



Advanced Design Tools for Ocean Energy Systems  
Innovation, Development and Deployment

Deliverable D9.5

Impact of dissemination and communication activities - 3rd  
annual report

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## EXECUTIVE SUMMARY

The dissemination and communication activities are key to maximise the impact of the project through the proactive promotion of its objectives and results, with the target to promote the design tools which will be produced and released for their future exploitation. The DTOceanPlus consortium decided that all dissemination, communication, training and education activities will be reported and evaluated at the end of each year of the project. This document is the third annual report on dissemination and communication activities and corresponds to the deliverable D9.5.

During the last year of the DTOceanPlus project, actions were exclusively dedicated to promoting a deeper understanding of the design tools, aiming to engage with target groups to facilitate adoption and usage of the DTOcean+ software and influence decision-making authorities, lobbies, policymakers regarding the uptake of the suite.

The number of visits per month to the project website is on average of 1,418, remaining far above the initial objective of 300. We can see that visitors are coming from EU countries and countries with ocean energy important projects underway. The duration of visits remains stable overall. All online PDF files were downloaded, with around 84 files downloaded each month, representing more than 4 times the initial objective. Among the most downloaded are the technical and market analysis reports. The most visited pages are mainly the ones with the link to DTOcean 1.0 and 2.0, those explaining the project and those focusing on the outputs.

Twitter and LinkedIn members who viewed project updates every month are significantly above the objective of 500. The size of this community fluctuates from month to month, certainly due to an alternation between strong moments with rich news and moments with fewer communication topics. Posts that generated most interactions are related to the release of standalone alpha versions of the tools, the education and training activities. The involvement of the project partners in the publication and sharing of posts shows their commitment and is a strong point for dissemination activities.

Activities related to mainstream media are very efficient thanks to the magazines and the newspapers channels. They give a lot of visibility to the project and the results. For example, OffshoreEnergy.biz has a monthly audience of 3,962 engaged users in the field of marine energy. There was no appearance on TV or radio, but this can be seen as partly compensated by the very large number of articles that appeared in the print media.

Several studies carried out during the project have been or will be published in recognised open access scientific journals. This allows the methods developed and results obtained to be promoted to an academic community that extends beyond the ocean energy sector. The datasets, also deposited in open access, will be very useful to technology and project developers.


























The partners mobilised strongly to promote the developments carried out in the DTOceanPlus project at international conferences. The number of presentations, posters and oral communications is beyond the objectives. The valorisation of the project results at virtual fairs proved to be not very efficient, and most of the trade fairs have been cancelled or postponed.



The objectives of the education and training activities were to explain the interest of the DTOcean+ suite for the different user profiles while providing different types of tools to make the software suite easier to use. Thanks to these actions during the last two years of the project, a community of potential users has been formed. It has been very active in participating in the various webinars, sessions and workshops that have been organised and which have allowed for numerous direct interactions with the software developers.

Despite the international health context due to the COVID 19 pandemic, the majority of the project's dissemination and communication objectives were achieved and even largely exceeded. This was made possible by the intense mobilisation of all the members of the consortium. The target audience has been reached and has shown a lot of interest in the various works carried out in the framework of the DTOceanPlus project, in particular the open-source software suite, which will be released by the end of August 2021.



Indicators	Obj.	Real.Y2	Real.Y3	% of achievement
No. visits / month	300	1,481	1,418	472 % 
Duration of visits (sec)	120	152	173	144 % 
No. downloaded files / month	20	55	84	420 % 
No. external web references	10	9	19	190 % 
No. views / month	500	4,500	4,003	800 % 
No. interactions / topic	> 50	152	300	600 % 
No. members of LinkedIn group	1,000	127	174	17 % 
Total no. video views	5,000	291	898	18 % 
No. press releases	4	5	8	200 % 
No. articles in newspapers	4	1	4	100 % 
No. appearances in TV or radio	3	0	0	0 % 
No. articles in magazines	6	27	49	816 % 
No. submitted scientific papers	6	1	8	133 % 
No. datasets deposits	3	0	3	100 % 
No. presentation/poster at conf.	6	2	9	150 % 
No. oral communications at events	12	18	24	200 % 
No. industrial events or fairs	6	1	3	50 % 
No. distributed leaflets	1,000	415	971	97 % 
No. organised webinars	3	4	4	133 % 
No. participants in each webinar	100	100	100	100 % 
No. technical workshops	2	-	2	100 % 
No. attendees per workshop	50	-	95	190 % 
No. of training sessions	4	-	5	125 % 
No. participants in each session	30	-	80	267 % 
No. technical visits	2	-	5	250 % 

**TARGET AND ACHIEVEMENT DEGREE OF ACTIVITIES REGARDING INITIAL OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



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## ABBREVIATIONS AND ACRONYMS

AAU: Aalborg University  
DCP: Dissemination and Communication Plan  
DT: Design Tools  
ESC: Energy Systems Catapult  
ETP: Education and Training Plan  
EU: European Union  
EWTEC: European Wave and Tidal Energy Conference  
FEM: France Energies Marines  
GDPR: General Data Protection Regulation  
IEA: International Energy Agency  
ICOE: International Conference on Ocean Energy  
M: Month  
MRE: Marine Renewable Energy  
OEE: Ocean Energy Europe  
OES: Ocean Energy Systems  
RAMS: Reliability, Availability, Maintainability and Survivability  
UEDIN: The University of Edinburgh  
UK: United Kingdom  
URL: Uniform Resource Locator  
WAVEC: WavEC Offshore Renewables  
WES: Wave Energy Scotland  
WP: Work Package



## 1. INTRODUCTION

The dissemination and communication activities are **key to maximise the impact of the project** through the proactive promotion of its objectives and results, with the target to promote the design tools which will be produced and released for their future exploitation.

Released during the first year of the project, the **dissemination and communication plan (DCP)** - Deliverable **D9.2** and the **education and training plan (ETP)** - Deliverable **D9.8** include all the activities to be implemented over a given project duration. As real dashboards, they provide an overview of the objectives to be achieved, the audience to be targeted, the key messages to be developed, the tools and channels to be used and the necessary contributors.

The DTOceanPlus consortium decided that all dissemination, communication, training and education activities will be **reported and evaluated at the end of each year** of the project. This periodic evaluation allows to verify that all stakeholders are reached and provided with appropriate information. It is also a good opportunity to **provide feedback** on what works well and what needs refinement or change in the strategy. This document is the **third annual report on dissemination and communication activities** for the DTOceanPlus project. It corresponds to the **deliverable D9.5**, a public deliverable produced in the context of WP9-Exploitation, Dissemination and Education, Task 9.2-Communication activities and dissemination of project results.



## 2. STRATEGY IN BRIEF

### 2.1 OVERVIEW OF THE STRATEGY

Dissemination and communication activities are carried out to ensure that the project research and practical outcomes are widely disseminated to the appropriate target audiences at appropriate times along the project lifecycle via appropriate methods with the contribution of all the consortium.

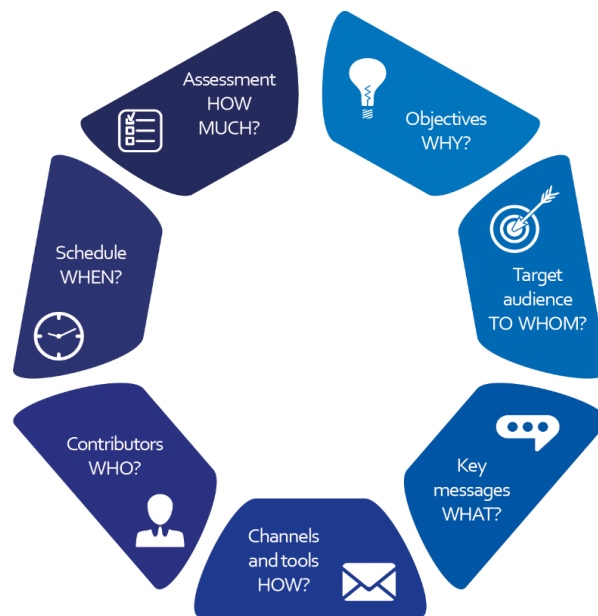


FIGURE 2-1. OVERVIEW OF THE DISSEMINATION AND COMMUNICATION STRATEGY

### 2.2 OBJECTIVES

The dissemination and communication activities mainly aim at **maximising the project impacts** on the wave and tidal energy sector and the European value chain in general. More specifically, two additional objectives were targeted during:

- ▶ the **stage 2** (M<sub>13</sub>-M<sub>32</sub>): **promoting a deeper understanding** of new tools for a number of audiences who can benefit from what DTOceanPlus project can offer and **engaging with target groups** to facilitate adoption and usage of DTOceanPlus designed tools;
- ▶ the **stage 3** (M<sub>33</sub>-M<sub>40</sub>): **influencing decision-making** within authorities, lobbies, policymakers regarding the uptake of DTOceanPlus tools.

### 2.3 TARGET AUDIENCE

As the benefits of DTOceanPlus are wide ranging and the success of the sector depends upon many actors, then the target groups for dissemination activities will necessarily come from a broad range of stakeholders. Target groups have been identified and fall mainly into one of three groups hereafter: primary users of the design tools (technology developers, project developers, design offices...), other key stakeholders (like policymakers, regulators, standards organisations...) and general public.



## 2.4 KEY MESSAGE

The DTOceanPlus **main message** is: “*DTOceanPlus project will develop and demonstrate an advanced open-source suite of tools for the selection, development, deployment and assessment of ocean energy systems.*” It contains a restrain and specific set of key words to maximise communication impact. Complementary messages are also used. They are described in detail in the DCP.

## 2.5 CHANNELS AND TOOLS

Most of the channels and tools used are specific to the type of activities (See Table 2 -1).

**TABLE 2-1. ACTIVITIES TYPES, CHANNELS AND TOOLS**

ACTIVITIES TYPES	CHANNELS	TOOLS
Communication and dissemination	<ul style="list-style-type: none"> <li>○ Website</li> <li>○ Social media</li> <li>○ Mainstream media</li> <li>○ Scientific &amp; technical publishing</li> <li>○ Events (conferences, fairs, meetings...)</li> </ul>	<ul style="list-style-type: none"> <li>○ Leaflet</li> <li>○ Brochure</li> <li>○ Poster</li> <li>○ Presentation (general)</li> <li>○ Didactic video</li> </ul>
Education and training	<ul style="list-style-type: none"> <li>○ Website</li> <li>○ Events (technical workshops)</li> <li>○ Online webinars</li> <li>○ Training sessions and visits</li> </ul>	<ul style="list-style-type: none"> <li>○ Pedagogical scenarios</li> <li>○ Tutorials</li> <li>○ Presentations (specific aspects)</li> </ul>

## 2.6 OVERALL TIMELINE

DTOceanPlus is a 40-month project, running from May 2018 to August 2021. The project has six monthly milestones, culminating in the release of alpha, beta, and final versions of the software completed with a market analysis. According to that, priority dissemination spots were defined, represented by 8 grey dots in the Figure 2-2. These spots correspond to concrete realisation through press releases and conferences, presentations at conferences, fair attendances, scientific articles publications.... These spots are directly correlated to the 3 stages initially defined:

- ▶ **Stage 1 (M1-M12): Raising awareness** of the project’s objectives, results, benefits, use and applicability through diverse channels to all interested parties.
- ▶ **Stage 2 (M13-M32): Promoting a deeper understanding** of new tools for many audiences who can benefit from what DTOceanPlus project can offer and engaging with target groups to facilitate the adoption and usage of DTOceanPlus designed tools.
- ▶ **Stage 3 (M33-M40): Influencing decision-making** within authorities, lobbies, policymakers regarding the uptake of DTOceanPlus tools.



