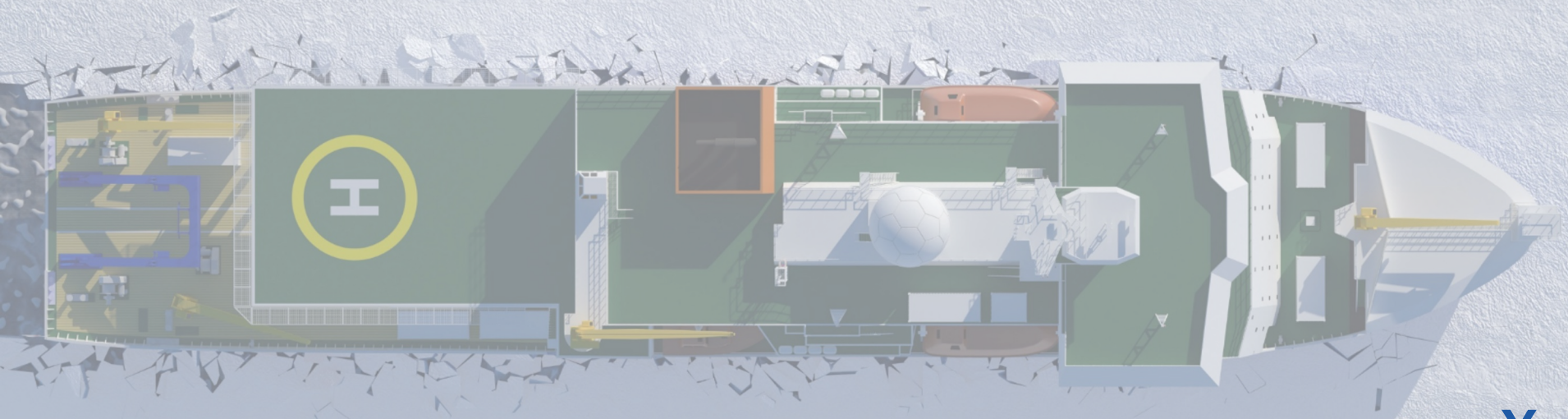
IRSO 2024
September 23-27 2024, Vancouver, Canada

Updates of Japan's Arctic research vessel "MIRAI II"



Yuko MORI JAMSTEC
Yumihiko KOBAYASHI Mitsui O.S.K. Lines, Ltd.

