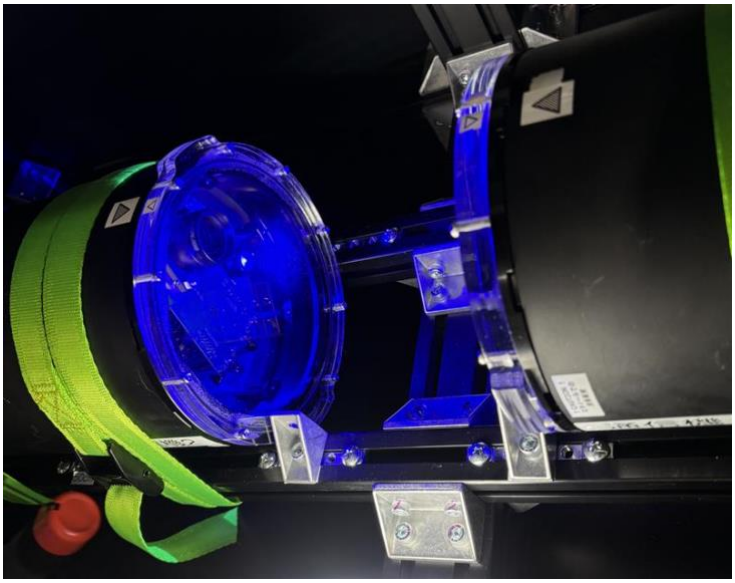
Press Information

Kyocera succeeds in world's fastest 750 Mbps short-range underwater wireless optical communication (UWOC) in offshore trials

Transforming marine data transfer and underwater Internet of Things with blue laser innovation.

Kyoto/London, 16th October 2025. Kyocera Corporation achieved an underwater wireless optical communication (UWOC) high-speed rate of 750 Mbps[1] with no latency, the world's fastest to date, in a prototype system featuring Kyocera SLD GaN lasers. The offshore trials took place near Numazu City, Shizuoka Prefecture with the ultimate goal of 1 Gbps speeds to advance high-speed, high-capacity communication for various underwater businesses, including underwater drones for marine research and smart aquaculture.



Kyocera's 1 Gbps short-range underwater wireless optical communication (UWOC) system under development

Offshore trials background

Recently, many organizations have increased use of marine resources and prioritized environmental conservation. Industry leaders are anticipating the use of smart AI-driven aquaculture and underwater drones, as well as AUVs (Autonomous Underwater Vehicles), to inspect and monitor underwater infrastructure. However, radio waves attenuate significantly in

[1] In 15 cm short-range optical wireless communication at a depth of 6.7 m in actual offshore conditions (Kyocera research as of September 2025).

water. Acoustic communication, which professionals commonly use, transmits large data volumes, such as images or videos, slowly. In contrast, underwater communication using light experiences little attenuation and enables high-speed data transmission. By focusing on this feature of light, Kyocera develops UWOC technology using GaN lasers, enabling high-speed, high-capacity, and low-latency communication. In January 2025, Kyocera achieved a communication speed of up to 1.8 Gbps in indoor experiments. To move toward practical application, Kyocera conducted communication trials offshore and confirmed the technology's usefulness. Despite these advancements, the system's operational range and effectiveness can be affected by water clarity and power supply constraints. Understanding these limitations is essential for the application in diverse marine environments.

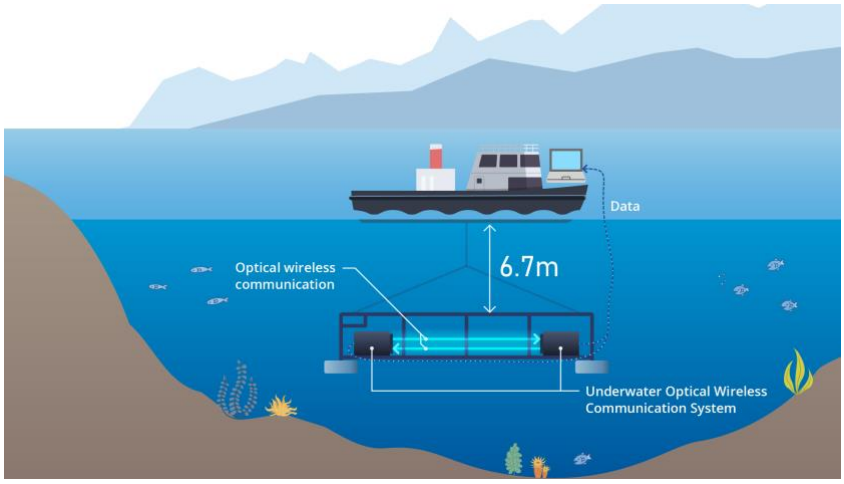
Overview of Kyocera's UWOC system and demo

Kyocera has developed a Gbps-class, high-speed UWOC system with no latency. The system utilizes gallium nitride (GaN) blue semiconductor lasers, a material and design that efficiently emits blue light. Trials confirmed that Kyocera's system, designed to achieve a maximum data transfer rate of 1 Gbps, can stably reach 750 Mbps over short distances, even in harsh marine environments. The laser-based system was minimally affected by turbidity (cloudiness caused by particles in water) and ambient light, meeting the expected transmission speeds in both freshwater indoor and actual offshore conditions.