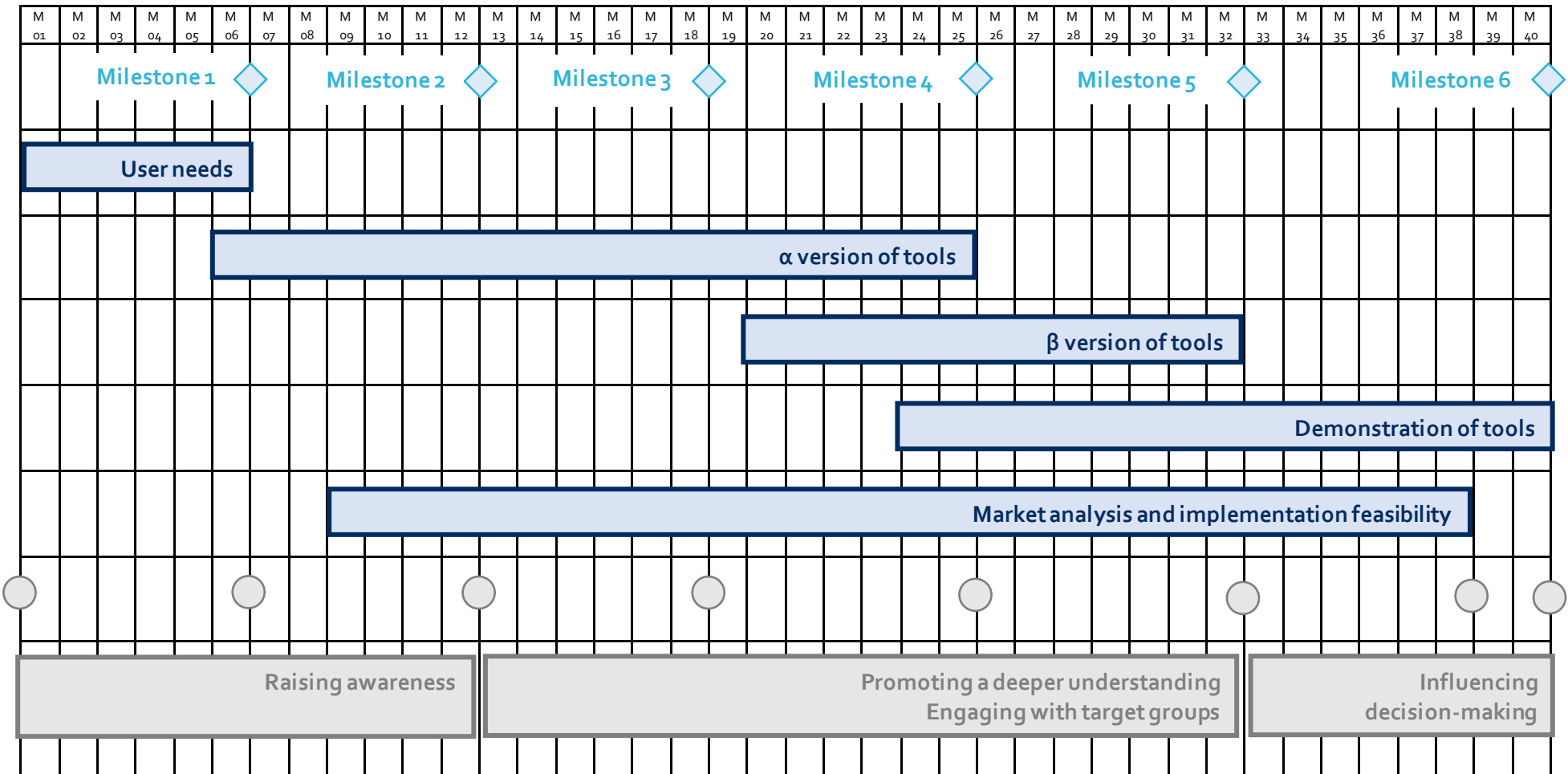


FIGURE 2-2. PRIORITY DISSEMINATION SPOTS (GREY DOTS) THROUGHOUT THE PROJECT



### 3. COMMUNICATION AND DISSEMINATION ACTIVITIES

#### 3.1 ON THE PROJECT WEBSITE

##### 3.1.1 List of activities

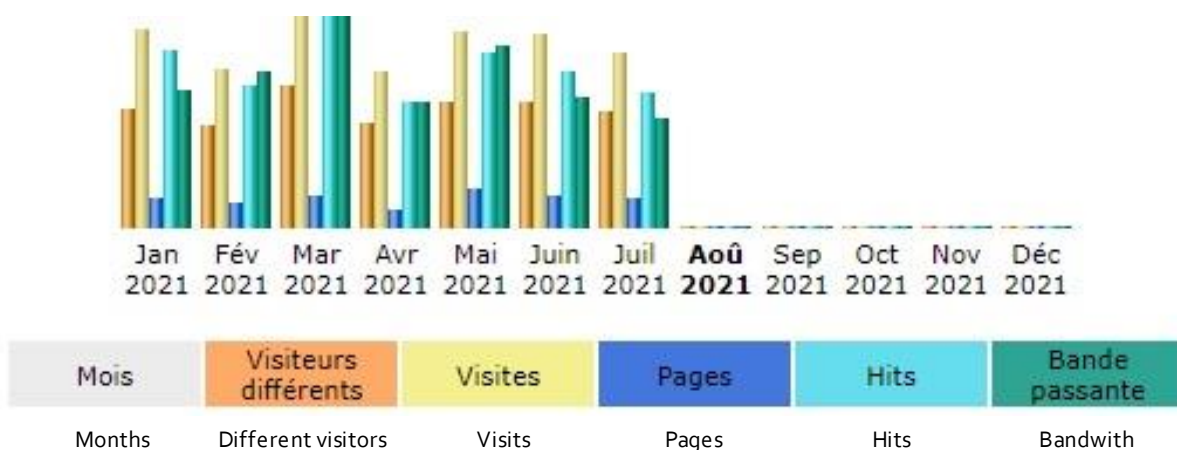
In the last 16 months of the project, **main updates** concerned:

- ▶ **9** public deliverables that were released (D3.3, D4.3, D5.8, D6.6, D7.3, D8.2, D8.3, D9.5 and D9.9),
- ▶ **5** scientific papers that were published,
- ▶ **22** news mainly related to conference attendances, deliverable releases and training activities.

There are currently 66 subscribers to the DTOceanPlus **newsletter** and among them **45 companies and institutions that are not part of the consortium** are represented. Between May 2020 and August 2021, eight issues were sent to announce the release of new deliverables and the holding of workshops and training sessions.

##### 3.1.2 Results monitoring

Statistics on the project website are obtained using AWStats tool (Figure 3-1). It is a free powerful and featureful tool that generates advanced web statistics and complying with General Data Protection Regulation (GDPR). It also allows access to real traffic, excluding that related to robots. To ensure that dissemination through [www.dtoceanplus.eu](http://www.dtoceanplus.eu) is efficient, 4 indicators have been defined and are monitored on a monthly basis (See Table 3-1). Other information given by the statistics tool are very interesting, as they provide an overview of the downloaded document and worldwide visibility of the project (See Table 4.2 and Figure 4.2).



**FIGURE 3-1. EVOLUTION OF VISITORS, VISITS, VIEWED PAGES, HITS AND BANDWIDTH CONSUMPTION BETWEEN JANUARY AND JULY 2021 GIVEN BY AWSTATS TOOL**

TABLE 3-1. DISSEMINATION IMPACT WITH WEBSITE CHANNEL

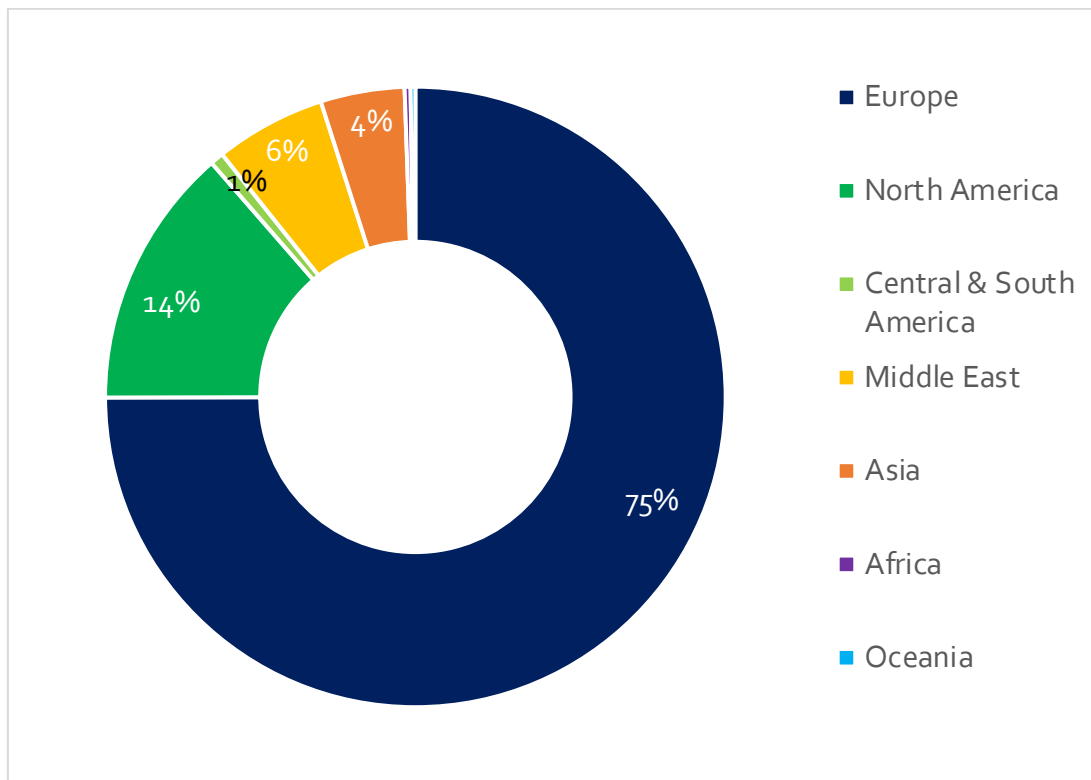
	No. of monthly visits	Duration of visits (sec)	No. of downloaded files / month	No. of references from external web pages
<b>Objective</b>	<b>300</b>	<b>120</b>	<b>20</b>	<b>10</b>
M24 - 04/20	1,341	262	70	13
M25 - 05/20	1,419	250	72	14
M26 - 06/20	1,265	221	77	14
M27 - 07/20	1,009	186	78	14
M28 - 08/20	1,279	147	78	14
M29 - 09/20	1,271	143	75	16
M30 - 10/20	1,454	185	79	18
M31 - 11/20	1,659	158	82	18
M32 - 12/20	1,663	192	91	18
M33 - 01/21	1,584	208	89	20
M34 - 02/21	1,274	174	91	20
M35 - 03/21	1,693	137	89	21
M36 - 04/21	1,254	123	86	21
M37 - 05/21	1,567	119	95	23
M38 - 06/21	1,552	128	96	26
M39 - 07/21	1,408	171	100	26
<b>Average</b>	<b>1,418</b>	<b>173</b>	<b>84</b>	<b>19</b>

TABLE 3-2. DTOCEANPLUS COMPLEMENTARY STATISTICS FROM M24 TO M39

Top 10 countries visiting website with ocean energy interest (no. viewed pages)		Top 10 downloaded files related to DTOceanPlus (no. downloads)		Top 10 URL excluding landing pages (no. viewed pages)	
France	15,932	Deliverable D8.1	679	DTOcean Tool Version 2.0	1,218
United States	9,005	Deliverable D3.2	397	DTOceanPlus Description	915
Russia	7,420	Deliverable D5.7	366	D7.1 - Standard Data Formats of OES	850
Great Britain	6,986	Deliverable D5.2	364	DTOceanPlus History	711
Turkey	4,015	Deliverable D3.1	358	News - Alpha version of the tools	441
Germany	3,742	Deliverable D8.2	355	News - Workshop at OEE2020	415
The Netherlands	2,168	Deliverable D2.2	349	WP8 Market Analysis	374
Belgium	2,102	Deliverable D5.6	332	Scientific publications	364
Spain	2,093	Deliverable D6.5	284	DTOceanPlus Objectives	356
Portugal	1,707	Deliverable D6.3	259	DTOcean Tool Version 1.0	301







**FIGURE 3-2. BREAKDOWN OF THE NUMBER OF VIEWED PAGES BY MAJOR AREAS OF THE WORD FROM M24 TO M39**

Statistics on the website show results that are higher than the initial objectives. The number of visits to the site is in average of 1,418 remaining far above the initial objective. From Top 10 countries visiting the website, we can see that visitors are coming from EU countries, but also from countries with ocean energy important projects underway (United States, Russia and Turkey). The duration of visits remains stable overall, with slight increases when new content is inserted online. All online PDF files were downloaded between March 2020 and July 2021, with around 84 files downloaded each month, representing more than 4 times the initial objective. Among the most downloaded are the deliverables, and more specifically the technical and market analysis reports. The most visited pages are mainly the one with the link to DTOcean 1.0 and 2.0, those explaining the project and those which focus on the outputs like market analysis, digital representation, alpha version of the tools and scientific publications.

Indicators	Obj.	Real. Y2	Real. Y3	% of achievement
No. visits / month	300	1,481	1,418	472 %
Duration of visits (sec)	120	152	173	144 %
No. downloaded files / month	20	55	84	420 %
No. external web references	10	9	19	190 %

**FIGURE 3-3. TARGET AND ACHIEVEMENT DEGREE REGARDING WEBSITE OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



## 3.2 IN SOCIAL MEDIA

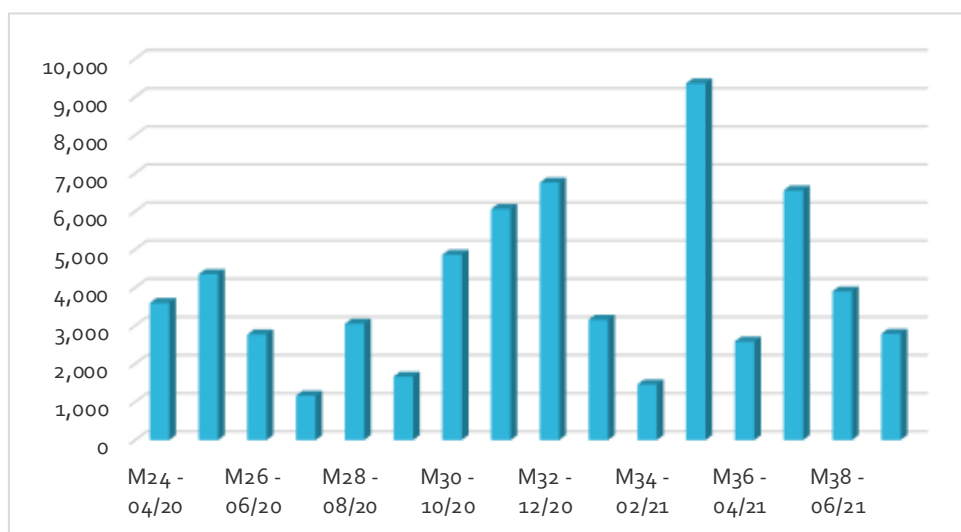
### 3.2.1 List of activities

Regarding social media, it has been decided to use current partner profiles instead of creating bespoke ones to take advantage of the existing community. Information about the project was mainly disseminated with **134 posts on LinkedIn and Twitter**. The tag widely used was **#DTOceanPlus**. These posts are listed in Annex I and a selection of posts is presented in Annex II. Posts were also regularly published on the “Design tools for Ocean Energy Systems” **LinkedIn Group**. A summary for each of the technical public deliverables released so far was also published in **ResearchGate**.

