OoT - Ocean of Tomorrow

NEWSLETTER Issue 1 December 2016

Nine European projects to tackle the marine environmental problems through biosensing

The aim of the 'The Ocean of Tomorrow 2013' call is to pool the efforts of stakeholders from a broad range of sectors to develop innovative marine technologies for a wide range of applications.
The call comprised 4 topics covering three key areas: marine sensing technologies (including biosensors) to monitor the marine environment, innovative antifouling materials for maritime applications and innovative transport & deployment systems for the offshore wind energy sector. As a result, 12 projects have been selected for funding for an EU contribution.

Topic 1 :Biosensors
BRAAVOO – http://www.bravoo.org
ENVIGUARD - www.EnviGuard.net
SEA-ON-A-CHIP - www.sea-on-a-chip.eu
SMS - www.sms-project.eu

Topic 2 :Innovative Multifunctional sensors
COMMON SENSE www.commonsenseproject.eu
NeXOS - www.nexosproject.eu
SCHeMA - www.schema-ocean.eu
SENSOCEAN - www.senseocean.eu
MARIABOX – http://www.mariabox.eu

Topic 3: Innovative antifouling materials for maritime applications
BYEFOULING - www.byefouling-eu.com
SEAFRONT - www.seafront-project.eu

Topic 4: Innovative Transport & Deployment systems for the offshore wind sector
LEANWIND - www.leanwind.eu

SEVENTH FRAMEWORK PROGRAMME

Oot Facts:
71,6M€ EU funding
4 topics
12 projects

This newsletter is result of a joint effort of the projects that comprises the Topic 1 and Topic 2 of the FP7-OCEAN-2013 call

Contacts:

Kontor 46 Sas

matteo.bonasso@kontor46.eu

MARIne environmental in situ Assessment and monitoring tool BOX

Due to growing concerns about the health of the oceans and their capacity to continue to provide resources, as well as associated risks to the human health, there is an increasing demand for real-time monitoring of the environmental status of marine water quality and the provision of early warning systems.
MariaBox is developing an autonomous, analytical device based on novel biosensors to monitor chemical and biological pollutants in seawater. The device is suitable for installation on free-floating devices, buoys, ships or to be used as a portable instrument. The lower target cost of the MariaBox system, in combination with its long-term autonomous operation will allow continuous monitoring of the seas for much longer intervals with respect to today's standards.

The MariaBox consortium comprises 13 partners from 6 differents countries across Europe and will be evaluated in four marine locations:

Alfacs Bay – Spain
Galway and Bantry Bay – Ireland
Vassilikos Bay – Cyprus
Oslofjord and Skagerrak - Norway

System design

Biosensors:

Chemical pollutants for which biosensors will be developed		Algal toxins for which biosensors will be developed	
Category	**Analyte**	**Algae**	**Analyte**
1. PAHs	Naphthalene	5. Dinoflagellate, *Alexandrium*	Saxitoxin and derivatives
2. Fluorinated surfactants	PFOS	6. Cyanobacteria: *Microcystis, Nodularia, Anabaena, Oscillatoria,* Nostoc	Microcystin and structurally related variants
3. Heavy metals	All heavy metals	7. *Azadinium spinosum*	Azaspiracid
4. Pesticides	Camphechlor	8. *Pseudo nitzschia* sp.	Domoic acid

Data sharing:

The MariaBox web platform will make available all the information collected by the deployed MariaBox systems. Compatibility with:

- the INSPIRE directive
- Copernicus
- OGC Sensor Observation Service (SOS)
- SeaDataNet
- GOOS
- Facilitate the implementation of the MSFD

Autonomous device:

- Preliminary design as a relatively compact and portable instrument
- Biosensors are designed in the form of assay discs
- Analyte (pollutant) identification is done through optical (fluorescence) techniques
- Biosensors disc storage and automatic replacement mechanisms are foreseen

Figure 1. MariaBox device concept

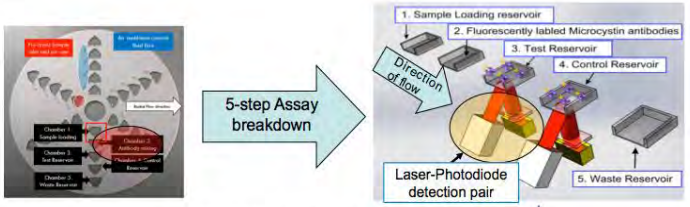


Figure 2. The Analytical assay-on-disc breakdown

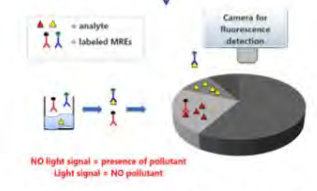


Figure 3. Enlargement of Figure 2, step 3

MARIABOX: Autonomous Biohazard Detection Tool for Improving Marine Health Analytics

What is MariaBox

An autonomous, analytical device based on novel biosensors to monitor in real time chemical and biological pollutants in seawater.
The revolutionary device is suitable for installation on free-floating devices, buoys, ships or to be used as a portable instrument offering an autonomy up to 6 months

Sensors Available

- 4 biosensors for detecting man-made chemicals: Naphthalene, PFOS, Heavy metals, Camphechlor
- 4 biosensors for detecting microalgae toxins: Saxitoxin, Microcystin, Azaspiracid, Domoic acid
- 4 environmental sensors: pH, Dissolved Ocysgen, Conductivity, Water Temperature
- Additional sensors can be connected based on customer requirements

Key Features

- Dimensions: 100x100x55 cm
- Data transmission: Wi-Fi, 4G/3G/GPRS, Satellite
- Up to 6-months unattended deployment
- Automatic filters changing and biosensors calibration
- Biosensors designed in the form of CDs for space reduction, easy handling and easy replacement
- Open data sharing through cloud-platform: compatible with INSPIRE, Copernicus, GOOS, SeaDataNet, OGC SOS
- Mobile application available

Modular Design

- Flexibility in the number of biosensors for reduction of overall device
- Flexibility in number and type of sensors
- Flexibility in power and communication options

CyRIC Cyprus Research & Innovation Center Ltd
Tel: +357 22 282828
Email: info@cyric.eu
Website: www.mariabox.eu

