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# Verification through Accelerated testing Leading to Improved wave energy Designs

# VALID

Verification through Accelerated testing  
Leading to Improved wave energy Designs



## Your new platform

Deliverable 7.6  
Training Programme Plan  
Version 1.0  
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**Lead participant: AAU**  
**Dissemination level: PU**



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### Dissemination level

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

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## Executive Summary

As part of WP7, the Training programme plan (Deliverable 7.6) aims to support the overarching Knowledge Exchange and Dissemination Strategy (Deliverable 7.1) by developing a plan for using online webinars to support knowledge exchange and dissemination of the project results.

The training programme plan outlines the tentative content of three webinars to be given on a yearly basis. The proposed topics are “Hybrid Testing for Wave Energy Converters: Virtual Modelling”, “Accelerated Hybrid Testing for Wave Energy Converters” and “VALID Accelerated Hybrid Testing Platform: Demo Cases”. In addition, two industrial workshops are planned during the last year of the project. This deliverable also provides details about the logistics behind the webinars and industrial workshops.

The training programme plans are expected to evolve along with the project. Once D7.6 is submitted, a ‘live version’ of the document will continue to be updated as necessary throughout the course of the three-year VALID project.



### Project partner names

RISE	RISE Research Institutes of Sweden AB
TECNALIA	Fundación Tecnalia Research and Innovation
CORPOWER OCEAN	CorPower Ocean AB
RINA-C	RINA Consulting S.p.A.
BiMEP	Biscay Marine Energy Platform SA
IDOM	IDOM Consulting, Engineering, Architecture, S.A.U.
AAU	Aalborg University
AVL	AVL List GMBH
Wavepiston	Wavepiston AS
TU Delft	Delft University of Technology
Aquatera	Aquatera Sustainability Ireland LTD
JFC	Julia F. Chozas, Consulting Engineer
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# 1 Introduction

## 1.1 Project background

The VALID project will develop a hybrid testing platform that encompasses several components and subsystems that form Wave Energy Converters (WECs) as test cases, with the final goal of delivering a novel methodology for accelerating WEC technology development.

The consortium approach builds upon a unique hybrid method that is highly adaptable (covering a wide range of technologies and input conditions), and that can minimise expenditure in both prototype development costs and real sea-testing, whilst promoting increases in the reliability and survivability of critical components.

The VALID project is organised in eight different work packages specifically designed to develop a Hybrid Testing Platform and communicate, disseminate, and exploit project outputs.

## 1.2 Scope of Training programme plan

The aim of the training programme plan is for the VALID team to present the progress made in the project to date, in an easily accessible manner – through webinars that will be open to the public. The webinars will be distributed over VALID's project timeline, following the progress of the work. At present, there are three planned webinars with the following tentative titles:

1. Hybrid Testing of Wave Energy Converters: Virtual Modelling.
2. Accelerated Hybrid Testing for Wave Energy Converters.
3. VALID Accelerated Hybrid Testing Platform: Demo Cases.

The first webinar will cover the work done in WP1, as reported in Deliverables “Accelerated Testing Requirements” (D1.1) and “Critical Components and Modelling Limitations” (D1.2). The second webinar will cover the work done in D1.1 and in WP2 Deliverables “Specification of the open architecture of a VALID Hybrid Test Platform for the wave energy sector” (D2.1) and “Specification for connecting the different models” (D2.3) as well as the experiences gained in WP3-5 dealing with setting up the VALID Accelerated Hybrid Testing Platform. The third and final webinar will cover the application of the VALID Hybrid testing platform to the three User Cases and discuss the results obtained (WP3-5). The three demo cases in VALID are (see Figure 1):

- *Dynamic sealing degradation*, as investigated using the CorPower Ocean point absorber (PA) device.
- *Electric generator failure*, as investigated using the Marmok floating Oscillating Water Column (OWC) device.
- *Hydraulic pump failure*, as investigated using the Wavepiston oscillating surge wave energy converter (OSWEC) device.

The communications plan consists of the following sections:

- Section 2 of this document outlines the contents of the expected webinars.
- Section 3 details the webinar platform and logistics.
- Section 4 provides details about industrial workshops.
- Section 5 contains lessons learned from the webinars/workshops and is to be updated after every webinar/workshop.



