Next generation, Cost-effective, Compact, Multifunctional Web Enabled Ocean Sensor Systems Empowering Marine, Maritime and Fisheries Management

NeXOS Kick-Off Meeting Report

Contract Number: 614102	*Codification: 131220-NXS-WP11_KoM-REP-v3*

Document Preparation	NeXOS Management Team - *November 25th 2013*
Revisions	Eric Delory (PLOCAN) – December 12th 2013 Nolwenn Beaume (PLOCAN) – December 20th 2013
Final version and approval	TBD

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I. Introduction

This document summarizes the Kick-off Meeting (KoM) of the NeXOS project, along with the actions and objectives of the 11 work packages and highlights the decisions and remarks that have been raised during the 2-day meeting.

1. Agenda

The Kick-Off Meeting took place on October the 30th and 31st of 2013, at PLOCAN's premises in Telde, Gran Canaria, Spain.

Below is the agenda:

Day 1 – October 30th

08:00 – 08:30 Bus Transfer from: *Parque Santa Catalina. Calle Eduardo Benot, 35005, Las Palmas de Gran Canaria*

08:30 – 9:00 Registration

9:00 – 11:00 – SESSION 1: INTRODUCTION

Chair: Mr. Eric Delory

9:00 – 9:30 – NeXOS Kick-Off Meeting Institutional Introduction

9:30 – 10:00 – Partnership Introduction

10:00 – 11:00 NeXOS Background and Project Vision

11:00 – 11:30 – Break

11:30 – 17:30 – SESSION 2: SCIENTIFIC AND TECHNICAL WORK PACKAGES PRESENTATIONS

Chair: Mr. Christoph Waldmann, Co-chair Jean-François Rolin

11:30 – 12:00 – NeXOS WP1 (Christoph Waldmann)

12:00 – 12:30 – NeXOS WP2 (Johan Gille)

12:30 – 13:00 – NeXOS WP3 (Jean François Rolin, Laurent Delauney)

13:00 – 14:30 – Lunch

14:30 – 15:00 – NeXOS WP5 (Oliver Zielinski)

15:00 – 15:30 – NeXOS WP6 (Eric Delory)

15:30 – 16:00 – NeXOS WP7 (Jean-François Rolin)

16:00 – 16:30 – Break

16:30 – 17:00 – NeXOS WP4 (Joaquín del Río)

17:00 – 17:30 – NeXOS WP8 (Kai Sorensen)

17:30 – 18:00 – NeXOS WP9 (Nils Roar)

18:00 – 18:30 Bus Transfer to: *Parque Santa Catalina. Calle Eduardo Benot, 35005, Las Palmas de Gran Canaria*

20:30 Dinner : *La Marinera Restaurant; Paseo Las Canteras, 1 - bajo, 35008 Las Palmas de G.C. Phone: 928 468 802*

Day 2 – October 31st

08:00 – 08:30 Bus Transfer from: *Parque Santa Catalina. Calle Eduardo Benot, 35005, Las Palmas de Gran Canaria*

8:30 – 9:00 – Reception

9:00 – 11:00 – SESSION 3: MANAGEMENT AND DISSEMINATION WORK PACKAGES PRESENTATION

Chair: Mr. Jay Pearlman

9:00 – 9:30 – NeXOS WP10 (Jay Pearlman)

9:30 – 10:30 – NeXOS WP11 (Ayoze Castro)

10:30 – 11:00 – Break (+ WP6 meeting - Room n°3)

11:00 – 13:00 – SESSION 4: COMMITTEES MEETINGS (*restricted to Members)*

Chair: Mr. Christoph Waldmann

11:00 – 13:00 – Technical Oversight Committee meeting: Partners included in WP1. Additional partners can participate in this meeting upon requested by the TOC leader.

13:00 – 14:30 – Lunch

14h – 14h30 : WP3 Meeting – Meeting Room n°2

14h – 14h30 : WP5 Meeting – Meeting Room n°3

14h – 14h30 : WP6 Meeting – Meeting Room n°1

Chair: Mr. Eric Delory ; Co-chair: Mr. Ayoze Castro – Main Room

14:30 – 16:00 – Steering Committee meeting: Restricted to WP leaders

SESSION 5: 16:00 – 18:00 Specific WP Meetings

Chair: Mr. Johan Gille – Meeting Room n°1

16:00 – 17:00 – NeXOS WP 2: Economic Viability and Industrialization Strategy

Chair: Mr. Eric Delory ; Co-Chair: Jay Pearlman – Meeting Room n°3

16:00 – 17:00 – NeXOS First Advisory Board Meeting: Patrick Farcy, Svein Rune Smådal

Chair: Mr. Jay Pearlman – Meeting Room n°1

17:00 – 18:00 – NeXOS WP 10: Dissemination and Outreach

Chair: Mr. Jean-François Rolin – Meeting Room n°3

17:00 – 18:00 – NeXOS WP 3: Engineering of Cost-efficient and Reliable Sensor Systems

2. Attendees

The list of participants is detailed below (sorted by surname):

	Name	Surname	Institution
1	Daniel	Alonso	*CTN*
2	Carlos	Barrera	*PLOCAN*
3	Nolwenn	Beaume	*PLOCAN*
4	Patrice	Brault	*NKE*
5	Arne	Bröring	*52° North*
6	Ayoze	Castro	*PLOCAN*
7	Luigi	Corradino	*SMID*
8	Arnaud	David	*NKE*
9	Laurent	Delauney	*IFREMER*
10	Eric	Delory	*PLOCAN*
11	Patrick	Farcy	*IFREMER*
12	Frederic	Fiquet	*ACSA*
13	Blas	Galván	*PLOCAN*
14	René	Garello	*IEEE*
15	Johan	Gille	*ECORYS*
16	Madeleine	Goutx	*AMU*
17	Nils-Roar	Hareide	*REC*
18	Joaquín	Hernández-Brito	*PLOCAN*
19	Rüdiger	Heuermann	*TrIOS*
20	Irene	Jorge	*UPC*
21	Eberhard	Kopiske	*Uni-HB*
22	Damien	Malardé	*NKE*

