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Presentation Material

Iwatani

Introducing the Hydrogen Fuel Cell Ship Project

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Today's Presentation Overview

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①Introduction

- Background, Schedule, Project Framework
- Development Concept

②Overview of Hydrogen Fuel Cell Ship

- Specifications (Development Results)
- Propulsion System Overview
- Hydrogen Tank Compartment

③Overview of Hydrogen Bunkering Facility

- Specifications(Development Results)
- Energy Management

Image:Operating in Osaka Bay

①Introduction – Background(Business Strategy)

Overview of Our Business

Hydrogen Strategy

Iwatani holds the No.1 share of hydrogen gas in Japan.
As part of our business strategy, we are working to expand the energy market.
In line with this strategy, We have developed
both a hydrogen fuel cell ship and a hydrogen refueling station for ships.

①Introduction – Development Schedule

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FY2020~2023 | FY2024 | FY2025 | FY2026~

Hydrogen Fuel Cell Ship

FC Ship Design and Construction

~Summer 2024

Demonstration on Experimental Ship

Bunkering Facility

Station Construction

Component Development

~2024.2

Route Image

Demonstration Operation with the Main Ship

~2025.4

Operation during Osaka-Kansai Expo

~2025.10

Post-Expo Utilization and Continued Demonstration

①Introduction – Project Framework

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NEDO project
(NEDO: New Energy and Industrial Technology Development Organization)

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Ship Building

Subject
- Iwatani Corp.

Construction
- Namura Shipbuilding
- Setouchi craft

Propulsion System
- Totech、 RIX

Bunkering

Subject
- Iwatani Corp.

Hydrogen filling equipment
- Iwatani Gas
- Tokico System Solutions

electrical charging equipment
- Kansai Electric Power
- Fuji Electric

civil engineering
- Obayashi Road

Energy Management

Subject
- Kansai Electric Power

System construction
- Fuji Electric

Operation

Subject
- Iwatani Corp.

ship operation
- Osaka Aqua Bus

Shipbuilding Research Centre of Japan

Tokyo University of Marine Science and Technology

①Introduction – Development Concept

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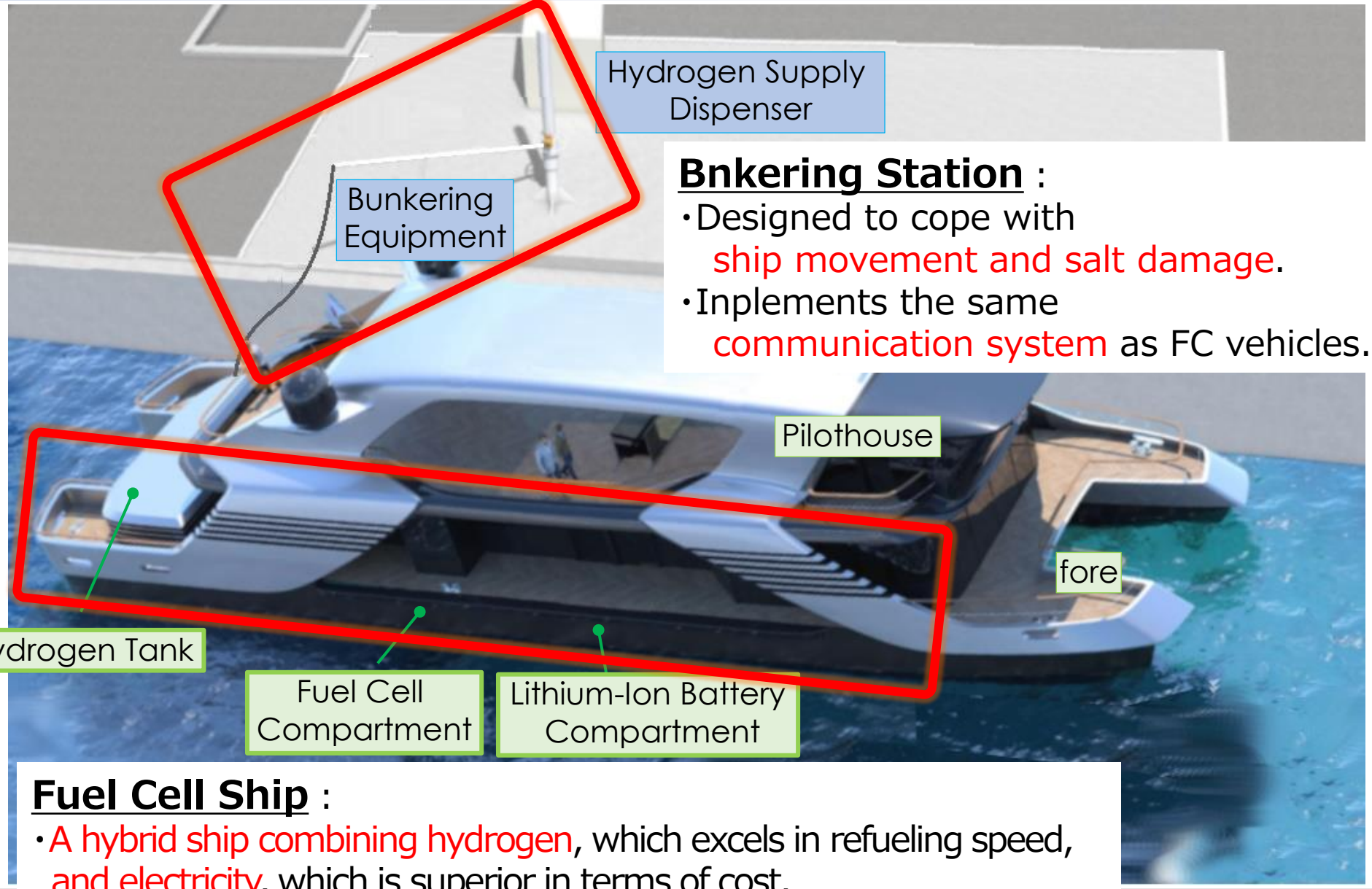


