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D6.2.2. Regulatory and professional acceptance road-map

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Dissemination level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1 INTRODUCTION

Building on the professional and regulatory input by DAN Europe, the Advisory Board charted a regulatory and professional acceptance road-map document. This road-map provided a clear, well-intentioned, intermeshed set of sequential measures to be taken in order to facilitate the penetration of the CADDY concept of robot-assisted human diver operations into the scientific, occupational, and leisure- and sports-oriented diver community. During the project, through segmentation of the diving activities, the roadmap was refined to cover the following segments:

1. Offshore Diving
2. Inshore Diving
3. Inland Diving
4. Fish Farms
5. Fishing and collecting activities (abalony, sea cucumber, etc.)
6. Scientific Diving
7. Media Diving
8. Recreational Diving
9. Public safety (police, fire brigade etc)
10. Armed forces

2 METHODS

As mentioned in the previous deliverable D6.2.1, each type of diving activities has its own particular needs, rules, standards and regulations. Segment number 10 is beyond the scope of CADDY project. Within these different segments, two major groups were identified according to the regulations and standards: Occupational Diving (Segments 1-7 and 9) and Recreational Diving (8); while a gray area that include recreational diving instructors, guides and dive leaders is identified. In fact, this gray segment includes both individuals who are carrying out these tasks for a living as well as for leisure. This gray area is an important component because most of the time they act as opinion leaders of the industry. On the other side, there is a third party who is taking a major role in diving: This is the medical Community. Both recreational and occupational diving regulations have a medical component because diving is an activity performed in extreme environment and impose constraints related to the health status of the divers.

A three step road map was drafted for each group: Induction, dissemination and consensus. Only induction and dissemination activities were carried out during the lifetime of the CADDY project. The dissemination part is also a component of the WP7 but involves only the communications devoted to concrete results to be shared with the key organizations representing the end users; these activities provided a clear background for the “consensus” phase that needs to be concluded after continuous use of the CADDY devices under controlled conditions. The representatives of major segments listed above are invited to take part in a survey on CADDY and they were invited to make dives with CADDY. A marine biologist, a search and Recovery diver (SAR), a recreational diving instructor, an underwater archeologist, a fire fighter and commercial diver participated to diving with CADDY. It is expected that these key persons may act as the ambassador of the product in diving industry.

The induction stage is described in the previous deliverable. For the last part of the dissemination phase, DANEU prepared the questionnaire about the products and knowledge developed by members and compiled the documents necessary such as presentations, leaflets, bill of materials. This information is circulated within the AB members as well. An executive summary of the products is communicated to the target groups for updating them on the final CADDY products. DANEU and

the Advisory Board organized bilateral, multilateral, in-person or e-facilitated discussions with targeted professional divers, regulators, representatives of diver education, training and administration bodies (associations, schools etc.) panels. These activities on different segments are presented in the Results section.

3 RESULTS

3.1 REGULATORY AND PROFESSIONAL ACCEPTANCE ROAD-MAP FOR OCCUPATIONAL DIVING

3.1.1 Induction

Three organizations active in setting the industry standards in occupational diving were targeted. Namely, Association of Diving Contractors International (ADCI) dominating the continental America; International Marine Contractors Association (IMCA) and European Diving Technology Committee. Chinese Diving and Salvage Association (CDSA) is an emerging organization. All four organizations were addressed during the first half of the project timeline: DAN Europe presented the CADDY project in the EDTC and CDSA meeting in 2015 by oral presentations. DANEU also placed a poster in the exhibition hall of CDSA. IMCA was also present at these meetings, so there was no need to repeat the induction in a IMCA meeting. The CADDY project was presented during the ADC meeting in New Orleans on the 11th of February 2015. Induction completed for all 4 major organizations.

3.1.2 Dissemination

The state of the art in the CADDY project is presented at the CITEPH (Concertation pour l'Innovation Technologique dans les domaines des énergies) project meetings while presenting of the spin-off project of CADDY: DiMERS (Diver monitoring and emergency response system). The project reached the attention of the major players in the offshore diving industry such as Technip, Subsea7, Saipem and Total. As a follow up, the project was also presented and discussed in the internal meeting of Technip at their R&I center in Paris. The results of the CADDY initial experiments were shared in EDTC annual meeting on the 7th of October in 2016 where IMCA diving division was represented as well as the IDFR delegate. The executive summary on the results together with presentations on the CADDY products was sent to the EDTC delegates who are interested in the project. Private discussion with the director of ADAS (Australian Diving Accreditation Scheme) yielded to have the CADDY article on the ADAS newsletter in 2017. Another article is being prepared for the IDSA (International Diving Schools Association). A final presentation is planned for the 21-23rd of February 2017 to take place in the Underwater Intervention, New Orleans. It was advised by DANEU to have an exhibitor boot and organize dives during the Underwater Intervention to increase the impact on dissemination, but that has to be cancelled due to the budget limitations. However, it is strongly advised by DANEU that CADDY needs to be presented more interactively during the commercial dive events such as IMCA, ADCI and CDSA meetings. Otherwise, the dissemination to industry standard setting organizations will be completed by the end of February.

