Joint European Research Infrastructure network for Coastal Observatories

Report after the Strategic workshop #1 (Heraklion)

Grant Agreement n° 262584

Project Acronym: JERICO

Project Title: Towards a Joint European Research Infrastructure network for Coastal Observatories

Coordination: P. Farcy, IFREMER,

jerico@ifremer.fr, www.jerico-fp7.eu:

Authors: P. Farcy, I.Puillat, D. Durand, N. Beaume, M. Pichard

Involved Institutions: Ifremer and JERICO partners

Version and Date: Version 3 – 20 December 2013

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REFERENCES

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other				

1. Executive Summary

One of the main JERICO objectives is to establish a strategy for the future of the coastal observation. In other words, firstly JERICO has both to perform the state of the art with regards to European coastal observation systems and to help harmonizing technologies and sharing knowledge. Then according to the results of this first stage, the project will deliver a strategic plan to step forward. As a starting point, a roadmap was written in deliverable D1.2 “Rationale and Definitions for a Common Strategy” to give a framework to the project participants and inform about intentions. The following step in the process was to organise a strategic workshop #1 which is reported in this document.

In the following report presentations made during the workshop are exposed. The first part of the minutes report is dedicated to examples of national coastal observation strategies from:

- USA: Janet Newton, University of Washington
- France: Patrick Farcy, IFREMER.
- Greece: Georges Petihakis, HCMR
- Germany: Wilhelm Petersen, COSYNA.
- Spain: Julien Mader, AZTI.
- Spain: Joaquin Tintore, CSIC-IMEDEA.
- Ireland: Glenn Nolan,MI.
- UK: David Hydes, NERC.

In the second part of the workshop minutes, discussions on the potential future strategy for the coastal observatories in Europe are reviewed, as well as discussions on the possible lobbying to support the future implementation of the future strategy. This last part is a starting point to set in motion a common reflection on a European strategy for coastal observatories.

Instead of only reporting the words and discussions occurred during the meeting, authors also report their analysis of the given information in order to put forward specific issues with regards to the national strategies: gathered information with regards to common issues specific to build a strategy for the future:

- the scientific strategy,
- the infrastructure integration in a national or regional observation system;
- the strategy for innovation and to better link with the private sector,
- the strategy to flow the data in an integrated data management system and to communicate with scientists, stakeholders and general public.

To conclude with this document authors analyses the gathered information versus the missing one in order to better focus the upcoming work and the next workshop. Conclusions also highlight the need of a coordinated implementation and encompassing European governance and the necessity to enhance the links with modeling community.

2. Introduction and Workshop's agenda

The JERICO General Assembly held in Heraklion in the 1st & 2nd October 2012 and concluded the first 18th-month period of the project. Then two workshops were organised as it was a unique opportunity to involve all partners:

- The Best Practices workshop: “best practices on coastal observing systems”
- The Strategic workshop: "How to have a common vision and to build a strategy for the next 10 years?”

Previously, the JERICO consortium recognized the ambition on elaborating guidelines, quality label and the so-called Common Strategy, requires a consensual vision and shared understanding. As a consequence, this workshop was organised in 2 steps: at first an inventory of national coastal observation strategies is presented, and then the potential future strategy for the coastal observatories in Europe and initiatives that could be supported by an efficient lobbying are discussed.

The given presentations will help establishing key elements of the JERICO common strategy on European coastal observatories by answering the specific objectives of the workshop which are:

- To analyse with shared criteria the initial strategy of existing networks among the national and regional observation systems: commonalities and differences will be analysed a posteriori,
- To raise ways to reduce investment and running cost (integration of systems, harmonisation, innovation);
- To find out mechanisms for the sustainability of financial resources;
- To discuss future technological and methodological developments;
-To set in motion a common reflection on an ad-hoc governance scheme facilitating and linking European coastal observatories.

Agenda:

09.00-12.30 session 1: Examples of national coastal observation strategies : 1. Introduction talk (Patrick Farcy) 2. US coastal observatories (Janet Newton) 3. IFREMER and French strategy for operational coastal oceanography (Patrick Farcy) 4. HCMR and Greece (George Petihakis) 5. COSYNA future strategy (Wilhelm Petersen) 6. AZTI strategy (Julien Mader) 7. CSIC strategy (Joaquin Tintore) 8. Irish strategy (Glenn Nolan) 9. NERC and UK strategy (David Hydes) **12.30-17.00 Session 2: Discussions on the strategy** 1) *Discussion : What future strategy for the coastal observatories in Europe?* (Moderators : Pascal Morin, Wilhelm Petersen, Georges Petihakis, Dominique Durand) 2) *Discussion : How can we have an efficient lobbying?* (Moderators : Stefania Sparnocchia, Patrick Farcy).

Attendees

	Institute		Country	Partner's representative
1	Institut Français de Recherche pour l'Exploitation de la Mer	Ifremer	France	Patrick FARCY
2	Finnish Environment Institute	SYKE	Finland	Jukka SEPPALA
3	Institute of Hydro-Engineering of the Polish Academy of Sciences	IBW PAN	Poland	Piotr SZMYTKIEWICZ
4	Danish Meteorological Institute	DMI	Denmark	not represented
5	Norwegian Institute for Water Research	NIVA	Norway	Dominique DURAND
6	Institute of Marine Research	IMR	Norway	Henning WEHDE
7	Independent consulting and research institute	DELTARES	Netherlands	not represented
8	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	OGS	Italy	Caterina FANARA
9	Consiglio Nazionale delle Ricerche	CNR	Italy	Stefania SPARNOCCHIA
10	University of Malta	UOM	Malta	Adam GANCI
11	Hellenic Centre for Marine Research	HCMR	Greece	George PETIHAKIS
12	Natural Environment Research Council	NERC	UK	David HYDES
13	National Institute for Geophysics and Volcanology	INGV	Italy	not represented
14	Institute for Coastal Research	HZG	Germany	Wilhelm PETERSEN
15	Management Unit of the North Sea Mathematical Models	MUMM	Belgium	Frederic FRANCKEN
16	The Secretary of State for Environment, Food & Rural Affairs	CEFAS	UK	Jo FODEN
17	Swedish Meteorological and Hydrological Institute (EuroGOOS)	SMHI	Sweden	Iréne LAKE
18	Consejo Superior de Investigaciones Cientificas	CSIC	Spain (Balearic)	Joaquim TINTORE
19	Royal Netherlands Institute for Sea Research	NIOZ	Netherlands	not represented
20	Marine Institute	MI	Ireland	Glenn NOLAN
21	Blue Lobster I.T.	BL	UK	Simon KEEBLE
22	AZTI - Tecnalia	AZTI	Spain	Julien MADER
23	Institut National des Sciences de l'Univers (CNRS)	INSU / CNRS	France	Pascal MORIN
24	Instituto Hidrográfico	IH	Portugal	Sara ALMEIDA
25	Institute of Oceanology - Bulgarian Academy of Sciences	IO-BAS	Bulgaria	Atanas PALAZOV
26	Puertos del Estado	PUERTO	Spain	not represented
27	Euro-Mediterranean Center for Climate Change	CMCC	Italy	Srdjan DOBRICIC

3. Minute of the workshop

3.1. Session 1: Examples of national and regional strategies

3.1.1. Introduction talk (P. Farcy)

In order to open the first session, Patrick Farcy (IFREMER - JERICO coordinator) introduced the main guidelines of this meeting and emphasised that this workshop is an introduction for the definition of the strategy for the future after Deliverable D1.2.

First of all, Patrick Farcy talked about the possibility of building a common future strategy for JERICO.

The rationale of observation collection in our coastal seas is four-fold:

- Assessment of environment status
- Better understanding of both natural and anthropogenic variability in biological, chemical and physical processes
- Short-term to long-term environmental prediction and forecasting
- Sustaining development, implementation and control of European policy

However, even if technologies exist, the integration and the coordination such observations in an optimal way have not yet been realised. JERICO aim is to work to fill this gap.

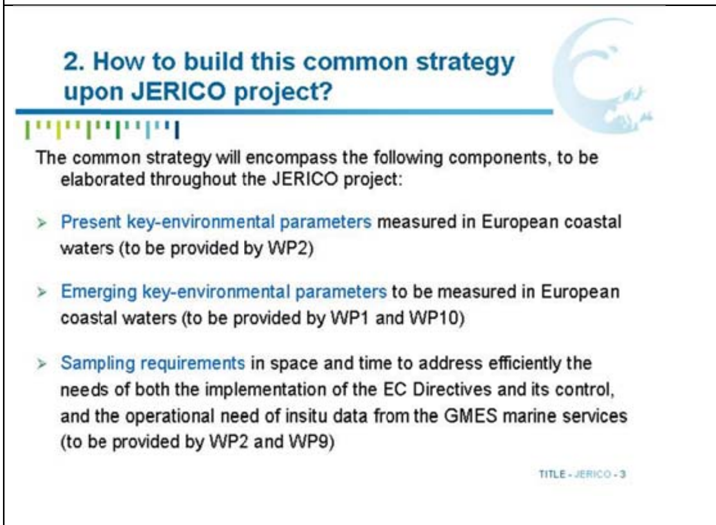
Moreover, in order to develop this idea, Patrick Farcy emphasized on how to build this common strategy upon the JERICO project. This aspect may be brought thanks to the following components, to be defined throughout the JERICO project:

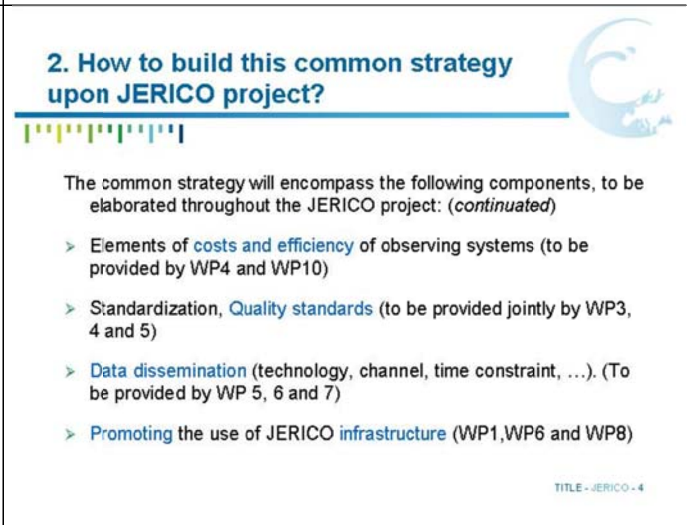
- Present and emerging key-environmental parameters
- Sampling requirements
- Costs and efficiency of observing systems
- Quality standards
- Data dissemination
- Promoting the use of JERICO infrastructure

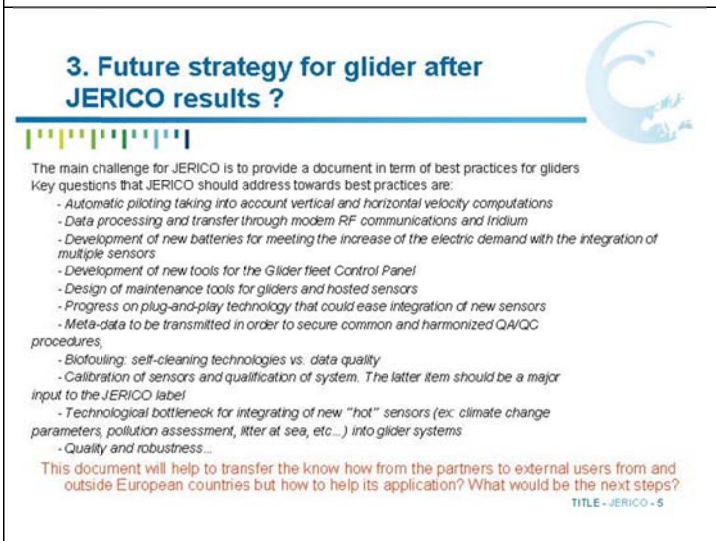
Secondly, one of the main challenges for JERICO is to provide a document on existing best practices for gliders, fixed platforms and ferryboxes. This document will help to transfer the know-how from the partners to external users and for non-European countries.

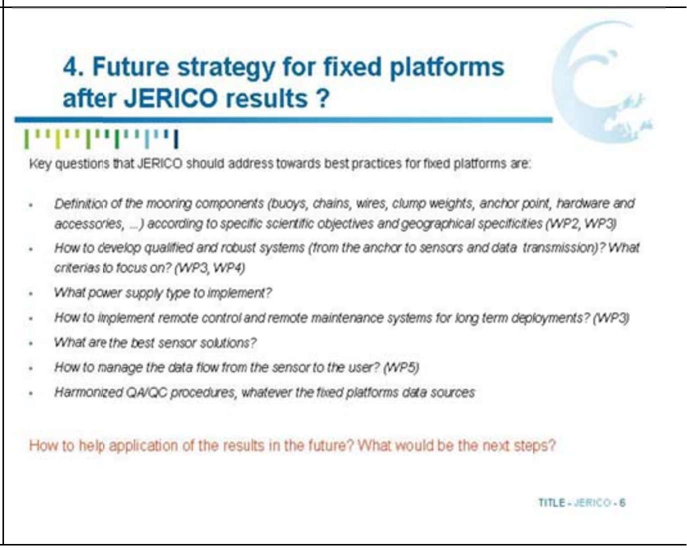
In order to gain an overall picture of the national coastal observation strategies implemented in Europe, examples of national coastal observation strategies have been introduced, opening on the next presentations.

Slides are presented below.









3.1.2 US coastal observatories (Janet Newton, University of Washington)

After a brief introduction by Patrick Farcy, Janet Newton (University of Washington – NANOOS Director) described the US coastal ocean observatories and their strategies.

In the USA, the coastal observation strategy is based on two major ocean observing systems: Ocean Observing Initiative (OOI) and Integrated Ocean Observing System (IOOS). These systems are integrated, working on a single data management system between the two initiatives. OOI aims to study climate variability, ocean circulation and ecosystem dynamics, while IOOS goal is to establish a national integrated system of ocean, coastal and Great Lakes observing systems.

Janet Newton introduced the actions and structures involved in the USA, dealing with coastal ocean observatory and analysis:

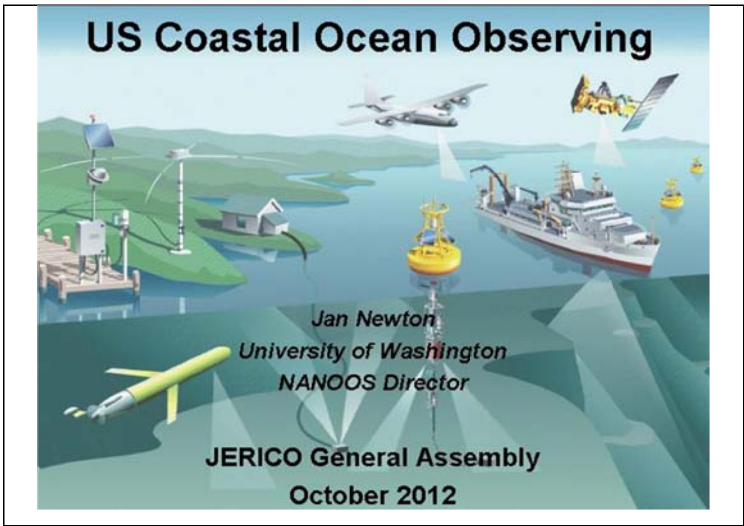
- The Alliance for Coastal Technologies (ACT): the link to sensor validation and verification. ACT develops partnerships with academic research institutions involving coastal and ocean science and technology expertise.
- The HF Radar National Observing Network: a national observing network which has been proficient in the USA these past few years. This network comprises more than 30 institutions operating 128 HF Radars. The structure represents a federal/non-federal investment of $55M in the last 15 years and has a partnership with Industry, thanks to US-based CODAR Ocean Sensor.

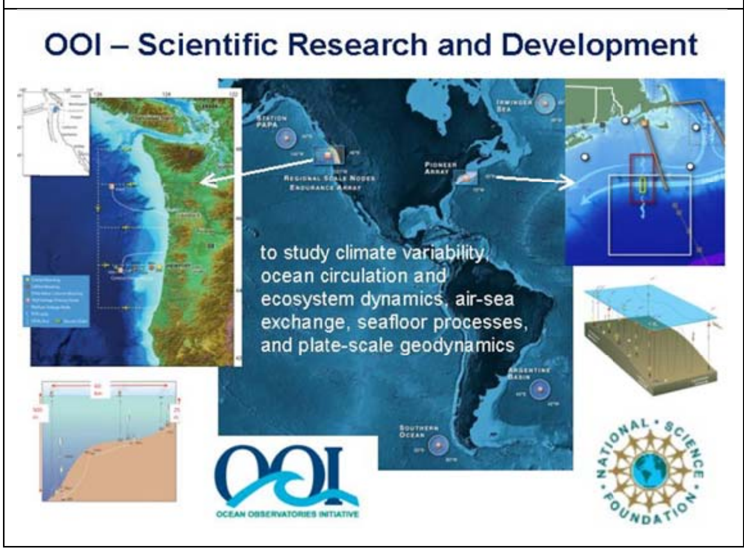
In addition, Janet Newton talked about NANOOS (Northwest Association of Networked Ocean Observing Systems) and the associated strategy dedicated to develop a Pacific Northwest PNW Observing System. NANOOS gathers a community of people that provides data through one place for quicker decision-making (My NANOOS: Google based dissemination system).

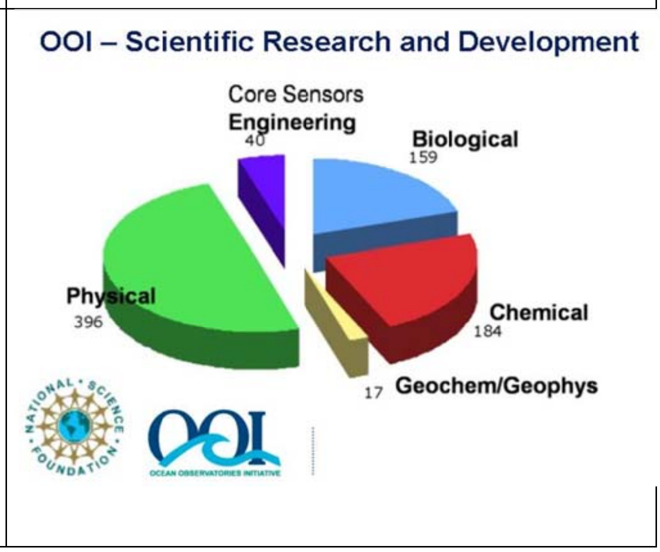
Janet Newton is interested in collaborating with JERICO on Best practices.

Synthesis with regards to the workshop objectives:
The US strategy is twofold with IOOS and OOI, the first one is funded by NOAA and the second one by NSF. Both are working to build an integrated data management system from the open ocean to coastal and Great lakes areas
Whereas OOI deals more with open oceans, IOOS is integrating regional components, and involves technology experts via the ACT.
26 core variables are monitored.
The information to the public is insured via an on line web interface dedicated to education and outreach.

Slides are presented below.







OOI – Scientific Research and Development

GLIDER
Water velocity profile
Conductivity, temperature and depth
Fluorometer for chlorophyll
Photosynthetically Active Radiation
Dissolved oxygen

Fixed Platforms
Water velocity profile
Conductivity, temperature and depth
Dissolved oxygen
Fluorometer: chlorophyll, colored dissolved organic matter, optical backscatter
Nitrate concentration
Optical attenuation and absorption
Water pCO_2
Atmospheric pCO_2
pH
Spectral, down-welling irradiance
Photosynthetically Active Radiation
Passive, broad-band hydrophone
Bulk meteorology instruments
Single Point current meter
Surface wave spectra instruments
Direct air-sea fluxes of heat, moisture, and momentum
Bio-acoustical zooplankton sensor

AUV
Water velocity profile
Conductivity, temperature and depth
Nitrate, nitrite, phosphate, and silicate analyzer
Photosynthetically Active Radiation

Deep Ocean Floor
Conductivity, temperature and depth
Bottom Pressure-Tilt
Digital still camera and strobe
Digital high definition video camera
Horizontal electric field pressure inverted echo sounder
Passive, low-frequency hydrophone
Mass spectrometer
Ocean bottom seismometer
Short Period Ocean bottom seismometer
Osmotic Water sampler for trace chemical analyses
in situ measurements of fluid flow at methane seep
Microbial DNA sampler
Seafloor pressure sensor for measuring depth and tides
Water sampler for H2S and pH, H2, H2S, and pH at deep sea vents
Seafloor water temperature thermistor array
Seafloor temperature and resistivity at hydrothermal vents
Vertical 5-beam acoustic current profiler, 300 kHz

http://www.oceanobservatories.org/wp-content/uploads/2012/03/OOI_Announcement_of_Core_InstrumentModels_and_Locations_2012-02-21_ver_0-01.pdf

Integrated Coastal & Ocean Observation System Act of 2009

Created IOOS, with NOAA as lead Federal agency

"The purposes of this subtitle are to–

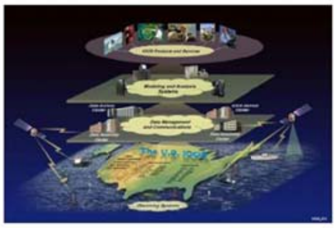
(1) establish a **national integrated System** of ocean, coastal, and Great Lakes observing systems,
comprised of **Federal and non-Federal** components coordinated at the national level by the National Ocean Research Leadership Council and at the regional level by a network of regional information coordination entities,
and that includes in situ, remote, and other **coastal and ocean observation, technologies, and data management and communication systems**,
and is **designed to address regional and national needs** for ocean information, to gather specific data on key coastal, ocean, and Great Lakes variables, and to ensure timely and sustained dissemination and availability of these data…"

IOOS®

U.S. IOOS

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

Global Component
Coastal Component (EEZ to the head of tide)

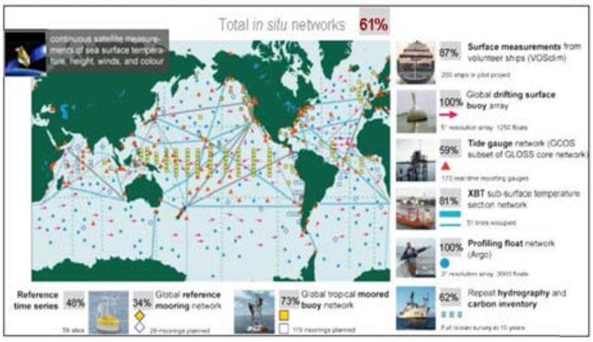


7 Goals, 1 System
Improve predictions of **climate change and weather**
Improve the safety and efficiency of **maritime operations**
Improve forecasts of **natural hazards**
Improve **homeland security**
Minimize **public health risks**
Protect and restore **healthy coastal ecosystems**
Sustain living marine **resources**

IOOS® **Enhances science and improves decision making**

Global Component

IOOS INTEGRATED OCEAN OBSERVING SYSTEM



GCOS GOOS jcomm

IOOS®

Coastal Component

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

- Comprised of federal agencies (National level) and non-federal (Regional level)
- Geographic extent: EEZ to the head of the tide
- Based on 26 core variables
- Data Management and Communications (DMAC) is a major focus that is intended to be enterprise wide from National to Regional scales
- Outreach and Education components

IOOS®

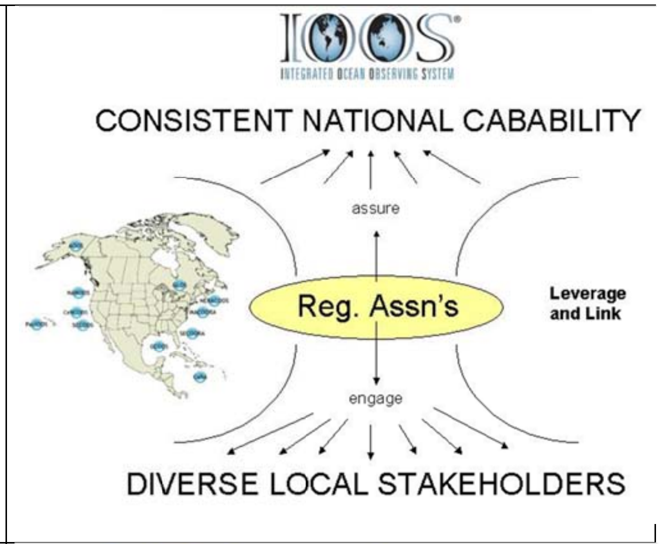
26 core variables

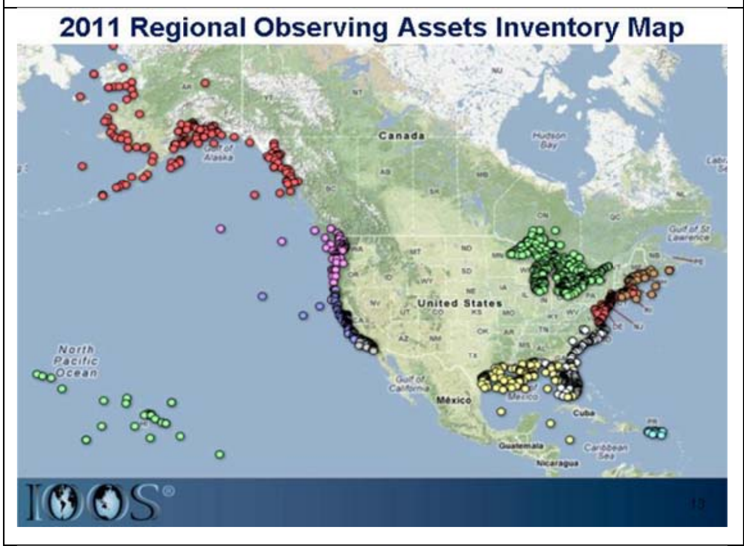
IOOS INTEGRATED OCEAN OBSERVING SYSTEM

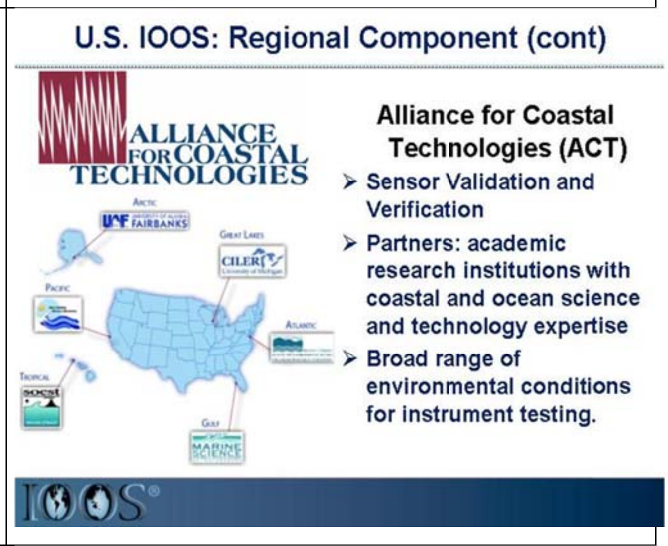
- Acidity (pH)
- Bathymetry
- Bottom character
- Colored dissolved organic matter
- Contaminants
- Dissolved nutrients
- Dissolved oxygen
- Fish abundance
- Fish species
- Heat flux
- Ice distribution
- Ocean color
- Optical properties
- Partial pressure of carbon dioxide (pCO_2)
- Pathogens
- Phytoplankton species
- Salinity
- Sea level
- Stream flow
- Surface currents
- Surface waves
- Temperature
- Total suspended matter
- Wind speed and direction
- Zooplankton abundance
- Zooplankton species

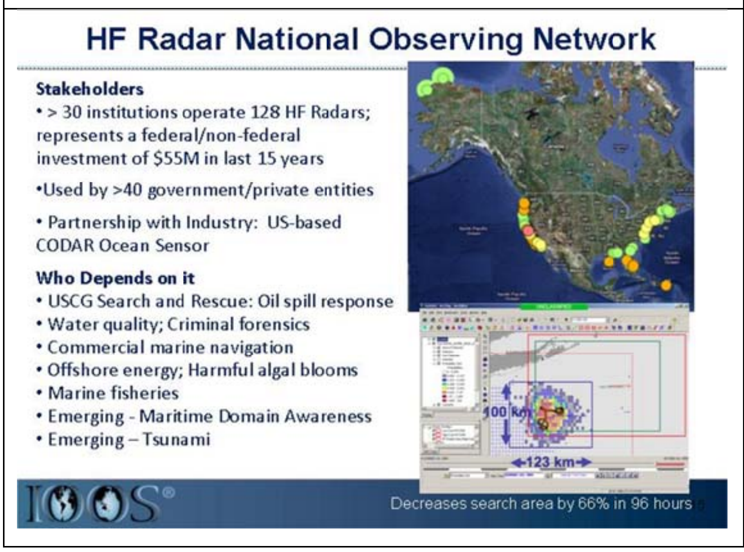
IOOS®


U.S. IOOS Regional Associations
AOOS
Alaska Ocean Observing System
NANOOS
GLOS
NERACOOS
MACOORA
SECOORA
CeNCOOS
PacIOOS
GCOOS
CaRA

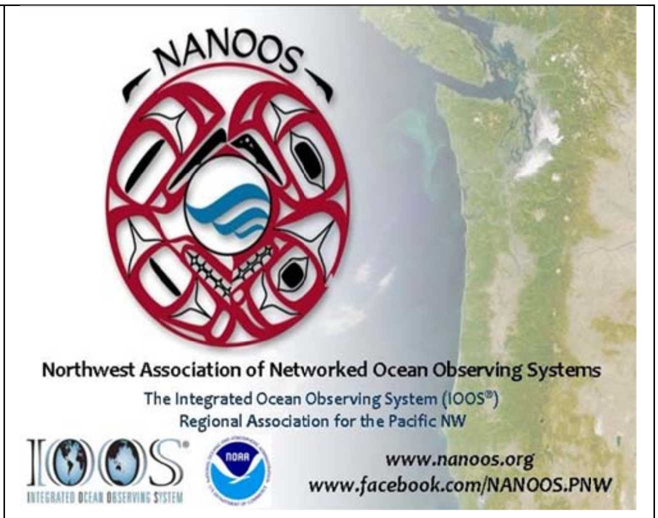

IOOS
INTEGRATED OCEAN OBSERVING SYSTEM
CONSISTENT NATIONAL CABABILITY
assure
Reg. Assn's
Leverage and Link
engage
DIVERSE LOCAL STAKEHOLDERS


2011 Regional Observing Assets Inventory Map
Canada
United States
North Pacific Ocean
Gulf of California
México
Cuba
Caribbean Sea


U.S. IOOS: Regional Component (cont)
ALLIANCE FOR COASTAL TECHNOLOGIES
Alliance for Coastal Technologies (ACT)
➢ Sensor Validation and Verification
➢ Partners: academic research institutions with coastal and ocean science and technology expertise
➢ Broad range of environmental conditions for instrument testing.


