

Making Effective Use of ICT (IoT / Big Data)

The Challenge of Constantly Improving Safety and Protecting the Environment

Usage of ICT such as the "Internet of Things" (IoT) or big data is expected to help address societal issues and act as a step toward greater innovation.

By drawing fully on data gained from operated vessels, up-to-the-minute reports on weather and sea conditions, and information from past incidents, the MOL Group forges ahead to become the world leader in safe operation and strives to preserve and protect the marine and global environments. These efforts also help us offer our customers safe, secure, and reliable services.

<FMS. Safety> Monitoring system for weather information and conditions surrounding vessels in operation.



MOL uses FMS.Safety, which was developed in cooperation with Weathernews Inc. (WNI), to check on the weather, sea conditions, and other conditions surrounding the approximately 880 vessels operated by MOL Group companies, 365 days a year, 24 hours a day. There is always someone available if a ship captain requires assistance. (Please refer to page 18 for details)

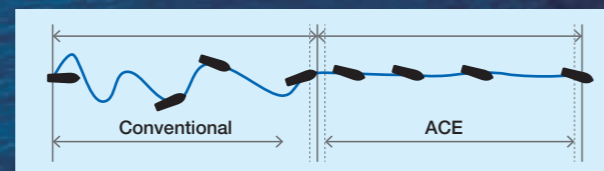
<Captain's DOSCA*1> Selecting the optimal course <ECDIS> Electronic Chart and Display Information System



MOL Group introduced the WNI-developed Captain's DOSCA communication system, which makes effective use of weather data to develop route plans that offer improved safety, on-time performance, economic efficiency, and environmental friendliness. MOL will move ahead toward greater safety improvements by concurrently adding its own information and using the Electronic Chart and Display Information System (ECDIS).

*1 Capt's DOSCA: Captain's Dynamic Operation System for Counter planning and Analysis

<ACE> New autopilot route control function



MOL, along with Tokyo Keiki Inc., conducted a performance demonstration test of its autopilot route control function, called "Advanced Control for Ecology (ACE)", onboard a vessel in service. The ACE estimates disturbance effects such as wind and tide by setting the vessel's course direction. It optimally controls the helm to minimize route deviation and reduce the number of course changes required during a voyage, achieving significant reductions in fuel consumption compared to a similar vessel with a conventional control system.

Approximately 1.5% energy-savings effect was confirmed through a verification test using "Fleet Monitor".

<CMAXS e-GICSX*2> Condition-based engine monitoring system

MOL has started a demonstration test of a next-generation condition-based engine monitoring system called "electronic Global Internet Customer Support neXt" (CMAXS e-GICSX) aboard the methanol carrier *Mayaro*, delivered in 2015.

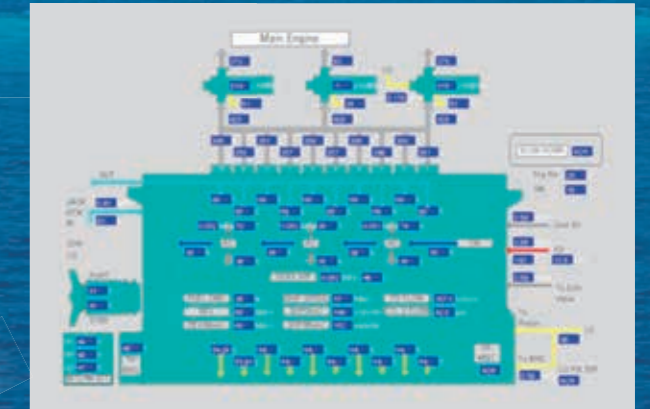
Using the vessel operation monitoring system, CMAXS e-GICSX offers early detection of engine abnormalities that crewmembers may not be aware of. Thus, it contributes to prevent engine problems and minimizing downtime.

*2 CMAXS e-GICSX

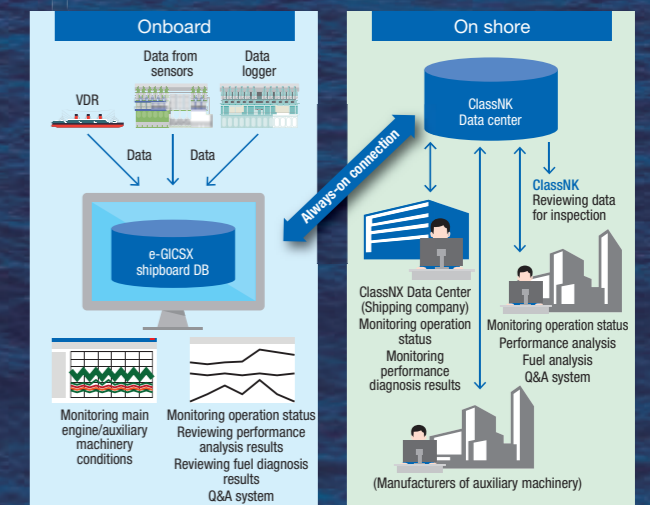
This advanced engine monitoring system brings together cutting-edge data analysis functions based on joint research between Mitsui Engineering & Shipbuilding Co., Ltd. and ClassNK. It detects abnormalities onboard, regardless of ship-to-shore telecommunication status, and creates troubleshooting displays based on the detected abnormalities. It is different from conventional condition-based monitoring systems and can analyze correlations among multiple sensors.

<Fleet Monitor> Vessel operation monitoring system

MOL Group has introduced Fleet Monitor, a system developed by Mitsui Engineering & Shipbuilding Co., Ltd., on 60 vessels. The Internet-based ship-to-shore integrated information infrastructure system manages ship operation while sharing operation information from vessels in service. The system is automatically transmitted to offices on land at regular interval via satellite telecommunication.



Data analysis helps detect possible engine abnormalities in advance.



Using data to evaluate new technologies