The MariaBox project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 614088

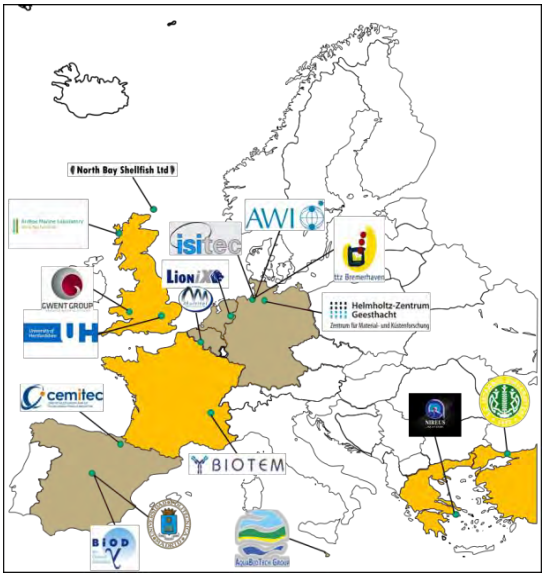
The team:

Development of a biosensor technology for environmental monitoring and disease prevention in aquaculture ensuring food safety

The main aim of the EnviGuard project is to develop a highly specific and precise in situ measurement device for currently hard to measure man-made chemical contaminants and biohazards. This will be possible by the development of the EnviGuard port consisting on three different detection units - Algae, Pathogens and Chemicals - integrated into a single and portable device which will be able to collect and send the data in real-time for a period of at least one week without maintenance in an offshore, marine surrounding.

More info about the project

- EnviGuard Port module will be the interface between the three biosensor modules, supplying the connected sensors with power, preparing the samples, processing the data and transmitting it to the customer.
- Algae detection unit for toxic marine microalgae species, mainly dinoflagellates which to have the potential to form Harmful Algal Blooms (HABs).
- Chemical detection unit based on a novel concept of biophotonic sensing cells which use resonant nanopillars as transducer and monoclonal antibodies as selective bioreceptors to detect toxins and man-made pollutants.
- Pathogen detection unit to detect bacteria and virus particles specific and quantitative consisting on chip coated with aptamers and an optical detection unit.



EnviGuard Consortium

The EnviGuard consortium is composed of 18 partners from 6 different countries across Europe plus Turkey, grouping the companies (ISI, BIOD, MT, LX, ABT, NBS, VFF, AET, BIOAZUL, ILK), research institutes (TTZ, AWI, HZG, CNT, UPM, BIOT, UH, UI). The consortium combines the highest expertise from experienced research organizations and SMEs in the field of development and implementation of innovative sensors applied in the marine environment for monitoring water quality and ensuring food safety. The idea is to combine the best theoretical and practical expertise available in the field in Europe to achieve maximum outcomes in the project.

More info

EnviGuard partners have presented the project in several international conferences and trade fairs related to Aquaculture, Photonics and Fishing, as:

- AquaNOR
- EAFP
- OPTOEL
- World of Photonics
- Aquaculture Europe
- EASOF 2016

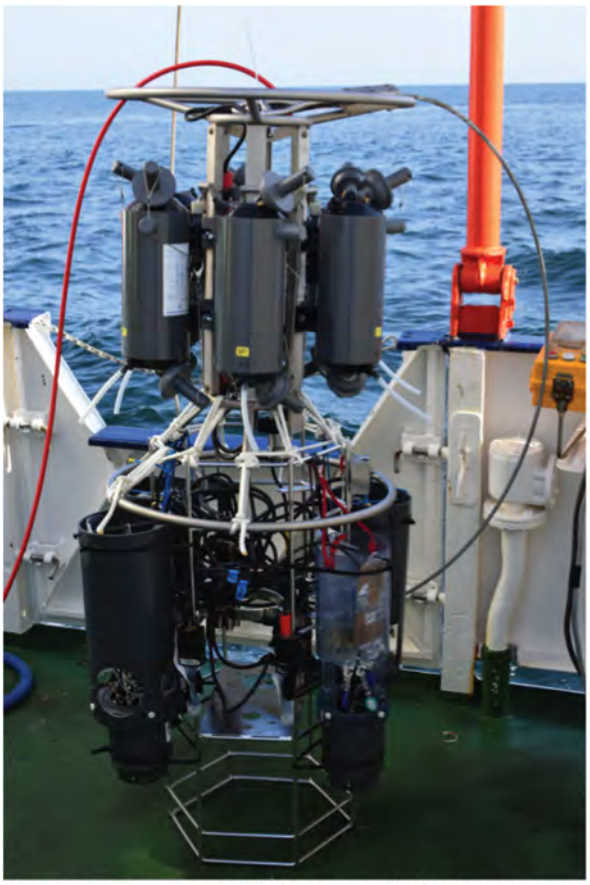
SenseOCEAN is a €5.9M European Commission funded collaborative research project with the goal of producing a modular sensor system that can be deployed on any platform and measure multiple parameters. This is being achieved by improving analytical techniques, sensor technology and microfabrication methods, and reducing the cost of mass production.

The project has twelve partners across Europe from academia and industry, each of who brings expertise in a particular aspect of research, development, production and commercialization of sensor technology.

The third year of the SenseOCEAN project has been an extremely busy and productive one. There have been significant advances at the individual sensor level, where we have continued to increase the technology readiness level of each sensor with the aim of getting them as close to market as possible. There has also been considerable progress towards a de facto standard for true 'plug and play' sensor operation. This has been achieved through a shared system of data management, power and resource management and communication both with the individual sensors on our multifunctional sensor platform and the wider world using standardized data output via the internet.

Our multiparameter fluorimeter is the most advanced of our sensors and is already being marketed by Chelsea Technologies Group. We have fully operational electrochemical sensors for nitrous oxide, phosphate, silicate and CO_2. New optodes for in situ determination of pH and ammonia have been developed and in a significant step, a multi-- analyte optode system has been designed. We have developed a new process for the manufacture of sensor spots; reducing costs and increasing the quality of the spots. There have been important advances in the development of our suite of lab on chip sensors, both in the range of analytes, the sensitivity of the sensors and the miniaturization and cost savings in manufacturing them.

