill from the ship.**

*Analysis and forecasting system used by the Italian Coast Guard Operational Centre - I.M.R.C.C.
Rome.*

vvr110

Currents

vvr110

Currents

Sended to: CPD Civil Protection Department – Technical Committee , Peripheral Offices (ITCG Livorno, ITCG Porto S.Stefano, ITCG Giglio Island), REMPEC and other Authorities involved

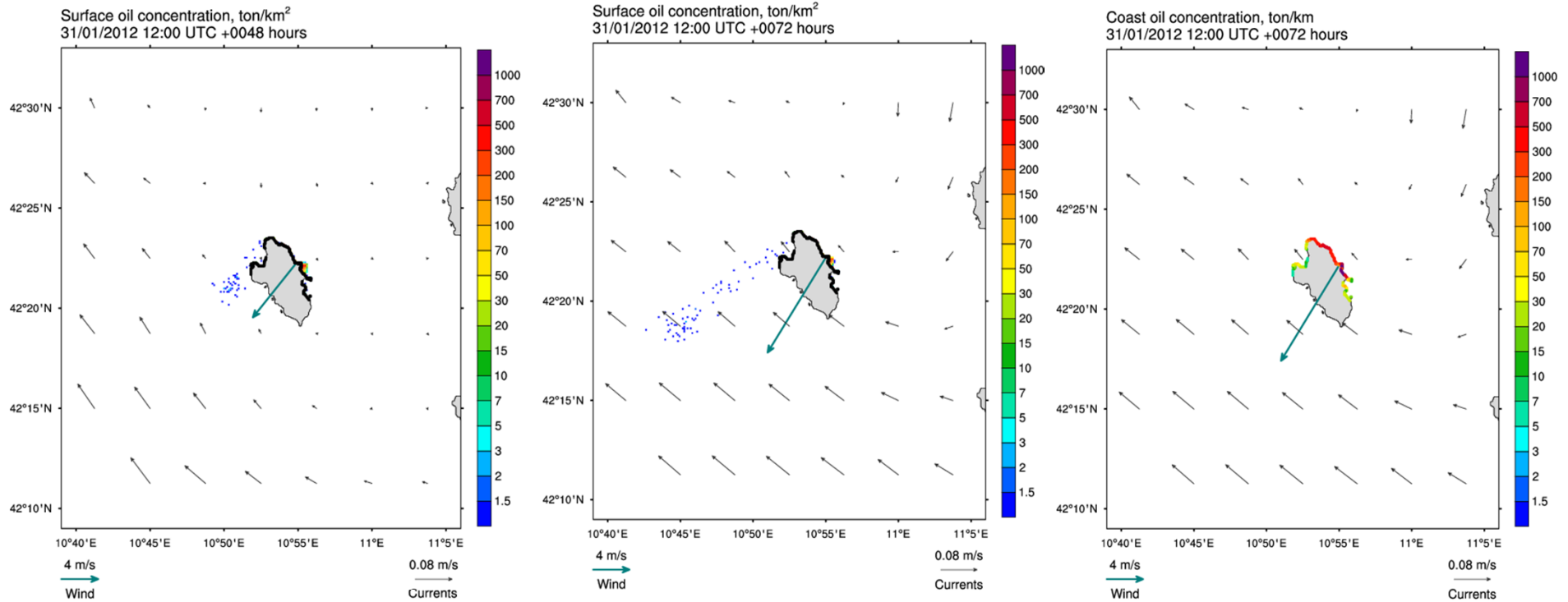


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CONCORDIA DISASTER

Oil Spill Drifting Forecast