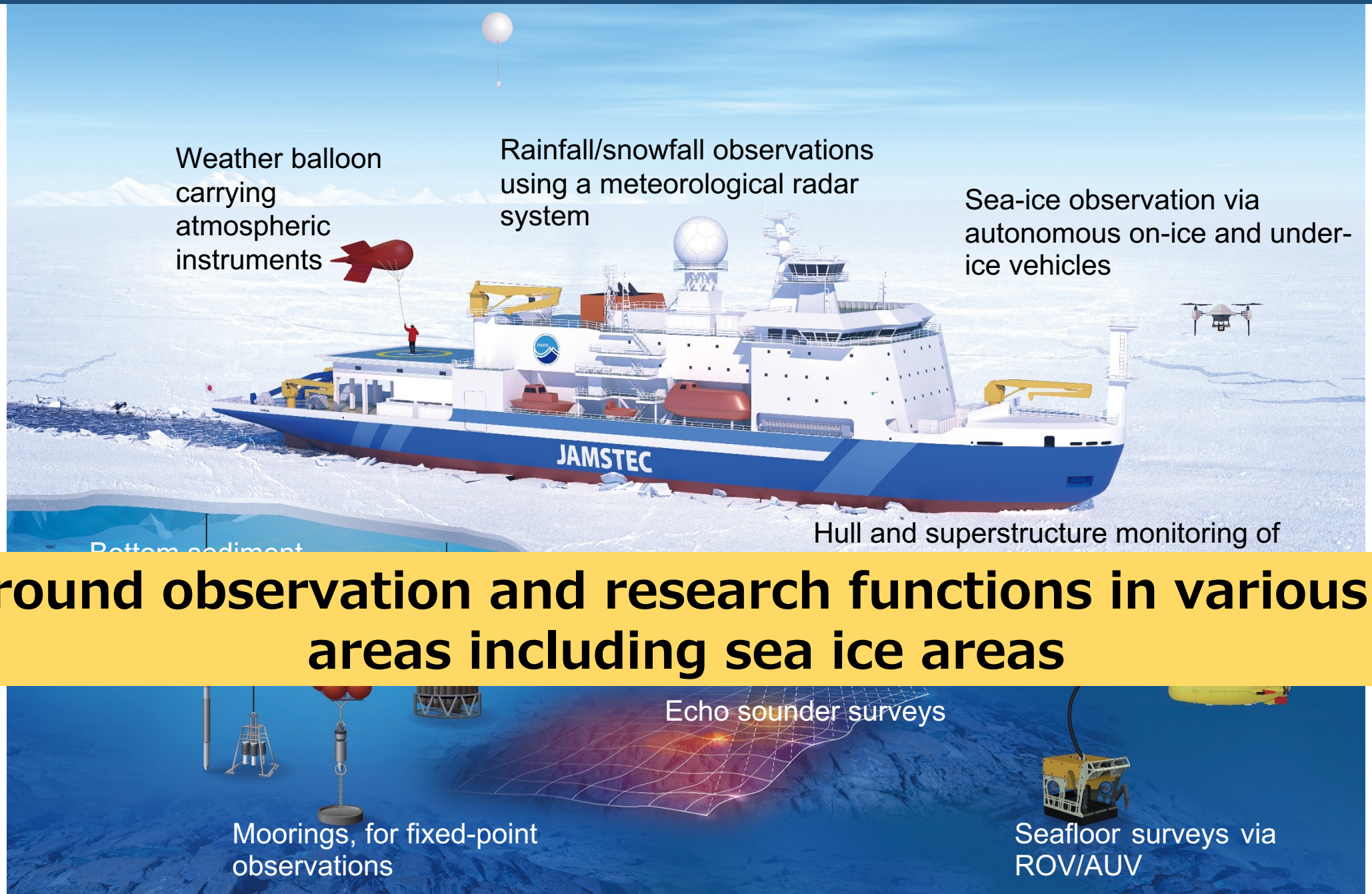
MIRAI II Main Specifications

MIRAI II

Length	128m
Beam	23m
Depth	12.5m
Draft	8.0m
Gross tonnage	13,000 tons
Ice-breaking capacity	capable of continuously breaking 1.2 m of flat, one-year ice at a speed of 3.0 knots
Polar class	PC4
Propulsion	Controllable pitch propeller
Accommodation	97

- ✓ **Shipowner: JAMSTEC**
- ✓ **Builder: Japan Marine United (JMU)**
- ✓ **Construction Supervisor /Expected Operator: Mitsui O.S.K. Lines (MOL)**
- ✓ **Preparation for research observation support/Expected research observation supporter: Marine Works Japan (MWJ)**

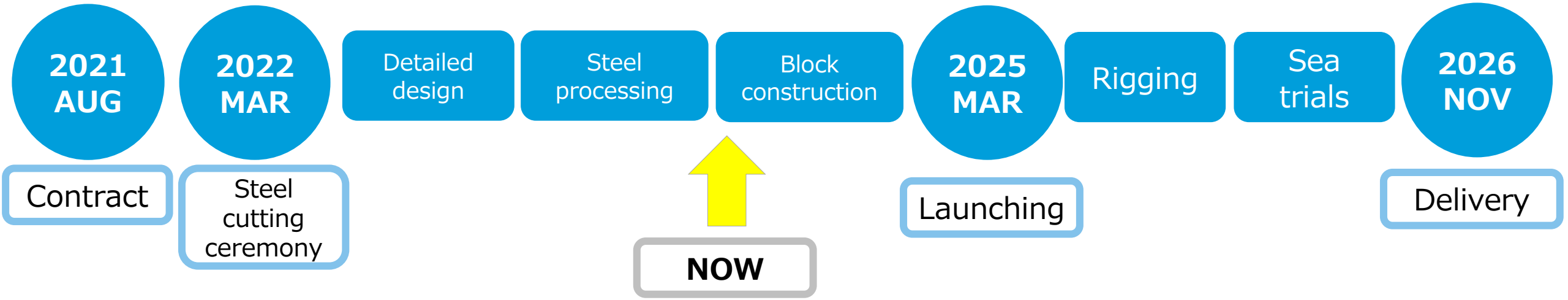
Functions and Facilities



All-round observation and research functions in various sea areas including sea ice areas

Schedule

Construction is currently underway for completion in 2026.



