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NAUTILOS

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EXECUTIVE SUMMARY

The following document provides the second 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 second EAB meeting held at the end of the second year of NAUTILOS, in Month 24.

The following deliverable has four main sections:
- o **Chapter 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
- o **Chapter 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.
- o **Chapter III: Report On The Second 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 second year.

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

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

CAPARDUS	Capacity-building in Arctic Standardisation Development
CoastObs.eu	Commercial service platform for user-relevant coastal water monitoring services based on Earth observation
CS	Citizen Science
CMEMS	Copernicus Marine Environment Monitoring Service
D	Deliverable
doi	Digital Object Identifier
EAB	External Advisory Board
EB	Engagement Board
EC	European Commission
EE	External Evaluator
EMODnet	European Marine Observation and Data Network
EMSO ERIC	European Multidisciplinary Seafloor and water-column Observatory
EthAB	Ethical Advisory Board
EU	European Union
EURO ARGO	European research infrastructure consortium for observing the oceans
EUROqCHARM	European Quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of plastic pollution
EuroGOOS	EuroGOOS
GA	General Assembly
GrAg	Grant Agreement
G7	Group of Seven
INTAROS	Integrated Arctic observation system
IPMA	Instituto Português do Mar e da Atmosfera
JERICO RI	
Lifewatch ERIC	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
NERSC	Nansen Environmental and Remote Sensing Center
OGS	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
PO	Project Officer
RIs	Research Infrastructures
TIB	Technical and Innovation Board
TIM	Technical and Innovation Manager
TNA	Transnational Access
TRL	Technology readiness level
UN	United Nations
UNIS	The University Centre in Svalbard
WP	Work Package

I. INTRODUCTION

This document represents the second 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).
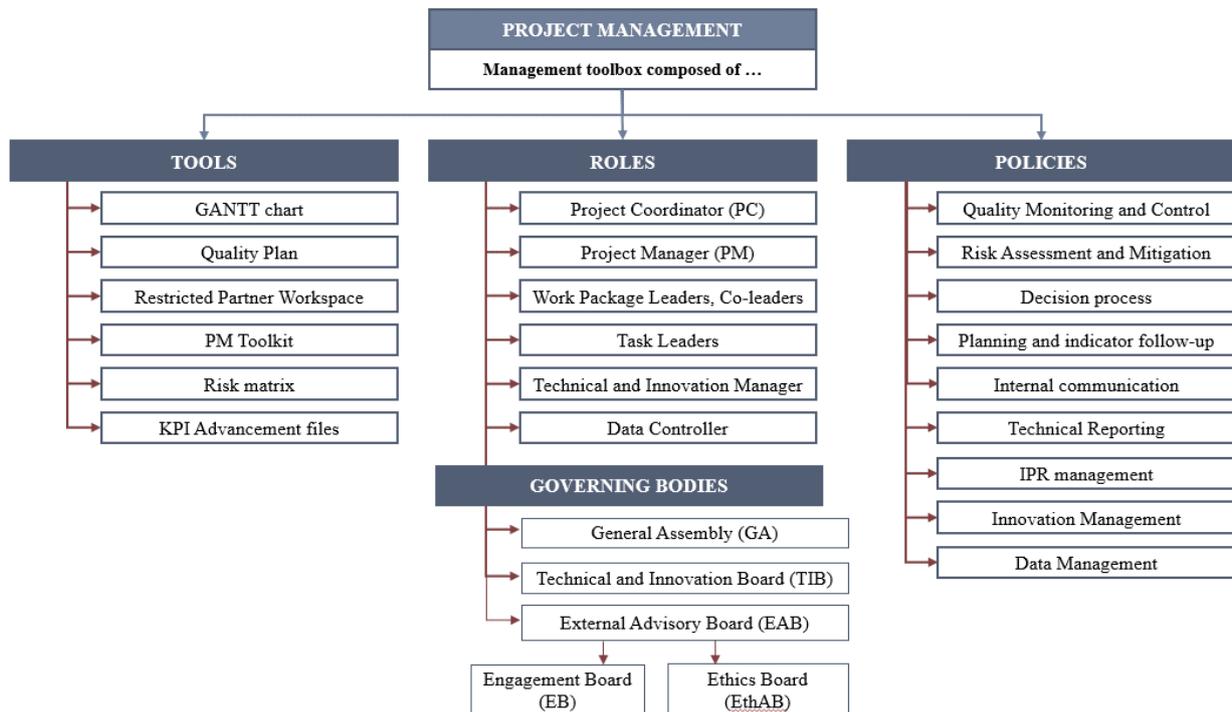
Figure 1. NAUTILOS Project Management Structure and Governing Bodies

