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R/V Yokosuka Cruise Report

YK25-17

Performance verification test of URASHIMA 8000 (2/2)

Sagami-Bay, Takuyo-Daisan seamount, and Japan Trench

November 6, 2025 - November 26, 2025

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

Contents

1. Cruise Information

- Cruise ID: YK25-17
- Name of vessel: R/V Yokosuka
- Title of the cruise:

  Performance verification test of URASHIMA 8000 (2/2)
- Chief Scientist: Takeshi Nakatani [JAMSTEC]
- Cruise period: November 6, 2025 – November 26, 2025
- Ports of departure / call / arrival:

  Yokosuka Shin Port / Sendai-Shiogama Port, Sendai Port Area / Yokosuka (JAMSTEC)
- Research area: Sagami-Bay, Takuyo-Daisan seamount, and Japan Trench
- Research Map

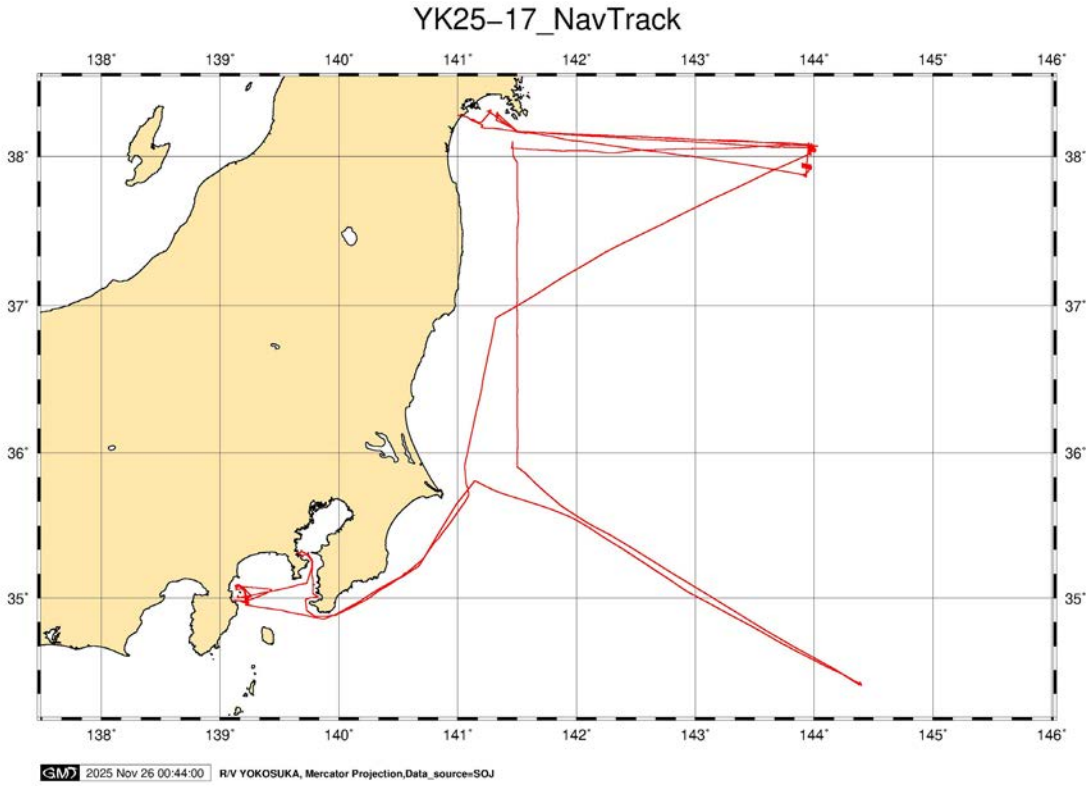

Fig.1 Cruise track of YK25-17

2. Researchers

● Title of proposal: Performance verification test of URASHIMA 8000

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●Representative of the Science Party: Takuya Shimura [JAMSTEC]

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*1 November 6, 2025 – November 16, 2025 *2 November 16, 2025 – November 26, 2025

3. Performance verification test of URASHIMA 8000

● Purpose

JAMSTEC has developed an 8,000m-class cruising type AUV by upgrading the long-established URASHIMA, with the aim of acquiring the capability to survey approximately 98% of Japan's EEZ, including the Japan Trench.

