



Wave basin



Sea-floor station



« omics » : sequencing platform

## Task 6.4 - Marine Research Infrastructures / Atlantic region

Updated overview, Regional / European integration and vision of the future

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6000m ROV



Research Vessel



AUV



Oceanic profiler

## 4 main coordination challenges, for Atlantic region / for Europe

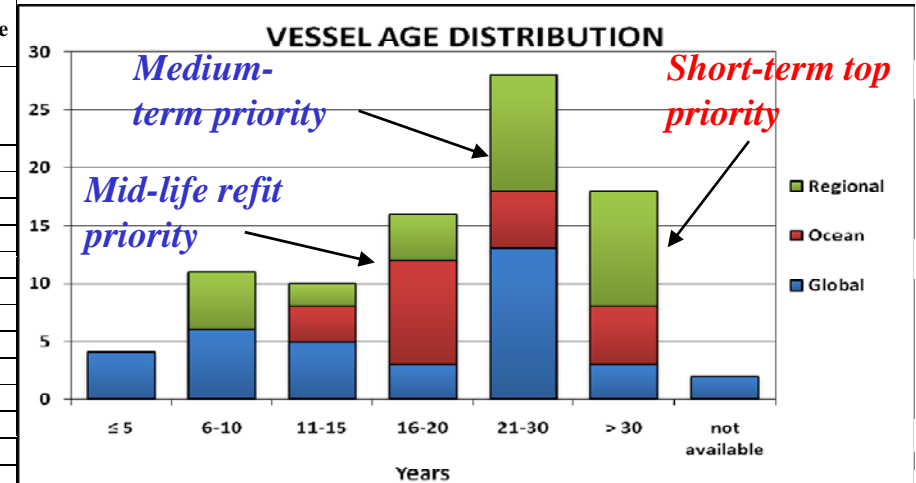
- **Research vessels and underwater vehicles**
- **Ocean and coastal observation & monitoring issues** (In situ data acquisition systems, satellites for sea surface remote sensing , data centres, incl. access to high computing facilities & generic modelling).
- **Marine land-based and in situ facilities for the ocean renewable energy challenge**
- **Experimental facilities for biology, biodiversity and ecosystem studies for the marine life resources challenge**

## Research Vessels and underwater vehicles : Fleets overview and evolution in Atlantic region

### Fleets overview for Atlantic countries

	Research Vessels				Underwater vehicles				Large exchangeable equipment
	Global vessel > 65 m	Oceanic vessel > 55 m	Regional Vessel > 35 m	Local Coastal	ROV	AUV	Manned Submersible	USV	
Norway	3	4	1	9	4				5
Sweden	1	1	3	6	2				
Denmark	1	1		2					
Iceland	1	1				1			
Germany	5	3	9	12	4	3	1		3
Netherlands	3	1	1	8			1		
Belgium	1	1	2		3				
UK	15	2	3	19	5	4	5		3
Ireland	1			2	3				
France	6	1	1	14	2	2	2		3
Spain	4		5	8	2	2			1
Portugal	2	1		7	9	5	1	5	4
<b>Total Atlantic</b>	<b>43</b>	<b>16</b>	<b>25</b>	<b>87</b>	<b>34</b>	<b>17</b>	<b>10</b>	<b>5</b>	<b>19</b>
	<b>171 Research Vessels</b>				<b>66 Underwater Vehicles</b>				<b>19</b>

### Vessel age distribution



### New or refit vessels planned (end 2011 situation)

Country	Vessel number	Vessel class			Scheduled year	Old vessel replacing/refitting
		Global/Ocean	Regional	Local/coastal		
Norway	3	2	1		2013-2018	3 replacements
Faroe Islands	1		1		2013	
Germany	4	3	1		2015-20 2011	3 replacements, 1 refit
Belgium	2	1	1		2012 & 2015	2 replacements
UK	1	1				1 replacement
Ireland	1	1				1 refit
France	2		1	1	2015-2017	
Spain	2	1	1		2012 & 2015	1 replacement, 1 refit
<b>Total</b>	<b>16</b>	<b>9</b>	<b>6</b>	<b>1</b>		

### In Atlantic region :

8 countries are planning a fleet renewal.

