

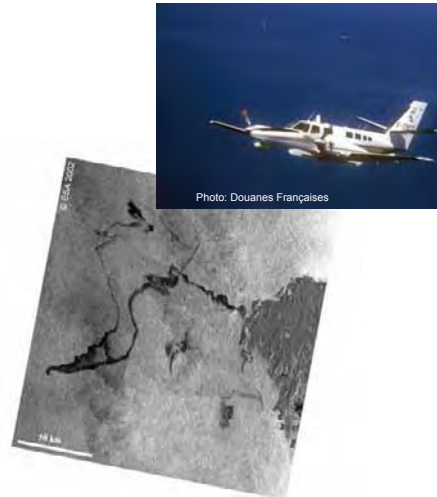
The Prestige and international cooperation

A REALTIME AERO-SATELLITE COVER AT THE SCALE OF THE BAY OF BISCAY

Georges Peigné
Cedre

“Journée d’information du Cedre”

Paris , 9 March 2006



A REALTIME AERO-SATELLITE COVER AT THE SCALE OF THE BAY OF BISCAY

Objective: To detect and locate slicks, monitor their drift and dissemination, and guide control means



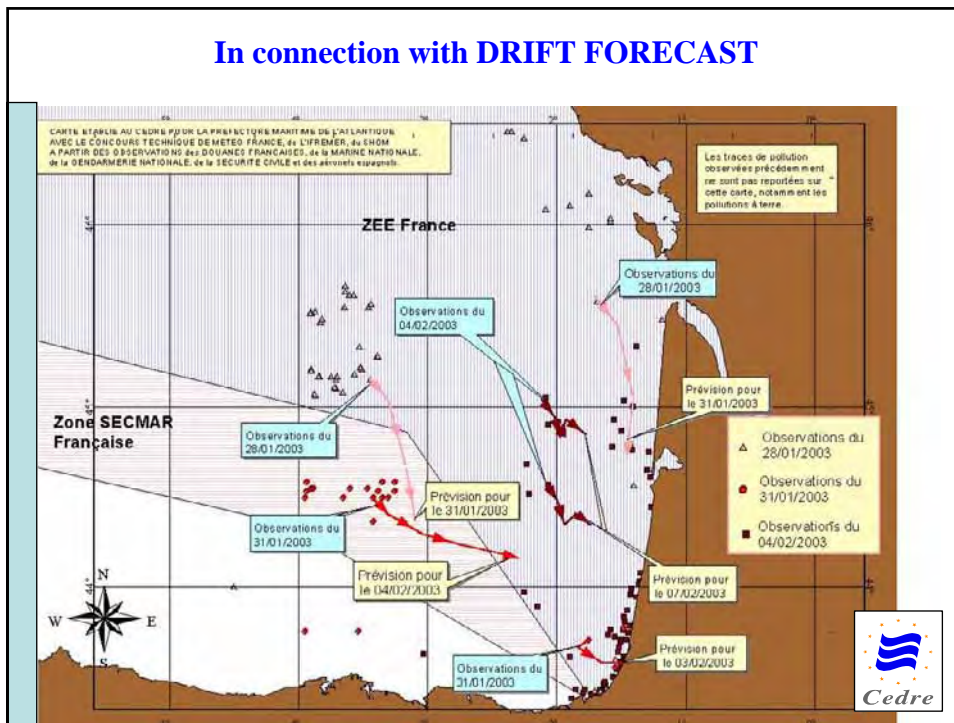
Means:

- *Aircrafts*
- *Helicopters*
- *Satellites*

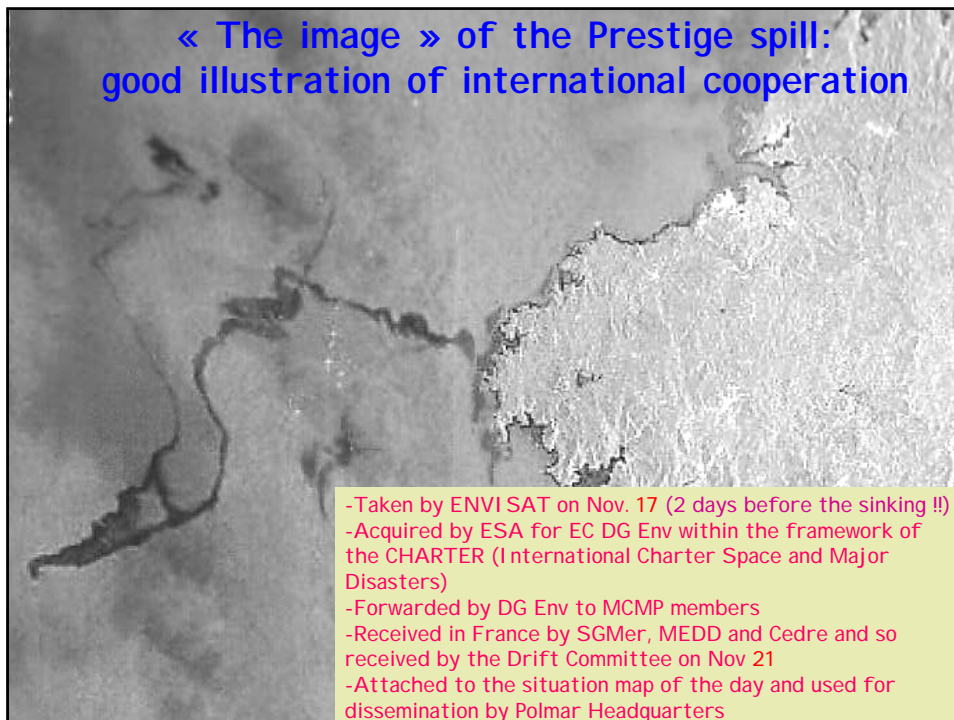
- *Drifting buoys*



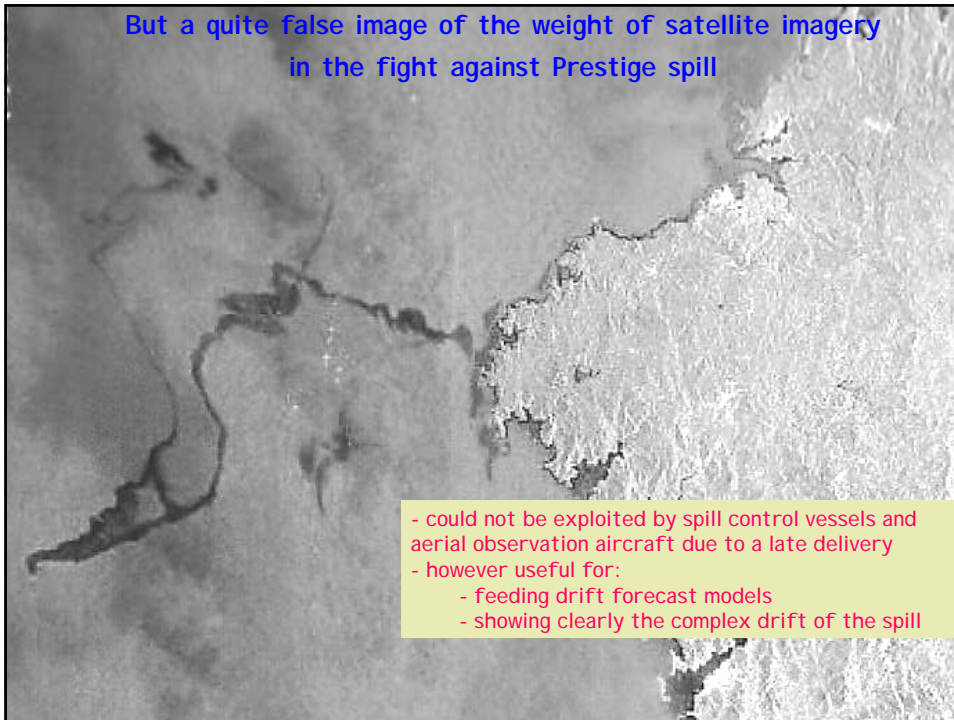
In connection with DRIFT FORECAST



« The image » of the Prestige spill: good illustration of international cooperation



But a quite false image of the weight of satellite imagery
in the fight against Prestige spill



- could not be exploited by spill control vessels and aerial observation aircraft due to a late delivery
- however useful for:
 - feeding drift forecast models
 - showing clearly the complex drift of the spill

Aerial Observation :

A key element of the fight against the Prestige spill:

- from 13 November 2002 to early March 2003
- more than 1200 observation flight hours
- 2 to 7 flights every day

A strong cooperation :

- within the 3 countries directly involved (Sp, Fr, P):
 - between national and regional authorities
 - between departments
- at international level:
 - between the 3 countries involved
 - with assistance from some European countries
 - and from Itopf

Spanish means for aerial observation

No specialized means

But many aircraft and helicopters mobilized, including:

- Sasemar: - helicopters Helimer Galicia & Helimer Cantabrico
- Fisheries: - aircraft Roche & Sanctipetri
- Air Force: - helicopters Alcotan I & Alcotan II
- Customs: - aircraft Reno A77 60, 61, 62, 63, 68
- Guardia Civil: - aircraft
- Navy: - helicopters Cuco 20 & 24
- Army: - several helicopters
- National Police : - helicopters Talud 07
- Xunta de Galicia: - helicopter Angel
- Xunta de Galicia: - helicopters Pesca Uno & Pesca Dos
- Guardia Civil de Asturias: - helicopter
- Principado de Asturias: - helicopter
- Ertzaintza: - helicopter
- SOS Cantabria: - helicopter

Portuguese support for aerial observation

Several aircraft and helicopters involved, including

- FAP specialized aircraft: Aviocar Flash 23



French support and mobilisation for aerial observation

Specialized means

- Customs aircraft Polmar I & Polmar II

Non specialized means

- Navy:
 - aircraft Falcon 50
 - helicopters
- Customs:
 - non specialized aircraft
- Civil protection:
 - helicopters
- Sorona:
 - aircraft Cessna 208b Caravan

French assistance to Spanish authorities

14 November 2002



POLMAR2 on alert

15 November



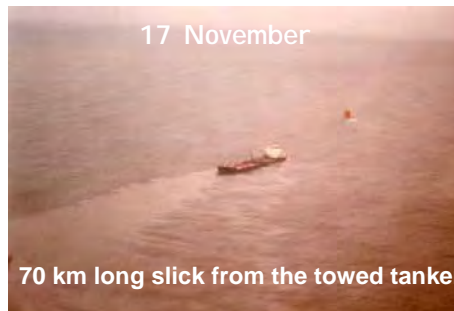
Flight to La Corogna and first surveys

16 November



Two daily surveys

17 November



70 km long slick from the towed tanker

Photos: Douanes françaises

Polmar 2 (F) assistance to Spanish authorities

18 November



Monitoring of the towed tanker and survey of slicks along the coastline

19 November

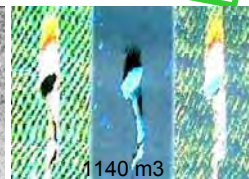
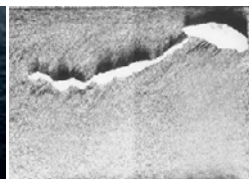
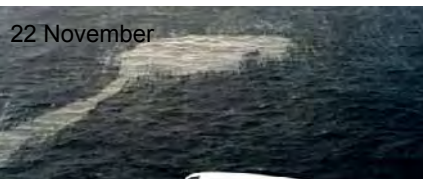
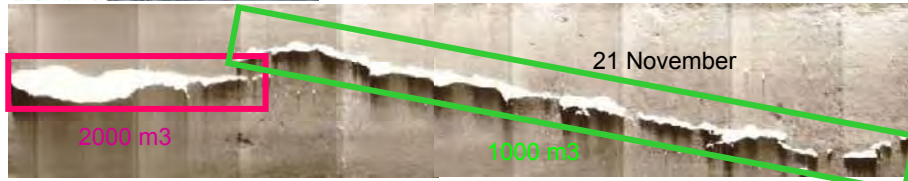


Shooting: Régis BOULANT

Photos: Douanes françaises



Polmar 2: Assistance to the assessment of spill size with remote sensing equipment