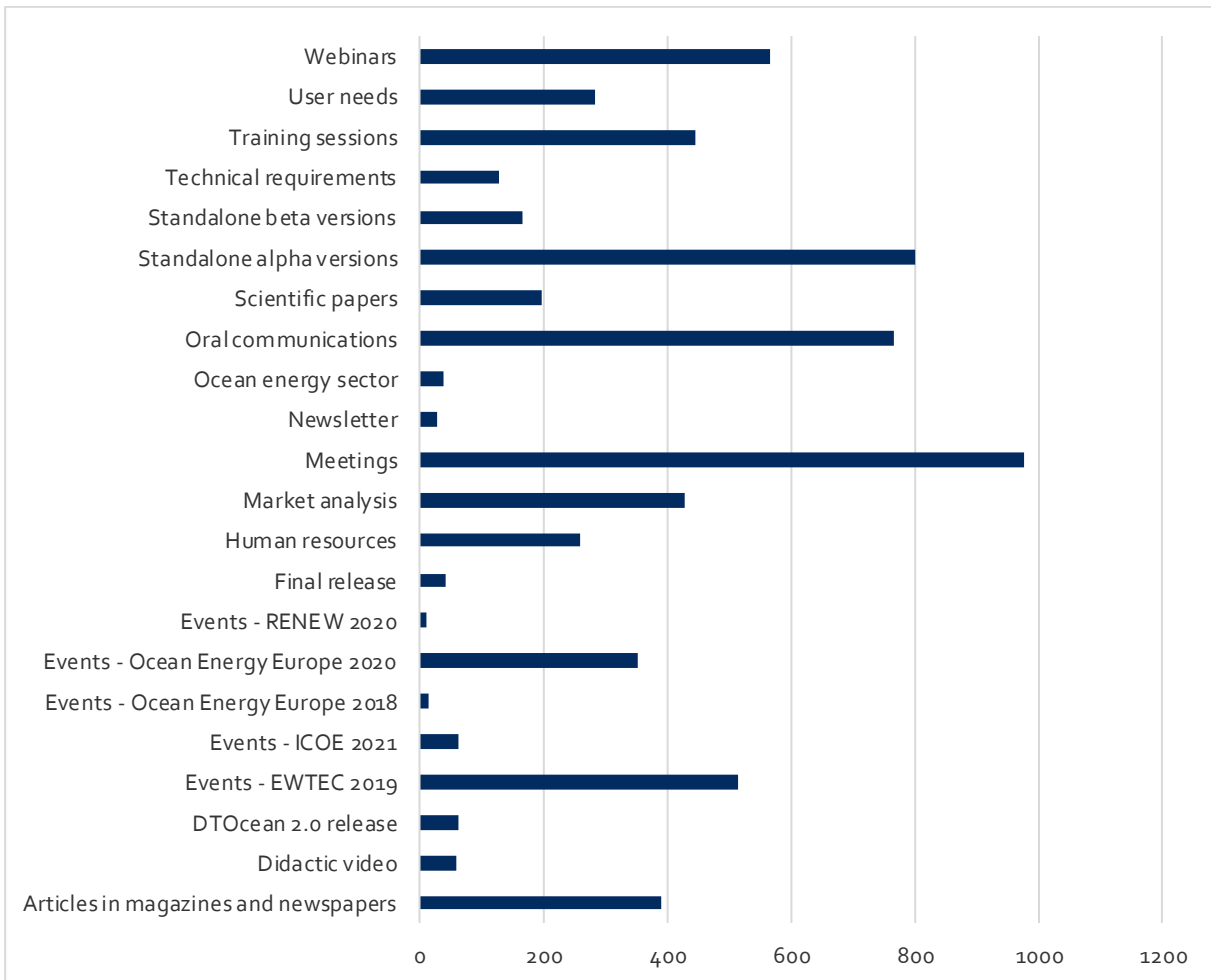
### 3.2.2 Results monitoring

To ensure that dissemination through social media is efficient, 4 indicators were previously defined and are regularly monitored:

- ▶ The number of **contact updates** can be assimilated to the number of **views** regarding the updates tagged with **#DTOceanPlus** as it corresponds to the number of members who saw the updates. The objective is 500 per month and the follow up is shown in Figure 3-4;
- ▶ The number of **visits** per post can be connected to the number of **interactions** (like, share, comment and /or click) for each topic that was treated. The objective is more than 50 per topic and the follow up is shown in Figure 3-5;
- ▶ The number of **active members** in the community of users is the number of **members of the LinkedIn Group** called “Design tools for Ocean Energy Systems”. The objective is 1,000 at the end of the project;
- ▶ The number of didactic video **views on YouTube**. The objective is 5,000 in total with website views for the whole project period.



**FIGURE 3-4. NUMBER OF CONTACTS WHO SAW DTOCEANPLUS UPDATES PER MONTH FROM M24 TO M39**



**FIGURE 3-5. NUMBER OF INTERACTIONS PER TOPIC FOR THE WHOLE PROJECT PERIOD**

Twitter and LinkedIn members who viewed project updates every month are significantly above the objective of 500. The size of this community fluctuates from month to month, certainly due to an alternation between strong moments with rich news (deliverable releases, workshop, training sessions...) and moments with less communication topics. Posts that generated most interactions are related to the release of standalone alpha versions of the tools and the education and training activities. The involvement of the project partners in the publication and sharing of posts shows their commitment and is a strong point for dissemination activities.

It seems important to use two types of social media, as it gives the possibility to target different groups: LinkedIn is more adapted to potential tools users and stakeholders with LinkedIn whereas Twitter interacts better with the general public. Completing the approach with ResearchGate seems relevant to reach the scientific community. On this media, statistics indicate 217 interactions for the project page itself and a total of 1,134 interactions for the different technical reports.



“Design tools for Ocean Energy Systems” LinkedIn Group has 174 members which is very low compared to the objective of 1,000 members by the end of the project. Although the size of the group is small, it brings together a significant number of potential users of the DTOcean+ suite and, as such, it is a privileged channel for targeted, technical and interactive discussions.

The total number of views regarding the didactic video is 917. Again, even if it is below the initial objectives, this represents a significant number of people who became aware of the project content through this medium. It should also be added that according to the exploitation plan of the project results, the global addressable market of the DTOceanplus tools is around 4,000 users. So the initial target number of views of the video might have been a little too ambitious.

Indicators	Obj.	Real. Y2	Real. Y3	% of achievement	
No. views / month	500	4,500	4,003	800 %	<input type="text"/>
No. interactions / topic	> 50	152	300	600 %	<input type="text"/>
No. members of LinkedIn group	1,000	127	174	17 %	<input type="text"/>
Total no. video views	5,000	291	917	18 %	<input type="text"/>

**FIGURE 3-6. TARGET AND ACHIEVEMENT DEGREE REGARDING SOCIAL MEDIA OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



### 3.3 IN MAINSTREAM MEDIA

#### 3.3.1 List of activities

To capture mainstream media attention and get the right messages about the project, the main tools are press releases. Three press releases have been issued to date and the full texts are in Annex III:

- ▶ **25 May 2020 - Standalone alpha versions of the design tools ready for the verification phase.** The development of the standalone alpha versions of the whole suite of the design tools for ocean energy systems is now completed. The alpha versions are now ready for the verification phase and then demonstration against real scenarios. Project partners are intensifying the training and education activities to strongly engage with potential users of the tools.;
- ▶ **1<sup>st</sup> March 2021 - Standalone beta versions of the DTOcean+ tools are ready for the demonstration phase.** The development of the standalone beta versions of the whole suite of the design tools for ocean energy systems is now completed. The beta versions are now ready for full integration and the demonstration phase against real scenarios. The final open-source version of the suite and detailed documentation will be available in August 2021;
- ▶ **30 July 2021 - DTOcean+, an open-source software suite to design and optimise tidal and wave farms, will be released soon.** DTOceanPlus is an ambitious European project to accelerate the development of the ocean energy sector. At the end of August, an open-source integrated suite of design tools will be released. A framework to standardise the data formats of ocean energy systems design was developed. A detailed analysis of the ocean energy market was carried out.

These press releases were disseminated on DTOceanPlus website in the 'Dissemination material' section and by e-mail to press contacts of each partner. A final virtual press conference was organised to present the main outputs of the project. The international version was held on 26 August 2021 and the French version on 30 August 2021.

#### 3.3.2 Results monitoring

To ensure the impact of dissemination via mainstream media, 4 indicators have been defined in advance and are monitored regularly:

- ▶ Number of **press releases** written during the project with the objective of 4;
- ▶ Number of articles published in **newspapers** talking about DTOceanPlus with the objective of 4;
- ▶ Number of appearances in **TV and radio** referring to the project with the objective of 3;
- ▶ Number of articles published in **offshore renewable magazines** talking about DTOceanPlus with the objective of 6.

Since the last reporting period, the DTOceanPlus project has been mentioned and discussed in 22 articles which are detailed in Table 3-3. An extract of the press review is in Annex IV.







**TABLE 3-3. OVERVIEW OF PUBLISHED PARTICLES IN MAINSTREAM MEDIA FROM M24 TO M39**

#	Date	Media	Type	Article title
28	26 Mar. 2020	OffshoreEnergy.biz	Magazine	ETIP Ocean webinar with DTOceanPlus rescheduled
29	05 May 2020	OffshoreEnergy.biz	Magazine	DTOceanPlus publishes five new deliverables
30	18 May 2020	OffshoreEnergy.biz	Magazine	DTOceanPlus unveils early version of ocean energy tools
31	18 May 2020	GospodarkaMorska.pl	Magazine	DTOceanPlus przedstawia wczesną wersję narzędzi do systemów energii oceanicznej
32	26 May 2020	Newsletter from Wave Energy Scotland	Magazine	The standalone tools developed in the DTOcean Plus programme are now ready for verification
33	27 May 2020	EnergyNews	Magazine	H2020 DTOceanPlus project alpha versions of the design tools ready for verification
34	30 June 2020	Offshore Renewable Energy 2020	Magazine	DTOceanPlus unveils early version of ocean energy tools
35	17 Aug. 2020	Revista de Marinha	Newspapers	DTOceanPlus: a descarbonização do sector eléctrico passa pelos oceanos
36	26 Aug. 2020	SmartgridSpain.org	Magazine	Nueva solución de diseño para reforzar los futuros proyectos en el campo de la energía undimotriz y mareomotriz
37	04 Sept. 2020	CORDIS Portal	Magazine	New software suite will strengthen future wave and tidal energy projects
38	22 Sept. 2020	JRL-ORE Newsletter	Magazine	Improving wave and tidal energy projects through advanced design tools
39	07 Jan. 2021	The Scotsman	Newspapers	How Wave Energy Scotland working with the DTOceanPlus project to create an industry benchmark
40	01 Mar. 2021	WES Newsletter	Magazine	DTOceanPlus Tools Ready for Demonstration
41	02 Mar. 2021	OffshoreEnergy.biz	Magazine	Standalone beta versions of the DTOcean+ tools are ready for the demonstration phase
42	02 Mar. 2021	MarinePress	Newspapers	DTOceanPlus design tools set for demonstration
43	26 July 2021	Green Univers	Magazine	Vite vu
44	30 July 2021	OffshoreEnergy.biz	Magazine	DTOceanPlus set to release open-source design optimisation tools for tidal and wave farms
45	30 July 2021	Opera News	Magazine	DTOceanPlus set to release open-source design optimisation tools for tidal and wave farms
46	30 July 2021	Global Energy News	Magazine	DTOceanPlus set to release open-source design optimisation tools for tidal and wave farms



47	30 July 2021	PowerLinks News	Magazine	An open-source integrated suite of design tools
48	2 Aug. 2021	Energies de la mer	Magazine	Hydrolien et houlomoteur : la suite logicielle open source DTOcean+ bientôt disponible
49	30 Aug. 2021	OffshoreEnergy.biz	Magazine	DTOceanPlus set to release open-source design optimisation tools for tidal and wave farms

Activities related to mainstream media are very efficient thanks to the magazines and the newspapers channels. They give a lot of visibility to the project and the results. For example, OffshoreEnergy.biz has a monthly audience of 3,962 engaged users in the field of marine energy. There was no appearance on TV or radio, but this can be seen as partly compensated by the very large number of articles that appeared in the print media.

