

## Development of Unmanned Marine Observation Vehicles to Contribute to Forecasting and Monitoring of Typhoon Artificial Control

Project manager

### Shuichi MORI

Coordinator (Senior Scientist)  
Center for Coupled Ocean-  
Atmosphere Research (CCOAR) of  
Research Institute for Global  
Change RIGC), Japan Agency for  
Marine-Earth Science and  
Technology (JAMSTEC)



leader's institution

JAMSTEC

R&D institutions

JAMSTEC

### Summary of the project

To realize weather control, nature needs to be continuously monitored with sufficient accuracy. For typhoons it is important to continuously monitor the marine atmosphere and ocean surface layer near the typhoon center, which play important roles in the typhoon generation and development. It is difficult, however, to monitor them by aircraft or satellites, namely to obtain typhoon intensity (central pressure and maximum windspeed) accurately as the “true value”, which means it is one of bottlenecks for weather control. This project aims to develop unmanned maritime surface vehicles that can be virtually moored (VM) near the area of a typhoon center and continuously observe the atmosphere-ocean data along the movement path of the typhoon. We call this a VM drone.

Year 1 (2022): Design and manufacture of prototypes and observation sensors. Then, testing them in a laboratory, full-scale water tank, and coastal waters in Japan.

Year 2 (2023): Conduct a short-term (approx. one week) open-ocean test in the east of Philippines, where typhoons frequently occur, by using an improved prototype for its control, communication, and sensor validation.

Year 3 (2024): Perform a long-term test (approx. one month) in the same waters by the final prototypes to confirm VM function and sensor accuracy under stormy conditions around typhoons.

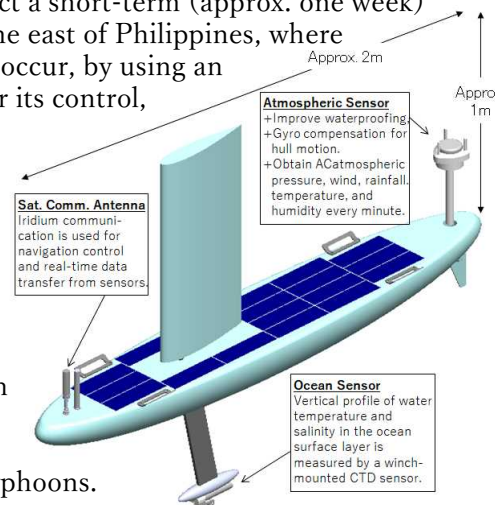


Fig. 1 Overview of the VM drone prototype. Specifications are subject to change by improvement based on various test and validations

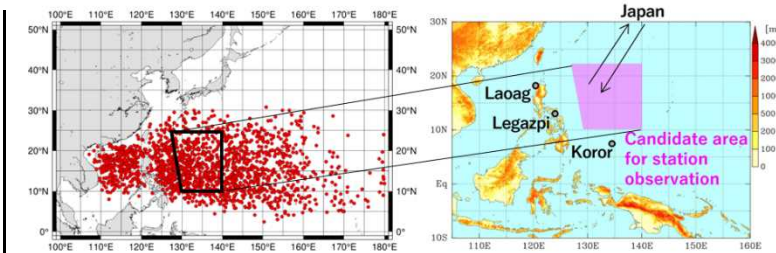


Fig. 2 Climatology of typhoon occurrence locations (red dots), 1951-2021, based on Digital Typhoon\*1 (left). Planned route of R/V *Mirai* cruises in 2023/2024 and stationary points for open-ocean tests of VM drone prototypes in the east of Philippines (right).  
\*1 <http://agora.ex.nii.ac.jp/digital-typhoon/reference/birthplace.html.jp>

### Milestone by the end of project (year 2024)

We develop unmanned maritime surface vehicles (VM drones) that can continuously monitor marine atmosphere and ocean surface layer in the area around center of typhoons with sufficient accuracy required for meteorological control.

### R&D theme structure of the project

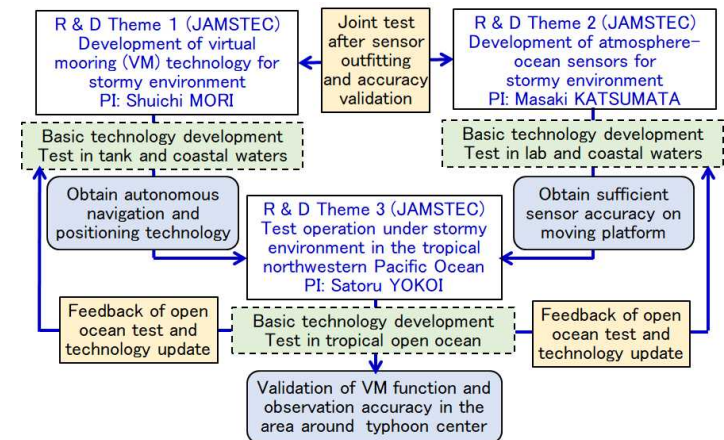


Fig. 3 Three R&D themes, their PIs, and schematic of their interrelationships. All PIs are affiliated with the same institute, which facilitates close cooperation with each other.