Keynote

Thu. Nov 12, 2026 9:00 AM - 10:30 AM JST | Thu. Nov 12, 2026 12:00 AM - 1:30 AM UTC | Room A (Oshidori) (2F)

Keynotes A2

Chair: Fumio Inagaki, Swadhin Behera

9:35 AM - 9:55 AM JST | 12:35 AM - 12:55 AM UTC

[MW49V9HW-03] Bridging the Physical and Virtual Ocean: A Cyber-Physical Approach to Marine Digital Twins

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While the ocean surface is comprehensively observed via satellite technology, the underwater environment remains a largely unexplored frontier where real-time monitoring presents significant challenges. Since the commercialization of the world’s first practical fish finder in 1948, Furuno Electric has been relentlessly dedicated to the "visualization of the ocean." Acoustic technologies have since evolved from single-point, downward-looking echo sounders into advanced multi-dimensional sonars capable of simultaneously capturing wide-area volumes. Furthermore, the integration of ocean current profiling capabilities has continually expanded the methodologies available for marine sensing and resource exploration.

Today, rapid advancements in cloud computing and Artificial Intelligence are revolutionizing these traditional approaches. By seamlessly aggregating acoustic data from fishing fleets and smart buoys, dynamic, wide-area ocean monitoring can now be achieved. For example, AI-equipped sensors deployed on set nets automatically analyze net conditions and classify fish species in real time, directly optimizing the daily operational behavior of fishers.

Concurrently, data-driven fishing ground forecasting systems have been commercialized. By analyzing global oceanographic data—including water temperatures, currents, and sea surface heights—these systems can predict high-probability fishing zones prior to departure. Notably, AI-optimized predictive models are increasingly reporting forecasting accuracies that surpass those of conventional physical models.

The next-generation marine digital twin is thus envisioned as a "cyber-physical" ecosystem: one that harmoniously integrates real-world acoustic sensing with virtual, AI-driven predictions. In this session, this synergy will be explored from the perspective of an industry manufacturer. Actual use cases will be presented demonstrating how these integrated technologies are practically implemented in the field, creating a robust bridge between the physical and virtual ocean to empower end-users and ensure sustainable maritime operations.

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