



theBlueGrowthfarm

*Empowering Offshore Aquaculture*

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Project Newsletter - August 2021 - N°6





# THE BLUE GROWTH FARM NEWSLETTER

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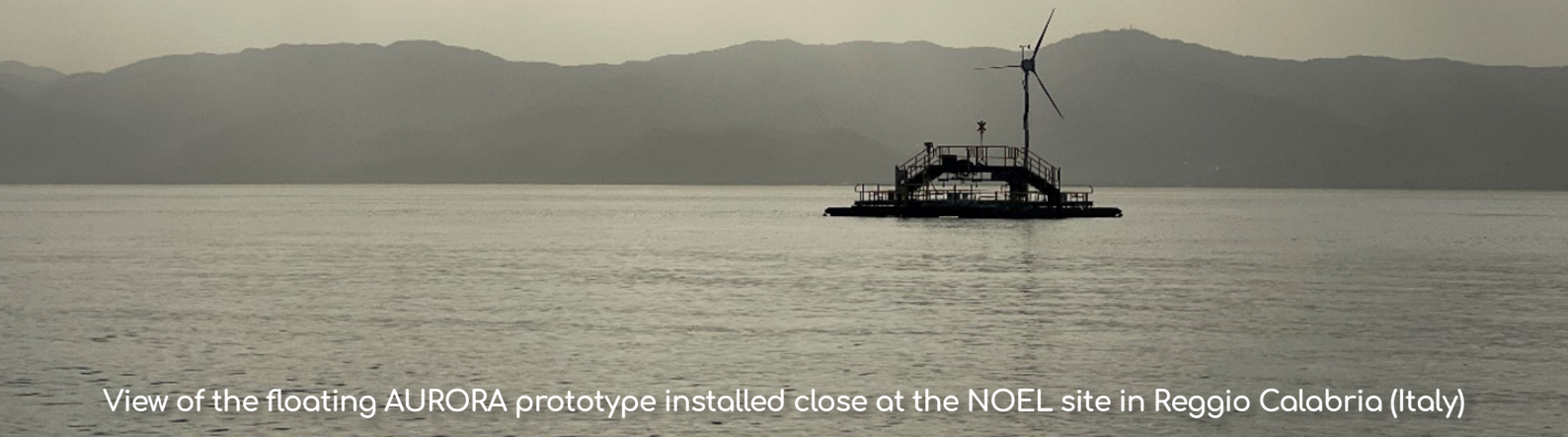
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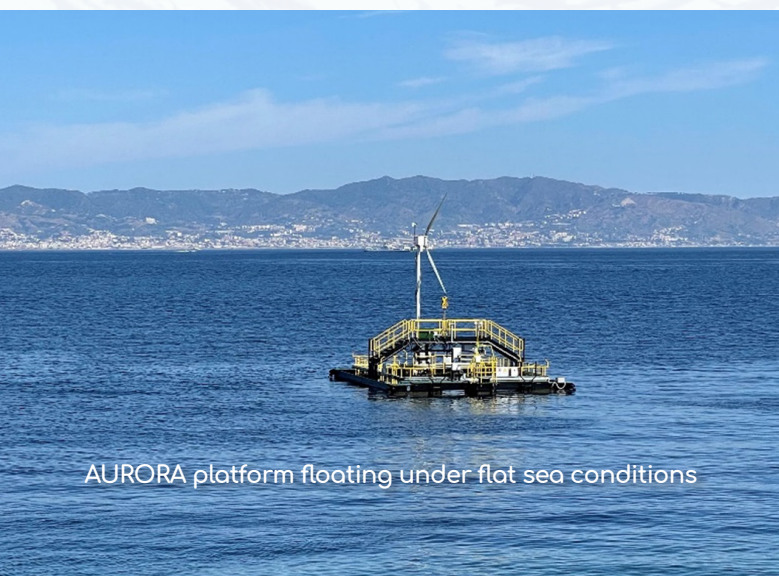
# AURORA PROTOTYPE INSTALLATION: TOWARDS THE CONCLUSION OF THE EXPERIMENTAL CAMPAIGN