Recent photos

Construction dock at JMU Isogo works in August 2024.

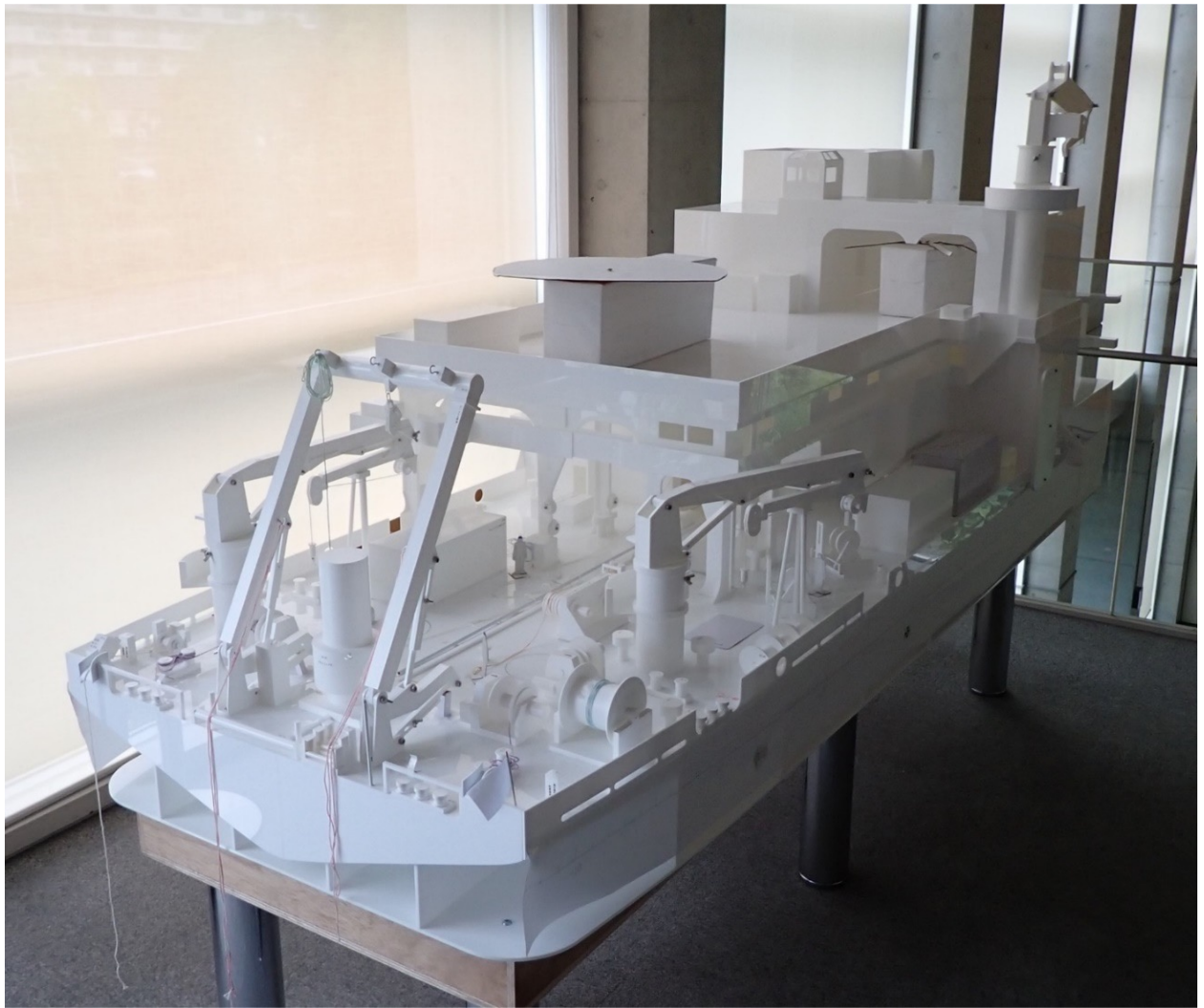
Recent photos

↑Block of the moonpool

→ Bottom-side moonpool opening

Study using mock-up model

1/25th scale acrylic resin model of the ship's observation deck and other observation facilities was used to check whether there were any defects or points for improvement, assuming actual operation.