23	**Dick**	**Mans**	*ECORYS*
24	**Svein**	**Østerhus**	*Uni RESEARCH*
25	**Giovanni**	**Pavanello**	*CNR-ISMAR*
26	**Francoise**	**Pearlman**	*IEEE*
27	**Jay**	**Pearlman**	*IEEE*
28	**David**	**Peddie**	*CMR*
29	**Wilhelm**	**Petersen**	*HZG*
30	**Jean-François**	**Rolin**	*IFREMER*
31	**Svein Rune**	**Smadal**	*Havila Shipping*
32	**Kai**	**Sørensen**	*NIVA*
33	**Stefania**	**Sparnocchia**	*CNR-ISMAR*
34	**Marc**	**Tedetti**	*AMU*
35	**Christoph**	**Waldmann**	*Uni-HB*
36	**Oliver**	**Zielinski**	*UNOL*

II. Session 1: Project Introduction

Despite not being a deliverable of the project, the coordination decided that it would be useful to conclude the NeXOS Kick-Off Meeting with a document which highlights the activities and suggestions made during this event.

To begin with, we introduce the initial presentations performed by Mr Eric Delory, NeXOS Project Coordinator and Head of the Observatory at the Oceanic Platform of the Canary Islands (PLOCAN).

1. Institutional Introduction

Mr. Eric Delory welcomed all the participants and started the Kick-Off Meeting by giving an Institutional speech, to introduce PLOCAN to the attendees.

The institution is funded by both the National and Regional governments (50% each), through an investment agreement which is planned from 2007 to 2021.

The main objective of the structure is to design and build an offshore platform for Research and Innovation in marine science and technologies.

In his presentation, Eric Delory highlighted the importance of NeXOS for PLOCAN, which is in accordance with PLOCAN vision and scope of work. Nowadays, the undersea activity grows exponentially and there is a need for knowledge, technology and environmental guarantees.

After the Institutional presentation, Eric Delory detailed the Kick-Off Meeting agenda and various logistics information to the participants.

2. Overview of the project

In the second part of his presentation, Eric Delory described the NeXOS background and vision and the expected impacts and results that will come from the work of all partners.

The oceans are key actors for the Earth's climate and are sources of life, this fact has driven the selection **of sets of variables of interest during the project proposal's development** and the innovations that will take place. The NeXOS Consortium **aims at resolving** the sampling resolution and the cost-effectiveness issues and **providing** a better outreach to society.

As a whole, the project's 11 WPs will:

- Deliver cost-efficient multifunctional sensors
- Launch a more efficient monitoring strategy
- Set data in a standard format
- Implement a common data and sensor interface
- Reduce the need for human-operated quality control
- Calibrate and validate all new sensors and increase its reliability

In terms of expected impacts, the NeXOS project will enhance the European contribution to the Global Monitoring of the Oceans, support the implementation of European Maritime Policies and advance competitiveness for European industries.

NeXOS will lead to **specific innovations** that will improve the process and efficiency of the work done by scientists and researchers. Such innovations are planned in optics, acoustics, data and metadata, sensor interface, antifouling and assemblies engineering. **Transversal innovations** will address sensor antifouling, sensor interface interoperability, housings and mechanical functions.

Potential risks were also discussed, stating that most issues may come from additional requirements, delays in the development, the demonstration activities and the bio-fouling protection. These risks are important but will be controlled, and their impacts can be substantially mitigated if we act early in time.

Eric Delory highlighted the **objectives of this meeting** which were to get to know all partners, to recap the activities through presentations and to get familiar with the management structure and methodologies.

The Kick-Off Meeting also enabled to start organizing the Scientific and Technology Activities (through the TOC meeting) and discuss any unresolved matter in order to guarantee a smooth start for the project (issues related to the CA and GA).

3. Inter-project cooperation

To conclude the introduction, Eric Delory presented the inter-project cooperation plans for the 4 selected projects under Topic 2 of the 2013 Ocean of Tomorrow call , coordinated by PLOCAN (Spain), NOCS (United Kingdom), LEITAT (Spain) and University of Geneva (Switzerland) respectively, as mentioned in the DoW of each project.

The four projects, which started fourth quarter of 2013, are supervised by Izabela Freytag of the European Commission.

The inter-project cooperation aims at **optimising the EC contribution by working together on "to be identified" or specific commonalities**, e.g. the GEOSS data sharing principles, cross validate our developments, etc. Besides, it will be a good opportunity for discussing our practical experiences including successes and failures, to ensure that we optimize our efforts and can learn from our mistakes.

At the end of this presentation all the partners had the opportunity to introduce themselves to the rest of the consortium.

Presentation available here

III. Session 2: Scientific and Technical Work Packages Presentations

This second session was chaired by Mr. Christoph Waldmann (Uni-HB/MARUM) and co-chaired by Jean-François Rolin (IFREMER).

1. NeXOS WP1 presentation (Christoph Waldmann – Uni-HB)

Christoph Waldmann presented WP1, focusing on Scientific and Technological coordination, requirements and the validation strategy.

First, this workpackage aims at establishing a comprehensive **sensor development plan**, from requirements to concept, integration and validation by interacting with developers and other WPs.

By doing so, WP1 will assure a project **Scientific and Technological cohesion** (by identifying emerging risks for instance) and provide direction on sensor systems, from requirements to concepts and products.