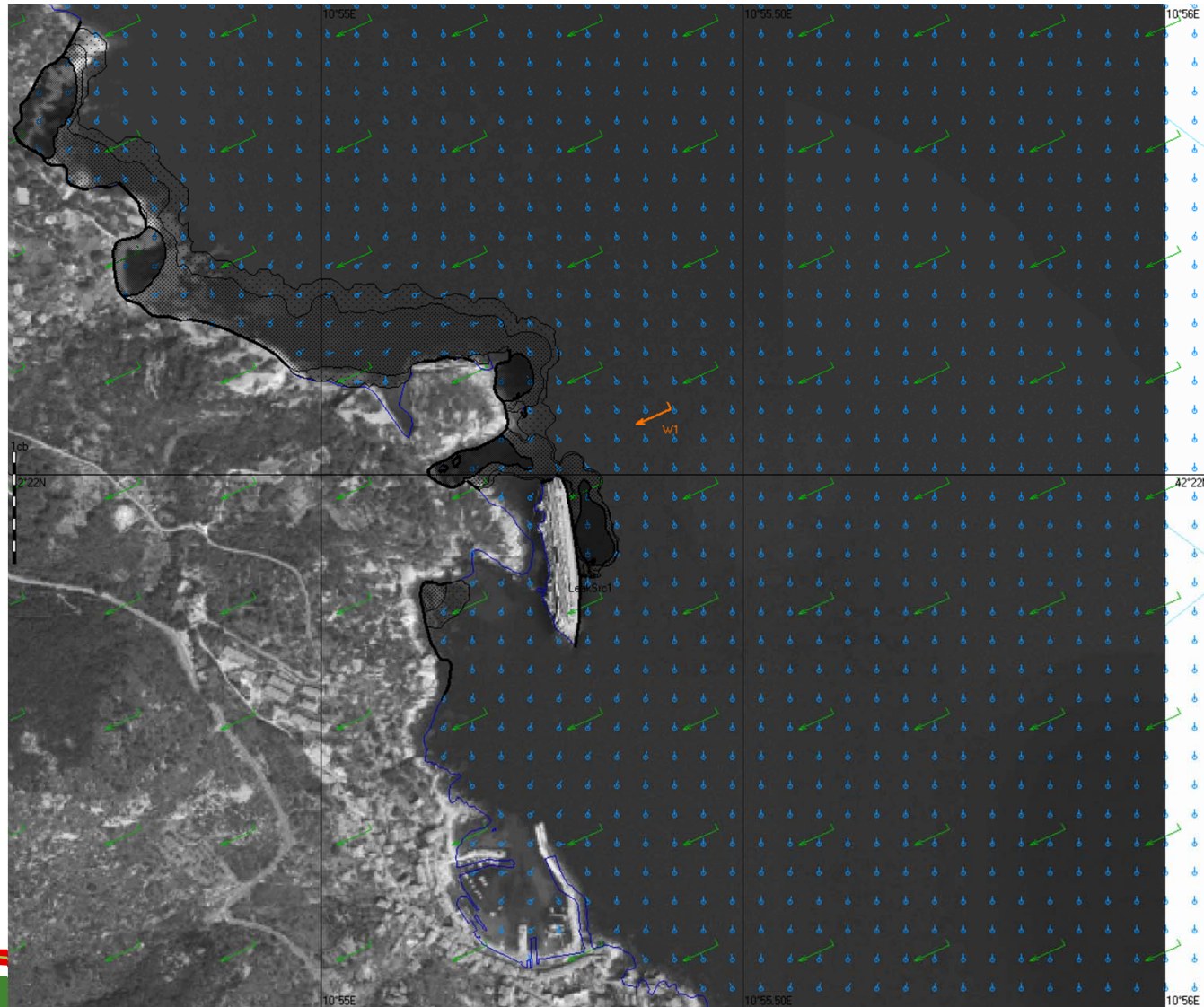
48 and 72 hours after the possible start of the oil spill

oil concentration on the coast is visualized with colours from blue to purple in Ton/km. Currents (black arrows) and wind forecasts (green arrow) are shown in the background

CONCORDIA DISASTER

Oil Pollution Scenario by using PISCES 2 simulator

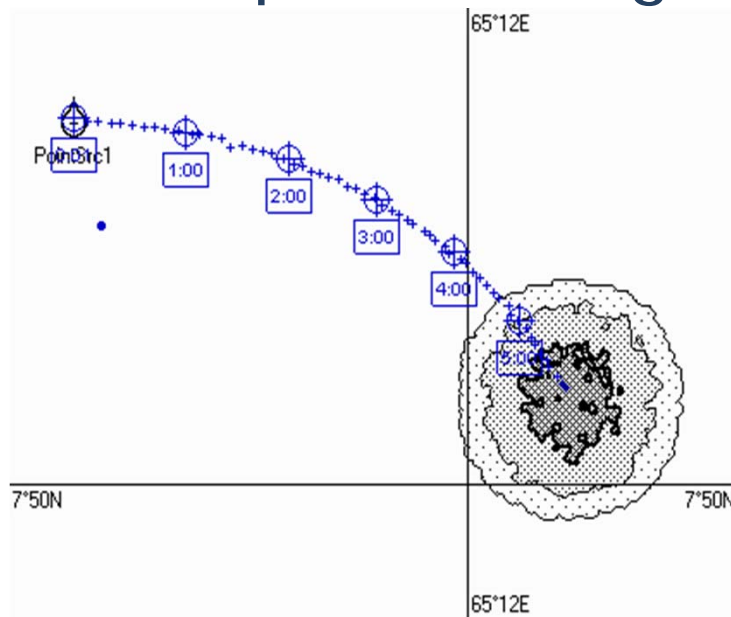
24 hour simulation: Snapshot every 1 hour from the 1200 UTC on the 13 of January