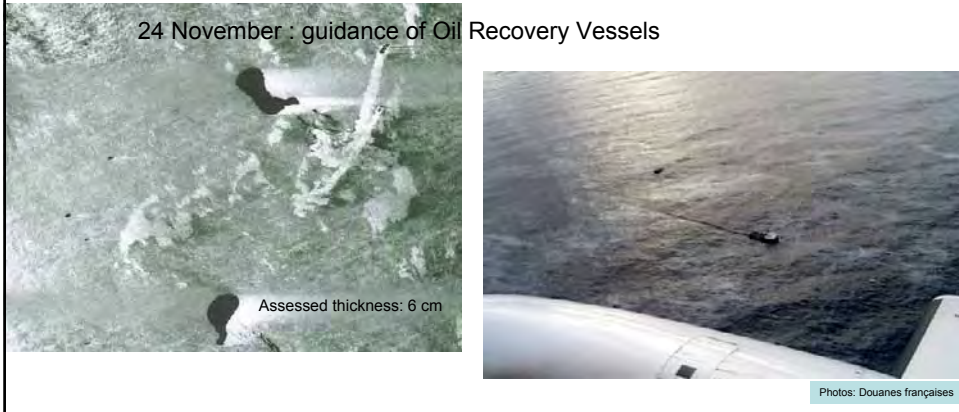


Photos: Douanes françaises

23 November: first spill splitting up; more than 100 slicks



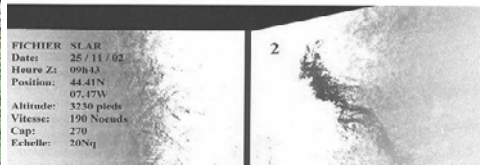
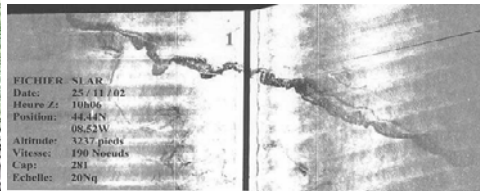
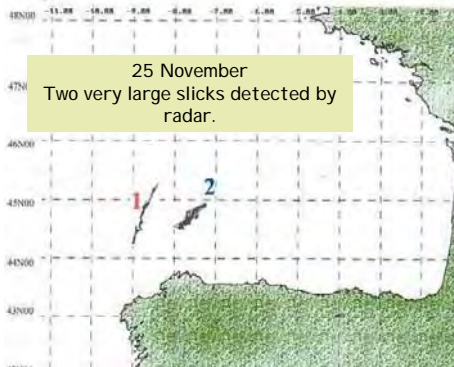
24 November : guidance of Oil Recovery Vessels



Photos: Douanes françaises

From Corogna to French Waters

25 November
Two very large slicks detected by radar.



Photos: Douanes françaises

International assistance for aerial observation



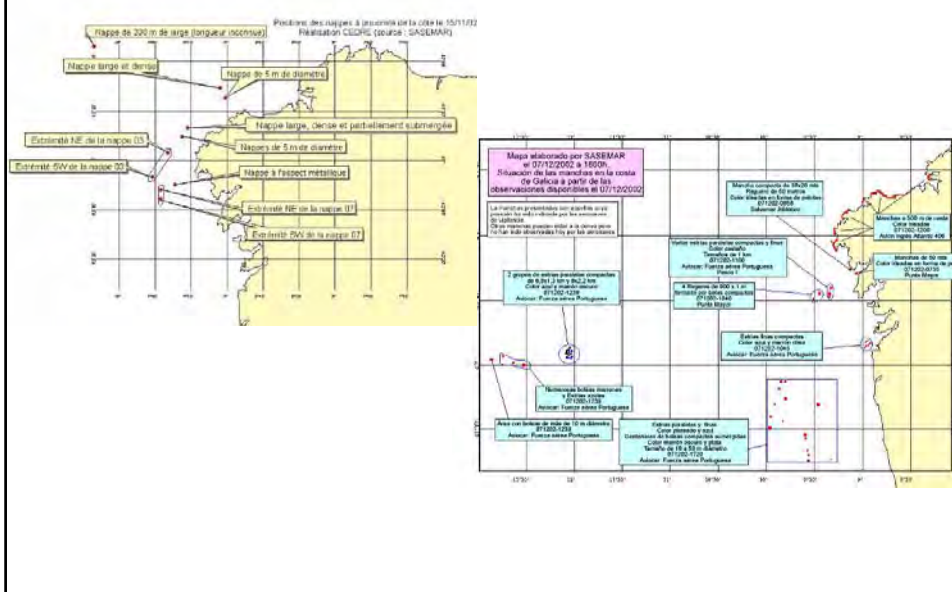
International assistance for aerial observation

For more than 10 weeks, 1 to 2 flights per day

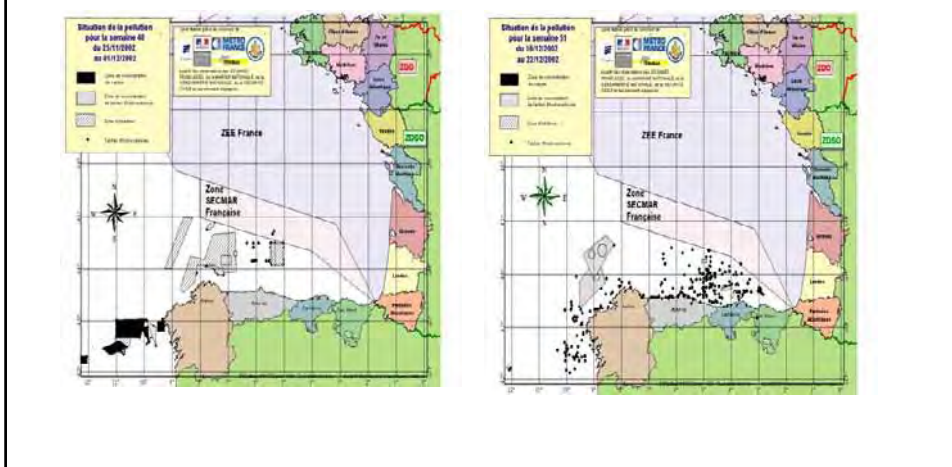
Specialized or dedicated means

- Germany: aircraft 4790 from the Navy early December
- Norway: Merlin Fairchild 113 from NPCA Jan 3 to 9 & Jan 15 to 23
- United Kingdom: Cessna 406 from MCA Jan 3 to 9; Jan 14 to 19;
Jan 22 to 25; Feb 7 to 17
- Italy: ATR 42 from Coast Guard Jan 12 to 18; Feb 23 to 28
- Denmark: Challenger CL 604 from TAC Jan 25 to 31
- Finland: Dornier 228 from Coast Guard Jan 31 to Feb 4

