

CNR – ISTI  
Institute of Information Science and Technologies "A. Faedo"



# External Advisory Board Report 3

Date: 24.10.2023

Doc. Version: V2.0

[10.5281/zenodo.10664670](https://doi.org/10.5281/zenodo.10664670)



**Document Control Information**

Settings	Value
<b>Deliverable Title</b>	External Advisory Board Report 3
<b>Work Package Title</b>	Project Management
<b>Deliverable number</b>	D1.7
<b>Description</b>	An annual report and evaluation provided by the External Advisory Board providing their overall assessment of NAUTILOS and advice on the future direction of the project. The following deliverable will be the report following their meeting after M36 of the project.
<b>Lead Beneficiary</b>	CNR
<b>Lead Authors</b>	Gabriele Pieri (CNR)
<b>Contributors</b>	EAB members
<b>Submitted by</b>	Gabriele Pieri
<b>Doc. Version (Revision number)</b>	V2.0
<b>Sensitivity (Security):</b>	Public
<b>Date:</b>	24/10/2023

**Document Approver(s) and Reviewer(s):**

NOTE: All Approvers are required. Records of each approver must be maintained. All Reviewers in the list are considered required unless explicitly listed as Optional.

Name	Role	Action	Date
Sandra Sá	WP10 Leader	Approved	24/10/2023
Lazarina Dimitrova	WP1 Co-Leader	Approved	24/10/2023

**Document history:**

The Document Author is authorised to make the following types of changes to the document without requiring that the document be re-approved:

- Editorial, formatting, and spelling
- Clarification

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Changes to this document are summarised in the following table in reverse chronological order (latest version first).

Revision	Date	Created by	Short Description of Changes
<b>V0.1</b>	23/08/2023	Gabriele Pieri	Skeleton and first draft
<b>V1.0</b>	19/10/2023	Gabriele Pieri	Version ready for review
<b>V2.0</b>	24/10/2023	Gabriele Pieri	Final version after reviews

**Configuration Management: Document Location**

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<b>R</b>	Report	✓
<b>DEC</b>	Websites, patents, filing, etc.	
<b>DEM</b>	Demonstrator	
<b>O</b>	Other	

Dissemination level		
<b>PU</b>	Public	✓
<b>CO</b>	Confidential, only for members of the Consortium (including the Commission Services)	

## ACKNOWLEDGEMENT

This report forms part of the deliverables from the NAUTILOS project which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000825. The Community is not responsible for any use that might be made of the content of this publication.

NAUTILOS - New Approach to Underwater Technologies for Innovative, Low-cost Ocean observation is an H2020 project funded under the Future of Seas and Oceans Flagship Initiative, coordinated by the National Research Council of Italy (CNR, Consiglio Nazionale delle Ricerche). It brings together a group of 21 entities from 11 European countries with multidisciplinary expertise ranging from ocean instrumentation development and integration, ocean sensing and sampling instrumentation, data processing, modelling and control, operational oceanography and biology and ecosystems and biogeochemistry such, water and climate change science, technological marine applications and research infrastructures.

NAUTILOS will fill-in marine observation and modelling gaps for chemical, biological and deep ocean physics variables through the development of a new generation of cost-effective sensors and samplers, the integration of the aforementioned technologies within observing platforms and their deployment in large-scale demonstrations in European seas. The fundamental aim of the project will be to complement and expand current European observation tools and services, to obtain a collection of data at a much higher spatial resolution, temporal regularity and length than currently available at the European scale, and to further enable and democratise the monitoring of the marine environment to both traditional and non-traditional data users.

NAUTILOS is one of two projects included in the EU's efforts to support the European Strategy for Plastics in a Circular Economy by supporting the demonstration of new and innovative technologies to measure the Essential Ocean Variables (EOV).

More information on the project can be found at: <http://www.nautilos-h2020.eu>

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## EXECUTIVE SUMMARY

The following document provides the third annual report and evaluation by the External Advisory Board (EAB), providing their overall assessment of NAUTILOS and advice on the project's future direction. The following deliverable is the report following the third EAB meeting held at the end of the third year of NAUTILOS, in Month 36.

The following deliverable has four main sections:

- **Section I: Introduction**  
The chapter briefly reviews the project management structure, giving a more detailed recap of the specific role of the External Advisory Board and its organisation within all the governing bodies of NAUTILOS
- **Section II: External Advisory Board Related Deliverables** describes the scheduling and due dates for the NAUTILOS deliverables, focusing on the reports directly related to the EAB.
- **Section III: Report On The Third EAB Meeting**

This section describes the EAB's second meeting, highlighting the board members' advice and suggestions. A specific highlight is given to the activities of the Ethical Advisory Board during this third year.

