

## Value Creation Story 02



# Enabling safe marine logistics and transportation

The majority of accidents at sea are caused by human factors, and many serious accidents leading to scrapping have occurred around the world.

The realization of safe and stable operations in maritime logistics is a major issue in terms of ensuring the safety of human life, preventing marine pollution and economic losses.

With the steady increase in global sea freight volume, supply and demand for seafarers around the world is expected to be tight in the future, and there are growing expectations for the actualization of automated vessels as a solution for achieving labor saving in addition to safety.

In addition to providing marine equipment, we also provide systems to enable safe and optimal ship navigation. We are also investing our energies into the development of autonomous ship operation systems.

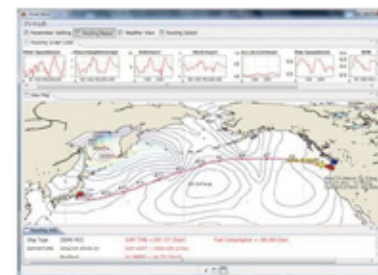
## Engine monitoring system ClassNK CMAXS e-GICSX



System Image

Together with Nippon Kaiji Kyokai (ClassNK), we have jointly researched and developed the CMAXS e-GICSX system incorporating IoT, M2M\*, big data analysis and other technologies to enable the remote monitoring of main engines and the detection of abnormalities. In addition, we have independently developed e-GICS Advance to help reduce the workload borne by crew members and life cycle costs.

## Ship's operational management system Maritime-SOL



System Image

Maritime-SOL is a one-stop portal site for the maritime industry. Ships' onboard systems work in conjunction with the land-based portal site to support the realization of a ship's operational management system based on cooperation between ship and land. The system provides solutions such as enabling tracking of vessel operational status from land, calculating optimal routes, and analyzing hull performance.

※M2M: Machine to Machine

The exchange of information between machines over communications networks, enabling a high degree of autonomous control and operation without manual intervention

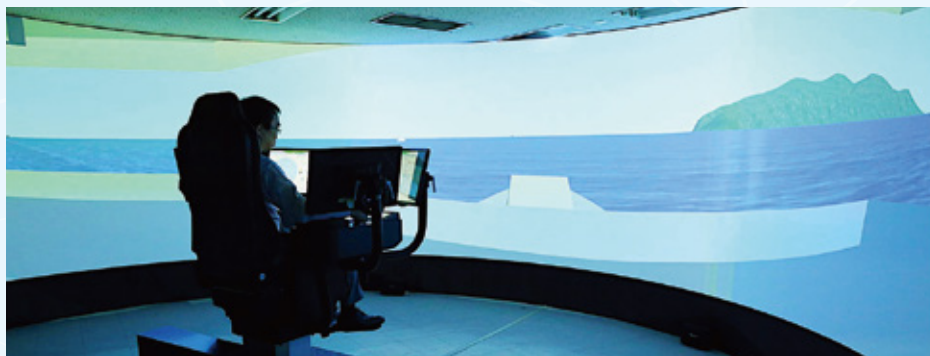
## Target / KPI

○Mitsui E&S will contribute to the practical realization of automated vessels by 2025, which is the goal of "Future Investment Strategy 2017" established by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

# Further challenges toward realizing safe marine logistics and transportation

## Challenge Development of new systems for achieving automated ship operation

Mitsui E&S Shipbuilding Co., Ltd. aims to improve the safety of ship operations and reduce the workload of seafarers by combining its digitalization technologies—monitoring technologies to grasp the status of ships, service analysis technologies to achieve optimal ship operations, and control technologies to realize automatic and autonomous ship control. In 2021, we plan to release maneuvering systems with autonomous functions - automatic avoidance, automatic berthing/unberthing, automatic route planning, automatic mooring monitoring and remote monitoring, and have developed a simulator for validation testing at Akishima Laboratories (Mitsui Zosen) Inc.



Simulator for validation test

## Challenge Participation in a joint technology development program for demonstrative testing of unmanned vessels

Mitsui E&S Shipbuilding is participating in two consortiums in the joint technological development for verification testing of unmanned ship navigation (MEGURI 2040) being conducted by the Nippon Foundation. We are conducting demonstrative testing of autonomous vessels with support from the Nippon Foundation in the form of subsidies.



## Challenge World's first success in automatic berthing and un-berthing of large-sized car ferry at actual pier

From March to April 2021, Mitsui E&S Shipbuilding Co., Ltd. and Akishima Laboratories (Mitsui Zosen) Inc.—which are participating in the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) Joint Demonstration Project related to the Safety of Vessels' Auto Berthing and Un-berthing—conducted demonstrative testing of automatic berthing and unberthing operations at the actual pier of Oarai Port, Ibaraki Prefecture, using the large-scale car ferry Sunflower Shiretoko. They succeeded in automatic berthing and unberthing of a large-scale car ferry at an actual pier for the first time in the world.

Going forward, using the results of this verification test, the companies will perform verification tests of automatic berthing and unberthing using other ship types and at actual piers, aiming to make it more versatile technology. In addition to the automatic berthing/unberthing, they will also begin activities for realization of autonomous marine navigation.