Indicators	Obj.	Real. Y2	Real. Y3	% of achievement
No. press releases	4	5	8	200 % 
No. articles in newspapers	4	1	4	100 % 
No. appearances in TV or radio	3	0	0	0 % 
No. articles in magazines	6	27	49	816 % 

**FIGURE 3-7. TARGET AND ACHIEVEMENT DEGREE REGARDING MAINSTREAM MEDIA OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



## 3.4 USING SCIENTIFIC & TECHNICAL PUBLISHING CHANNELS

### 3.4.1 List of activities

Since the last reporting period, 6 scientific papers were published in open access journals:

- ▶ Ruiz-Minguela P., Nava V., Hodges J. & Blanco J. M. (October 2020) **Review of Systems Engineering (SE) Methods and Their Application to Wave Energy Technology Development.** *Journal of Marine Science and Engineering*, Vol. 8, 823 (<https://doi.org/10.3390/jmse8100823>);
- ▶ Yang Y. & Sørensen J. D. (October 2020) **Probabilistic Availability Analysis for Marine Energy Transfer Subsystem Using Bayesian Network.** *Energies*, Vol. 13, 5108 (<https://doi.org/10.3390/en13195108>);
- ▶ Villate L., Ruiz-Minguela P., Pérez-Morán G., Nava V. & Robles E. (November 2020) **Design tools for offshore renewable energy.** *DYNA Ingeniería e Industria*, Vol. 95, p. 601-605 (<https://doi.org/10.6036/9848>);
- ▶ Kerr P., Noble D.R., Hodges J. & Jeffrey H. (April 2021) **Implementing radical innovation in renewable energy experience curves.** *Energies*, Vol. 14, 2364 (<https://doi.org/10.3390/en14092364>);
- ▶ Correia da Fonseca F. X., Amaral L. & Chainho P. (June 2021) **A decision support tool for long-term planning of marine operations in ocean energy projects.** *Journal of Marine Science and Engineering*. Vol. 9, 810 (<https://doi.org/10.3390/jmse9080810>);
- ▶ Apolonia M., Fofack-Garcia R., Noble D., Hodges J. & Correia da Fonseca F. X. (August 2021) **Legal and political barriers and enablers to the deployment of marine renewable energy.** *Energies*. Vol. 14, 4896 (<https://doi.org/10.3390/en14164896>).

Four other papers are or will be soon in the process of peer-review:

- ▶ Tunga I., Garcia-Teruel A., Noble D.R. & Henderson J., **Addressing European ocean energy challenge- the DTOceanPlus Structured Innovation tool for concept creation and selection;**
- ▶ Roberts O., Tunga I., Garcia-Teruel A., Noble D.R. & Henderson J., **Bringing structure to the wave energy innovation process with the development of a techno-economic tool;**
- ▶ Garcia-Teruel A., Roberts O., Noble D.R., Henderson J. & Jeffrey H., **Design limits for wave energy converters based on the relationship of power and volume obtained through multi-objective optimisation;**
- ▶ Araison E., Michelet N., Kervella Y., Luxcey N., Duarte R. & Safi G., **A Python3-Based Module for the assessment of environmental impact and social acceptance of Ocean Energies.**

The full references of these articles will be posted on the project website upon publication.





Three **research datasets** for the sector produced to run the tools have also been published separately from the tools, deposited in ZENODO public repository:

- ▶ **Electrical Network Reference Components**, comprising cables (static/umbilical), connectors (wet/dry mate), and collection points (hubs & substations/transformers) [[DOI:10.5281/zenodo.5215642](https://doi.org/10.5281/zenodo.5215642)];
- ▶ **Station Keeping Reference Components**, Mooring Line Properties (diameter, elasticity, weight, cost, SN curve parameters, etc...), Drag Anchors (relation between dimensions of mass, height, length, width, and Ultimate Holding Capacity) [[DOI:10.5281/zenodo.5336289](https://doi.org/10.5281/zenodo.5336289)];
- ▶ **Logistics and marine operations**, O&M activities and speeds, equipment (vessels, ROVs, etc.), terminals at ports, etc. [[DOI:10.5281/zenodo.5222431](https://doi.org/10.5281/zenodo.5222431)].

A short document explaining what's in the dataset, how this was obtained, and a description of the dataset format were also prepared for each.

### 3.4.2 Results monitoring

To ensure the impact of dissemination using scientific & technical publishing channels, 2 indicators have been defined in advance and are monitored regularly:

- ▶ Number of **submitted scientific papers** (including published articles) in open access journals with the objective of 6;
- ▶ Number of **datasets** in open access repositories with the objective of 3.

Several studies carried out during the project have been or will be published in recognised open access scientific journals. This allows the methods developed and results obtained to be promoted to an academic community that extends beyond the ocean energy sector. The datasets, also deposited in open access, will be very useful to technology and project developers.

Indicators	Obj.	Real. Y2	Real. Y3	% of achievement
No. submitted scientific papers	6	1	9	150 % <input type="text"/>
No. datasets deposits	3	0	3	100 % <input type="text"/>

**FIGURE 3-8. TARGET AND ACHIEVEMENT DEGREE REGARDING S&T PUBLISHING OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



## 3.5 DURING EVENTS

### 3.5.1 List of activities

Some DTOceanPlus results were presented through presentations and posters at international events like RENEW and Sea Tech Week in October 2020 and ICOE in April 2021. A presentation is also planned for early September 2021 at EWTEC. Partners also presented the project through a virtual stand at OEE in December 2020 and various webinars and workshops. The detail of activities carried out are in Table 3-4.

**TABLE 3-4. OVERVIEW OF EVENTS AT WHICH THE PROJECT WAS PRESENTED**

#	Date	Event	Type	Title and contributors
1	16 Sept. 2020	France Energies Marines S&T Tribune Online	Oral com <sup>o</sup>	Farm-level design tools at France Energies Marines FEM, Nicolas Germain
2	16 Sept. 2020	France Energies Marines S&T Tribune Online	Oral com <sup>o</sup>	DTOceanPlus Environmental and Social Acceptance module FEM, Georges Safi
3	13 Oct. 2020	RENEW 2020 Online	Conference	Joint optimisation of geometry and mass distribution of wave energy converters UEDIN, Anna Garcia-Teruel & David Forehand
4	13 Oct. 2020	RENEW 2020 Online	Conference	Power fluctuation analysis for WEC farms AAU, Francesco Ferri
5	12-16 Oct. 2020	Sea Tech Week Online	Conference	Site characterisation module of the open source DTOcean+ suite for the design of ocean energy systems FEM, Youen Kervella
27	01-04 Dec. 2020	OEE 2020 Online	Fair Stand	All partners
28	16 Dec. 2020	EDPR&D New Session Online	Oral com <sup>o</sup>	Project DTOceanPlus EDP, Maria Inês Marques TECNALIA, Pablo Ruiz-Minguela
29	12 Jan. 2021	Ocean Energy ENEA Workshop Online	Oral com <sup>o</sup>	New software suite will strengthen future wave and tidal energy projects TECNALIA, Pablo Ruiz-Minguela
30	05 Feb. 2021	Atelier Energies Online	Oral com <sup>o</sup>	H2020 - Projet DTOceanPlus pour développer des outils de conception numérique pour les systèmes de marées et de vague SABELLA, Erwann Nicolas
31	28 Apr. 2021	ICOE 2021 Online	Conference	Tools for selecting the most promising technology concepts for ocean energies: the experience in H2020 DTOceanPlus project ESC, Inès Tunga



#	Date	Event	Type	Title and contributors
32	30 Apr. 2021	ICOE 2021 Online	Conference	The novel paradigm of Digital Representation of Ocean Energy Systems for enhancing the interoperability of data in DTOceanPlus TECNALIA, Vincenzo Nava
33	30 Apr. 2021	ICOE 2021 Online	Conference	Assessing the Environmental and Social Acceptance of Ocean Energy Array Using DTOCEANPLUS Design Tools FEM, Emma Araigous
34	28-30 Apr. 2021	ICOE 2021 Online	Fair	-
35	9 Jul. 2021	Institute for Energy Systems seminar Edinburgh, UK	Oral com <sup>o</sup>	Integrating radical innovation into ocean energy cost modelling UEDIN, Donald Noble, Paul Kerr
36	7-8-9 Sept. 2021	EWTEC2021 Plymouth, UK	Conference	On the relevant, realistic and effective criteria for wave energy technology assessment - a dialogue with EWTEC2019 paper ID 1426 TECNALIA, Pablo Ruiz-Minguela





### 3.5.2 Results monitoring

Four indicators were initially defined to assess the impact of dissemination activities related to events:

- ▶ Number of attended **conferences** with presentation or poster with the objective of 6;
- ▶ Number of **oral communications** at congresses, seminars or meetings with the objective of 12;
- ▶ Number of attended **industrial events or fairs** with the objective of 6;
- ▶ Number of **leaflets distributed** at events with the objective of 1,000.

Despite the unfavourable context for holding events due to the COVID-19 health crisis, the partners mobilised strongly to promote the developments carried out in the DTOceanPlus project at international conferences. However, the number of presentations, posters and oral communications is beyond the objectives. The valorisation of the project results at fairs proved to be complicated as the virtual stand trial conducted at OEE 2020 was not convincing in terms of the interactions generated. In addition, most of the trade fairs have been cancelled or postponed to the second half of 2021. Although the leaflets and brochures could not be distributed widely, they were downloaded a significant number of times, thus contributing to the dissemination of the existence and objectives of the project.



Indicators	Obj.	Real. Y2	Real. Y3	% of achievement	
No. presentation/poster at conf.	6	2	9	150 %	
No. oral communications at events	12	18	24	200 %	
No. industrial events or fairs	6	1	3	50 %	
No. distributed leaflets at events	1,000	415	971	97 %	

**FIGURE 3-9. TARGET AND ACHIEVEMENT DEGREE REGARDING S&T EVENTS OBJECTIVES FOR THE WHOLE PROJECT PERIOD**



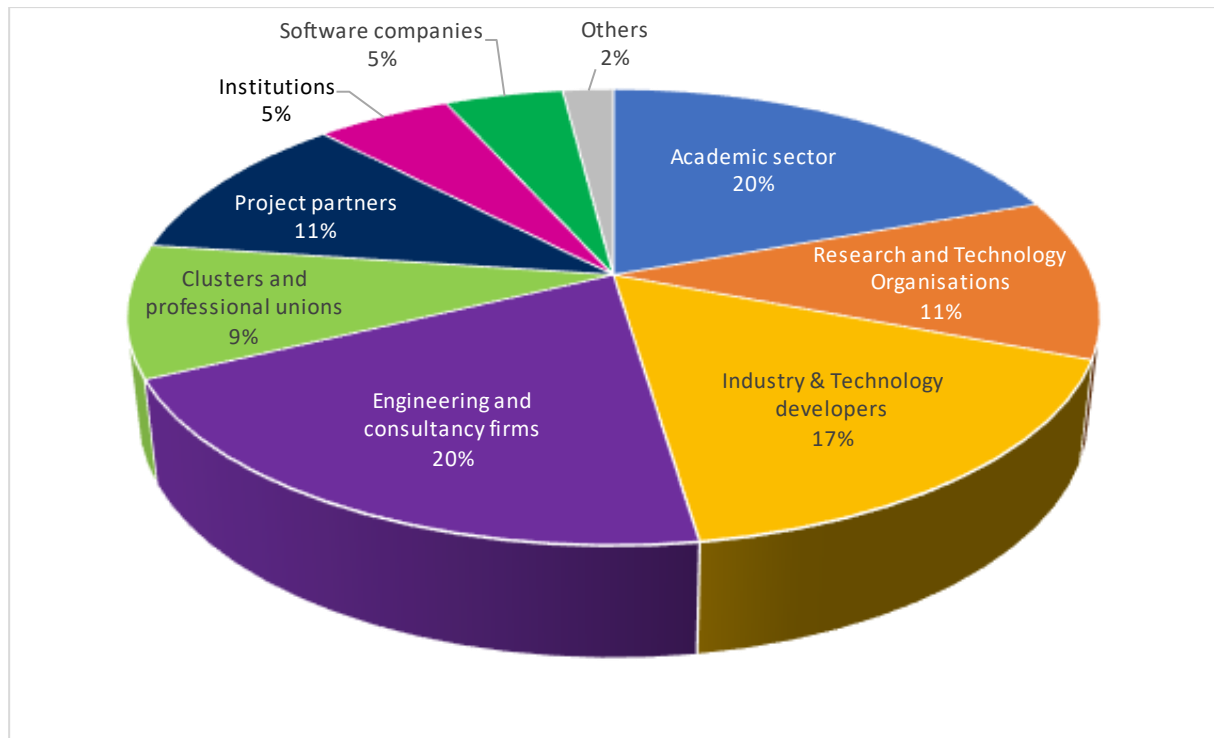
## 4. EDUCATION AND TRAINING ACTIVITIES

### 4.1 TECHNICAL WORKSHOPS

Two technical workshops were organised to showcase the project results and explain the importance of using them for designing ocean energy systems and arrays, particularly the open-source software suite. Target audiences were the primary users of the design tools (technology developers, project developers, design offices...), but also other key stakeholders (like policy makers, regulators, standards organisations...) of the ocean energy sector.

The format of these workshops was adapted to the health context of the COVID 19 pandemic:

- ▶ The first one was organised **alongside OEE2020** on 2<sup>nd</sup> December 2020 in a webinar format. It was attended by almost 150 participants, willing to get a better overview of the project and learn more about the functionalities of the future software suite. 43% of the participants were potential primary users of the tools. The distribution of participants according to their organisation of origin is in Figure 4-1.
- ▶ The second one took the form of a **series of videos** accessible in replay throughout the summer of 2021, with the possibility for the audience to submit questions on the project website. The videos received a total of 75 views. One **live Q&A session** was organised on 31 August 2021 to promote direct interactions with the attendees. 41 people registered to participate in the event.