PISCES2:

developed specifically to support the Preparedness for Response Exercise Program (PREP) administered by the U.S. Coast Guard;
2D model (LaGrange approach same as INGV) used mostly for education and training; great capability of modeling resources like different booms, skimmers, dispersants, vessels. Possibility of integration of real AIS data, RADAR data, METOCEAN data and to overlay different images. It is possible to attach equipment to the real targets acquired by AIS or RADAR...

Oil spill modeling



- **Multiple spill sources**
- **Oil Transport by wind and currents**
- **Spreading**
- **Evaporation**
- **Emulsification**
- **Natural dispersion**
- **Dispersant application**
- **Burning**
- **Interaction with response resources**



Spill Simulation Comparison

INGV model gives wind and currents for every 6hr, while within PISCES data between 6hr are interpolated with 12 additional information's: so for every 30minutes. It change little bit currents and winds...

correlation for first 18hr of simulation have been made (show in the video)



GlobCurrent capabilities and Italian Coast Guard operational activities:

1. **Search And Rescue** (at the moment no S&R model for operational purposes);
2. Satellite data **correlation and integration** with, models and existing **ship reporting system** (AIS, VMS, LRIT, VTMIS) in order to have a more complete *Maritime Picture*;



WHAT WE NEED IS TO HAVE EVERYTHING ON THE SAME SCREEN !

because efficiency is to make good things, but EFFECTIVENESS IS TO MAKE THE RIGHT THING !



Complexity of oil detection and polluter identification in the northern Adriatic

Marko Perkovic, Milan Batista, Primoz Bajec, Luigia Caiazzo, Dario Cau, Maria Angelucci and Gordon Campbell

University of Ljubljana, Faculty of Maritime Studies and Transport

Slovenian Maritime Administration

Italian Coast Guard Headquarters

e-GEOS S.p.A.