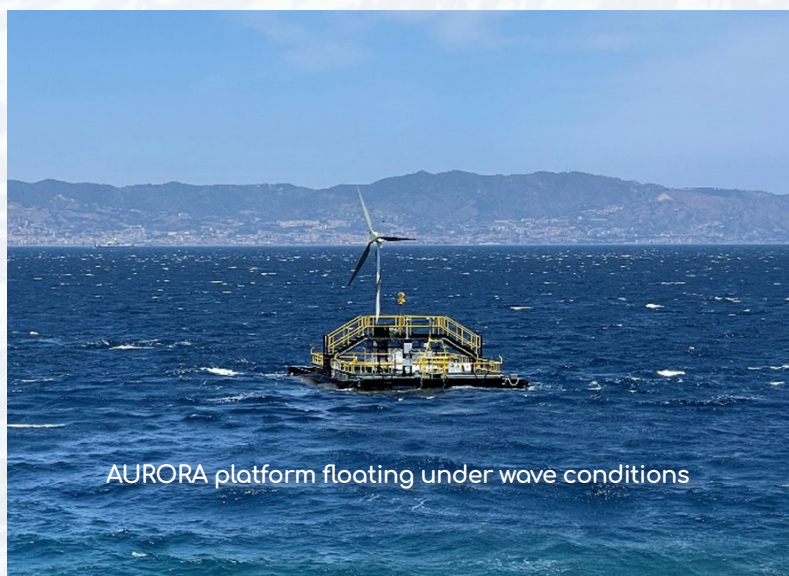
View of the floating AURORA prototype installed close at the NOEL site in Reggio Calabria (Italy)

We are glad to announce that the AURORA prototype of the BGF 1:15 scale model is quickly progressing with the planning of the experimental campaign at NOEL laboratory site of the “Università degli Studi Mediterranea” in Reggio Calabria (Italy). Thanks to the successful collaboration of all our project partners, who worked during the pandemic, the assembly, installation, and deployment has successfully achieved in late February - beginning March 2021, and since then data from the different configuration testing phases of this physical prototype have been acquired, recorded and processed. In particular, the different configurations included:

- 1) test with no blades rotation and with WECs windows closed (with water inside);
- 2) test with blades rotation and with WECs windows closed (with water inside);
- 3) test with blades rotation and with WECs windows open; test with blades rotation, with WECs windows open and with nets installed. The output of the entire testing campaign, suitably post-processed, will serve to design with more accuracy the BGF full-scale infrastructure, thanks to the numerical SW models calibration, obtained over two different scales experiments results.



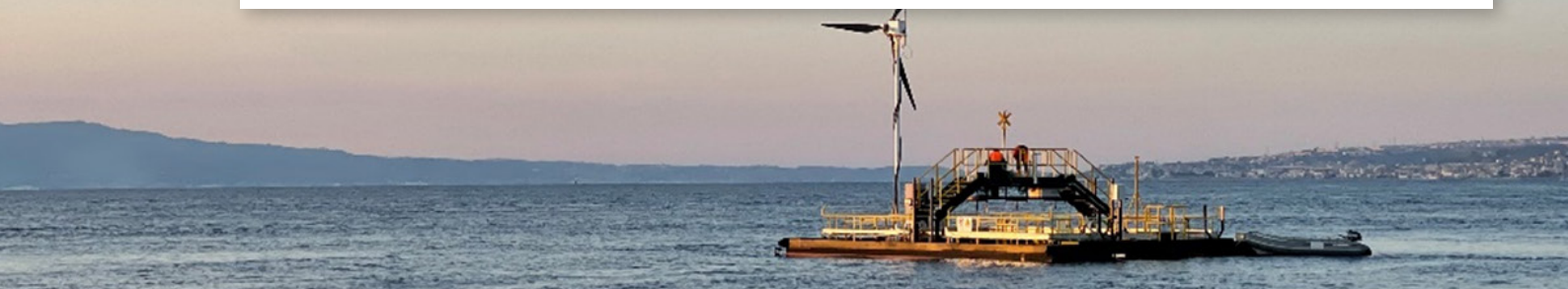
AURORA platform floating under flat sea conditions