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:
- o provide ongoing connection and compliance to EuroGOOS, CMEMS, EMODnet, and European Marine Research Infrastructures (EMSO ERIC, EURO ARGO, JERICO RI, Lifewatch ERIC);
- o provide expert advice, feedback and input into a better understanding of the barriers facing effective Transfer of Marine Technologies within NAUTILOS;
- o build relationships with stakeholders in Europe; and internationally, where relevant;
- o 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, 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, Surfrider Foundation Europe.
7. Prof. Jorge Miguel de Miranda, President of the Portuguese Institute for the Ocean and Atmosphere-IPMA.
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 Deliverable D1.4 Quality Plan, whose update D1.9 "Quality Plan – final version" is being drafted at the same time as this report.

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) is the only remaining deliverable due in the project's second year. An EAB report will be due every year until the end of the NAUTILOS Project.

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

Del. No.	Deliverable Title	WP no.	Lead beneficiary	Type	Dissemination level	Due Date (in months)
D1.2	*External Advisory Board Report 1*	*WP1*	*1 - CNR*	*Report*	*Public*	*12 Accepted*
D1.6	External Advisory Board Report 2	WP1	1 - CNR	Report	Public	**24**
D1.7	External Advisory Board Report 3	WP1	1 - CNR	Report	Public	**36**
D1.8	External Advisory Board Report 4	WP1	1 - CNR	Report	Public	**48**
D1.5	EthAB Reports	WP1	1 - CNR	Report	Public	**48**
D13.1	*H - Requirement No. 1*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*3 Accepted*
D13.2	*POPD – Requirement No. 2*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*3 Accepted*
D13.3	*A - Requirement No. 3*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*3 Accepted*
D13.4	*NEC - Requirement No. 4*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*3 Accepted*
D13.5	*EPQ - Requirement No. 5*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*3 Accepted*
D13.6	*DU - Requirement No. 9*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*6 Accepted*
D13.10	*GEN – Requirement No. 13*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*6 Accepted*
D13.7	*GEN – Requirement No. 10*	*WP13*	*1 - CNR*	*Ethics*	*Confidential*	*18 Accepted*
D13.8	GEN – Requirement No. 11	WP13	1 - CNR	Ethics	Confidential	**36**
D13.9	GEN – Requirement No. 12	WP13	1 - CNR	Ethics	Confidential	**48**

III. REPORT ON THE SECOND 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 took place on 22 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).

A mention should be paid to recall the inclusion of a specific session dedicated to the EAB within the third NAUTILOS Consortium Meeting, held virtually on 19 October 2021 at the end of the first year of activities. During this session, 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.

This second-year report covers the feedback and recommendations collected from the EAB during the project's second year. In the second year (Months 13-24), many accomplishments were completed: starting with the achievement of the first period review, then with the completion of technical activities in Work Packages 3 and 4, which are bringing to an end the development of the sensors and samplers that are the core of NAUTILOS project.

Different reports and documents were provided to the EAB to keep up to date and aware of the project's development status.

This section first describes the intense activities performed in the context of 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 second EAB meeting are reported. The meeting took place virtually on 26 September 2022.

1. ETHICS ADVISORY BOARD ACTIVITIES

In the project's second year, with the EAB's complete formation, an essential aspect of the work was related to the EthAB. As reported in Table 1 above, several deliverables were due since the beginning of the project. Considering several of them were scheduled before the complete formation of the EAB, an important revision was considered after the first EthAB meetings.