European Space Agency



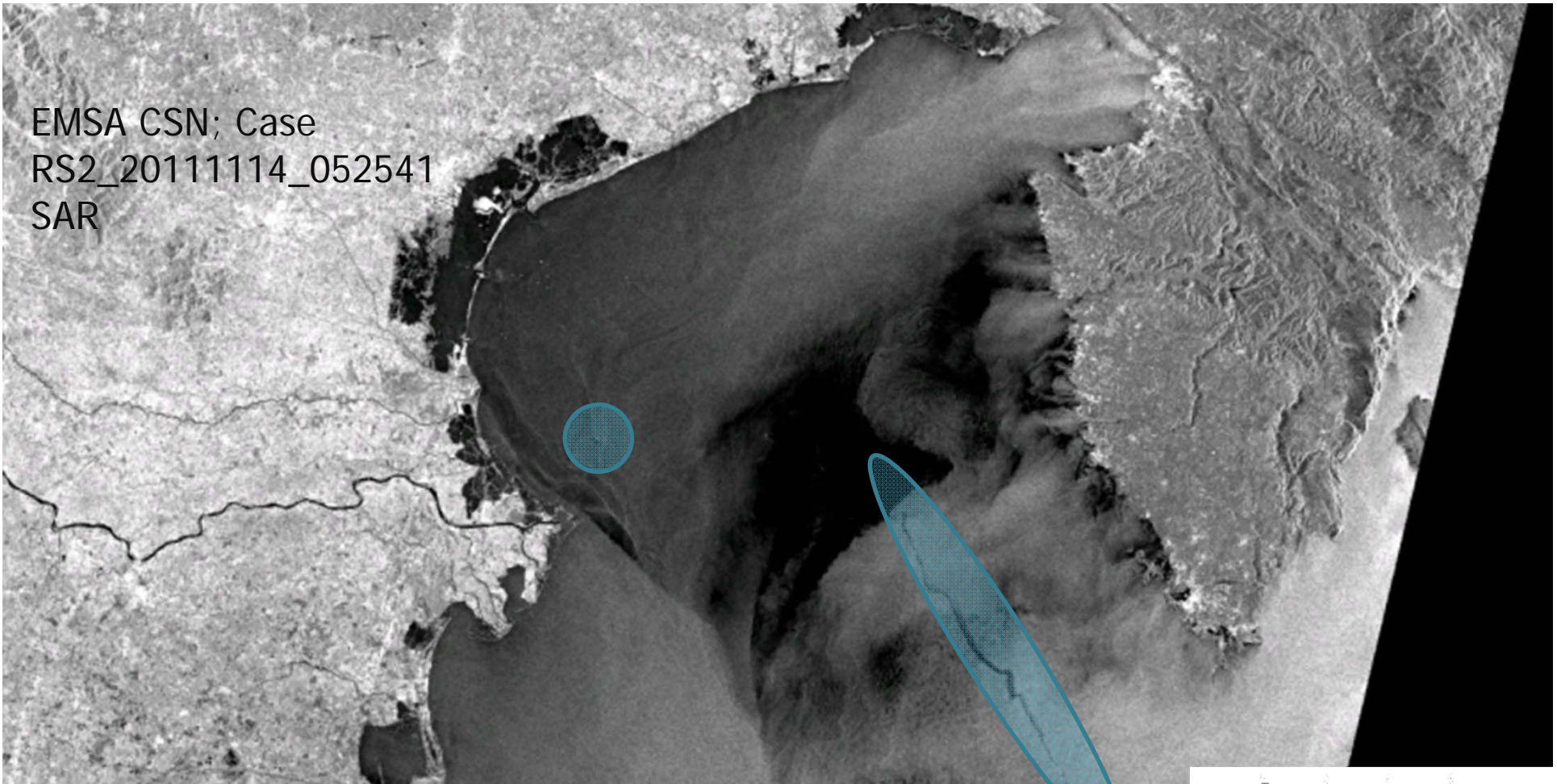
Oil spill case dated 14.11.2011 (presented at EMSA CSN user meeting) where current and wind were analyzed from AIS information's – from vessel drift information