16 projects are planned or are ongoing :

**12 projects concerning construction of new vessels**

**4 to refit existing vessels.**



## Research Vessels and underwater vehicles – Vision of the future

A lot of R/V and underwater equipment, but pressure on the operating budgets.

The future is still strong national fleets but with robust cooperation schemes at both Regional and Eu level.

As regard coordination, we should consider the specificity of two categories of fleets :

- Global/Ocean class multipurpose vessels (> 55 m)
- Regional class vessels

Within **EUROFLEETS**, the next stage will be pioneering exploring and experimenting new integrating tools such as virtual joint fleet or shared scientific evaluation.

**OFEG** (Ocean Facilities Exchange Group) still active to give flexibility to the sea cruises planning of global/ocean vessels (in the Atlantic area especially) and to foster operability of rare underwater equipment, but restricted to countries having similar vessels.

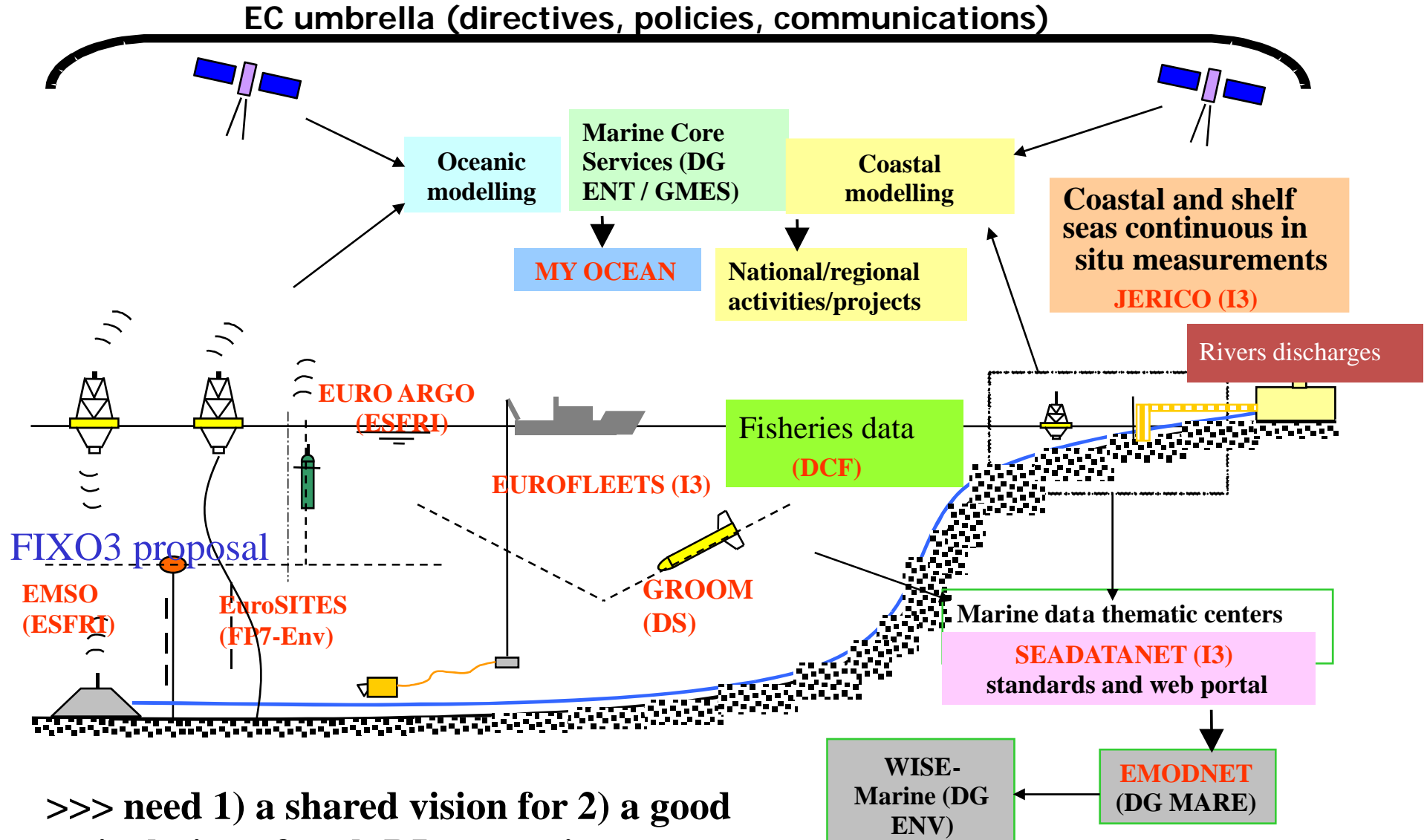
**ERVO** (European Research Vessels Operators group) could evolve towards the advisory committee for regional vessels procurement strategy and implementation.