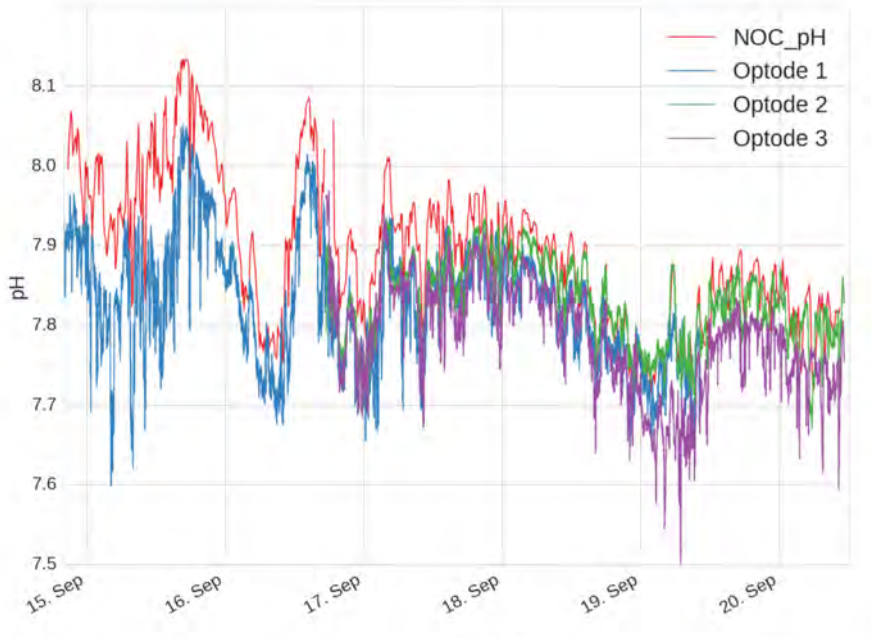
All the new sensors have been tested in the laboratory and some are already deployed in the field. Recently a comprehensive ten day testing and inter-calibration exercise was completed in Kiel, Germany. As well as assessing the performance of the sensors against each other, an integrated system including electrochemical sensors, lab on chip sensors and optode sensors was deployed and tested from a shore side pontoon and in deeper waters from a ship.



Sensor package on CTD frame ready for deployment at Bocknis Eck (photo courtesy of M. Grand)

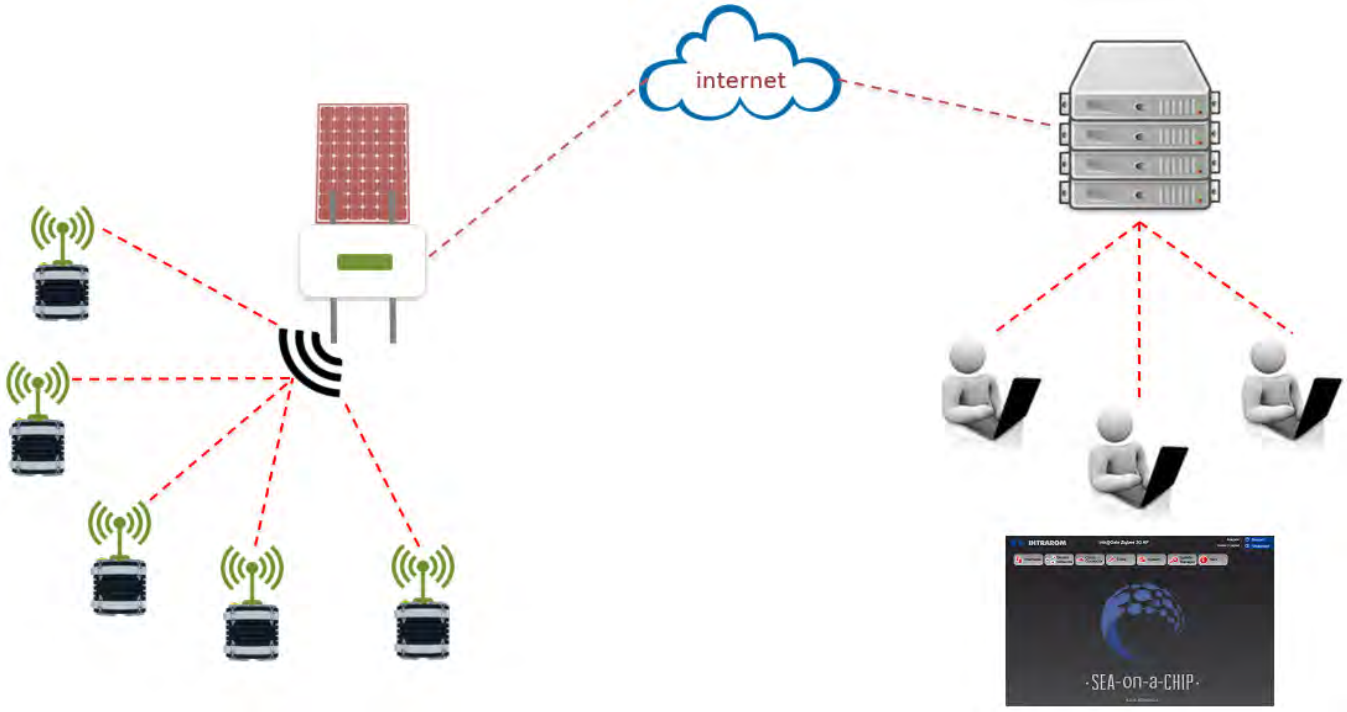
The plot below shows the performance of several sensors measuring pH. Although the results are preliminary unprocessed data, the correlations are excellent.