Christoph Waldmann then detailed the main tasks of WP1. Below are the **characteristics of each task** and the additional information that have been given during the presentation:

- Task 1.1: Regarding the *Assessment and narrowing down of general sensor system requirements*, everyone agreed that we need to further determine our needs. Interacting with other projects will also be a good way to widen our perspectives.
- Task 1.2: A *Project Implementation Plan* will be implemented to achieve the functional capability and performance of the sensor package. This plan has to be seen as a dynamic tool, which will need a constant adaptation to the evolution of the development and requirements.
- Task 1.3: A focus on *risk identification and contingency plans for RTD goals* was presented, stating that we should keep track of particular issues that might appear in the upcoming months, regarding incompatibility for instance.
- Task 1.4: The *constitution and operation of the Technical Oversight Committee (TOC)* is an important activity launched during Session 4 of the KoM (see summary of the TOC meeting in the Session 4 section). Efficient operation throughout the project will be traced through regular meetings.

❖ Task 1.5: The *Reference Model for multifunctional sensor system* will identify the interfaces between the different functional blocks of the sensor systems. It is a valuable and powerful, tool which will allow a better workflow.

Regarding quality checks, Christoph Waldmann highlighted that we need to launch a system which is properly working and which will take into account the way users will see and use it. Personnel resources are also well balanced among partners, which will lead to a fruitful cooperation.

As a conclusion, Christoph Waldmann expressed additional comments regarding the issues that might come up during the project:

❖ The success of this WP will depend on the input of the partners and their willingness to cooperate
❖ We have to keep an eye on the project aims while adapting to the challenges of the development teams
❖ WP1 will also act as an interface to other parallel EC funded projects

Presentation available here

2. NeXOS WP2 presentation (Johan Gille – ECORYS)

Johan Gille presented the work to be carried out within WP2, which consists in the **Economic Viability and Industrialization Strategy.**

He highlighted the fact that each stakeholder involved (technology developers, policy makers and market players) has different needs and ways of working which need to be **understood and answered**.

WP2 work is linked with the development of high quality sensors of various types, which will result from WP3 to WP7 work, where all innovations are made. The role of WP2 is to help these prototypes becoming **commercial products**.

As leader of this workpackage, ECORYS will work with **NeXOS industry partners** (NKE, ACSA, TrIOS, SMID, FRANATECH) in order to get market and business intelligence information and define their perspective, and will also work with **the users** (PLOCAN, Ifremer, Uni-HB) to learn about their demands and service level requirements.

To do so, the tasks of WP2 will be to **estimate market size** in terms of the current and expected future demand for monitoring services, assess the **competitive position** of the European supply industry regarding

non-EU competitors and how NEXOS products can penetrate this market and to develop **business models** for these products.

Johan Gille stated that the market assessment started already and that this phase depends on **information and results from WP3 to 7**. To work properly, WP2 members will need inputs about manufacturing and operating costs, the lifetime of the products and the main outputs. Any delay in delivering the results will increase the workflow and delay the other tasks of the project (inputs are requested before Month 3).

Presentation available here

3. NeXOS WP3 presentation (Jean-François Rolin, Laurent Delauney - IFREMER)

Jean-François Rolin and Laurent Delauney described the work which will be undertaken within WP3, which consists in the **Engineering of the sensor systems**.

The objective of this workpackage is to prepare and follow up the **sensor system developments** in order to cope with the major following needs:

- *Performance,* in terms of metrology, in harmony with the market
- *Robustness,* including mechanical and design aspects, for rugged use including transportation and deployment
- *Costs,* not only manufacturing but also operational costs, platform data management and data processing
- *Reliability* of sensors, their integration and interfaces
- *Biofouling resistance,* providing stability in various seawater environments, which requires adequate protection

One of the challenges of WP3 is to reach the **Technology Readiness Level** of component and basic subsystem technology validation in a relevant environment.

Inputs from WP1 on general sensor system requirements will be used in order to establish general specifications.

This workpackage also deals with **biofouling resistance** and **antifouling protection**. NeXOS will apply an innovative monitoring technology that will detect the earliest stages of biological growth on sensor surfaces so that biofouling can be effectively prevented. This will reduce energy needed and will avoid unnecessary introduction of potentially harmful chemicals in the environment.

Laurent Delauney presented the **active method** that will be developed throughout the project to protect instruments from biofouling. This method will implement local chlorination on optical windows for optical sensors, using a conductive layer electrode.

After 2 years of development and 3 months of operation, the method has been tested on 12 windows and **no alterations** were found. This will mainly be used for WP5 but can also be of interest for WP4 and WP6. To ensure efficient work and a good cooperation, meetings with WP5 will be scheduled every 6 months, to understand how the development part is progressing (for the optical part).

By using this active method, the question of **confidentiality** has been raised by Ifremer. This is a recurring matter for some partners, along with the background issue, which will have to be discussed in the upcoming months.

Presentation available here

4. NeXOS WP4 presentation (Joaquin del Rio – UPC)

Joaquin del Rio introduced the work of WP4, which consists in the **development of a modular and reconfigurable sensor system interface and a marine sensor web Architecture and components**.

Joaquin del Rio summarized the main activities within WP4 and the tasks that will be performed. He started his presentation by introducing the **hardware and software architecture** that will be developed through the project. This architecture will enable interoperable Web access to marine sensors, in order to facilitate a rapid integration of useful sensor (meta) data into standard open data portals.

The architecture will satisfy international standards to enable integration of marine sensors with existing observing systems. Regarding the developed sensor systems, they will require new modular electronic hardware interfaces and the design of these will consider the variability of different platforms in terms of **cost, power requirements, size and performance**.

As explained by Joaquin del Rio, the common interface is different from the standard interface. Any clients who want to identify the measurements will do so in the standard procedure. Different models for this standard interface will be discussed during a dedicated TOC meeting.