AURORA platform floating under wave conditions



# CONTRIBUTION OF THE INTERVIEWED PARTNERS TO THE EXPERIMENTAL CAMPAIGN AT THE NOEL SITE



## What is the role of your company in the experimental phase?

 <b>Carlo</b>  <b>Anita</b>	<p>NOEL is the ocean laboratory of the Mediterranean University of Reggio Calabria. Thanks to exceptionally favorable metocean conditions of the Straits of Messina, NOEL site is ideal to perform experimental activities on waves and marine structures. In the BGF project, we are running the project outdoor testing campaign, which implied:</p> <ul style="list-style-type: none"> <li>• implementation, installation and management of two articulated measurement systems, dedicated to the continuous and synchronized measurement of metocean input data (wind, wave, current) and of structure response (structure motions, moonpool wave field, WEC dynamics, mooring loads, overtopping, etc.);</li> <li>• procurement and installation of a surveillance system on-board;</li> <li>• data pre-processing and interpretation;</li> <li>• cable connection between the structure and the land to guarantee electrical supply and data flow;</li> <li>• support to the authorization process and contacts with local authorities;</li> <li>• on-board operations.</li> </ul> <p>Finally, we monitor continuously the structure behavior, contributing to the necessary diagnostic, inspections and maintenance tasks.</p>
 <b>Sara</b>	<p>Polimi oversaw the wind turbine prototype design and construction, and it is at present involved in the experimental campaign at NOEL. Polimi is responsible of all the tests in which the wind turbine prototype is operating.</p>
 <b>Giulio</b>	<p>We designed the scaled net, in cooperation with NOEL, and assisted net factory in the proper assemblage to fulfil net scaling strategies. We designed and set up the prototype sinker frame, and installed nets and net connections on Aurora through our diving staff.</p>
 <b>Maurizio</b>	<p>The University of Strathclyde is in charge to develop the complex numerical model of dynamics used to design and assess the platform. The main aim of the experiment at the NOEL site was to verify and validate the numerical models developed. Therefore, we supported NOEL, that is in charge of planning and executing the experiments, on several aspects, like the type and position of the sensors to be used, verified some extreme load cases for health and safety aspects. We contributed to the overall coordination of the different experimental phases, collecting the data, and preparing the numerical model to be compared against these experimental data.</p>
 <b>Ambra</b> <b>Giacomo</b> <b>Alessandro</b>	<p>RINA has been supporting and guiding the experimental test campaign at NOEL on different aspects: a) defining safety issues and practices; b) achieving and collecting SHM data; c) post-processing all sensors data via BGF_AQUARES GUI; d) controlling and alarming anomalies on data acquired due to unexpected events; e) supporting the coordination of activities onboard.</p>
<b>FINCOSIT</b> <b>Gianluca</b>	<p>Fincosit was in charge of developing the construction design of the AURORA prototype, manufacturing and deploying it at NOEL site, finally providing control and installation supervision assistance during the entire experimental campaign. The final task of this kind of activity follows the completion of the experiments, when the prototype will conclude its functional scope and undergo decommissioning.</p>
 <b>Ibon</b>	<p>DITREL, as subsea connector manufacturer, is responsible for the validation of the quick connection manoeuvre between dynamic cable and platform. The name for this connector is KONEKTA2. While other subsea connectors are designed to be connected out of the water, KONEKTA2 allows for a quick connection under the water without the involvement of divers, cranes or big vessels. In the first stages of the project, Ditrel designed (together with the rest of the Consortium) the type of connector to be used. Then, we manufactured one prototype and acquired one length of dynamic cable to be attached to the male part of the connector. On the other side, the female part was sent to Fincosit for the integration with the floating platform.</p> <p>Finally, the 14th of July, Ditrel with the close help from TecNALIA, NOEL, Commercial Diving Activities and under on-site supervision of Bureau Veritas, we managed to perform the cable to platform physical connection. All activities have been carried out in strict liaison and cooperation with both NOEL, as responsible of the experimental campaign at NOEL and RINA Consulting, as project coordinator and main supporter of this experimental campaign.</p>



## How much important is the contribution of your team, according to your perspective, to conceive and implement the experimental phase at NOEL site?

