

Improving Member States Preparedness to Face an HNS Pollution of the Marine System (HNS-MS)



HNS = Harmful and Noxious Substances

- 2000+ HNS transported by sea
- bulk or packaged form
- Transported volumes always increasing
- Number of reported spills exponentially increasing
- Large variety of chemical and physical behaviours



(Source: EMSA, 2013)

**HNS = major threat for marine environment,
civil protection and maritime safety**

HNS-MS original idea

To develop a decision-support tool that national maritime authorities and coastguard stations will activate in order to forecast the drift, fate and behaviour of acute marine pollution by Harmful Noxious Substances (HNS) accidentally released in the marine system.



& Bay of Biscay

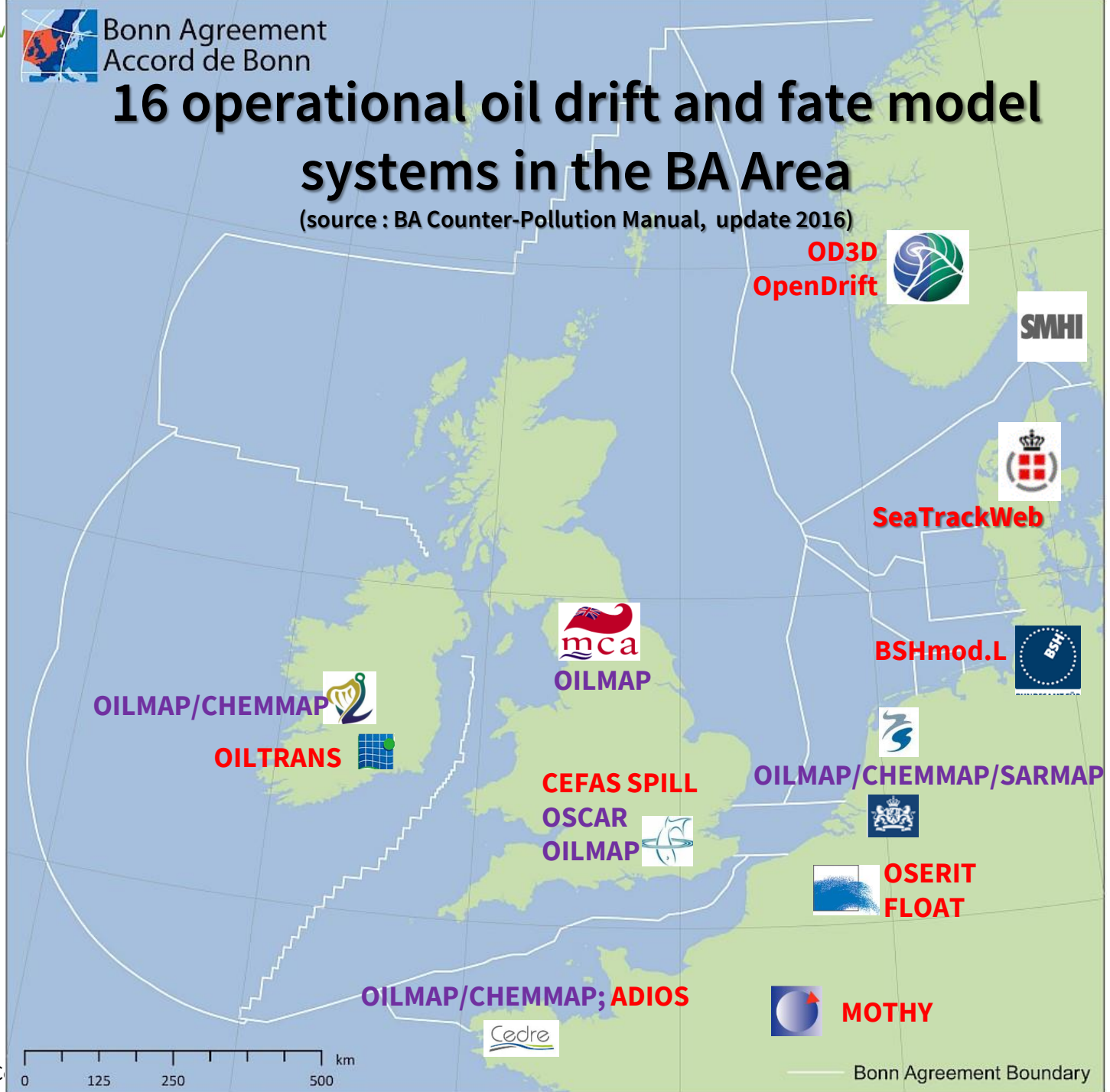


16 operational oil drift and fate model systems in the BA Area

(source : BA Counter-Pollution Manual, update 2016)