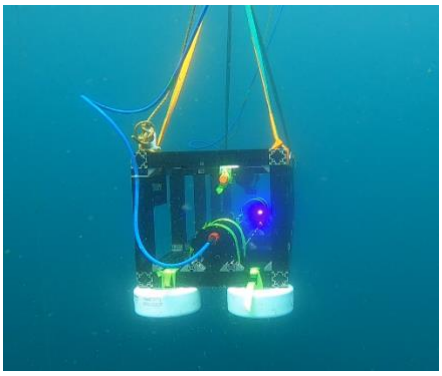
The trial was conducted over 6.7 meters in an offshore saltwater environment over a 15 cm~1.5 m communication distance with moderate water turbidity to evaluate system stability and performance under various conditions. These trials are essential for ensuring that technology will enable the smooth transmission of high-definition video and sensor data.

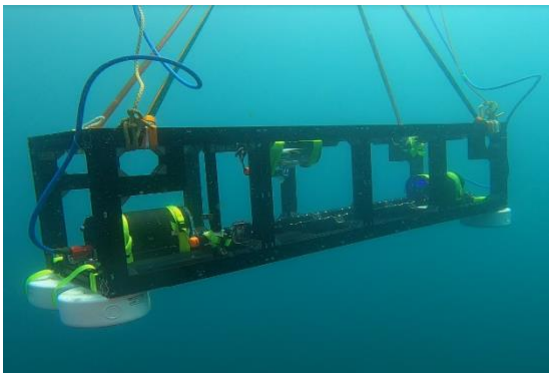
Trial details

Location	Offshore Numazu City, Shizuoka Prefecture
Date	August 19-21, 2025
Environmental measurement	Detailed measurements of marine environment parameters such as turbidity, water temperature, chlorophyll concentration, salinity, and illuminance
Communication speed measurement	Verification of the relationship between communication distance and communication speed
Evaluation of external light influence	Verification of communication performance with and without shading covers and under sunlight



Underwater wireless optical communication offshore trial image
(for concept illustration only; not to scale)





Actual prototype

Future developments

This technology enables next-generation Underwater Internet of Things (IoT), which was not possible with conventional methods. It supports ultra-high-speed data transmission by underwater drones and robots, retrieval of vast amounts of data from marine observation equipment, and large-scale underwater sensor networks for smart aquaculture. Kyocera will work to establish gigabit-per-second (Gbps) communication, exceeding the current speed, in offshore environments. The goal is to realize the practical application of this underwater wireless optical communication system by 2027. With this technology, Kyocera aims to accelerate the marine business, open new possibilities for global marine monitoring and resource management and contribute to a sustainable future society. To achieve this, Kyocera is planning several pilot projects to further evaluate the system's capabilities in diverse marine conditions. Collaborations with industry leaders and key stakeholders in the marine sector are underway to harness regulatory insights and streamline the adoption process. The company is also actively pursuing partnerships to facilitate large-scale implementation and to align with environmental and industry standards.

This demonstration experiment is a preliminary report based on the results of a paper presented at the 43rd Annual Conference of the Robotics Society of Japan (RSJ2025) held in September 2025.

The press material is available for download via the following link:
https://spgroup.box.com/s/a329gr1lsvqn2ucpf2cpthvgu9ias11n

For more information on Kyocera: uk.kyocera.com

About Kyocera

Kyocera has been successful in Europe for over 50 years. From its European headquarters in Esslingen am Neckar, KYOCERA Europe GmbH operates 29 sites including manufacturing facilities, with products ranging from fine ceramics, automotive, semiconductor and optical components to components for medical products, industrial tools, LCDs, touch solutions, industrial printing components, and consumer goods such as kitchen and office products.

KYOCERA Europe GmbH is a company of the KYOCERA Corporation headquartered in Kyoto/Japan, a renowned supplier in semiconductor, industrial and automotive components as well as electronic components, printing and multifunction systems, smart energy systems, and communications technology. Kyocera is one of the most experienced technology producers, with more than 65 years of industry expertise. The Kyocera Group comprises 288 subsidiaries (31 March 2025). With around 77,200 employees, Kyocera generated net annual sales of around EUR 12.43 billion in the 2024/2025 fiscal year.

Kyocera is ranked 874 on Forbes magazine's 'Global 2000' list for 2024 and ranked as 'The 100 Most Sustainably Managed Companies in the World' according to the Wall Street Journal. For the second year in a row, Kyocera qualified for the Dow Jones Sustainability Index (Asia-Pacific). As well, Kyocera receives a Bronze rating on EcoVadis Sustainability Survey and was acknowledged as a 'Top 100 Global Innovator 2025' for the ninth time by Clarivate, being one of the world's leading innovators.

Kyocera also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by Kyocera founder Dr Kazuo Inamori — to individuals worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (equivalent to approximately €596,500 per prize category).

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