- **Section IV: Conclusion** recap the document and resumes some final recommendations from the EAB meeting.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENT</b> .....	<b>3</b>
<b>COPYRIGHT</b> .....	<b>3</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>3</b>
<b>LIST OF FIGURES</b> .....	<b>5</b>
<b>LIST OF TABLES</b> .....	<b>5</b>
<b>LIST OF ACRONYMS AND ABBREVIATIONS</b> .....	<b>5</b>
<b>I. INTRODUCTION</b> .....	<b>7</b>
1. Recap of Project Management Structure.....	7
2. External Advisory Board organisation .....	7
<b>II. EXTERNAL ADVISORY BOARD-RELATED DELIVERABLES</b> .....	<b>9</b>
1. List of Deliverables related to EAB activities .....	9
<b>III. REPORT ON THE THIRD EAB MEETING</b> .....	<b>11</b>
1. Ethics Advisory Board activities.....	11
2. Engagement Board activities.....	12
3. Agenda and Coordinator report.....	12
4. EAB comments and feedback.....	13
<b>IV. CONCLUSIONS</b> .....	<b>17</b>
<b>APPENDIX 1: REFERENCES AND RELATED DOCUMENTS</b> .....	<b>18</b>

## LIST OF FIGURES

Figure 1. NAUTILOS Project Management Structure and Governing Bodies .....	7
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## LIST OF TABLES

Table 1. The updated list of NAUTILOS Deliverables related to the EAB.....	9
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## LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
<b>AQUA-lit</b>	Preventive measures for averting the discarding of litter in the marine environment from the aquaculture industry
<b>CA</b>	Consortium Agreement

<b>CAPARDUS</b>	Capacity-building in Arctic Standardisation Development
<b>CS</b>	Citizen Science
<b>CMEMS</b>	Copernicus Marine Environment Monitoring Service
<b>doi</b>	Digital Object Identifier
<b>EAB</b>	External Advisory Board
<b>EB</b>	Engagement Board
<b>EC</b>	European Commission
<b>EE</b>	External Evaluator
<b>EMODnet</b>	European Marine Observation and Data Network
<b>EMSO ERIC</b>	European Multidisciplinary Seafloor and water-column Observatory
<b>EOOS</b>	European Ocean Observing System
<b>EthAB</b>	Ethical Advisory Board
<b>EU</b>	European Union
<b>Euro-Argo</b>	European research infrastructure consortium for observing the oceans
<b>EuroGOOS</b>	European Global Ocean Observing System
<b>GA</b>	General Assembly
<b>GrAg</b>	Grant Agreement
<b>G7</b>	Group of Seven
<b>INTAROS</b>	Integrated Arctic observation system
<b>IPMA</b>	Instituto Português do Mar e da Atmosfera
<b>JERICO RI</b>	
<b>LifeWatch ERIC</b>	European Research Infrastructure Consortium providing e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services in order to support society in addressing key planetary challenges
<b>NERSC</b>	Nansen Environmental and Remote Sensing Center
<b>OGS</b>	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
<b>RIs</b>	Research Infrastructures
<b>TIB</b>	Technical and Innovation Board
<b>TRL</b>	Technology readiness level
<b>UN</b>	United Nations
<b>UNIS</b>	The University Centre in Svalbard
<b>WP</b>	Work Package

## I. INTRODUCTION

This document represents the third yearly report on the NAUTILOS Project External Advisory Board (EAB) activities.

### 1. RECAP OF PROJECT MANAGEMENT STRUCTURE

The project management structure of NAUTILOS has been designed as outlined in Figure 1. The management structure and procedures to be applied within NAUTILOS are established in the Grant Agreement (GrAg) and Consortium Agreement (CA).