Perfect backtracking case: using currents measured by HF Radars INTEGRATION

Sat image, AIS shipping, HF currents and Wind Stress on top Navigational chart



EMSA CSN; Case
RS2_20111114_052541
SAR



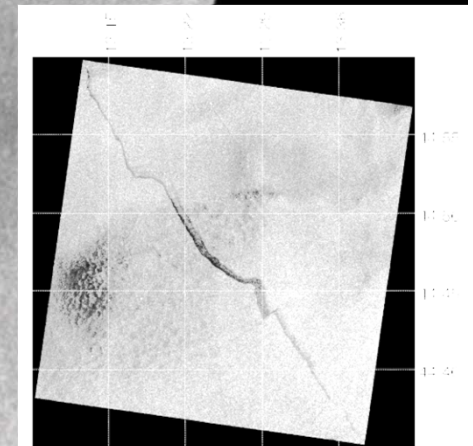

CleanSeaNet Alert Report


Satellite: SAR_LR - Acquisition Time: 2011-11-14 05:24:56.082 Frame ID: 15334



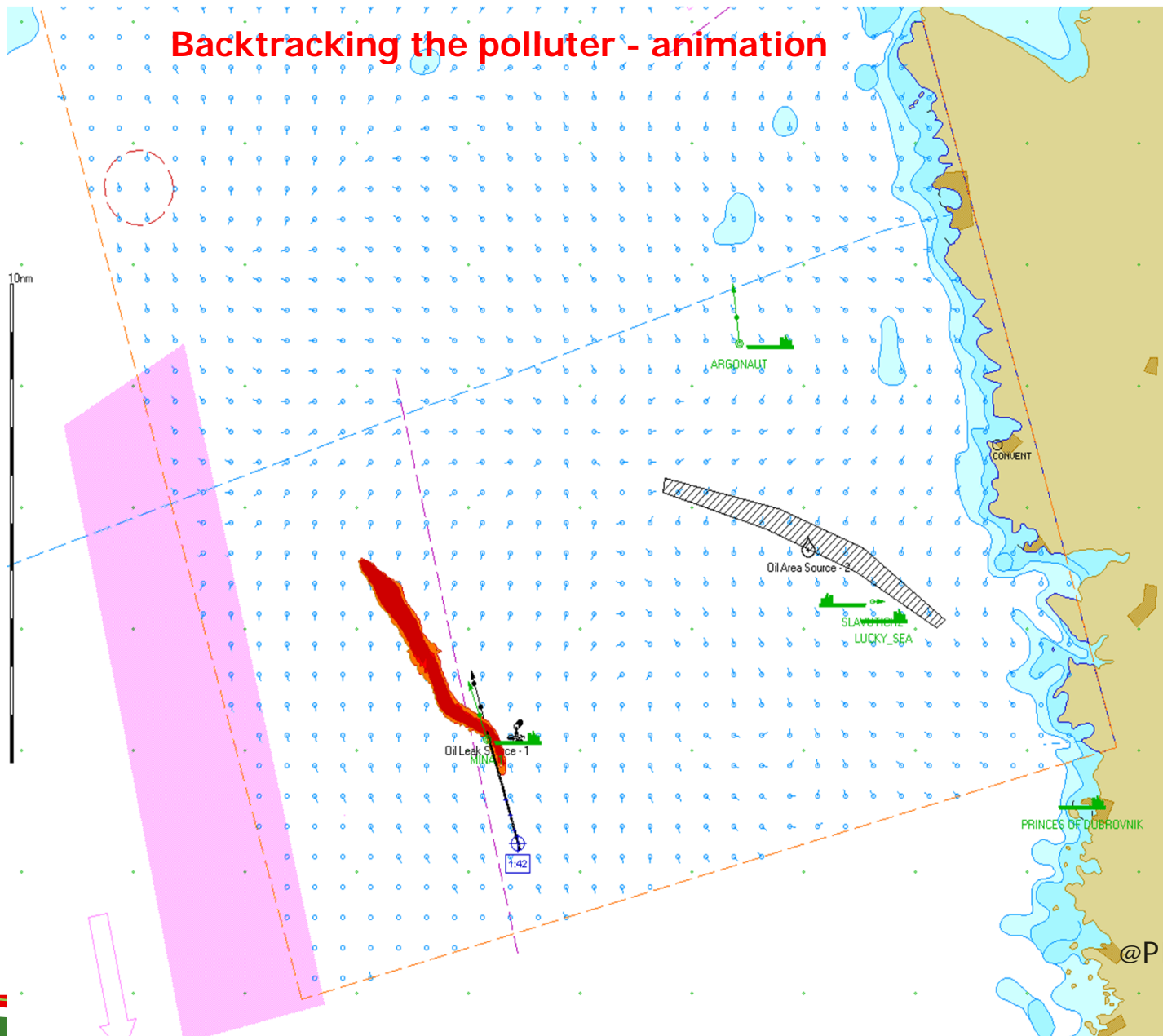
COMMENT

#	Id	Position	Warning	Detected	Alert	Class	Det
1	15334_RS2_20111114_052541_0044_GCNA_HH_GCN_165241_0000_00000000_OC_1	45°05'08.88";12°34'49.60"	Green	Yes	Green	B	Link
2	15334_RS2_20111114_052541_0044_GCNA_HH_GCN_165241_0000_00000000_OC_2	44°47'17.16";13°24'21.24"	Green	Yes	Green	A	Link



RSAT-2 - 2011-11-14 05:25:41

Backtracking the polluter - animation

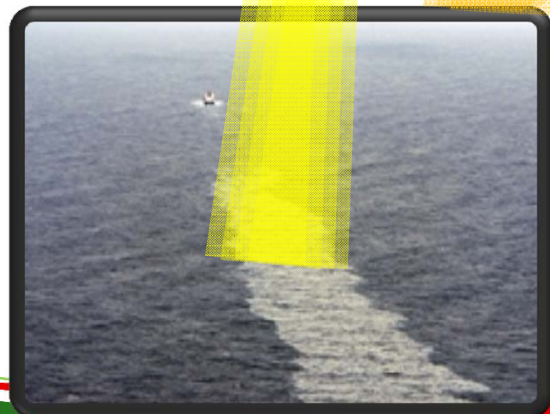


@PISCES 2

QUARTERS



METOCEAN Validation and ENHANCED BACKTRACKING PROCESS



GIS data

- TSS
- Ports
- Terminals
- Platforms
- Wrecks
- Natural seeps
- Bathymetry ...