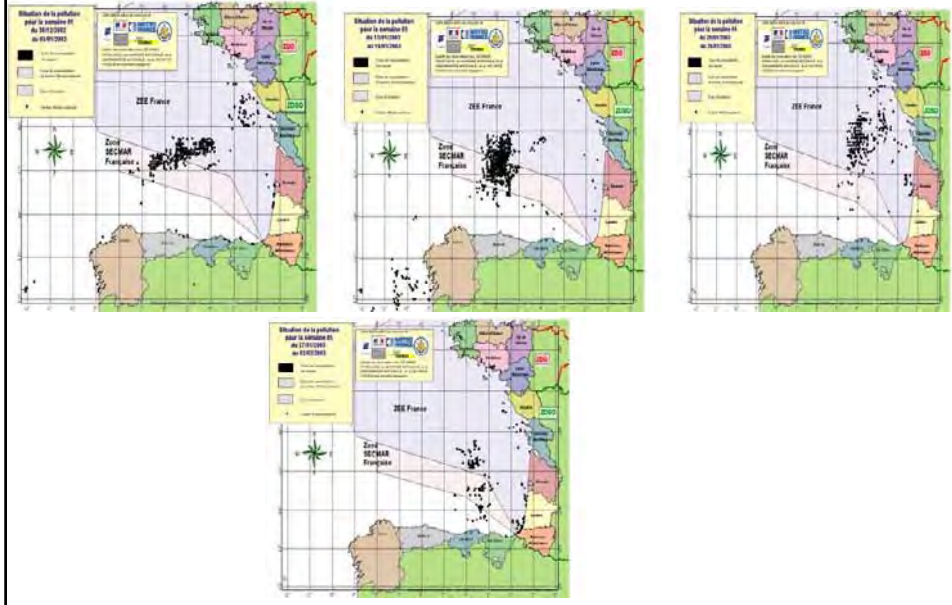
Data Exploitation : maps published by SASEMAR



Data Exploitation : maps published by the French Drift Committee



Data Exploitation : maps published by the French Drift Committee



Aerial observation :

A key element for the fight against the Prestige spill, allowed a realtime guidance of offshore control operations and so contributed to their efficiency.

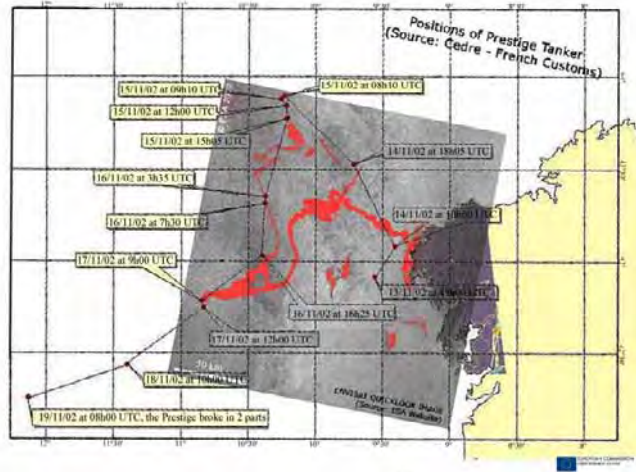
A strong cooperation was necessary to mobilize for the whole period enough means to cover such a large area.

But improvements are possible and expected:

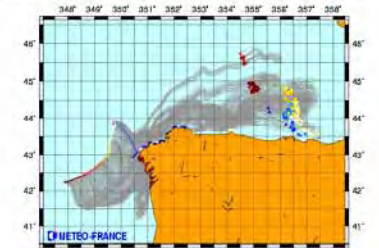
- for the detection of poorly buoyant oil**
- for faster data exchanges between all actors**

The use of Satellite Imagery in the Prestige spill

- The image dated 17 November

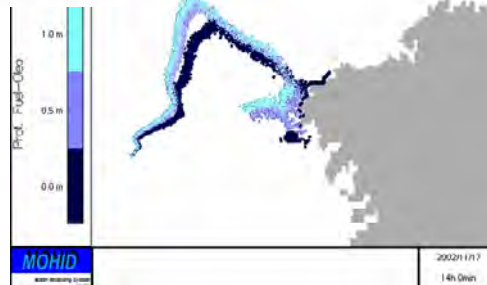


MOTHY/ARPEGE_ANA : Pr vision pour le 11/01/2003 00 utc



Position initiale :
 le 15/11/2002 09h10 utc
 Latitude : 45 52,30'
 Longitude : -10 15,30'
 Polluant : Fuel Prestige
 Masse volumique : 1000 kg

Attention : document technique de prévision de dérive d'hydrocarbures, à utiliser pour d'un seul point choisi dans un ensemble complexe de rades (obser) ou sur un
 Caution : Technical support for oil drift forecast from a single point out of a complex set of rades (observed or not)



Drift prediction at different depths

Use of Satellite Imagery for the Prestige spill

International Charter Space and Major Disasters:

- Agreement of several Space Agencies for freely providing data for a short period (1 or 2 weeks)
- for the Prestige spill: the allowed user was G. Vincent (DG Env) and the final user was the Spanish Government (Fomento Ministry)
- in France, CNES was the leader for its activation
- 25/11: after request from SGMer to DG Env, Cedre and Shom became authorised users of ESA data, provided directly by ESRIN (process set up by CNES)

Use of Satellite Imagery for the Prestige spill

EC JRC (14/11/02 - 5/03/03)

- was activated by DG ENV
 - analyzed 169 SAR images provided
 - through the Charter (Nov 14 to Dec 5),
 - directly from ESA (Dec 6 to March 5)
 - interpreted images
 - delivered relevant info to DG ENV
 - who distributed interpreted images, as annex to Infosheets to all memberstates
- Final product: a geo-located radar image with the indication of likely spilled areas
- 30 images identified as being of interest were delivered to DG ENV
- Delay from acquisition to delivery : about 9 hours
- Satellite observations provided useful information due to their capability to cover large and remote areas, but generally in a time largely unsatisfactory
 - Additional research on sensors and/or methodologies is needed:
 - to improve the reliability of the identification of slicks
 - to improve the retrieval of slick thickness and the detection of submersed oil
 - Creation of a technical body in charge of the image interpretation, of the coordination with all the other actors and of the integration of relevant information and expertise