In this cruise (YK25-17), which served as the second phase of performance confirmation (2/2), the primary objective was to ensure the operational stability of the upgraded URASHIMA-8000 and to validate the newly added functions and payloads, such as the newly mounted Multi-Beam Echo Sounder (MBES). Furthermore, the cruise aimed to establish the AUV technology necessary for wide-area and comprehensive deep-sea surveys, conducting practical test dives in critical geological areas including the Takuyo Dai-3 Seamount and the Japan Trench. The successful execution of multiple long-duration, overnight autonomous missions during this cruise has confirmed the vehicle's robustness and its enhanced capability for systematic and extensive deep-sea exploration.

● AUV URASHIMA 8000

The development of 3,500m class AUV URASHIMA began in 1998, and its first dive was conducted in 2000. In 2005, it achieved a continuous dive of 317 km using fuel cells, which was the longest in the world at the time. The AUV has been in practical use since 2009. The URASHIMA has been undergoing conversion to enable it to dive to depths of up to 8,000 meters, effectively acquiring the capability to survey approximately 98% of Japan's EEZ.

The first sea trial of the URASHIMA 8000 was conducted in November–December 2024 during YK24-18, with six dives (#302–307) carried out at Suruga Bay. During YK25-02 in March 2025, six additional trial dives (#308–313) were conducted, totaling 29 hours and 57 minutes, which confirmed stable operation at depths of up to 6,500 m.

Subsequently, in July 2025 during the YK25-12 cruise, the system's performance at maximum depth was fully tested. This cruise successfully achieved a maximum dive depth of 8,015.8 m, demonstrating the system's full-ocean-depth pressure resistance and reliability. Furthermore, an extended autonomous mission over 25 hours was completed, establishing the vehicle's endurance and long-duration operational stability.

The current YK25-17 cruise builds on these achievements, focusing on the validation of newly mounted payloads like the Multi-Beam Echo Sounder (MBES) and solidifying the operational procedures for long-duration, deep-sea exploration missions.

Fig.2 AUV URASHIMA 8000

Table 1 Specifications of URASHIMA 8000

Size[L×B×H] (m)	10.7 x 1.3 x 1.5
Weight in air(ton)	7.0
Max. operation depth (m)	8,000
Cruising speed(knot)	2.5 – 3.0
Power supply	Li-ion

● Activities

Table 2 shows the activities of the cruise. The third sea trial of the URASHIMA 8000 was conducted from November 6 to November 26, 2025. Seven dives of URASHIMA 8000 (#320-326) were carried out.

Table 2 Schedule of YK25-17 cruise

Date	Activities
Nov. 6	Depart from Yokosuka Shin Port URASHIMA 8000 wet test (under hoisting condition)
Nov. 7	URASHIMA 8000 Dive#320 (Sagami-Bay)
Nov. 8	URASHIMA 8000 Dive#321 (Sagami-Bay)
Nov. 9	AUV vehicle maintenance
Nov. 10	Rough sea conditions
Nov. 11	URASHIMA 8000 Dive#322 (Sagami-Bay)
Nov. 12	Transit to Takuyo-Daisan seamount
Nov. 13	URASHIMA 8000 Dive#323 (Takuyo-Daisan seamount)
Nov. 14	Transit to Japan Trough
Nov. 15	URASHIMA 8000 Dive#324 (Japan Trough) Overnight dive
Nov. 16	URASHIMA 8000 Dive#324 (Japan Trough) Transit to Sendai-Shiogama Port (Sendai Port Area)
Nov. 17	Arrival at Sendai-Shiogama Port (Sendai Port Area)
Nov. 18	Depart from Sendai-Shiogama Port (Sendai Port Area) Rough sea conditions
Nov. 19	Rough sea conditions Transit to Japan Trough
Nov. 20	URASHIMA 8000 Dive#325 (Japan Trough)
Nov. 21	Rough sea conditions
Nov. 22	Rough sea conditions URASHIMA 8000 Dive#326 (Japan Trough) Overnight dive
Nov. 23	URASHIMA 8000 Dive#326 (Japan Trough) Vessel-based bathymetric survey (Japan Trough)
Nov. 24	Transit to Tateyama-bay
Nov. 25	Rough sea conditions Transit to Yokosuka
Nov. 26	Arrival at YOKOSUKA (JAMSTEC pier)

● Results

Throughout the seven dives (#320–#326) of the YK25-17 cruise, which totaled 79 hours and 25 minutes of submerged time, the functional stability of the upgraded URASHIMA 8000 was verified, along with the performance of its newly equipped observation systems. The maximum diving depth during the cruise was 7,482 m (Dive #326).

