

November 2, 2021

Kawasaki Kisen Kaisha, Ltd.

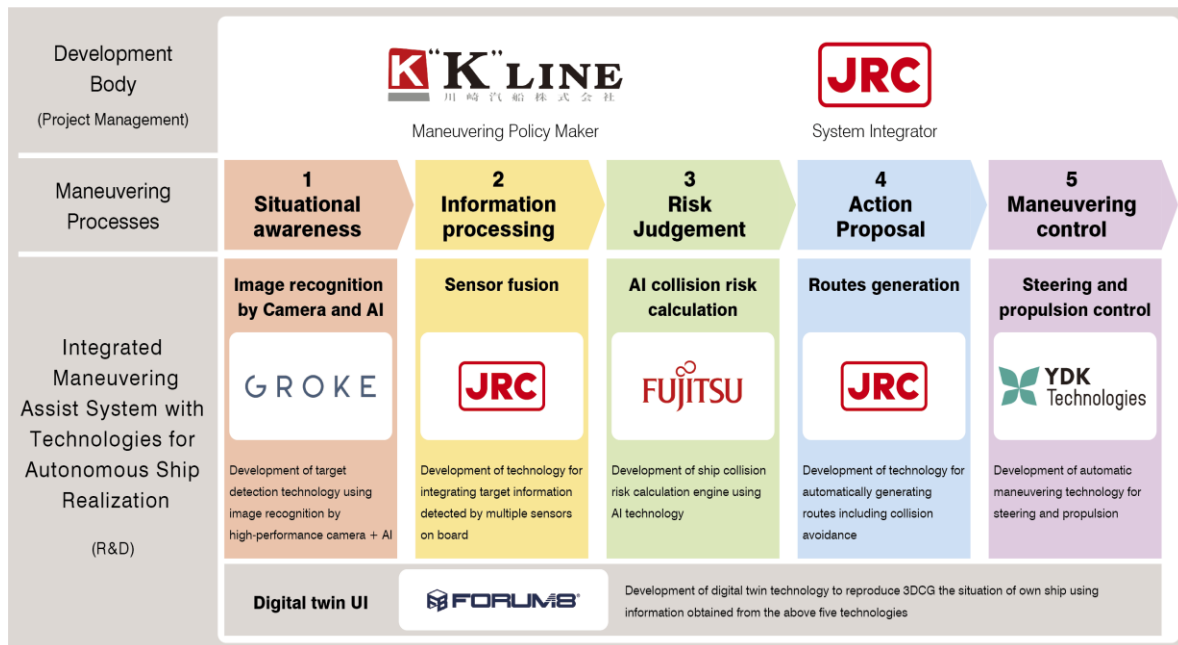
Starts Joint R&D on Integrated Navigation Support System Using AI
and Other Cutting-edge Technologies

~Initiative for Expediting Implementation of Autonomous Ships~

As a part of an initiative to expedite implementation of autonomous ships, Kawasaki Kisen Kaisha, Ltd. ("K" LINE) has entered into a joint R&D agreement with Japan radio Co.,Ltd.(JRC) and YDK Technologies Co., Ltd. (YDK) to develop an integrated navigation support system that utilizes artificial intelligence (AI) and other cutting-edge technologies for assisting maneuvering in making safety maneuvering decisions. This joint R&D project aims to develop a system that will prevent serious maritime accidents such as ship collisions and groundings and that will lead to autonomous ship operations by combining "K" Line's maneuvering knowledge and experience in safe ship operation over many years, JRC marine equipment's knowledge and advanced radio technology developed, and YDK's steering and propulsion control technology. This system is expected to meet Degree 1(*1) of the International Maritime Organization (IMO) standard for development stages of autonomous ships and is an initiative to follow the global trend of the development of autonomous ships and further expedite the project.