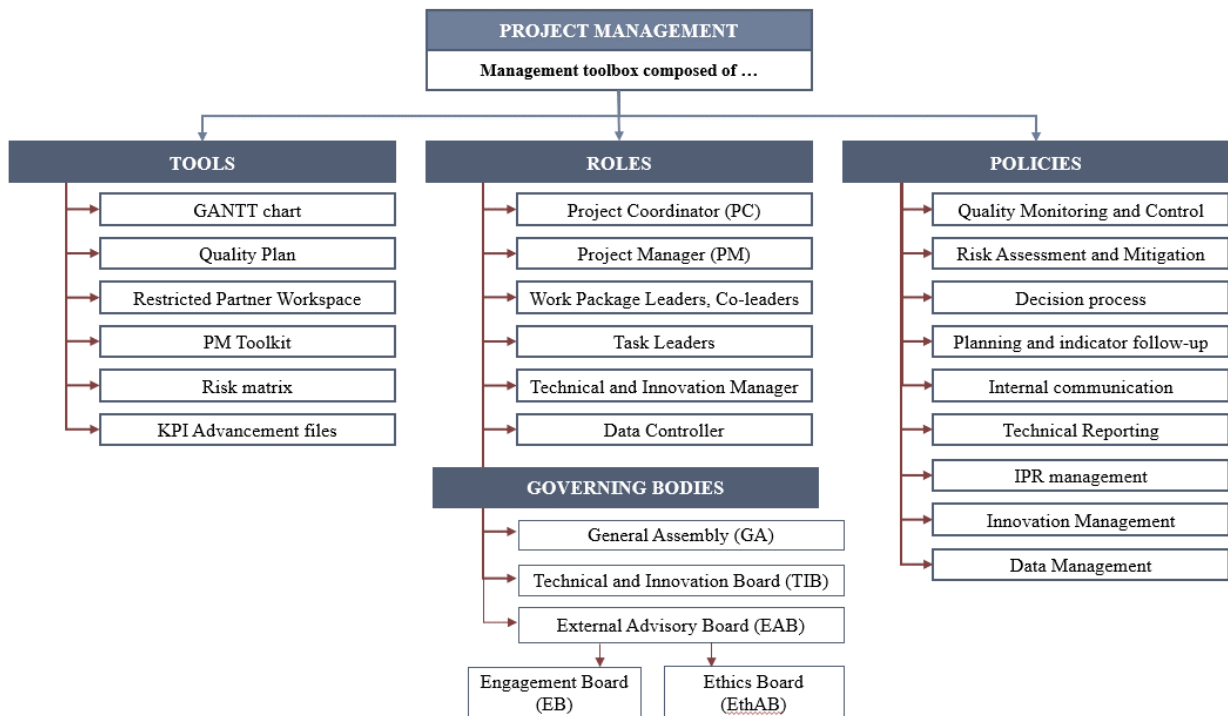


Figure 1. NAUTILOS Project Management Structure and Governing Bodies

As reported in the figure, among the **project's governing bodies** (as further detailed in Deliverable D1.1), there is the External Advisory Board (EAB), along with the General Assembly (GA) and the Technical and Innovation Board (TIB).

The EAB, chaired by the Coordinator, is composed of external experts who bring their expertise and ensure an external point of view concerning the implementation of the project. This organisational and decision-supporting structure will cover all necessary competencies regarding the quality of project implementation, supervision and correction actions, if necessary, based on the complexity of procedures. The EAB receives updates and reports on the project's progress and related outputs and provides feedback: to the GA concerning the strategic view and the TIB regarding the technical point of view.

### 2. EXTERNAL ADVISORY BOARD ORGANISATION

The EAB acts as an independent external body reviewing the project's progress and providing advice and guidance. EAB aims to ensure that the project is in support of the implementation of the "G7 Future of the Seas and Oceans" initiative, the "Paris Climate Agreement", the "UN Decade of Ocean

Science for Sustainable Development", and the needs of the "EC Integrated Maritime Policy" and the "Marine Strategy Framework Directive".

The EAB aims to:

- provide ongoing connection and compliance to EuroGOOS, CMEMS, EMODnet, and European Marine Research Infrastructures (EMSO ERIC, Euro-Argo, JERICO RI, LifeWatch ERIC);
- provide expert advice, feedback and input into a better understanding of the barriers facing effective Transfer of Marine Technologies within NAUTILOS;
- build relationships with stakeholders in Europe; and internationally, where relevant;
- promote and enhance the external communication activities of the project.

The EAB meets once per year and is responsible for supervising the achievement of the project's objectives, overseeing the project developments, results, constraints, obstacles, and ways to overcome them.

The actual list of External Advisory Board Members in NAUTILOS is the following:

1. Dr Juanjo Dañobeitia, Director General EMSO-ERIC.
2. Dr Alessandra Giorgetti, Coordinator of EMODnet Chemistry.
3. Dr Christos Arvanitidis, CEO and Director General LifeWatch ERIC.
4. Dr Stein Sandven. NERSC, Coordinator of INTAROS H2020 project.
5. Dr Mariana Mata Lara, Coordinator of the AQUA-LIT project.
6. Dr Haizea Jimenez, Head of Expertise Dept. - Surfrider Foundation Europe.
7. Prof. Jorge Miguel de Miranda, Executive Administrator of Atlantic International Research Centre - AIR Centre.
8. Dr Mafalda Carapuço. Member of the Portuguese Institute for the Ocean and Atmosphere-IPMA.
9. Dr Nina J. Zugic, independent research ethics expert.

The external advisory board will have two subsections within it:

1. The *Ethics Advisory Board (EthAB)* supervises and monitors the project's ethical aspects. The EthAB is an independent body advising the GA and all NAUTILOS members on ethical, regulatory and socio-environmental issues raised by the research and development to be undertaken under NAUTILOS. For the moment, it consists of Dr Nina J. Zugic, an independent ethics research expert.
2. The *Engagement Board (EB)* ensures that stakeholders' inputs have been considered in all aspects of the proposed implementation. The EB is part of EAB advising the GA and all NAUTILOS members regarding the stakeholders' engagement. Dr Haizea Jimenez, representing Surfrider Foundation, is part of the EB.