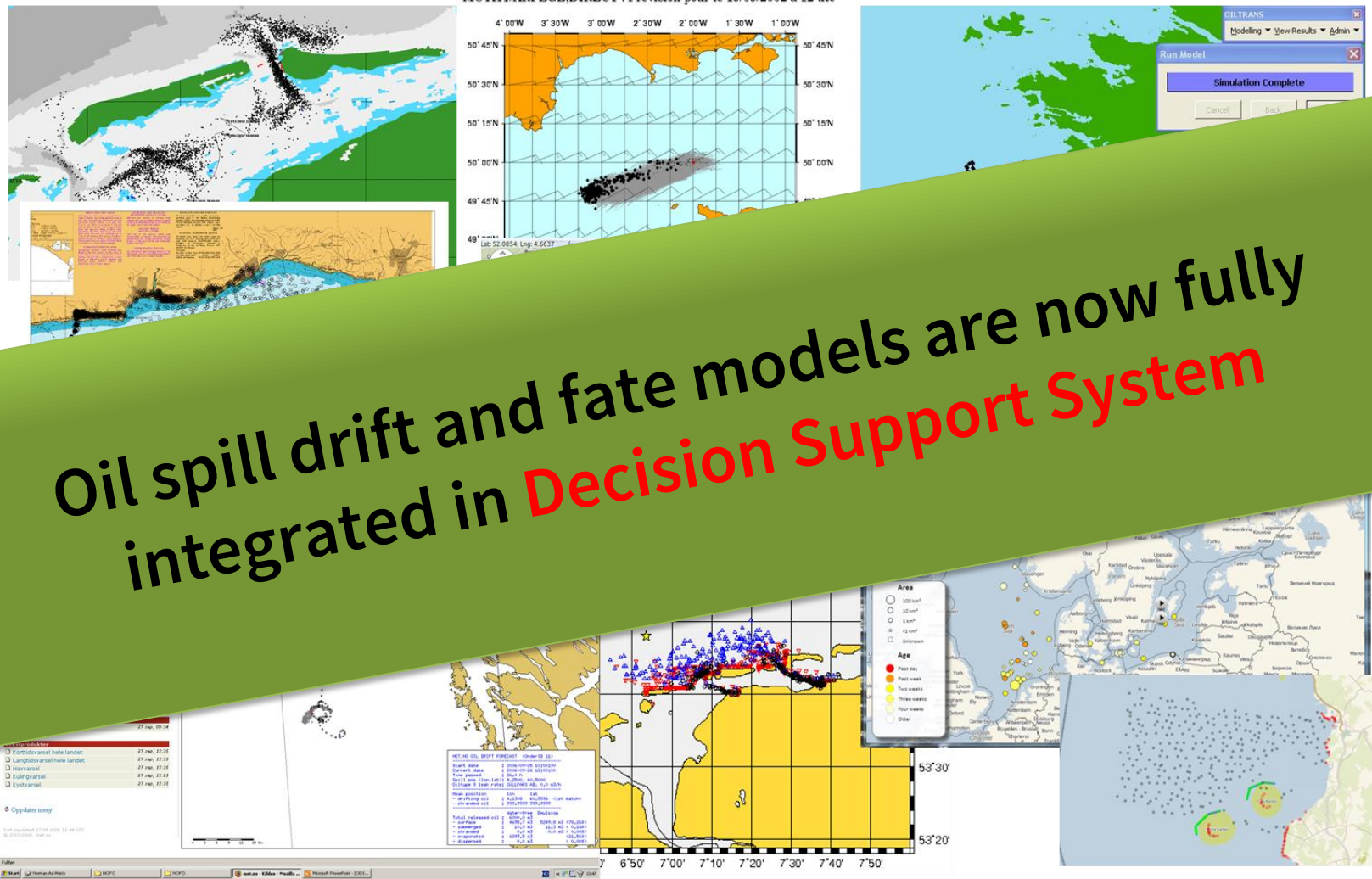
« In-house » or public models

Commercial solutions



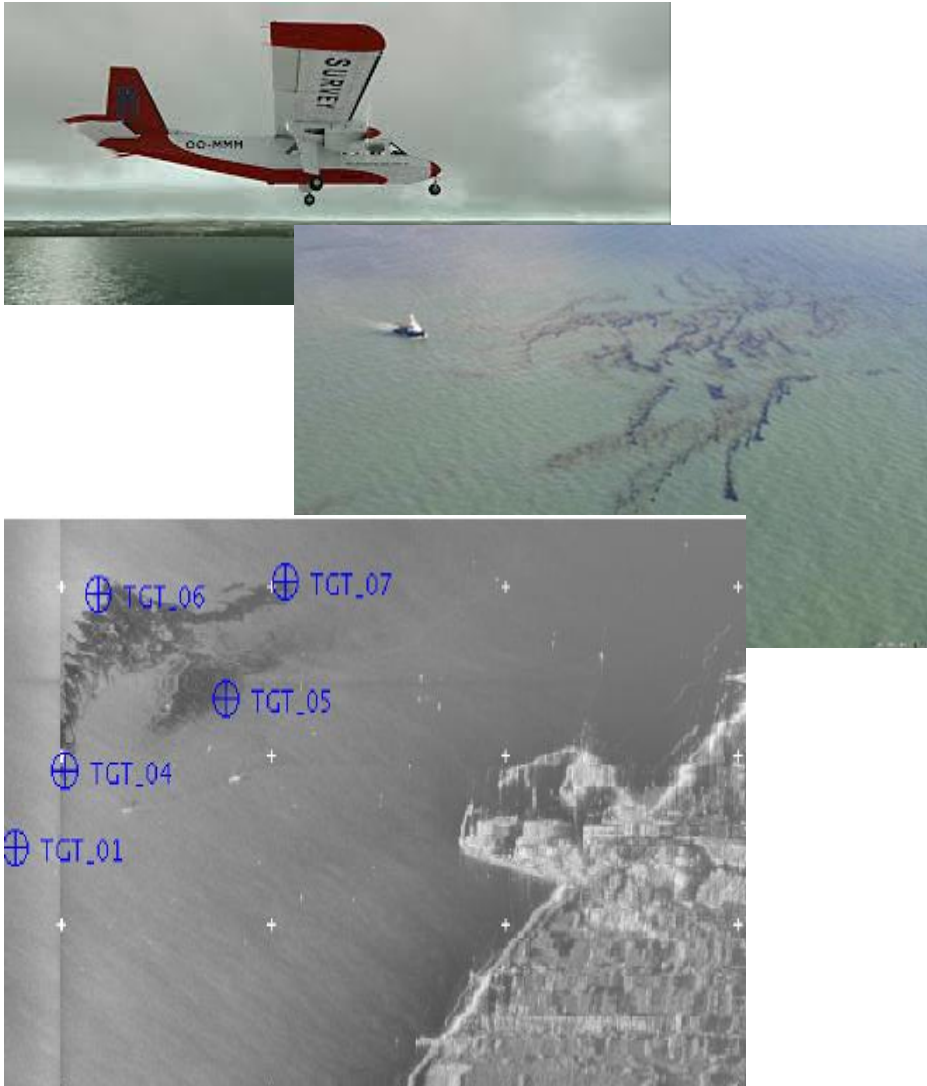
Each similar, each different

Relies on decades of improvement in oil drift and fate modelling !