 <b>Carlo</b>  <b>Anita</b>	<p>As coordinators and site operators, our contribution was indispensable for the realization and success of the experimental campaign. Our team has actively participated to the birth and development of the project since its earliest stage, contributing to Consortium establishment, structure concept definition, structure design and outdoor experimental campaign arrangement and implementation. The experimental campaign has been feasible thanks to the NOEL site environmental characteristics and the NOEL's team know-how. NOEL is indeed a one-of-a-kind laboratory, where experiments are carried out at sea, enabling to demonstrate higher technology readiness levels with respect to traditional indoor wave basins. Finally, our team's work resulted essential for the success of the campaign.</p>
 <b>Sara</b>	<p>Experimental activities at NOEL site can be considered a successful experience due to the great collaboration of all the involved partners. We believe that we gave a good contribution in consideration of our expertise in wind energy and in experimental activities.</p>
 <b>Giulio</b>	<p>We cooperated with other partners in defining areal limits of mooring system, with regard to bordering protected areas. The assessment of possible environmental effects of Aurora installation, operation and dismission was also under our responsibility. We also offered our contribution in defining the trials related to the assessment of internal pool water movement, in the perspective of understanding the environmental suitability of the pool under an acceptable fish welfare.</p>
 <b>Maurizio</b>	<p>The main contribution of University of Strathclyde was to ensure that the experimental data gathered at the NOEL site can be used for verification and validation of the numerical model developed, that is one of the main objectives of the whole project, since this numerical model is a primary design support tool. From this point of view, our contribution has been crucial.</p>
 <b>Ambra</b>	<p>My role in the RINA team was to develop the overall prototype control system of the AURORA platform (BGF_AQUARES), designed to provide a centralized tool capable of facilitating data gathering and data visualization capability from heterogeneous sources, thus providing consistent situation awareness for control process. My contribution has the main goal to integrate and persist all data coming from the platform subsystems and to present them to the operator via a single Human Machine Interface, thus transforming the incoming data in a compatible format for subsequent analysis with machine learning algorithms.</p>
 <b>Giacomo</b>	<p>My role in the RINA team was to install the entire Smart health monitoring system on the platform, composed by various type of fiber optics sensors: strain gauges, inclinometer, accelerometer and temperature sensor. After the installation of the sensors, I have configured the data acquisition unit for pre-processing the raw data and sending them from the Pc on-board to our workstation on the NOEL laboratory.</p>
 <b>Alessandro</b>	<p>I was in charge of designing functions and related performance of the offshore camera to be procured by NOEL to outfit the AURORA prototype. Following the installation onboard, I had the opportunity to follow the performance test and trials and to set a plan for the related demonstration of this technology.</p>
 <b>Gianluca</b>	<p>Fincosit is less involved in the experimental testing, but our propaedeutic activity (prototype construction and deployment) was indispensable to enable this campaign being a reality. Additionally, we are monitoring on a monthly basis the status of the installation (platform positioning, anchors stability, etc) to continuously guarantee operativity and safety to the technical team in charge of the experimental campaign.</p>
 <b>Ibon</b>	<p>Ditrel's contribution was formally to validate the KONEKTA2 connector. Then, it is very important to achieve all the agreed requirements with the EC. Additionally, we have demonstrated the reliability of the designs and procedures defined during the earlier stages of project and we have also validated the cost savings that our KONEKTA2 foresees for this kind of floating platforms. We must keep in mind that it has been the first KONEKTA2 manoeuvre in real conditions to connect one floating platform, so the challenge was big enough from Ditrel's point of view. Finally, the metoceanic conditions at NOEL site and the active involvement of Professor Felice Arena and the rest of the personnel were extremely helpful for the success of this milestone.</p>



## What challenges and risks did the pandemic raise in your work and specifically which impacts on the experimental activity onboard AURORA prototype have you registered?