HF Radar National Observing Network
Stakeholders
• > 30 institutions operate 128 HF Radars; represents a federal/non-federal investment of $55M in last 15 years
•Used by >40 government/private entities
• Partnership with Industry: US-based CODAR Ocean Sensor
Who Depends on it
• USCG Search and Rescue: Oil spill response
• Water quality; Criminal forensics
• Commercial marine navigation
• Offshore energy; Harmful algal blooms
• Marine fisheries
• Emerging - Maritime Domain Awareness
• Emerging – Tsunami
100 km
123 km
Decreases search area by 66% in 96 hours


Examples of National Observing Networks
Gulper
Slocum
Wave
Spray
Seaglider
Gliders



NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

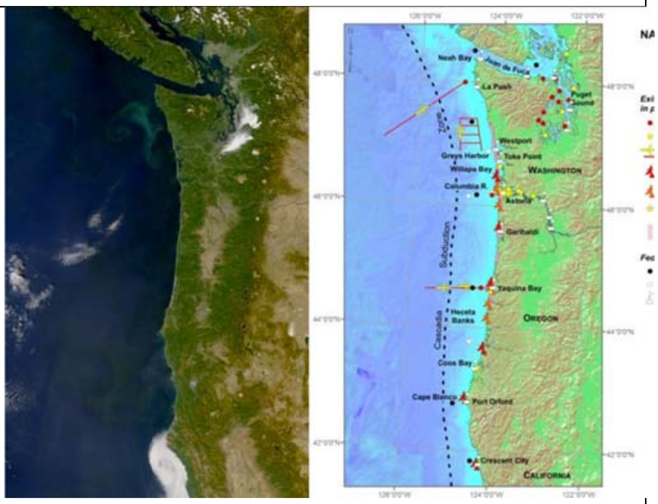
WASHINGTON - OREGON - NORTHERN CALIFORNIA

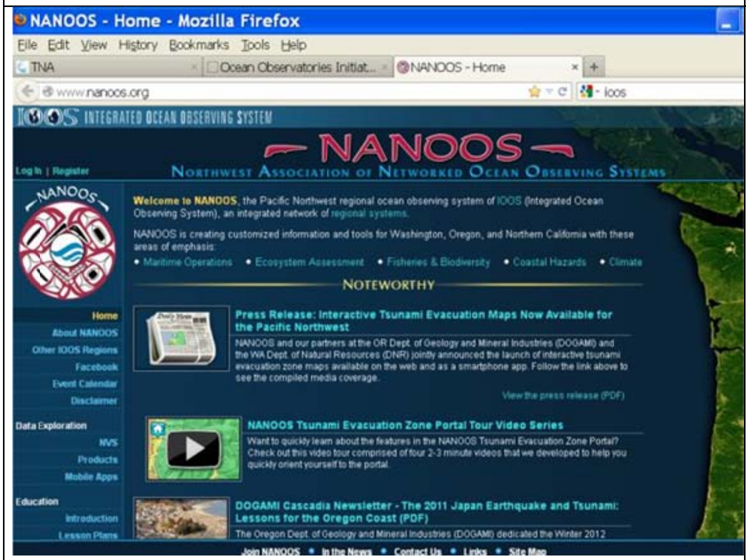
Strategy to develop a PNW Observing System

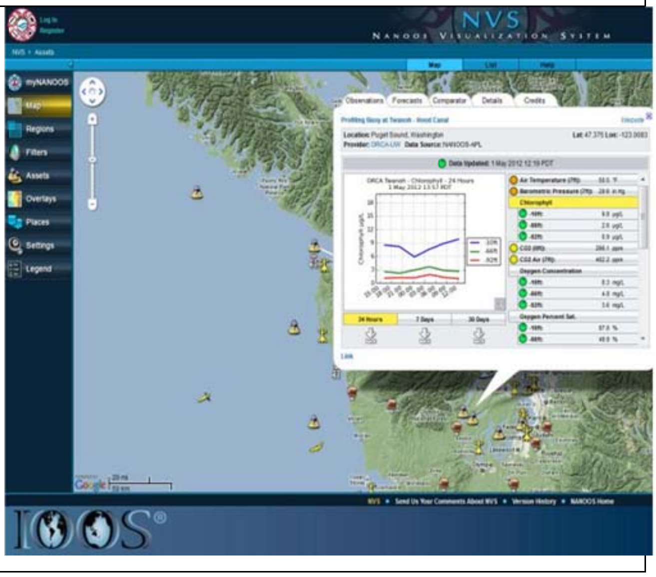
1. Integrate what we have (assets, people, technologies)

   = federal, state agency, academic, local, tribal, and industry

2. Be strategic regarding what we need, based on priorities



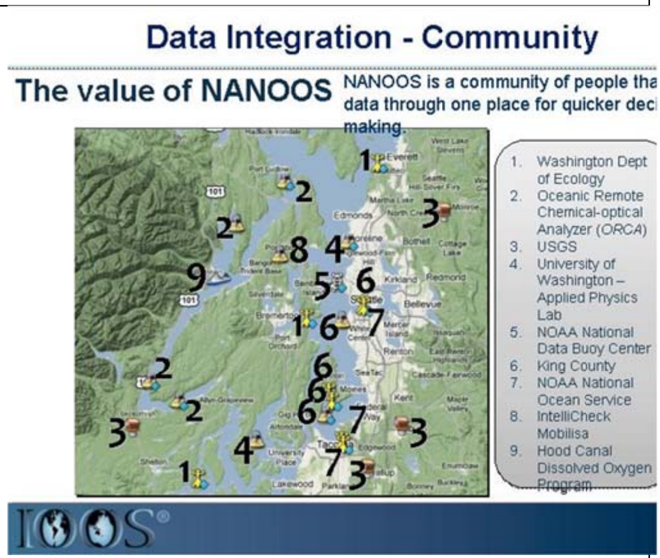


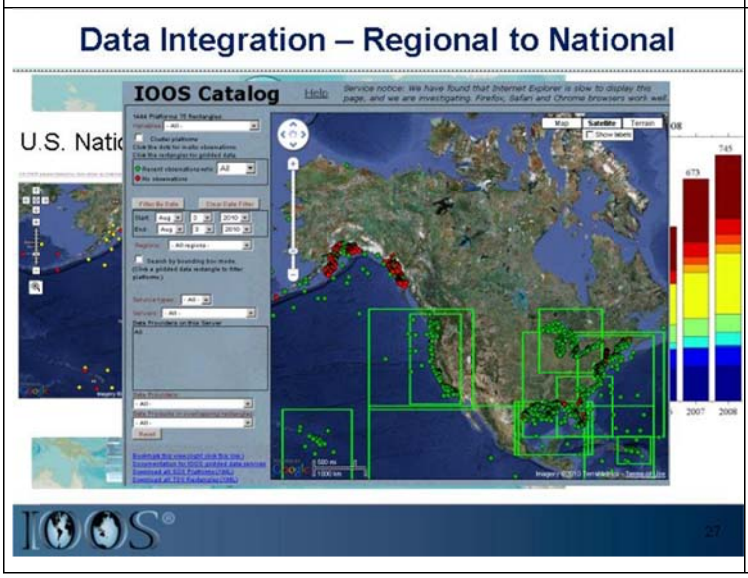


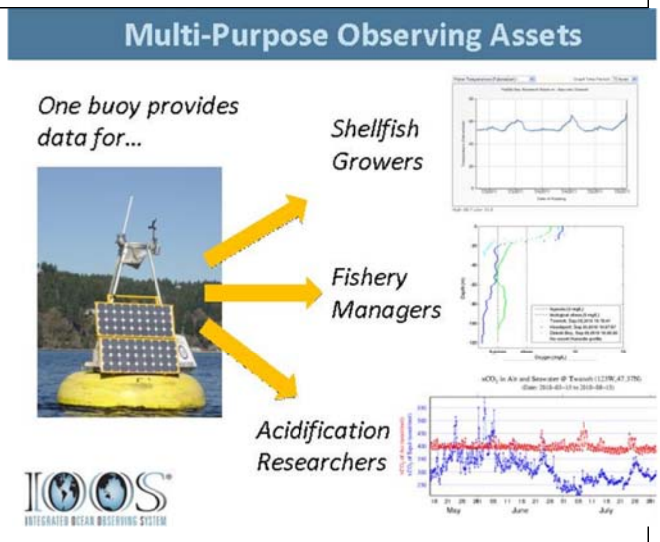

NVS
NANOOS VISUALIZATION SYSTEM
myNANOOS
Map
Regions
Filters
Assets
Overlays
Places
Settings
Legend
IOOS

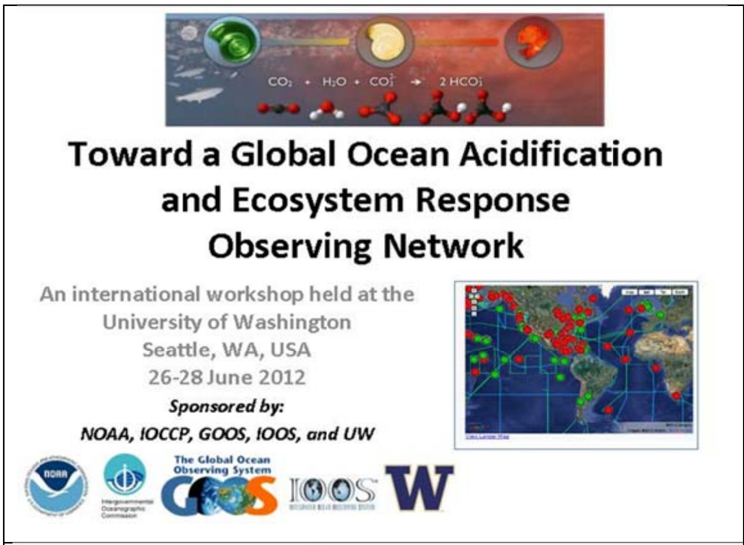

NVS
NANOOS VISUALIZATION SYSTEM
myNANOOS
NVS iPhone App
Assets on Google Map
Sensor Data Values
Weekly Tren

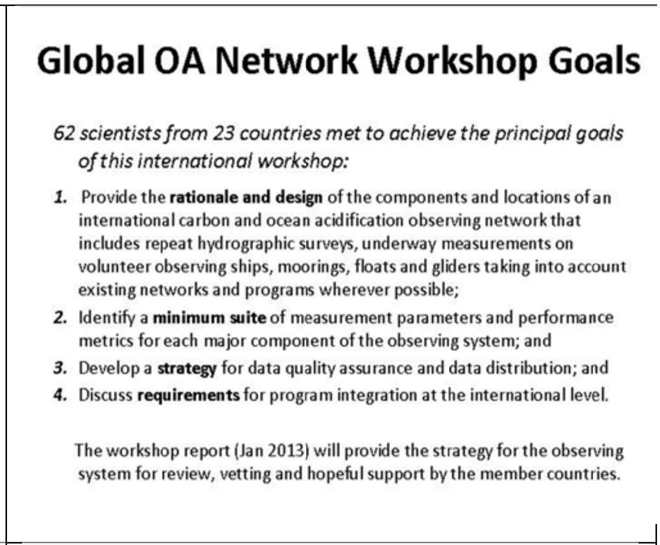

NVS
NANOOS VISUALIZATION SYSTEM
myNANOOS
Map
Regions
Filters
Assets
Overlays
Places
Settings
Legend
NANOOS funds:
UW, WA State Dept. Ecology, OHSU, OSU, OR Dept State Lands assets,
~19 in total
NANOOS displays:
Federal, Tribal, State, University, Private assets,
167 in total
NVS • Send Us Your Comments About NVS • Version History • NANOOS Home

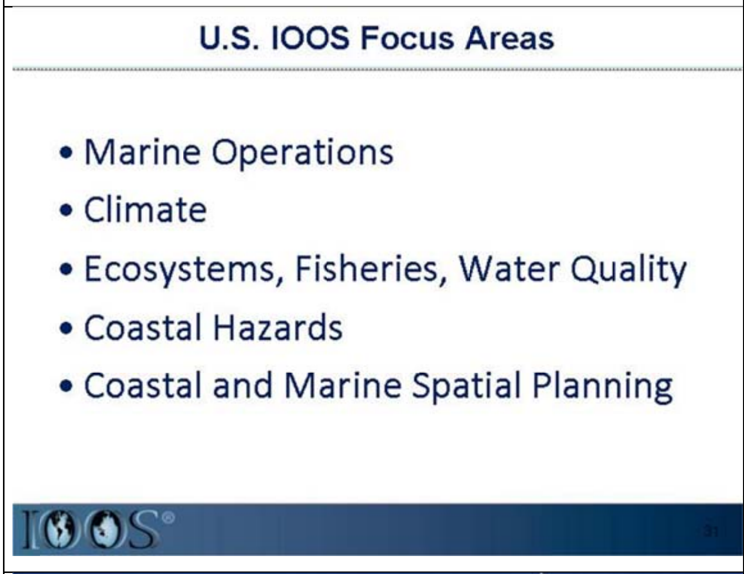

Data Integration - Community
The value of NANOOS
NANOOS is a community of people tha data through one place for quicker dec making.
1. Washington Dept of Ecology
2. Oceanic Remote Chemical-optical Analyzer (ORCA)
3. USGS
4. University of Washington – Applied Physics Lab
5. NOAA National Data Buoy Center
6. King County
7. NOAA National Ocean Service
8. IntelliCheck Mobilisa
9. Hood Canal Dissolved Oxygen Program
IOOS

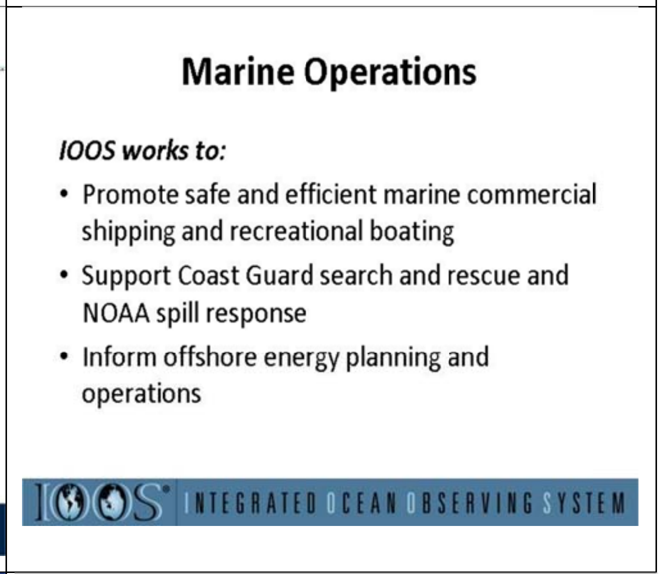

Data Integration – Regional to National
IOOS Catalog
U.S. Nati
IOOS

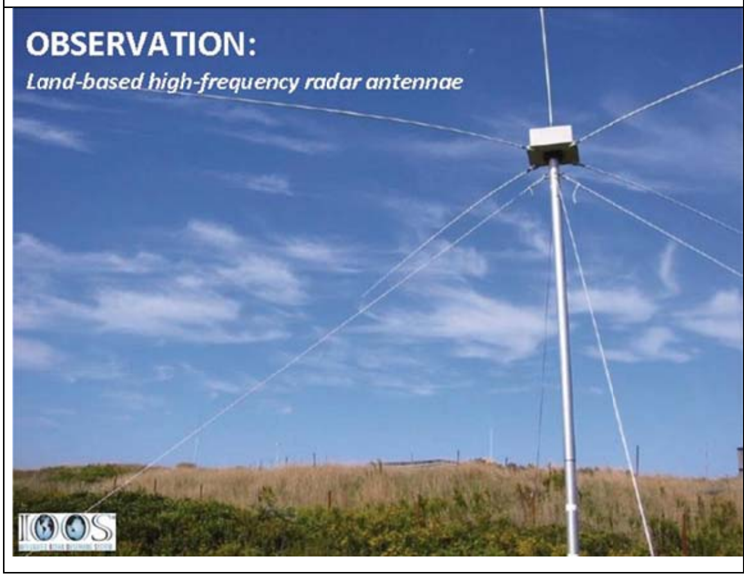

Multi-Purpose Observing Assets
One buoy provides data for...
Shellfish Growers
Fishery Managers
Acidification Researchers
IOOS
INTEGRATED OCEAN OBSERVING SYSTEM

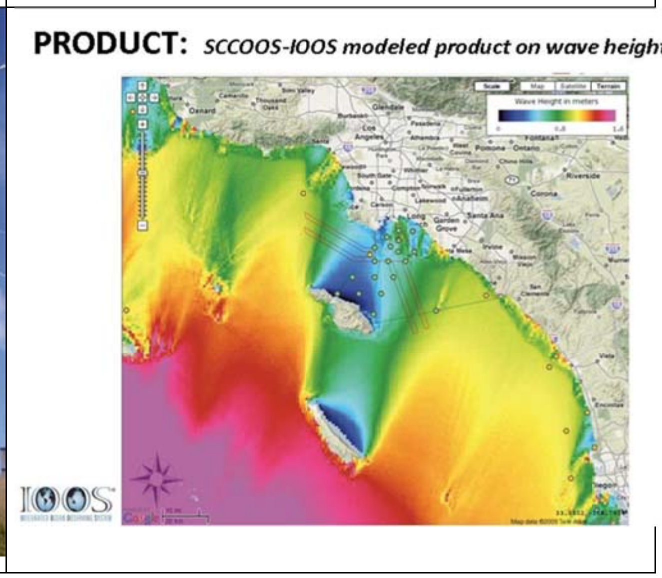

Toward a Global Ocean Acidification and Ecosystem Response Observing Network
An international workshop held at the University of Washington
Seattle, WA, USA
26-28 June 2012
Sponsored by:
NOAA, IOCCP, GOOS, IOOS, and UW
The Global Ocean Observing System


Global OA Network Workshop Goals
62 scientists from 23 countries met to achieve the principal goals of this international workshop:
1. Provide the rationale and design of the components and locations of an international carbon and ocean acidification observing network that includes repeat hydrographic surveys, underway measurements on volunteer observing ships, moorings, floats and gliders taking into account existing networks and programs wherever possible;
2. Identify a minimum suite of measurement parameters and performance metrics for each major component of the observing system; and
3. Develop a strategy for data quality assurance and data distribution; and
4. Discuss requirements for program integration at the international level.
The workshop report (Jan 2013) will provide the strategy for the observing system for review, vetting and hopeful support by the member countries.


U.S. IOOS Focus Areas
• Marine Operations
• Climate
• Ecosystems, Fisheries, Water Quality
• Coastal Hazards
• Coastal and Marine Spatial Planning
IOOS


Marine Operations
IOOS works to:
• Promote safe and efficient marine commercial shipping and recreational boating
• Support Coast Guard search and rescue and NOAA spill response
• Inform offshore energy planning and operations
IOOS INTEGRATED OCEAN OBSERVING SYSTEM


OBSERVATION:
Land-based high-frequency radar antennae
IOOS

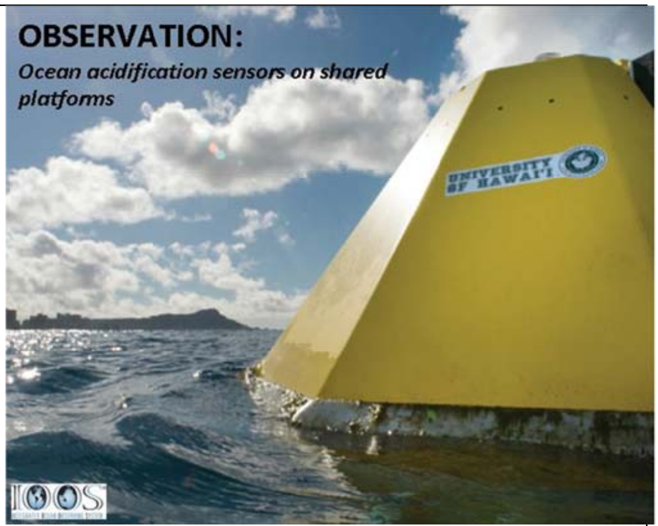

PRODUCT: SCCOOS-IOOS modeled product on wave height
IOOS

Climate

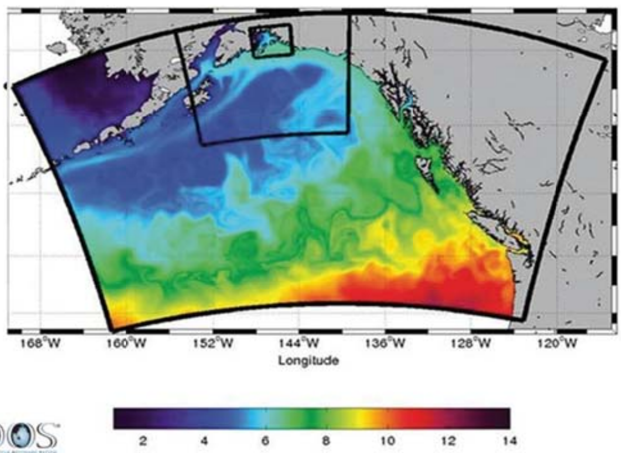
IOOS works to:

- Support regional climate status and trends
- Provide national climate experts with regional measurements
- Provide coastal communities with more accurate estimates

IOOS INTEGRATED OCEAN OBSERVING SYSTEM



PRODUCT: *AOOS-IOOS nested models link global to local*



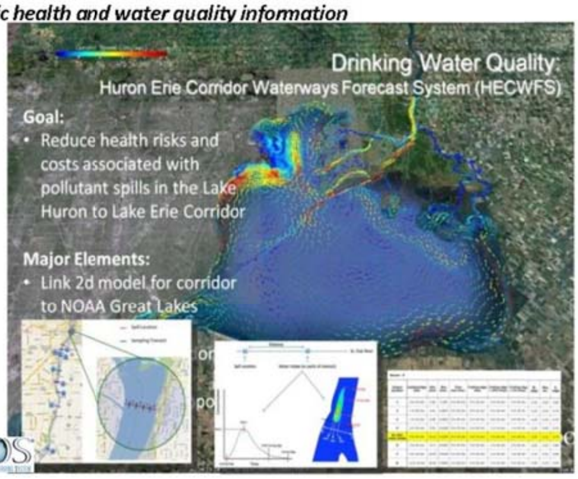
Ecosystems, Fisheries & Water Quality

IOOS works to:

- Minimize potential harm from HABs, hypoxia, ocean acidification, etc. via early warnings
- Support ecosystem-based management
- Support protection of drinking water supplies
- Assist public health officials, resource managers and public users via data access

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

PRODUCT: *GLOS-IOOS real-time data and models provide public health and water quality information*



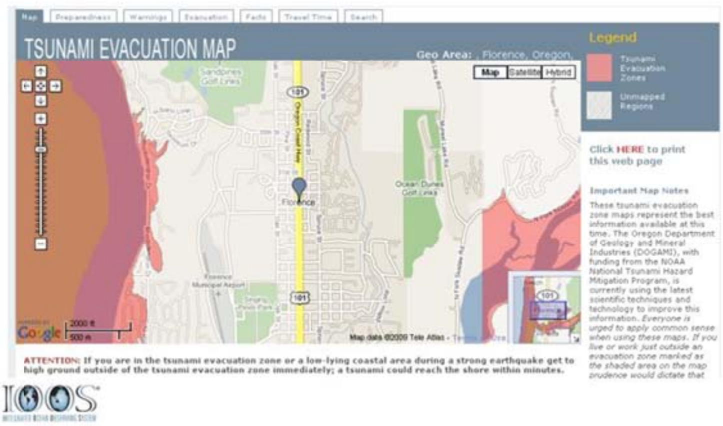
Coastal Hazards

IOOS works to:

- Promote safe and efficient marine commercial shipping and recreational boating
- Support Coast Guard search and rescue and NOAA spill response
- Inform offshore energy planning and operations

PRODUCT:

NANOOS-IOOS Tsunami inundation zones and evacuation map



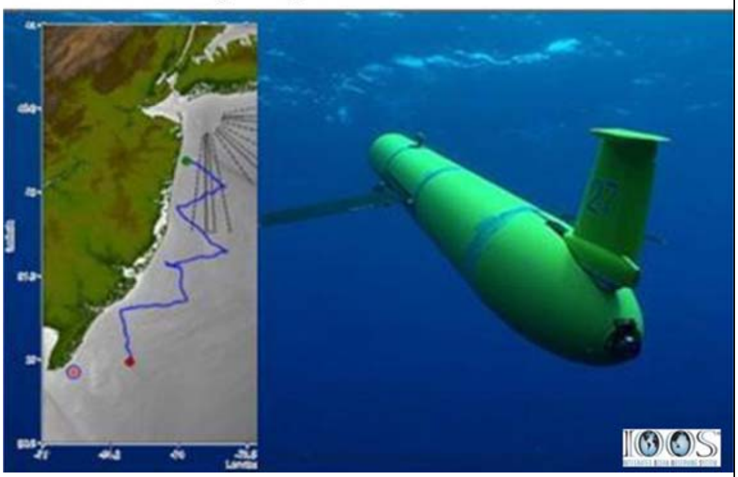
Coastal and Marine Spatial Planning

IOOS works to:

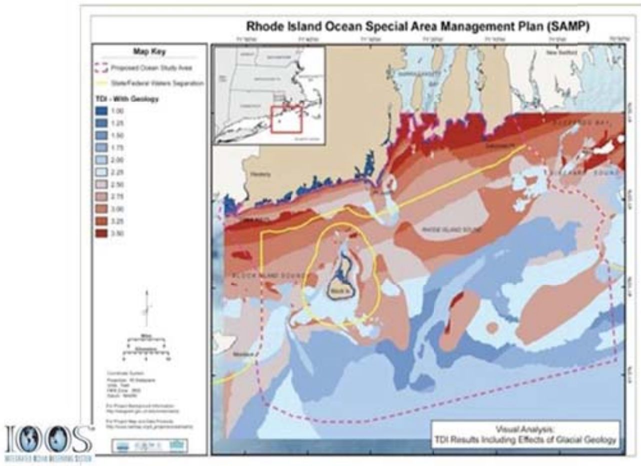
- Promote safe and efficient marine commercial shipping and recreational boating
- Support Coast Guard search and rescue and NOAA spill response
- Inform offshore energy planning and operations

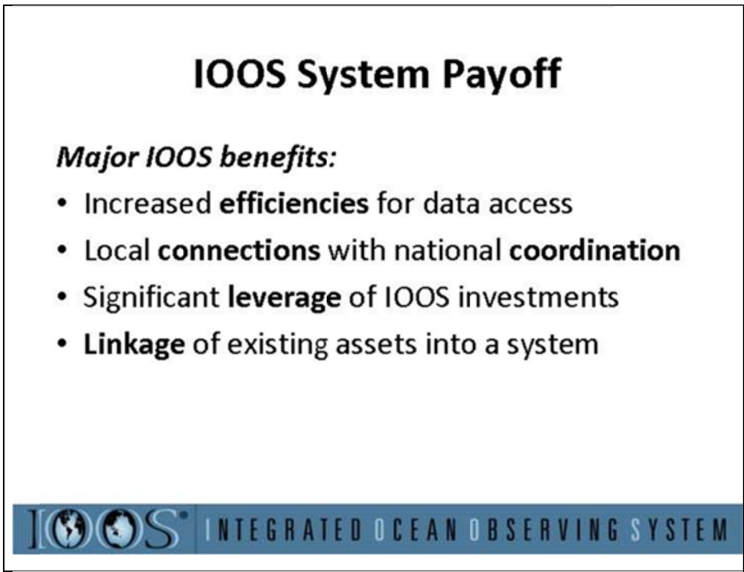
OBSERVATION:

AUV and ROV surveys along the coast



PRODUCT: *NERACOOS IOOS Technology Development Index map for wind energy development*

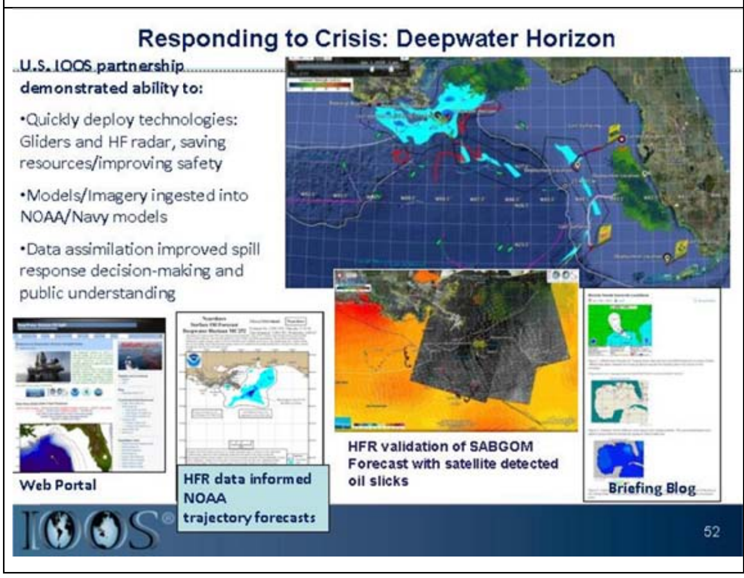


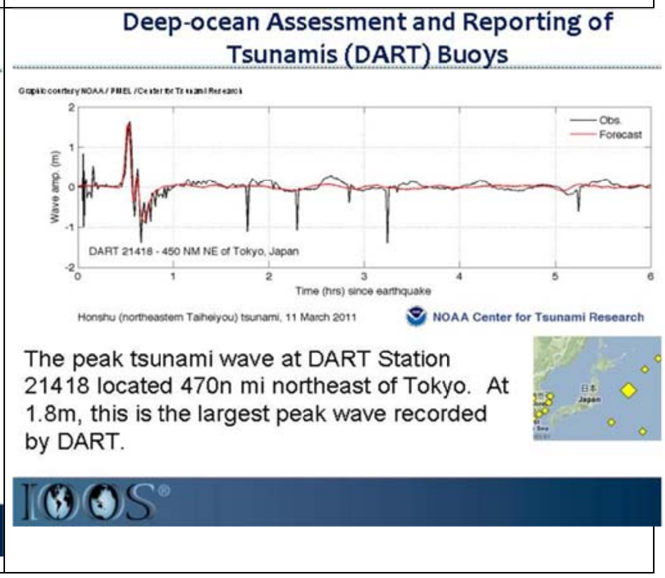

IOOS System Payoff
Major IOOS benefits:
• Increased efficiencies for data access
• Local connections with national coordination
• Significant leverage of IOOS investments
• Linkage of existing assets into a system
IOOS INTEGRATED OCEAN OBSERVING SYSTEM