International cooperation

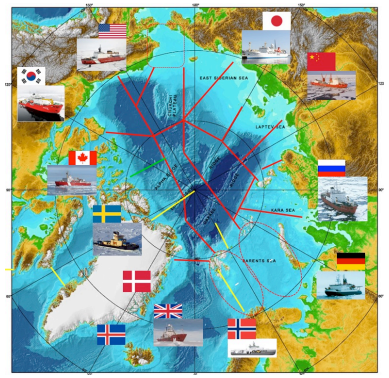
In order to operate MIRAI II as an international research platform, we are committed to international research projects and fostering domestic and foreign early-career scientists.

- **1st International Workshop on Arctic Ocean Observation**
- **Call for early-career scientists' proposals for the MIRAI research cruise**
  - **13 early-career scientists on board from Japan, USA, UK, Denmark, Norway and Portugal**
- **Took over the secretariat of the Synoptic Arctic Survey (SAS)**

NOW

- **New Arctic research projects using MIRAI and MIRAI II scheduled to start from 2025**
- **2nd International Workshop on Arctic Ocean Observation in 2025**
- **Bid and host ASSW 2027 in Hokkaido**

1st International WS in 2023


Countries participated in the SAS (2020-2022)

Foreign early-career scientists on board MIRAI.


ASSW2015 in Toyama

International Conferences
Research Observation

1st International Workshop on Arctic Ocean Observation in 2023

The first International Workshop on Arctic Ocean Observation was held in Tokyo on 17 - 18 November 2023.

A total of 118 participants from 12 countries (Canada, China, Denmark, France, Germany, India, Korea, Norway, Portugal, UK, USA, and Japan) attended the two-day workshop with 42 participants from overseas organizations.

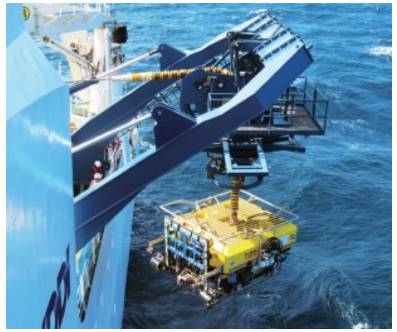
The second international workshop is also planned for 27th October or 1st November next year in Japan!

We hope that many people involved in icebreaking research vessel operations will join.

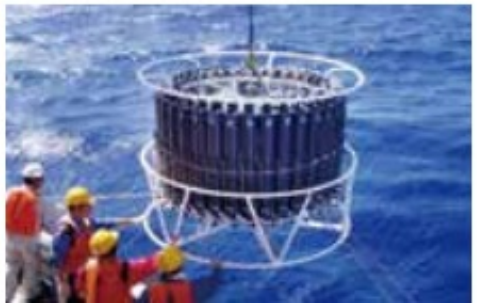
There will also be an agenda item on operations in the polar regions. If you are interested in participating, please contact us!

Crew Training

Dispatch of captains and officers to cable ships and a research vessel
>Familiarization with offshore operations & Dynamic Positioning System
>To accumulate observation operation know-how



Cited from KDDI Cableships & Subsea Engineering Inc.



Cited from JAMSTEC

Operation Preparation

Visiting Research Vessels

>Learning about operations & equipment

>Learning Best Practices

Thanks for giving us a shot!!

RV Kronprins Haakon
(2023 Jan.)

Cited from Wikipedia

RV Polarstern
(2023 Apr.)

RRV Sir David Attenborough
(2023 Jun.)

IB Oden
(2024 Jun.)

Kaiyo Maru
(2023 Jul.)

Umitaka Maru
(2024 Aug.)

Cited from Tokyo University of Marine science and Technology

Ryofu Maru
(2024 Feb.)