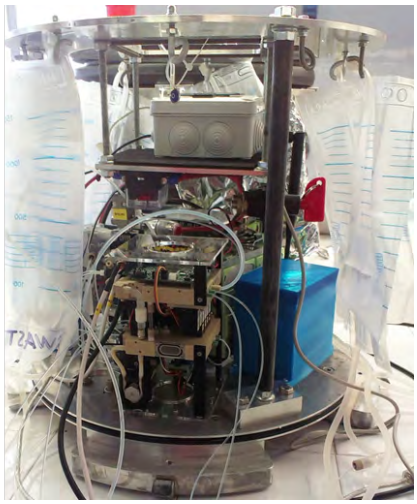
In the final year of the project, further development and refinement of the sensors and the integrated system, and testing under more challenging conditions will take place. SenseOCEAN will continue to highlight the potential of our sensors at trade shows and scientific meetings in both Europe and across the world. Currently nine peer-reviewed papers have been published and there will be a significant increase in output as the sensors are more widely used. Four patents are already issued or in progress.

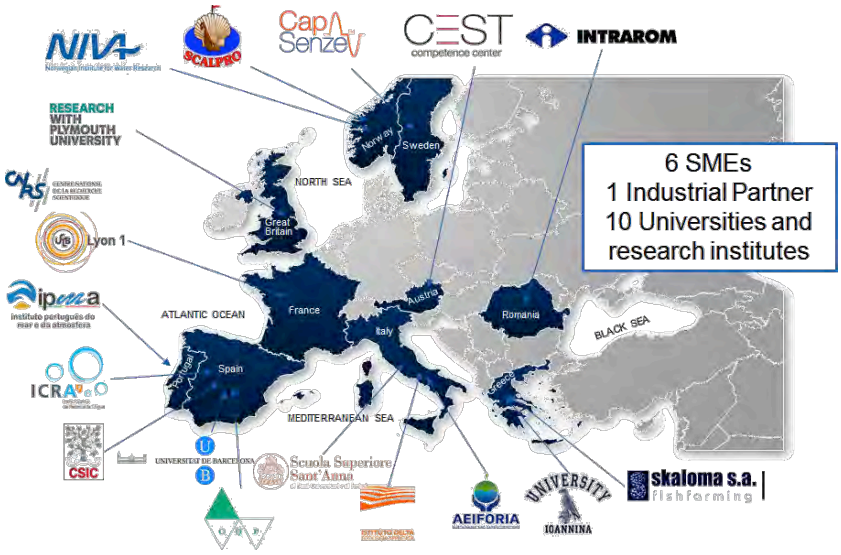


Plot showing pH data (unprocessed) from four sensors during Kiel deployment

We are currently in the last period of the project, and the research previously initiated has been consolidated. The SEA-on-a-CHIP project has been built according to a three-level approach. Each level has been finalised with a complete evaluated prototype. The results of each evaluation have been the basis for the following one. At this moment, the second prototype was successfully built showing good performance for the detection of three analytes in sea-water based on immuno-recognition and amperometric measurements, and we are working on the final system. According to the results and experience gained with the first prototype a series of changes and improvements were included in the second one. The primary objectives were: the change of the electrochemical measurements to amperometry to improve the robustness of the analytical measurements, the integration of an on-line solid phase extraction (SPE) to increase the sensitivity and the clean-up of the extracts, and the miniaturisation of individual elements, as valves and pumps, to reduce the final weight of the equipment, the volumes and the energy consumptions. Therefore, between the first and the second prototypes, an important work was carried out regarding the coordinated re-design of the different modules individually and their integration in a compact platform. For the third prototype, our major objective is to enlarge the number of analytes simultaneously analysed and the lessons learned from the second platform indicated that no major changes were requested in this last version. However, some improvements should be done in terms of SPE refinement for selected compounds, compaction, some improvements in the communication module and the implementation of a bidirectional communication, and on the materials employed for the platform building. Currently, immunoassays for sulfonamide antibiotics, irgarol, domoic acid, chloramphenichol, estradiol, polybromodiphenyl ether (PBDE47) and deltamethrin have been optimised including the raising of antibodies against deltamethrin. Three of these immunoassays, for the detection of sulfonamides, irgarol and domoic acid were implemented in the second prototype, and the rest of them are being integrated on the last prototype. A lab-on-a-chip cell has been developed admitting till eight amperometric measurements. The sensor microelectrodes were adapted first to amperometric measurements and posteriorly the sensing area of microelectrodes was slightly increased to achieve better detection limits. Regarding sensitivity gain, it should be highlighted the advantages obtained by the inclusion of the SPE module. Besides, in the second prototype the fluidics, and microfluidics management platform was rebuilt and compacted according to the new scheme for the sample pre-concentration and clean-up and by the use of miniaturised elements. And now, for the last prototype, the fluidic management platform has been compacted again thanks to a new design and the merging of this module and the microelectronics unit and by the elimination of redundant sensors used during the optimisation of the system. In addition, a final user software has been developed and integrated for results display and the remote management of the system. All this work has been only possible thanks to the combined efforts by partners in the project and their close collaboration, interchange of information and numerous working meetings carried out during the project. As well as the important labour carried out by the steering committee. During this period, different integration meetings at the facilities of the IDAEA-CSIC and UB in Barcelona (Spain), at the CNRS in Lyon (France), and at the SSSA in Pontedera (Italy) were conducted. The significant advances achieved in the second prototype were tested according to a step-by-step validation approach, consisting of in-lab evaluations, tests at mesocosms level and real scale in real aquaculture facilities. The second prototype was first tested at the Istituto Delta in Goro, Ferrara (Italy) and second at the aquaculture facilities of SCALPRO in Bergen (Norway). We are preparing the third (and last) prototype which will be smaller, autonomous for 30 days' operation, able to measure 8 compounds simultaneously and to make two measurements per day. Partners are updating the biosensor in order to be ready next year for the SEA-on-a-CHIP Open Technical Meeting combined with the third case study in Portugal (March-May 2017). During the event, the device will be presented to stakeholders, fish farmers, and scientific community.







Marinella Farré (Deputy coordinator)
Institute of Environmental Assessment and Water research (IDAEA-CSIC)
marinella.farre@idaea.csic.es

Sensing toxicants in Marine waters makes Sense using biosensors

SMS: an innovation that alerts public authorities for seawater pollution within two hours

Seawater pollution is an environmental, economic and social problem. It is for this reason that the development of a monitoring device that effectively and quickly detects worrisome levels of pollution is key to the better management of our oceans and coastal areas. Therefore, the EU project SMS is developing an in-situ real time monitoring system for seawater quality control.