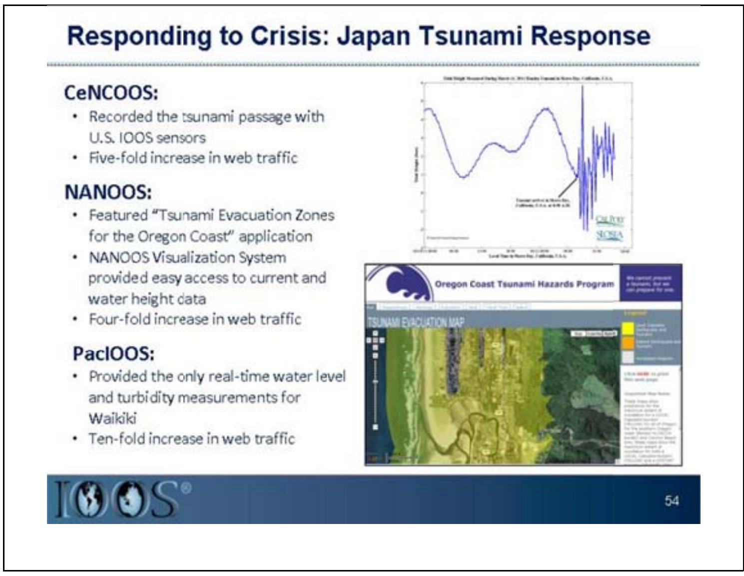

U.S. IOOS: Education and Outreach
Education and Outreach
Regional Education Websites

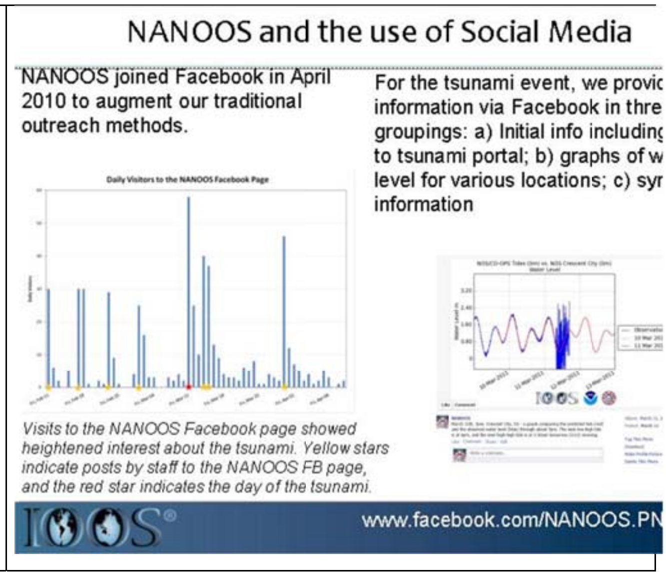

U.S. IOOS : A National Endeavor but in a Global Context
• Nested design: regional, national, global
• Strategic observations
• Data interoperability critical
• Best Practices not developed for most sensors; sharing with JERICO recommended


U.S. IOOS®: Education and Outreach
Education and Outreach
Regional Education Websites


Responding to Crisis: Deepwater Horizon
U.S. IOOS partnership demonstrated ability to:
•Quickly deploy technologies: Gliders and HF radar, saving resources/improving safety
•Models/Imagery ingested into NOAA/Navy models
•Data assimilation improved spill response decision-making and public understanding
Web Portal
HFR data informed NOAA trajectory forecasts
HFR validation of SABGOM Forecast with satellite detected oil slicks
Briefing Blog
52


Deep-ocean Assessment and Reporting of Tsunamis (DART) Buoys
Graphic courtesy NOAA / PMEL / Center for Tsunami Research
Obs.
Forecast
Wave amp. (m)
DART 21418 - 450 NM NE of Tokyo, Japan
Time (hrs) since earthquake
Honshu (northeastern Taiheiyou) tsunami, 11 March 2011
NOAA Center for Tsunami Research
The peak tsunami wave at DART Station 21418 located 470n mi northeast of Tokyo. At 1.8m, this is the largest peak wave recorded by DART.





3.1.3 The French strategy for operational coastal oceanography (Patrick Farcy, Ifremer)

After Janet Newton' speech on US coastal observatories, Patrick Farcy presented the French strategy for operational coastal oceanography and introduced it by wondering how to optimise observations?

In his view, first, it is crucial to extend the use of observing systems, through HF Radar, coastal sub-sea observatories and systems of opportunity (VOS) such as fishing vessels. In this context, a VOS example was presented: the RECOPESCA system, a participative approach to collect data on fishing activities and environmental parameters.

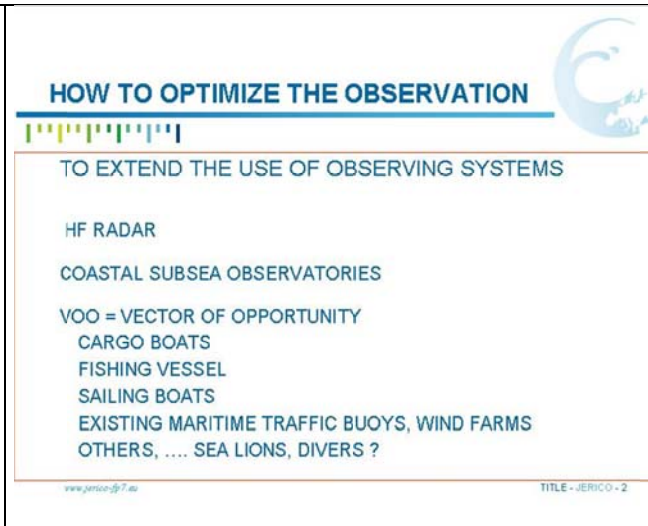
Second, another way to optimise the observation would be to integrate new and innovative sensors, through nutriments, contaminants or alkalinity. To drive the point home, the example of FONCE was introduced to the participants. It is an observatory network dedicated to monitor the main river plumes and to address questions being asked in the research on the sensitivity of coastal ecosystems.

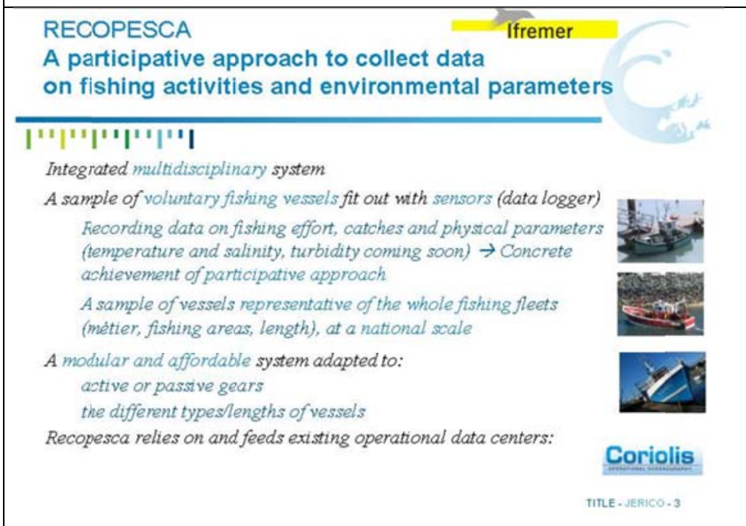
To conclude, it is explained that technology developments are specifically needed, in the domain of biochemistry in order to face important issues such as global changes, acidification, eutrophication and harmful algal blooms in coastal areas.

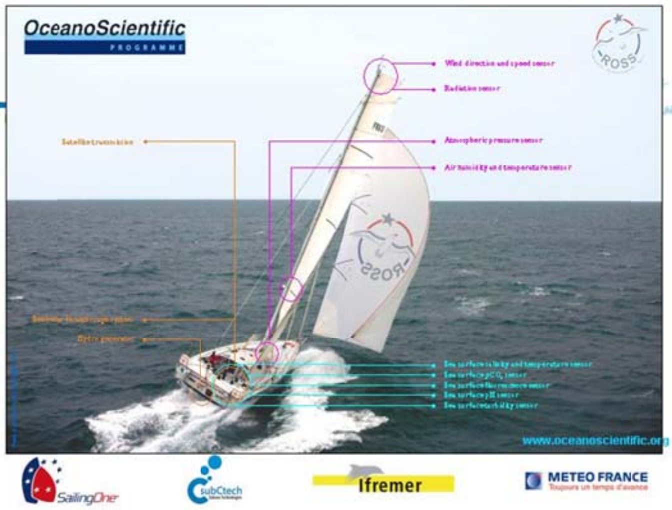
<u>Synthesis with regards to the workshop objectives</u> :
Existing French systems dedicated to coastal in situ observation are mainly those being integrated in JERICO like buoys, gliders, ferryboxes, vessels of opportunity (such as fishing boats), plus HF radars. For the future, the strategy should work on 4 main axes, helping to save money.

1- The objective to take more benefit of vectors of opportunity: sailing boats, cargo, fishing vessels etc. by deploying already developed systems: the OceanoScientific, the RECOPESCA probes.
2- Development of innovative sensors able to be integrated onboard small systems dedicated to nutrients, contaminants, alkalinity, and phytoplankton measurements. This implies to push the technologies with SMEs via the JERICO FCT and the label
3- Development of a French observatory Network (initially named FONCE) dedicated to the observation and monitoring of main river plumes in France. This network intends to put efforts on specific parameters automated measurements: such as turbidity, pCO2, plankton and particles counting, helping for the development of innovative technologies dedicated to monitor effects of global changes, acidification, eutrophication and harmful algal blooms in coastal areas.
4- Extension of the use of observing systems, through HF Radar

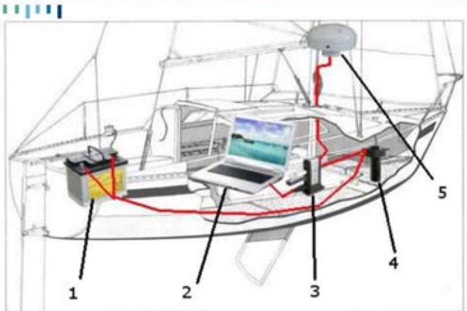
Slides are presented below.







❖ The CANOE system :



TITLE - JERICO - 7

HOW TO OPTIMIZE THE OBSERVATION

TO INTEGRATE NEW AND INNOVATIVE SENSORS

NUTRIENTS

CONTAMINANTS (bio-sensors)

ALKALINITY : pH, pCO2, dissolved O2

PHYTOPLANCTONIC CHAIN (see presentation Lars Steeman WP10)

→ TECHNOLOGY PUSH, SMEs, to promote an Euro-ACT (FCT, labels)

www.jerico-fp7.eu

TITLE - JERICO - 8

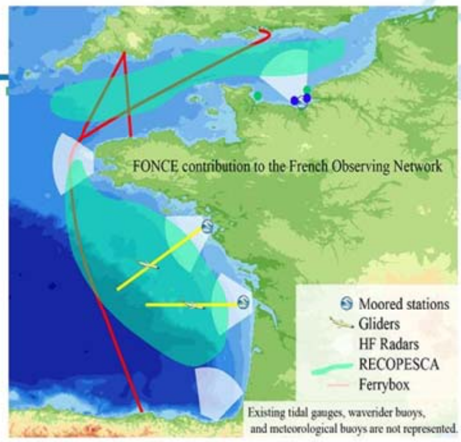
FONCE : scientific objectives

An observatory network of the main river plumes to respond to research questions on the sensitivity of coastal ecosystems to global change and anthropogenic pressures for the following aspects:

1) In coastal ocean, 80% of the nutrient and contaminant contributions are coming from the river plumes
2) changes in coastal circulation and density structure (T & S) related to the system changes (biological content, climate changes);
2) changes in trophic conditions (nutrient availability related to the biological demand) and in primary productivity and the evolution of trophic structure;
3) changes in the size structure of the planktonic community which partly depends on the nutrients
4) changes in the nature and flow of contaminants;
5) exchanges in greenhouse gas emissions (GHG).

TITLE - JERICO - 9

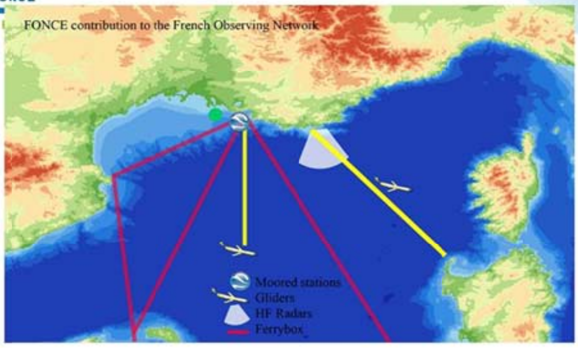
FONCE



TITLE - JERICO - 10

FONCE

FONCE contribution to the French Observing Network



TITLE - JERICO - 11

Task 2.1 NUTRIMENTS

- *CHEMINI (Nitrate & Silicate) combined with*
- *ANESIS (Silicate and phosphate – tbd)*

Task 2.2 Plankton and particles counting and characterisation:

- *Fluorescence - Cytometrie - Laser optical plankton counter – Underwater Vision Profiler*

AUTONOMOUS MODULATED FLUOROMETER

- *Estimation du phytoplancton et de la production primaire*

CYTOMETRIE (LOG + COM + LOV)

- *Estimation de la biomasse phytoplanctonique et de sa composition*

IMAGERIE (LOV)

- *Détection de particules > 50 µm et zooplancton*

Laser optical plankton counters (COM)

- *Détection de particules de 100 µm à 2,5 cm*

TITLE - JERICO - 12

FONCE WP2

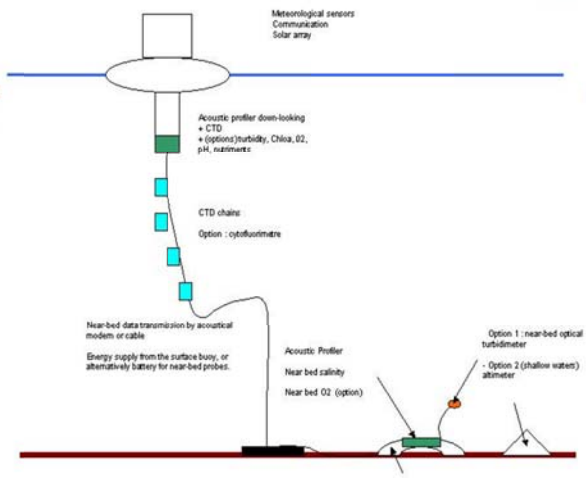
Task 2.3 : TURBIDITY

- *Evaluation de la combinaison optimale de 2 instruments*
  - *Optical backscattering devices (turbidity meters, multi-spectralECOBB3) fluorometers (chla and CDOM)*
  - *In situ grain size analysers (LISST ST, LISST 100X and LISST HOLO)*
  - *Acoustic profilers ADP 600kHz and 1200kHz*
  - *Acoustic Backscatter Systems: Aquascat (0.5, 1, 2, 4 Mhz)*
  - *Acoustic Doppler Velocimeter ADV 6Mhz*

Task 2.4 : pCO2 en zone côtière

- *Développement de capteurs CARIOCA pour le côtier avec participation de NKE*

TITLE - JERICO - 13



INNOVATION FOR IN-SITU OBSERVATIONS

COASTAL MODELING, COUPLED WITH BIOLOGICAL SEDIMENT TRANSPORTATION MODELS NEEDS MORE AND MORE BIO GEOCHEMICAL DATA TO FORECAST

GLOBAL CHANGE EFFECTS ON THE COASTAL AREA

ACIDIFICATION

EUTROPHICATION

HARMFUL ALGAL BLOOMS

www.jerico-fp7.eu TITLE - JERICO - 15

3.1.4 Strategy in Greece (George Petihakis, HCMR)

This presentation made by George Petihakis dealt with Greek monitoring and forecasting capacity.

George Petihakis introduced the POSEIDON monitoring and research infrastructure, which is an operational monitoring, forecasting and information system of marine environmental conditions in the Eastern Mediterranean area.

The infrastructure is operated by HCMR since 2000 and is supported by Greek National Marine Service and the Greek Navy. Its main goals are to support maritime transport, research oriented applications, to protect the environment and to manage coastal zones. It integrates several platforms such as profilers, buoys, moorings, gliders and seabed frames, plus calibration facilities, modelling and forecasting systems and it manages the communication to the public.

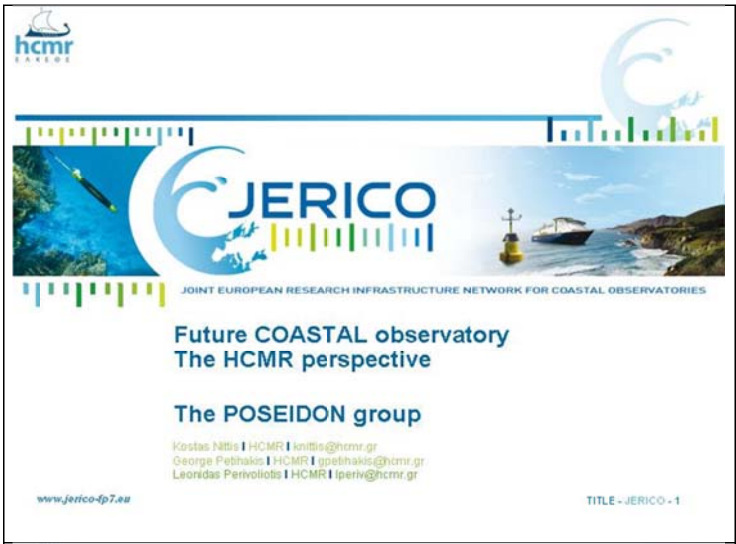
<u>Synthesis with regards to the workshop objectives:</u>

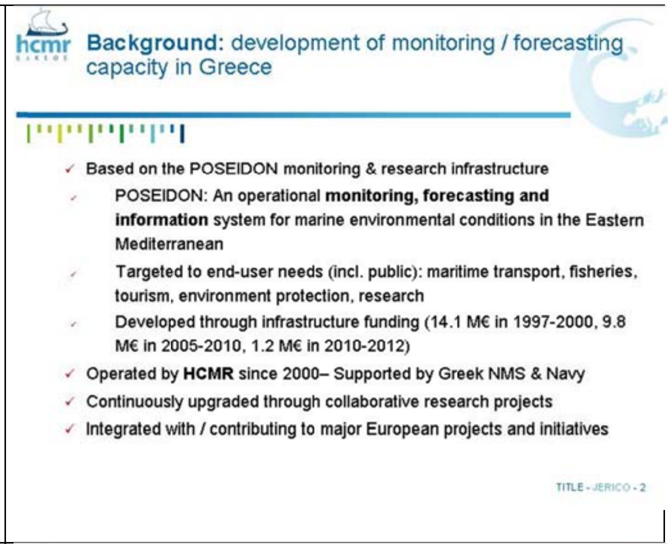
The Greek infrastructure, Poseidon, has been set up with a multi-platform, multi-scale and multi-purpose approach for ocean observatories in Greece. This integration is necessary due to specificities of marine environment in Greece, but it is also driven by user needs. The Poseidon buoy is part of a bigger network including ferryboxes, ARGO floats, HF radars, calibration facilities, modelling platforms. The information to the public is insured via on line web interface.

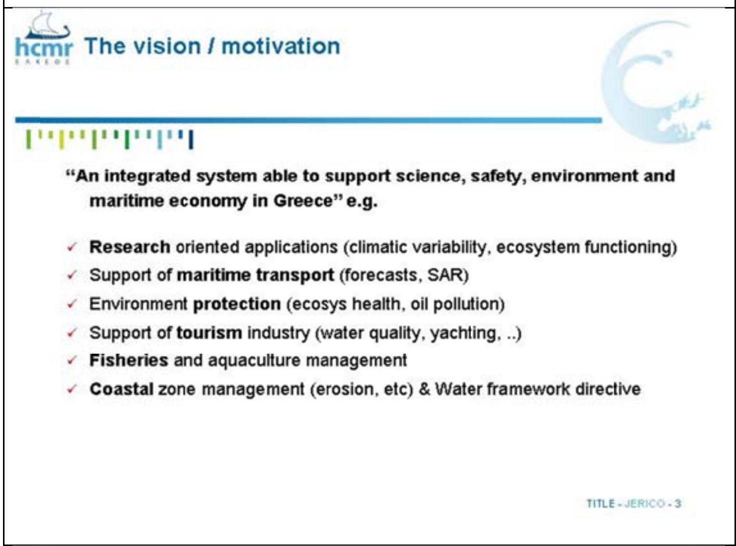
The development strategy is the following:

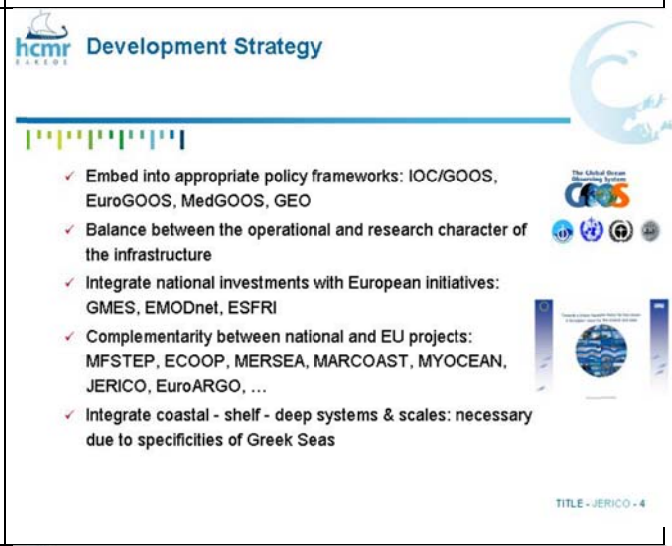
- Embed into appropriate frameworks (EuroGOOS, GEO, etc.)
- Balance between the operational and research sides of the infrastructure
- Integrate national investments with European initiative
- Complementarity between national and EU projects

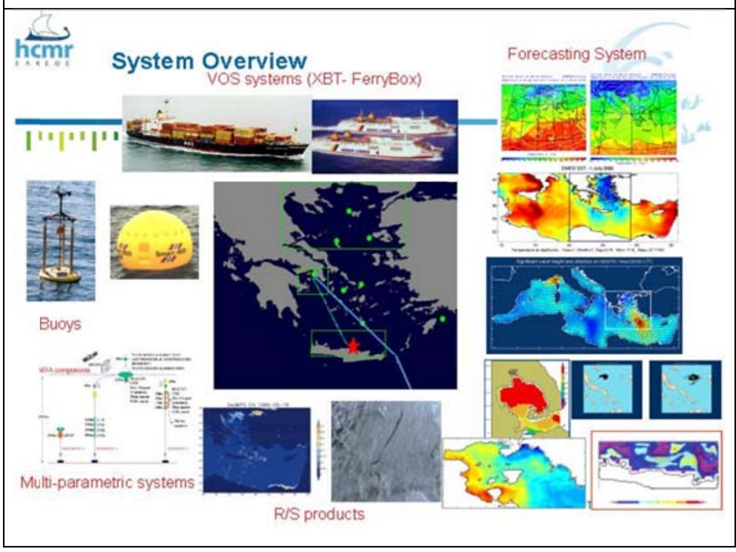
Slides are presented below.

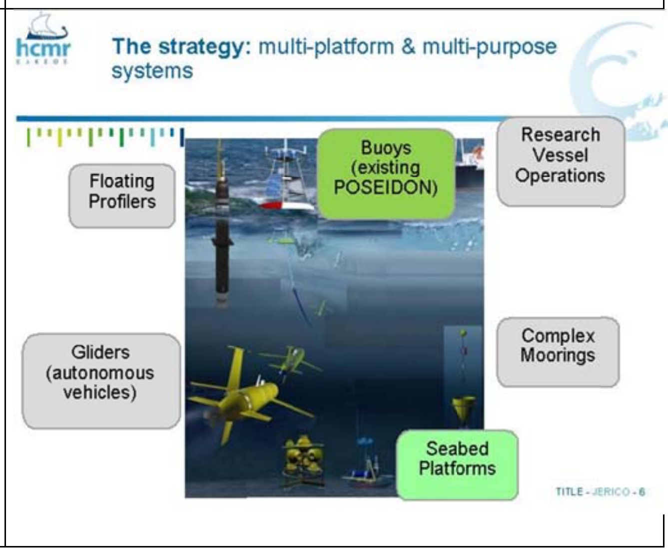

hcmr
JERICO
JOINT EUROPEAN RESEARCH INFRASTRUCTURE NETWORK FOR COASTAL OBSERVATORIES
Future COASTAL observatory
The HCMR perspective
The POSEIDON group
Kostas Nittis I HCMR I knittis@hcmr.gr
George Petihakis I HCMR I gpetihakis@hcmr.gr
Leonidas Perivoliotis I HCMR I lperiv@hcmr.gr
www.jerico-fp7.eu
TITLE - JERICO - 1

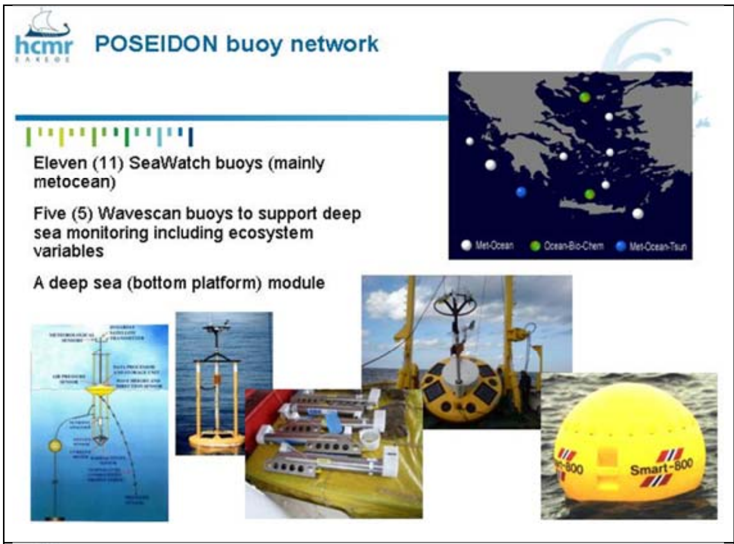

hcmr
Background: development of monitoring / forecasting capacity in Greece
Based on the POSEIDON monitoring & research infrastructure
POSEIDON: An operational monitoring, forecasting and information system for marine environmental conditions in the Eastern Mediterranean
Targeted to end-user needs (incl. public): maritime transport, fisheries, tourism, environment protection, research
Developed through infrastructure funding (14.1 M€ in 1997-2000, 9.8 M€ in 2005-2010, 1.2 M€ in 2010-2012)
Operated by HCMR since 2000– Supported by Greek NMS & Navy
Continuously upgraded through collaborative research projects
Integrated with / contributing to major European projects and initiatives
TITLE - JERICO - 2

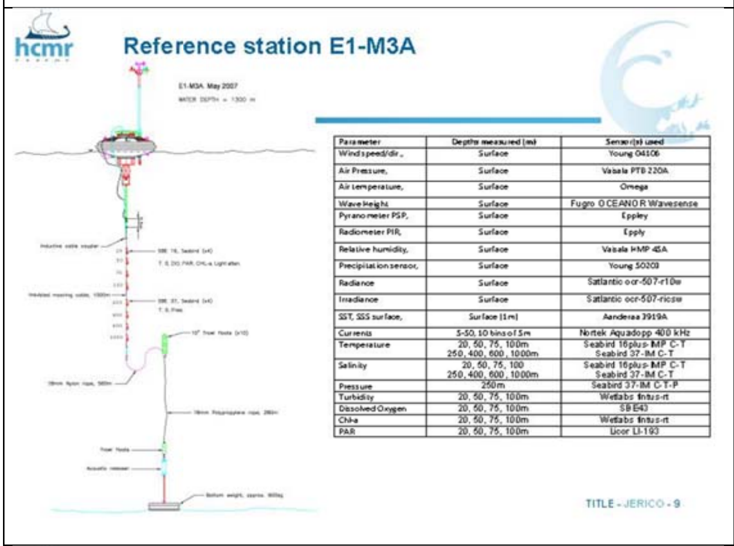

hcmr
The vision / motivation
"An integrated system able to support science, safety, environment and maritime economy in Greece" e.g.
Research oriented applications (climatic variability, ecosystem functioning)
Support of maritime transport (forecasts, SAR)
Environment protection (ecosys health, oil pollution)
Support of tourism industry (water quality, yachting, ..)
Fisheries and aquaculture management
Coastal zone management (erosion, etc) & Water framework directive
TITLE - JERICO - 3


hcmr
Development Strategy
Embed into appropriate policy frameworks: IOC/GOOS, EuroGOOS, MedGOOS, GEO
Balance between the operational and research character of the infrastructure
Integrate national investments with European initiatives: GMES, EMODnet, ESFRI
Complementarity between national and EU projects: MFSTEP, ECOOP, MERSEA, MARCOAST, MYOCEAN, JERICO, EuroARGO, …
Integrate coastal - shelf - deep systems & scales: necessary due to specificities of Greek Seas
TITLE - JERICO - 4