## II. EXTERNAL ADVISORY BOARD-RELATED DELIVERABLES

NAUTILOS foresees a comprehensive list of project's deliverables; thus, achieving a high level of quality for these target landmarks is essential to the success and impact of the project. While some will be confidential to protect copyrights and companies' assets, most of the deliverables will be available to the public. It will thus be accessible long after the project's completion. A quality assurance plan for deliverables has been organised to maximise the project's impact and ensure the above. The program is centred on timely deliverable preparation by all partners and an internal peer-reviewing system. NAUTILOS creates deliverables that are either reports, prototypes or demonstrators as described in "Annex I of the Grant Agreement". For those that do not take the form of a written report, an accompanying record in the form of a document will nevertheless be prepared to include supporting material for the accomplishment. For demonstrators, a technical report will be created, capturing the outcomes of the demonstration. For more detail, see Deliverables D1.4 "Quality Plan" and D1.9 "Quality Plan – final version". All deliverables are listed and available, if already prepared and not confidential on the dedicated project web page.

### 1. LIST OF DELIVERABLES RELATED TO EAB ACTIVITIES

The following Table 1 is an extract from the project list of deliverables that includes the ones directly linked with the EAB activities. As it can be noticed, these belong all to WP1 (Project Management) and WP13 (Ethics); several of the Ethics WP deliverables were due in the first months of the project and were submitted and accepted at the end of the first period (i.e. Month 18).

The present document (underlined in the table), along with the Ethics deliverable D13.8 are the remaining deliverable due in the project's third year. The final EAB report will be due at the end of the NAUTILOS Project, on Month 48.

**Table 1. The updated list of NAUTILOS Deliverables related to the EAB**

<b>Del. No.</b>	<b>Deliverable Title</b>	<b>WP no.</b>	<b>Lead beneficiary</b>	<b>Type</b>	<b>Dissemination level</b>	<b>Due Date (in months)</b>
<b>D1.2</b>	<i>External Advisory Board Report 1</i>	WP1	1 - CNR	Report	Public	12 <i>Accepted</i>
<b>D1.6</b>	<i>External Advisory Board Report 2</i>	WP1	1 - CNR	Report	Public	24 <i>Submitted</i>
<b><u>D1.7</u></b>	<u>External Advisory Board Report 3</u>	<u>WP1</u>	<u>1 - CNR</u>	<u>Report</u>	<u>Public</u>	<b><u>36</u></b>
<b>D1.8</b>	External Advisory Board Report 4	WP1	1 - CNR	Report	Public	<b>48</b>
<b>D1.5</b>	EthAB Reports	WP1	1 - CNR	Report	Public	<b>48</b>
<b>D13.1</b>	<i>H - Requirement No. 1</i>	WP13	1 - CNR	Ethics	Confidential	3 <i>Accepted</i>
<b>D13.2</b>	<i>POPD – Requirement No. 2</i>	WP13	1 - CNR	Ethics	Confidential	3 <i>Accepted</i>
<b>D13.3</b>	<i>A - Requirement No. 3</i>	WP13	1 - CNR	Ethics	Confidential	3 <i>Accepted</i>
<b>D13.4</b>	<i>NEC - Requirement No. 4</i>	WP13	1 - CNR	Ethics	Confidential	3 <i>Accepted</i>
<b>D13.5</b>	<i>EPQ - Requirement No. 5</i>	WP13	1 - CNR	Ethics	Confidential	3 <i>Accepted</i>
<b>D13.6</b>	<i>DU - Requirement No. 9</i>	WP13	1 - CNR	Ethics	Confidential	6 <i>Accepted</i>
<b>D13.10</b>	<i>GEN – Requirement No. 13</i>	WP13	1 - CNR	Ethics	Confidential	6 <i>Accepted</i>
<b>D13.7</b>	<i>GEN – Requirement No. 10</i>	WP13	1 - CNR	Ethics	Confidential	18 <i>Accepted</i>

<b>D13.8</b>	GEN – Requirement No. 11	WP13	1 - CNR	Ethics	Confidential	<b>36</b>
<b>D13.9</b>	GEN – Requirement No. 12	WP13	1 - CNR	Ethics	Confidential	<b>48</b>

### III. REPORT ON THE THIRD EAB MEETING

The EAB was formed during the first year of the project (2021), in particular the administrative actions to finalise the contacts were completed by the end of July 2021. The first EAB meeting took place on 22<sup>nd</sup> September 2021, close to the end of the first year of NAUTILOS activities.

The outcome of this meeting and recommendations from the board were reported in the document deliverable D1.2 (mentioned in Table 1 above).

During the third NAUTILOS Consortium Meeting, at the end of the first year of activities, three members of the EAB, Dr **Alessandra Giorgetti**, Dr **Christos Arvanitidis**, and Dr **Nina Zugic** (EthAB member), presented and discussed topics that should be considered in European projects from three different perspectives and gave the whole Consortium their advice for improving the quality of the work developed. The topics presented dealt with ethical issues to be taken into account in a multiple and wide domain project like NAUTILOS; the data management emphasising the role of openness and compliance with FAIR principles of data and open science; the multiplatform integration of technologies overcoming barriers to get free access and cross-domain examples. An intervention from Dr **Nicolas Segebarth** (the NAUTILOS EC Policy Officer from the Healthy Seas and Oceans Unit of the DG Research and Innovation) highlighted the suggestion to ensure real-time data transfer from the sensors to a data centre.