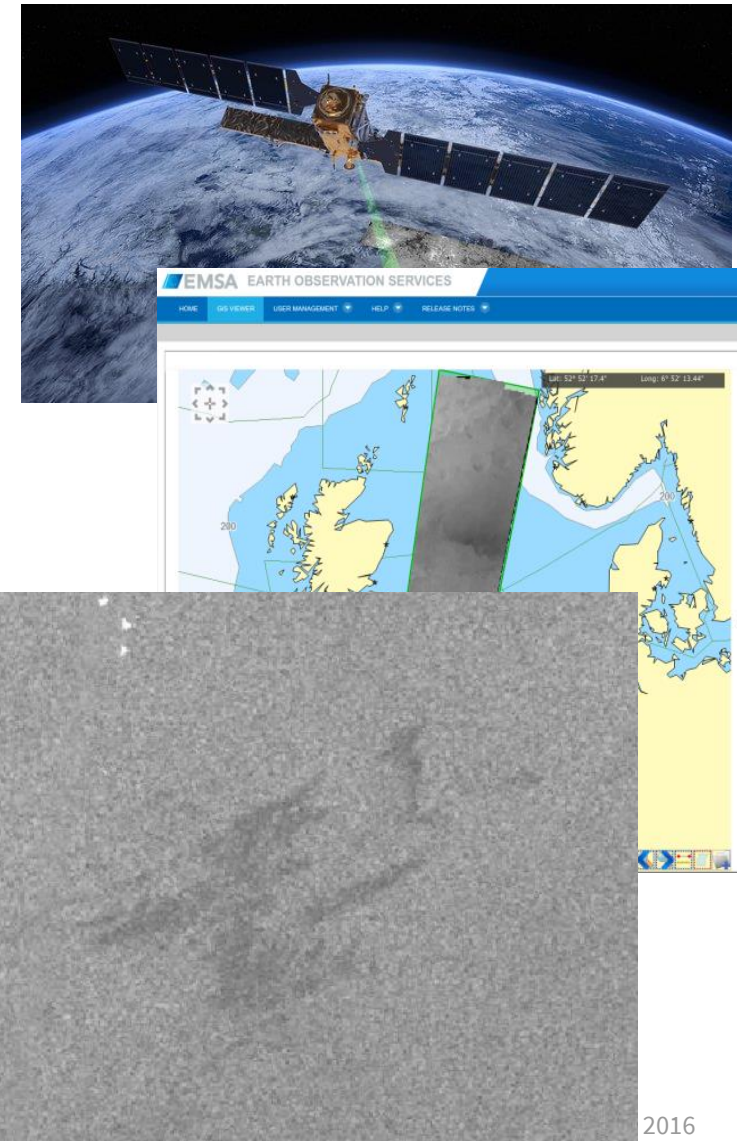


Effective & continuous surveillance of oil spill

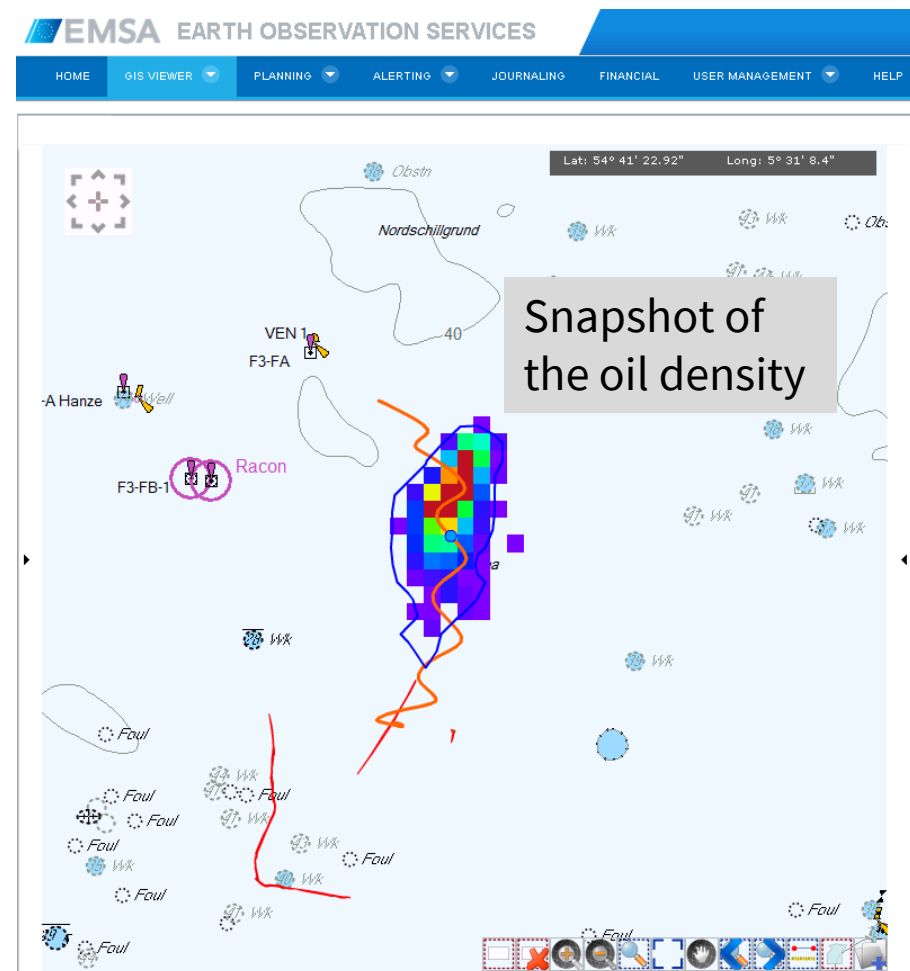
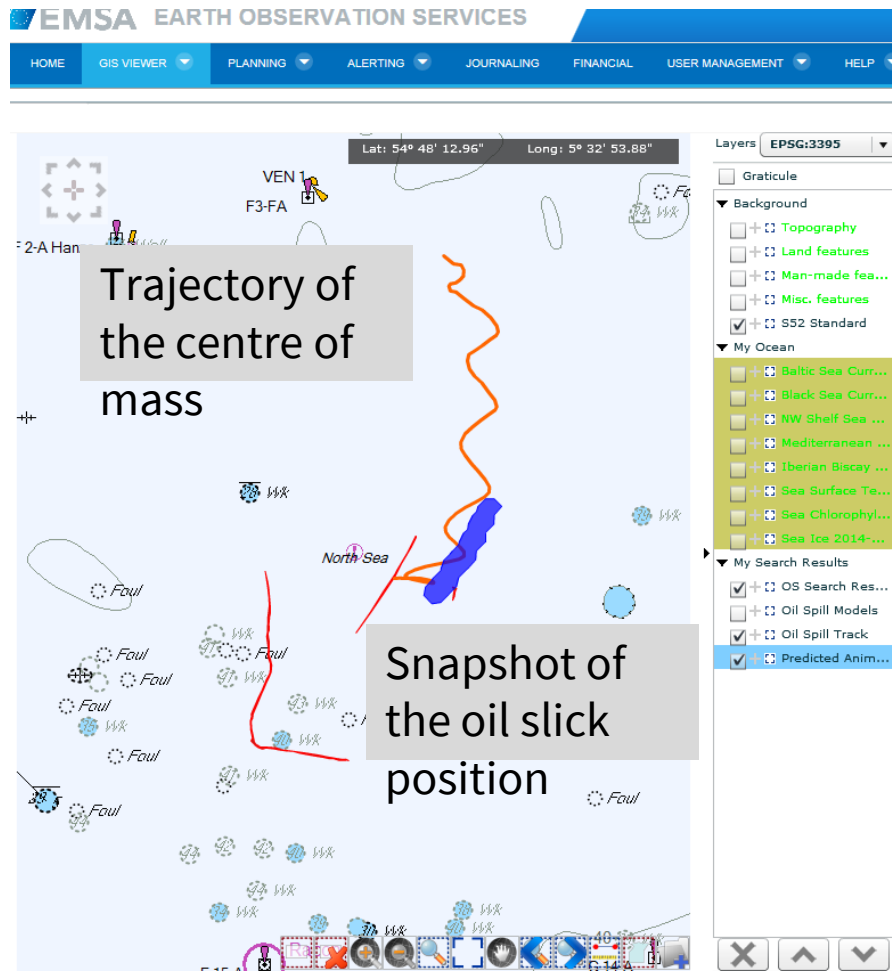
Airborne surveillance



Satellite-based surveillance



System-to-system interface between EMSA CleanSeaNet and Model Service Providers (OSERIT, SeaTrackWeb, MOHID, MEDSLICK)