Bnkering Station :

- Designed to cope with ship movement and salt damage.
- Inplements the same communication system as FC vehicles.

Fuel Cell Ship :

- A hybrid ship combining hydrogen, which excels in refueling speed, and electricity, which is superior in terms of cost.

②FC Ship－Specification(Development Results)

The Completed Hydrogen Fuel Cell Ship

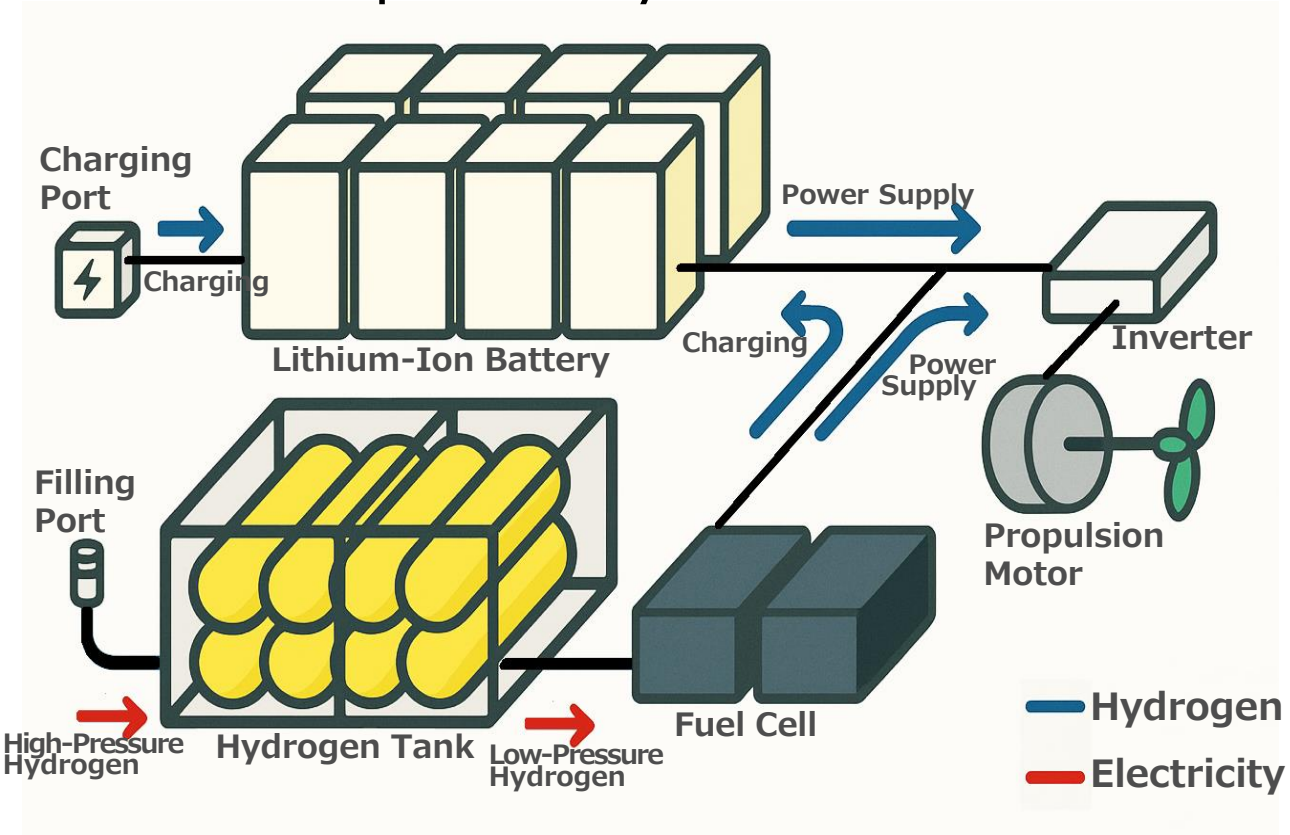
Image: Sea trial operation

Overview	
Size	Length30m x Width8m(Catamaran)
Gross Tonnage	177tons
Capacity	150passengers
Speed	10knots
Energy Sources	Hydrogen and Battery Hybrid Hydrogen Compressed hydrogen approx. 150kg Fuel Cell 60kW×4units Battery Lithium-ion battery 1,000kWh
Propulsion Output	400kW
Cruising Range	approx.130km (at 10knot)