Mutualisation within regional arrangement could be envisaged :

- bartering exchange of ship time at regional level : “the OFEG scheme”
- one owner and multi users (per month) : “the Thalassa scheme”
- rare equipment interoperability

News : ERVO now associated partner in EUROFLEETS

**Ocean and coastal observation & monitoring issues :  
a complex articulation of skills and initiatives**



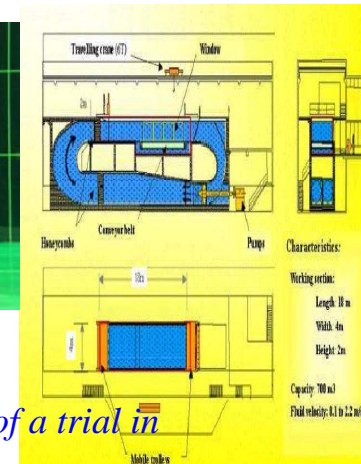
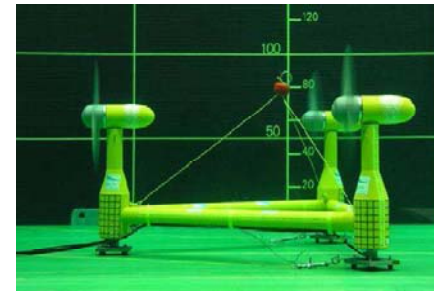
>>> need 1) a shared vision for 2) a good articulation of each RI consortium



**Marine land-based and in situ facilities, for ocean engineering and for a new crucial challenge for the Atlantic region : ocean renewable energy**



*Wave basin with a wave energy converter under testing*



*Sketch of the flume and view of a trial in current for a marine energy converter system*



*1000 bars / 2° C hyperbaric tank*



*Wave test offshore site*



*Wave energy converter in test*

**Marine land-based and in situ facilities, for ocean engineering and for a new crucial challenge for the Atlantic region : ocean renewable energy**

**European integration in this domain is mainly supported by two FP7-I3 projects :**

**MARINET** (“Marine Research Infrastructures Network for Energy Technologies”, april 2011- march 2015) : more focused on testing facilities for Marine Energy Converters

**HYDRALAB IV** (“More than water, Dealing with the complex interaction of water with environmental elements, sediment, structures and ice”, 2011-2015) : Hydraulic/Hydrodynamic testing facilities for offshore engineering as for marine environment issues

Both consortia gather very similar skills and could envisaged a cooperation on common issues like wave generation, water current flumes, test protocols, ...

## **Experimental facilities for biology, biodiversity and ecosystem studies :**

**4 types of facilities identified : Marine Genomics facilities, Aquaculture experimental facilities, Mesocosm facilities, Marine Biodiversity observatories , sharing common skills on marine life resources and their aquatic environment.**

**1) ASSEMBLE (FP7-I3) + EMBRC (ESFRI project) :** a European Marine Biological Resource Centre composed of a network of coastal marine laboratories in the European Research Area (ERA), with a single entry point.

A distributed research infrastructure, with 12 Marine institutes and EMBL, representing 9 Countries and including 300 Scientists.

Partners / Atlantic region : *Norway, Sweden, Germany, UK, France, Portugal,*

Associated-aspiring partners / Atlantic region : *Spain, Ireland*

**2) AQUAEXCEL (FP7-I3, march 2011 – feb. 2015) :** collaboration among 17 partners and 23 facilities.

**3) MESOAQUA (FP7-I3 , jan. 2009 – déc. 2012) :** network of leading MESOCosm facilities to advance the studies of future AQUATIC ecosystems from the Arctic to the Mediterranean

**4) EMBOS (European Marine Biodiversity Observatory System, COST action)**

+ **LIFEWATCH** (ESFRI project) / marine data part.