Other facilities

❶Overhead travelling crane

It is equipped with a 70-ton overhead crane and a 4.9-ton crane.

❷Working space

There is a 45 m × 20 m work space adjacent to the large acoustic tank for equipment maintenance.

❸Storage space

There is an equipment loading space that can accommodate a 100-ton trailer.

❶

❷

❸

Access

From Tokyo

- plane: 1 h 40 min
- Nozomi Super express: 4 h
- JR Sanyo line: 1 h
- Iwakuni Airport
- car: 30 min
- Tsudu St.
- walk: 15 min

From Osaka

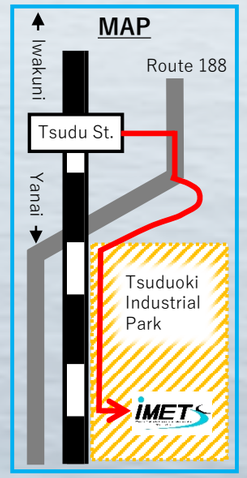
- Nozomi Super express: 1 h 25 min
- Kodama Super express: 14 min
- Shin-Iwakuni St.
- car: 20 min

From Hakata

- Kodama Super express: 1 h

Hiroshima St.

Iwakuni Maritime Environment Test & Evaluation Satellite（IMETS）



Contact

Iwakuni Maritime Environment Test & Evaluation Satellite

Naval Systems Research Center, ATLA

Address: 1805-1 Nagano, Iwakuni, Yamaguchi 740-0045

TEL: +81-3-3268-3111 (ext: 27904 ~ 27907)

https://www.mod.go.jp/atla/en/kansouken.html

Naval Systems Research Center, ATLA

IWAKUNI Maritime Environment Test & Evaluation Satellite

IWAKUNI Maritime Environment Test & Evaluation Satellite

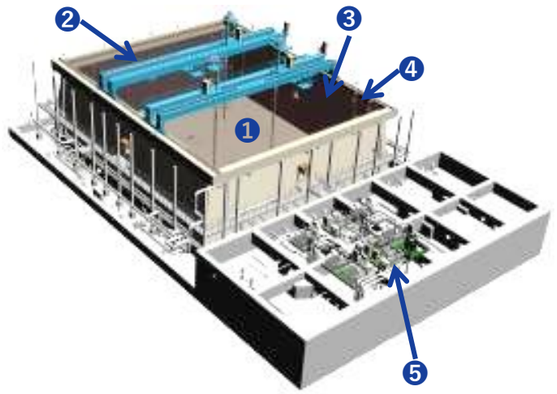
Iwakuni Maritime Environment Test & Evaluation Satellite (IMETS), a facility for testing and evaluating Unmanned Underwater Vehicles (UUVs) and other equipment, was established in Iwakuni City, Yamaguchi Prefecture, as part of the government's strategy for regional revitalization "relocation of central government offices to local regions".

Future Vision through the Use of IMETS

- Efficient and effective testing in the research area of UUVs, with which Naval Systems Research Center will be actively involved in the future.
- Improvement of technologies related to the research area of UUVs through cooperation with the private sector and the use of testing and evaluation facilities.
- Revitalization of the local economy by attracting companies related to research area of UUVs and by creating new businesses and jobs through industry-academia-government research cooperation.

Underwater acoustic measurement system

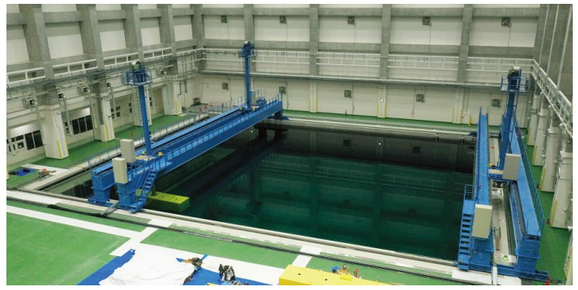
Underwater acoustic measurement system is the facility to test and evaluate UUVs and various acoustic equipment by the large acoustic tank. It is consisted of the large acoustic tank, traversers, acoustic material, underwater position measuring device, and water-purifying device.



❶Large acoustic tank

It is one of the largest acoustic tanks in Japan, and observation inside the tank is possible through 1 m × 1 m windows set on four sides.

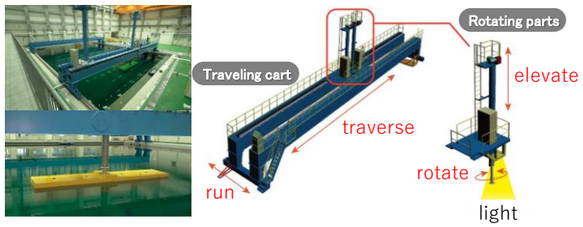
It has temporary place at either end of tank for attaching/detaching equipment to traversers easily.