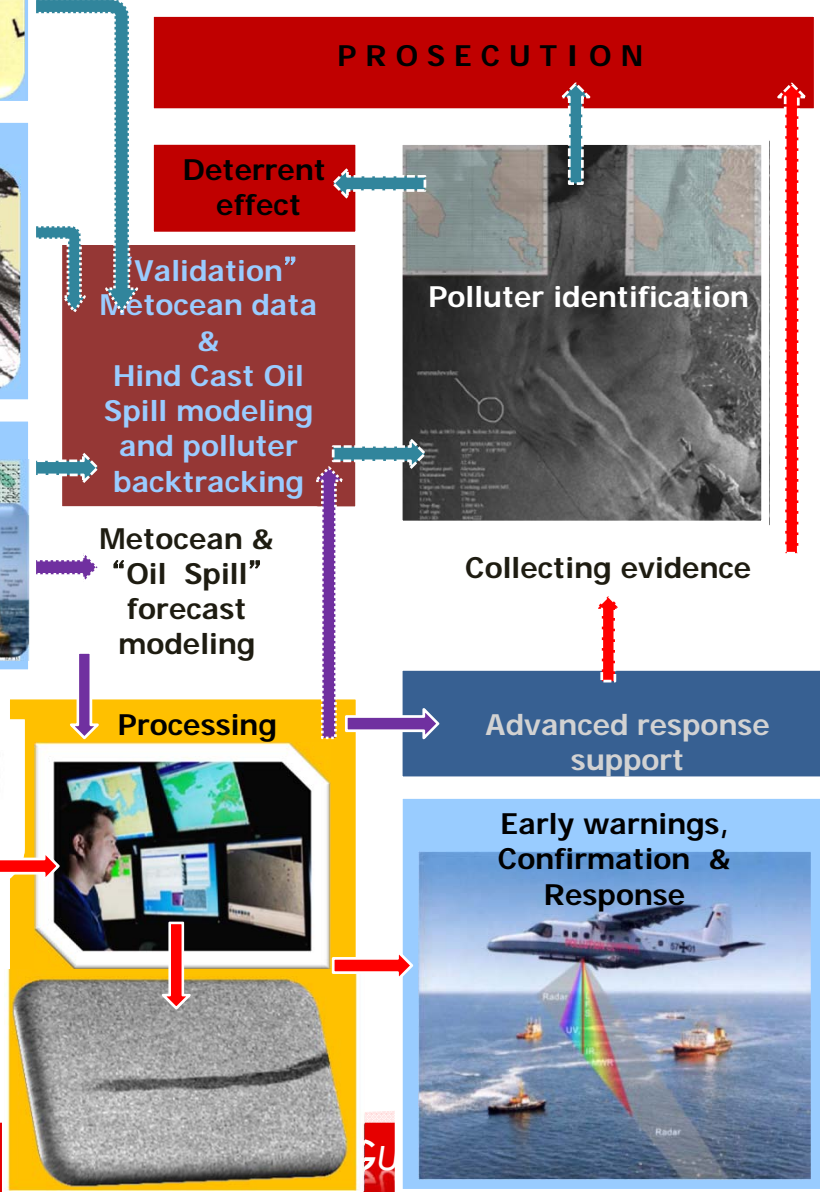
Shipping data

- RADAR
- AIS
- VMS
- LRIT
- Reports
- SAT
- Log Book ...

Metocean data

- Wind
- Waves
- Currents
- Tides
- SST
- Chlorophyll ...

OPERATIONAL SAMPLE OF WHAT WE ARE WORKING FOR



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Marko Perkovic marko.perkovic@fpp.uni-lj.si

.....and references:

http://gnoo.bo.ingv.it/static/GNOO_Services.htm

<http://gnoo.bo.ingv.it/myocean/>

http://c181984.r84.cf1.rackcdn.com/DShipMar12.pdf?utm_source=DS+newsletter+March+2+2012&utm_campaign=DS+Newsletter&utm_medium=email (Learning from Costa Concordia, page31-33)

Thank you for your kind attention!



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