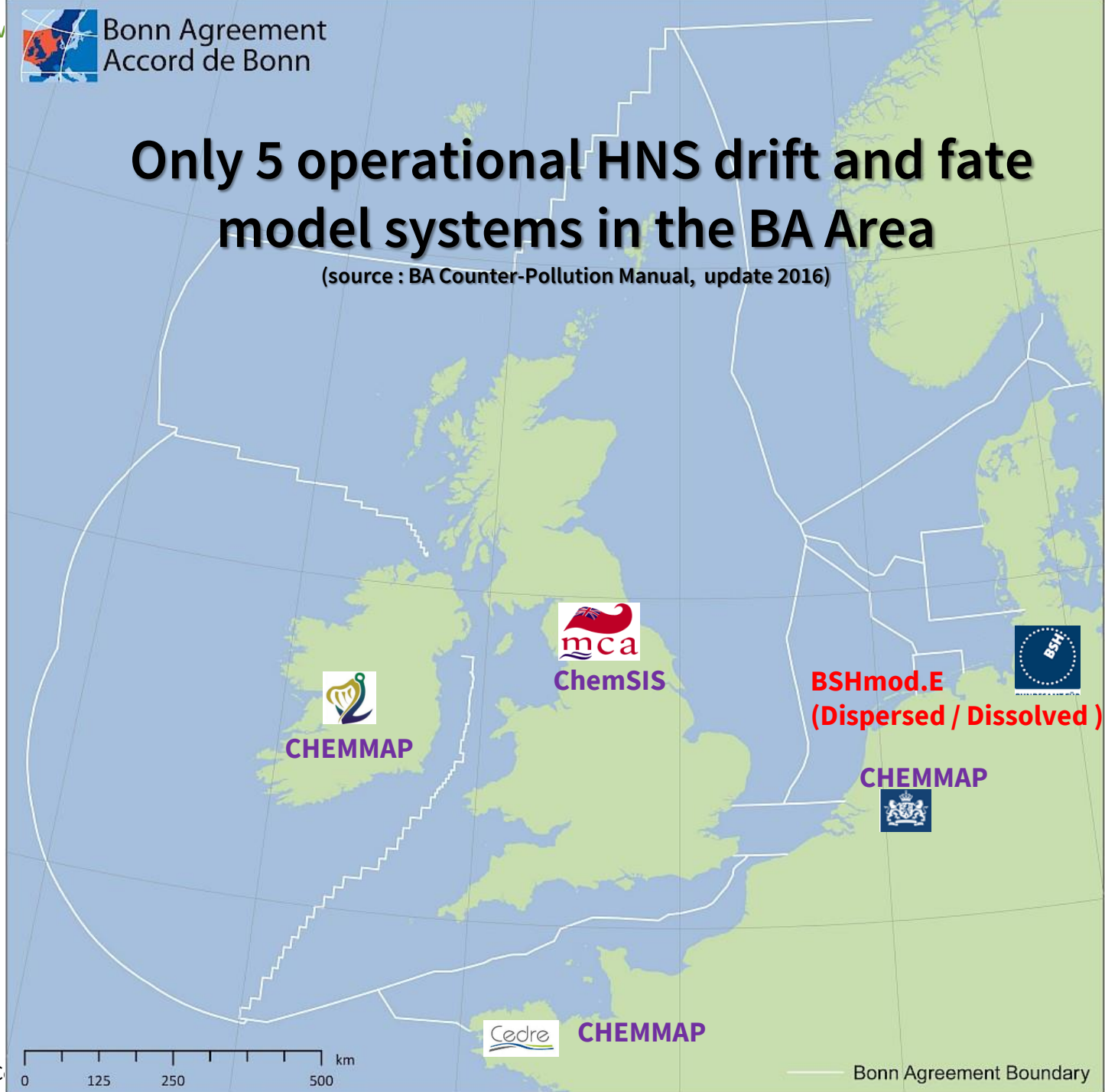


Only 5 operational HNS drift and fate model systems in the BA Area

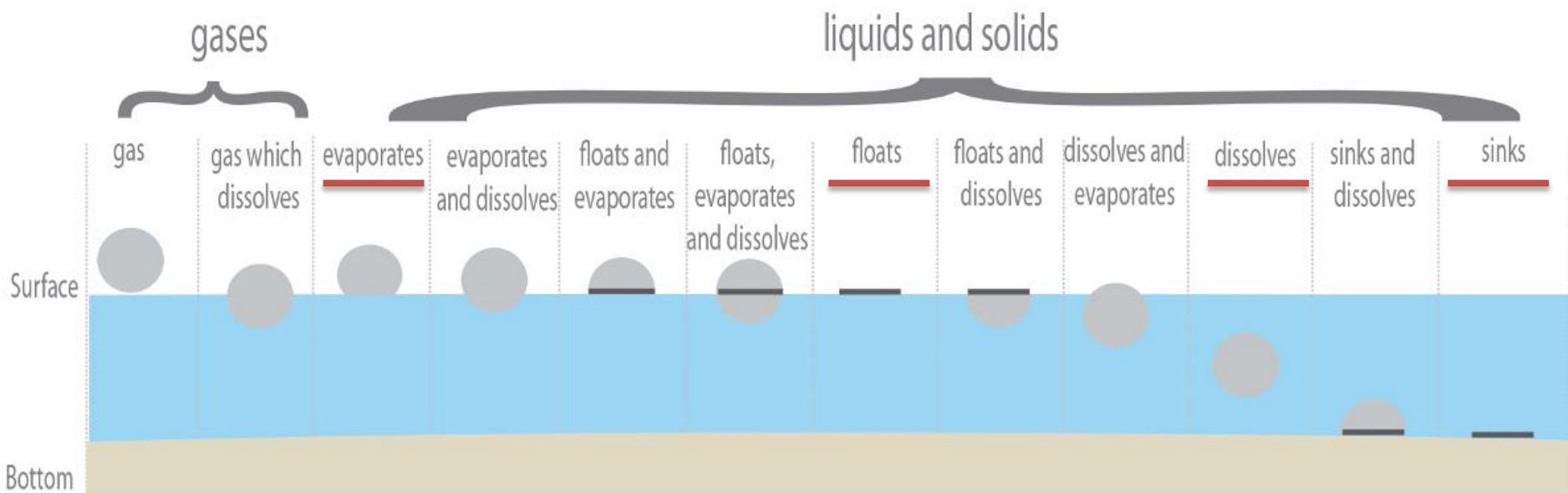
(source : BA Counter-Pollution Manual, update 2016)

« In-house » or public models

Commercial solutions



The Standard European Behaviour Classifications classes HNS in 12 classes



SEBC based on 3 predictors :

- Density
- Vapour pressure
- solubility