WP4 is divided into six tasks to **cover the full data chain**, from the sensors to the users and data portals. Tasks 4.1 to 4.3 will consider instrumentation and Tasks 4.4 and 4.5 will address the Sensor Web architecture and communication with Open Data Portals. Task 4.6 will integrate the outcomes of the previous tasks. These six tasks are linked with the work undertaken by WP1, 3, 5, 6 and 7.

After his presentation, Joaquin del Rio answered to the remarks and questions from some of NeXOS partners. Regarding the **antifouling system**, there is no method defined yet for integration on the interface. WP4 members will have to decide if it will be based on own control, separate or both.

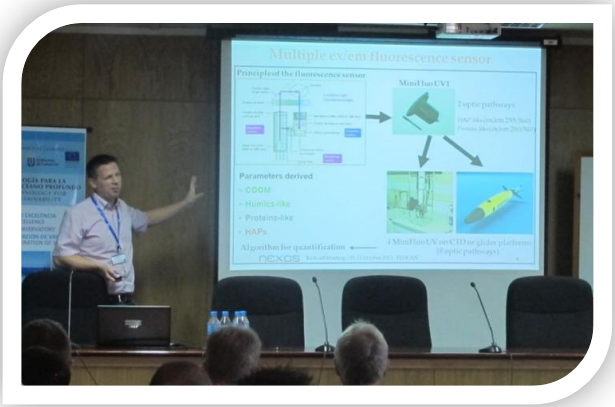
Questions about case 1 were raised (see architecture diagram in DoW) and the **transmission of data**. For the moment, choosing our own electronics and developing our own device (which will be placed inside the instrument) is the prevailing option. However, internal and external device should be considered, depending on situations: we have to study alternatives.

This interface is core to our future developments: in NeXOS we don't want to just add another interoperability layer to existing instruments. We have to think deeper in terms of **new and integrated system developments**.

Presentation available here

5. NeXOS WP5 presentation (Oliver Zielinski – UNOL)

Oliver Zielinski presented the work and activities that will be achieved by WP5, which consists in the **development of optical sensor systems**.



Oliver Zielinski introduced the main objective of WP5, which is to develop innovative, compact and cost efficient **multifunctional sensor systems** for optical measurement of marine environmental parameters.

The WP's tasks will develop the following systems and methods:

- Matrix-fluorescence sensors for the detection of dissolved substances and dissolved organic matter (Task 5.1)
- Hyperspectral cavity absorption for investigation of phytoplankton and other absorbing components (Task 5.2)
- Carbon cycle relevant parameters such as pH, CO_2 and CH_4 (Task 5.3).

The planned development will **improve the available optical technologies** in terms of multi-functionality, size and cost, multiplatform integration and will satisfy the common sensor interface definitions.

Below are **WP5 links** to others WPs:

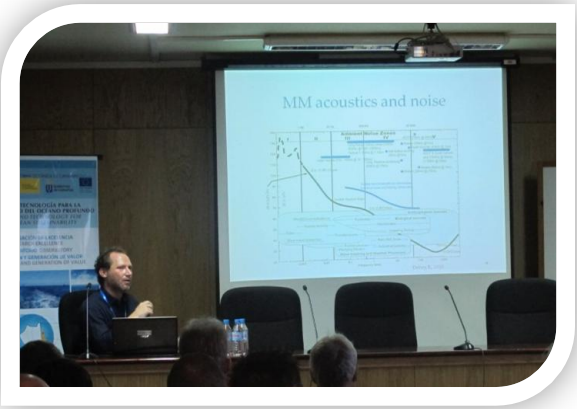
- Input from WP1 Requirements (D1.1, D1.2)
- Input from WP3 on Antifouling (D3.3)
- Input on interface requirements from WP4
- Close links with industry partners will secure pre-competitiveness (WP2).

A meeting in January 2014 will be organized, most probably in Hamburg, to provide the outputs needed from and to the others WPs and partners.

To conclude his presentation, Oliver Zielinski raised the following question: **"What happens to the sensors produced by the project (when finished)?".** This will be discussed at the end of the project and will be arranged with those who produce these sensors (case by case). Eric Delory suggests to produce several replicas to be distributed among the developers in the WP.

Presentation available here

6. NeXOS WP6 presentation (Eric Delory – PLOCAN)



Eric Delory described the role of WP6 in NeXOS. WP6 will develop a new, compact multifunctional and cost-efficient **sensor system for passive acoustics**. This module will include the transducer(s), the firmware for pre-processing and the software for post-processing of acoustic information. It will be installed on the sensor and user interfaces developed in WP4.

The minimal multifunctional requirements of the module may include **oceanographic variables** relevant to acoustics and further specifications defined in WP1 and by the MSFD on **Good Environmental Status descriptor 1** (Biodiversity: aquatic mammals) **and 11** (underwater noise). The module may be configured to serve the additional purposes identified in WP1.

As Eric Delory explained, these developments will measure and help mitigate the **environmental impact of marine systems** on marine life and track how marine life evolves in the face of low-frequency sound such as those produced by volcanic activity and maritime traffic.

Noise SPL measurements and statistics will be a part of these developments. The main issue won't be to extract acoustic features but to make sensors low-power and compact enough to be hosted by a glider or a profiler. Work will also cover **sound source localisation** and classification.

Eric Delory then described the requirements for tailoring the **physical interface**, whose aspect will have to be defined. All these requirements should respond to reducing energy consumption and overall size, and allow for efficient communication with the device.