Source: Interspill 2004

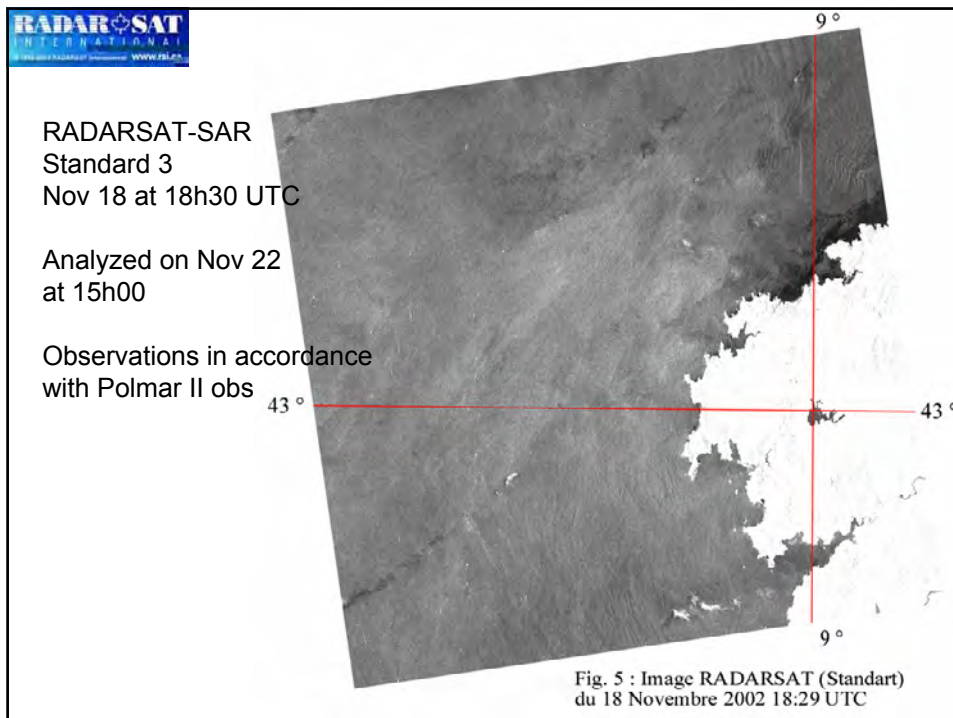
Use of Satellite Imagery for the Prestige spill

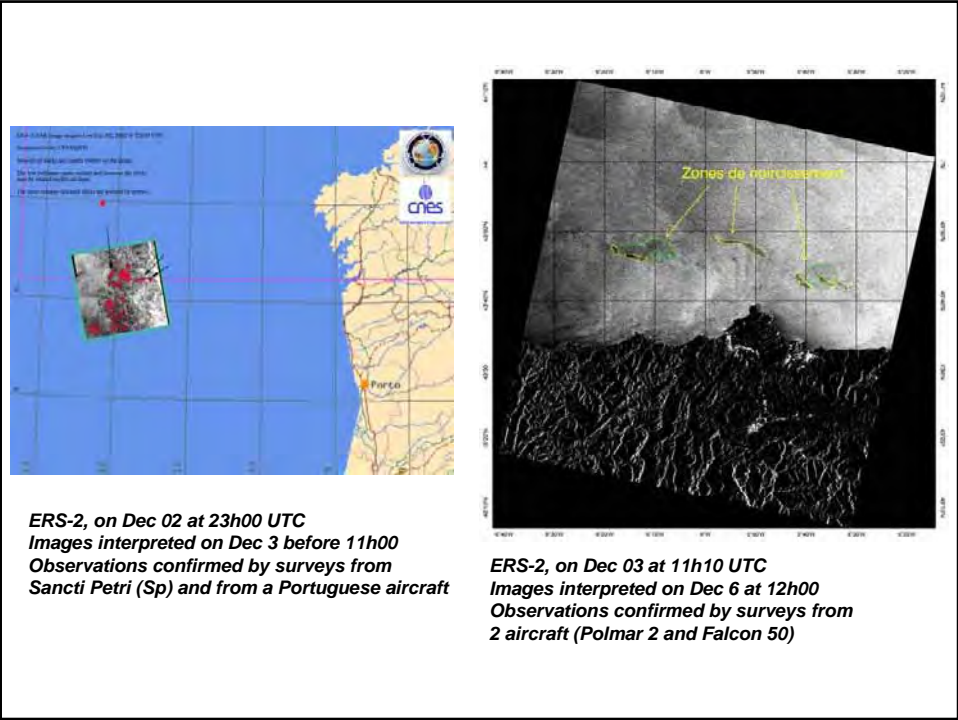
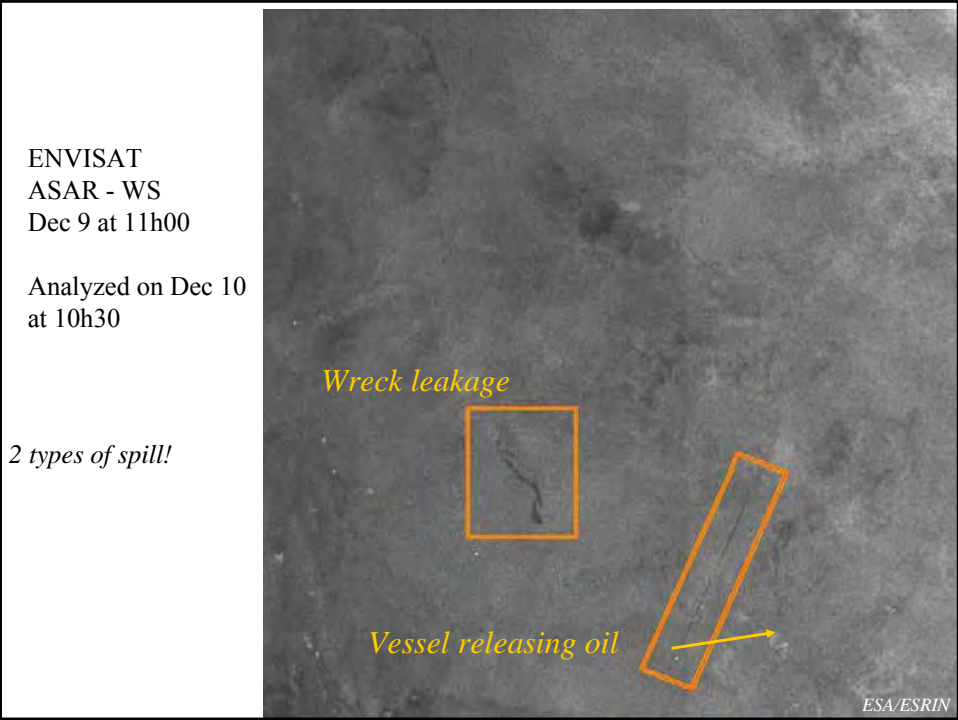
Cedre (21/11/02 - 2/01/03)

- Analyzed about 60 SAR images
- from satellites
 - ERS-2 and ENVISAT (UE),
 - RADARSAT (Can)