**FIGURE 4-1. DISTRIBUTION OF PARTICIPANTS IN THE FIRST WORKSHOP ACCORDING TO THEIR ORGANISATION OF ORIGIN**

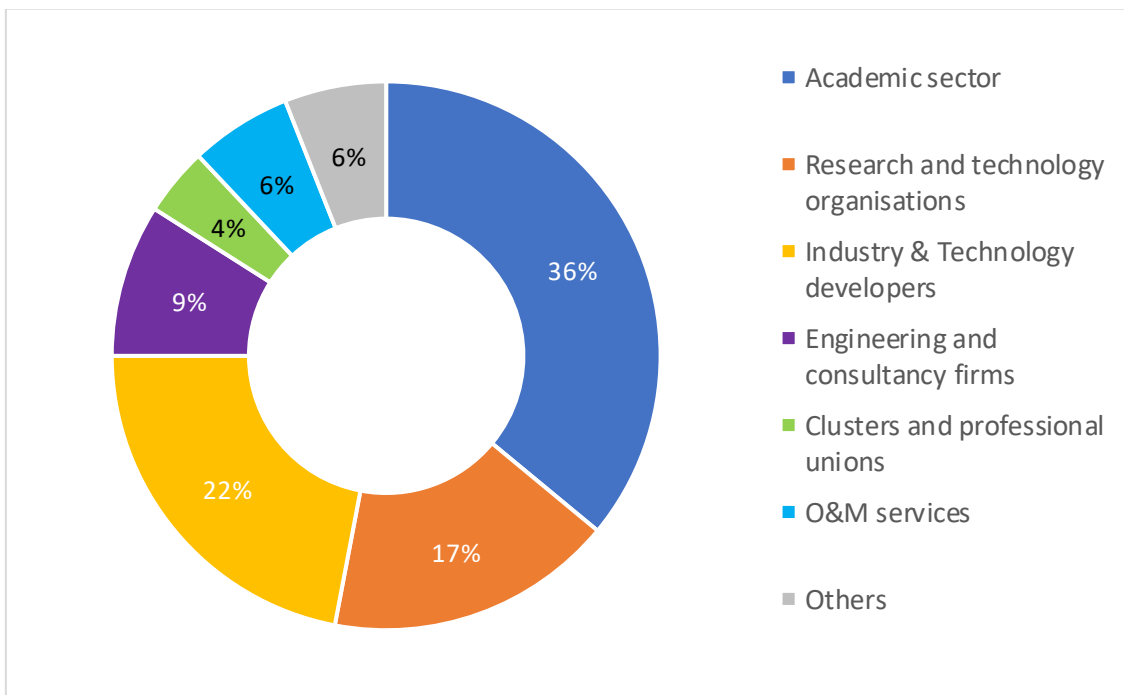
## 4.2 TRAINING SESSIONS

In total, 5 training sessions were held to explain in detail how the tools work and to emphasise their added value. Details of the actions carried out are shown in Table 4-1.

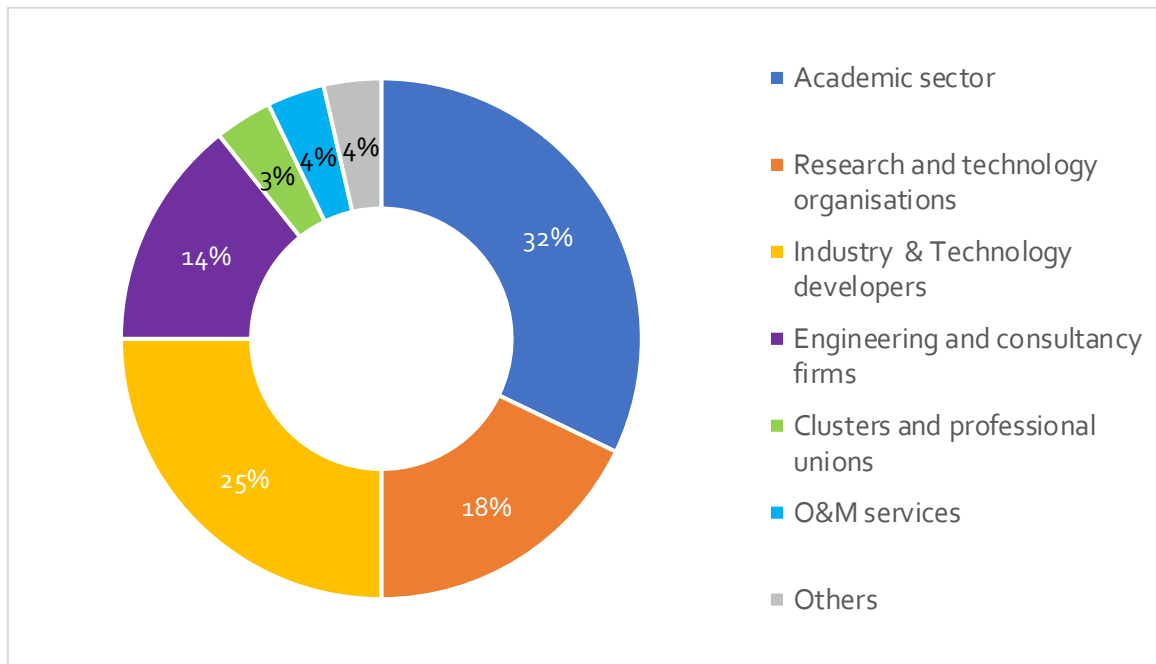
**TABLE 4-1. TRAINING SESSIONS ORGANISED DURING THE PROJECT**

#	Date	Topic	Contributors	No. of attendees
1	19 Nov. 2020	Reducing uncertainty in techno-economic analysis of ocean energy - Project feasibility and the use of software tools	UEDIN	82
2	25 Mar. 2021	DTOceanPlus, an ambitious EU project to accelerate the commercialisation in the ocean energy sector - Focus on station keeping and system performance and energy yield modules	TECNALIA	20
3	11 May 2021	DTOceanPlus logistics and marine operations module	WAVEC	135
4	1 Jul. 2021	Deployment and Assessment Design Tools for Ocean Energy Systems	FEM/OCC/ UEDIN	111 (47 in live + 64 in replay)
5	6 Jul. 2021	Using the DTOceanPlus suite of tools to Guide Technology Development of Ocean Energy Systems	WES	52 (28 in live + 24 in replay)

Regarding the two training sessions organised in July 2021, the distribution of participants according to their organisation of origin are in Figures 4-2 and 4-3.



**FIGURE 4-2. DISTRIBUTION OF PARTICIPANTS IN THE TRAINING SESSIONS DEDICATED TO DEPLOYMENT AND ASSESSMENT TOOLS ACCORDING TO THEIR ORGANISATION OF ORIGIN**



**FIGURE 4-3. DISTRIBUTION OF PARTICIPANTS IN THE TRAINING SESSIONS DEDICATED TO STAGE GATE TOOL ACCORDING TO THEIR ORGANISATION OF ORIGIN**

### 4.3 VIRTUAL VISITS

Given the health context during the last 18 months of the project, it proved complicated to organise face-to-face technical visits. It was therefore decided to prepare and distribute videos in which the industrial partners' projects explain their development strategy and give testimonials on the benefits of using the DTOcean+ suite. The 5 prepared videos are on the project website and they are part of the contents for the final technical workshop:

<https://www.dtoceanplus.eu/Publications/Training/Technical-workshop-2>

### 4.4 RESULTS MONITORING

Seven indicators were initially defined to assess the impact of education and training activities:

- ▶ Number of **webinars** with the objective of 3 in total and 100 participants per webinar;
- ▶ Number of **technical workshops** with the objective of 2 in total and 50 participants per event;
- ▶ Number of **training sessions** with the objective of 4 (and 2 of which must include **visits**) in total and 30 participants per session.

The partners really mobilised to carry out the activities initially planned, even if it meant finding remote alternatives to ensure that potential users and other stakeholders were sufficiently aware of the interest and functioning of the DTOcean+ software suite.

Overall, the activities that were carried out mobilised an audience that was consistent in composition with the intended targets and greater in number than the initial objectives. Furthermore, it appears that the community, thus formed has followed the progress of the work assiduously, with a keen interest in using the software suite as soon as it is released.

Indicators	Obj.	Real. Y2	Real. Y3	% of achievement
No. organised webinars	3	4	4	133 %
No. participants in each webinar	100	100	100	100 %
No. of organised technical workshops	2	-	2	100%
No. attendees per workshop	50	-	95	190%
No. training sessions	4	-	5	125%
No. participants in each session	30	-	80	267%
No. technical visits	2	-	5	250%

**FIGURE 4-4. TARGET AND ACHIEVEMENT DEGREE REGARDING EDUCATION AND TRAINING ACTIVITIES FOR THE WHOLE PROJECT PERIOD**





## 5. CONCLUSIONS

The effectiveness of dissemination and training actions was evaluated each month using indicators defined upstream. This allows for close monitoring and corrective action to be taken if necessary.

During the last year of DTOceanPlus project, actions were exclusively dedicated to promote a deeper understanding of the design tools, aiming to engage with target groups to facilitate adoption and usage of the DTOcean+ software and to influence decision-making within authorities, lobbies, policy makers regarding the uptake of the suite.

The project website appears as the main channel for information and dissemination, but social media are proving to be strong assets in reaching the potential users of the future suite of tools. A significant number of articles about DTOceanPlus results were published in newspapers and online magazines dedicated to ocean energy sector. Several scientific papers have been published in open access journals, useful datasets for the sector have been deposited in a public repository, and outputs of the projects were presented during several international conferences. The promotion of the project through events was really intense.

The objectives of the education and training activities were to explain the interest of the DTOcean+ suite for the different user profiles, while providing different types of tools to make the software suite easier to use. Thanks to these actions during the last two years of the project, a community of potential users has been formed. It has been very active in participating in the various webinars, sessions and workshops that have been organised and which have allowed for numerous direct interactions with the software developers.

Despite the international health context due to the COVID 19 pandemic, the majority of the project's dissemination and communication objectives were achieved and even largely exceeded. This was made possible by the intense mobilisation of all the members of the consortium. The target audience has been reached and has shown a lot of interest in the various works carried out in the framework of the DTOceanPlus project, in particular the open-source software suite which will be released by the end of August 2021.



## ANNEX I: LIST OF SOCIAL MEDIA POSTS

#	Date	Media	Author	Subject	Views	Int°
152	28-Feb-20	Twitter	FEM	Oral communication	329	8
153	28-Feb-20	LinkedIn	FEM	Oral communication	289	3
154	28-Feb-20	Twitter	FEM	Webinars	512	7
155	28-Feb-20	LinkedIn	FEM	Webinars	368	14
156	04-March-20	Twitter	FEM	Standalone alpha versions	670	8
157	04-March-20	LinkedIn	FEM	Standalone alpha versions	759	27
158	06-March-20	Twitter	FEM	Webinars	959	14
159	06-March-20	LinkedIn	FEM	Webinars	376	10
160	09-March-20	Twitter	FEM	Market analysis	643	5
161	09-March-20	LinkedIn	FEM	Market analysis	515	21
162	13-March-20	Twitter	FEM	Webinars	259	2
163	13-March-20	LinkedIn	FEM	Webinars	295	8
164	16-March-20	Twitter	WES	Webinars	942	11
165	16-March-20	LinkedIn	WES	Webinars	319	16
166	16-March-20	LinkedIn	UEDIN	Webinars	290	17
167	16-March-20	LinkedIn	WAVEC	Market analysis	ND	7
168	20-March-20	LinkedIn	ESC	Market analysis	ND	2
169	20-March-20	LinkedIn	UEDIN	Market analysis	224	9
170	25-March-20	LinkedIn	ESC	Market analysis	ND	4
171	26-March-20	Twitter	FEM	Webinars	566	9
172	26-March-20	LinkedIn	FEM	Webinars	400	6
173	26-March-20	LinkedIn	WES	Webinars	202	8
174	27-March-20	Twitter	FEM	Market analysis	229	0
175	27-March-20	LinkedIn	FEM	Market analysis	335	6
176	27-March-20	LinkedIn	TECNALIA	Webinars	ND	11
177	06-Apr-20	Twitter	FEM	Webinars	1499	14
178	06-Apr-20	LinkedIn	FEM	Webinars	639	13
179	07-Apr-20	Twitter	FEM	Webinars	945	7
180	07-Apr-20	LinkedIn	FEM	Webinars	512	30
181	04-May-20	Twitter	FEM	Standalone alpha versions	361	7
182	04-May-20	LinkedIn	FEM	Standalone alpha versions	693	29
183	04-May-20	LinkedIn	TECNALIA	Standalone alpha versions	ND	18
184	06-May-20	Twitter	WAVEC	Standalone alpha versions	354	6
185	06-May-20	LinkedIn	WAVEC	Standalone alpha versions	514	13
186	06-May-20	LinkedIn	WAVEC	Standalone alpha versions	534	14
187	15-May-20	Twitter	FEM	Standalone alpha versions	231	3
188	15-May-20	LinkedIn	FEM	Standalone alpha versions	928	58
189	21-May-20	LinkedIn	TECNALIA	Standalone alpha versions	ND	14
190	25-May-20	Twitter	FEM	Standalone alpha versions	507	17
191	25-May-20	LinkedIn	FEM	Standalone alpha versions	422	11
192	27-May-20	Twitter	WAVEC	Standalone alpha versions	286	9
193	28-May-20	LinkedIn	UEDIN	Standalone alpha versions	408	23
194	28-May-20	LinkedIn	WES	Standalone alpha versions	313	16
195	18-June-20	Twitter	WAVEC	Standalone alpha versions	523	10