GAS (Vapour pressure > 101.3 kPa at 20 °C)

	G	GD
Solubility	10%	

FLOATING LIQUIDS (density < seawater)

Vapour pressure			
10 kPa	E	ED	DE
3 kPa	FE	FED	D
0.3 kPa	F	FD	
Solubility	0.1%	1%	5%

SINKING LIQUIDS (density > seawater)

	S	SD	D or DE if VP > 10 kPa
Solubility	0.1% 5%		

FLOATING SOLIDS (density < seawater)

	F	FD	D
Solubility	10% 100%		

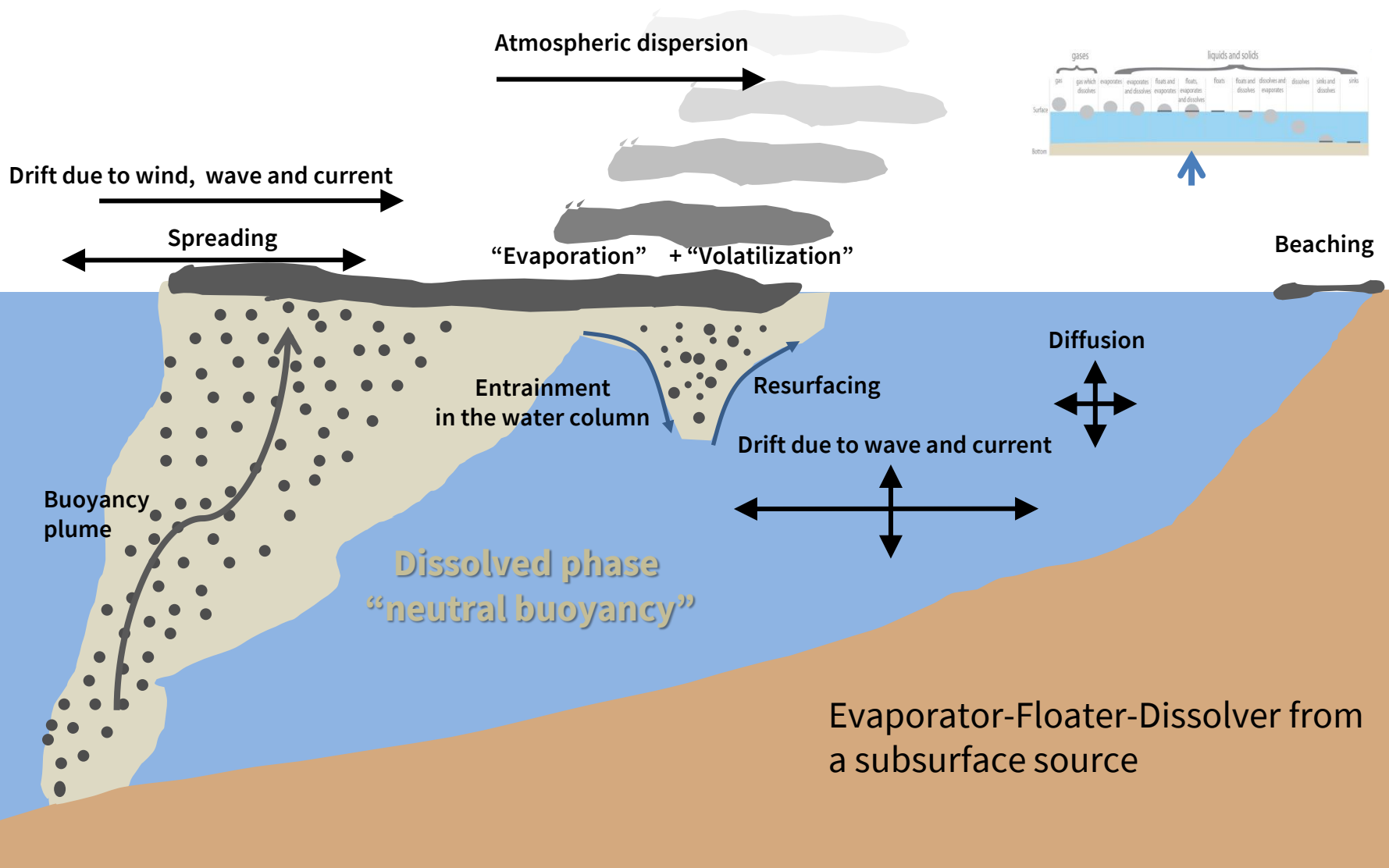
SINKING SOLIDS (density > seawater)