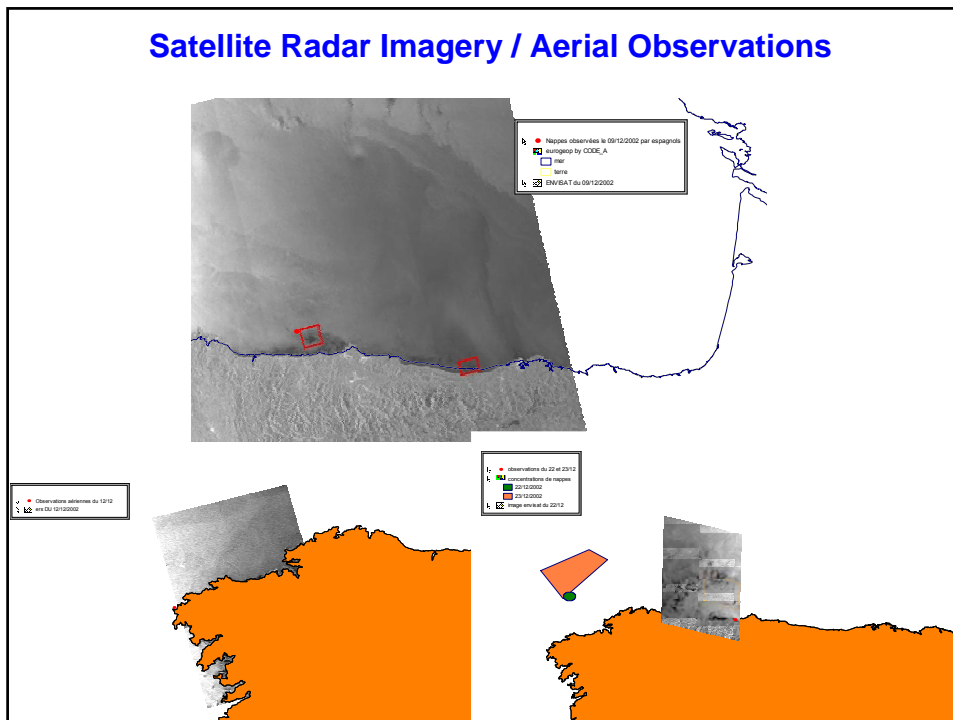
- ENVISAT: - images available 2 days after shot
- ERS-2: - some interpretations 2 to 3h after shot
 - limited coverage (100x100 km)
 - long delay between two passes (35 days)
- RADARSAT: - very expensive (4 images)

- images interpretation: - needs oceanographic data
 - connection with aerial observations and drift forecast
- Observations maps shall mention overflow areas
- Access to the CHARTER could be facilitated
- SAR images treatment can be improved, notably through experimental spills





Satellite Radar Imagery / Aerial Observations



Use of Satellite Imagery

A limited contribution to the fight against the Prestige spill: images arriving too late or of limited added value compared to aerial observations.

A fruitful cooperation for the provision of images, but very limited regarding their interpretation and exploitation.

But many late validations of the quality of some interpreted images, encouraging for a near future, which should permit realtime exploitation of images and therefore facilitate the coverage of larger areas for spill observation.

Improvements can be expected :

- to improve realtime access to images
- to cluster an international expertise on images interpretation, based on joint tests

Drift forecast



An Erika
alternative
scenario made
true

Bilateral challenge :

- ☒ **Spain without drift prediction unit**

French challenge :

- ☒ **Performing better than with Erika**

Cooperation with Portugal and Spain

Portugal :

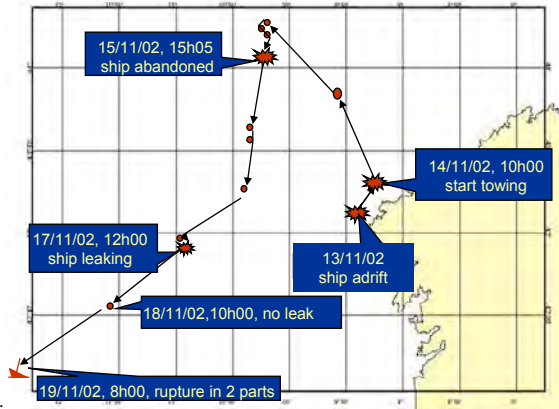
- *no response co-operation agreement,*
- *drift prediction capacity in hydrographic institute, unknown from the French*

Spain :

- *A bilateral mutual assistance plan*
- *no organised drift prediction capacity*

- ☒ **No operational cooperation ready**

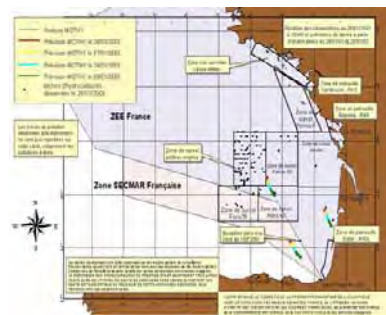
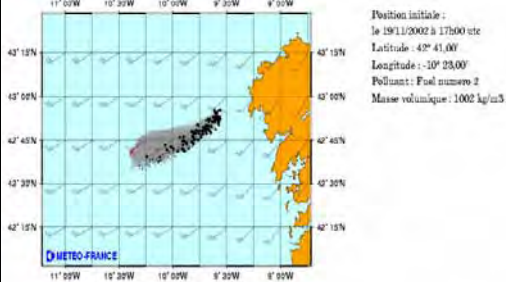
An exceptional slick drift showcase



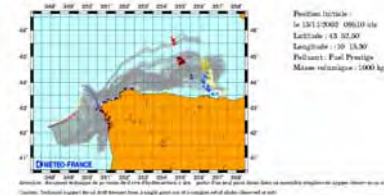
Ship 5 days in tow, seeping fuel, then sinking in deep waters, far from coastline

✉ **Spill scattering into innumerable oil small slicks, drifting longer and farther than in any other spill in Europe**

MOTHY/ARPEGE : Prévision pour le 22/11/2002 à 18 utc



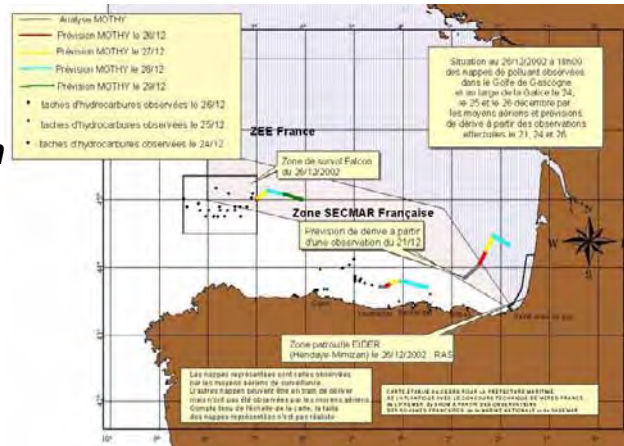
MOTHY/ARPEGE_ANA : Prévision pour le 11/01/2003 00 utc