#	Date	Media	Author	Subject	Views	Int°
196	18-June-20	LinkedIn	WAVEC	Standalone alpha versions	955	41
197	30-June-20	Twitter	FEM	Standalone alpha versions	414	6
198	30-June-20	LinkedIn	FEM	Standalone alpha versions	876	34
199	31-July-20	Twitter	FEM	Events - Ocean Energy Europe 2020	259	1
200	31-July-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	902	27
201	05-Aug-20	Twitter	FEM	Standalone beta versions	1653	49
202	05-Aug-20	LinkedIn	FEM	Standalone beta versions	737	30
203	17-Aug-20	Twitter	WAVEC	Articles in magazines, newspapers	ND	4
204	17-Aug-20	LinkedIn	WAVEC	Articles in magazines, newspapers	ND	86
204	06-Aug-20	LinkedIn	FEM	Oral communication	658	11
205	07-Sept-20	Twitter	WAVEC	Articles in magazines, newspapers	ND	3
206	07-Sept-20	Twitter	FEM	Articles in magazines, newspapers	753	25
207	07-Sept-20	LinkedIn	FEM	Articles in magazines, newspapers	625	21
208	10-Sept-20	LinkedIn	WAVEC	Articles in magazines, newspapers	ND	11
209	10-Sept-20	LinkedIn	WAVEC	Articles in magazines, newspapers	ND	17
210	19-Sept-20	LinkedIn	TECNALIA	Articles in magazines, newspapers	ND	21
211	16-Sept-20	LinkedIn	FEM	Oral communication	285	3
212	05-Oct-20	LinkedIn	UEDIN	Events - RENEW 2020	297	11
213	10-Oct-20	LinkedIn	TECNALIA	Scientific paper	ND	31
214	12-Oct-20	LinkedIn	ESC	Events - Ocean Energy Europe 2020	ND	11
215	12-Oct-20	LinkedIn	UEDIN	Articles in magazines, newspapers	310	18
216	16-Oct-20	Twitter	FEM	Market analysis	129	4
217	16-Oct-20	LinkedIn	FEM	Market analysis	329	4
218	16-Oct-20	LinkedIn	ESC	Market analysis	ND	9
219	26-Oct-20	Twitter	FEM	Scientific paper	938	24
220	26-Oct-20	LinkedIn	FEM	Scientific paper	578	12
221	30-Oct-20	Twitter	FEM	Events - Ocean Energy Europe 2020	1 482	19
222	30-Oct-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	798	41
223	10-Nov-20	LinkedIn	ESC	Events - Ocean Energy Europe 2020	ND	12
224	12-Nov-20	Twitter	FEM	Events - Ocean Energy Europe 2020	410	9
225	12-Nov-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	982	37
226	20-Nov-20	Twitter	FEM	Events - Ocean Energy Europe 2020	442	6
227	20-Nov-20	Twitter	FEM	Events - Ocean Energy Europe 2020	2 102	16
228	20-Nov-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	626	27
229	24-Nov-20	Twitter	WAVEC	Events - Ocean Energy Europe 2020	214	5
230	24-Nov-20	LinkedIn	WAVEC	Events - Ocean Energy Europe 2020	602	25
231	24-Nov-20	LinkedIn	TECNALIA	Events - Ocean Energy Europe 2020	ND	10
232	27-Nov-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	684	14
233	01-Dec-20	LinkedIn	UEDIN	Events - Ocean Energy Europe 2020	244	7
234	02-Dec-20	Twitter	FEM	Events - Ocean Energy Europe 2020	1 133	21
235	02-Dec-20	LinkedIn	FEM	Events - Ocean Energy Europe 2020	741	21
236	02-Dec-20	Twitter	WES	Events - Ocean Energy Europe 2020	478	7
237	02-Dec-20	Twitter	WAVEC	Events - Ocean Energy Europe 2020	ND	2
238	03-Dec-20	LinkedIn	WES	Events - Ocean Energy Europe 2020	ND	18
239	14-Dec-20	Twitter	FEM	Events - Ocean Energy Europe 2020	519	5
240	14-Dec-20	Twitter	FEM	Events - Ocean Energy Europe 2020	730	13



#	Date	Media	Author	Subject	Views	Int°
241	16-Dec-20	Twitter	FEM	Oral communication	1 217	14
242	16-Dec-20	LinkedIn	FEM	Oral communication	519	10
243	28-Dec-20	Twitter	FEM	Scientific paper	140	3
244	28-Dec-20	LinkedIn	FEM	Scientific paper	1 033	50
245	07-Jan-21	Twitter	WES	Articles in magazines, newspapers	1 065	25
246	07-Jan-21	LinkedIn	WES	Articles in magazines, newspapers	763	50
247	08-Jan-21	Twitter	FEM	Standalone beta versions	204	1
248	08-Jan-21	LinkedIn	FEM	Standalone beta versions	1 126	39
249	11-Jan-21	LinkedIn	TECNALIA	Articles in magazines, newspapers	ND	30
250	03-Feb-21	Twitter	FEM	Standalone beta versions	431	8
251	03-Feb-21	LinkedIn	FEM	Standalone beta versions	1 028	36
252	01-March-21	Twitter	FEM	Standalone beta versions	477	11
253	01-March-21	LinkedIn	FEM	Standalone beta versions	671	21
254	01-March-21	Twitter	WAVEC	Standalone beta versions	423	6
255	01-March-21	LinkedIn	TECNALIA	Standalone beta versions	ND	ND
256	01-March-21	LinkedIn	UEDIN	Standalone beta versions	1 087	27
257	02-March-21	LinkedIn	OCC	Standalone beta versions	ND	17
258	22-March-21	Twitter	FEM	Market analysis	2 146	22
259	22-March-21	LinkedIn	FEM	Market analysis	2 965	115
260	29-March-21	Twitter	FEM	Events - ICOE 2021	952	9
261	29-March-21	LinkedIn	FEM	Events - ICOE 2021	635	15
262	12-Apr-21	Twitter	FEM	Events - ICOE 2021	388	6
263	23-Apr-21	Twitter	FEM	Scientific paper	147	1
264	23-Apr-21	LinkedIn	FEM	Scientific paper	648	32
265	26-Apr-21	Twitter	FEM	Events - ICOE 2021	918	12
266	26-Apr-21	LinkedIn	FEM	Events - ICOE 2021	484	22
267	03-May-21	Twitter	FEM	Market analysis	1306	18
268	03-May-21	LinkedIn	FEM	Market analysis	916	18
269	04-May-21	Twitter	FEM	Training sessions	265	2
270	04-May-21	LinkedIn	FEM	Training sessions	840	30
271	04-May-21	LinkedIn	WAVEC	Training sessions	2300	211
272	05-May-21	Twitter	WAVEC	Training sessions	296	5
273	05-May-21	LinkedIn	WAVEC	Training sessions	623	24
274	21-June-21	Twitter	WAVEC	Training sessions	ND	3
275	25-June-21	Twitter	FEM	Training sessions	297	2
276	25-June-21	LinkedIn	FEM	Training sessions	2079	41
277	29-June-21	Twitter	FEM	Training sessions	312	2
278	29-June-21	LinkedIn	FEM	Training sessions	1211	12
279	05-Jul-21	Twitter	FEM	Training sessions	423	2
280	05-Jul-21	LinkedIn	FEM	Training sessions	716	19
281	26-Jul-21	Twitter	FEM	Training sessions	211	5
282	26-Jul-21	LinkedIn	FEM	Training sessions	1077	22
283	30-Jul-21	Twitter	FEM	Final release	358	6
284	30-Jul-21	LinkedIn	FEM	Final release	995	37

ND: No Data



## ANNEX II: SELECTION OF POSTS SCREENSHOTS

**Policy and Innovation Group**  
800 followers  
1w • 🌐

#DTOceanPlus Workshop during Ocean Energy Europe Conference #OEE2020 will take place on the 2nd December from 01:30 to 03:30 PM (CET).

The #H2020 DTOceanPlus project aims to develop and test a software suite of advanced design tools for #tidal and #wave systems. The workshop will give a general overview of the suite of tools and their capabilities, plus explain how to run them with relevant user cases.

For more information and the agenda, please visit the project website: <https://lnkd.in/ebkJ6ms>.

The workshop is an official side event and you can join it completely free of charge!

**Wave Energy Scotland**  
1,618 followers  
3w • 🌐

Find out more about the #DTOceanPlus programme and how WES are helping the ocean energy developers of the future.  
<http://ow.ly/Q1GT50D2yNP>  
#WaveEnergy #OceanEnergy

**Open Cascade, part of Caggemini**  
1,404 followers  
1d • 🌐

The development of the standalone beta versions of the whole suite of the #DTOceanPlus design tools for ocean energy systems is now completed. The beta versions are now ready for full integration and the demonstration phase against real scenarios. The final open source version of the suite and detailed documentation will be available in August 2021.

💡 See the press release: <https://lnkd.in/e9Yyyks>.

TECNALIA Research & Innovation, Policy and Innovation Group, Energy Systems Catapult, Wave Energy Scotland, France Énergies Marines, WavEC - Offshore Renewables, Aalborg University, Enel Green Power, Bureau Veritas | Marine & Offshore, IDOM Consulting, Engineering, Architecture, Nova Innovation Ltd, CorPower Ocean, Open Cascade, part of Caggemini, Orbital Marine Power Ltd, EDP, SABELLA, Sandia National Laboratories, National Renewable Energy Laboratory

#oceanenergy #designtools #opencascade #waveenergy #opensource

How Wave Energy Scotland is using data to develop new tools in the wave energy sector

**France Énergies Marines**  
@FrceEnergiesMar

The 2 training sessions dedicated to #DTOceanPlus software are now available in replay  
@WaveEnergyScot @EdinburghUni  
[dtoceanplus.eu/News/Training-...](http://dtoceanplus.eu/News/Training-...)

Traduire le Tweet

11:33 AM · 26 juil. 2021 · Twitter Web App

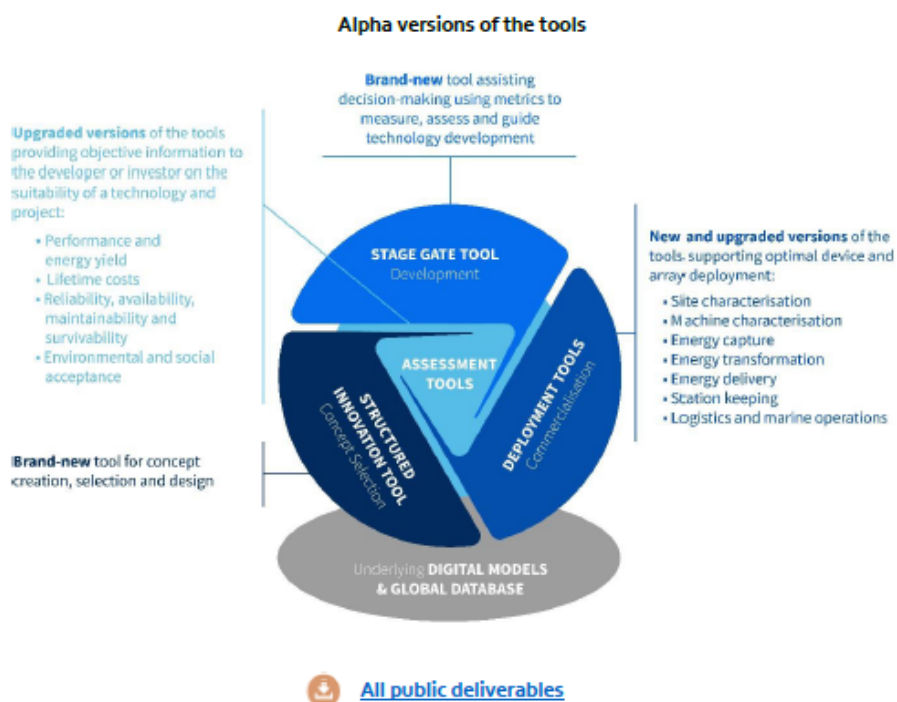
## ANNEX III: DISSEMINATED PRESS RELEASES

### H2020 DTOceanPlus project: standalone alpha versions of the design tools ready for the verification phase

The development of the standalone alpha versions of the whole suite of the design tools for ocean energy systems is now completed. The alpha versions are now ready for the verification phase and then demonstration against real scenarios. Project partners are intensifying the training and education activities to strongly engage with potential users of the tools.

**Standalone alpha versions of the tools built on standardized data formats to allow design information sharing and reuse in ocean energy designs**

The development of the standalone alpha versions of the whole suite of the design tools for ocean energy systems is now completed. That means that the core functionality of each individual tool or module is complete and can run independently, with ongoing integration of the whole software and data flow between modules to give valuable results to the users. These alpha versions are built on the framework that has been defined during the project to standardise the data formats of ocean energy systems design: a digital representation for the elements of the whole system at different levels of aggregation and accounting for different levels of complexity. All technical reports that describe the use cases, the functionalities and the architecture of the alpha tools are available at: [dtoceanplus.eu](http://dtoceanplus.eu).



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921



**DTOcean+** Press Release - 25 May 2020 - Offshore Renewable Energy

**Verification phase before the demonstration against real scenarios**

The standalone alpha versions of the suite of tools are now ready for the verification phase. This phase will be carried out by the testing of each tool and module in order to verify that they meet the functional and technical requirements defined at the beginning of the project. This will result into a beta version of tools that will be demonstrated against real scenarios by the industrial partners within the project. That means that the suite will be run to showcase the applicability of the tools to concept generation and selection, technology development and farm deployment and optimisation.

**Training and education activities to engage with potential users of the tools**

The project partners are now intensifying their training and education actions to promote a deeper understanding of new tools and engage with potential users to facilitate adoption and usage of DTOcean+ design tools. The main past and future highlights are summarised below:

- A didactic video which outlines the main areas of the project in 5 min;
- 4 webinars are available online to explain the suite of tools and the approach planned;
- An online forum to ensure interactivity between the tools' developers and users;
- 2 workshops that will allow live demonstrations of the tools in December and March;
- 4 training sessions to explain how to practically run the tools from December;
- Preparation of technical and user manuals and video tutorials to accompany users in their first steps with the tools by the end the project.