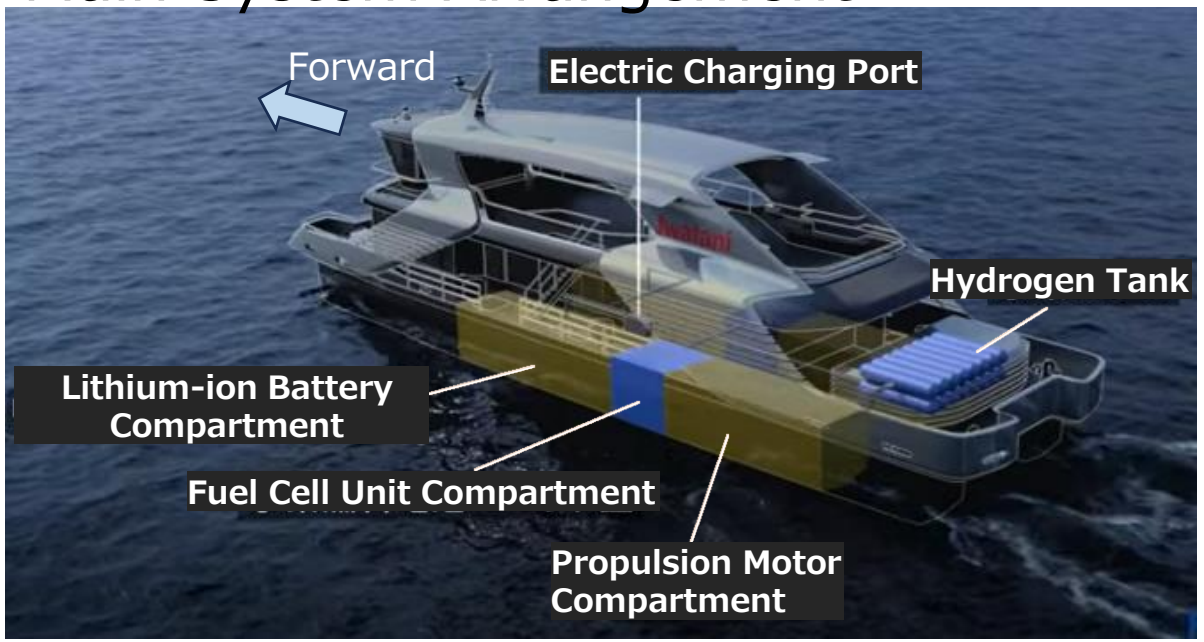
Quitness
Video→

②FC Ship – Propulsion System Overview

Electric Propulsion System Overview



Main System Arrangement



- The motor is powered either by electricity generated from hydrogen fuel cells or by electricity from lithium-ion batteries.
- Surplus electricity generated by the hydrogen fuel cells is used to charge the lithium-ion batteries.
- Redundancy is maintained by having hydrogen and battery systems on both sides(port and starboard).
- The ship does not rely on internal combustion engines (such as diesel or heavy oil), and hydrogen is refueled from a dedicated onshore hydrogen station.

