

# Integrating Sensors Using Bristlemouth, an Open Connectivity Standard for Marine Hardware

## **Reserved Seating**

Seating for this event is limited, so attendees must gain permission from the instructor in advance if they would like to attend. Those interested in attending should email Zack Johnson at [zack@sofarocean.com](mailto:zack@sofarocean.com) with the subject line 'OCEANS 2023 Bristlemouth Training' and include the following information:

- 1) What is the name of the person interested in attending?
- 2) Do they have the prerequisite skills mentioned below?
- 3) Please confirm that the attendee can bring their own laptop.

## **Prerequisite Skill Sets:**

- Basic programming/coding ability in C or Micropython

## **Materials:**

- Participants will bring their own laptops
- Sofar Ocean will provide Bristlemouth hardware and sensors for the hands-on portion

## **Summary:**

Integrating sensors onto marine platforms has traditionally been time-consuming, expensive and risky, as the ocean environment is extremely harsh and every integration must be bespoke. Bristlemouth, a new open connectivity standard for marine hardware, has changed that paradigm with easy-to-use, plug-and-play physical connectors and Arduino-like programming interfaces enabling rapid and repeatable integration of marine based sensors.

During this 2-hour session, participants will learn about the Bristlemouth standard, including the physical connector and the software used to manage sensors on the Bristlemouth network. They will see examples of off-the-shelf and custom sensors successfully being integrated using the standard. Next, participants will learn to appropriately scope a Bristlemouth project, including identifying sensors and platforms that are a good fit for Bristlemouth. Finally, they will have the opportunity to work on their own sensor integration in smaller groups.

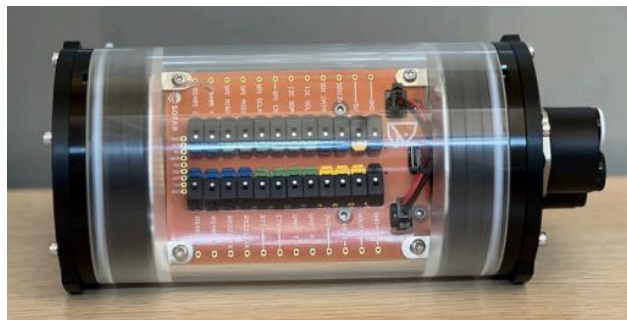
It is recommended that participants bring their own laptops so that they can participate in the programming of a Bristlemouth-enabled sensor. Technical topics covered will include:

- Using the Bristlemouth Control Message Protocol to enable efficient content-aware multicast routing
- Establishing peer-to-peer communication to exchange data across endpoints
- Managing 2-conductor Power Line Communications (PLC) to distribute DC power and data across a network

Participants will have the opportunity to learn how efforts that traditionally required extensive hardware engineering can now be accomplished quickly and repeatedly with high level software application development and configurations. Additionally, participants will see examples of how Bristlemouth will not only save time making common integrations but also enable more novel innovation, rapid prototyping and sensor scaling. By the end of the session, participants will have the skills to independently conduct their own sensor integration using the Bristlemouth connector and programming interface.



*Figure 1: During the training session, participants will have the opportunity to get hands-on with the two wired Bristlemouth marine connectors. These physical connectors are open designed and greatly simplify the mechanical and electrical connection between marine systems.*



*Figure 2: The Bristlemouth Smart Mooring Development kit will provide participants the flexibility and controls to connect a multitude of supported payloads directly into the power and data controls of the Sofar Smart Mooring system.*

#### **Agenda:**

- Introduction to the Bristlemouth standard: What it is, how it works, and what it enables
- Examples of a few different Bristlemouth applications
- Project scoping: Participants will be trained on what makes a good Bristlemouth project
- Hands-on portion: Participants will use their laptops and learn about the Bristlemouth repos and programming interfaces
- Hands-on portion: Participants will break out into groups of (2-3) and use Bristlemouth to integrate some common sensors to a Sofar marine platform