Initial dives, including Dive #320 in Sagami Bay (approx. 1,200 m), successfully verified the data recording capability of the newly installed Multi-Beam Echo Sounder (MBES, Seabat 7125) and optimized its settings to minimize interference with other onboard sensors such as the Side Scan Sonar (SSS) and DVL. This successful integration confirms the vehicle's enhanced capability for high-resolution bathymetric mapping.

In the Japan Trench, two long-duration, overnight autonomous missions were performed. Dive #324, conducted in the JTRACK Site area (6,800–7,400 m depth), successfully completed a survey line navigation for over 23 hours at 3 knots, demonstrating significant progress in stable, long-endurance deep-sea operation. A vertical profile of Dive #324 is shown in Fig. 2. This dive also confirmed the stable performance of the DVL ground speed measurement, which was a key focus from previous cruises, with INS drift remaining within normal operational parameters.

During Dive #325, also in the Japan Trench (#319 site, 7,200 m depth), high-quality geological data was acquired. The use of high-speed acoustic communication allowed for the real-time uplink of SSS images, enabling the clear identification of a high cliff. The ability to acquire and immediately analyze such high-resolution data confirms the practical readiness of URASHIMA 8000 for complex deep-sea scientific investigation.

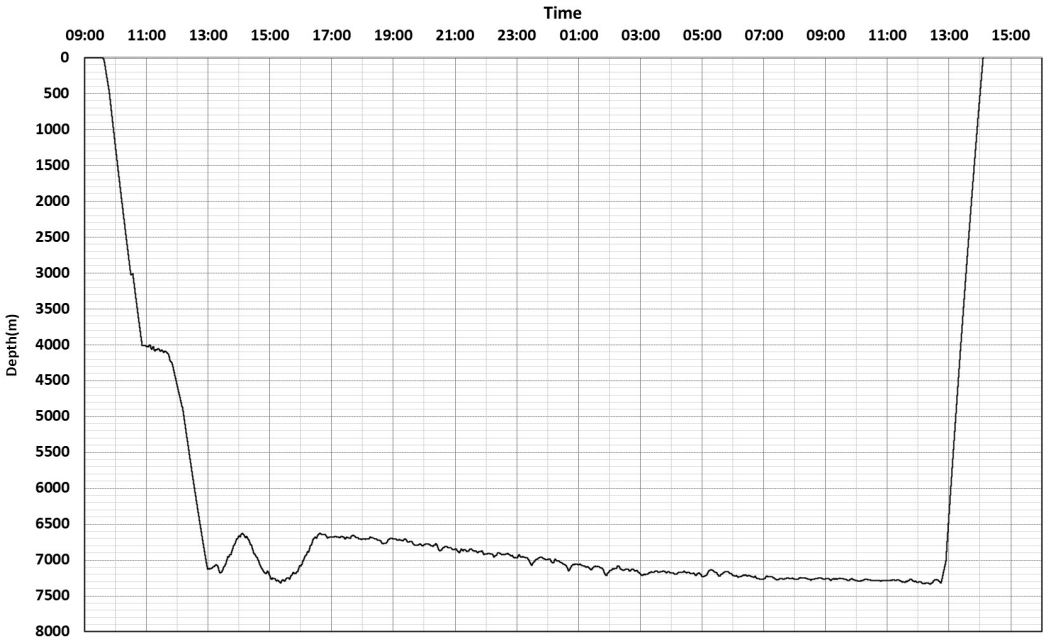

Fig.2 Vertical profile of URASHIMA 8000 during Dive #324

4. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
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