After the second year of project activities, the EAB met on 26<sup>th</sup> September 2022, and the outcomes of this meeting was reported in the document D1.6. It covers the feedback and recommendations collected from the EAB in that period.

In the third year (Months 25-36), many accomplishments were completed: starting with the completion of technical activities in Work Package 4 and contextual conclusion of the fundamental Integration Work Package 5 and the Work Package 6 dealing with calibration and validation activities in controlled scenarios. A very intense activity has been performed concerning Communication and Dissemination actions during the last year. Among them the organisation of a NAUTILOS Policy Round table “Supporting Ocean Observations” in Genoa, Italy, where Dr **Juanjo Dañobeitia** made a presentation under the name of “The Deep Ocean Observation Systems; A key to understand Global Changes”, this was done including the majority of European marine Research Infrastructures (i.e., LifeWatch, Euro-Argo, EMBRC, Danubius and ICOS marine) with an intervention during a session and, Dr **Nicolas Segebarth** was invited to bring an introductory talk.

This section first describes the activities performed by the Ethics Advisory Board (EthAB) during this period, followed by a recap of the Engagement Board (EB) activities. Then a detailed description and comments on the third EAB meeting are reported. The meeting took place virtually on 13<sup>th</sup> October 2023.

#### 1. ETHICS ADVISORY BOARD ACTIVITIES

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Following on the strong basis built during the previous year, in the project's third year, an essential aspect of the work was related to the EthAB.

Building on the previous mandatory deliverable D13.7 "General Requirement No. 10", submitted and accepted after revision at M18, the EthAB with the support of several internal members, worked on drafting of a successive and more general report dealing with Research Ethics in a multidisciplinary project.

The organisation and drafting of such a comprehensive document are under achievement thanks to the contribution of many different partners covering various aspects of NAUTILOS activities dealing with very diverse topics, led by the coordinator of the external EthAB, Dr **Nina Zugic**.

More details on this will be available in the deliverable D13.8 “GEN – Requirement No. 11” which is under submission.

## 2. ENGAGEMENT BOARD ACTIVITIES

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Within the frame of NAUTILOS governing bodies, the Engagement Board (EB) represent an example of a stakeholder concerning the NAUTILOS field of activities. The stakeholder representative in NAUTILOS EAB is Surfrider Foundation<sup>1</sup>, a non-profit organisation dedicated to protecting and enjoying the world's oceans for all people through a powerful activist network. In NAUTILOS it is represented by Dr **Haizea Jimenez**.

In the third year, the support of the EB continued following the previous activities and bringing the points of view and experience of a main stakeholder, especially considering the extent to which the Citizen Science activities have been achieving for NAUTILOS Project.

## 3. AGENDA AND COORDINATOR REPORT

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The third yearly EAB meeting participants were all the 9 EAB members, plus NAUTILOS Coordinator and NAUTILOS Project Management staff. The agenda for the meeting was the following:

- The Coordinator presented the situation of the project's activities at the end of the third year and in view of the upcoming Review Period.
- A recall of the amendments requested and obtained by the Consortium so far was presented;
- The Coordinator presented the general status of the NAUTILOS project, with the main achievements of the last year; moreover, a summary presentation of the activities in each WP was given, as well as the foreseen activities for the subsequent period;
- A final round table with question and comments was established with all members of the EAB commenting and requesting clarifications;
- In the end there was a discussion and wrap-up of the Board meeting.

The presentation given by the Coordinator is stored and available on the project's Team Drive.

In the first part, the Coordinator presented the current status of the project in view of the upcoming second Review Meeting with a detail of the documents under preparation, also taking into account the outcome and requests from the first period.

After this, a recap of the two project's amendment has been shown, following the second one which was delivered and accepted within the last year.

A presentation of NAUTILOS' achievements within the last year of the project has been presented. In brief:

- Three WPs correctly concluded on time and achieved their foreseen goals (WP4, WP5 and WP6);
- All foreseen (71 for the whole period of 3 years) deliverables submitted or under submission phase;

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<sup>1</sup> <https://www.surfrider.org/>

- All foreseen sensors/prototypes, including these from WP4 closed at the end of M24, are developed and ready for the next stage;
- Some delays exist but contingency plans have been applied to overcome the delays;
- All foreseen milestones (6) during this year were achieved;
- Dissemination and communication activities widely proceeding and successfully promoting NAUTILOS;
- Broad participation in many public events (Galway 10 years celebration, EMD 2022, EMODnet Conference...), both in terms of general NAUTILOS project presentations as well as specific technical presentations;
- The organisation of NAUTILOS Policy Round Table event, in the context of the World Ocean Race Grand Finale in Genoa;
- Contextual presentation of two policy briefs developed;
- In the context of the Project's capacity building activities, successful organisation of the first NAUTILOS Summer School, held in Oslo;
- Several Citizen Science campaigns were held;
- Synergies activities continue to be established;
- Multiple achievements from WP8 data infrastructure and tools (including CS App);

Finally, each WP's status was presented with details on issues, deliverables and future activities.