Seawater pollution not only puts biodiversity at risk and disrupts the fragile equilibrium that exists underwater, but also affects economic activities, such as fisheries, aquaculture and tourism.

Scientists have been working on monitoring methods and technologies for many years to alert the public authorities and professionals about potential pollution risks for human health and the environment. Unfortunately, methods currently used for the detection of water pollution are expensive and it can take up to five days before scientists are able to alert public authorities and professionals when the status of water quality becomes worrisome. Traditional methods require specialized workers and heavy equipment; indeed, researchers have to use boats to go on-site, sample the water and return to the laboratory. Once in the laboratory, tests have to be run to analyse seawater quality.
The urgency of the current situation in seawater quality monitoring combined with the expensive and lab-intensive methods required were the main motivations of the EU project SMS. The SMS team of scientists, SMEs and environmental agency are working together to develop a cost-effective monitoring tool that will be easy to use and will undertake real-time monitoring through *in situ* sampling and analysis.

"*The idea behind our research is to develop a device*
that will be placed on a buoy in the ocean and that will be able to analyse the quality of seawater in real-time and without the intervention of men" explained
Professor Palleschi, coordinator of the project. "*Our device will be able to alert, through wireless connection, about water pollution in two hours instead of up to five days*".

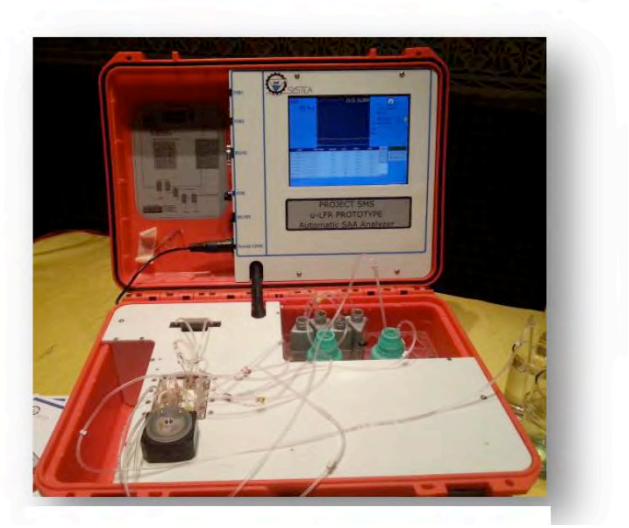


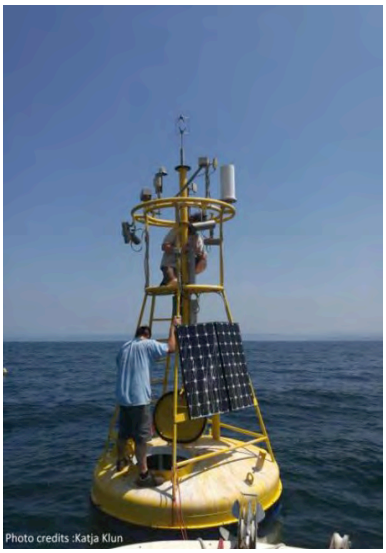
Photo 1: Automated micro Loop Flow Reactor analyser to measure sulphonamides by spectrophotometric method

The sensors developed by the team allow the device to detect dangerous substances listed under the Water Framework Directive. The device will be able to detect four categories of pollutants. The sensors developed by the Univeristy of Roma 'Tor Vergata' will allow the detection of marine algal toxins, such as Okadaic Acid, Saxitoxin, Domoic Acid and Palytoxin. Partner Microbia Environnement is developing sensors to detect toxic algal species.

The University Hassan II of Mohammedia - Casablanca has developed sensors to detect pharmaceuticals (sulphonamides). And finally, partner ICN has developed sensors to detect chemical compounds, such as pesticides (Tributyltin), herbicides (Diuron) and flame retardants (PentaBDPE).
All of the data collected by the sensors are stored locally in coastal buoys and platforms and will be forwarded to a remote Central Node through a wireless connection. This real-time information, which can take the form of alerts, will allow competent authorities and professionals to make informed and quick response decisions in terms of ocean management.

At present, SMS has developed a prototype for the detection of sulphonamide. It consists of an optical device that was assembled by partner Systea, applied for measurements in seawater and installed on a buoy by Slovenian partner NIB in the Gulf of Trieste.

A new device for the detection of toxic algal species is under construction by Microbia in collaboration with Systea. All components of this instruments have been designed and the two partners agreed to assemble this prototype that has a 10 fold improvement in sensitivity as compared with the earlier developed ALGADEC sensor for toxic algae; it will also be fully automated and ready for installation on the buoy. A prototype for sampling and pre-concentration has been assembled by Acromed partner in collaboration with ENEA and is currently under evaluation by ENEA and Systea to perform validation analyses. Concerning the toxins, U2 and Systea have developed an optical device for the detection of Okadaic Acid. The measurement procedure has been transferred to Systea and a prototype was first assembled and was then used to detect Okadaic Acid in seawater. A close collaboration with Systea, UTH and the sensor groups is on-going in order to automate and engineer optical procedures for the detection of the other toxins, pesticides, and flame retardants.



"We don't always realise it, but monitoring the quality of seawater is crucial for human health" stressed Linda Medlin from Microbia Environnement. *"For example, the accumulation of toxins in shellfish, such as mussels, oysters, and clams, can have severe repercussions on human health if these shellfish are consumed. Paralytic shellfish poisoning, which occurs from ingesting shellfish containing toxins, can cause life-threatening neurological effects. Symptoms start quickly and the median time between ingestion and onset is 1 hour". "In 12 hours, death can occur because of respiratory failure caused by paralysis"* she added.

"This is one example of a crisis, which we try to avoid, by providing the authorities and professionals with the right instruments to better monitor the quality of seawater - both for the environment and for humans" concluded Professor Palleschi.