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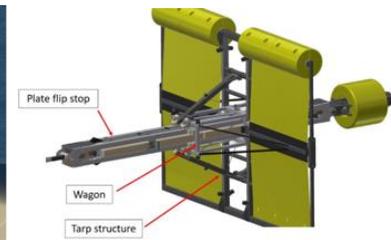
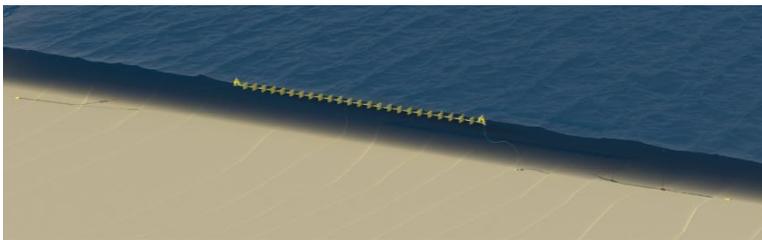
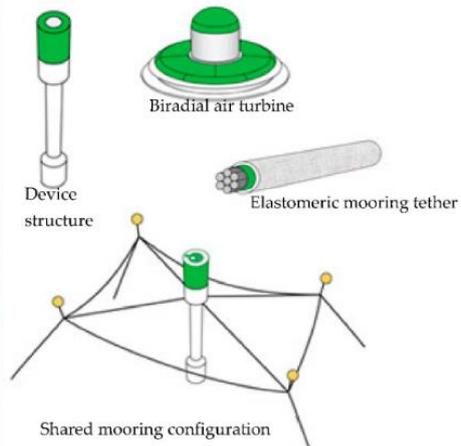
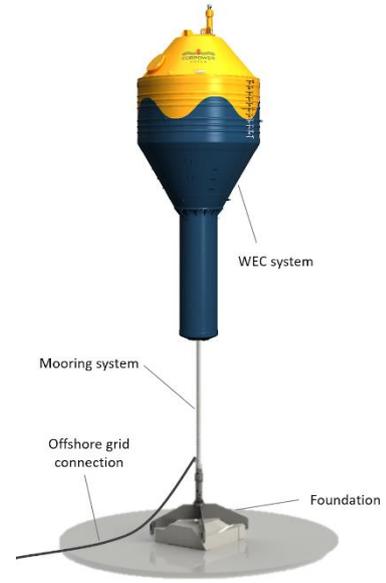


Figure 1: Top: CorPower Ocean PA. Middle: Marmok OWC. Bottom: Wavepiston OSWEC.



## 2 Webinar Content

### 2.1 Webinar 1

**Title:** HYBRID TESTING OF WECs: VIRTUAL MODELLING

**Keywords:** hybrid testing, virtual models, wave energy converters

**Tentative Date:** May 2022

**Summary:** Hybrid testing presents an alternative testing technique to the conventional large-scale structural testing process. It involves physically testing the portions of a device whose behaviour is difficult to model (such as connections or repaired sections), while modelling/simulating the remaining components of the structure. Thus, it presents the possibility of large-scale testing without having to fabricate large portions of the technology. Hybrid testing is being used in a wide variety of industrial sectors (e.g., automotive, aerospace, offshore engineering, wind energy) but has not been applied to ocean energy yet.

The webinar will provide an overview of hybrid testing, and the use of hybrid testing primarily in the automotive industry. The presentations will cover the prospects of using this approach in the wave energy sector, with a clear focus on the virtual (numerical) side. The questions of real-time modelling and coupling with industry standard tools will be addressed. The virtual modelling side of VALID User Case 1 will be presented.

**Preliminary agenda:**

- (5 min) – Welcome to the webinar from the moderator (and initial waiting time)
- (20 min) – Overview of the MODEL.CONNECT framework (AVL)
- (20 min) – Virtual model coupling using MODEL.CONNECT (CORPOWER)
- (10 min) – Questions and answers between the speakers and the attendees through chat

### 2.2 Webinar 2

**Title:** ACCELERATED HYBRID TESTING FOR WECs

**Keywords:** hybrid testing, accelerated testing, wave energy converters, hardware-in-the-loop.

**Tentative Date:** December 2022

**Summary:** Accelerated hybrid testing presents an alternative testing technique to the conventional large-scale structural testing process. This webinar will focus on the physical side of the hybrid testing using AVL's Integrated and Open Development Platform (IODP). The connection between the physical and numerical side will be discussed as well as the possibilities and problems of accelerating the testing.

