



Fulbright Portugal @65 Talks

Bruce Howe

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7 May 2025

6.30 PM – 7.30 PM

FLAD – Fundação Luso-Americana para o Desenvolvimento

(Rua do Sacramento à Lapa, 21. Lisboa)

"Observing the Oceans and Earth: the Role of Subsea Cables"

Understanding climate change, ocean warming and circulation, sea level rise, and tsunamis, earthquakes and geophysics comes with observations. Because the ocean and earth are difficult and costly to monitor, we lack fundamental data to adequately model, understand, and address these processes. Over the last decades, dedicated submarine cable systems have been supporting science and early warning. These are now evolving to be based on a commercial component, what we call SMART Cables: Science Monitoring And Reliable Telecommunications.

The SMART Cables Initiative is working to integrate sensors into telecom cables. These sensors will share the power and communications infrastructure of millions of kilometers of undersea cable, enabling seafloor-based global ocean and Earth observing at modest incremental costs. The UN Joint Task Force (JTF) is facilitating the adoption and implementation.

Initial sensors include temperature, pressure, and seismic motion. These sensors will provide data for improving ocean heat content and circulation and sea level rise estimates, global tsunami and earthquake warning networks, and geophysical understanding of the earth. These sensors and future extensions can help protect the cable from natural and anthropogenic hazards.

We review some history and then describe the SMART initiative and provide more detail on two systems: Tamtam connecting Vanuatu and New Caledonia, and Atlantic CAM connecting Lisbon (the Continent), Azores and Madeira in a 3700 km ring with SMART nodes along the cable, both to be installed in 2026. Opportunities for further developments to improve both ocean observing as well as cable protection will be discussed.



ITU/WMO/UNESCO IOC Joint Task Force

SMART Cables

Dr. Bruce Howe is Chair of the international Joint Task Force (JTF) SMART Cable initiative, (Science Monitoring And Reliable Telecommunications) to incorporate sensors into commercial trans-ocean submarine telecommunication cable systems for climate, ocean circulation and sea level monitoring and tsunami and earthquake warning, now with several projects funded. Dr. Howe develops ocean observing infrastructure, including cable systems. Projects have included basin-scale acoustic thermometry and planning, development, and operation of cabled observatories. At Station ALOHA 100 km north of Oahu, he and his team installed and operate the ALOHA Cabled Observatory – the world’s deepest plug-and-play power and Internet node on the planet at 4728 m water depth, now with more than 10 years of continuous data. After obtaining engineering and oceanography degrees at Stanford University and the University of California at San Diego, he worked at the Applied Physics Laboratory, University of Washington, and since 2008, at the University of Hawai‘i, Department of Ocean and Resources Engineering.