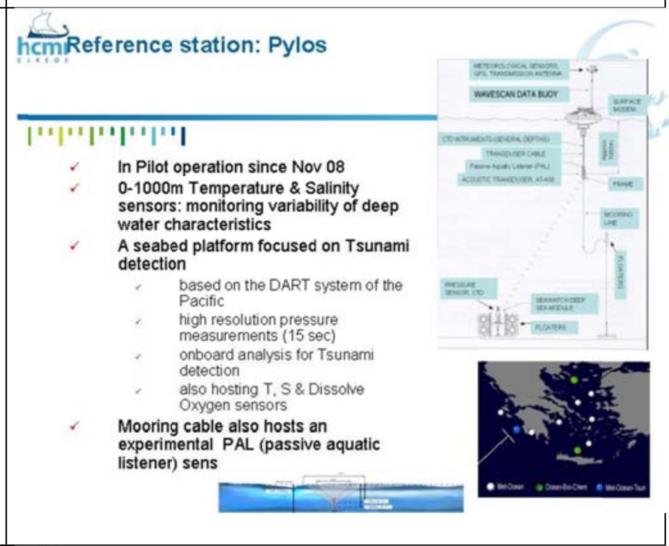

hcmr
System Overview
VOS systems (XBT- FerryBox)
Forecasting System
Buoys
Multi-parametric systems
R/S products

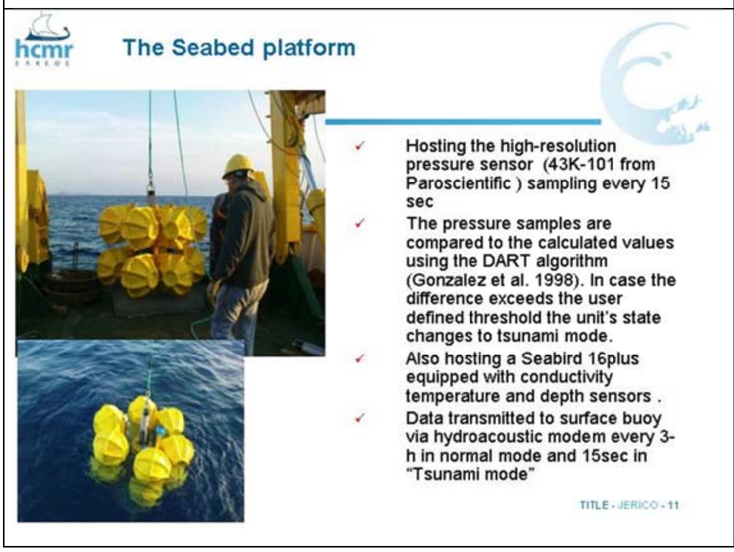

hcmr
The strategy: multi-platform & multi-purpose systems
Floating Profilers
Buoys (existing POSEIDON)
Research Vessel Operations
Gliders (autonomous vehicles)
Complex Moorings
Seabed Platforms
TITLE - JERICO - 6

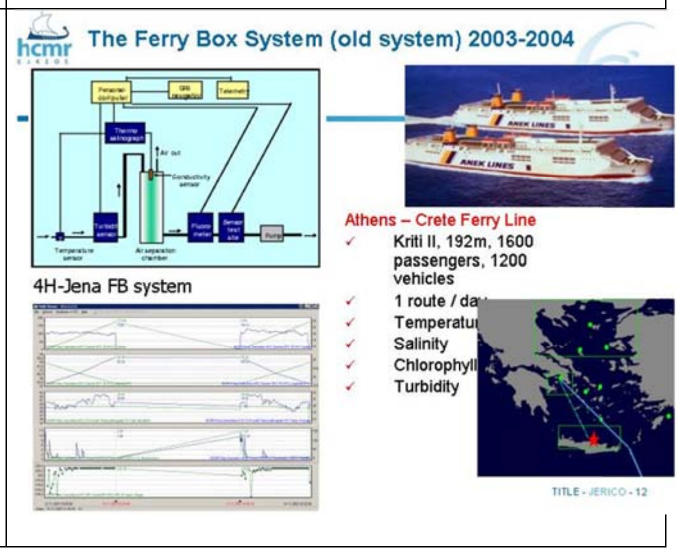


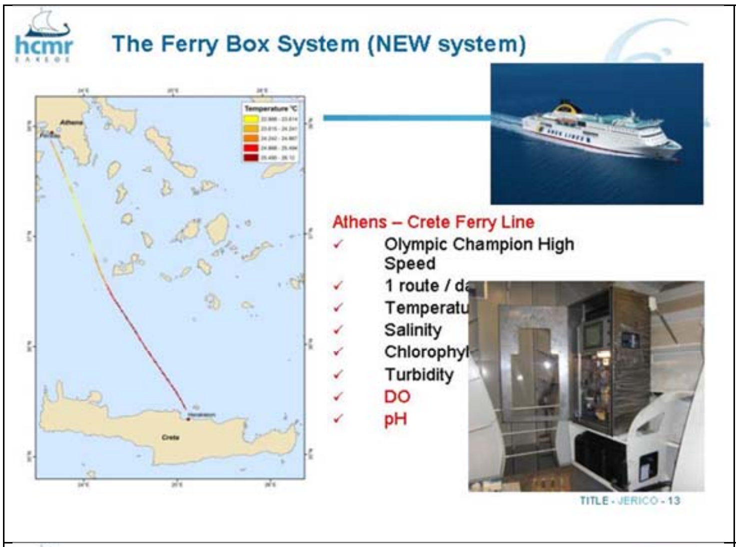


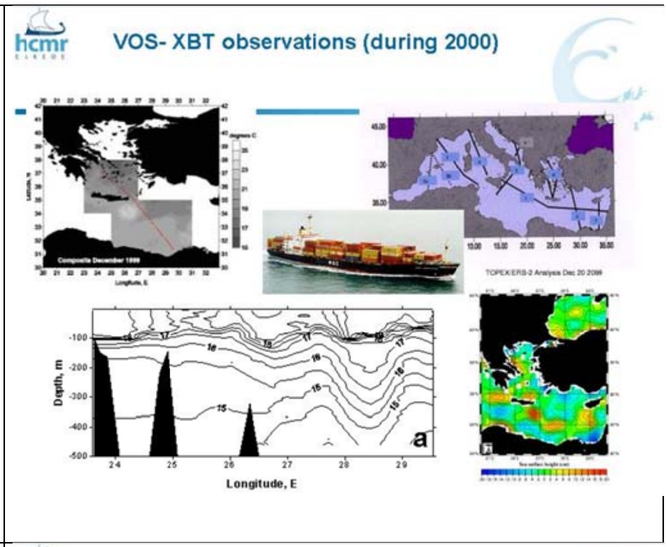
Parameter	Depths measured (m)	Sensor(s) used
Windspeed/dir.,	Surface	Young 04106
Air Pressure,	Surface	Vaisala PTB 220A
Air temperature,	Surface	Omega
Wave Height	Surface	Fugro OCEANOR Wavesense
Pyranometer PSP,	Surface	Eppley
Radiometer PIR,	Surface	Epply
Relative humidity,	Surface	Vaisala HMP 45A
Precipitation sensor,	Surface	Young 50203
Radiance	Surface	Satlantic ocr-507-r10w
Irradiance	Surface	Satlantic ocr-507-icsw
SST, SSS surface,	Surface (1m)	Aanderaa 3919A
Currents	5-50, 10 bins of 5m	Nortek Aquadopp 400 kHz
Temperature	20, 50, 75, 100m 250, 400, 600, 1000m	Seabird 16plus-IMP C-T Seabird 37-IM C-T
Salinity	20, 50, 75, 100 250, 400, 600, 1000m	Seabird 16plus-IMP C-T Seabird 37-IM C-T
Pressure	250m	Seabird 37-IM C-T-P
Turbidity	20, 50, 75, 100m	Wetlabs flntus-rt
Dissolved Oxygen	20, 50, 75, 100m	SBE43
Chl-a	20, 50, 75, 100m	Wetlabs flntus-rt
PAR	20, 50, 75, 100m	Licor LI-193

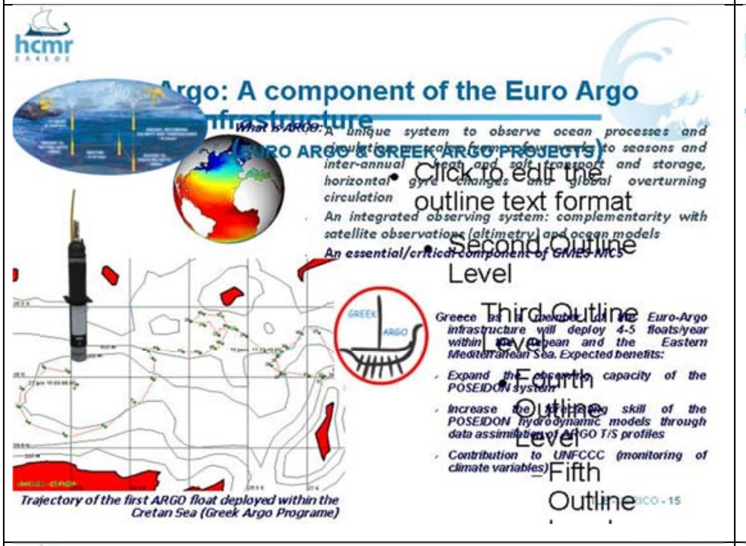


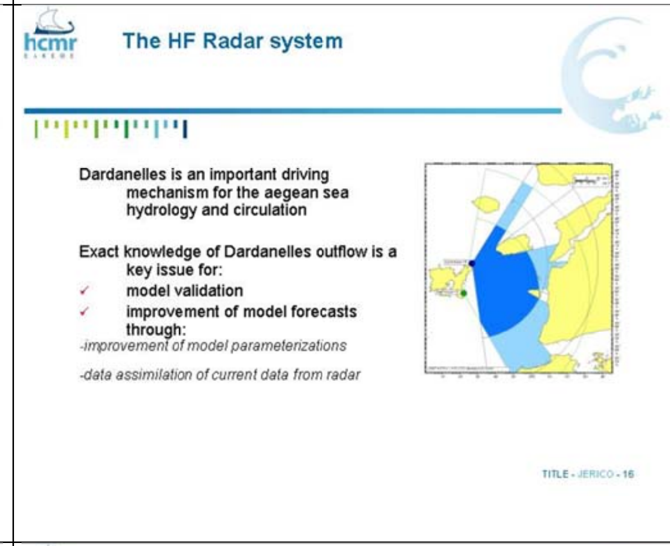


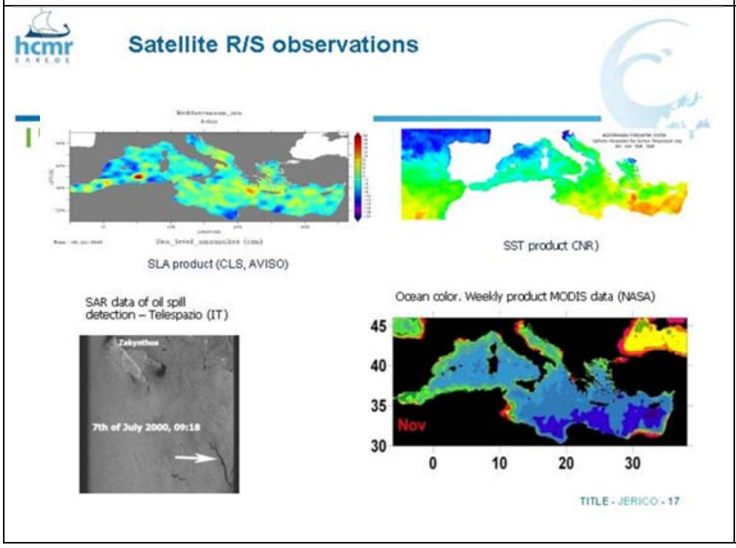


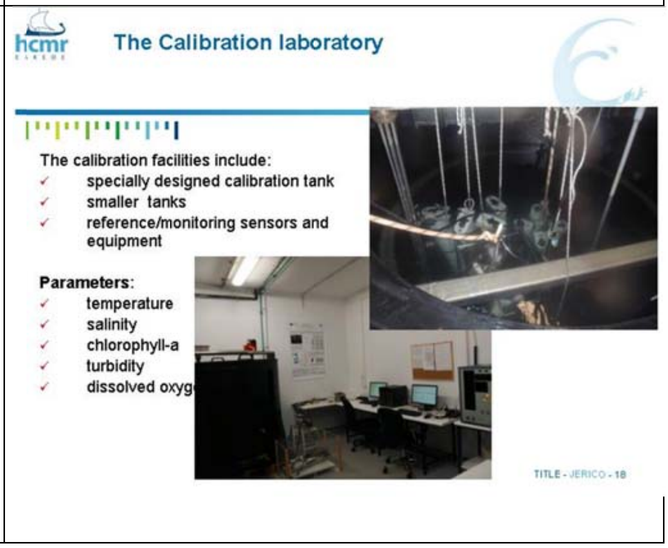

hcmr
The Ferry Box System (NEW system)
Athens – Crete Ferry Line
Olympic Champion High Speed
1 route / da
Temperatu
Salinity
Chlorophyl
Turbidity
DO
pH
TITLE - JERICO - 13

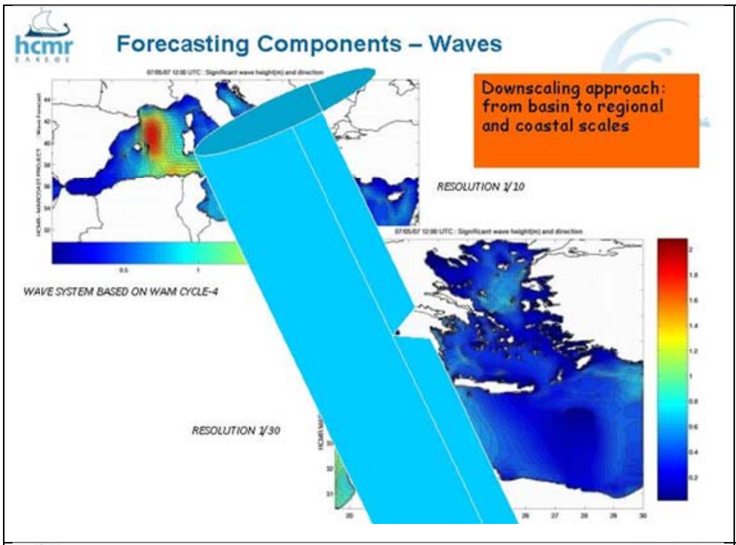

hcmr
VOS- XBT observations (during 2000)
Depth, m
Longitude, E
TOPEX/ERS-2 Analysis Dec 20 2000

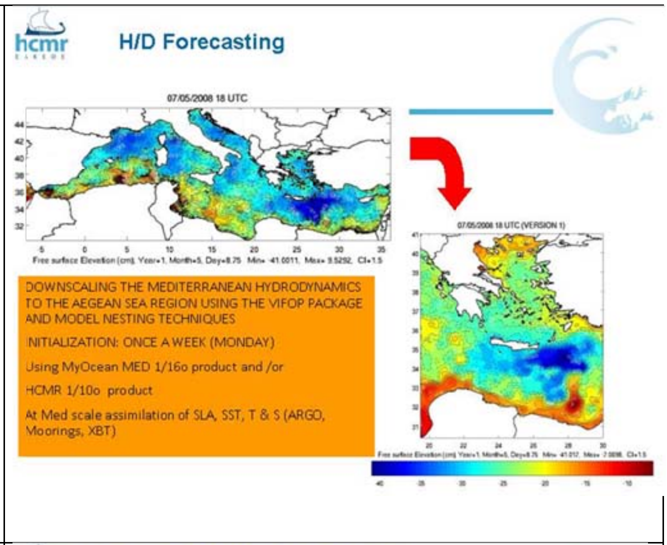

hcmr
Argo: A component of the Euro Argo infrastructure
EURO ARGO & GREEK ARGO PROJECTS
What is ARGO: A unique system to observe ocean processes and
inter-annual heat and salt transport and storage,
horizontal gyre changes and global overturning circulation
An integrated observing system: complementary with satellite observations (altimetry) and ocean models
An essential/critical component of GMES MCS
Click to edit the outline text format
Second Outline Level
Third Outline Level
Fourth Outline Level
Fifth Outline
Greece infrastructure will deploy 4-5 floats/year within the Aegean and the Eastern Mediterranean Sea. Expected benefits:
Expand the capacity of the POSEIDON system
Increase the forecasting skill of the POSEIDON hydrodynamic models through data assimilation of ARGO T/S profiles
Contribution to UNFCCC (monitoring of climate variables)
Trajectory of the first ARGO float deployed within the Cretan Sea (Greek Argo Programe)

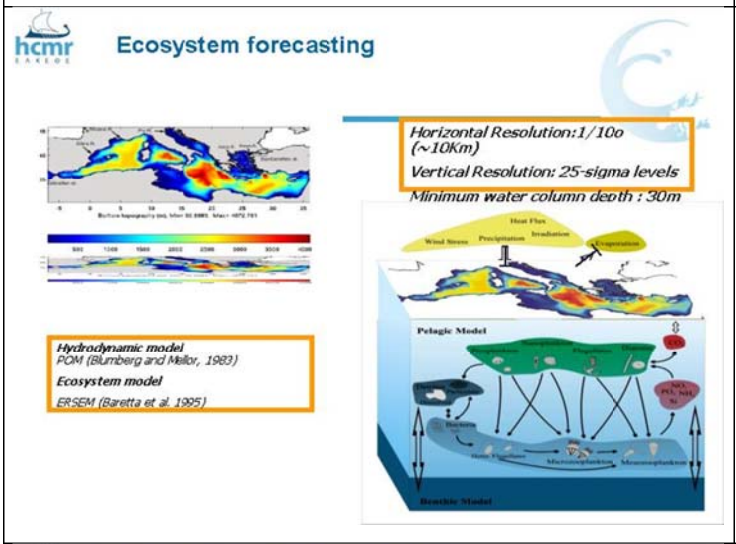

hcmr
The HF Radar system
Dardanelles is an important driving mechanism for the aegean sea hydrology and circulation
Exact knowledge of Dardanelles outflow is a key issue for:
model validation
improvement of model forecasts through:
-improvement of model parameterizations
-data assimilation of current data from radar
TITLE - JERICO - 16

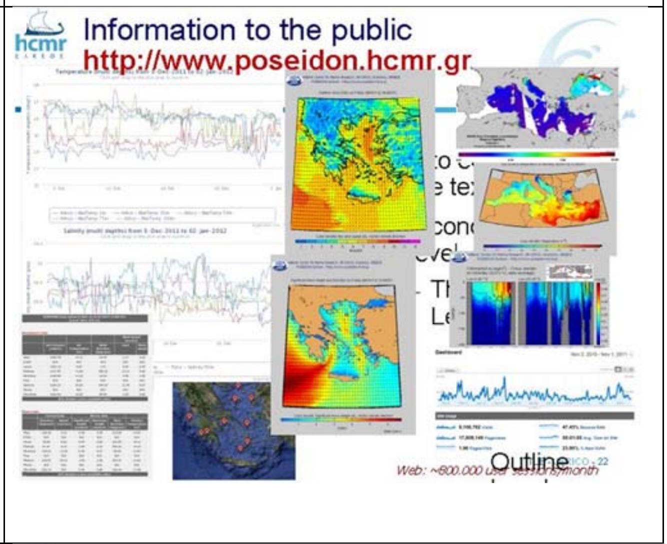

hcmr
Satellite R/S observations
SLA product (CLS, AVISO)
SST product CNR)
SAR data of oil spill detection – Telespazio (IT)
Zakynthos
7th of July 2000, 09:18
Ocean color. Weekly product MODIS data (NASA)
45
40
35
30
Nov
0
10
20
30
TITLE - JERICO - 17

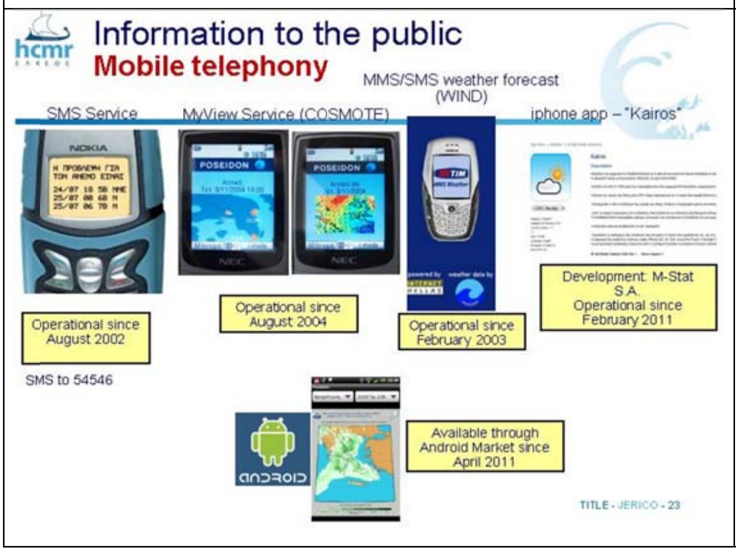

hcmr
The Calibration laboratory
The calibration facilities include:
specially designed calibration tank
smaller tanks
reference/monitoring sensors and equipment
Parameters:
temperature
salinity
chlorophyll-a
turbidity
dissolved oxyg
TITLE - JERICO - 18

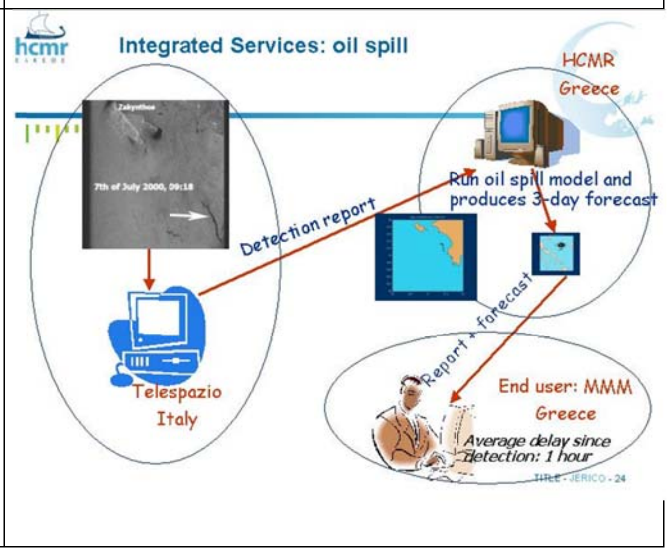

hcmr
Forecasting Components – Waves
Downscaling approach: from basin to regional and coastal scales
RESOLUTION 1/10
WAVE SYSTEM BASED ON WAM CYCLE-4
RESOLUTION 1/30

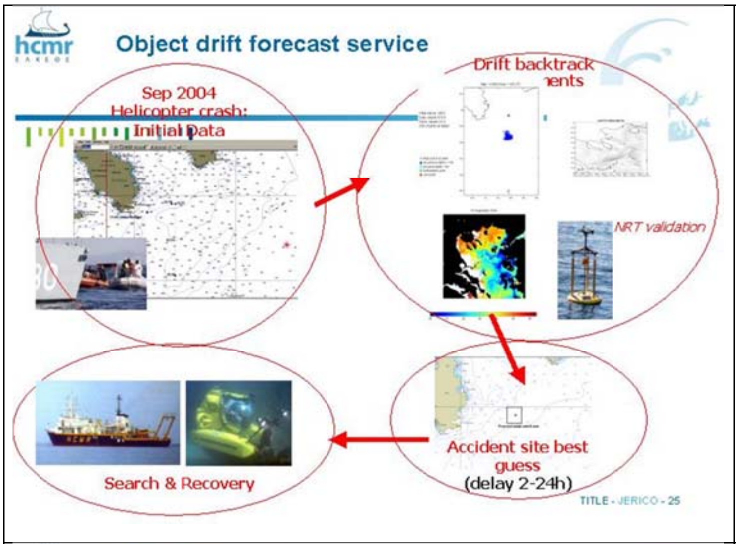

hcmr
H/D Forecasting
07/05/2008 18 UTC
DOWNSCALING THE MEDITERRANEAN HYDRODYNAMICS TO THE AEGEAN SEA REGION USING THE VIFOP PACKAGE AND MODEL NESTING TECHNIQUES
INITIALIZATION: ONCE A WEEK (MONDAY)
Using MyOcean MED 1/16o product and /or
HCMR 1/10o product
At Med scale assimilation of SLA, SST, T & S (ARGO, Moorings, XBT)

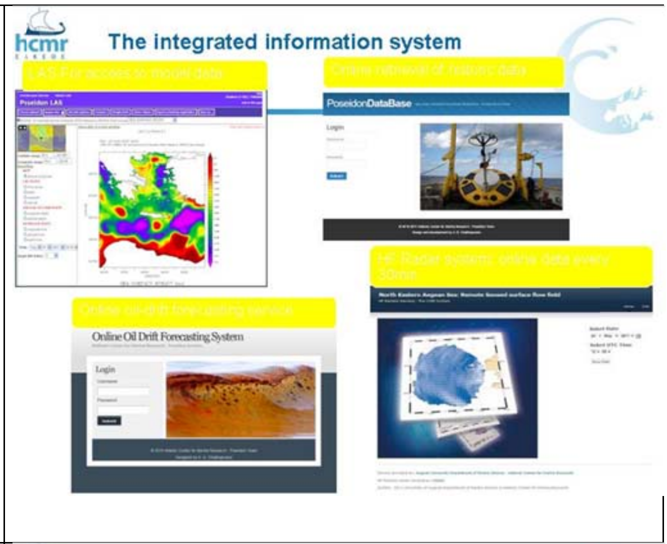

hcmr
Ecosystem forecasting
Horizontal Resolution: 1/10o (~10Km)
Vertical Resolution: 25-sigma levels
Minimum water column depth : 30m
Hydrodynamic model
POM (Blumberg and Mellor, 1983)
Ecosystem model
ERSEM (Baretta et al. 1995)
Pelagic Model
Benthic Model

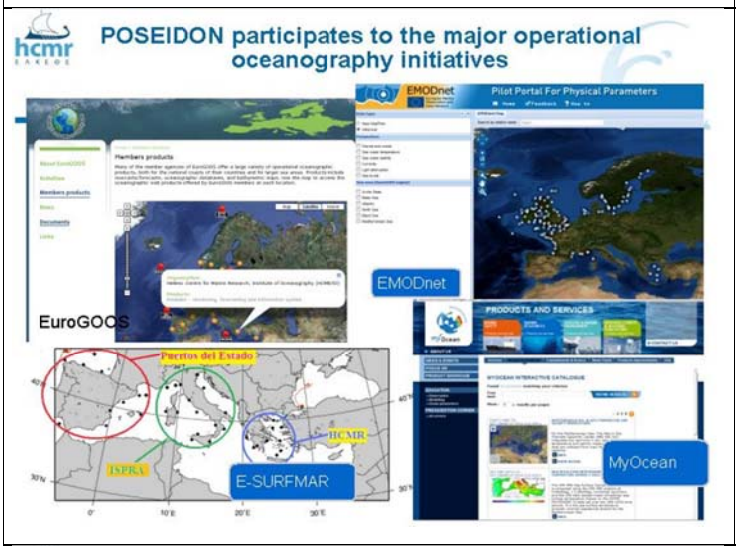

hcmr
Information to the public
http://www.poseidon.hcmr.gr
Web: ~600.000 user sessions/month

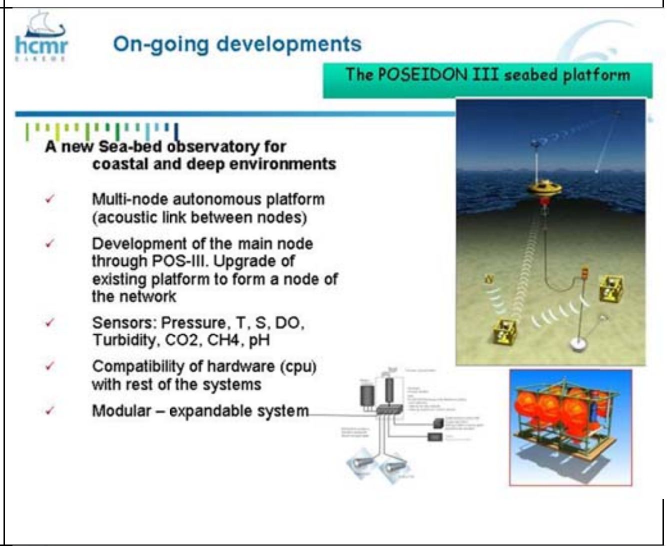

hcmr
Information to the public
Mobile telephony
MMS/SMS weather forecast (WIND)
SMS Service
MyView Service (COSMOTE)
iphone app – "Kairos"
Operational since August 2002
SMS to 54546
Operational since August 2004
Operational since February 2003
Development: M-Stat S.A.
Operational since February 2011
Available through Android Market since April 2011
TITLE - JERICO - 23


hcmr
Integrated Services: oil spill
HCMR
Greece
7th of July 2000, 09:18
Detection report
Run oil spill model and produces 3-day forecast
Report + forecast
Telespazio
Italy
End user: MMM
Greece
Average delay since detection: 1 hour
TITLE - JERICO - 24

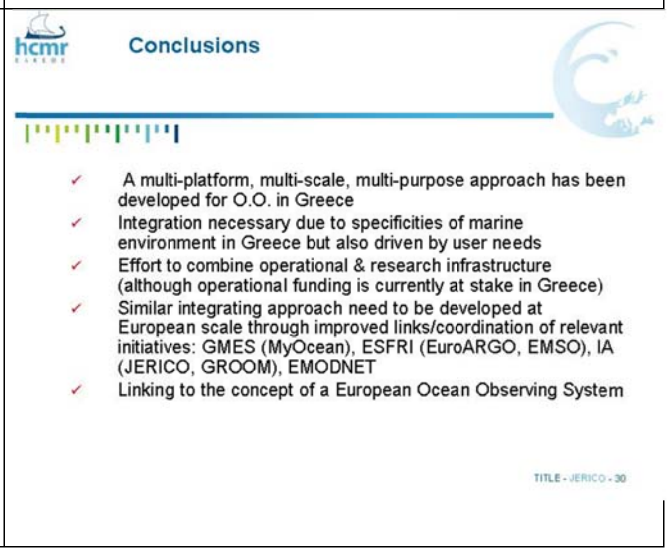

hcmr
Object drift forecast service
Sep 2004
Helicopter crash:
Initial Data
Drift backtrack
NRT validation
Accident site best
guess
(delay 2-24h)
Search & Recovery
TITLE - JERICO - 25


hcmr
The integrated information system
PoseidonDataBase
Online Oil Drift Forecasting System


hcmr
POSEIDON participates to the major operational
oceanography initiatives
EMODnet
Pilot Portal For Physical Parameters
EuroGOOS
Puertos del Estado
ISPRA
HCMR
E-SURFMAR
MyOcean


hcmr
On-going developments
The POSEIDON III seabed platform
A new Sea-bed observatory for
coastal and deep environments
Multi-node autonomous platform
(acoustic link between nodes)
Development of the main node
through POS-III. Upgrade of
existing platform to form a node of
the network
Sensors: Pressure, T, S, DO,
Turbidity, CO2, CH4, pH
Compatibility of hardware (cpu)
with rest of the systems
Modular – expandable system


hcmr
The Glider component
Part of a new national infrastructure proposal
Provision of 2 glider systems
Participation and expertise development through EGO and GROOM
Link to JERICO activities
TITLE - JERICO - 29


hcmr
Conclusions
A multi-platform, multi-scale, multi-purpose approach has been
developed for O.O. in Greece
Integration necessary due to specificities of marine
environment in Greece but also driven by user needs
Effort to combine operational & research infrastructure
(although operational funding is currently at stake in Greece)
Similar integrating approach need to be developed at
European scale through improved links/coordination of relevant
initiatives: GMES (MyOcean), ESFRI (EuroARGO, EMSO), IA
(JERICO, GROOM), EMODNET
Linking to the concept of a European Ocean Observing System
TITLE - JERICO - 30

3.1.5 Strategy for Northern and Artic Seas (Wilhelm Petersen, COSYNA)

The next presentation was led by Wilhelm Petersen and was focusing on COSYNA (Coastal Observing System for Northern and Arctic Seas) future strategy.
A key question of his presentation was: " How the numerous interactions between physical, biogeochemical and ecological parameters of coastal seas can be clearly described, and how they will evolve in the future?".