After his presentation, Eric Delory exchanged with NeXOS partners regarding the requirements of this work package. Below are the **main issues and remarks** discussed:

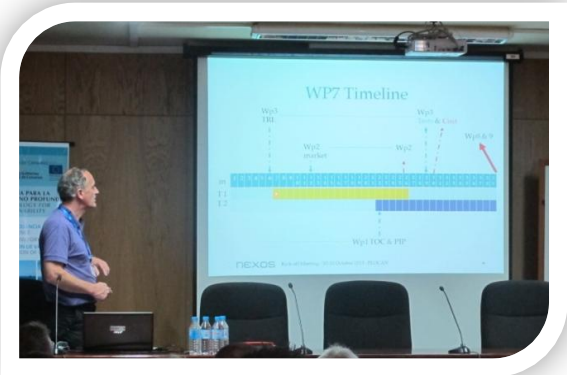
- The validation phase is important and we should create **replicas as fallback to the risk of loss or failure.** Validation will ensure that what we develop is in agreement with the agreed requirements
- There is a risk of **interference** between the sound of mobile platforms (pumping, hard drive) and environmental sound: it's a risk that we will try to anticipate by adapting mechanical conditions, the location of the device, or the acquisition control cycles.

We should be able adapt the preprocessing to new applications, make it as open as possible, like reprogramming of the interface.

Presentation available here

7. NeXOS WP7 presentation (Jean-François Rolin – IFREMER)

Because Patrice Woerther couldn't attend the NeXOS Kick-Off Meeting, Jean-François Rolin presented the work of WP7, which consists in the **development of ecosystem approach to fisheries management sensor systems**.



WP7 activities will allow developing **new and low cost sensors** for the multi-variable sensor system RECOPESCA, which will be enhanced with new variables relevant to fisheries management and the CFP.

Ecosystem approach to Fisheries (EAF): In order to measure the effort of the French fishing fleet, Ifremer and NKE have developed a system called **RECOPESCA**, which is composed of sensors, a hauler counter, a precise scale and a data concentrator to store and transmit the data to a shore management centre.

The objective of this WP is to provide an **upgrade of the RECOPESCA sensors**, adapted to the needs of the biological communities, suitable for use throughout Europe, and to test, calibrate and optimize the **new EAF sensor systems** for integration, scientific validation and demonstration activities.

As Jean-François Rolin explained, the two objectives are not independent: oxygen and fluorescence may also be incorporated in the most advanced fisheries research approaches.

This WP will be coordinated **in close collaboration** with WP3, through functional analysis, anti-fouling, reliability and cost analysis. A software layer will be added (WP4) to warrant interoperability with international data portals through Sensor Web Enablement. The full system integration and validation will be performed in WP8 and demonstrated in WP9.

At the end of his presentation, Jean-François Rolin raised some **issues and remarks** regarding WP7 work and IFREMER policy:

- We have to think of a specific dissemination plan to the fisheries community (WP10), which should be approached differently from the oceanographic community.
- The background and foreground of the project should be clearly defined, especially with the integration of fluorescence and oxygen sensors.

Presentation available here

8. NeXOS WP8 presentation (Kai Sørensen – NIVA)

WP8 addresses the **multiplatform integration and validation of the new sensor system prototypes**, and was presented by Kai Sørensen, form NIVA.

WP8 work will start Month 19 and end Month 42. **18 out of 21 partners** are involved in this work package: 60% of person/month is allocated to platform integration and 40% to validation and recommendation for demonstration.

Kai Sørensen listed the **objectives of WP8**, which are the following:

- Perform the integration of the sensor systems on selected marine platforms (Task 8.1 to 8.3)
- Perform the field scientific validation of the sensor systems (Task 8.4 to 8.6)
- Prepare the recommendations for the Demonstration phase (link with WP9) of the project (Task 8.7)

This WP carries NeXOS further into the **integration and field validation** of sensor systems as developed in WP 5 to 7, including the interfacing (WP4) and biofouling protection (WP3), when applicable. It serves as the step between the sensor development and the final demonstrations in W 9.

The aim of the integration tasks (one for each sensor type), is to unite the sensor itself with the supporting structures and functions, and adapt it to the carrying platform and prepare the assembly for deployment in realistic sea conditions. Sensor systems will be **functionally and scientifically validated** for a short period at sea under real conditions.

Validation will verify the functionality and scientific validity of the sensor systems on given platforms, in agreement with the **sensor requirements** and validation strategies set in WP1. The validation is planned to include three cases, each with a specific Task dedication, divided according to the sensor system type.

Kai Sørensen mentioned the **main issues** that might come up during WP8, as listed below:

- The main concern is the **validation tasks duration**, which will only last for 5 months. We should discuss for an earlier start of the validation period.
- Most NeXOS partners are involved in this work package, so we need to establish a good **communication strategy** within WP8 to ensure an efficient work and cooperation.

Presentation available here

9. NeXOS WP9 presentation (Nils Roar Hareide - REC)

The work of WP9, **demonstrations of sensor systems performance**, was introduced by Nils Roar Hareide, from Runde Environment Center.

The main objective of this WP is, after the validation process, to publically **demonstrate the new sensor developments**, in real operational scenarios on various platforms, in conjunction with outreach and dissemination events (WP10).

Demonstrations will be done as much as possible in collaboration with pre-programmed scientific and oceanographic missions and using existing infrastructure, in order to **save cost and time**.

The **sensor systems to be demonstrated** will be the same as those successfully integrated and validated in WP8, i.e. optical, acoustic and EAF technologies. The biofouling management (WP3) and data processing and dissemination tools (WP4) will be included in the demonstrations.

The second objective is to involve, in the framework of a final dissemination workshop, **stakeholders** from the marine and maritime industries such as fisheries, oil Industry, offshore renewable and marine environmental monitoring as end users.

Nils Roar Hareide mentioned that the **Havila Troll vessel** will be used for operations at no costs, as already agreed with the ship operator (Letter of Intent to be sent). Whale presence will also be monitored, allowing for acquisition of information on potential interactions and behavioral patterns related to human activities. For this **demonstration**, a SeaExplorer glider from ACSA will be equipped with Optical sensor O1 and passive acoustic sensor A1; a ASV (SAILBUOY) from CMR will be equipped with optical sensor O3; A FerryBox system on a vessel of opportunity will be equipped with optical sensor O2.