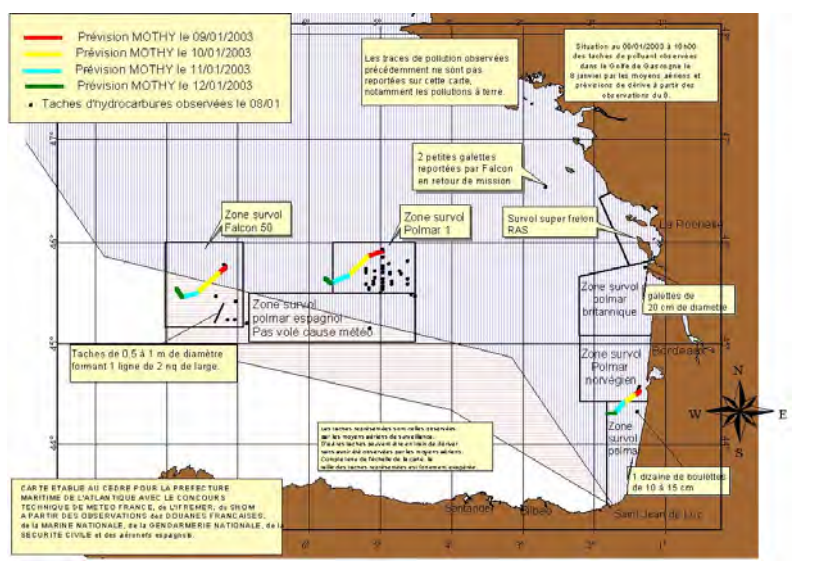
Mothy drift forecast

Operating a national slick drift committee at Cedre

- Cedre, Météo France, IFREMER, SHOM, French Navy,
- meeting and stamping jointly the daily prediction map

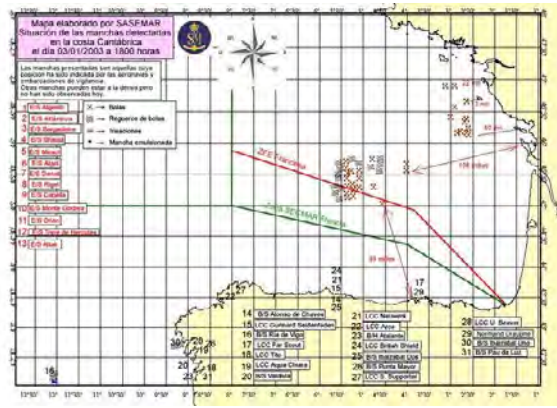


French slick drift prediction committee

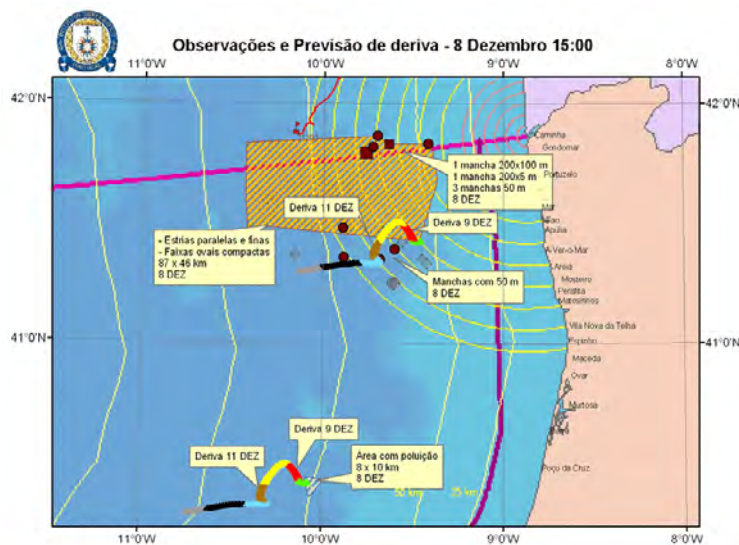


Opening the Cedre / Météo France cooperation to Spain

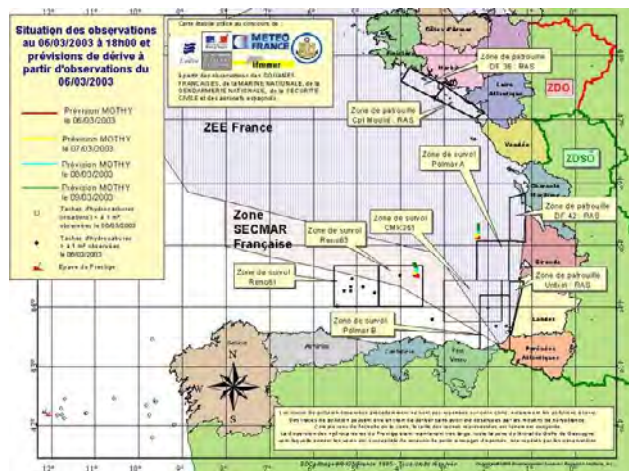
- A Sasemar engineer at Cedre for prediction mapping in Spanish and emergency transfer of technology
- Continuous exchange of information with the basque institute AZTI



Maps by the Portuguese Hydrographic Service



**Jointly
monitoring
oil
movements
back and
forth for 3
months**



**To the benefit of a response of unprecedented
extent and duration**

Drift forecasts

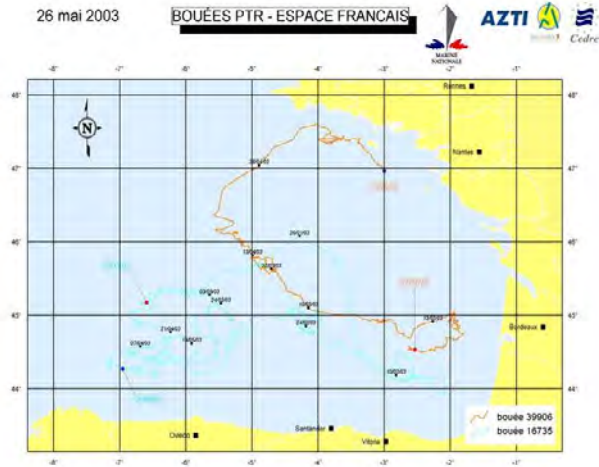
A key element of the fight against the Prestige spill, linked to aerial observation.

Benefiting from many improvements since the Erika spill and during the Prestige one, as regards both the quality and the presentation of predictions.

A strong national cooperation in France (Drift Committee) and the start of an international cooperation, going on since with Spain (ESEOO programme).