②FC Ship – Hydrogen Tank Compartment

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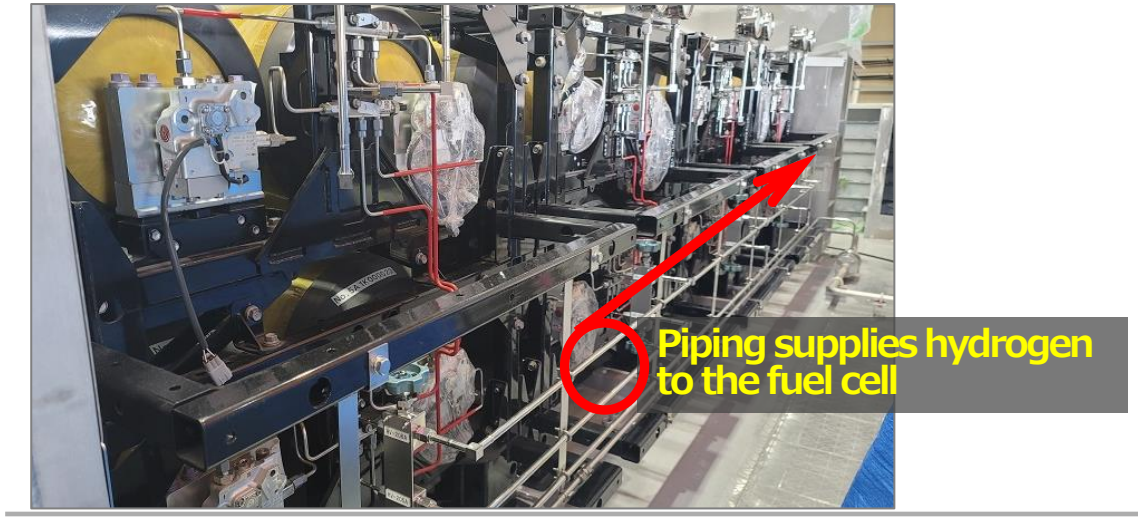
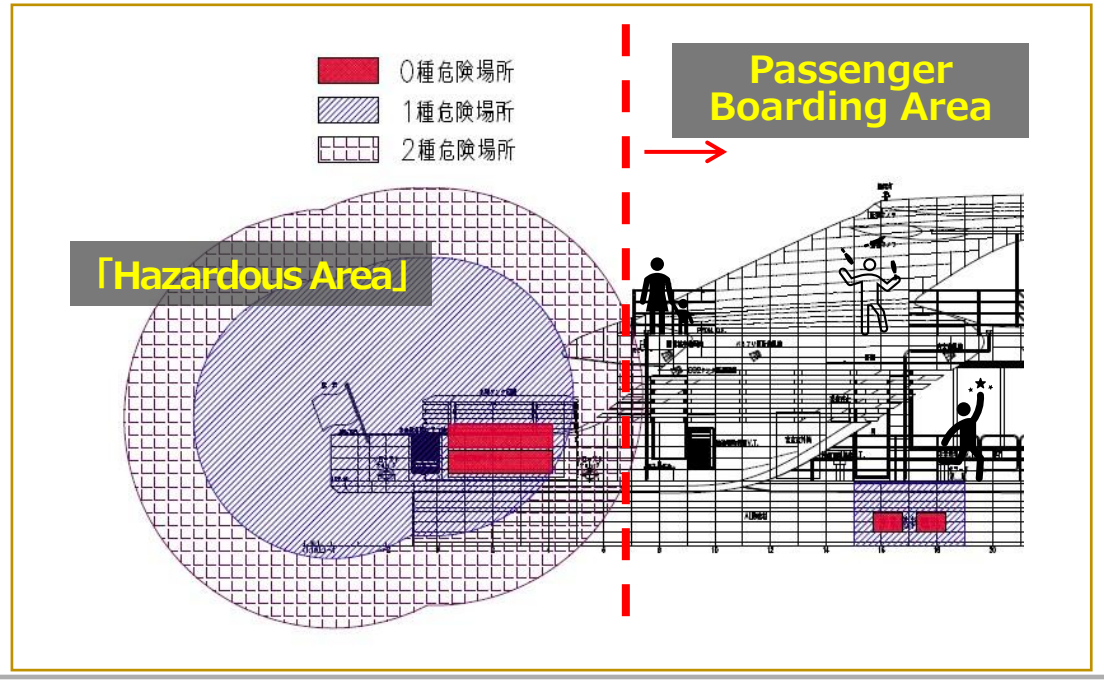
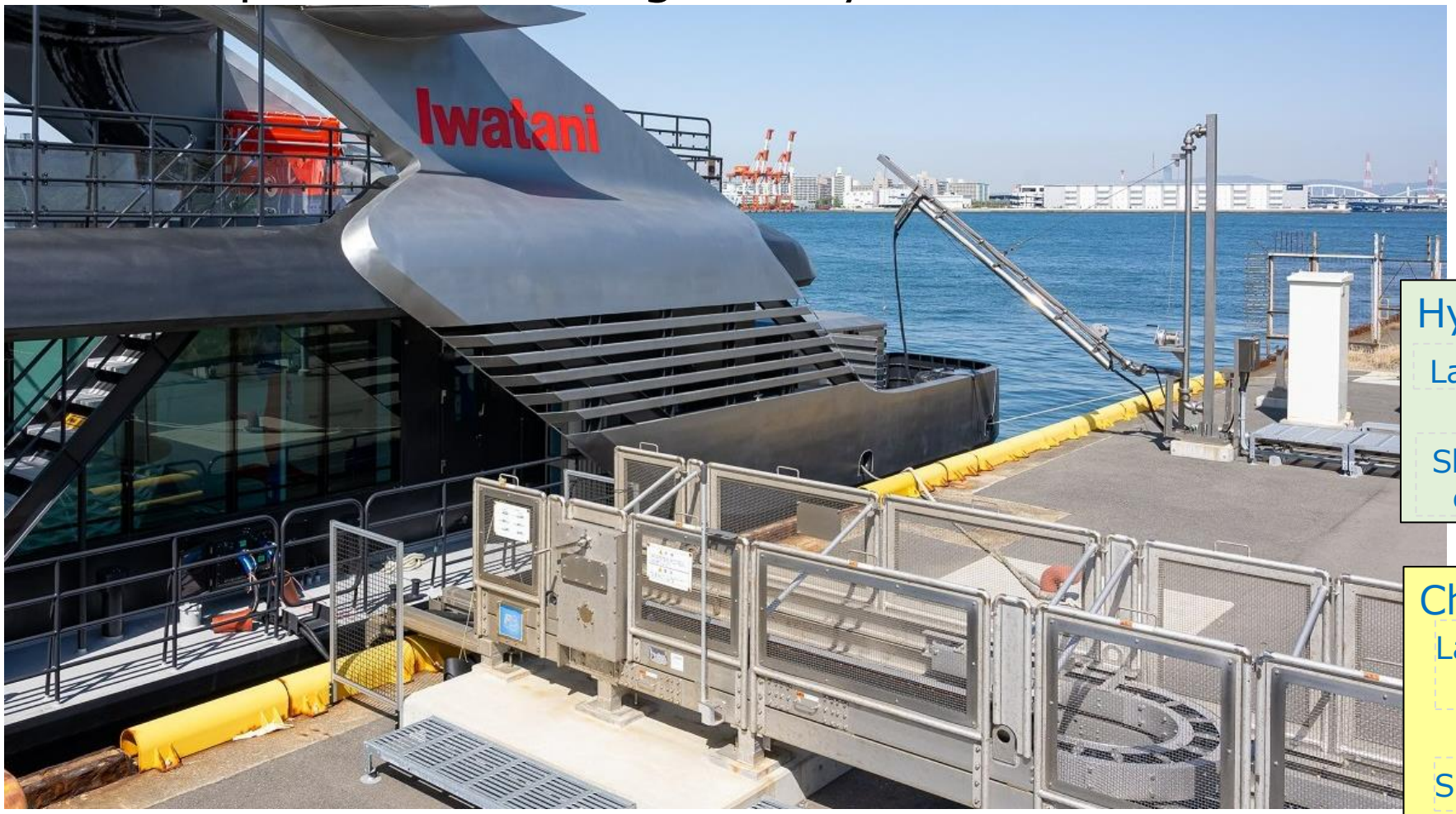