Presentation available here

IV. Session 3: Management and dissemination work packages presentation

This third session, chaired by Jay Pearlman, focused on the presentation of the last two work packages of the project, WP10 and 11.

Before starting these presentations, Eric Delory summarized the main issues and remarks raised during the first day of the event. These comments are described in the "conclusion" part.

1. NeXOS WP10 presentation (Jay Pearlman – IEEE)

Jay Pearlman (IEEE) presented the work to be undertaken in WP10, dealing with **dissemination and outreach.** WP10 is a **focal point** for all dissemination and outreach activities with technical content provided by all WPs. It aims at raising awareness of the solutions and best practices developed in NEXOS to industry groups, SMEs, sensor producers, users of ocean information and policy makers.

The main **objectives** of this work package are to:

- Prepare the NeXOS dissemination and outreach plan
- Organize participation in conferences, seminars and other meetings, and coordinate publications in technical journals, trade magazines and online.
- Produce factsheets, website content, webinars, newsletters, video material and Earthzine articles
- Organize and develop three international Workshops

Jay Pearlman then presented the **communication tools** that will be used for dissemination and outreach. Earthzine is one of the targeted online magazines for publishing and promoting our work, apart from the NeXOS website, which will be launched in January 2014, and the newsletter.

Jay Pearlman explained to the partners the **NeXOS project video**, which will describe during a few minutes the work done by various WPs. This video will highlight the special aspects of the NeXOS project and introduce our developments to the targeted audience.

At the end of his presentation, Jay Pearlman and the partners discussed about the issues that might occur and addressed partners' remarks:

- ❖ NeXOS partners contributions and recommendations for the Dissemination plan, the fact sheet and the website content are welcome.
- ❖ We have to agree on our first workshop location and agenda. We have to make sure that the targeted stakeholders will be available at that time.
- ❖ Regarding copyrights and pictures references, we have to be careful while using pictures from a third party, despite some of the content will be directly created by the project.
- ❖ A possible summer school for the project was suggested (i.e. Glider summer school in PLOCAN)

Presentation available here

2. NeXOS WP11 presentation (Ayoze Castro – PLOCAN)

Ayoze Castro presented WP11, on **project management.** WP11 will implement an efficient organizational structure to **satisfy the objectives of NeXOS**. This WP also includes the management of the Intellectual Property Rights.

The **main axes** of this workpackage are the administrative and financial management (reports, reviews, compliance with the GA and CA, IPR issues), management of communication flow (day to day partner requests, intranet and project meetings) and technology transfer.

To ensure an **efficient follow-up** of the activities performed within the project, project checkpoint reports will be requested every 4 months (internal ; 5-6 pages max.). These reports will be prepared by WP leaders with the contributions of WP members, based on a defined template. Every 18 months, an EC periodic report will be requested, leading to our first EC external review on Month 18 in Brussels.

Regarding **internal communication**, any question/issue raised by a member of a WP should be addressed to the WP leader, who and when necessary will redirect the inquiry to the Project Coordinator. Emails are the most efficient way to do so, allowing for a written proof for the involved parties.

Ayoze Castro then listed the **upcoming tasks** that will soon be completed:

- KoM & SC minutes (November)
- Consortium Agreement Formalization (November)
- Project Management Guide (January – M4)
- Grant Agreement accession (Form IV) (December)
- Bank accounts (December)
- Project Intranet (January)

Presentation available here

V. Session 4: Committees Meetings (restricted to Members)

This 4th session, restricted to members, launched the first Technical Oversight Committee meeting and the first Steering Committee meeting.

Side meetings which occurred during this session will be summarized in the Session 5 section.

1. Technical Oversight Committee Meeting

The first Technical Oversight Committee meeting was chaired by Christoph Waldmann. The following section compiles the remarks raised and suggestions made during this meeting.

The Technical Oversight Committee (TOC) is chaired by the **WP1 leader** (Christoph Waldmann) and co-chaired by the **WP3 leader** (Jean-François Rolin). The work of the TOC will be mainly conducted by bi-weekly telephone conferences during M1-M6. There will be monthly telephone conferences after M6.

It is a **consensus-driven committee** but the composition of the TOC will not stay fixed during the lifetime of the project - possible changes on its composition can occur in the upcoming months

The workpackage leaders will form the TOC core group but **additional members** can join the TOC by request of the TOC chair. The TOC chair invited the following additional members to the TOC: *Svein Osterhus (validation strategies, user perspective), Wilhelm Petersen (user perspective), Jay Pearlman (Dissemination + independent technical advice), Nils Roar Hareide (Demonstration of sensor) and Rudiger Heuermann (manufacturer perspective).*

The TOC shall:

- Check scientific and technical progress of the project.
- Harmonize the work from different workpackages.

The TOC is a **central component of NeXOS** that oversees the overall technical development and implementation steps of the project. It will be in charge of developing a coherent strategy for technical activities within NeXOS.

Regarding **IPR discussion**, the TOC members suggested that the best place to discuss potential issues should be the Subcommittee for the Advancement of Small and Medium Enterprise Competitiveness (ACSC). IP matters may be addressed during the TOC meetings in order to report them in due time to the coordination and ensure recording as Background Industrial Property.