With the mandatory deliverable D13.7 "General Requirement No. 10", due at M18, the EthAB with the support of several internal members, worked on drafting this report, which could be considered a general update to many of the initial ethics deliverables. Besides a solid update of the informed consent forms for participation in both demonstration and Citizen Science activities, and their translations in several languages, the report included important additions such as comprehensive demonstration and Citizen Science Ethics Risk tables and the drafting of a specific common section to be added to technical deliverables to perform an "Ethics check".

As reported in the mentioned deliverable, to organise and draft such a complete report, the contribution of many different partners covering various aspects of NAUTILOS activities was fundamental to be able to release a comprehensive report which could deal with very diverse topics.

The coordination role of the external EthAB member, Dr **Nina Zugic**, was crucial to lead the group of contributors towards a valuable outcome.

During the project review meeting, these activities from the EthAB were very positively evaluated by the Project Officer and External Experts evaluators.

2. ENGAGEMENT BOARD ACTIVITIES

Within the frame of NAUTILOS governing bodies, the Engagement Board represent an example of a stakeholder concerning the NAUTILOS field of activities. The stakeholder representative in NAUTILOS EAB is Surfrider Foundation[1] , 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**.

An important activity during this second year of the project was the arrangement by the NAUTILOS consortium of a dedicated Workshop held during the annual European Maritime Day[2], during which Europe's maritime community meet to network, discuss and outline joint action on maritime affairs and sustainable blue economy. This year the meeting was held in Ravenna (Italy) on 19-20 May 2022. The workshop entitled "Citizens Empowerment through Ocean knowledge co-production" was moderated by **Antonio Novellino** (NAUTILOS Data Controller) and focused on knowledge co-production by sharing experiences, significant outcomes, and good practices of different Citizen Science projects. Among the speakers, a representative from the NAUTILOS consortium (Dr **Silvia Merlino** from CNR-ISMAR) and Dr Jimenez from the Surfrider Foundation also represent NAUTILOS EB.

The workshop's goal was to bring an uptake, explore and champion best practices of Citizen Science (CS) projects with a forward-looking perspective. Both feedback from participants and the EC organisers were very positive.

3. AGENDA AND COORDINATOR REPORT

The second yearly EAB meeting participants were all the 9 EAB members, plus NAUTILOS Coordinator. The agenda for the meeting was the following:
- The Coordinator presented the outcomes of the first review meeting, held in Pisa, together with the recommendations and observations from the Project Officer (PO) and the External Evaluators (EE).
- A recall of the amendments requested by the Consortium during these first two years was presented;
- The Coordinator presented the general status of the NAUTILOS project while reaching the end of the second year; moreover, a detailed presentation of the activities per WP was given, as well as the foreseen activities for the subsequent period;
- A question and comment session 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.

In the first part, the Coordinator presented the outcomes from the recent first review meeting held in Pisa on 22-23 June 2022. The main points, comments and requests from the panel consisting of the

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[1] https://www.surfrider.org/

[2] https://maritime-day.ec.europa.eu/index_en

PO and EE have been described, and the status of replies and actions taken by the NAUTILOS Consortium have been discussed. The evaluation report (from the panel) and reply letter (from the Consortium to the PO) were previously shared with the EAB.

Details on this presentation are not the main objective of this report, but it is stored and available on the project's ownCloud[3].

After this presentation, the status of the project's amendment has been presented. The first amendment, back in February 2022, was quickly delivered and accepted by the EC. Currently, a new amendment request has been issued, and it is now going under finalisation to fix a few small issues plus a needed shift of budget and working activities between two of the partners of NAUTILOS.