COSYNA goals deal with development and test of analysis systems, consisting of observations and numerical modelling, for the operational synoptic description of the environmental status of the North Sea and of Artic coastal waters.
It aims to provide knowledge tools that can help authorities and other stakeholders to manage routine tasks, emergency situations and evaluate trends.
The actual strategy for coastal observing system for Northern and Artic Seas is coordinated and financed by HZG. External partners from universities and authorities are also participating to it.

The development strategy aims to study the following areas:

- Long-term changes of physical boundary conditions, e.g., current pattern, waves, temperatures, salinities and the radiation filed in the water
- Consequences of these changes on the Suspended Particulate Matter (SPM) budget and the morphodynamics
- Evolution of the bio-geochemical state of the Wadden Sea and the North Sea
- Impact of "Extreme Events" for the seasonal primary production and the bio-geochemical budgets
- Significance of the exchanges of SPM, nutrients and organic matter between Wadden Sea and the North Sea
- Defining driving factors for algal blooms; under which conditions HABs are formed
- Effects of planned offshore wind mills on the physical dynamics, sediment transport and biological processes.

The types of observations made by these coastal observing systems consist of:

1. Point Measurements:
   Buoys & Fixed Stations (offshore & onshore)
2. Surface Transects:
   FerryBoxes
3. 3D Transects:
   SCANFISH
   Gliders
4. Fields:
   Optical Remote Sensing (satellite)
   Radar (HF & X-Band)

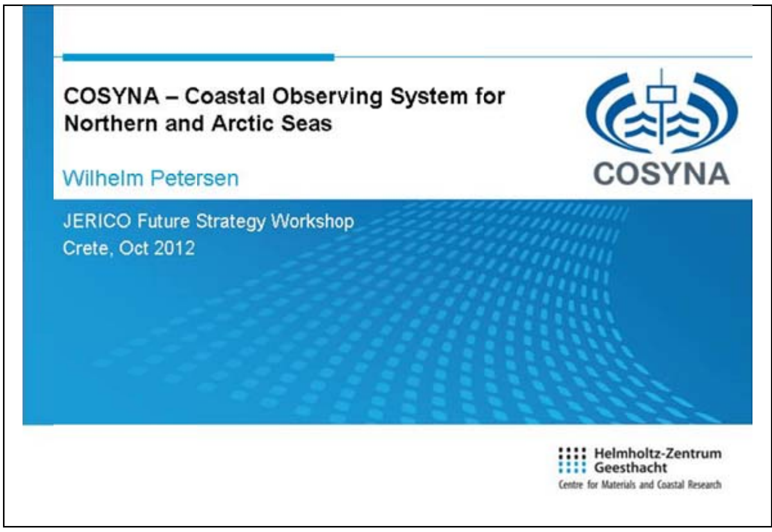
A set of different observing stations and methods was successfully tested and implemented in a pre-operational mode to describe the environmental status of coastal waters. The combination of the observations with models (including data assimilation) is important to fill the gaps in observations and to improve the estimates of the models "Operational products" with forecast possibilities that provide tools for coastal managers, authorities and companies to manage routine tasks, emergency situations and evaluate trends.

For the future, the main concern is the budget to be dedicated to the coastal observing system. To ensure its sustainability, further funding will be needed. The solution could be that those systems would be taken over by agencies for operational use.

Synthesis with regards to the workshop objectives:

COSYNA infrastructures deal with development and test of analysis systems, consisting of multiplatform in situ and remote observations and numerical modelling, for ocean observatories in Northern and Artic seas. It includes also the delivering of data products by a data portal, in an operational mode for stakeholders and companies.
The possible strategy to sustain the funding of the systems could be the operational use of those systems would be taken over by agencies.

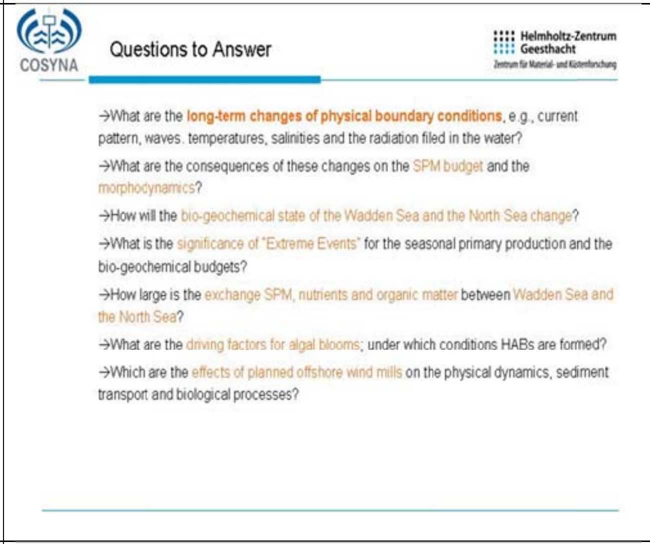
Slides are presented below.

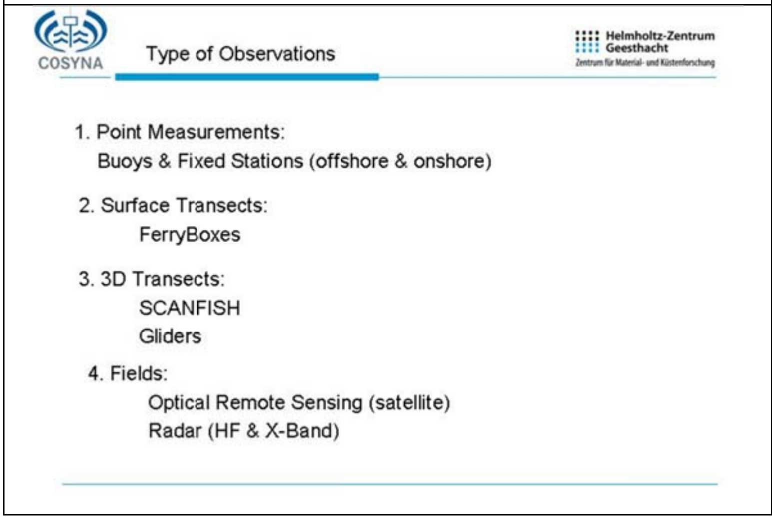


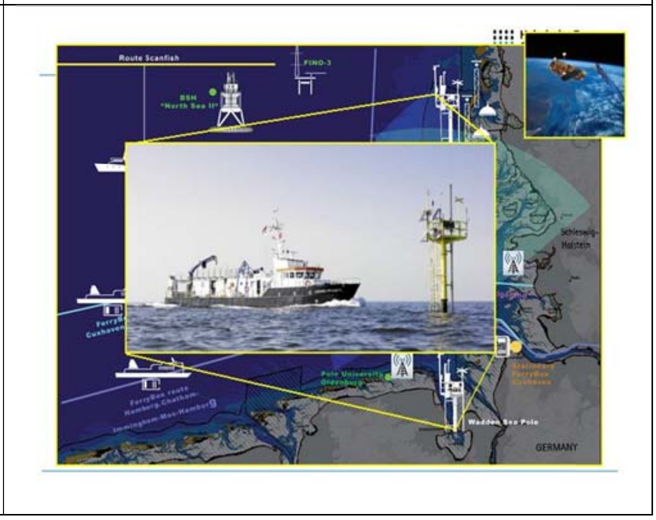

COSYNA
Motivation
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Unique ecosystems
Ecosystem services
Matter fluxes
Regional & global impacts
Changes
Causes or consequences not known
A key question is how the numerous interactions between physical, biogeochemical and ecological parameters of coastal seas can be best described and how they will evolve in future.

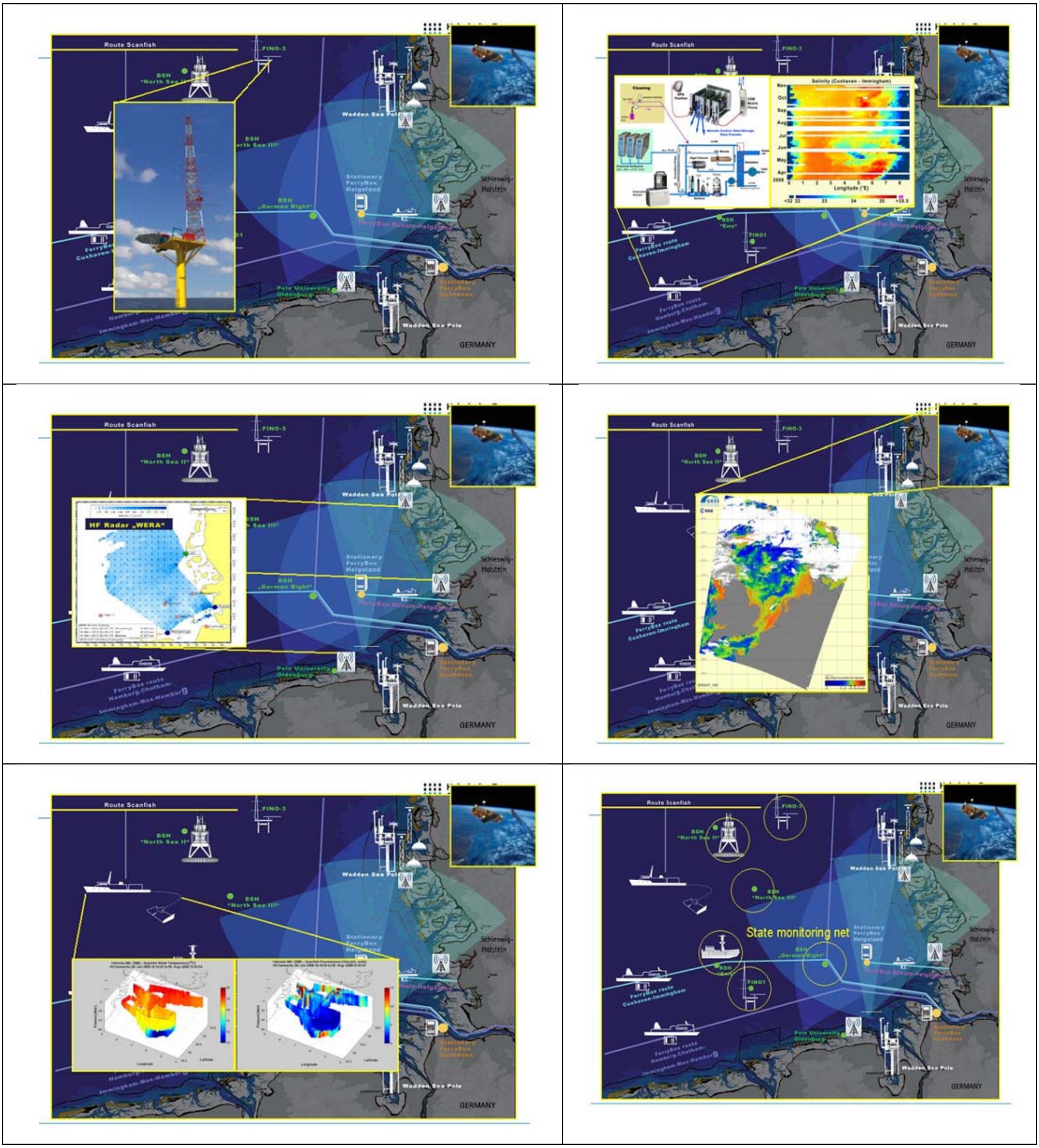

Motivation
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Conflict of uses in the German Exclusive Economic Zone
Ship traffic
Off-shore Windparks
Sediment extraction/Oil drilling
Military Practice
Nature conservation
Border of German EEZ
0 20 40 60 80 Kilometer

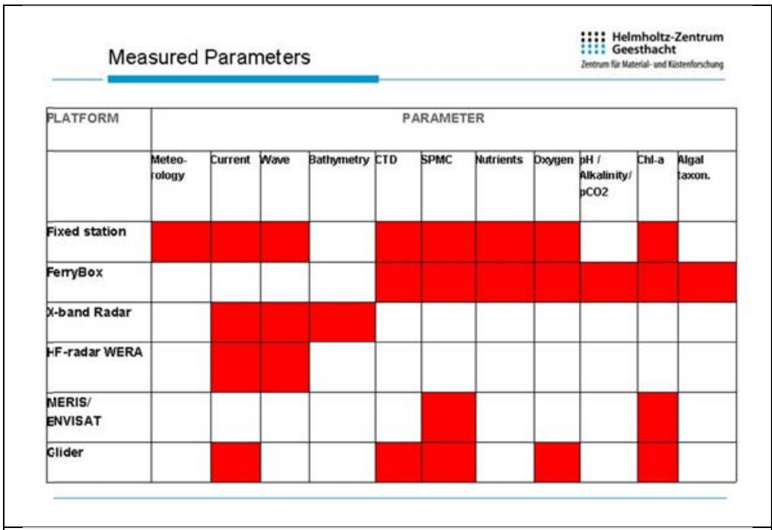

COSYNA
COSYNA
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Mission Statement
Development and test of analysis systems, consisting of observations and numerical modelling, for the operational synoptic description of the environmental status of the North Sea and of Arctic coastal waters. COSYNA aims to provide knowledge tools that can help authorities and other stakeholders to manage routine tasks, emergency situations and evaluate trends.
· Co-ordinated and financed by HZG
· Participation of external partners from universities and authorities
HPA
marum
imare
ICBM
AWI
NLWKN


COSYNA
Questions to Answer
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
→What are the long-term changes of physical boundary conditions, e.g. current pattern, waves, temperatures, salinities and the radiation filed in the water?
→What are the consequences of these changes on the SPM budget and the morphodynamics?
→How will the bio-geochemical state of the Wadden Sea and the North Sea change?
→What is the significance of "Extreme Events" for the seasonal primary production and the bio-geochemical budgets?
→How large is the exchange SPM, nutrients and organic matter between Wadden Sea and the North Sea?
→What are the driving factors for algal blooms; under which conditions HABs are formed?
→Which are the effects of planned offshore wind mills on the physical dynamics, sediment transport and biological processes?

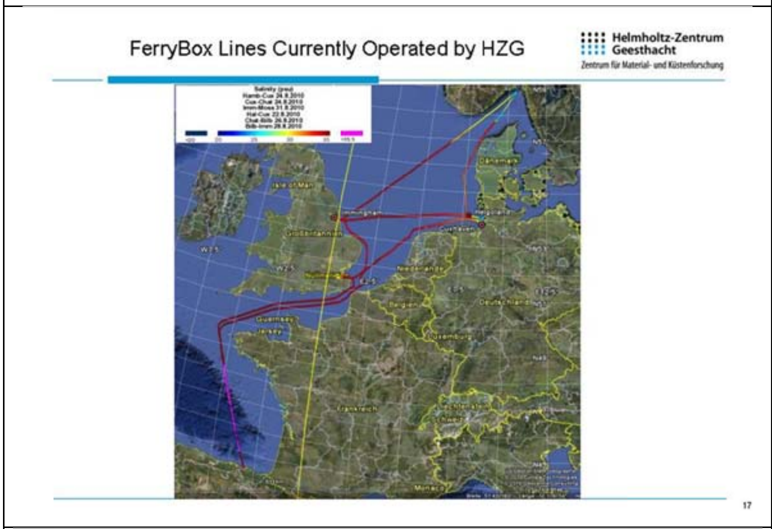

COSYNA
Type of Observations
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
1. Point Measurements:
Buoys & Fixed Stations (offshore & onshore)
2. Surface Transects:
FerryBoxes
3. 3D Transects:
SCANFISH
Gliders
4. Fields:
Optical Remote Sensing (satellite)
Radar (HF & X-Band)

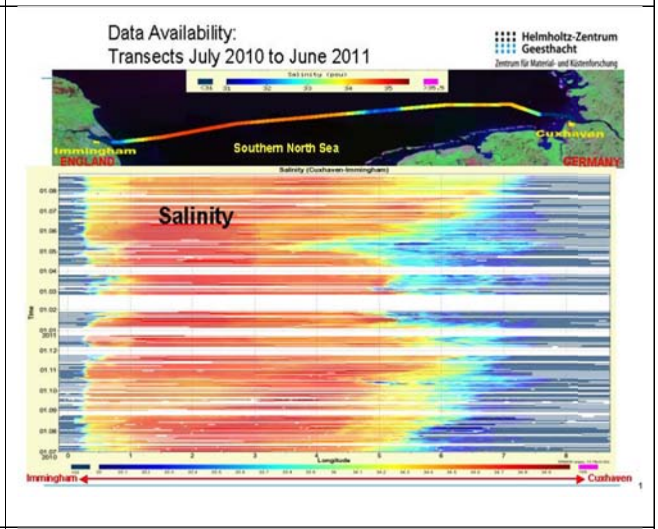

Route Scanfish
FINO-3
Wadden Sea Pole
GERMANY

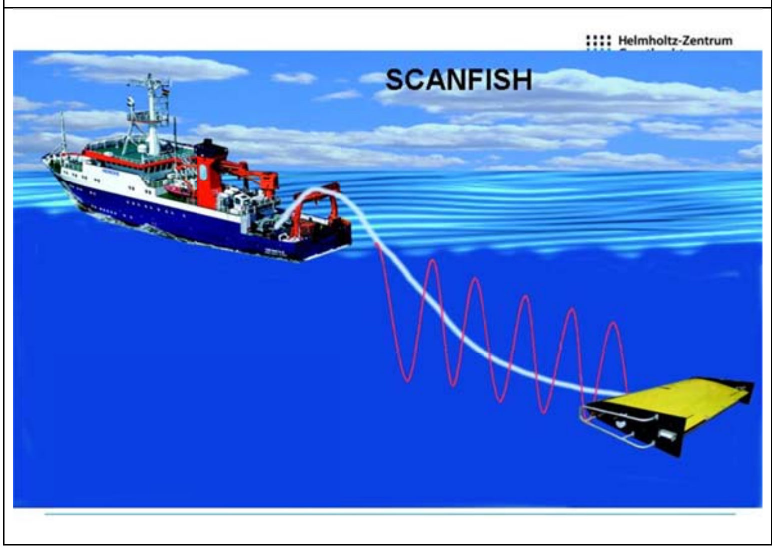

Route Scanfish
FINO-3
Wadden Sea Pole
Schleswig-Holstein
GERMANY
HF Radar „WERA“
Salinity (Cuxhaven - Immingham)
State monitoring net

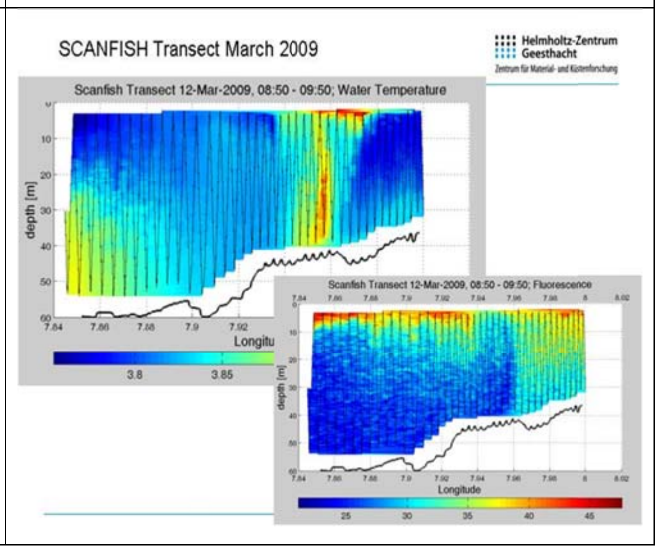

Measured Parameters
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
PLATFORM
PARAMETER
Meteo-rology
Current
Wave
Bathymetry
CTD
SPMC
Nutrients
Oxygen
pH / Alkalinity/ pCO2
Chl-a
Algal taxon.
Fixed station
FerryBox
X-band Radar
HF-radar WERA
MERIS/ ENVISAT
Glider

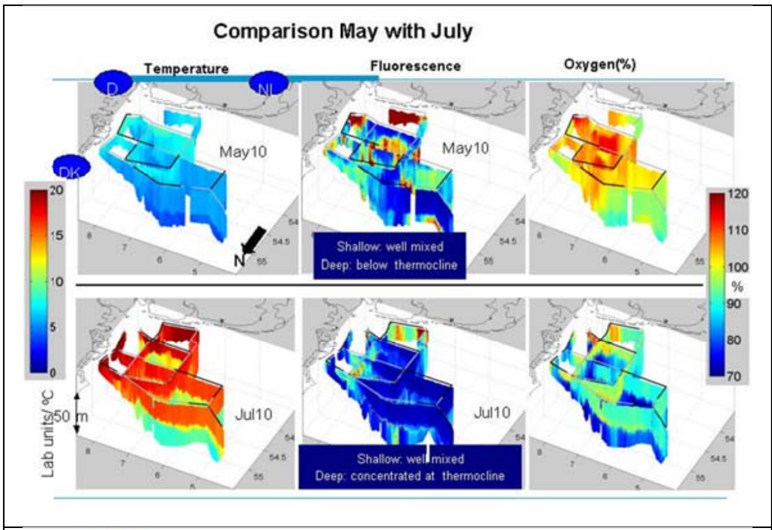

FerryBox on Ships of Opportunity
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Sensor Package
FerryBox
16


FerryBox Lines Currently Operated by HZG
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
17

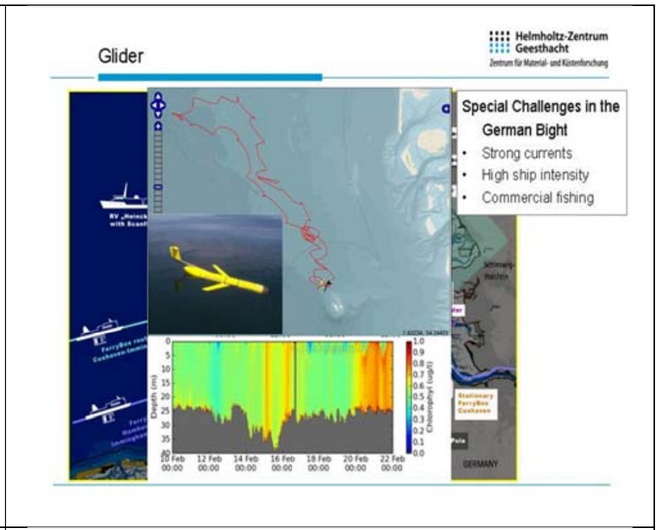

Data Availability:
Transects July 2010 to June 2011
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Immingham
ENGLAND
Southern North Sea
Cuxhaven
GERMANY
Salinity
Immingham
Cuxhaven


Helmholtz-Zentrum
SCANFISH

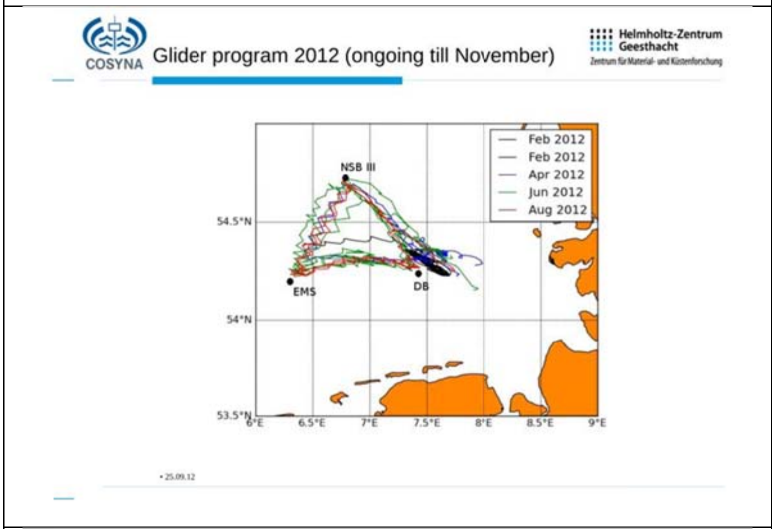

SCANFISH Transect March 2009
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Scanfish Transect 12-Mar-2009, 08:50 - 09:50; Water Temperature
depth [m]
Scanfish Transect 12-Mar-2009, 08:50 - 09:50; Fluorescence
Longitude



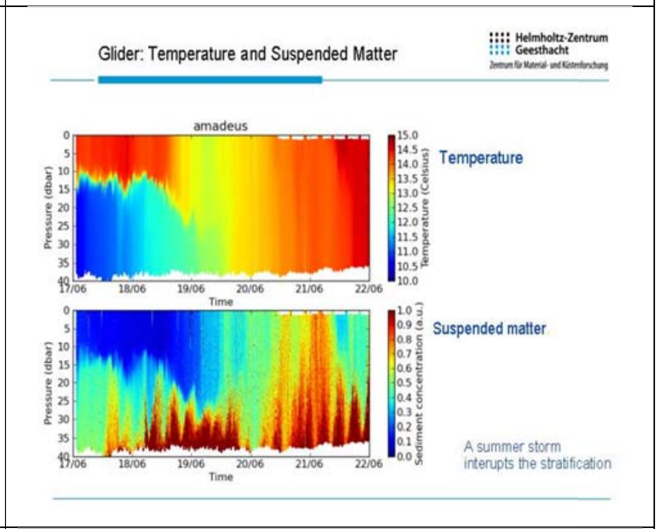
Comparison May with July
Temperature
Fluorescence
Oxygen(%)
May10
May10
Shallow: well mixed
Deep: below thermocline
Jul10
Jul10
Shallow: well mixed
Deep: concentrated at thermocline
Lab units/ °C
50 m
%



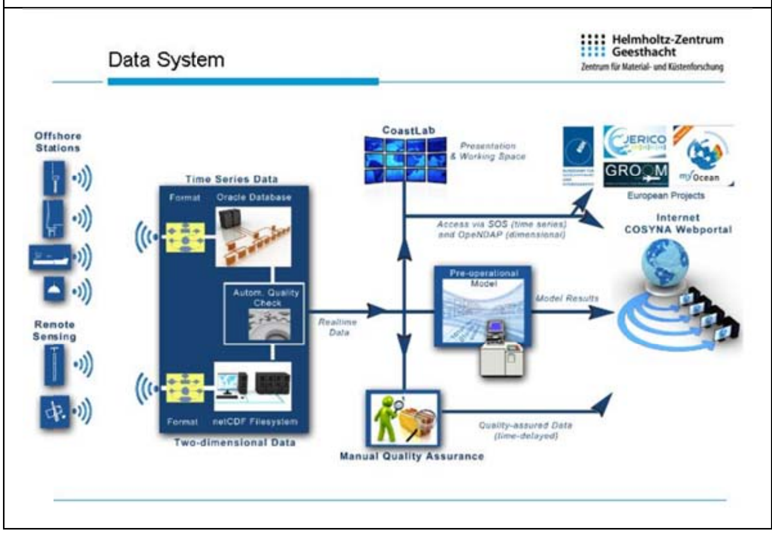
Glider
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Special Challenges in the German Bight
Strong currents
High ship intensity
Commercial fishing
GERMANY



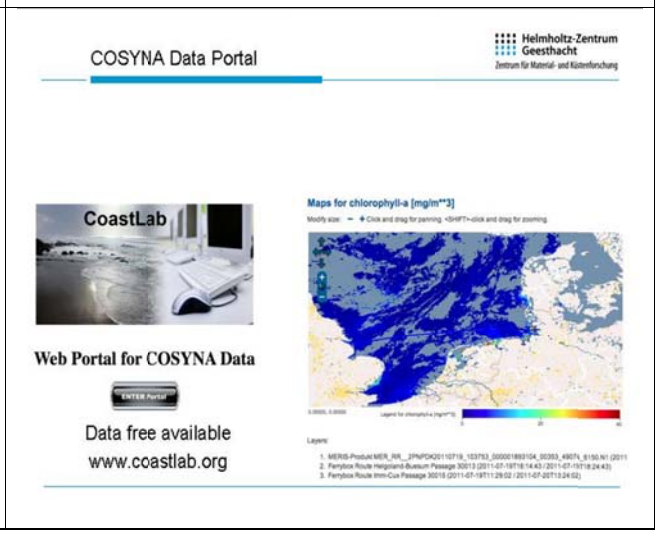
COSYNA
Glider program 2012 (ongoing till November)
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Feb 2012
Feb 2012
Apr 2012
Jun 2012
Aug 2012
NSB III
EMS
DB
54.5°N
54°N
53.5°N
6°E
6.5°E
7°E
7.5°E
8°E
8.5°E
9°E