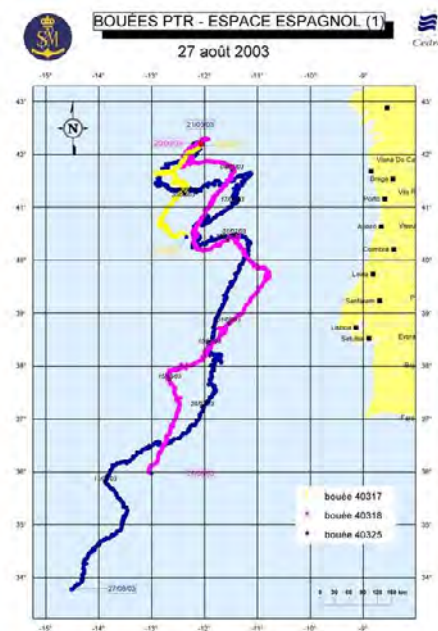
In addition to aerial observation :
Drift buoys
 for marking and monitoring slicks

Links between drift forecasts and monitoring of surface and subsurface drifting buoys

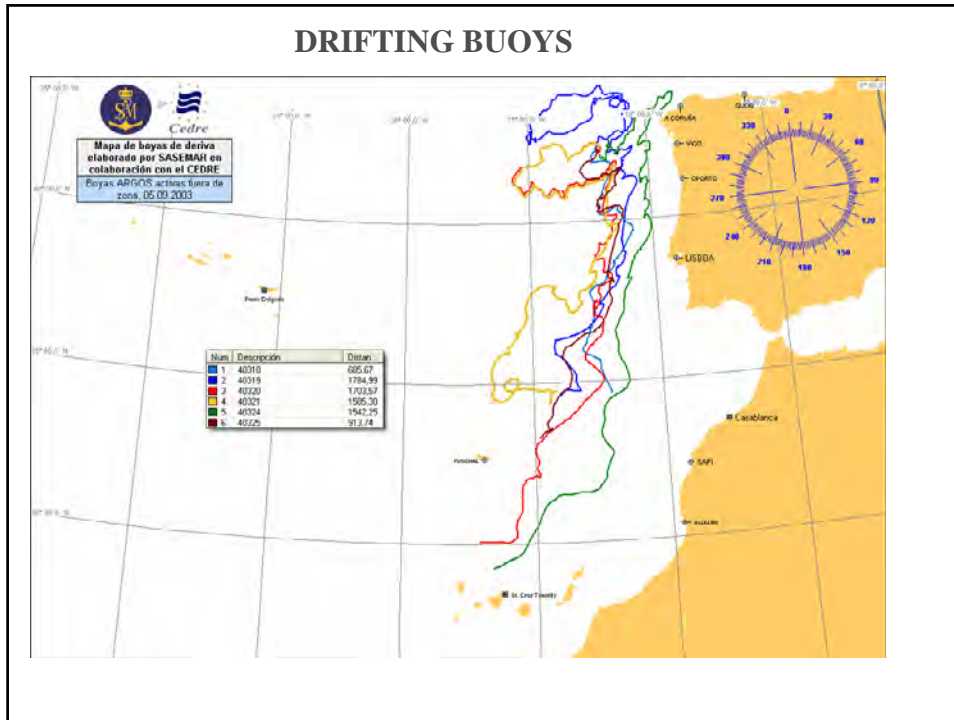


Assessing the wreck danger

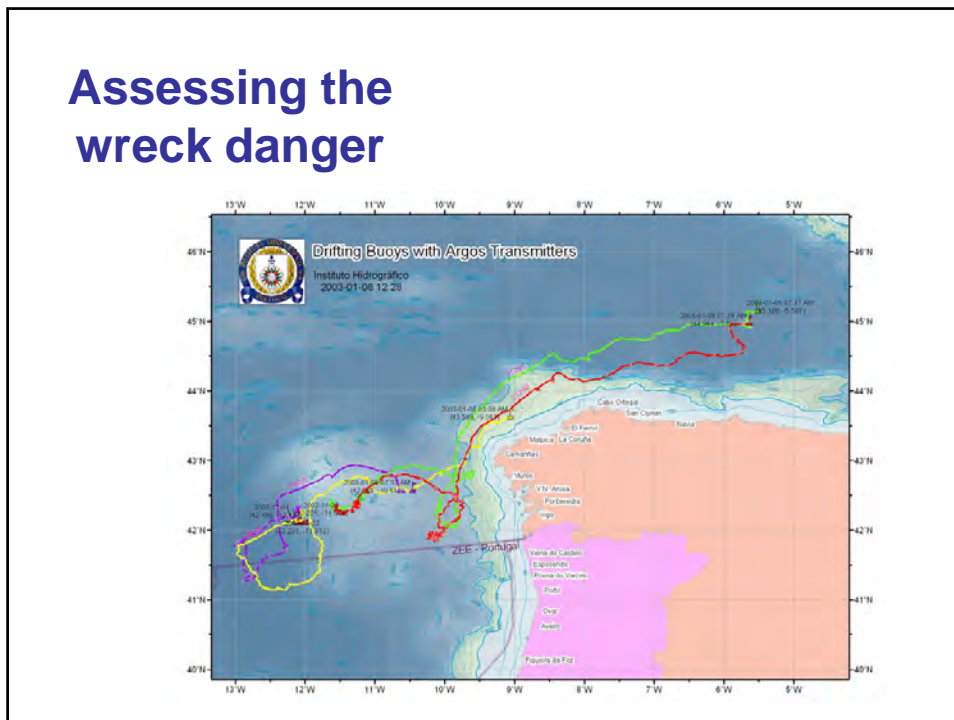
Monitoring the movements of surface drifting buoys released above the wreck



DRIFTING BUOYS



Assessing the wreck danger



Buoys drift recording

- **Confirmed to be a key tool to aerial and maritime observations for medium to long term surveillance and interpretation**
- **Also a useful information media toward the media and public (maps available on websites)**
- **Benefited from many fruitful cooperations**

A REALTIME AERO-SATELLITE COVER AT THE SCALE OF THE BAY OF BISCAY

-A VERY AMBITIOUS CHALLENGE

-QUITE ACHIEVED THANKS TO MANY FRUITFUL COOPERATIONS, REGARDING 3 LINKED AND COMPLEMENTARY ACTIVITIES:

- AERIAL OBSERVATION
- DRIFT FORECAST
- USE OF DRIFTING BUOYS

-WHICH SHOULD BE IMPROVED IN THE NEAR FUTURE WITH

- REALTIME ACCESS TO CORRECTLY INTERPRETED SATELLITE IMAGES
- IMPROVED DATA EXCHANGE SCHEME AND TOOLS, MAKING USE OF UP-TO-DATE TECHNOLOGIES, NOTABLY PROVIDED BY WEB, AS PROPOSED BY ESEEO OR ECUME:



THANK YOU