Cited from Japan Meteorological Agency

Issues Under Consideration

- **Ice Navigation Training**
- **PWOM***
  *Polar water operation manual
- **Ice Survival Training**
- **Ice Trial Planning**

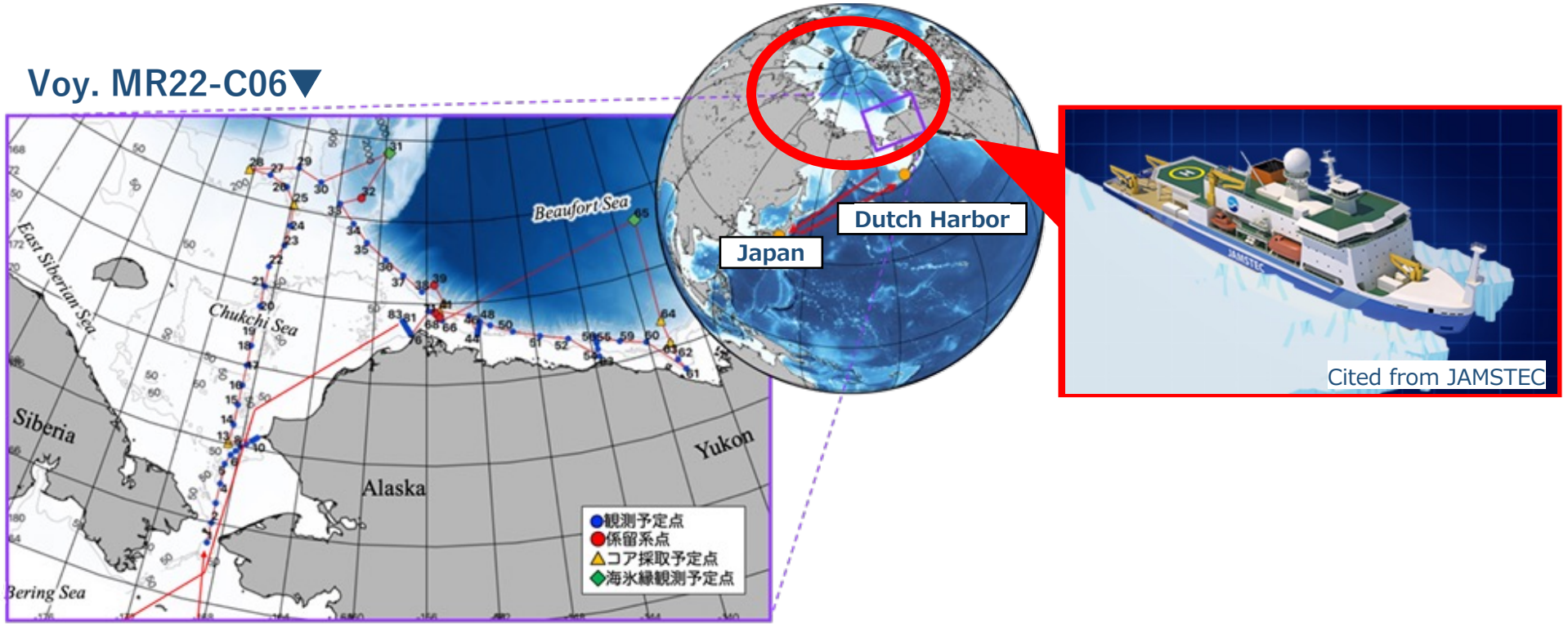
Max ETR* *Max estimated time of rescue	**Japan doesn't have any observation base in the Artic region.**
Helicopter Operation	**Can a DRONE substitute for a helicopter?**
Dual-fueled (LNG/MGO)	**What is the best way to use it to reduce environmental impact?**

As the successor… Beyond “MIRAI”

- Icebreaking capacity: Observation in a wider range of Arctic waters
- Environmental performance: Dual-fuel generator reduces environmental impact.
- Ice resistance: PC4 hull enables observation in ice.
- Equipment: ROV, Helicopter, DPS enabling a wide range of observations.

> “Mirai II” is expected to be a more efficient and environment friendly vessel!

Voy. MR22-C06▼



Cited from JAMSTEC

Thank you for your attention