The key part of the webinar will focus on the development of the test rigs within the VALID project and coupling between the virtual and physical components using IODP. The possible impact of hybrid testing on future WEC's development will be discussed.

**Preliminary agenda:**

- (5 min) – Welcome to the webinar from the moderator (and initial waiting time)
- (40 min) – Presentation (AVL, TECNALIA, AAU)
- (15 min) – Questions and answers between the speakers and the attendees through chat



## 2.3 Webinar 3

**Title:** VALID ACCELERATED HYBRID TESTING PLATFORM: DEMONSTRATION CASES

**Keywords:** hybrid testing, accelerated testing, wave energy converters, best practice, demonstration, reliability

**Tentative Date:** November 2023

**Summary:** Overview of the work performed in the VALID project with a focus on the VALID accelerated hybrid testing platform and the application to the three demonstration cases mentioned above. Guidance and best practices in accelerated hybrid testing will be presented, based on the deliverables “VALID testing plan guidance” (D1.3) and “Guidance Note – Methodology for Critical Component / Subsystem Testing” (D1.5). The three demonstration cases will illustrate the application of hybrid testing using the VALID hybrid testing platform, covering the virtual and physical test rigs. The webinar will discuss how the VALID platform can be used to improve the reliability and survivability of the WECs.

### **Preliminary agenda:**

- (5 min) – Welcome to the webinar from the moderator (and initial waiting time)
- (10 min) – Introduction and explanation of the three cases (RISE)
- (20 min) – User case #1: Dynamic sealing degradation (CORPOWER)
- (5 min) – Questions and answers between the speakers and the attendees through chat
- (5 min) – Short break
- (20 min) – User case #2: Electric generator failure (IDOM/TECNALIA)
- (5 min) – Questions and answers between the speakers and the attendees through chat
- (20 min) – User case #3: Hydraulic pump failure (WAVEPISTON)
- (5 min) – Questions and answers between the speakers and the attendees through chat
- (5 min) – Closure (RISE/AQUATERA)



## 3 Webinar Logistics

### 3.1 Webinar platform

**Platform:** Zoom Pro

**Partner subscription:** Aquatera Ltd

**Functions:**

- Host meetings with up to 100 participants
- Break-out rooms
- Social media streaming
- Recording of meeting
- Whiteboard
- Group meetings for up to 30 hours
- Private and group chat

**Gathering attendees:**

In the months leading up to each webinar, the Communications Team, led by Aquatera, will create a plan for effectively advertising the VALID webinar to interested stakeholders, using for example the Stakeholder Database, social media platforms, project partners' networks and the VALID website.

**Sign up process:**

- Create a registration page for the event
- Registered participants will receive an invitation with a link to the webinar
- Syncs to participants' calendars

**Additional tools beyond Zoom:**

- Slido – live survey tool
- Mentimeter – real-time voting
- Google Jamboard – online whiteboard

### 3.2 Logistical roles

**Moderator:**

The Moderator is in charge of hosting the event, which involves welcoming guests, giving a short overview on the webinar topic and introducing the speakers. They will host any polling or questions that are put to the participants throughout the event. They are also responsible for posing participants' questions to the speakers during the questions and answers session. Finally, the Moderator will summarise the discussion points and thank participants for attending at the close of the event.



#### Specific responsibilities:

- Start the webinars
- Introduce housekeeping rules of the webinar in relation to the use of cameras, microphones, the chat function and questions and answers function
- Explain that the event will be recorded
- Explain format for the webinar and how and questions and answers session will work
- Hold poll at start, if chosen
- Ask participants questions to the speaker most fit to answer
- Conclude the webinar

#### **Facilitator:**

The Facilitator works in conjunction with the moderator as a silent participant, ensuring that all participants are able to enter the room and handling any technical issues that might arise.