Below are the **main points** that were discussed during the TOC meeting:

- Kai Sørensen stated that we need to precisely *define a validation procedure for the sensors*. One example would be that chlorophyll sensor can be calibrated against chlorophyll fluorescence or against chlorophyll concentration. He also mentioned that different requirements are applicable depending on the field of use of the sensor.
- Rudiger Heuermann stated that the basic requirements have to come from the *scientific/user communities*. According to the requirements the sensors can also be adapted to user needs, e.g. equipped with special interfaces (LAN, RS232, USB etc.)
- Joaquin del Rio explained the *sensor standardisation approach*: as the standard interface will be defined within WP4. The WP4 team will also investigate which type of interface is currently used by other companies, such as Seabird, etc.
- Arne Bröring explained the *SID concept* and informed the partners that the SID sensor information (encoded in XML) will be added to the sensor metadata. The data acquisition system will provide the metadata to the SID interpreter.

Partners also discussed the upcoming tasks and points that would need to be discussed during the next meetings:

- Decide what will be the best way to conduct the validation strategy (duration, means, etc)
- Make everyone understand how we want to proceed
- Where do we want to direct our development
- How we proceed to narrow down the requirements
- Provide a list of user/observing scenarios to the manufacturers (understanding needs) and contact communities to widen our target market.

A detailed report of the TOC minutes is available on the Intranet dedicated page.

2. Steering Committee Meeting

The first Steering Committee meeting was chaired by Eric Delory, the Project Coordinator, and co-chaired by Ayoze Castro. Minutes are available on the intranet.

VI. Session 5: Specific WP meetings

The fifth and last session of the NeXOS Kick-Off Meeting was dedicated to the first Advisory Board meeting and specific WP meetings when requested by WP leaders.

1. Advisory and Stakeholders Board Meeting

The first ASB meeting was held during the NeXOS Kick-Off Meeting. It was chaired by Eric Delory and co-chaired by Jay Pearlman. Patrick Farcy (IFREMER and Coordinator of the JERICO project) participated as an external advisor. He was asked to comment on the project objectives and to comment on any aspect he finds relevant.

One of the issues highlighted was the interaction between the NeXOS workpackages. Workpackages 5 6 and 7 will work closely together. However there is **no sufficiently clear link** between WP 4 and 8 (sensor interface and platform integration). This needs to be addressed.

Another issue is to determine how the project will **be integrated** in the environment of marine research and its community: *how to link NeXOS to other projects, ensure the sensors can be connected to existing and future gliders and buoys, etc.* One of the main issues is thus to **validate the interfacing** between the sensors and the observatory systems. It is important to have the same interface (for NeXOS and the other projects) to facilitate the integration on the observing systems. Here are some of the other comments that were made:

- WP1: We have to make sure that new sensors will be easily integrated in operational systems (many inputs in the RI projects: EURO ARGO, EMSO, JERICO, GROOM, FIXO3)
- WP3: question was raised on the confidentiality of the background of the anti-fouling system, that needs to be defined in the CA
- WP5 to 7: take into account, if possible, the opportunity to answer some requirements not yet validated, especially for passive acoustics: how to open up to new applications? *There is some background coming from previous projects that could be integrated: for example, see work done in WP10 of JERICO in multispectral fluoremeter and pH/alkalinity/pCO2 sensors.*
- WP8: We should try as much as possible to use RI facilities within TNA (Fix03, JERICO 2, etc), for validation and/or cross validation of the sensors (may be possible in WP5 to 7).

2. NeXOS Side Meetings

On the last day, parallel sessions and side meetings were organized by WP leaders. Minutes of these meetings are summarised in the following sections.

i. WP2 side meeting

The WP2 side meeting was chaired by Johan Gille, leader of this workpackage, and focused on the **common understanding** of the overall aim of the workpackage.

From the perspective of the (SME) industry players, this WP would be valuable if it provides insight into how the future market will look like and what drivers are behind. An **identification and analysis** of multiple market segments will be needed and some work with multiple sensor platforms, others with very specific sensors only, important to distinguish research clients vs other groups.

The added value of NeXOS is not just new products or services but also to **gain knowledge** or get access to new networks of partners & clients. Added value of sensors cannot be seen separately from platforms.

Below are **comments and suggestions** made by the participants, for each WP2 task:

- Task 2.1 Market assessment
  - To look at global markets
  - Focus of SME operators is short term – focus on next few years
  - State of the art; to make use of existing studies and inventories (examples from UK and France mentioned; maybe similar can be found in Germany. Also in some Member States defence related programs – how many MS active on this? Idem for government investments in marine infrastructure)
  - Looking for future developments, especially driven from politics/EC. How do innovations respond to changed demand.
  - To address relevant sub-markets
  - However limited project budget for this task.

- Task 2.2 Competitiveness
  - Price is not main issue (varies between markets), but technology

- Task 2.3 Added value of NeXOS
  - NeXOS will deliver innovations for individual sensors, but may also provide results in relation to the use of platforms or the combination of sensors ('instruments')
  - Added value for SME companies is also access to network, net client groups, sectors (e.g. oil & gas)
  - Set-up of ASCS: scope to go beyond IPR issues only. ASCS to put concerns on the agenda; SC to make decisions for implementation in other WPs.

- Task 2.4 Business models (NKE lead)
  - To make use of current models of SME partners as well as previous ideas developed by them
  - To draft a template based on existing models
  - To ensure alignment with various markets and various SME players on board.
  - Also to consider US models (different financing approaches)

- Task 2.5 Industrialisation strategies
  - Task understood to be about commercialisation

The minutes of this meeting and its presentation support can be found on the WP2 Intranet dedicated page.

ii. NeXOS WP5 side meeting

The WP5 side meeting was chaired by Oliver Zielinski, leader of the workpackage.

It was discussed that the best way to **exchange information internally** would be to have a shared workspace, which has now been created in the NeXOS intranet. A specific email address for this workpackage might also be considered.

To have an efficient **link with other WPs**, liaison partners have been identified: UNOL (along with HZG and TriOS) with WP1, TriOS with WP2, Franatech (along with TriOS) with WP3, NIVA with WP8 and AMU with WP10.