[Watch the didactic video](#)



[Watch the webinars](#)



[Access to the online forum](#)

Contact: France Energies Marines - [contact@ite-fem.org](mailto:contact@ite-fem.org) - +33 (0)2 98 49 98 69



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921



**DTOcean+** Press Release – 1<sup>st</sup> March 2021 - Offshore Renewable Energy

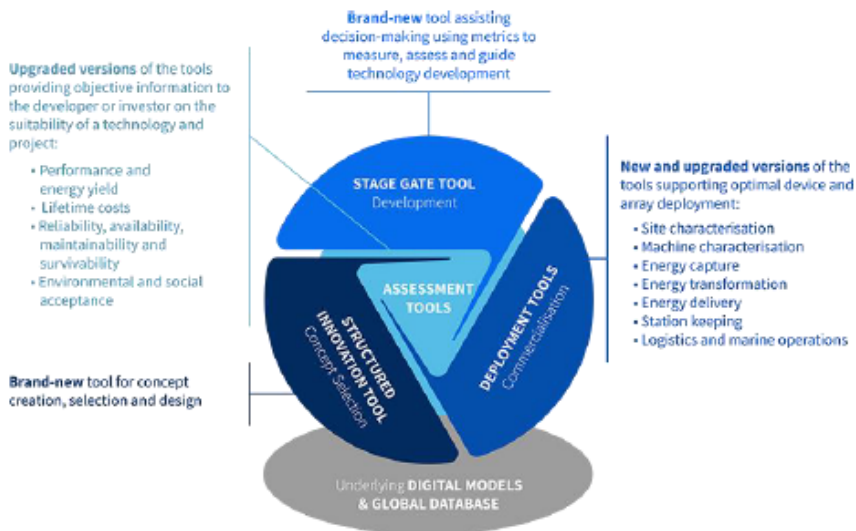
## Standalone beta versions of the DTOcean+ tools are ready for the demonstration phase

The development of the standalone beta versions of the whole suite of the design tools for ocean energy systems is now completed. The beta versions are now ready for full integration and the demonstration phase against real scenarios. The final open source version of the suite and detailed documentation will be available in August 2021.

The development of the standalone beta versions of the whole suite of the design tools for ocean energy systems is now completed. That means that the core functionality of each individual tool or module is complete and can run independently. Ongoing integration of the whole software and data flow between modules will provide additional valuable results to the users. Testing of each tool and module was also carried out in order to verify that the software meets the functional and technical requirements defined at the beginning of the project. All technical reports that describe the verification process and contain the user manuals are available at: [dtoceanplus.eu](http://dtoceanplus.eu).

Over the next few months the beta versions of the tools will be demonstrated against real scenarios by the industrial partners within the project. That means that the suite will be run to showcase the applicability of the tools to concept generation and selection, technology development, plus farm deployment and optimisation. A workshop and several virtual training sessions will be organised to promote a deeper understanding of the tools and engage with potential users to facilitate adoption and usage of DTOcean+ suite. The final public release of the open source software will be at the end of August 2021. To support the future users in their various uses of the suite, project partners are preparing tutorials and how-to guides that will be released at the same time.

### Beta versions of the tools



Contact: France Energies Marines - [contact@ife-fem.org](mailto:contact@ife-fem.org) - +33 (0)2 98 49 98 69



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921





**DTOcean+** Press Release – 1<sup>st</sup> March 2021 - Offshore Renewable Energy

**Available resources**

  
[All public deliverables](#)

  
[Scientific papers](#)

  
[Webinars](#)

  
[The project in video](#)

  
[Online forum](#)

**DTOceanPlus in short**

**Subject:** development and testing of a suite of digital tools for the design of tidal and wave systems

**Duration:** 40 months (May 2018 to August 2021)

**Budget:** €8 million

**Funding:** EU Research and Innovation Programme H2020 (Grant Agreement No 785921)

**Leader:** Tecnalia (Spain)

**Partners:**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921

**DTOcean+** PRESS RELEASE  
28 July 2021

### DTOcean+, an open-source software suite to design and optimise tidal and wave farms, will be released soon

**An ambitious European project to accelerate the development of the ocean energy sector**

The FP7 funded [DTOcean](#) project (2014-2017) produced a first generation of freely available, open-source design tools for wave and tidal energy arrays. Built upon this solid foundation, [DTOceanPlus](#) (2018-2021) with a total budget of 8 million euros, developed and demonstrated a suite of second-generation **advanced design tools for the selection, development, and deployment of ocean energy systems**. The consortium was formed to bring together representatives of all key user and stakeholder groups and developers of Europe's leading ocean energy sub-systems, devices, and arrays. Two US institutions also took part in the project.

Users of the DTOcean+ suite of tools will be able to generate designs for **innovative ocean energy technologies** and deployments. These designs are **optimised for a wide variety of key metrics** including lifetime costs, reliability, availability, maintainability, survivability, performance, environmental impact and socio-economic impact. They also **balance technological and financial risk** which, in combination with greatly improved **cost effectiveness**, ensure that ocean energy technologies become significantly more commercially attractive.

<ul style="list-style-type: none"> <li>Tecnalia</li> <li>University of Edinburgh</li> <li>Energy Systems Catapult</li> <li>Wave Energy Scotland</li> <li>France Energies Marines</li> <li>WaveEC Offshore Renewables</li> <li>Aalborg Universitet</li> <li>Enel Green Power</li> <li>Bureau Veritas</li> <li>IDOM Oceantec</li> <li>Nova Innovation</li> <li>CorPower Ocean</li> <li>Open Cascade</li> <li>Energias de Portugal</li> <li>Orbital Marine Power</li> <li>Sabella</li> <li>Sandia National Laboratories</li> <li>National Renewable Energy Laboratory</li> </ul>
---

*DTOceanPlus partners*

**An open-source integrated suite of design tools**

The functional requirements of the software suite were developed considering both the expectations of potential users, identified during a consultation phase, and the functionalities not covered by the various tools available on the market. Feedback from the DTOcean project has also proved very valuable. **Standalone versions of the different tools were first developed: the core functionality of each individual tool or module was complete and could run independently.** In order to provide additional valuable results to the users, **the whole software was integrated and data flow between modules were optimised.** Then, **real scenarios were run by the industrial partners of the project demonstrating the applicability of the tools to concept generation and selection, technology development, farm deployment and optimisation.** **The final public release of the open-source software will be at the end of August 2021.** To support the future users in their various uses of the suite, project partners are preparing tutorials and user guides that will be released at the same time.

DTOceanPlus - Press release - 28 July 2021





### A detailed analysis of the ocean energy market

Given the large potential of ocean energy sector, a review of **current market sizes**, potential applications, geographical locations, and **future outlook** of the markets was prepared. Then, an assessment of the **supply chain across Europe** was carried out to deliver a complete understanding of the current and future supply chain, and to guide sustainable exploitation of the software in the sector. A cost-benefit analysis was conducted considering both **technology push and market pull funding** options for achieving or surpassing **long-term cost reduction targets**. In combination, the analysis considered gross value-added and other **environmental and socioeconomic** benefits. Standard approaches to business management models were developed; combining the value of the DTOcean+ toolset with a knowledge of both the potential markets that ocean energy technology can be applied to and the supply chain in place to exploit the opportunities. They include pricing methods which can support development of business, funding and support cases. A critical evaluation of the ocean energy sector's **legal, institutional and political frameworks** was carried out by analysing barriers or enabling features for the deployment of ocean energy during both the development and industrial roll out stage of both wave and tidal energies.

### DTOceanPlus in short

<b>Subject</b> Development and testing of a suite of digital tool for the design of tidal and wave systems	<b>Duration</b> 40 months (May 2018 to August 2021)
<b>Budget</b> €8 million	<b>Funding</b> EU Research and Innovation Programme H2020
<b>Leader</b> Tecniaia (Spain)	<b>Partnership</b> 16 EU partners + 2 US laboratories



Press contact  
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921.

[dtoceanplus.eu](http://dtoceanplus.eu)

## ANNEX IV: SELECTION FROM THE PRESS REVIEW FROM APRIL 2020 TO AUGUST 2021

Revista de Marinha - 17 August 2020



**83.º Ano**

**DTOcean+**

**WavEC**  
Offshore Renewables

### DTOceanPlus: a descarbonização do setor elétrico passa pelos oceanos

por Francisco Correia da Fonseca\*

**O**s nossos mares e oceanos são uma das maiores fontes de energia renovável limpa no planeta, com o potencial para satisfazer uma fração significativa da procura global de eletricidade. Hoje, estima-se que a energia dos oceanos poderá desempenhar um papel importante na resposta a um dos maiores desafios atuais à escala mundial: a descarbonização do setor energético. No que diz respeito à Europa, a este desafio acresce a necessidade de fazer uma transição de um sistema elétrico baseado em combustíveis fósseis importados, para um sistema flexível e interligado, baseado em recursos endógenos, limpos, renováveis e infinitos.

Tendo em conta as metas estabelecidas no acordo de Paris e o reconhecido potencial das energias dos oceanos, a Comissão Europeia tem vindo a apoiar a investigação e inovação no sector, tal como o desenvolvimento de tecnologias promissoras para aproveitamento dessa energia. Hoje, um dos grandes desafios da energia dos oceanos prende-se nos ainda elevados custos de produção de eletricidade, que refletem a baixa maturidade das tecnologias. Contudo, à se-

Instalação do C3, protótipo do conversor de energia das ondas da CorPower Ocean, parceiro industrial do DTOceanPlus, em Orkney, Reino Unido. Foto de Colin Keldie.

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revistademarinha.com · 1016 Julho/Agosto 2020 · Revista de Marinha



**Energias Renováveis Marinhas**

melhança do que aconteceu nos últimos anos com os fotovoltaicos e a energia eólica onshore, que têm vindo a reduzir os seus custos de produção de eletricidade para valores abaixo dos da energia produzida por centrais a gás e a carvão, esta questão poderá ser ultrapassada com o desenvolvimento de instrumentos e processos adequados para apoiar a inovação tecnológica e o crescimento do mercado.

O DTOceanPlus é um projeto H2020 de três anos (2018 – 2021) financiado pela Comissão Europeia, que tem como objetivo acelerar a comercialização das tecnologias de aproveitamento da energia dos oceanos. O projeto consiste em desenvolver e validar um pacote de ferramentas computacionais com o mesmo nome, gratuito e em código aberto, de projeto e apoio à decisão no planeamento de parques de energia das ondas e das marés. Com o intuito de promover inovação tecnológica desde a conceção até à implementação, o software DTOceanPlus irá não só apoiar o utilizador no projeto de parques de energias marítimas, mas também na seleção de tecnologias promissoras, guiar o processo de investigação e desenvolvimento tecnológico e fornecer ferramentas para avaliar projetos do ponto de vista ambiental, social e de investimento financeiro.

O projeto DTOceanPlus conta com um financiamento total de 8 M€ e a contribuição de 18 parceiros internacionais e de 2 laboratórios de referência dos Estados Unidos. No passado mês de maio de 2020, dois anos após o arranque do projeto, o DTOceanPlus lançou a primeira versão alfa das ferramentas, uma etapa crucial no desenvolvimento do software. Enquanto líder de várias tarefas do

projeto, o WavEC é responsável pelo desenvolvimento de duas ferramentas: a ferramenta logística para otimizar a infraestrutura (embarcações, equipamentos, portos/estaleiros navais) necessária e o planeamento das operações marítimas de instalação e manutenção de parques, assim como a ferramenta económica, para avaliar a viabilidade económica e financeira de um dado projeto de energias marítimas.

Ao longo dos próximos meses, as ferramentas serão testadas e validadas em cenários reais, até que a versão final do software seja lançada e disponibilizada publicamente. Até lá, os parceiros do projeto irão lançar iniciativas de educação e formação abertas ao público para

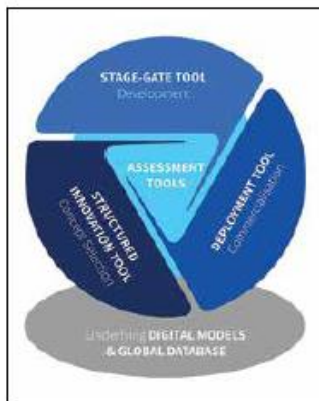
demonstrar as capacidades do software e formar os futuros utilizadores das ferramentas.

Mais informações sobre o projeto estão disponíveis em [www.dtoceanplus.eu](http://www.dtoceanplus.eu)

\* Engenheiro  
Offshore Operations Specialist  
WavEC - Offshore Renewables



Este projeto recebeu financiamento da União Europeia, através do programa Horizon 2020 research and Innovation, com a grant agreement n° 785921.



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**FAÇA PARTE DO FUTURO DO MAR**

**PRESENTES NA NAUTICAMPO 2019**

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[CORDIS Portal - 4 September 2020](#)




HORIZON  
2020

## Advanced Design Tools for Ocean Energy Systems Innovation, Development and Deployment

### Results in Brief














## New software suite will strengthen future wave and tidal energy projects

In their quest to reduce the cost of wave and tidal energy technologies, the DTOceanPlus consortium have identified design software as a key stepping stone. The project's results will help to decrease the technological risks for the next development stages and significantly contribute to an increase in technology performance.