About SMS's partners:

University of Rome "Tor Vergata", Italy – Coordinator
Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy
Catalan Institute of Nanotechnologies, Spain
Acromed, Sweden
National Institute of Biology, Slovenia
University of Thessaly, Greece
SYSTEA, Italy
Université Hassan II Casablanca, Morocco
Microbia Environnement, France
Aliénor EU, Belgium

Contact:
SMS Communication Elise Regairaz, AliénorEU
Tel: +32 (0)2 791 76 10

E-mail:elise.regairaz@alienoreu.com
www.project-sms.eu

@SMS_EU
www.facebook.com/SMSeu

Innovative and Multifunctional Optical, Acoustic and Fisheries Management Sensors Configured for Implementation on Multiple Cost-Effective Platforms

NeXOS sensor and sensor system innovation focuses on multi-sensor applications with optical and acoustical sensor systems and a wide range of platforms options. As a complementary area of innovation, new biofouling protection capability increases the longevity of sensors. The third year has been very productive as NeXOS sensors have matured and preparations are made for field validation and demonstrations.

Optical Sensors

NeXOS has developed a matrix-fluorescence optical system which uses a combination of three excitation and four emission wavelengths in one sensor unit, to allow highly sensitive detection of polycyclic aromatic hydrocarbons in water and includes an automated correction for other substances, e.g. colored dissolved organic matter (CDOM), influencing detection limits of PAH will be implemented.

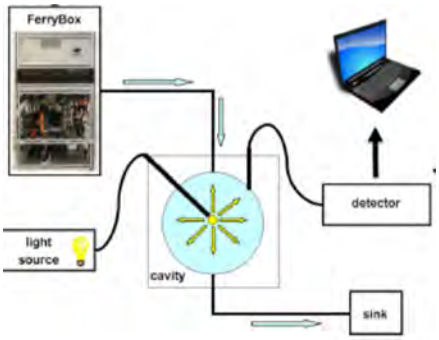
UV-Version:
PAH monitoring
CDOM classification

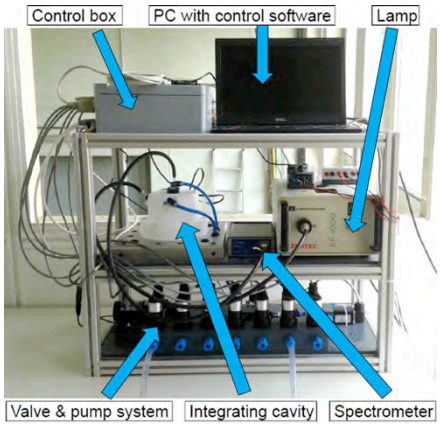
	Em			
Ex	280	360	450	850
254	PAH(a)	PAH(b)	CDOM(A)	
280	scat 280	PAH(c)	CDOM(B)	
320			CDOM(C)	
850				Turbidity

VIS-Version:
algae, CDOM,
turbidity monitoring

	Em			
Ex	460	655	682	850
375	CDOM	CDOM backgnd	CDOM backgnd	
470	scat 460		chl-a	
625		cyanobac pig.	PC via chl-a	
850				Turbidity

A second NeXOS optical sensor uses hyperspectral light absorption measurements to provide information about water constituents such as dissolved organic matter, suspended material and phytoplankton. The hyperspectral sensor has been adapted for continuous measuring flow-through system on applications to ferrybox and fixed platforms.

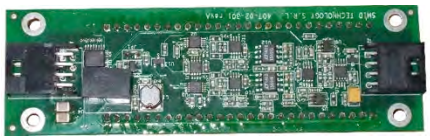




A third NeXOS optical system monitors the carbon system in the ocean. Currently high precision measurements are done by spectrophotometric techniques to determine pH, total alkalinity and carbonate ion, as a Pb complex. NeXOS has developed a new compact autonomous system combining high precision sensing of pH, AT, and the carbonate ion together with a membrane-based pCO2. This system offers reliable measurements under varying conditions with stability and precision for long-term observations without time-consuming maintenance.

Passive Acoustic Sensors

In addition to monitoring noise, NeXOS supports assessment of marine mammal populations, detection of fish reproduction areas, detection of Green-House Gases seeps from pipelines and gasification of methane clathrates. The new sensor has important new features: the analog front-end reduces input noise to the point that measurements below Sea State Zero and very high sound levels can be measured simultaneously; the sensor has embedded pre-processing of data, customized to small low-power platforms and is web-enabled, with sufficient metadata to permit traceability of performance.

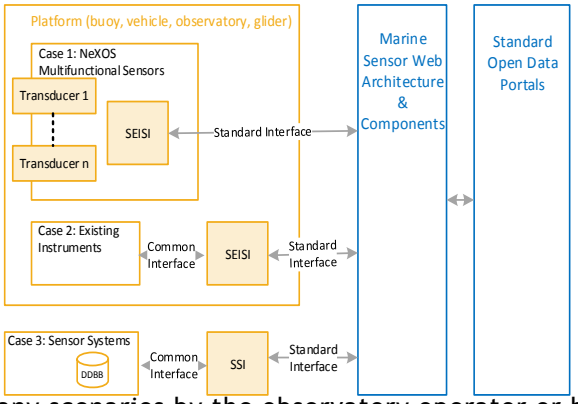


Fishery Sensors

The use of sensors on fishing boats as an integral part of their operations is to some extent quite different from the classical oceanographic instrumentation field. For the oceanographic use and applications to fisheries, NeXOS developed and offers oxygen and fluorescence (as a proxy for chlorophyll) sensors both for their applications to fish population assessments and because they are reported as Essential Ocean Parameters by the operational oceanographic community.

Data Management

For practical applications of these sensors and to support the transition from individual process studies to long-term, multidisciplinary ocean observations is calling for a paradigm change in the realm of ocean sensors, a capability to combine data from different disciplines traceability is an indispensable pre-requisite. This is exactly the objective of the Smart Electronic Interface for Sensors and Instruments (SEISI) for the instrument side, and the NeXOS Sensor Web architecture for the client side. NeXOS will have its own SensorML description.



The SensorML will be provided inside each system in the PUCK payload; this can be reconfigured for each new deployment in any scenarios by the observatory operator or by the scientist. The SensorML will both document the system descriptions for users and provide the configuration of the SEISI-based systems. The operator can then use the information from the SensorML inside the PUCK payload to autoconfigure the operation mode such as: sampling period, auto-manage new sensors connected to his input interfaces, IP filters, enable output interface (Ethernet, Serial), etc. Puck interfaces are being expanded in a variety of platforms to improve interoperability.