- Size: 35 m (length) x 30 m (width) x 11 m (depth) (11.8 m at the deepest point)
- Amount of water: 12,163 m^3

❷Traverser

It is installed at the top edge of the large acoustic tank and can run, traverse, elevate, and rotate, with test equipment attached.



- Traveling cart: 2 units, Rotating parts: 3 units
- Maximum lifting load：2 ton
- Accuracy： run ±30 mm
  traverse ±30 mm
  elevate ±10 mm
  rotate ±1°
- Speed： run 100 mm/s
  traverse 100 mm/s （with one unit, 1000 mm/s）
  elevate 100 mm/s
  rotate 360° /min

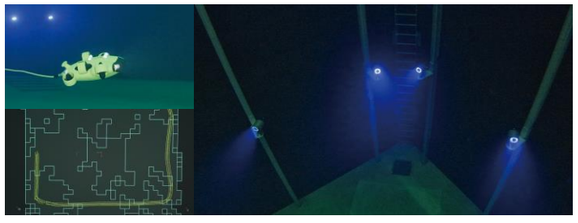
❸Acoustic material

It is installed on the inner side of the large acoustic tank to suppress sound wave reflections from the wall.

- Size (1 sheet): 450 mm × 450 mm × 60 mm
- Number of sheets: 6634
- Attenuation: 10 dB or more (10 kHz～100 kHz)

❹Underwater position measuring device

By attaching a spherical reflective marker to a UUV or other measurement target, the position, attitude, and wake in the large acoustic tank can be measured and recorded.



- Underwater camera: 32 units
- Accuracy：±30 mm
- Measurement area: 25 m (length) × 20 m (width) × 7 m (depth) or more

❺Water-purifying device

By filtering water suctioned from the bottom of the tank, dirt and bacteria in the water can be removed and turbidity in the tank can be reduced.

- System: Diatomaceous earth filtration
- Filtration accuracy: 10 μm or less
- Ability: 1600 m^3/h (Maximum)

HILS System [Simulator]

-scheduled to operate from JFY 2022-

HILS (Hardware In the Loop Simulation) System is the simulator to test and evaluate UUVs in any ocean environment and operation scenario. The simulator can provide generated motion information and simulated signal such as ocean environment to the components by connecting the simulator with the components.

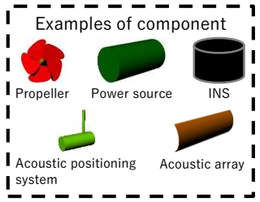
Also, it is easy for the simulator to be utilized in private sector, simplified plug-in of any component digital model as an example, by adopting ROS2 (Robot Operating System2) as component middleware that is the framework with library and tools necessary for robot development.

HILS System consists of (1) modeling function, (2)simulation function, and (3) Acoustic simulation function.

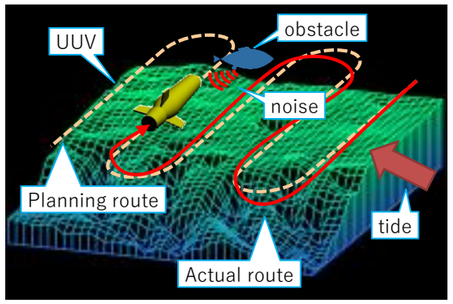
❶Modeling function

HILS System generates various digital model regarding UUV's shape, function, performance. It can prepare a program for mounted sensor, signal processing and UUV's behavior decision.

Set the UUV's shape and component arrangement



INS: Inertial Navigational System



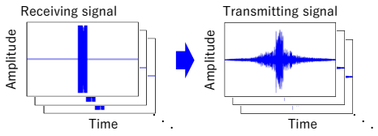
❷Simulation function

HILS System tests and evaluates generated digital model through simulation by setting any ocean environment and behavior scenario. The function has two modes as follows,

- Mathematical simulation mode
  Simulate with all software
- Physical simulation mode
  Simulate with software and real component

❸Acoustic simulation function

At acoustic sensor of UUVs in large acoustic tank, HILS reproduce real acoustic signal that inputted as simulated acoustic signal into acoustic sensor in digital model during simulation.



Conversion by inverse filter of transfer function

Establishment of virtual ocean acoustic environment

By combining underwater acoustic measurement system and HILS, HILS can test and evaluate UUV's function, performance and autonomous judgement through inputting acoustic signal into acoustic sensor under various types of ocean environment condition.