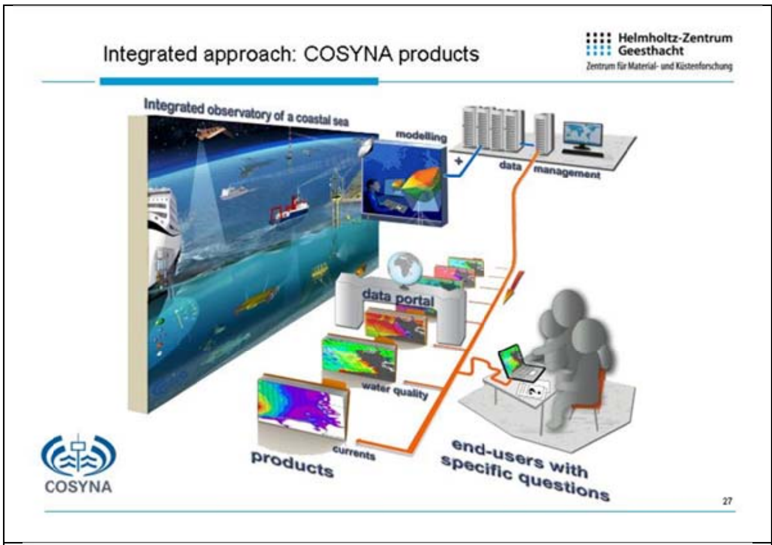
Glider: Temperature and Suspended Matter
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
amadeus
Pressure (dbar)
Time
Temperature (Celsius)
Temperature
Sediment concentration (a.u.)
Suspended matter
A summer storm
interupts the stratification

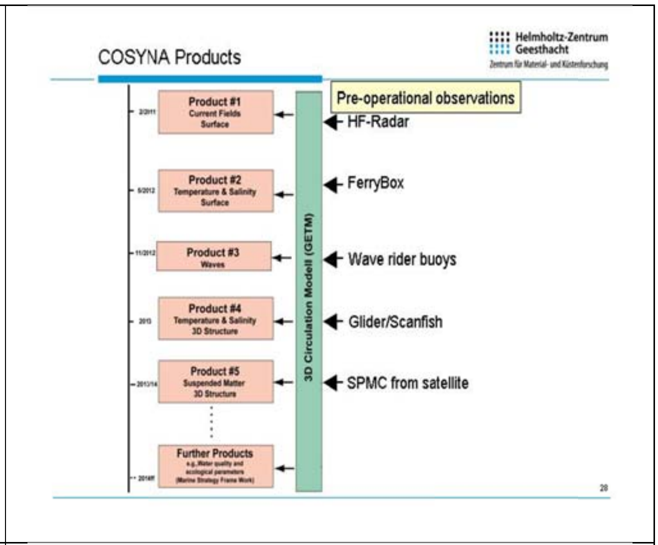


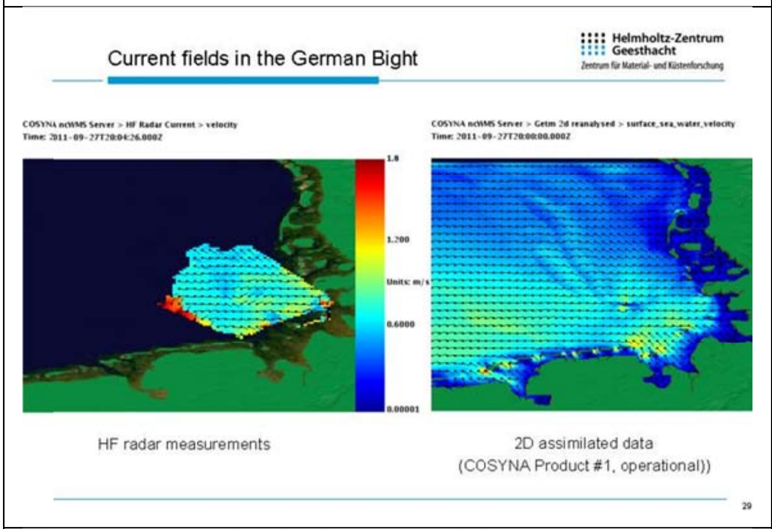
Data System
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Offshore Stations
Remote Sensing
Time Series Data
Format
Oracle Database
Autom. Quality Check
Format
netCDF Filesystem
Two-dimensional Data
Realtime Data
CoastLab
Presentation & Working Space
Access via SOS (time series) and OpeNDAP (dimensional)
Pre-operational Model
Model Results
Manual Quality Assurance
Quality-assured Data (time-delayed)
European Projects
Internet COSYNA Webportal

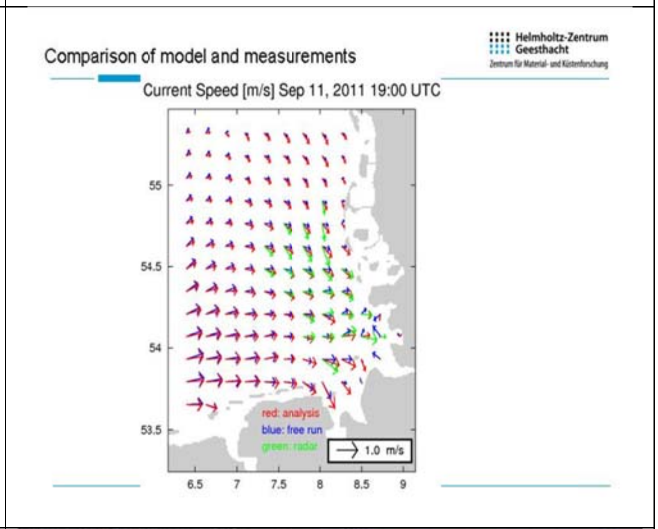


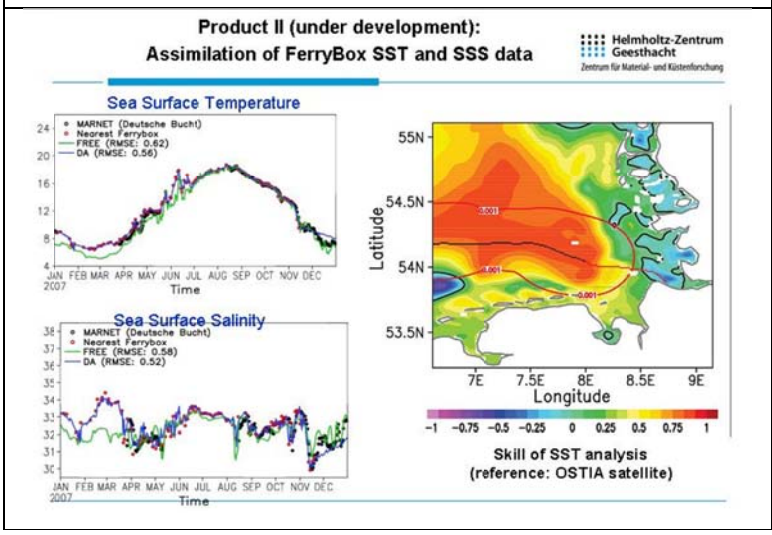
COSYNA Data Portal
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
CoastLab
Web Portal for COSYNA Data
Data free available
www.coastlab.org
Maps for chlorophyll-a [mg/m**3]


Integrated approach: COSYNA products
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Integrated observatory of a coastal sea
modelling
data management
data portal
water quality
currents
products
end-users with specific questions
COSYNA
27

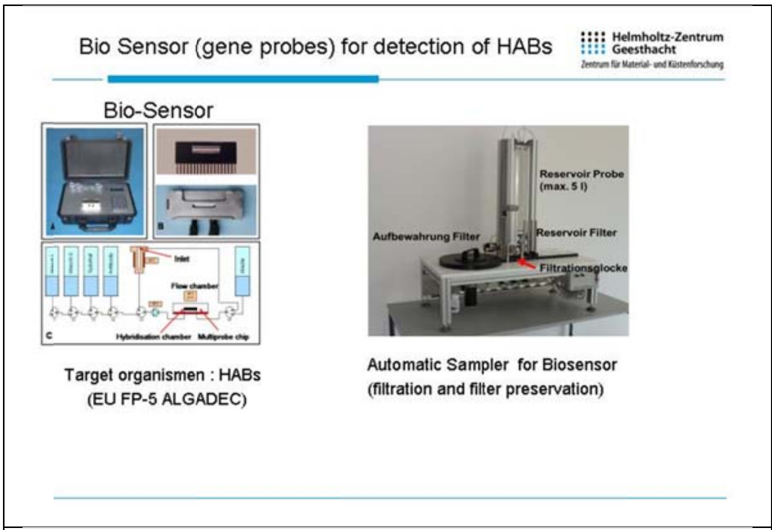

COSYNA Products
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Pre-operational observations
Product #1 Current Fields Surface
HF-Radar
Product #2 Temperature & Salinity Surface
FerryBox
Product #3 Waves
Wave rider buoys
Product #4 Temperature & Salinity 3D Structure
Glider/Scanfish
Product #5 Suspended Matter 3D Structure
SPMC from satellite
Further Products
3D Circulation Modell (GETM)
28

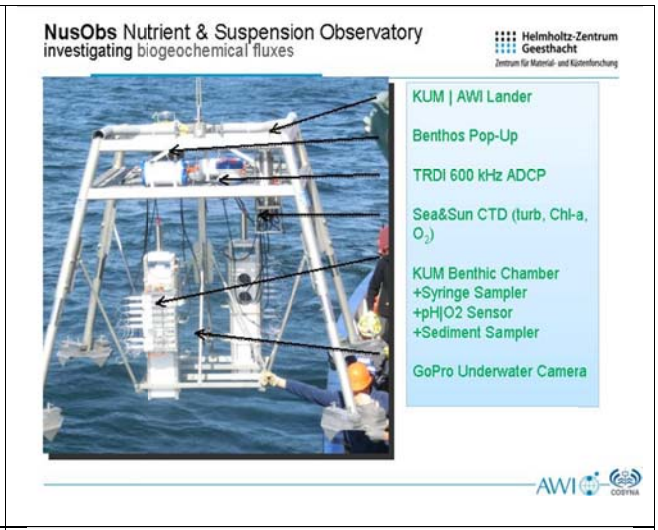

Current fields in the German Bight
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
HF radar measurements
2D assimilated data
(COSYNA Product #1, operational))
29

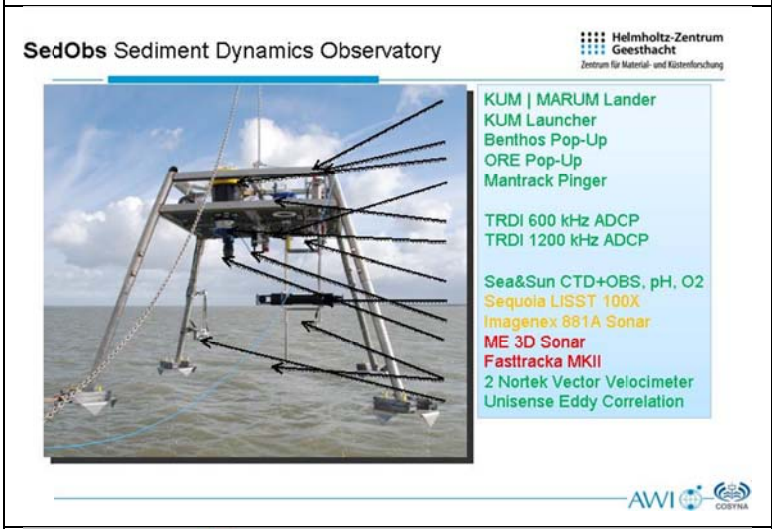

Comparison of model and measurements
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Current Speed [m/s] Sep 11, 2011 19:00 UTC
red: analysis
blue: free run
green: radar
1.0 m/s

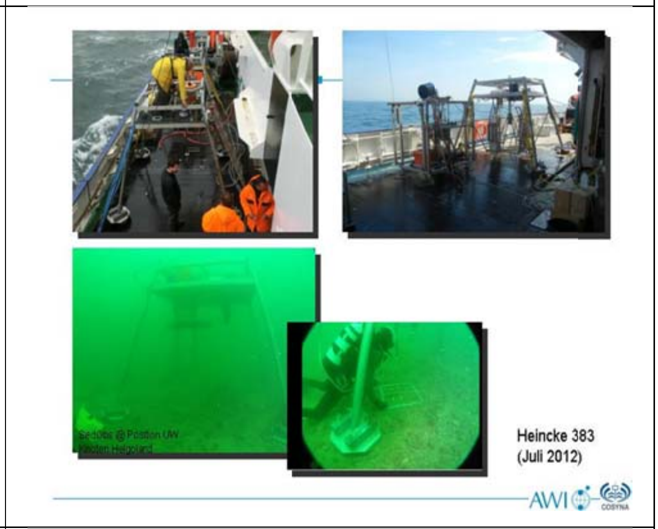

Product II (under development):
Assimilation of FerryBox SST and SSS data
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung
Sea Surface Temperature
MARNET (Deutsche Bucht)
Nearest Ferrybox
FREE (RMSE: 0.62)
DA (RMSE: 0.56)
Time
Sea Surface Salinity
MARNET (Deutsche Bucht)
Nearest Ferrybox
FREE (RMSE: 0.58)
DA (RMSE: 0.52)
Time
Latitude
Longitude
Skill of SST analysis
(reference: OSTIA satellite)

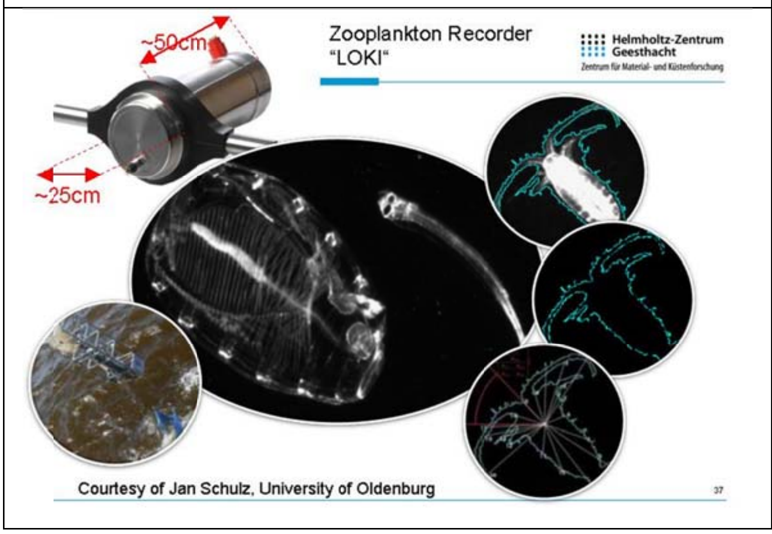

Modules operated by COSYNA partners
Geneprobe (AWI)
Pole Elbe (HPA)
Pole Spiekeroog
(Uni Oldenburg)
Zooplankton (AWI)
Sediment/Water Interactions
MARUM & AWI
Underwater Node (AWI)

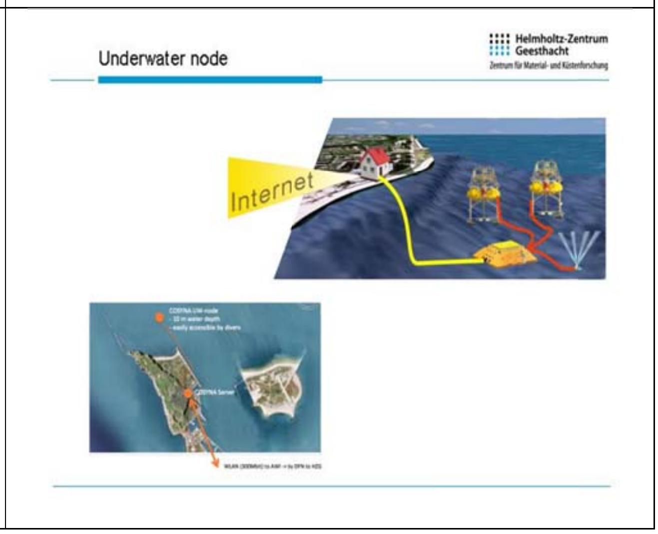

Bio Sensor (gene probes) for detection of HABs
Helmholtz-Zentrum Geesthacht
Bio-Sensor
Reservoir Probe (max. 5 l)
Aufbewahrung Filter
Reservoir Filter
Filtrationsglocke
Target organismen : HABs
(EU FP-5 ALGADEC)
Automatic Sampler for Biosensor
(filtration and filter preservation)

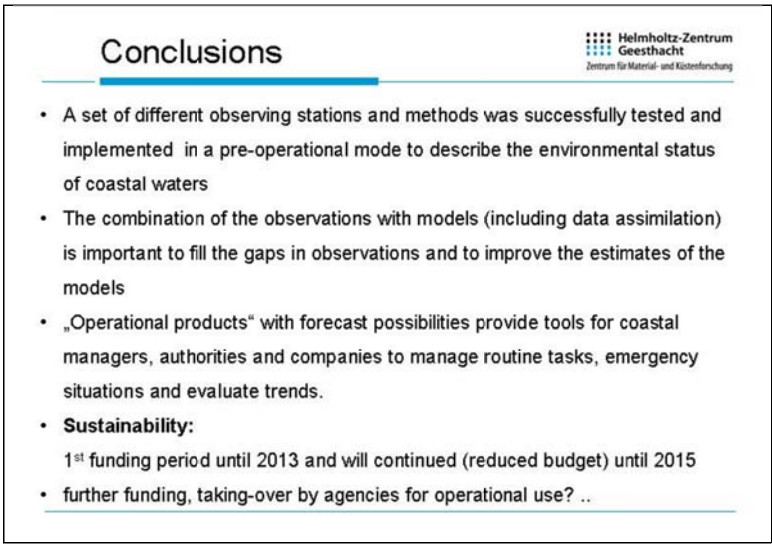

NusObs Nutrient & Suspension Observatory
investigating biogeochemical fluxes
Helmholtz-Zentrum Geesthacht
KUM | AWI Lander
Benthos Pop-Up
TRDI 600 kHz ADCP
Sea&Sun CTD (turb, Chl-a, O_2)
KUM Benthic Chamber
+Syringe Sampler
+pH|O2 Sensor
+Sediment Sampler
GoPro Underwater Camera
AWI
COSYNA


SedObs Sediment Dynamics Observatory
Helmholtz-Zentrum Geesthacht
KUM | MARUM Lander
KUM Launcher
Benthos Pop-Up
ORE Pop-Up
Mantrack Pinger
TRDI 600 kHz ADCP
TRDI 1200 kHz ADCP
Sea&Sun CTD+OBS, pH, O2
Sequoia LISST 100X
Imagenex 881A Sonar
ME 3D Sonar
Fasttracka MKII
2 Nortek Vector Velocimeter
Unisense Eddy Correlation
AWI
COSYNA


Heincke 383
(Juli 2012)
AWI
COSYNA


~50cm
~25cm
Zooplankton Recorder
"LOKI"
Helmholtz-Zentrum Geesthacht
Courtesy of Jan Schulz, University of Oldenburg
37


Underwater node
Helmholtz-Zentrum Geesthacht
Internet



3.1.6 Spanish strategy for operational oceanography in the Bay of Biscay (Julien Mader, AZTI)

Julien Mader (AZTI) discussed the role of users in the coastal operational oceanography. The main scientific issues of the Core Service to be addressed in an operational mode can be summed up as follow:

- Contingency plans, sustainable management of human impacts: harbours, oil industry, aquaculture, desalination plants, waste water, dredging,
- Safety in coastal area, search and rescue,
- Morphodynamics,
- Fisheries Management,
- Marine spatial mapping,
- Marine energy,
- Assessment of environmental status,
- Others.

The main objective is to organize the validation of Core Service (and for coastal models running on overlapped areas) in a way coordinated between the ROOSs by taking in account the users perspectives. This process is based on strong and sustainable observing systems and on a coordinated approach of validation process along the coastal area.

It implies the need:

- to coordinate activities of intermediate users in the ROOS for downstream services and to get the feedback to the “Core Service”,
- to develop and optimise coastal observing systems in a coordinated way and to include trans-national HF radars networking,
- to capitalise on trans-national coastal operational oceanography systems,

For the next years, the strategy is:

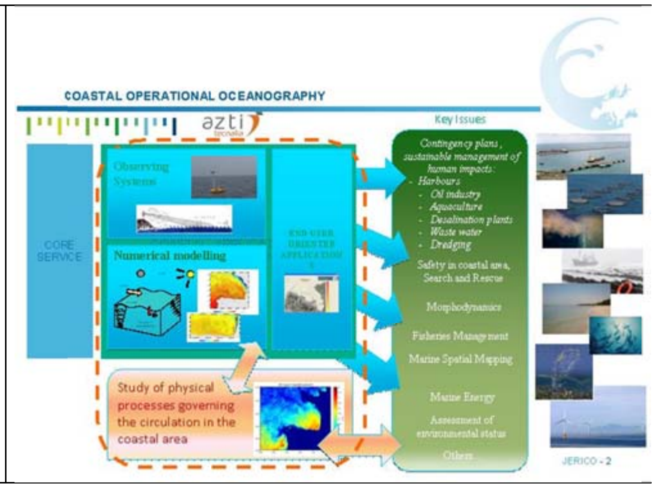
- To sustain the present network with national, regional and European funding;
- To improve visibility and feedback of the use of the data;
- To use data more extensively and to help for a wider exploitation of the data in the framework of the WFD and of the MSFD.

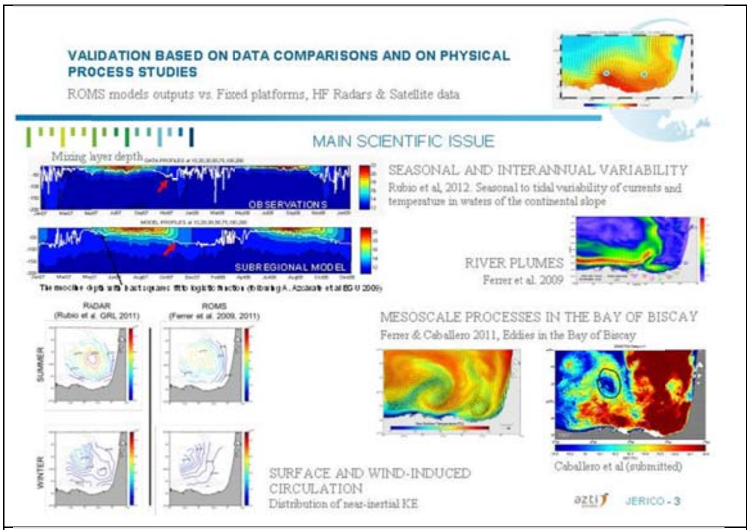
To conclude, a parallel between JERICO' challenges and strategy was drawn, to address the challenge of observing the complexity and high variability of coastal areas at Pan-European level, by implementing new active requirements arising from WFD and MSFD and by reinforcing the role of the Intermediate users in coastal observatories.

Synthesis with regards to the workshop objectives:

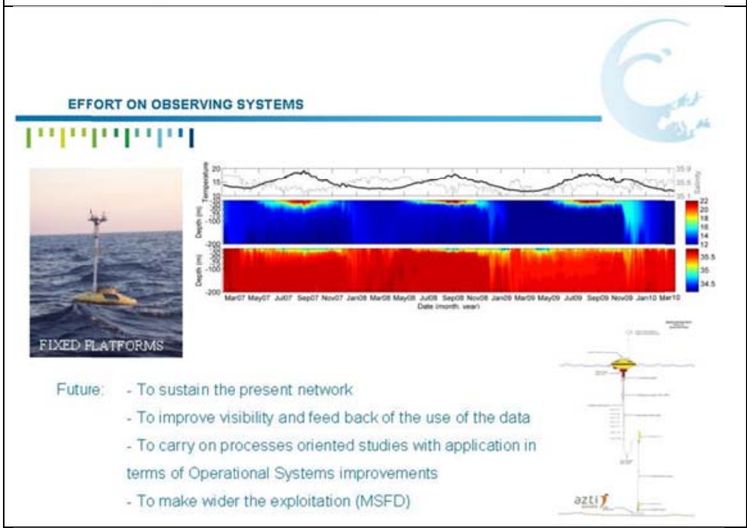
The Spanish strategy for the Bay of Biscay is lead by AZTI. The main objective is to organize the validation of Core Service (and for coastal models running) in a way coordinated between the ROOS by taking in account the intermediate users perspectives. This implies the need to both coordinate the organisation of downstream services between ROOS and to get the feedbacks to the core services.
The strategy is also based on the development and optimisation of the coastal observing system by including trans-national systems such as HF radar network.

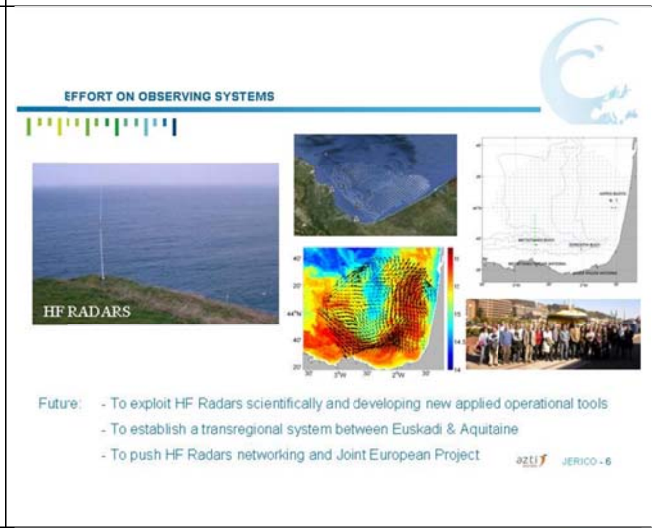
Slides are presented below.




VALIDATION BASED ON DATA COMPARISONS AND ON PHYSICAL PROCESS STUDIES
ROMS models outputs vs. Fixed platforms, HF Radars & Satellite data
MAIN SCIENTIFIC ISSUE
Mixing layer depth
OBSERVATIONS
SUBREGIONAL MODEL
SEASONAL AND INTERANNUAL VARIABILITY
Rubio et al, 2012. Seasonal to tidal variability of currents and temperature in waters of the continental slope
RIVER PLUMES
Ferrer et al. 2009
RADAR (Rubio et al. GRL 2011)
ROMS (Ferrer et al. 2009, 2011)
SUMMER
WINTER
MESOSCALE PROCESSES IN THE BAY OF BISCAY
Ferrer & Caballero 2011, Eddies in the Bay of Biscay
Caballero et al (submitted)
SURFACE AND WIND-INDUCED CIRCULATION
Distribution of near-inertial KE
azti JERICO - 3

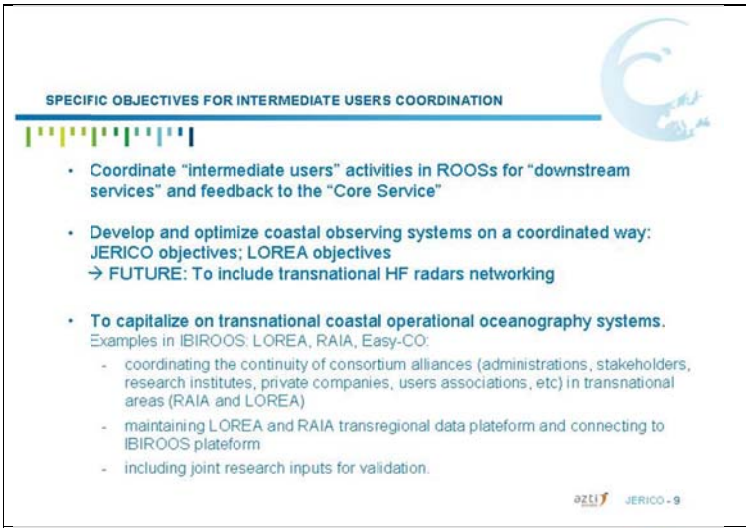

RELATION WITH CORE SERVICE
To organize the validation of Core Service in the buffer area (and for coastal models running on overlaped areas) in a coordinated way in the ROOSs with Intermediate Users perspectives
Based on:
•Strong and sustainable Observing Systems
→ VISIBILITY AND EUROPEAN CO-FOUNDING
•Coordinated processes approach validation along the coastal area → REINFORCING THE ROLE OF INTERMEDIATE USERS
azti JERICO - 4

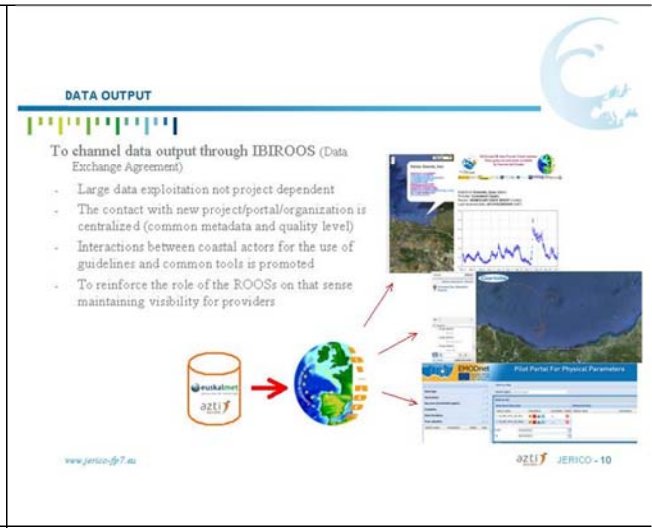

EFFORT ON OBSERVING SYSTEMS
FIXED PLATFORMS
Future: - To sustain the present network
- To improve visibility and feed back of the use of the data
- To carry on processes oriented studies with application in terms of Operational Systems improvements
- To make wider the exploitation (MSFD)
azti

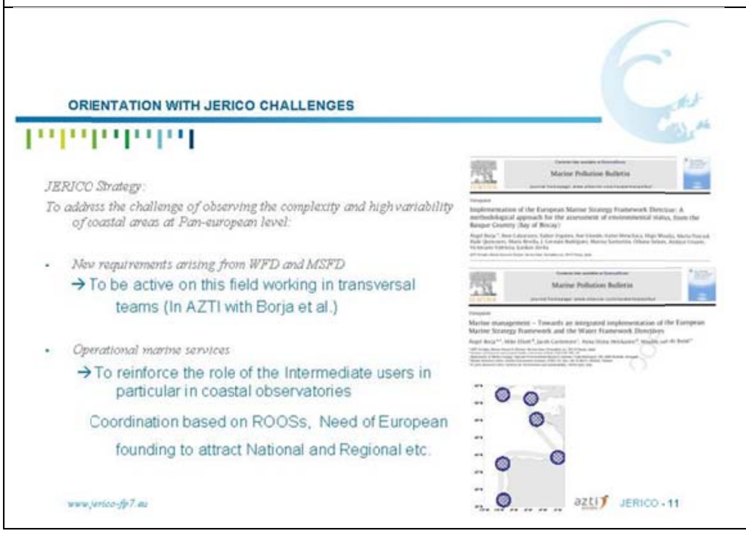

EFFORT ON OBSERVING SYSTEMS
HF RADARS
Future: - To exploit HF Radars scientifically and developing new applied operational tools
- To establish a transregional system between Euskadi & Aquitaine
- To push HF Radars networking and Joint European Project
azti JERICO - 6


EFFORT ON OBSERVING SYSTEMS
GLIDERS
No own investments in materials (related to the size of the technical team in AZTI and to other recent acquisitions: Fixed platforms, HF Radars)
→ NEED OF SPECIALIZATION IN EUROPE AT LEAST ON THE FIRST STEPS OF DEVELOPMENTS & APPLICATIONS (between Institutes, Projects, Countries…)
AZTI promotes European (JERICO) and National (Spanish Singular Project SOCIB) collaborative strategies.
→ Participation to Glider School (Carlos Hernández, Anna Rubio)
→ Application for Transnational Access to Gliders (Dr Ainhoa Caballero, AZTI-Tecnalia)
MOTIVATION:
Scientific Interest: Mesoscale processes description
Technologies Intercomparison and complementarities between them
To improve own technical knowledge on Gliders
www.jerico-fp7.eu
azti JERICO - 7


EFFORT ON OBSERVING SYSTEMS
FERRYBOX
• It could have some opportunities (Belgium-Pasajes)
• Not priority until now
UECC
CNRS-INSU: Portsmouth - Santander
HZG: Cuxhaven - Chatham - Bilbao - Immingham - Moss - Halden
www.jerico-fp7.eu
azti JERICO - 8







3.1.7 *Spanish strategy for innovation in the Mediterranean Sea (Joaquin Tintore, CSIC)*

Given the ocean complexity, the continuous need for improvement in instrumental capacities is underlined. It is explained improvements have to be made in tool capabilities, in order to increase understanding and to allow major practical benefits.