The main topics discussed during this meeting are the following:

- WP5 participation in **WP10 activities**: contribution to Earthzine, the project video and webinars and support to a summer school
- WP5 available **test sites**: Marseille Beach (Ship, Mooring, Harbor,…), OSLO-Kiel Ferry, FerryBox-Route Cuxhaven-Immingham
- What are the main **target platforms**? FerryBox (suitable for Optics 1, Optics 2 and Optics 3), AUV or Glider (suitable for Optics 1, limited for Optics 2 and impossible for Optics 3), buoys and fixed platforms
- Regarding **antifouling** requirements, it is going to be relevant for Optics 1 (Fluorescence) and Optics 2 (PSICAM)

A WP5 meeting will be held in Hamburg in **January 2014**. The following topics will have to be discussed: partners expertise and plans in WP5, risks assessment, validation process (what to validate and how) and interface/data types.

A detailed meeting minutes report is available on the WP5 Intranet dedicated workspace.

iii. NeXOS WP6 side meeting

The WP6 side meeting was chaired by Eric Delory, leader of the workpackage, and focused on the requirements needed and the sensor inventory of the partners.

The **development plan**, linked to WP1, WP2, WP3 and WP4, is an important part of WP6 work and the developments conducted within the workpackage. There is a need for basic requirements for platforms, so that sensor developers know how to proceed.

The priority is to have two compact passive acoustic systems that have, respectively **A1** -Important power, bandwidth and dimensional constraints- and **A2** -Nearly no power, nor bandwidth constraints (e.g. streaming data from a cabled observatory)-.

For A1, sounds will be processed by the **hydrophone** (algorithms to be taken care of by CTN). The interface should take care of the preprocessing if it's not directly possible through the planned hydrophone electronics.

During this meeting, both platform manufacturing companies and partners of the project, described their products and their general characteristics (ACSA for gliders and NKE for PROVOR floats).

The main **constraints** of these sensors were the following:

- *Power:* batteries for the PROVOR type (150 Ah are available for a mission of 5 years 200 cycles-). 100Ah can be added for payload if necessary.
- *Communication:* Relatively high cost of data delivery ; 50 cts per minute, when at surface (3-4 KB per minute for PROVOR and 0.2-0.4 kb/sec for ACSA glider)
- *Weight and volume:* 35 kgs for PROVOR ; The shape of the NKE and ACSA sensors allows to have space for electronic add-ons. The dimensional characteristics of these sensors will have to be discussed in detail, so that the electronic devices fit perfectly.
- *Depth:* 2000 meters for PROVOR (NKE) and 700 meters for the SeaExplorer glider (ACSA). Note ACSA's vehicle is noisy during certain periods of the dive.

Hydrophone characteristics will have to address/account for partners' platform constraints in a first place, where sensors will be demonstrated. However it is important to remind that instruments must also be mountable on other similar platforms (sensor interoperability is a requirement for all NeXOS sensors) from other manufacturers.

A more detailed minutes report is available in WP6 workspace.

v. NeXOS WP10 side meeting

The WP10 side meeting was chaired by Jay Pearlman, leader of the workpackage. This meeting aimed at describing in details the activities and actions which will be undertaken within this work package and the requirements regarding partners' involvement.

The first element of the communication plan to be presented was the **webinar**. Webinars can focus on the outcomes of the project, the capabilities of the project partners and/or subject relevant to the science underlying our technology.

They are a good opportunity to promote our work (Work package focused webinars for instance) and should address both the technical community and the more general public. They will be divided into **2 parts**: a 40 minute presentation and a timeslot of 20 minutes for questions and debate.

Another important element of the dissemination plan is dedicated **workshops and conferences**. A list of potential events that we could attend is detailed in the WP10 side meeting presentation. Various subjects can be considered, like standardization synergies, user needs, cost perspective and performance, both data and sensor users.

At an advanced stage, a **video** illustrating the work done within the project will be produced. It will be composed of short interviews and illustrations in order to show the importance of the work done. The video will last approximately 2 minutes and each partner will be asked for their contribution.

Jay Pearlman highlighted the importance of communication among partners and of letting the team know when a **publication** features the project. Each partner agreed on the communication plan and actions and detailed their own collaboration for these tasks (see summary table in WP10 side meeting presentation).

The minutes of this meeting and the presentation can be found on the WP10 Intranet dedicated page.

VII. Conclusion

The NeXOS coordination and management team would like to thank all partners for coming to this Kick-Off Meeting and for **actively participating** into the discussions that occurred during these 2 days.

To conclude this report, a **synthesis** of raised issues and remarks per WPs has been detailed below.

- WP1:
  - Interface with other projects: what type of information to give and get?
- WP2:
  - Commercialization VS industrialization (what is the most appropriate strategy/term?)
  - Implication of large companies? To what extent?
- WP3:
  - Discuss the confidentiality of documents and data (work on background and foreground)
  - Think of collaboration with JERICO? (Use of data)
- WP4:
  - Antifouling measurements : own control? Separate? Both?
  - Discuss the different possibilities/models for the interface
- WP5:
  - End of the project: What happens to the sensors produced?
- WP6:
  - Risks of external sounds (interferences, sounds from the pumping, hard drive, etc)
  - Narrowing down requirements as early as possible in the project
- WP7:
  - None
- WP8:
  - Concerns about the validation task period (schedule to reconsider)
  - Integration of passive acoustics into the system?
  - Sensor systems to be developed on several types of platform? Common requirements?
- WP9:
  - Concerns about the validation task period (added to season issues)
- WP10:
  - Date and location of the first workshop
  - We have to be careful on copyright issues (pictures, diagrams)
- WP11:
  - Final versions of the CA and GA
  - Quality review process and templates to be followed by all partners