#### **4. EAB COMMENTS AND FEEDBACK**

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After this step, the EAB members commented and gave specific feedback on various aspects for which they could provide direct support or help to achieve the strategic objectives of NAUTILOS, considering its actual status.

**Jorge Miguel de Miranda (Executive Administrator of Atlantic International Research Centre - AIR Centre):** congratulated the NAUTILOS Consortium for the status of the project and its activities, stating that it is normal to have delays in such a technological oriented project, especially considering these historical times. Dr de Miranda, following a request from the Coordinator seeking for suggestions for organising a joint session with other projects or initiatives during our future Consortium Meeting, suggested that considering that among the partners of the projects there are large operational organizations like HCMR, and that there are a lot more in EU (e.g. IFREMER) who are responsible for observational infrastructures, they should be targeted by the project. It would be very interesting to invite people from those institutions to present to them what the project is about, what are the advantages, they are other big stakeholders of the of the project outcomes.

Moreover, he suggested that products and tools like the CS App, could be organised under some common umbrella, like a "marketplace" for blue apps. There are many apps, but we could have a common place for all of them to compare and check their minuses and pluses. Last – as Dr de Miranda moved from IPMA to AIR centre which is much more connected to the Atlantic and South America, it suggests that would be interesting to find out more about the cooperation with those low-income countries.

**Christos Arvanitidis, (CEO and Director General of LifeWatch ERIC)** agreed about the little delays that are expected and can be considered linked to the project subject and connection with technology development in a difficult environment such as the Ocean waters. He was content to see synergies in the area where some of the key research products (not limited to technologies) produced by NAUTILOS can be exploited further. That brings up to the sustainability issue. The question is how many of the project products can be exploited and commercialized. In the EAB there are 2 research organizations who could help and mentor the people to onboard research products. Science

knowledge graph system (based on blockchain system technology) could be offered by us, helping in tracking the roadmap of the products once the project will end. When you talk about marketplace people have to have good meta data files, certain norms to onboard the apps, and integrate with others.

The Coordinator thanked DG Arvanitidis and replied that NAUTILOS activities in WP11 concerning the Exploitation are under way and aiming to understand how the things will be in 5-10 years and lining the products with the blue economy. About synergies with existing infrastructures/platforms – some of the sensors were already exploiting the initiative from MINKE Project to perform some product tests and calibrations. Another important point: we received offers from some organisation for the availability of vessels to test the sensors in a real environment, now we were contacted by big organizations to have the vessels equipped by some of the sensors which could extend a lot the data gathered and the observations.

**Mariana Mata Lara (Coordinator of AQUA-LIT project)** mentioned the Citizen Science app developed in the context of WP8 activities, recalling that many other applications already exist, but is there a plan to integrate this data acquired in NAUTILOS, for example linked with beach cleaning campaigns? It would be important and valuable to achieve an integration of the collected data as there are already many other places and organisations collecting data in this respect. As an example, she mentions a new platform BluBioMatch<sup>2</sup>, which could serve as a host for the NAUTILOS App, as it is aimed to be the hub of the Blue Economy in Europe in terms of people, organisations, working groups, events, projects, product showcases, as well as mentorship and opportunities. Each person registered can upload information on all these categories.

As a second comment, she congratulated for the project policy brief, especially the first one published by a joint effort of 10 European Projects, this is a very good way to strengthen the power of the projects, asking if it was organised by the HRB or supported by them.

Finally, she reported about an event carried out by Blue Mission BANOS, that is one of the EU Mission Ocean lighthouses, this one for the Baltic-North Sea. They are organising the 1<sup>st</sup> Mission Ocean Arena<sup>3</sup>, happening in Gothenburg, Sweden from November 14-16<sup>th</sup>, 2023. The event foresees to have interactive sessions, workshops, pitching events, demonstrations and networking, serving as a laboratory to both, pave the way for innovative blue economy solutions in the Western Baltic; to showcase local, regional and national approaches for a circular, carbon-neutral blue economy; and, provide concrete pathways for the EU's Mission Ocean's success.

The Coordinator replied that Policy Round Table was done by the projects and facilitated by the HRB; concerning the CS App, NAUTILOS made it clear that didn't want to have yet another app for CS, this is the reason why it is not simply downloadable from the website, the proposal was to have internal app – the added value, is to use it in the project in connection with the data portal and the project data infrastructure and to the thematic aggregators. All the process is leading to the CS App data acquired and seamlessly transferred to well established EU thematic data centres, this is valid for all types of data included in the CS App, not only the plastic collection campaigns. The Coordinator thanked Mata Lara for all the advice and suggestions, confirming that they will be brought to the entire consortium and the recommendations will be analysed to identify potential external synergies.