	S	SD	D
Solubility	10% 100%		

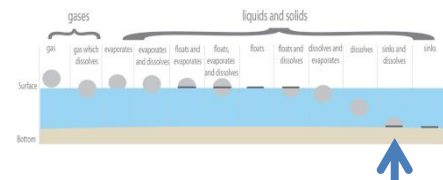
SEBC = blending of four basic behaviours



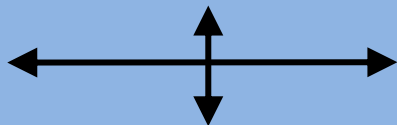
An intricate story once spilt in a dynamic environment



An intricate story once spilt in a dynamic environment



Drift due to wave and current



Diffusion

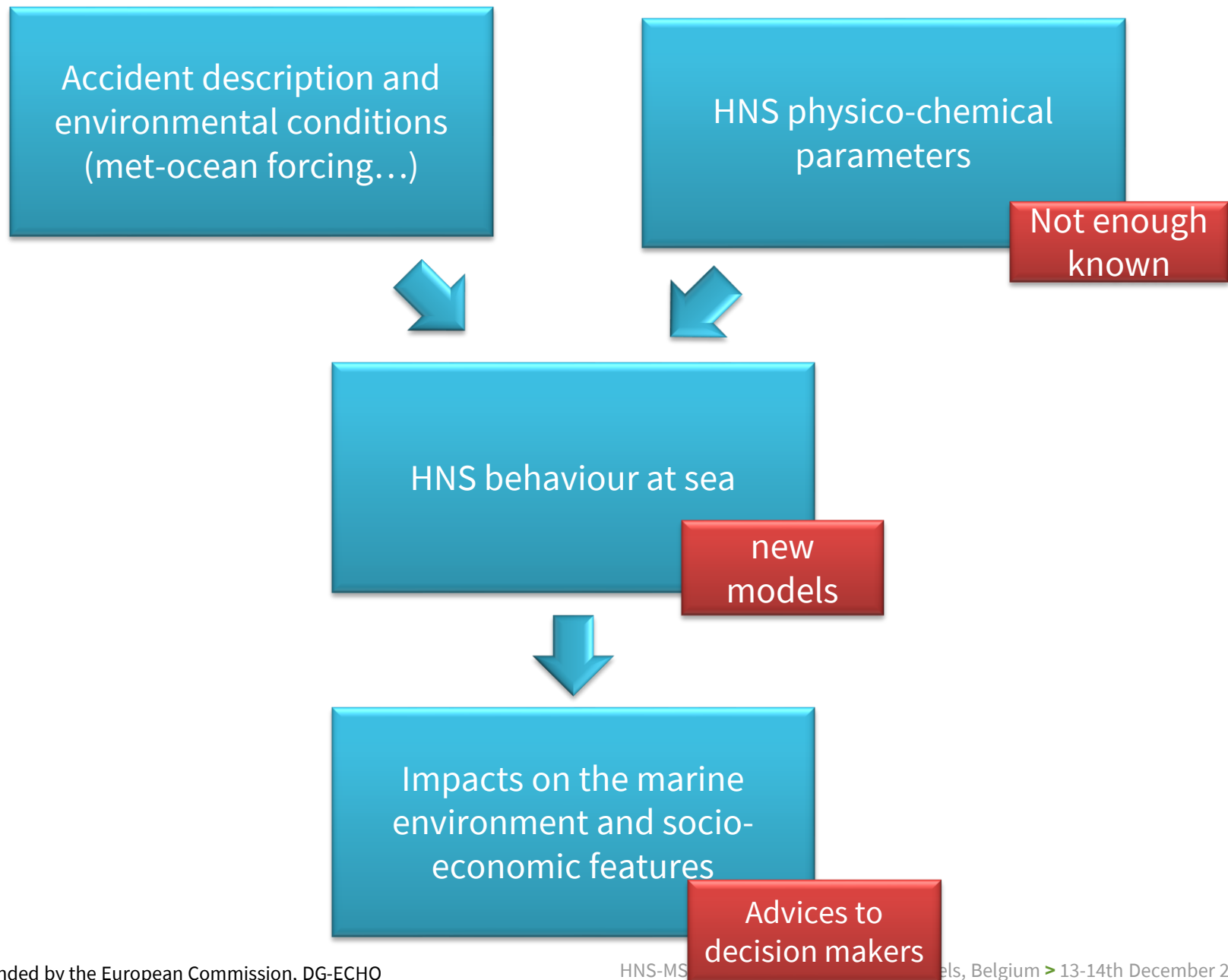


What about interaction with SPM and seabed?