The key to successful radical innovation in oceanographic instrumentation are given as follow:

- Building a visionary leadership
- Developing a close coupling between science and engineering
- Creating a coherent investment strategy based on distributed and coordinated resources

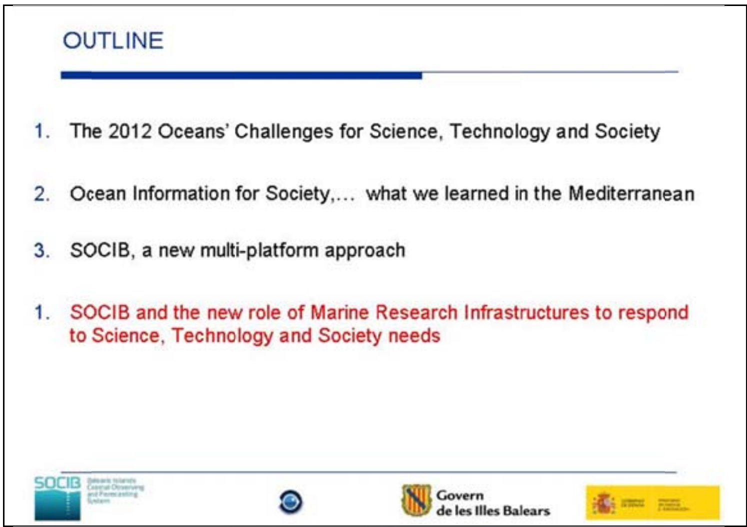
Regarding the real challenge for the next decade, the main goal is to use and integrate these new technologies to monitor the variability at small scales and to establish the decadal variability.

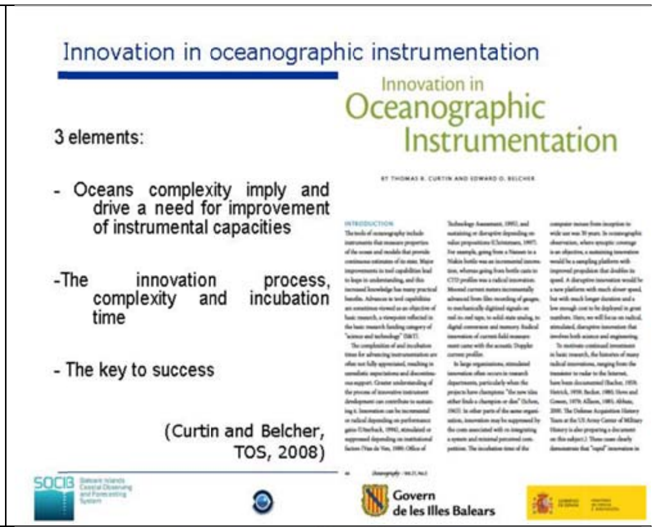
<u>Synthesis with regards to the workshop objectives:</u>

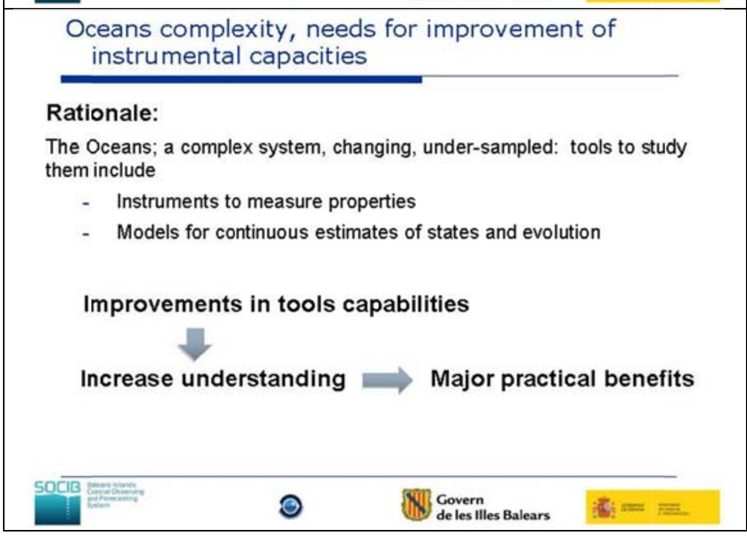
Ocean observing systems are dedicated to respond to 3 main drivers: science, technology, society needs. They are working after continuous improvements in instrumental capacities, which are based on a strong innovation process. This is underlining the key role of innovation in coastal monitoring and research; innovation that has to answer to the need to develop integrated systems working in an operational mode to:

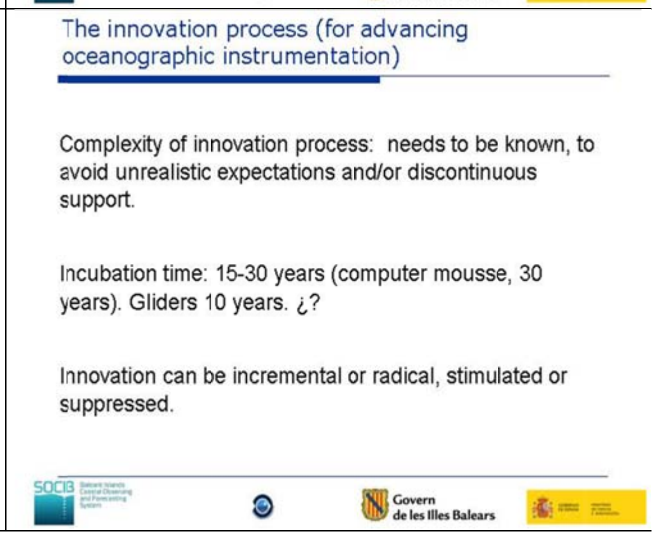
- Monitor the variability at small scales, e.g. mesoscale/week, to
- Resolve the sub-basin/seasonal and inter-annual variability and by this
- Establish the decadal variability, understand the associated biases and correct them.

Slides are presented below.

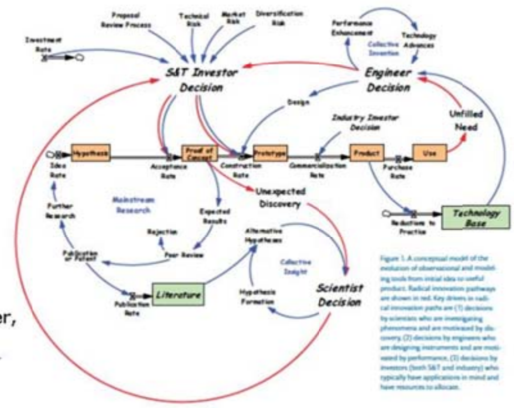








The innovation process (for advancing instrumentation)



(Curtin and Belcher, TOS, 2008)

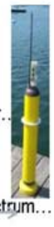
The innovation process (for advancing instrumentation)

Why is it important? : we need synoptic coverage

And... "Every time a new instrument has arrived, new key findings"...

Examples of innovations:

- Ships → Public – Private transfer
- Satellites → Ocean Weather...
- CTD → Micro-structure,
- Buoys- ARGO profilers →
- Currentmeters (rotor to ADCP) Spectrum...
- Gliders → Submesoscale - ...



The innovation process (disruptive, gliders)

Incubation time for gliders; ½

Why?:

... "A coherent set of scientists, engineers, and investors that envisioned the scientific goal, understood the technology potential and sustained the funding" (Curtin and Belcher, TOS; 2008).

The key to success for radical innovation in oceanographic instrumentation

1. Visionary leadership
2. Close coupling between science and engineering
3. A coherent investment strategy based on distributed, coordinated resources
4. Effective processes for communication, feedback, and contingency planning.
5. Incentive to assume responsibility for risky instrumentation development projects without undue career jeopardy.

In summary: work in collaborative, multidisciplinary teams, be tenacious and focused on long term objectives while producing short-term success, and find creative champions among funding agencies and investor organizations.

The role of new marine research infrastructures (MRI/ICTS/Ocean Observatories....)

→ Need to...: **RESPOND TO THE 3 KEY DRIVERS**

- Science Priorities – (ok!)
- Strategic Society Needs (more listening!, policy makers&managers endorsement), MSFD (GES); Energy, Tourism, etc.
- New Technology Developments (companies, social society endorsement)

Coastal Observatories are particularly well placed

AND → Need to define a **JOINT STRATEGY** (international level, more than coordination, Partnership...between Observing and Forecasting Systems !!!

SUMMARY... Coastal observatories and the future...

1. **Respond to 3 drivers: science, technology, society needs**
2. **Use and integrate new technologies to:**
   - Monitor the variability at small scales, e.g. mesoscale/week, to
   - Resolve the sub-basin/seasonal and inter-annual variability and by this
   - Establish the decadal variability, understand the associate biases and correct them ...
3. **Select key control sections for routine monitoring 'choke or control points' to characterise coastal ocean variability**

3.1.8 Irish strategy (Glenn Nolan, MI)

The presentation focused on the future operational oceanographic system for Irish waters which will aim to respond to the user needs of the Irish marine sectors.

The in-situ system in Ireland is multiplatform and it comprises:

- Ferry Box (1)
- Gliders (1)
- Fixed buoys (deep water) (1)
- Fixed buoys (shallow water) (8)
- Seabed observatories (1)
- Sea level monitoring stations (20)
- Radars HF (1)

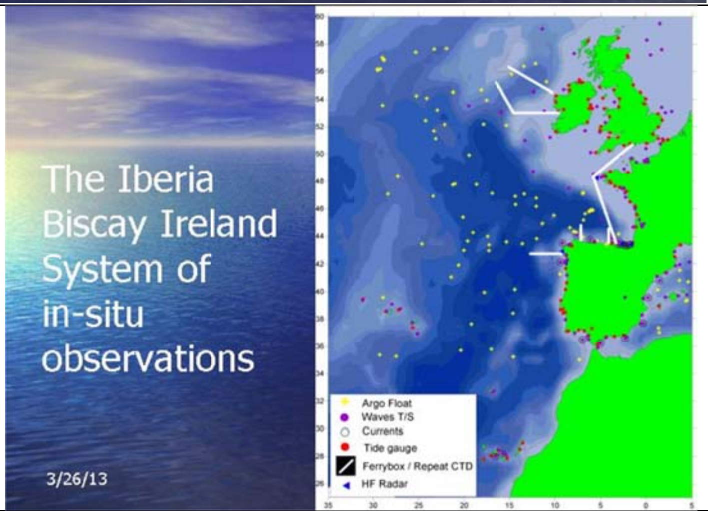
It is dedicated to face several kinds of needs such as fishing and environmental monitoring, criminal investigations. The key elements of the future system are:

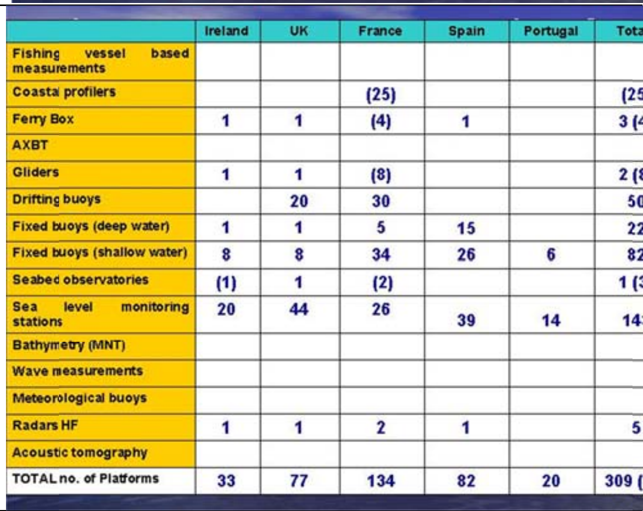
- ARGO
- Fishing vessel capability (RECOPESCA)
- Cabled and high speed wireless applications (CELTNET)
- Biogeochemical observatories
- Enhanced satellite capabilities (HF radars)

It is concluded that the future system will have to be sensitive and adaptive to user needs. Biogeochemical measurements will form a major component of the system. major use of platforms should be increased.

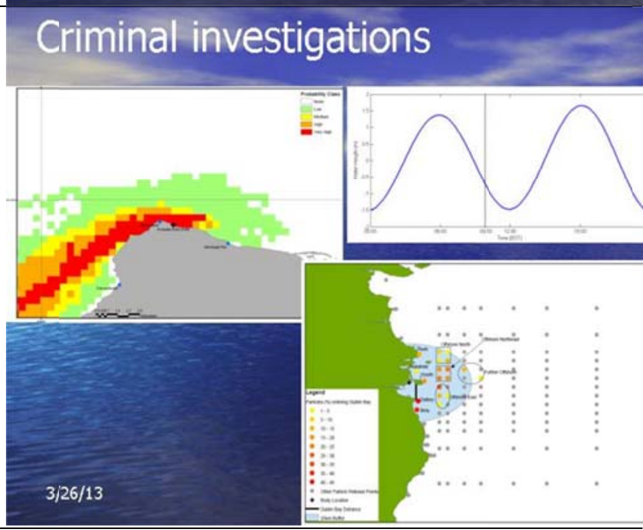
Synthesis with regards to the workshop objectives:
The Irish system is multiplatform, involving fixed buoys, gliders and profiling floats, vessels of opportunity (VOS), seabed observatories, HF radars etc. The stregy for the future is based on the development of key elements of the systems such as ARGO float, VOS, observatories, radars, and of biochemical monitoring.

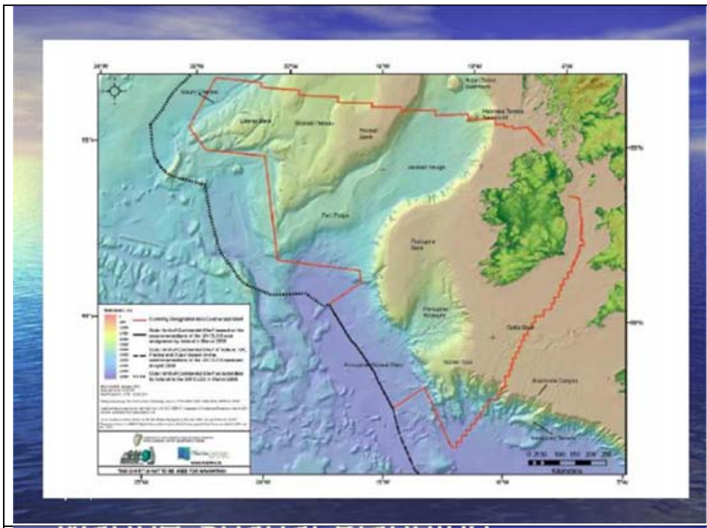
Slides are presented below.

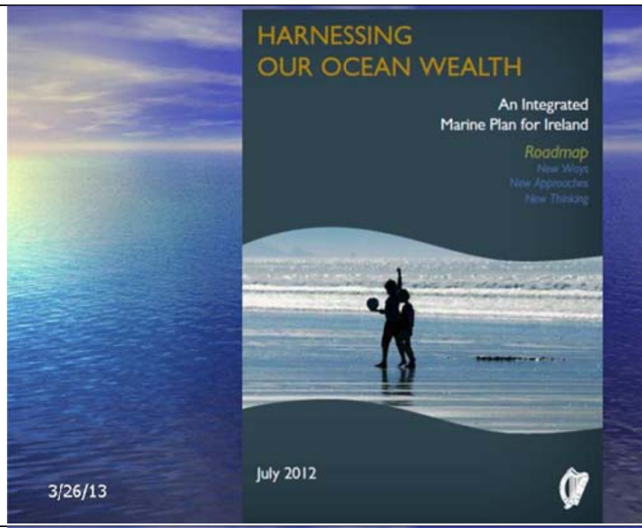


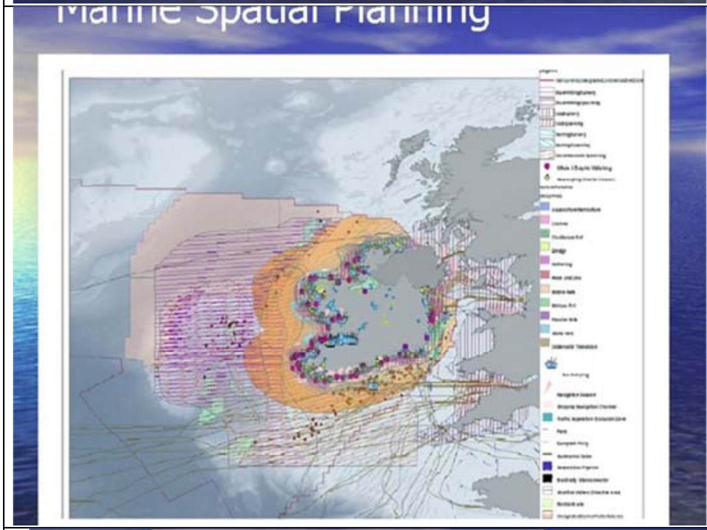


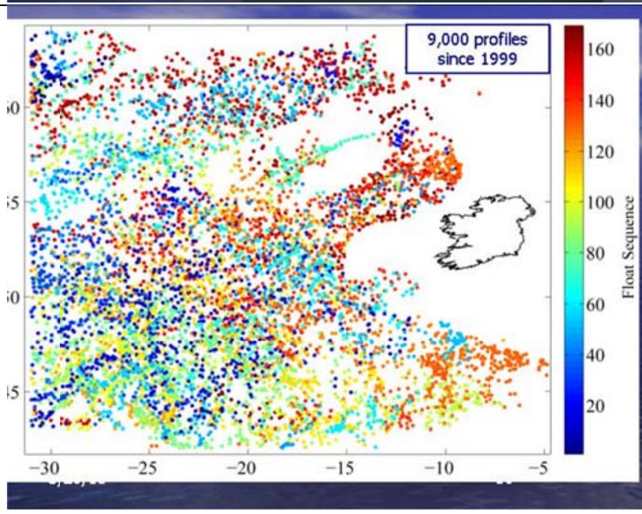
	Ireland	UK	France	Spain	Portugal	Tota
Fishing vessel based measurements						
Coastal profilers			(25)			(25
Ferry Box	1	1	(4)	1		3 (4
AXBT						
Gliders	1	1	(8)			2 (8
Drifting buoys		20	30			50
Fixed buoys (deep water)	1	1	5	15		22
Fixed buoys (shallow water)	8	8	34	26	6	82
Seabed observatories	(1)	1	(2)			1 (3
Sea level monitoring stations	20	44	26	39	14	14
Bathymetry (MNT)						
Wave measurements						
Meteorological buoys						
Radars HF	1	1	2	1		5
Acoustic tomography						
TOTAL no. of Platforms	33	77	134	82	20	309 (

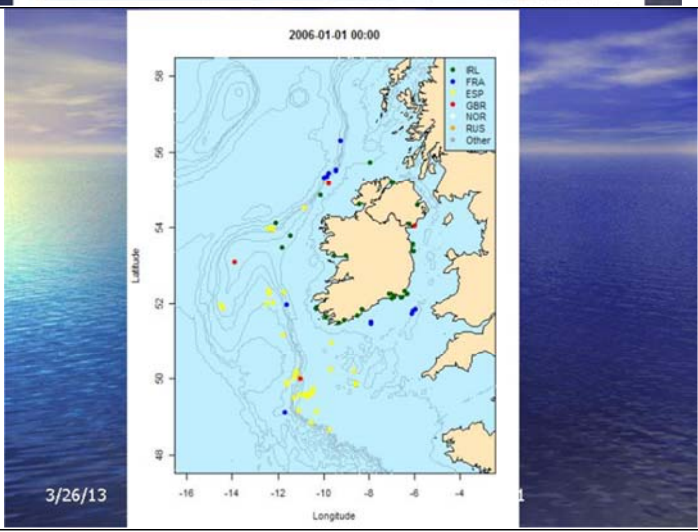




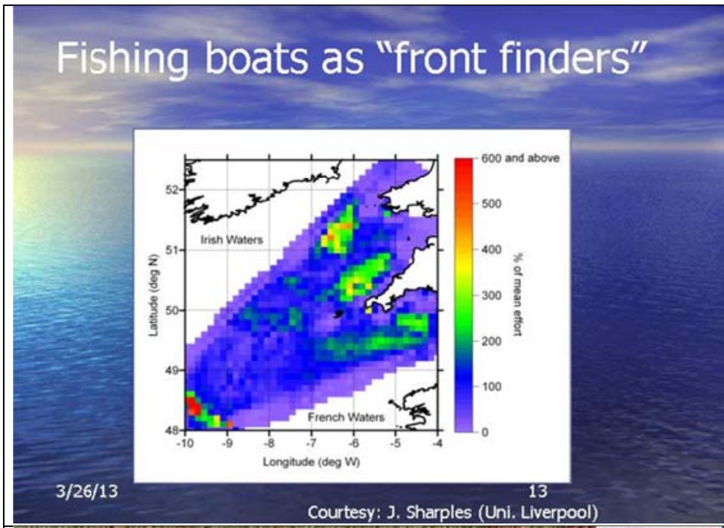

HARNESSING
OUR OCEAN WEALTH
An Integrated
Marine Plan for Ireland
Roadmap
New Ways
New Approaches
New Thinking
July 2012
3/26/13

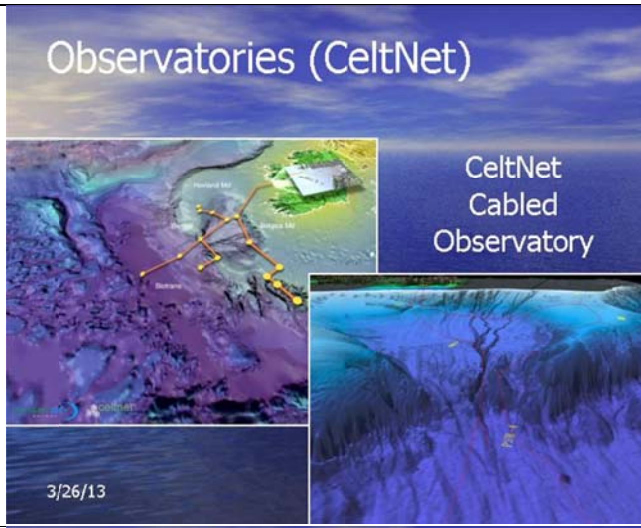

Marine Spatial Planning

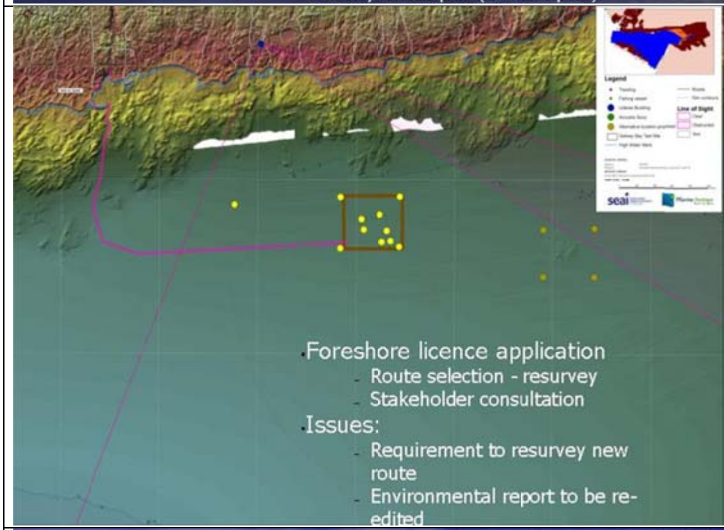

9,000 profiles
since 1999
Float Sequence

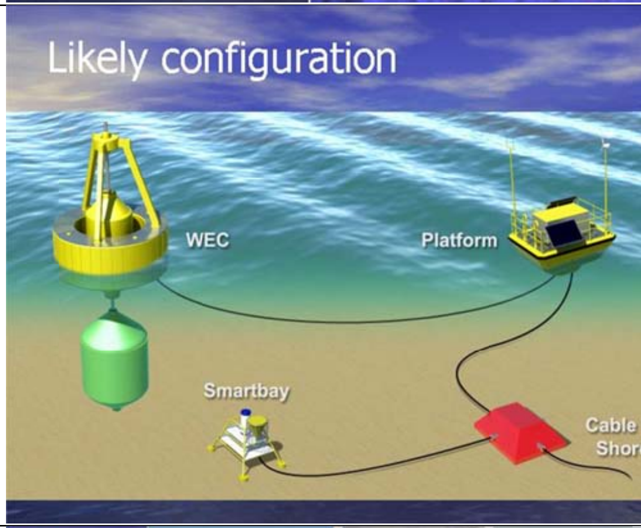

2006-01-01 00:00
IRL
FRA
ESP
GBR
NOR
RUS
Other
Latitude
Longitude
3/26/13


RECOPESCA
Communication GPRS
Stockage des données
Communication capteurs
GPS
Concentrateur
Balance
Compte tours
PC de configuration
Capteurs
t°/pression
salinité
turbidité


Fishing boats as "front finders"
600 and above
500
400
300
200
100
0
% of mean effort
Irish Waters
French Waters
Latitude (deg N)
Longitude (deg W)
3/26/13
13
Courtesy: J. Sharples (Uni. Liverpool)

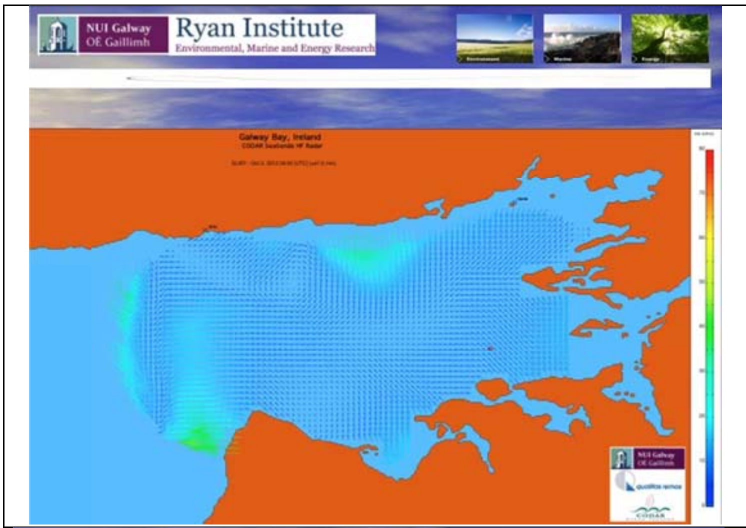

Observatories (CeltNet)
CeltNet
Cabled
Observatory
3/26/13


Foreshore licence application
Route selection - resurvey
Stakeholder consultation
Issues:
Requirement to resurvey new route
Environmental report to be re-edited

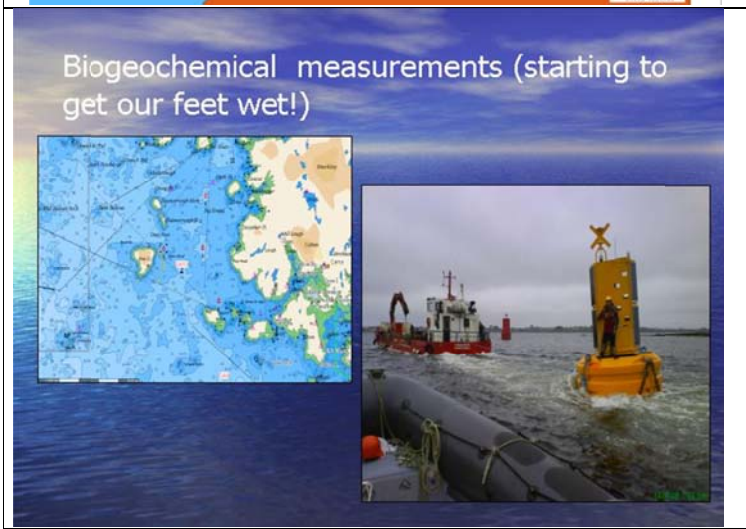

Likely configuration
WEC
Platform
Smartbay
Cable
Shore

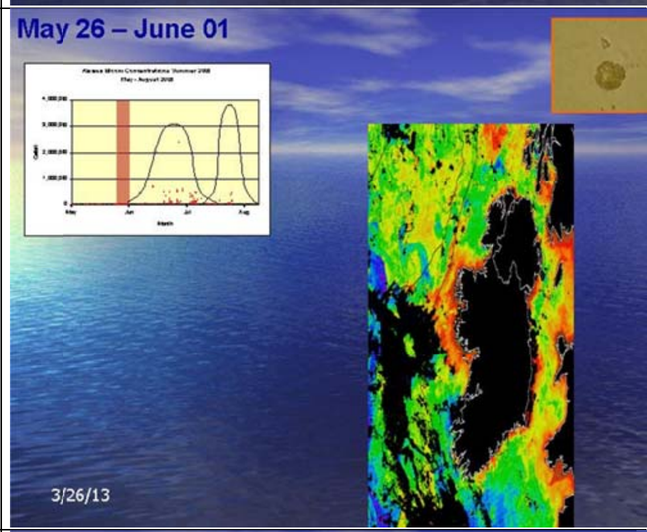

NUI Galway
OÉ Gaillimh
Ryan Institute
Environmental, Marine and Energy Research
Galway Bay Radar

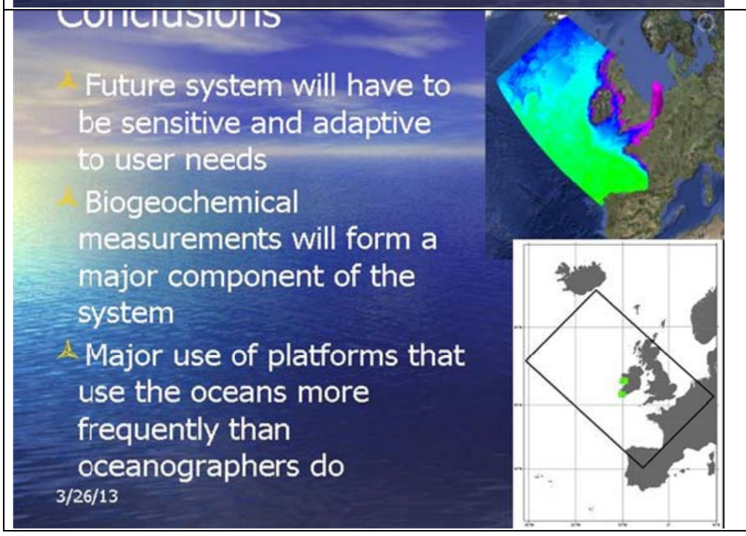

NUI Galway
OÉ Gaillimh

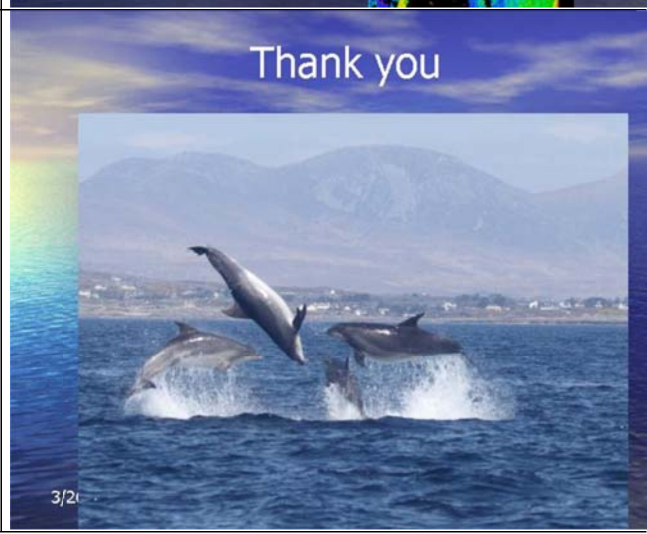

NUI Galway
OÉ Gaillimh
Ryan Institute
Environmental, Marine and Energy Research


Local multi-parameter buoy
3/26/13
20


Biogeochemical measurements (starting to get our feet wet!)