**Juanjo Dañobeitia, (EMSO-ERIC Director General)** mentioned that – the connection with other sister projects is fundamental. He is involved in a new project, GEORGE<sup>4</sup> which improves new sensor and platform technologies developed between three key EU Ocean research infrastructure (ICOS, Euro-Argo and EMSO ERIC) allowing them to be integrated into floats, mooring, and ships to be more efficient and enhancing the European Ocean Observing System (EOOS). Therefore, a connection with

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<sup>2</sup> <https://bluebiomatch.hivebrite.com/>

<sup>3</sup> <https://1st-mission-arena.b2match.io/>

<sup>4</sup> <https://george-project.eu/>

such project could be important and valuable for NAUTILOS and vice versa, as it has the goal to find convergence between different observation infrastructures, to complement each other more efficiently. It is very important to think about the legacy about technologies to be used after the project, to think about interacting and exploiting the outcomes of NAUTILOS through existing entities which are long lasting.

DG Dañobeitia then asked: what is meant with data interoperability – the data flows in EMODnet, SeaDataNet, Copernicus, by the project or by the beneficiaries themselves, and under which naming? And about the calibration week held in Oslo – it was a calibration or intercalibration activity? He, anyway, said that this was an important achievement and could bring a lot of positive outcomes in the future.

He congratulated with NAUTILOS organisation (thanks to Antonio Novellino, ETT and Sandra Sá, EurOcean) for Policy Round table in Genoa. He also acknowledged that for such an extensive technology project, little delays are not to be too much worried, and physiological.

Finally, he presented his worries about how NAUTILOS is going to handle the legacy (in the frames of EU research infrastructures), this excellent job should go to somewhere – concerning the research infrastructures, you need to make effort on how to transfer these results to the interested network and stakeholders.

The Coordinator replied about the data interoperability that NAUTILOS adapted through the infrastructure to make all the data provided to the thematic centres as data provided by the project. About the calibration – it was mainly a single sensors calibration, but there was also some intercalibration performed, as NIVA was using the UAV (i.e., drones) equipped with sensors, and they were flying over the fjord, in the meanwhile there was the ferry line with ferry box equipped with a sampler and this data could be coupled and aligned. Moreover, in an upcoming testing activity in Crete in HCMR –testing will occur for different sensors and different platforms, data will be collected along with data from HCMR buoy, in this case there will be even more intercalibration, and the testing of integration with multi-sensors and multi-platforms.

**Nina Zugic, (an independent research ethics expert)** congratulated for the achievements and for the appearance and completeness of the project website. About the follow up of the project: 3 advantages could be identified – the CS and all the achievements obtained so far, the animal borne instruments, which is a novelty, and the safe use of drones. I would inform the Board that the White Paper is to be used widely and to use the case studies from NAUTILOS – which case studies could be used is a question that all the EAB could provide suggestions and support. Furthermore, we can look at the Policy Briefs, an additional one could be focusing on the safe and ethical research done within the CS and also addressing the marine environment. With regards to marketing and dissemination a suggestion is to be more aggressive and proactive in the messages aiming to disseminate NAUTILOS results. For the legacy, Dr Zugic encourages everybody, to talk about the next steps or NAUTILOS 2.0. It would be really great to have info centre or brokerage place where we can let people know that this app has been developed and has results and not yet just another software application, but it is really worth using it. We need to make sure that NAUTILOS has done everything according to the requirements in terms of ethical effort.

Coordinator replied about the Policy Brief that the proposal could be something that NAUTILOS could really think about; about the drones and data ethics, the drones were not equipped with optical cameras and not dealing with sensitive data. For a NAUTILOS follow up project, partners now are fitting in the project, but we are all aware that not all of them may fit to another call for project. We are thinking since the beginning about brokerage event for promoting our products, but as it was not the focus for instance for the CS App, also because other issues could be raised about the app, and it could pose other issues that should be considered.

**Alessandra Giorgetti, (OGS-National Institute of Oceanography and Applied Geophysics-Dept. Oceanography and Coordinator of EMODnet Chemistry)** commented on the CS activities related to

the marine litter. We collect this data and provide aggregated collection to MSFD technical groups for analysis and assessments, in this regard there is a lot of attention to the methodology applied for collection. It is important, even in the collection phase, to be aligned with the standards given at EU level if we want the data to be reused or aggregated. I would suggest involving more the people or institutes working on these aspects on collection of litter, to strengthen the connection, for instance to make joint events. To push more ahead the results, to make the community more aware even before being operational or having the actual collected data, while building it.

The coordinator replied that the app is already using established and standardised vocabulary, so that data could be available and shared. During the calibration week in Oslo, the drone was flying on the beach also and performed calibration activities and gathered data for different kinds of plastics. Another process is we have separate meetings for the sensors and samplers for data sharing, we are meeting with sensor providers and platforms, also in order to focus on common and standardised metadata for the collected data flowing through the NAUTILOS data infrastructure.