A presentation of NAUTILOS' achievements while reaching the first half of the project has been presented. In brief:
- Three WPs correctly concluded on time and achieved their foreseen goals (WP2, WP3 and WP8);
- All foreseen (39) deliverables submitted, with 2 revisions requested by the PO+EE;
- All foreseen sensors/prototypes (7) from WP3 are developed and ready for the next stage;
- Dissemination and communication activities widely proceeding and successfully promoting NAUTILOS;
- Broad participation in many public events, both in terms of general NAUTILOS project presentations as well as specific technical presentations;
- The organisation of a workshop at the European Maritime Days in Ravenna ("Citizens Empowerment through Ocean knowledge co-production");
- Various Citizen Science campaigns were held despite COVID-19 restrictions;
- A wide variety of synergies activities were established;
- Multiple achievements from WP8 data infrastructure and tools;

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

4. EAB COMMENTS AND FEEDBACK

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 (President of the Portuguese Institute for the Ocean and Atmosphere): congratulated the NAUTILOS Consortium for the successful outcome of the first review period and asked about the main problems and issues encountered in the project so far. The Coordinator replied by mentioning the newly added risks to the project list of risks and contingency actions updated at the end of the first period (M18); namely, the COVID-19 pandemic, which delayed some of the activities in the first two years (e.g. several in-person Citizen Science campaigns needed a re-scheduling), as well as delays in the supply chain of technological material for the development of various partners' activities. This, together with the Russian-Ukraine war, are also an unforeseen and unpredictable situation that could jeopardise some of the project activities, such as the demonstration activities that must be performed in areas like the Baltic Sea. Concerning the stability of the supplies, President de Miranda suggested characterising each developed sensor/solution by its criticalities in the supply risks,

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[3] https://cloud.nautilos-h2020.eu/

because it is clear that we cannot afford to rely on the ability to buy and promptly have all the components.

Christos Arvanitidis, (CEO and Director General of LifeWatch ERIC) raised the point about the interdependencies risks of the various activities from different Work Packages, which now need to be integrated and coordinated. Suggesting to have a structure running transversal to the interested WPs, who can act as an early warning. For instance, if one technology is not yet available for integration, then when having early advice of this situation, it could be substituted with a different one, while the latter could be finishing its delayed development.

The actual structure of NAUTILOS WPs, with its successive layers of integration WPs (WP5, 6 and 7) after the development WPs (WP2 followed by WP3 and 4), is currently working towards this view for taking care of eventual delays and possible contingency plans. Moreover, both the work of the Technical Innovation Board (TIB) and the drafting of a systematic and dynamic Technologies Table oriented towards the arrangement of the NAUTILOS demonstrations will support a smooth and more complete second phase of the projects while dealing with substitutions and possible delays. Nevertheless, constant and continuous monitoring during this second integration phase will be needed.

Moreover, DG Arvanitidis mentioned a newly started EU Project called "ANERIS" as an interesting one with similitudes and for fostering possible synergies.

Juanjo Dañobeitia, (EMSO-ERIC Director General) mentioned a possible technical issue and concern: mainly focusing on the technologies WPs (WP3 and 4), they are very useful and the basis of the rest of the work for the project, but they could be beneficial as well to other initiatives or projects dealing with observation systems; some of the technologies, as also raised by the EE in their evaluation report, are declared already as achieving a TRL 9, that is not understandable at the moment. DG Dañobeitia agrees with the experts about better specifying the current and expected TRL of the various technologies. Moreover, a question is raised about the lack of deep-sea tests up to Month 18, particularly for WP4 technologies, which is a fundamental stress test for comprehensive technologies claiming to achieve a high TRL while working at deep-sea, yet this is understandable also due to COVID-19 issues and delays. To overcome this, there is the possibility to receive support for NAUTILOS technologies through EMSO-ERIC exploiting the Trans-National Access (TNA) to perform tests in the deep-sea environment. This is also part of a synergy that would be important to exploit and central to EU policies.

The coordinator mentioned that TNA actions are known by the Consortium, which is already applying for some actions to improve and extend the demonstration activities.

Finally, DG Dañobeitia mentioned the closure of WP8, asking about the testing for the various technologies for the rest of the project.

The coordinator mentioned that all development of the various sensors will be finished by M24, but this does not mean that the feedback and results of testing will not be reported, and improvement of the multiple sensors will not be part of the initial development, but being developed within WP5 (Integration) and WP6 (Calibration & Validation). The final results of the various testing will be then reported in the specific WP6 deliverables. The coordinator also mentioned the decision to have a common deliverable structure for Work Packages 3 and 4 to provide more comprehensive, aligned and standardised reports. This idea will be replied to in the subsequent deliverables of WP6.