 <b>Carlo</b>  <b>Anita</b>	<p>The pandemic raised caused direct and indirect impacts on the experimental activity planning and implementation. Laboratory activities in person were limited, due to national restrictions during the spring 2020, as well as most of the project activities. In addition, the purchase and delivery of the measurement systems suffered from significant delays, as providers were heavily impacted by the pandemic. Finally, project meetings between partners and with third parties were limited as well, due to restrictions in travel and gathering. Due to these reasons, European Union extended the duration of the project and admitted a delay in the experimental activities. We managed to fulfill the new objectives and timeline, in the full respects of all the regulations and recommendations. In this regard, we are proud to note that the laboratory has always been Covid-free until now and that experimental activities have not suffered from anyhow, except for the mentioned delay.</p>
 <b>Sara</b>	<p>Pandemic had a not negligible impact on all our activities and in even in the evolution of the project: it was a stressful period and it was not easy to reorganize the work and the way to collaborate. We registered delays even because of problems encountered with suppliers, nevertheless, we believe that in the end, the whole Consortium was able to face the difficulties going ahead with the ongoing experimental activities in an efficient and safe way.</p>
 <b>Giulio</b>	<p>Beside the general delays in prototype building and installation, the compression of time available for trial has led to maximize the data extraction in a shorter time window than expected before pandemic.</p>
 <b>Maurizio</b>	<p>We had a number of visits planned, to “touch and feel” the NOEL model, which is always very useful and complementary to see the model only in pictures, CAD graphs, or in computer models – one thing is, for example, that although we now down to the millimeter all the measures, seeing the thing for real gives always another perspective on the size of the model, and on the practical aspects.</p> <p>Unfortunately, all these visits had to be cancelled. However, we were able to compensate the loss through a number of extra meeting and supplementary exchange of information. We still hope to see the model in person by the end of the project, if possible, but if not, we are still confident to fulfill the aim of the project.</p>
 <b>Ambra</b>	<p>My specific work is a software development activity; the impact is medium/low. I developed the BGF_AQUARES application remotely. The interaction with the BGF team collaborators was performed via email or collaboration tools, allowing to achieve the goal without particular risks.</p>
 <b>Giacomo</b>	<p>The pandemic did not delay my work in any way, because the installation was performed outdoor.</p>
 <b>Alessandro</b>	<p>Even in the case of the offshore camera management, I was lucky to being able to follow the entire activity by remote, thanks to the capacity to command the camera movement from remote in a seamless way.</p>
 <b>Gianluca</b>	<p>Given that the installation control activity is normally done in absence of any interaction with the working team and basically independently from, our contribution had less impact by the pandemic. Then we may say the continuous assessment of operativity and safety has been guaranteed to the experimental team regardless the pandemic.</p>
 <b>Ibon</b>	<p>Our overall manufacturing activity was not affected so much during 2020 and 2021 due to our strategic position in the electrical supply chain for onshore products (pins for suspended glass insulators). Of course, we implemented all possible safety measures to avoid COVID-19 transmission, such as different working shifts, extra air circulation and sanitizing gel and masks everywhere. By fortune, our team is composed by six members, easy to manage, and no one has been infected for the whole experimental campaign from our side.</p> <p>Regarding the manufacture and supply of the connector for the AURORA prototype, we found some delays and cost increases from some of our common suppliers during 2020. By fortune, Ditrel is located in one relevant industrial area in the Basque Country and we always avoid depending on one single provider in order to have alternatives. All physical meetings between partners were obviously changed by virtual ones but we can conclude that the communication has been fluent and frequent to have all the involved people updated.</p>



**What is the added value brought by this activity at sea to your professional and academic experience and which role the collaborative work established in the BGF team (both physical and remote) has played on the results of this experimental campaign?**