③Bunkering Facility－ Specification(Development Results)

The Completed Bunkering Facility



Hydrogen Refueling System

Land：FCV refueling nozzle, 8m hose, 70MPa

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Ship：60kW×4 fuel cells,TypeⅣ tanks, equivalent to 2,000kWh of Hydrogen

Charging System

Land：Rapid charger 90kW×2 (200A/450V×2ports、cable length 20m)

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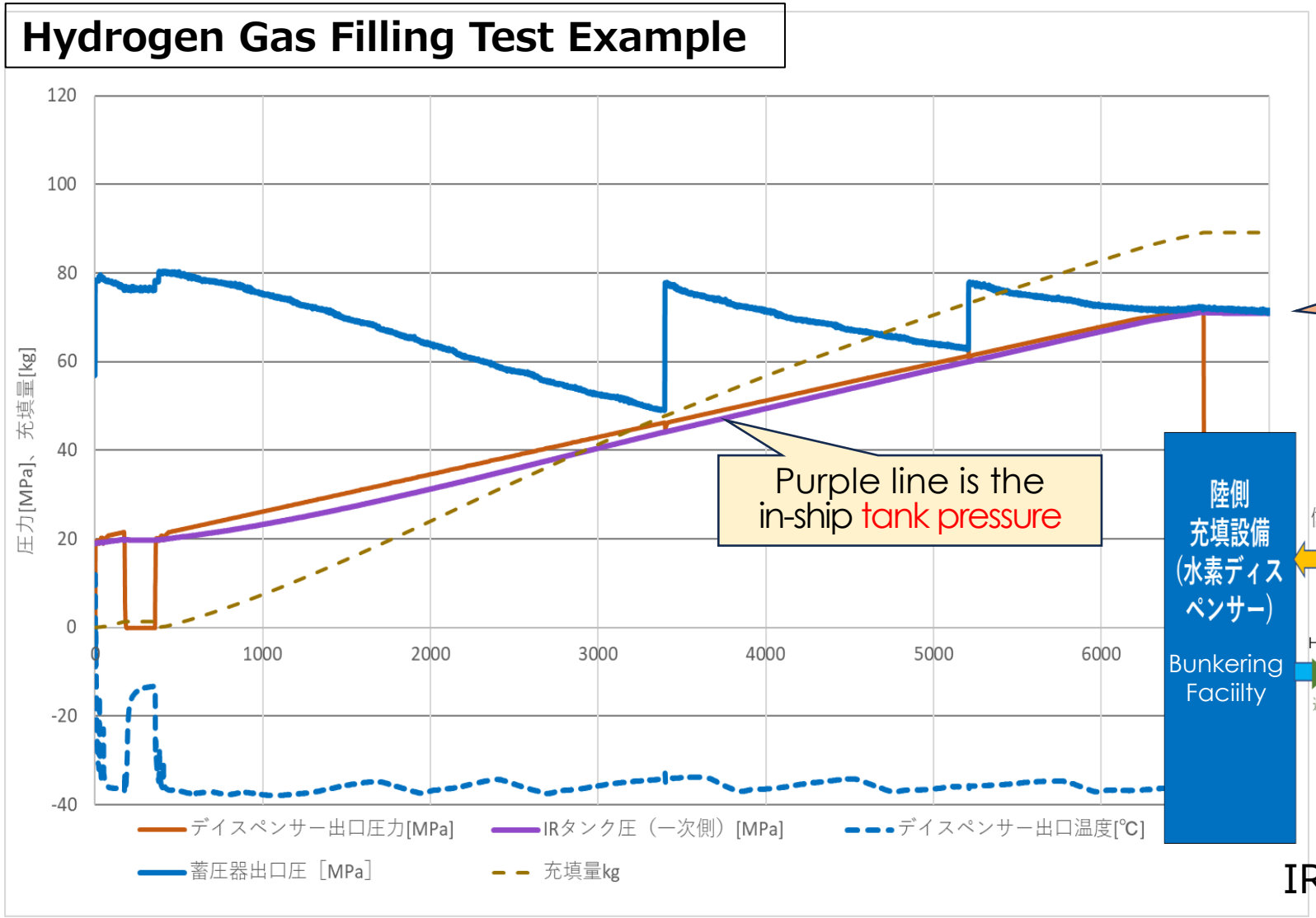