DG Dañobeitia remarked that the availability of such results, also in an effort towards having standardised technologies, will be fundamental for researchers. A final remark was made in working to improve the monitoring of Risk assessment and mitigation measures.

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, from macro- to micro-litter tracking and warning to algal bloom monitoring. The idea is that yet another application

could only bring to divide the information available on the topic. The question is about how NAUTILOS addresses this amount of data so as not to disperse them. A suggestion is made to cooperate with other existing projects and initiatives. An example is made with the Blue-Cloud Project, which is working on the topic of Open data access and sharing. Moreover, a suggestion is to increase the dissemination and communication actions to extend the knowledge about the availability of the collected and shared data, especially after the project.

Finally, it might be helpful to check out the EU project CoastObs.eu. The project has ended, but it continues as a water monitoring service provider based on Earth Observation and some modelling. This could be another potential sister project to connect with, and Dr Mata Lara can be the contact point for this.

The coordinator mentioned the joint effort in developing the NAUTILOS CS App, made in close collaboration with the CS partners and the data infrastructure developers. In brief, the developed App already shares the collected data with EU data aggregators (such as EMODnet). Moreover, in our opinion, it is a collector tool from many different topics (from the plastic collection to new devices/tools data to underwater images), towards existing data aggregator, not pretending to be yet another app.

Furthermore, about the synergies, the coordinator mentioned the already existing synergies and initiatives with many different Sister Projects, with effort mainly towards the dissemination and communication, as well as to data sharing and extension, but with the goal in mind to cooperate in some demonstration activities.

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 development of a complex Ocean Observing system is a complex task with long-term development, NAUTILOS being a 4-year project can be a part of an impact on a longer-term initiative. Furthermore, Prof Sandven recalled that it is essential to highlight the incremental improvement provided in NAUTILOS to show what is coming out of the NAUTILOS Project, building on previous experiences. In other words, what could be the improvement, the innovation at the eye of the EU and the Blue-Growth community. Thus, the dissemination actions should be advertising the project and the issue addressed by itself and remarking on the progress and innovations that our NAUTILOS work can bring to the community. The website is fine, but this latter topic could be improved and shown on it, as it represents the project as a whole.

On another note, Prof Sandven mentioned the project describing the Ocean Best Practices as a mechanism to share the experience, not only through publications but also through sharing experiences and improving the community.

Finally, a suggestion to possibly improve the effort of NAUTILOS' contribution towards standardisation, which could be an important and effective step forward and a real and valuable exploitation result for an EU project.

The coordinator briefly mentioned the participation of NAUTILOS in the Horizon Results Booster projects cluster called "Nourishing Blue Economy and Sharing Ocean Knowledge", which brought to the development and publication of a joint Policy Brief.

Nina Zugic, (an independent research ethics expert) recalled that the effort for the Ethics Work Package was performed by the EthAB in collaboration with several NAUTILOS partners. Nevertheless, an action could still be needed, considering how ample the scope of the NAUTILOS project is, to define better or extend the ethical points that may occur that are not yet covered. Furthermore, throughout the EthAB reasoning, considering the innovative and ground-breaking research, particularly with the sensors, consequently leaning towards an extended activity on ethical research, possibly working towards the writing of a joint paper on NAUTILOS ethical effort, perhaps proceeding towards a white paper. Extending the request of any kind of suggestion or help to the members of the EAB for including any possible ethics effort that was not taken into account in any shape and form.

On a different note, Dr Zugic raised the point, agreeing with other members, about the need for NAUTILOS to be more proactive on dissemination and add more collaborative efforts with the sister projects to gain more audience and share the experience and possibly exploitations.

Finally, regarding the Citizen Science activities and results so far, a suggestion is made towards a deeper look into education, lessons learnt, and connecting NAUTILOS outcomes, research with the hands-on activities such as CS, possibly with some of the Blue Schools (e.g. in Portugal – see below comments from Dr **Carapuço**).