 <b>Carlo</b>  <b>Anita</b>	<p>More than 20-years of experience maturated by the team about experiments in the field resulted extremely precious for the success of the project. Outdoor experimental campaigns are indeed more complex and unpredictable than the indoor ones, as the environment is not controlled and more aggressive, the duration is often prolonged and all the operations are more challenging. The experience of the team is precious also for data exploitation for industrial and scientific purposes, as particular care must be paid in the choice and distribution of sensors, experimental campaign realization and data pre-processing and interpretation, to maximize the significance of the data. Finally, the collaborative work established within the Consortium has also played a fundamental role, especially thanks to the sharing of complementary knowledge. This is indispensable in such a multi-disciplinary activity such as TBGF project, involving quite different tasks such as aquaculture, wind and wave energy productions, floating structure dynamics, maritime surveillance, etc., and will be increasingly important in the future of any kind of research. In this context, the use of the latest technologies for remote meetings, data sharing and remote operations have proven essential, allowing fulfilling in remote most of the project tasks, in spite of the restrictions due to pandemic raise.</p>
 <b>Sara</b>	<p>Participation in a big project that involves several partners is always an experience that permits to increase knowledge and skills both from a scientific and from a management and human point of view. In particular, it has been a profitable occasion to meet people with different backgrounds. The possibility to start with a physical collaboration helped a lot to switch into the remote one when the pandemic imposed it.</p>
 <b>Giulio</b>	<p>These activities have led our team to focus properly on fish welfare in extreme environments, a subject that we dealt with before and where a formal analysis was not been achieved yet. The collaborative work has been total, being the flux of information from other groups always complete and having supported open discussions on the best way to reach the expected goals of the experimental campaign.</p>
 <b>Maurizio</b>	<p>The added value of this activity not only for us, and for the Consortium, but for the whole research community is quite substantial. The NOEL model is one of a kind, no other models like this one (integrating wind and wave energy devices, and aquaculture system, at such a big scale) has been done before, and therefore the experience accumulated and the experimental data that are being obtained are unique, novel, pushing forward the knowledge in this exciting and booming field.</p> <p>Of course, such an endeavor, very challenging due to all the novel aspects involved, would have not been possible without a large Consortium such as the one of BGF project, linking together all the necessary expertise in planning and executing this first-of-its-kind experiment. And the other additional, but very important aspect, is that a network of experts at European level has been established, crucial for the further development of the timely and urgently needed Blue Growth sector.</p>
 <b>Ambra</b>	<p>The collaboration in the BGF team has played a major role in the results of the campaign. From my perspective, my main challenge was to be able to integrate different sensors/subsystems data, exchanged using different formats. Luckily the communication in the team has always worked and allowed us to deploy the BGF_AQUARES monitoring application without particular obstacles, also considering the flexible design chosen in order to configure the data gathering feature. Additionally, I found of great importance the continuous (and exhausting) interaction with RINA IT department to analyse the cyber risk threats of the application, define the best strategy for the data communication with NOEL, and set the basis for the implementation of adequate solutions to minimize that risk. Being part of this endeavor has been indeed exciting and formative over 360° perspective, and allowed me to expand my knowledge over the Blue Economy theme.</p>
 <b>Giacomo</b>	<p>The collaboration within the team led to the proper functioning of the system. From my point of view, the greatest work to be done as a team will be comparing the data with the other systems. I found very interesting to collaborate with university partners who are very knowledgeable about the blue economy</p>
 <b>Alessandro</b>	<p>My expertise on sensors-based monitoring system fills in with this task scope, then it was very comfortable working on BGF. Nevertheless, it was a pleasure to meet NOEL lab and its valuable experience in the ocean engineering and maritime assets testing capability.</p>
 <b>Paolo</b>	<p>It is quite unusual to me to work with academic partners and in the context of small demonstration prototype. Our pontoon is used to move weights order of magnitude higher than the one offered by AURORA and in context where environment challenges and risks are indeed higher. Nevertheless, it has been a pleasure to learn how small-scale testing could be useful in getting valuable output to more accurately design the full scale infrastructures. The ones we build every day!</p>
 <b>Ibon</b>	<p>Ditrel's test campaign was focused on the validation of the cable to platform connection, in terms of feasibility and cost savings compared to the state of the art. This testing opportunity given by BGF project has increased KONEKTA2 credibility in the Marine Renewable field, demonstrating the benefits of this technology to the community. The remote cooperation with the rest of the partners (for the structural integration of the connector, dynamic behavior of the cable, safety aspects, permissions, boat availability) has been demonstrated to be successful. Additionally, after the offshore connection manoeuvre new technological improvements have been raised on the table to be further developed with partners from the Consortium.</p>





Join us !

### **The Blue Growth Farm at Tropicalia Exhibition in Venice - 11.09 / 21.11**

[www.sustainablerevolution.org](http://www.sustainablerevolution.org)

The Blue Growth Farm project will have the occasion to show its technological and strategical innovation within engineered offshore aquaculture platform during the developmental steps of the projects. The exhibition will last for two consecutive months, from September up to November 2021, at the “Biennale di Venezia” exhibition site in the “Sustainable Revolution” framework.

### **The Blue Growth Farm at the “Aquaculture Europe” Congress in Madeira - October 2021**

[www.aquaeas.org](http://www.aquaeas.org)

We are glad to announce that TBGF is going to attend the European Aquaculture workshop (AE2021), organized by the European Aquaculture Society, to be held in Funchal, Madeira, October 4<sup>th</sup>-7<sup>th</sup>, 2021.

The workshop will involve the scientific community, together with researchers in the field and the aquaculture industrial protagonists from all over Europe.

In particular, the Blue Growth Farm team will be present at a booth n. 76 sharing information with the Conference attendees through promotional materials and videos of the most recent project’s advancements.



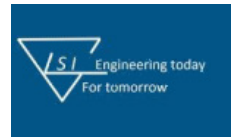
### **Third Stakeholders Workshop - online - Event planned for October 2021**



PARTNERS:



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