May 26 – June 01
3/26/13


Conclusions
Future system will have to be sensitive and adaptive to user needs
Biogeochemical measurements will form a major component of the system
Major use of platforms that use the oceans more frequently than oceanographers do
3/26/13


Thank you

3.1.9 UK strategy (David Hydes, NERC)

Both the NERC and the UK strategies have been presented.
In the first place, the presentation emphasized the operational networks (SmartBuoy and Wavenet) and the use of data from existing operational programmes outside of CEFAS. The will to improve the capability of existing programmes and to look for partnerships and collaborations is underlined.

The project of creating a single UK marine observatory was introduced in a workshop in November 2011, involving the main UK marine observatory representatives. After this workshop, the UK Integrated Marine Observing Network (UK-IMOS) was launched, serving societal needs by providing reliable marine data and information, for a better understanding of marine systems, improving safety, enhancing our economy and protecting the environment.

UK-IMOS learns from other projects and took opportunities from Us-IOOS model, BP and industry engagement, EMODNET, SEADATANET etc. It federates with partners' programmes. This process is resulting in several benefits. Indeed, it:

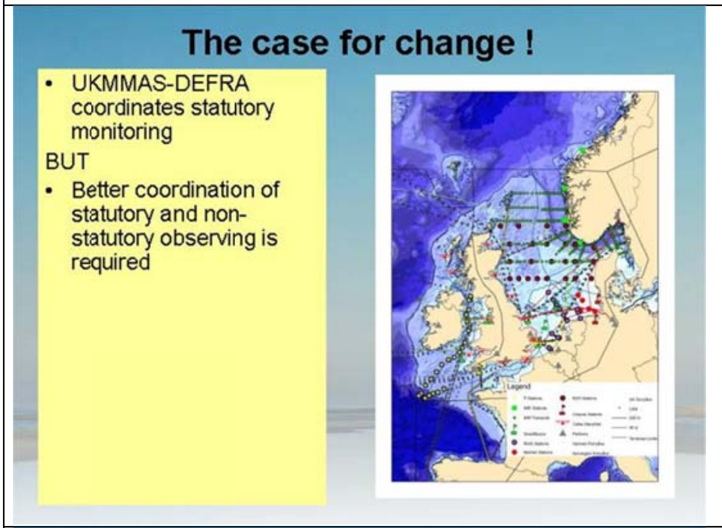
- bridges the gap between UK research, policy and operational organisations thanks to partnerships,
- provides better access to all marine data,
- improves understanding of the prevailing conditions through marine data access,
- Increases efficiency by streamlining access to information for specific policy, operations and research users,
- Serves up marine environmental information in a useable form for the public providing transparency about investment in environmental monitoring and clarity about the role of humans in achieving a desired environmental status.

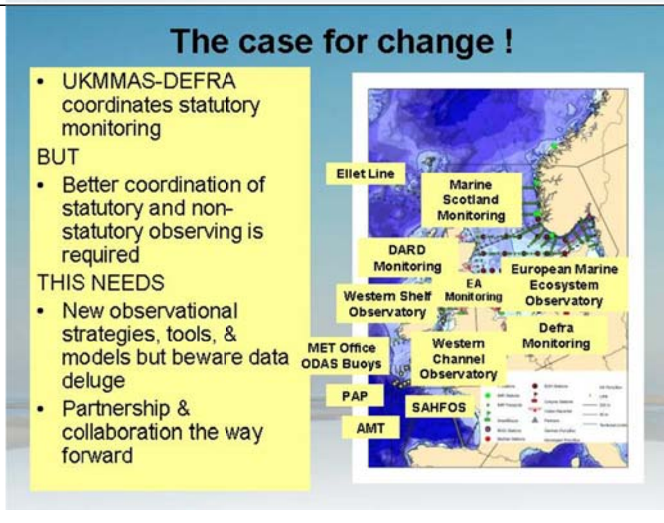
<u>Synthesis with regards to the workshop objectives:</u>

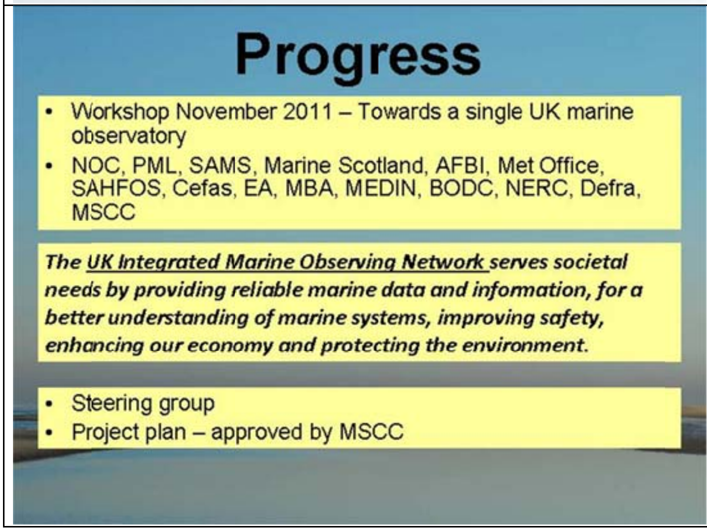
UK implemented the Integrated Marine Observing Network (UK-IMON).
With purpose to draw together existing UK marine observatories and observing programmes in order to create new knowledge and better evidence by making best use of all marine data. In the coming year in order to implement the UK Integrated Marine Observing Network, will play attention to:

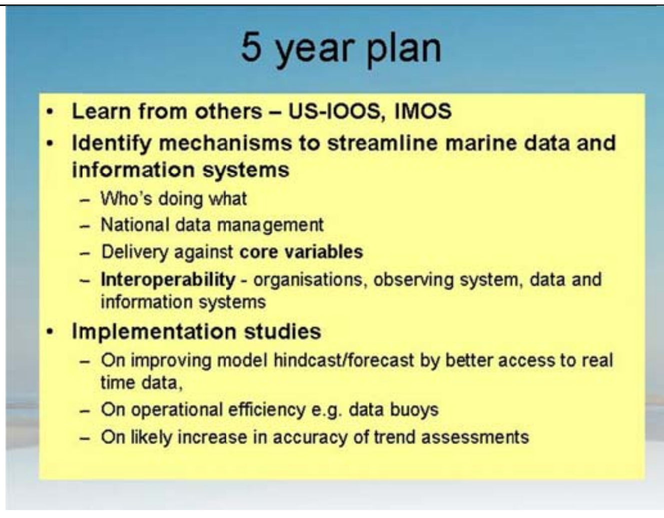
- Interoperability - organisations, observing system, data and information systems
- Implementation studies
    - On improving model hindcast/forecast by better access to real time data,
    - On operational efficiency e.g. data buoys
    - On likely increase in accuracy of trend assessments

Slides are presented below.









Examples of core variables following IOOS model

	Weather & climate	Marine operations	Natural hazards	National security	Public health	Healthy ecosystems: Clean & safe	Healthy ecosystems: Healthy & biologically diverse	Healthy ecosystems: Productive	Healthy ecosystems: Ocean processes	Sustained resources
Salinity (P)	✓	✓	✓	✓	✓				✓	✓
Temperature (P)	✓	✓		✓	✓				✓	✓
Surface waves (P)	✓	✓	✓	✓	✓				✓	✓
Optical properties (P)				✓	✓				✓	✓
Contaminants (C)				✓	✓	✓				
Dissolved nutrient (C)					✓	✓				✓
Chlorophyll (B)						✓	✓			
Phytoplankton species (B)	✓	✓		✓	✓	✓	✓			✓
Zooplankton abundance (B)							✓			✓
Fish species (B)							✓	✓		✓

Links and opportunities

- Offers of collaboration from US-IOOS
  - Summit meeting Nov 2012
- BP and industry engagement
- Marine Knowledge 2020 – EMODNET, EMOS (European Marine Observing System)
- ODIP – Ocean Data Interoperability Platform (EU-CSA)
- UK Conference on operational oceanography Jan 2013

Partner programmes

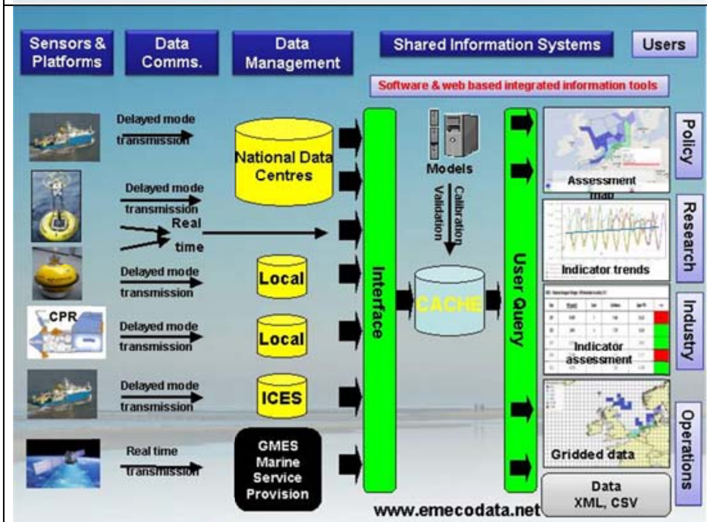
- Western Channel Observatory
- Continuous Plankton Recorder survey
- Defra SmartBuoy programme
- DARD environmental monitoring programme and buoy network
- Marine Scotland environmental monitoring
- Ellet Line
- Tiree passage buoy
- Porcupine Abyssal Plain (PAP) Mooring
- Western Shelf Observatory
- European Marine Ecosystem Observatory
- NOC Liverpool Bay sustained observations
- EA marine monitoring programme
- International Bottom Trawl Survey (IBTS)
- Met Buoy programme
- Drake passage time series
- Atlantic Meridian Transect

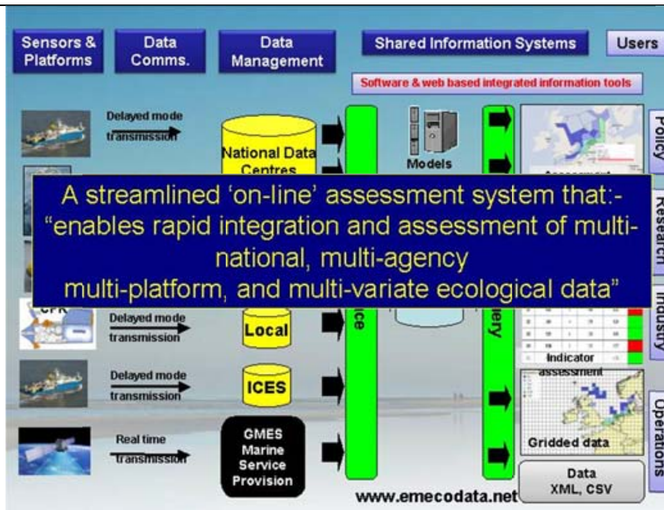
Data management – Seadatanet (II)

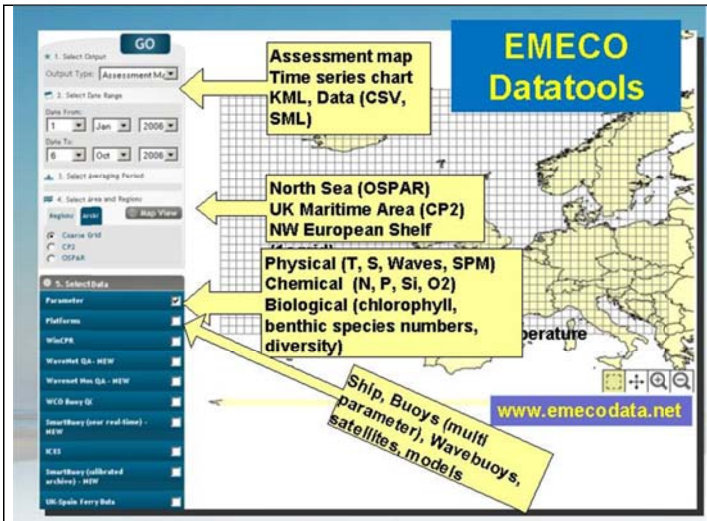
EU FP6

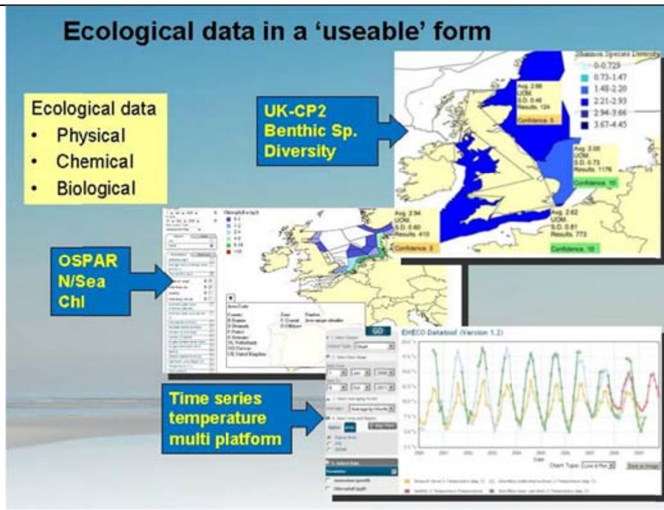
2006 - 2011

A pan-European infrastructure for managing marine and ocean data by connecting 40 National Oceanographic Data Centres (NODC's), national oceanographic focal points, and ocean satellite data centres, in Europe









Benefits

- **Bridging the gap** between UK research, policy and operational organisations by building effective partnerships
- Providing **better access to all marine data** in order to meet future evidence requirements for policy
- Ensuring that all marine data is available **for improving understanding of the prevailing conditions** in our seas that sets a context for work carried out to meet policy objectives
- Increasing efficiency by **streamlining access to information** for specific policy, operations and research users
- **Serving up marine environmental information in a useable form** for the public providing transparency about investment in environmental monitoring and clarity about the role of humans in achieving a desired environmental status

3.2 Session 2: discussion on future strategy

3.2.1 Part 1: What future strategy for coastal observatories in Europe?

Technologies now exist (or are on-going) which allow relevant measurements to be undertaken in autonomous ways from a range of observing platforms. However, integration and coordination of such observations in an optimal way have not yet been realized. JERICO is working to fill this gap, but this work cannot be limited to the project lifetime duration. That's why through this workshop, a common reflection on a European strategy for coastal observatories is launched. Previous presentations dealt with national and regional strategies, with key information on the following issues:

- Infrastructures
- Fields of research
- Marine data strategy
- Needs for the future (development & innovation, funding)

In this session 2, these key-issues are discussed and summarized hereafter.

Infrastructures (ferrybox, fixed platform, glider and others):

Attendees agreed that the first step towards the future of coastal observatories is to widen the integration of observations by including coastal radars, novel infrastructures such as cabled sea-floor observatories, new ships of opportunity based instrumentation and novel "sensor carriers".
This implies that the JERICO community will extend and consequently needs to be strongly organized to further develop Best practices, exchange of know-how and capacity buildings. Some European frameworks as COST, LIFE+, are performing tools to help these communities to grow and to be more visible.

The second step is to deploy novel sensors (e.g. biosensors, contaminant sensors, acoustic and imaging sensors for biodiversity), that should be available as Horizon 2020 begins, onto existing and new platforms in order to meet user needs.

Fields of research:

Coastal oceanography is a wide scientific research area, where several topic processes are meeting in the fields of Coastal Sea dynamics and ecosystem impacts: modelling and marine forecasting, operational oceanography, climatology, eutrophication, ocean acidification, primary productivity and plankton dynamics, contaminant dispersion, activities in estuaries and ocean waters as quantified fluxes between rivers and ocean.

However, most of the time artificial scientific boundaries are delimiting topical researches of coastal oceanography between the open ocean and the estuarine processes. Now it is essential to break down the ocean and river science artificial boundaries to step beyond and get a complete understanding of ocean processes. Consequently, to support this idea, we need to have a strong link with the research community involved the hydrodynamics and hydrology of the river plumes and catchment basins.

Marine data strategy: including physical, chemical and biological data up to the upper level of the trophic chain:
The data acquisition and measurements have to provide quality controlled and validated data.
The data management, including storage and quality checking, with the objective of better interoperability, has to be integrated in the future data management systems, under the umbrella of GMES and EMODNET.
The open access to infrastructures for research teams and European industries is one of the most important ways to exchange and to harmonise coastal observatories in Europe.

Needs for the future:

It is agreed that to answer the 3 previous key-issues, the consortium should focus on three hereafter strategic networking activities.

1. The "Trans-network nodes" concept, e.g. (1) performing extra-ordinary calibrations by regular inter-comparison exercises (2) agreeing and implementing best practices within the consortium in order to enable delivery of collected high quality data.
2. Strengthening the connection with the industrial users and stakeholders through the Forum for Coastal Technology (as we have developed in JERICO) and making more effective this cooperation (e.g. focusing on innovative sensors to improve time and spatial resolutions) by clearly defining the needs of the observing community so that appropriate instruments can be developed that meet those needs (such as accuracy and reliability).
3. Joint Research Activities. The JRA is often the best solution to go a step further together for the benefit of all the community but also for the society. Shared efforts on new technologies can avoid duplication and cut marine observatories sustained costs.

3.2.2 Part 2: How can we have an efficient lobbying?

The question remains open. the consortium has to be very active in the future framework programme H2020, within the JPI Ocean activities but must also foster links with the international community (US, Canada, Australia…).

Lobbying can be geared to the industry (mainly SMEs) by fostering the exchanges between research laboratories and industries via an extended Forum for Coastal Technology.

The consortium is now ready, in Europe, to create a EURO-ACT following the model of the US Alliance for Coastal Technology). This will contribute to create a market for European oceanographic instruments and techniques.

4. Conclusions of the JERICO strategy workshop

4.1. Conclusions on session 1

According to the presented information on the national and regional strategies the JERICO consortium can now extract important information with regards to issues specific to build a strategy for the future:

- the scientific strategy,
- the infrastructure integration in a national or regional observation system;
- the strategy for innovation and to better link with the private sector,
- the strategy to flow the data in an integrated data management system and to communicate with scientists, stakeholders and general public.

This information is a key to set up a harmonized and integrated system at European scale. Nevertheless as a first workshop on the topic, the given information is not homogenized enough to build a roadmap for the future. Indeed in the following table, the presented national and regional strategies are summarized along with a synthesis stating if the given information is answering the here above issues.

This synthesis table will help to drive the next meeting, by focusing the agenda on missing information. The most missing information is highlighting the weaker points: links with private sectors and the need of innovation strategy. This is putting forward the importance of JERICO WP10 and of the JERICO FCT.

Represented countries	Summary of the presented national strategies	Specific issues
US: **OOI + IOOS**	The US strategy is twofold with IOOS and OOI, the first one is funded by NOAA and the second one by NSF. Both are working to build an integrated data management system from the open ocean to coastal and Great lakes areas Whereas OOI deals more with open ocean, IOOS is integrating regional components and involves technology experts via the ACT. 26 core variables are monitored. The information to the public is insured via an on line web interface dedicated to education and outreach.	**- Good integration of coastal and ocean observation systems** **- Links with private sector insured** **- Data distribution and Outreach are running** **- Missing information on strategy for innovation**
France	Existing French systems dedicated to coastal in situ observation are mainly those being integrated in JERICO like buoys, gliders, ferryboxes, vessels of opportunity (such as fishing boats), plus HF radars. For the future, the strategy should work on 4 main axes, helping to save money. 1-The objective to take more benefit of vectors of opportunity: sailing boats, cargo, fishing vessels etc. by deploying already developed systems: the OceanoScientific, the RECOPESCA probes. 2- Development of innovative sensors able to be integrated onboard small systems dedicated to nutrients, contaminants, alkalinity, and phytoplankton measurements. This implies to push the technologies with SMEs via the JERICO FCT and the label	**- Not enough information on scientific integration (scales and processes)** **- Need to extend the observation infrastructure by including more kinds of systems** **-Innovation and link with private sector to strengthen** **-- Strategy for innovation put on biochemical sensors** **- Data distribution is running through national system but not shown.**

	3- Development of a French observatory Network (initially named FONCE) dedicated to the observation and monitoring of main river plumes in France. This network intends to put efforts on specific parameters automated measurements: such as turbidity, pCO2, plankton and particles counting, helping for the development of innovative technologies dedicated to monitor effects of global changes, acidification, eutrophication and harmful algal blooms in coastal areas. 4- Extension of the use of observing systems, through HF Radar	**-Outreach to improve.**
Greece	The Greek infrastructure, Poseidon, has been set up with a multi-platform, multi-scale and multi-purpose approach for ocean observatories in Greece. This integration is necessary due to specificities of marine environment in Greece, but it is also driven by user needs. The Poseidon buoy is part of a bigger network including ferryboxes, ARGO floats, HF radars, calibration facilities, modelling platforms. The information to the public is insured via on line web interface. The development strategy is the following: - Embed into appropriate frameworks (EuroGOOS, GEO, etc.) - Balance between the operational and research sides of the infrastructure - Integrate national investments with European initiative - Complementarity between national and EU projects	**- Integration of several scientific objectives from the coast to open sea and societal needs** **-important integration between several kinds of systems** **- Missing information on links with private sector** **- Missing information on strategy for innovation** **- Data distribution and outreach are running**
Germany (northern and arctic seas)	COSYNA infrastructures deal with development and test of analysis systems, consisting of multiplatform in situ and remote observations and numerical modelling, for ocean observatories in Northern and Artic seas. It includes also the delivering of data products by a data portal, in	**- Integration of several scientific objectives from large to small scales** **- Important integration between several kinds of systems**

	an operational mode for stakeholders and companies. The possible strategy to sustain the funding of the systems could be the operational use of those systems would be taken over by agencies.	**- Missing information on links with private sector** **- With regards to innovation bio sensors are developed but no information on links with private sector**
Spain (Bay of Biscay)	The Spanish strategy for the Bay of Biscay is led by AZTI. The main objective is to organize the validation of Core Service in the buffer area (and for coastal models running on overlapped areas) in a way coordinated between the ROOSs by taking in account the intermediate users perspectives. This implies the need to both coordinate the organisation of downstream services between ROOSs and to get the feedbacks to the core services. The strategy is also based on the development and optimisation of the coastal observing system by including transnational systems such as HF radar network and on the will to improve the visibility and feedback on the data uses.	**- Information on community integration is given but not enough information on platforms integration (HF radars, gliders and fixed platforms)** **-Missing information on strategy for innovation** **- An effort is forecasted on data visibility** **- No information on links with private sectors**
Spain (Mediterranean sea)	Ocean observing systems are dedicated to respond to 3 main drivers: science, technology, society needs. They are working after continuous improvements in instrumental capacities, which are based on a strong innovation process. This is underlining the key role of innovation in coastal monitoring and research; innovation that has to answer to the need to develop integrated systems working in an operational mode to: - Monitor the variability at small scales, e.g. mesoscale/week, to - Resolve the sub-basin/seasonal and inter-annual variability and by this - Establish the decadal variability, understand the associated biases and correct them	**- Scientific strategy given: from small to large scales.** **- Strong innovation will, with given information on how to.** **- Links with private sectors?**

Ireland	The Irish system is multiplatform, involving fixed buoys, gliders and profiling floats, vessels of opportunity (VOS), seabed observatories, HF radars etc. The strategy for the future is based on the development of key elements of the systems such as ARGO float, VOS, observatories, radars, and of biochemical monitoring	**- Strong integration between many platforms** **- Information missing on scientific objectives** **- Will to answer societal needs** **- Information mission on innovation, links with private sector, and an integrated data management system**
UK	UK implemented the Integrated Marine Observing Network (UK-IMON). With purpose to draw together existing UK marine observatories and observing programmes in order to create new knowledge and better evidence by making best use of all marine data. In the coming year in order to implement the UK Integrated Marine Observing Network, attention will be plaid to: - Interoperability - organisations, observing system, data and information systems - Implementation studies: -On improving model hindcast/forecast by better access to real time data, -On operational efficiency e.g. data buoys -On likely increase in accuracy of trend assessments	**- No information on the scientific strategy** **- Will to integrate both open sea and coastal systems** **- Will to be compliant with SeaDATAnet data management systems** **- Link with private sector expected** **- No information on innovation process**

4.2 Conclusions on session 2

The real challenge in marine coastal research for the next decade is to understand and forecast the evolution of the coastal ocean, from small to large scales. The observing infrastructures, from the deep ocean close to the coasts and down to the bottom of the sea, will be essential for the comprehension and the forecasting of coastal health of the ocean. As a consequence, most of the national and regional scientific strategies are taking care of driving researches from small to large scales in an integrated way. Here, integration means of systems; of research fields and of data management systems.

In order to work at European scale, **a coordinated implementation and encompassing European governance (EOOS)** is needed. Indeed, the ocean is a wide but global and complex system. Therefore a better coordination between all the communities is needed, from deep-ocean to the coast and from the surface to the deep parts.
A pan European system should also provide a European web capturing national/regional coastal observation systems. The need for pan European activity includes the need for the provision of data to support forecast models. Likewise for intercomparable environmental assessments across Europe there, is a necessity to have common practices, common calibrations, common processing, quality control and a common expertise for validation.

A real need for future forecast modeling: Today, the forecast models are global and have a high resolution. These models are now nested with more local models as coastal ones, but they need more and more in-situ data in renowned format and suitable quality near the coast for evaluation and assimilation. As more parameters are to be acquired, a shared approach is expected on the coastal observatories around Europe. Not a single organization has leading expertise on all parameters. Therefore the opportunity for the expert laboratories to share their expertise with the whole European community should be offered.

4.3 Next steps

This workshop was a first step towards a consistent future European strategy of coastal observations. In order to gain an overall picture of the national coastal observation strategies implemented in Europe, examples of national coastal observation strategies have been presented. All these elements confirmed the need to define a future European strategy of coastal oceanography. In addition this workshop put forward specific issues to be addressed to build a strategy for the future:

- the scientific strategy,
- the infrastructure integration in a national or regional observation system,
- the strategy for innovation and to better link with the private sector,
- the strategy to flow the data in an integrated data management system and to communicate with scientists, stakeholders and general public.

Consequently, after this first workshop a second one will be organised to better focus on these specific issues, getting the missing information, and to discuss the steps towards a common roadmap. It should be organised in February 26-27 2013, in Brussels. For this two-day workshop, the preliminary agenda is :

- Half a day for the 3rd TNA call selection panel meeting,
- one and half day SAC (Scientific Advisory Committee) workshop on the LABEL and future Strategy for Coastal observatories in Europe.