For additional information, contact info@nexosproject.eu

SCHeMA

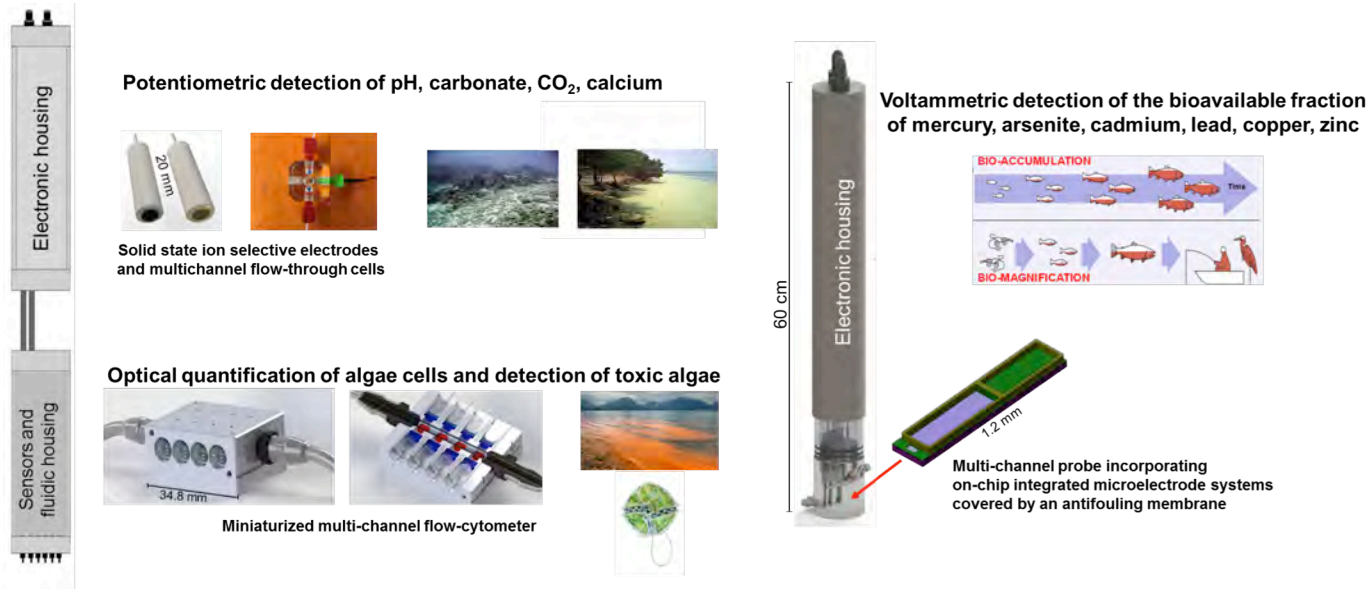
Integrated in **S**itu **CHe**mical **MA**pping probes
www.schema-ocean.eu

Marine environments are vulnerable ecosystems influenced by a diversity of anthropogenic constituents, natural substances, and organisms that may have adverse effects on their fragile equilibrium, their living resources, and ultimately, human health. Identification of relevant types of hazards at the appropriate temporal and spatial scale is thus crucial to detect their sources, to understand the processes governing their magnitude and distribution, and to ultimately evaluate and manage their risks and consequences preventing marine economic losses.

SCHeMA is a multi-disciplinary collaborative project aiming at providing an open and modular sensing solution for high resolution *in situ* mapping of a range of anthropogenic and natural chemical compounds coupled to master bio-physicochemical parameters.

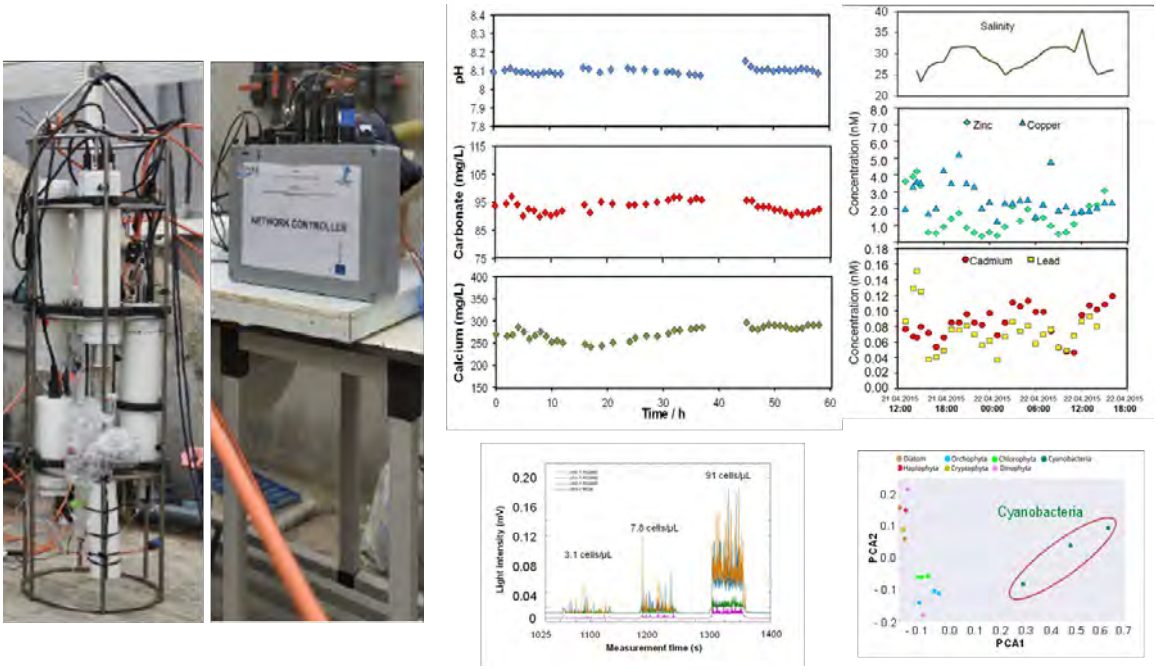
During the first 36 months of the project, SCHeMA has successfully developed and field characterized:

- Compact, novel submersible multi-channel electrochemical mapping probes based on:
  - all-solid-state ion selective mini-electrodes for potentiometric detection of pH, carbonate and calcium with CO_2 obtained from the combination carbonate/pH probes;
  - antifouling membrane covered on-chip microelectrode arrays for highly sensitive simultaneous voltammetric detection of the bioavailable fraction of a range of trace metals.
- Multi-wave length miniaturized flow-cytometer enabling in-situ optical detection of single cell events, classification of several algae classes and identification of toxin producing cyanobacteria.