3.1.3 Consensus

The target is to draft a consensus standard on the use of AUV as diver buddy at the EDTC level first. This committee is the organization where DANEU is more influence with several national directors taking part in the committee such as J. Desola, J. Wendling, J. Kot, S M. Egi, A Marroni. This will be addressed in the EDTC Workgroup #1 who is assigned to do "an inventory of existing rules and regulation within the EDTC member counties." as part of the suggestions for the future to draft a regulation on the use of AUV's with divers. This can be followed by the adoption of the standards by member countries. However, in order to be able to take place in the IMCA code of practice documents or ADCI guidelines, there is a need for CADDY type of AUV's to take place in the commercial diving market.

3.2 REGULATORY AND PROFESSIONAL ACCEPTANCE ROAD-MAP FOR MEDICAL SOCIETIES

3.2.1 Induction

The CADDY project is presented in the European Undersea and Hyperbaric Society Meeting (EUBS). The project awareness is ensured in Europe to a great extent. In fact, the German Medical Society Newsletter- CAISSON reserved its cover for the CADDY project pictures. The article in CAISSON was printed in German as well.

3.2.2 Dissemination

The results of the final results on physiological tele-monitoring of divers needs be presented in European Undersea and Baromedical Society (EUBS) and Undersea Hyperbaric Medical Society (UHMS) meetings as well as indexed journals on Environmental and Occupational Medicine. The dissemination activities are advised to continue in 2017 and 2018 in diving medicine. A stronger collaboration of DANEU and UNIV on the interpretation of the breathing, heart rate and motion data from challenging environments under controlled conditions is advised. Such a study is initiated by the user board member Innovasub, in cooperation with DANEU in the shark tank of Istanbul Aquarium but within the framework of a the GreenBubbles project that has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 643712.

3.2.3 Consensus

The medical experts always take place during the redaction of regulations and code of practices. So, proper dissemination of the CADDY results will provide the basis for the acceptance of the AUVs used as diver's buddies. This stage is expected to start in 2018.

3.3 REGULATORY AND PROFESSIONAL ACCEPTANCE ROAD-MAP FOR RECREATIONAL DIVING

3.3.1 Induction

The world largest diving organization professional Association of Diving Instructors (PADI), published an article on CADDY. The project is also presented by one of the user board member companies, INNOVASUB, in the world largest B-to-B professional trade show in diving: DEMA (Diving Equipment Manufacturers Association) and got the attention of several medium size underwater robot manufacturers who are involved in recreational diving as well such as: Deep Trekker, Seabotix and Open ROV. DANEU published several articles in the Alert Diver magazine that is sent to more than 100.000 members.

3.3.2 Dissemination

Alert Diver continued to give the updates of the project and however more sports diving magazine involvement is needed for the effective dissemination of the results. DEMA 2016 was targeted as it is the largest dive trade show with a very high participation level (Picture 1). CADDY results were shared with diving professional with a seminar entitled "CADDY: Underwater drone brings new technologies for diver safety" at room S230 on the 17th of November 2016. Prior to the seminar, invitations were sent to companies that manufactures underwater technology products especially ROVs. By the end of the seminar 5 new members were recruited for the user board and already expressed the interest in commercialization of the product. It is advised that the consortium disseminate the results during dive shows, especially the ones that include a pool for displaying the CADDY while diving with divers. The most promising one is the Boot Messe in Dusseldorf (Picture 2). The zero cost solution for this action will be of sharing/delegating the participation costs with the potential partners interested in commercialization of the product.



Pic 1. DEMA trade show entrance (3rd day)



Pic 2. Stage and the pool at Boot Messe

3.3.3 Consensus

Similar to the commercial diving market, in order to be able to take place in the regulations or the recreational diving agencies, there is a need for CADDY type of AUV's to take place in the recreational diving market. The earliest market take up can happen as early as 2017; Innovasub from the user board is requesting to commercialize CADDY following a request from a sea aquarium chain company who is managing several facilities in the world. They are planning to replace the diving guides especially while offering diving experience with sharks. The project needs a special version of CADDY – Guide version equipped with a custom configuration. This challenging task will bring the establishment of the related regulation at EU and national levels. The deliverables D6.1.1, D6.1.2 and D6.1.3 on formal hazard identification and risk assessment as well as safety won the use of CADDY provide the reference to initiate the regulatory requirements.

4. CONCLUSION

In the induction phase, the CADDY project was presented to the target community during first half of the project life time (1-18 M). In the dissemination part, concrete results were shared (19-24 M), but those efforts needs to continue in 2017. The last step is the consensus on the use of the AUVs as a buddy, to be started right after the validation trials and is to be carried out while the product reaches TRL9. The deliverables 6.1.1, 6.1.2 and 6.1.3 has the potential to be the baseline of such regulations.