DTOceanPlus (Advanced Design Tools for Ocean Energy Systems Innovation, Development and Deployment) considers potential users' needs from the get-go. It started off with a consultation process, during which the project team approached a wide panel of over 70 prospective users and stakeholders. They quickly found out that their tools' most important function would be to give confidence to both public and private investors.

"Wave and tidal stream-based energy surged from less than 5 GWh in 2009 to almost 50 GWh in 2019, but technologies are not yet mature enough. The energy sector needs software tools that will reduce the technical and financial risk of opting for ocean energy technologies. This will allow for the deployment of competitive wave and tidal arrays," says Pablo Ruiz-Minguela, project coordinator and head of wave energy at Tecnalia.

### Work in progress

DTOceanPlus didn't start from a blank sheet. A first generation of design tools had already been developed under a former FP7 project named



DTOcean and made freely available to stakeholders. These tools were successfully used for leading projects such as the four-turbine 6 MW MeyGen tidal array in the UK and a wave energy application made by Sandia National Laboratories in the USA. Yet, some stakeholders still wished for improvements.

“DTOceanPlus goes further by taking all stakeholder feedback into account to develop a better, more comprehensive set of second-generation design tools,” adds Ruiz-Minguela.

The new suite is comprised of five tools covering the full lifespan of the farm. It includes: a tool for concept creation, selection and design; a tool assisting decision-making in technology development; as well as deployment design tools supporting optimal device and array deployment. The suite also covers post-deployment phases. It includes assessment design tools informing users on the suitability of a technology and project, as well as a framework for design sharing and reuse.

All tools are currently in stand-alone alpha versions. They have already been made available to industrial partners. “Over the next 6 months, their key functionality will be verified and feedback will be fed into beta versions,” Ruiz-Minguela explains. “The embedded versions will then be validated by applying experience and lessons learned from real-world projects.”

Opinions collated so far indicate that usability, flexibility and expandability are most important to stakeholders. Transparency is also critical. Finally, the tools will need to deal with varying degrees of complexity both at different stages in the project lifecycle and for different user requirements.

“The response has been very good, with nearly all respondents indicating that they were likely or very likely to use DTOceanPlus at some stage of their project’s lifecycle,” Ruiz-Minguela notes.

### **A TRL timetable**

The DTOceanPlus team hopes to bring its technology to TRL 6 by the end of the project in April 2021. Ruiz-Minguela is optimistic that it will fill a significant gap in the market by providing a single, integrated open-source solution supporting the entire innovation, development and deployment process.

Whilst the project is firstly aimed at technology developers, project developers, public funding bodies and private investors, its outputs will also be of great value to policymakers, regulators, standardisation bodies.





insurance providers and the supply chain. All tools will be made freely available to the entire ocean energy sector in order to maximise impact.

## Keywords

DTOceanPlus, wave energy, tidal energy, design software, DTOcean


### Project Information

DTOceanPlus

Funded under  
H2020-EU.3.3.2.

Grant agreement ID: 785921

Overall budget  
€ 7 918 317,91

[Project website](#) 

Status  
Ongoing project

EU contribution  
€ 6 689 076,50

Start date  
1 May 2018

End date  
30 April 2021

Coordinated by  
FUNDACION TECNALIA  
RESEARCH & INNOVATION  
Spain



The Scotsman - 7 January 2021

☰

**THE SCOTSMAN**

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## create an industry benchmark

Scotland has ambitious renewable targets to meet, and wave energy has a vital role to play if its aspirations are to be realised.

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**Promoted by Wave Energy Scotland**  
Thursday, 7th January 2021, 3:57 pm



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The Stage Gate design tool will provide a standard for the wave energy sector and use data to encourage further growth

Wave Energy Scotland (WES), set up in 2014, is leading the way in the sector, having funded over 95 contracts and made investments totalling more than £41



million.

One initiative in which WES is involved is the DTOceanPlus project that has a total budget of 8 million euros and is funded through the EU Research and Innovation Programme H2020.

The DTOcean consortium is a project managed by Tecnalia, a private, independent, non-profit applied research centre with roots in the Basque Country in north of Spain.

Others involved in the consortium developing a second generation of ocean energy design tools, known as DTOceanPlus, include Nova and Orbital.

They are using the experience of wave and tidal energy projects to support the entire ocean energy development process from the selection and development of sub-systems and energy capture devices to full array deployment.

Pablo Ruiz-Minguela, head of wave energy at Tecnalia, says: “In the wave energy sector, Tecnalia offers test and analysis services for materials and components in the ocean, collaborative research and development projects, turn-key projects and investment opportunities.”

The Stage Gate design tool is being developed as part of the DTOceanPlus programme. It will provide a standard for the wave energy sector and use data to encourage further growth.

When it is launched in August it will provide companies with a grade to show where they are in terms of progress. It will also give investors a key marker to indicate how far along a company is in its development. The DTOceanPlus suite of tools will be open source, so they will be freely available to download and use.

Jillian Henderson, research engineer at WES, describes the work the consortium has been doing to develop the Stage Gate tool. “WES has been working extensively on developing metrics to measure success in wave energy. By metrics, we mean the parameters which are measured and assessed to demonstrate success of an ocean energy technology or project,” she says. “Metrics have helped manage the competitive innovation call that is the WES programme, demonstrate success in technologies in the sector and enable comparison across different technologies.”



She adds that the Stage Gate design tool is just one of the modules within the DTOceanPlus project. It is designed to provide a framework to guide the user through a technology assessment process.

“One of the key benefits of the Stage Gate design tool is that it brings a standardised structure to the development of ocean energy technologies,” adds Henderson. “This means that companies in the industry can benchmark their progress against defined targets and potential investors can compare technologies objectively.

“Splitting the technology development pathway up into clear, defined stages with measures of success, brings clarity and transparency to the development process.”

The tool will address one of the biggest challenges facing ocean energy at the moment – the lack of consensus in design. This issue makes the assessment and comparison of technologies difficult as wave and tidal energy devices can behave and perform in very different ways, according to WES.

The new tool will allow a standardised measure of the benchmarks of success that will help reduce the risk to investors when they are looking to fund new technologies.

Ben Hudson, research engineer at WES, says: “The software is primarily being developed using the popular Python programming language. JavaScript and the JavaScript framework known as Vue.js are being used to develop the Graphical User Interface (GUI), but the bulk of software development has involved the use of Python.

“A collaborative agile approach has been taken with respect to the development. Each module in the suite of tools was first developed in a ‘standalone mode’, meaning they all function independently. The next step will be to integrate the tools so they can communicate and operate together seamlessly.

“Crucially, the project has the benefit of having several industrial partners who will provide their real deployed project data to demonstrate the tools. These are wave energy technologies from Corpower and IDOM and tidal energy technologies from Nova Innovation, Orbital Marine Power and Sabella. The benefit of having real project data is that the DTO+ suite of tools will be



demonstrated with realistic use cases which will validate the tools before final release.”

Ruiz-Minguela adds: “The DTOceanPlus project aims to accelerate the development of the ocean energy sector aligning innovation and development processes with those used in mature engineering sectors.”

“This suite of design tools will reduce the technical and financial risks of devices and arrays to achieve the deployment of cost-competitive wave and tidal arrays.”



[OffshoreEnergy.biz](https://www.offshoreenergy.biz) – 30 July 2021

## **DTOceanPlus set to release open-source design optimisation tools for tidal and wave farms**

**BUSINESS DEVELOPMENTS & PROJECTS ([HTTPS://WWW.OFFSHORE-ENERGY.BIZ/TOPIC/BUSINESS-DEVELOPMENTS-PROJECTS/](https://www.offshoreenergy.biz/topic/business-developments-projects/))**

July 30, 2021, by Amir Garanovic

**An ambitious European project to accelerate the development of the ocean energy sector DTOceanPlus has announced the upcoming release of an open-source software suite for designing and optimisation of tidal and wave energy farms.**

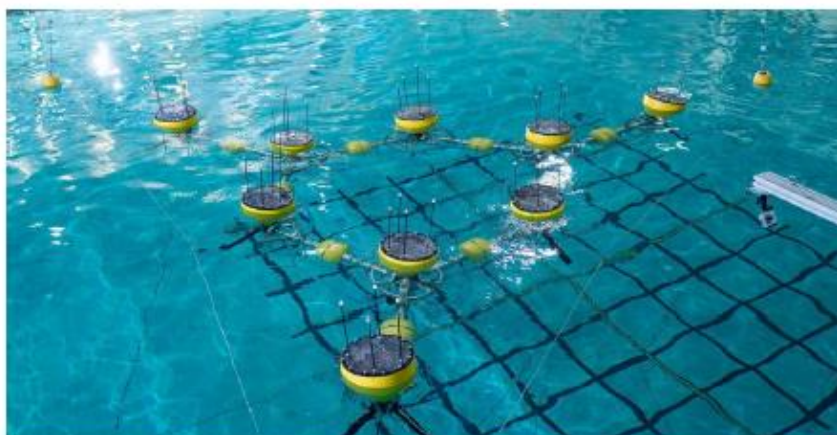


Illustration (Courtesy of Wave Energy Scotland – a project partner of DTOceanPlus)

DTOceanPlus project, with a total budget of €8 million awarded through EU's funding programme Horizon 2020, has developed and demonstrated a suite of second-generation advanced design tools for the selection, development, and deployment of ocean energy systems.

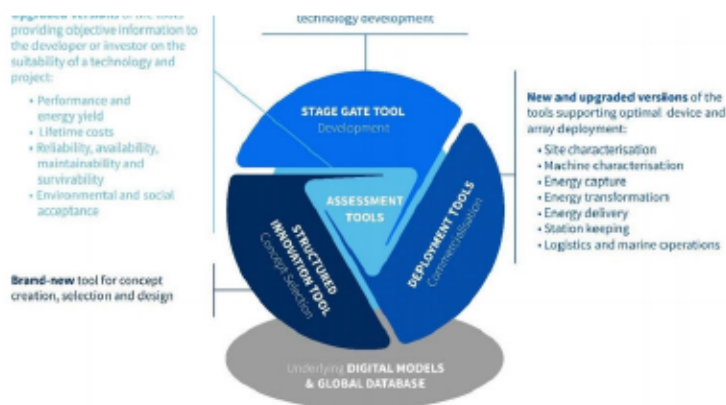
The users of the DTOceanPlus suite of tools will be able to generate designs for innovative ocean energy technologies and deployments, optimised for a wide variety of key metrics including lifetime costs, reliability, availability, maintainability, survivability, performance, environmental impact and socio-economic impact, according to project developers



The open-source tools, (<https://www.dtoceanplus.eu/Tools/DTOcean-Version-2.0>), set for release at the end of August 2021, are also said to balance technological and financial risk which, in combination with greatly improved cost effectiveness, ensure that ocean energy technologies become significantly more commercially attractive.

## An open-source integrated suite of design tools

The functional requirements of the software suite were developed considering both the expectations of potential users, identified during a consultation phase, and the functionalities not covered by the various tools available on the market.



Simplified presentation of the design tools composing the DTOceanPlus software suite (Courtesy of DTOceanPlus)

Feedback from the DTOcean projec (<https://www.offshore-energy.biz/dtocean-delivers-free-tidal-and-wave-arrays-design-tool/>)t has also proved very valuable, according to project developers.

Standalone versions of the different tools were first developed: the core functionality of each individual tool or module was complete and could run independently.

In order to provide additional valuable results to the users, the whole software was integrated and data flow between modules were optimised.

Then, real scenarios were run by the industrial partners of the project demonstrating the applicability of the tools to concept generation and selection, technology development, farm deployment and optimisation.

To support the future users in their various uses of the suite, project partners said they are preparing tutorials and user guides that will be released at the same time.

## **A framework to standardise the data formats of ocean energy systems design**

There is currently no standard method of describing the key characteristics and attributes of ocean energy technologies. Without such a standard, it can be difficult, if not impossible, to objectively analyse innovative technologies and compare competing technologies.

In the context of DTOceanPlus project, a framework was developed to standardise the data formats describing an ocean energy design so that it can be used as a common interchange language among different sector actors.

This has been done by means of the definition of a digital representation for the elements of the whole system at different levels of aggregation and accounting for different levels of complexity of the project.

In order to fully capture the main aspects of an ocean energy system, the digital representation framework has accounted for: elements of the technology design, phases of the technology lifecycle and constraints from the context; a vertical

dimension that describes a set of hierarchical connections among subsystems and components; a transversal dimension accounting for the individual and specific components of the system.

## **A detailed analysis of the ocean energy market**

Given the large potential of ocean energy sector, a review of current market sizes, potential applications, geographical locations, and future outlook of the markets was prepared, the project developers informed.

Then, an assessment of the supply chain across Europe was carried out to deliver a complete understanding of the current and future supply chain, and to guide sustainable exploitation of the software in the sector.





A cost-benefit analysis was conducted considering both technology push and market pull funding options for achieving or surpassing long-term cost reduction targets. In combination, the analysis considered gross value-added and other environmental and socioeconomic benefits.

Standard approaches to business management models were developed – combining the value of the DTOcean+ toolset with a knowledge of both the potential markets that ocean energy technology can be applied to and the supply chain in place to exploit the opportunities.

They include pricing methods which can support development of business, funding and support cases.

A critical evaluation of the ocean energy sector's legal, institutional and political frameworks was carried out by analysing barriers or enabling features for the deployment of ocean energy during both the development and industrial roll out stage of both wave and tidal energies.

Led by TecNALIA, the project has brought together mostly European companies and organizations, with international partners from the United States as well.





## CONTACT DETAILS

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Naval Energies terminated its participation on 31<sup>st</sup> August 2018 and  
EDF terminated its participation on 31<sup>st</sup> January 2019.



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