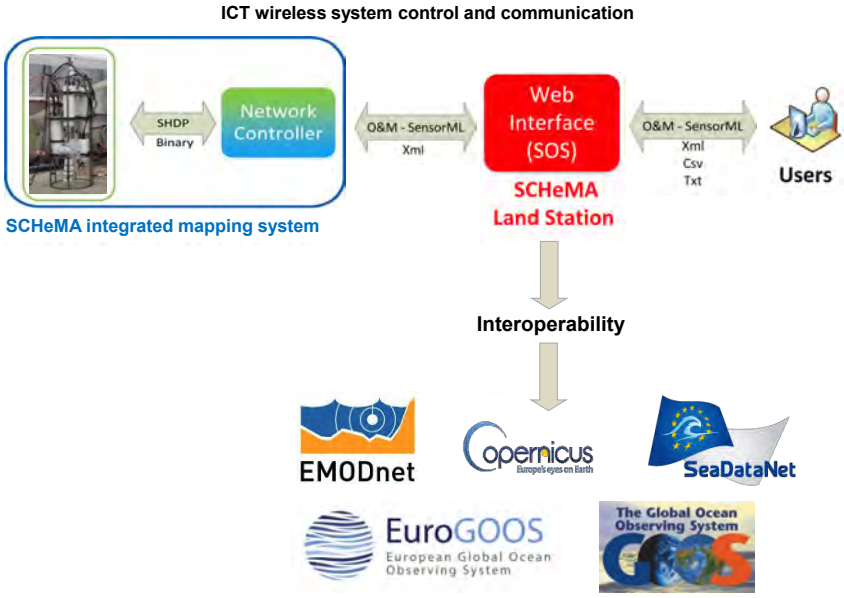
Novel SCHeMA sensors and individual chemical mapping probes ready for field applications

- Dedicated hardware, firmware and software components allowing their plug-and-play integration via a network controller (NC). The NC acts as gateway for bidirectional communication between the individual chemical mapping probe and a land station (self-registration and reconfiguration of



SCHeMA integrated sensing system ready for deployment and examples of monitored data.

- A web user interface and data information system enabling data visualization, treatment, and validation; data file reconfiguration and storage; and providing easy access and full interoperability with other systems and sensors. The interoperability features with international observation systems provided by the SOS Core profile methods developed were validated in cooperation with EMODnet Physics portal.



Web based user interface and data information system

Optimization of other devices, are underway to (i) extend the capability of the SCHeMA integrated system to the detection of nitrate, nitrite, arsenate and possibly VOCs; (ii) allow further miniaturization.

Field applications in Atlantic and Mediterranean coastal areas coupled to demonstrations to potential end-users are programmed during the first half of the year 2017.

Consortium: University of Geneva, Switzerland; Idronaut Srl Milan, Italy; University of Ulm, Germany; Graz University of Technology, Austria; EPFL Lausanne, Switzerland; nanoMyP Granada, Spain; University of Bordeaux, France; University of Genoa, Italy; ETT Spa, Italy.

For further information, please go to the SCHeMA web site www.schema-ocean.eu or contact Mary-Lou Tercier-Waeber (marie-louise.tercier@unige.ch)

COMMON SENSE

MARINE SENSORS - MARINE MONITORING

COST-EFFECTIVE SENSORS, INTEROPERABLE WITH INTERNATIONAL EXISTING OCEAN OBSERVING SYSTEMS, TO MEET EU POLICIES REQUIREMENTS

Marine ecosystems are integral to key environmental functions which support life on Earth, including climate regulation, prevention of erosion, and absorption of carbon dioxide. The oceans also contribute to economic activities resulting in prosperity, social well-being and quality of life. However, many marine environments, including some of those in EU marine territories, face increasing challenges, such as loss of biodiversity and habitats, pollution, and the impacts of climate change. For Europe, increasing environmental interest and awareness in both public and private sectors is a strategic objective for sustainable development and for ensuring continuity of economic activities. To achieve this, and to improve EU competitiveness, new technologies and methods for monitoring the marine environment are required.

The COMMON SENSE project supports the implementation of European Union marine policies such as the Marine Strategy Framework Directive (MSFD) and the Common Fisheries Policy (CFP). The project, which was launched in November 2013, is funded by the EC Seventh Framework Programme (FP7) and has been designed to directly respond to requests for integrated and effective data acquisition systems by developing innovative sensors that will contribute to our understanding of how the marine environment functions. COMMON SENSE is developing prototypes of in situ next generation marine monitoring sensors which will increase the availability of standardised data on eutrophication, concentrations of heavy metals, microplastics, underwater noise and other parameters.

Key limitations of current sensing technologies include their inability to operate autonomously and high maintenance costs as they require frequent servicing which in turn necessitates regular (and expensive) human involvement in their operation. COMMON SENSE is overcoming these barriers by providing low cost sensors which can provide in situ measurements, operate autonomously, and which require infrequent servicing and therefore minimal human involvement. Integral to the operation of these sensors is the Smart Sensor Unit (SSU) and Common Sensor Web Platform. This web platform allows our sensors to share data with existing and new observing systems and they are currently fully compatible with the Global Ocean Observing System (GOOS) and the Global Earth Observing System of Systems (GEOSS).

COMMON SENSE is coordinated by the Leitat Technological Centre, Spain, and its consortium brings together 15 partners from seven different countries, encompassing a wide range of technical expertise and know-how in the marine monitoring area.

Contact:
Sergio Martinez, COMMON SENSE Coordinator
smartineznavas@leitat.org
Leitat Technological Centre.

www.commonsenseproject.eu @commonsense_eu