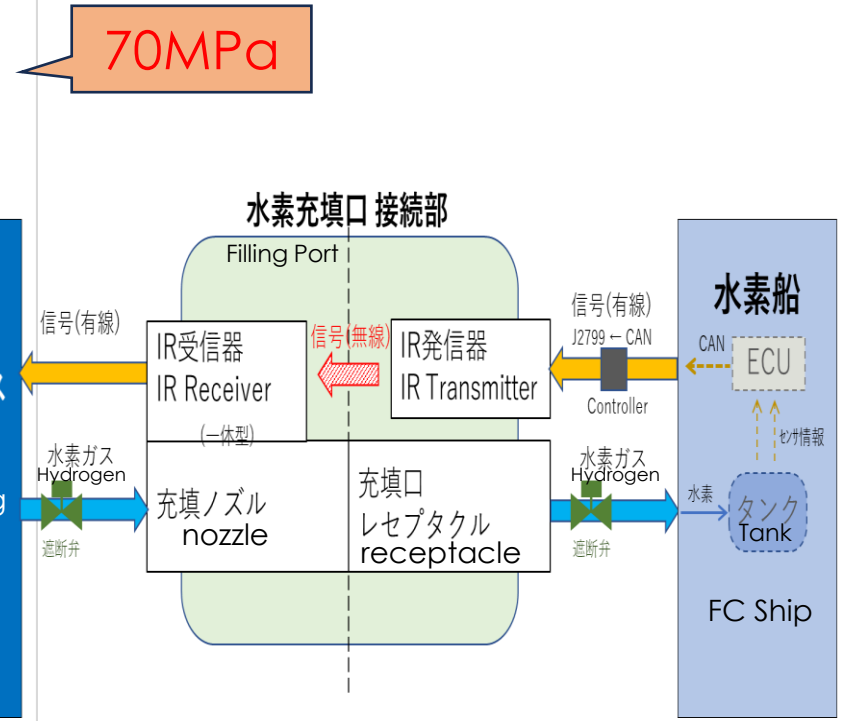
Ship： Battery approx.1,000kWh

③Bunkering Facility – Specification(Development Results)

Hydrogen Gas Filling Test Example



Implemented IR communication similar to that used for FCV, enabling 70MPa refueling under various conditions.



IR Communication Schematic

③Bunkering Facility – Energy Managemant

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