Alessandra Giorgetti, (**OGS-National Institute of Oceanography and Applied Geophysics-Dept. Oceanography and Coordinator EMODnet Chemistry)** confirmed the importance of guaranteeing the sustainability of the data management and data flow towards the European integrators/systems and appreciated the NAUTILOS plan on this and the sustainability after the end of the project. Following this, a suggestion was made to connect with the existing Citizen Science platform; for instance, the CS Italy and CS Europe platforms could be important to extend the new tools and activities on this topic.

On a different note, concerning the activities of WP6 on calibration, a suggestion about connecting with the EUROqCHARM project, a Macro- & microplastics monitoring quality harmonisation initiative, for assessing plastic pollution. Thus, especially about the plastic sensor (and possibly the sampler as well), a focus (or even an endorsement) on the evaluation could be an added value; NIVA coordinates the project.

Furthermore, OGS also organises a Blue Summer school on Blue Growth, where training from NAUTILOS outcomes could be shared and give beneficial information, link: https://blueskills.inogs.it/.

Haizea Jimenez, (**Head of the expertise department at Surfrider Foundation Europe**) raised a question about the mobilisation of volunteers, if there are already volunteer networks and what the plan is for Citizen Science activities.

The coordinator reported the current plan with CS partners, involving local schools, diving associations, and other associations for beach cleaning. Nevertheless, a collaboration with a significant association such as Surfrider could be envisioned, taking advantage of their expertise and extension all over Europe (and not only Europe), and steps will be performed for this engagement.

Dr **Mata Lara** also commented that she is part of the management of Surfrider – Portugal (in Porto) and can act as a link for this.

Mafalda Carapuço, (**Coordinator of Research Vessels at the Portuguese Institute for Sea and Atmosphere)**, connecting to previous comments, the link for the Blue School initiative in Portugal is the following: https://escolaazul.pt/en. A question was raised about how NAUTILOS plans to address the question of low cost in Ocean Observation because even from the beginning of the project (and even worse, taking into account the proposal stage), things have changed and will keep changing until the end of the project. With "things", the main issue is cost, as they are changing very quickly.

The coordinator replied, recalling the comments from the PO and EE regarding the distinction between development, adaptation, low cost, etc. To avoid misunderstanding, the Consortium chose to use a slightly different term, focusing on cost-effectiveness, which can be in terms of costs for using and acquiring data with respect to existing technologies. The Consortium believes that this is not changing the project's focus but simply needs to be better communicated.

Dr Carapuço agreed that this slight change of focus, from low-cost to cost-efficient, could improve even moving from the equipment towards the data useful for the observations.

During the wrap-up, the coordinator also reported that all the public deliverables will soon be available through the project website. The accepted ones are also already available on the EU Cordis platform. Still, we are following a different path, applying a specific identification **doi** to each one before publishing them on the website. This will also help improve the tracking of references and usage of NAUTILOS public documents.

IV. CONCLUSIONS

Reaching the halfway through the project lifetime is an important milestone for NAUTILOS, achieving the finalisation in the development of the sensors and samplers, which represent NAUTILOS fundamental technologies to enhance the observations in the ocean.

Among the many pieces of advice, a general one from the EAB can be highlighted: **the next steps focusing on the integration, validation, and, mainly, the demonstration will need to be carefully monitored to identify risks and avoid delays or provide mitigation measures promptly**.

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

One of the following steps will be to share through the project website all the approved (non-confidential) documents/deliverables and the submitted ones starting from the second half of the project. In this way, the EAB can have a more autonomous and continuous outlook and perception of the work going on in NAUTILOS.

APPENDIX 1: REFERENCES AND RELATED DOCUMENTS

Deliverable 1.6 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.	10.5281/zenodo.7162213
4	NAUTILOS Deliverable D1.2.	10.5281/zenodo.7163583
5	NAUTILOS Deliverable D1.4.	10.5281/zenodo.7163673
6	NAUTILOS Deliverable D13.7.	NAUTILOS ownCloud
7	External Advisory Board 1st meeting – minutes	NAUTILOS ownCloud
8	External Advisory Board 1st meeting – presentations	NAUTILOS ownCloud