#### Specific responsibilities:

- Silent participants
- Compile all slides into one slide deck in advance of the event
- Manage entrance from lobby/all technical issues
- Run through the slides on behalf of Moderator and speakers
- Gather question and answers in support of the Moderator

### **3.3 Pre- and post-webinar**

The three proposed webinars across the three-year VALID project provide an opportunity to reflect on and quantify the progress of the project thus far. Therefore, each webinar becomes a valuable tool that can be used across multiple platforms. A lot of work from multiple parties goes into producing an effective webinar, and it is important to be well-prepared while also ensuring that the final product can be exploited effectively. Because each webinar will be recorded, we will be able to share the final resource in line with VALID's D7.3 Communications Plan and as noted in the following.

#### Pre-webinar preparations:

- Gather video content, clips, images, and any other visuals to use during event
- Distribute drafts of the presentations to the VALID consortia for review at least two weeks before the webinar
- Collect PowerPoint slides from each of the speakers, compile into one presentation
- Test equipment/platform; carry out a test-run of webinar with speakers
- Advertise the webinar using multiple channels
- Manage the registrations process to ensure simplicity for the participants.



#### Post-webinar dissemination:

- Add recording as resource on VALID project website
- Share on VALID social media platforms, and request project partners to share
- Email recording out to stakeholder database/ incorporate in a VALID newsletter
- Email recording to those who subscribed to event
- Report on lessons learnt and summarise the questions and answers session in Section 4 of this document. Also include a brief summary of webinar in the VALID [communications activity tracker](#).

### **3.4 Educational content**

The educational content will be mainly presentation slides and the webinar recordings.

### **3.5 Stakeholder groups**

The webinars will be launched without any participant restrictions. The webinar registration page will be shared via email using VALID's Stakeholder Database and VALID's social media channels.



## 4 Industrial Workshops

### 4.1 Proposed venues/events

In addition to the webinars, at least two industrial workshops will be organised during 2022-2023. To heighten participation and reachability, the workshops will be planned in conjunction with relevant international conferences. Examples of venues/events which could be considered are:

- International Conference on Ocean Energy (ICOE2022), San Sebastian, Spain, 18-20 October 2022
- The 15<sup>th</sup> European Wave and Tidal Energy Conference (EWTEC2023), Bilbao, Spain, 2023
- The annual Ocean Energy Europe Conference & Exhibition (OEE2023), 2023

### 4.2 Logistics

An organizing committee for the industrial workshops will be established within the VALID consortium. During the preparatory phase, the following workshop features will be discussed and established within the organizing committee.

#### Purpose/preparations:

- Identify purpose of the workshop.
- Identify goals and outcome.
- Prepare a concise and appealing short summary of the workshop for marketing/registration.

#### Participants:

- Identify target groups (this is also correlated to selected event).
- Facilitate registration in conjunction with conference event.
- Establish if participants can help in the preparation or planning of the workshop (e.g., questionnaire: background, topics of interest, expectations etc.)

#### Product:

- Define tangible product – prepare physical documents, presentations, etc. for participants.
- Define intangible product – insights, ideas, next steps.
- Identify a working space (climate).
- Include collaborative exercises.
- Identify measurable results/input.

#### Follow-up process:

- Establish a way to follow-up with the participants after the workshop.
- Establish measurable outcome/outreach of the workshop.



Agenda:

- Incorporate varying environment/activities/discussions/forms of learning/communication.
- Ensure that content is engaging and enables participants to connect.
- Ensure that content leads to meaningful conclusions.
- Incorporate transfer of learning during workshop.

### **4.3 Logistical roles**

Similar logistical roles (moderator, facilitator, participants) to that described for the webinars in Section 3 will also apply to the industrial workshops.

### **4.4 Follow-up**

A follow-up process with the participants after the workshop could be a valuable way to receive feedback on e.g., the workshop content and usability of the project results.



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## 5 Lessons Learned

This section will be updated after each webinar/workshop including the feedback received and the lessons learned.



## 6 Nomenclature

### Abbreviations

D	Deliverable
EC	European Commission
EU	European Union
H2020	Horizon 2020
OSWEC	Oscillating surge wave energy converter
OWC	Oscillating water column
PA	Point absorber
WP	Work Package