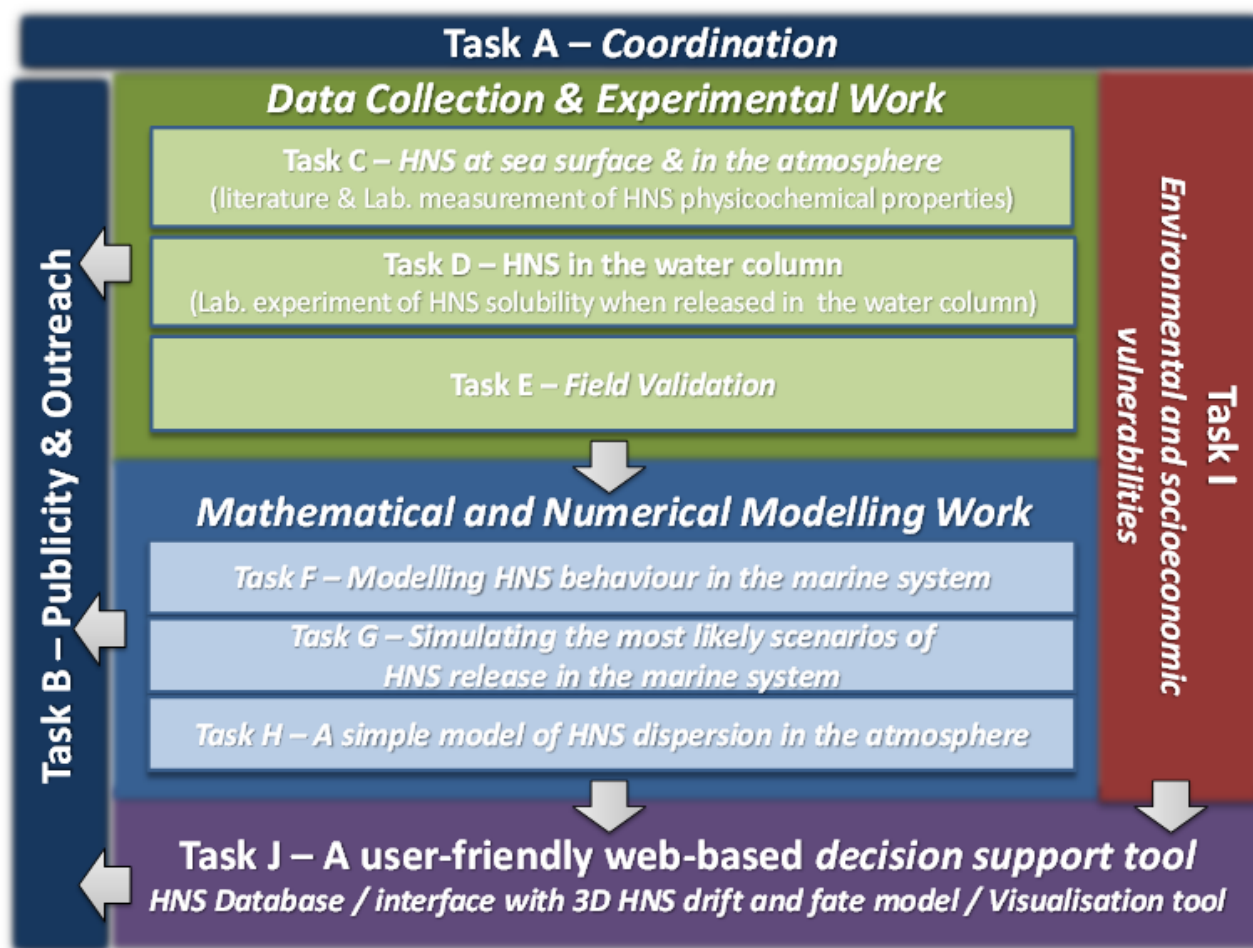
resuspension



Understanding physico-chemical processes that drive the behaviour and fate of the HNS in the marine environment



The HNS-MS concept





All the complexity cannot be tackled, especially in a framework of a 2 year project !

“Let’s focus on one region
and be a demonstrator for the other regions”

- Area of interest :
 - Bonn Agreement area
 - Bay of Biscay

“Let’s focus on a limited number of process”

- Out of the scope of this first project:
 - Chemical reactions
 - Explosions and fire
 - Interaction with SPM





Bonn Agreement
Accord de Bonn

HNS-MS results

Developing a decision-support tool for HNS spills in the Bonn Agreement area and Bay of Biscay

- ✓ A HNS data base with physicochemical parameters suitable for computing fate of HNS spilt at sea
- ✓ Maps atlas of environmental and socioeconomic HNS-sensitive resources
- ✓ A 3-dimensional HNS spill drift and fate mathematical model
- ✓ A user-friendly web-based tool accessible 24/7 by Coastguard stations

ENJOY THE MEETING!