**Mafalda Carapuço, (Coordinator of Research Vessels at the Portuguese Institute for Sea and Atmosphere)**, commented that it would be relevant to start having information about the costs. IPMA is interested, as a client as well, costs are relevant in terms of acquisition and maintenance. It would be useful to start having more info in that regards, to really assess the project and being able to understand the issues with legacy.

Coordinator replied that among NAUTILOS activities a partner is performing socio-economic analysis, while it is not easy to get all the needed info from the partners, due to the innovative nature of the research and development and to the different nature of the partners developing technologies (e.g. for some of the Research partners this analysis can be much more difficult to perform with respect to SMEs or private companies in general), but an effort is being done to let project partners understand the implications of this analysis. Currently we have a preliminary assessment, the team in the project are working on the final one to be ready next year. We are also trying to add sections on sensors and samplers on the website, so to have a more comprehensive look to be shown to the external visitors.

**Haizea Jimenez, (Head of the expertise department at Surfrider Foundation Europe)** asked to send the policy briefs to the EAB. She has a comment concerning the collaboration with other EU organisations (such as IFREMER), but this was addressed in a previous comment. As a second comment and as a successive comment to integrate the CS app data into some common and openly available data base.

Coordinator replied that he acknowledges the strong suggestion to include and involve large organisations as the partners already in NAUTILOS could have a preferential path to establishing new collaborations and joint initiatives. Moreover, NAUTILOS is working towards unifying the data and its usage.

**Stein Sandven, (senior scientist at NERSC-Nansen Environmental and Remote Sensing Center, Professor at UNIS and former Director of NERSC, Coordinator INTAROS & CAPARDUS)** remarked that the exploitation of the outcomes of such a complex development project as NAUTILOS is, are not necessary that all results (i.e., technologies) will be equally exploited. Some results would be more sustainable than other, but a focus should be on how that can be used? As research will go on and many of the results can be fed into new projects, results can be exploited in other operational systems. An important element is to see which results are promising regarding being operational and sustainable. Also, to be considered is the wide range of technologies in the project, ranging from coastal technologies to deep ocean ones, meaning that there could be many different sensors or platforms which could be adopted in diverse environments from the ones they were originally designed for.



And about demos – about the TRL improvement during the project– it will be important to evaluate how good are the results when tested. CS has become widely used term – what do you mean when using the term?

Coordinator replied proposing an example of the micro-plastic sensor made up of two different parts, the sampler, and the detector, with the sampling which has been already tested and used for collecting data. About the TRL – also required by the reviewers and PO, it was required that the final TRL must be at least 6, thus in view of the next review period we already established an analysis on this part to be presented in the review report for all the technologies. Concerning the CS app, it also includes sections for collecting and sharing data from the NAUTILOS sensors.

Following the wrap-up, the coordinator and the project management shared the project’s Policy Briefs with the EAB (they are also available through the NAUTILOS web site), as well as the minutes of the meeting used as a basis for the present document.

## IV. CONCLUSIONS

At the end of three years of intense activities, an important milestone is ahead of NAUTILOS: the second periodic report. This will also represent an important checkpoint regarding the duties towards the EU and the GrAgr. In this respect, the advice from the EAB represent an invaluable asset and support, providing a novel perspective and highlighting the areas of strength and suggesting strategic improvements. The EAB capability to capture the project’s achievements and supporting the alignment with the objectives set out in NAUTILOS.

Among the many pieces of advice, a rather common one comes from the EAB: **the need to start focusing the project’s activities both towards the legacy that our project will have and to be able to have an exploitation plan capable of providing a valorisation and sustainability to the results achieved so far and until the end the project.**

Many different activities were performed in this project's second year involving various members of the EAB, and all received positive feedback and already proved helpful to the Consortium.

## APPENDIX 1: REFERENCES AND RELATED DOCUMENTS

Deliverable 1.7 has been developed under the provision outlined within the following related documents:

ID	Reference or Related Document	Source or Link/Location
1	NAUTILOS Grant Agreement	NAUTILOS ownCloud
2	NAUTILOS Consortium Agreement Nr. 101000825.	NAUTILOS ownCloud
3	NAUTILOS Deliverable D1.1.	NAUTILOS TeamDrive
4	NAUTILOS Deliverable D1.2.	NAUTILOS TeamDrive
5	NAUTILOS Deliverable D1.4.	NAUTILOS TeamDrive
6	NAUTILOS Deliverable D1.6	NAUTILOS TeamDrive
7	NAUTILOS Deliverable D13.7.	NAUTILOS TeamDrive
8	External Advisory Board 3 <sup>rd</sup> meeting – minutes	NAUTILOS TeamDrive
9	External Advisory Board 3 <sup>rd</sup> meeting – presentation	NAUTILOS TeamDrive