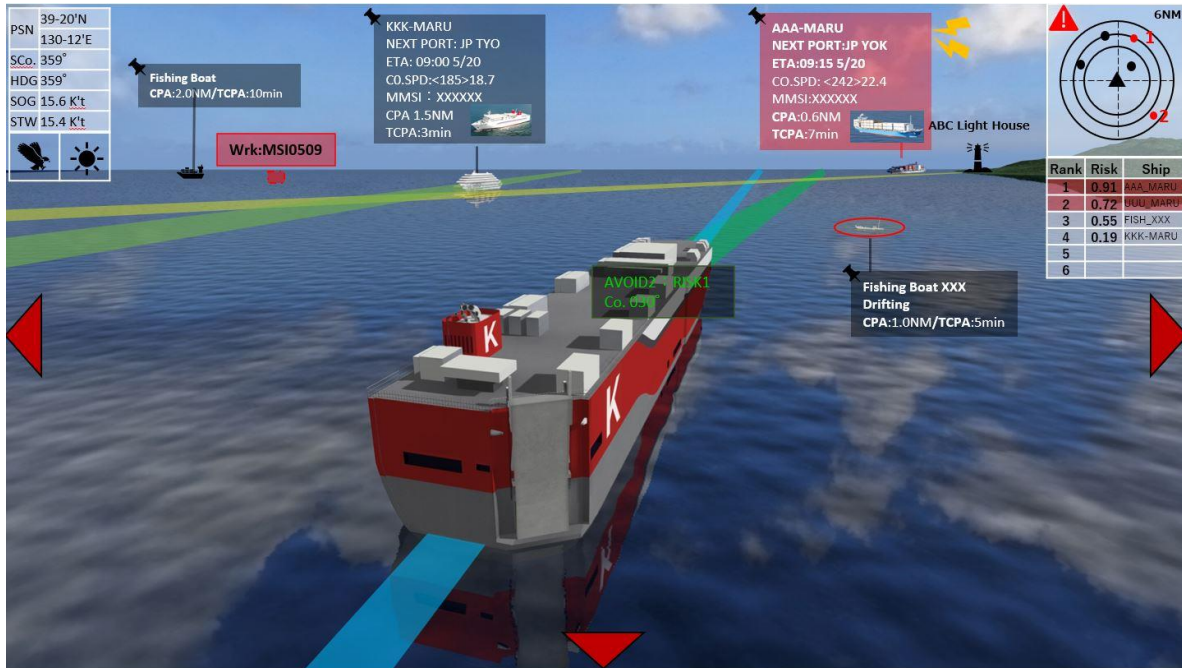
An overview of this initiative and the joint R&D structure is shown below. The aim is to develop a comprehensive system that will further improve the safety of ship operations by utilizing the knowledge and technologies of the three partners in each process from situation awareness by the seafarer to maneuvering control of the ship, combined with the most advanced technologies provided by Groke Technologies(*2), Fujitsu Limited(*3), and Forum8 Co.(*4).

【Overview of Initiative and Joint R&D Structure】



Starting from April 2023, demonstration at sea will be conducted on various ship types and routes, both domestic and international, with the aim of full-scale commercial implementation in the future. "K" Line, JRC, and YDK will continue to develop the system to further improve the safety of ship operations by providing more advanced support and reducing the burden on seafarers and to assist in implementing autonomous ships.

【Information display image】



This R&D is a part of our efforts to develop a crew support system for navigation and engine part. The aim is to prevent serious marine accidents under congested water such as collision and grounding by providing safety information to navigator and supporting their decision-making through this Integrated Navigation Support System that utilizes advanced technology. We will continue to accelerate development to improve safety, transportation quality and environmental performance that including the basic technologies required for future autonomous ships in view of cooperation with various partners.

*1: IMO's Development Level for Automated Ships (Degree 1)

Degree 1 is defined as a state where part of the ship's operation is automated, but the crew is still on board. This requires that human operators be ready and able to take control if any unforeseen circumstances arise.

<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx>

*2: Groke Technologies

Groke Technologies was established in 2019 by founders from the Rolls-Royce Ship Intelligence Team, the pioneers in the development of autonomous navigation technology today, with the investment backing from Mitsubishi Corporation. They are a provider of intelligent navigation solutions with extensive background in autonomous maritime systems. Groke Technologies has extensive expertise in maritime sensor fusion, machine vision and artificial intelligence solutions.

<https://www.groke-tech.com/>

*3: Fujitsu Limited

Since 2018, Fujitsu Limited has been conducting joint performance testing with the Maritime and Port Authority of Singapore to verify the effectiveness of Fujitsu's AI-based ship collision risk prediction technology in actual sea conditions. Starting from 2019, performance tests of this technology have also been conducted at the Tokyo Bay Maritime Traffic Center, Japan Coast Guard.

<https://pr.fujitsu.com/jp/news/2018/04/16-1.html>

<https://pr.fujitsu.com/jp/news/2020/04/15.html>

<https://pr.fujitsu.com/jp/news/2021/09/28.html>

*4: Forum8 Co., Ltd.

Forum8's CG-based VR simulation technology has already been used in a wide range of fields such as civil engineering and transportation, and recently, Forum8 has also been working on CG-based simulations of ships and marine traffic and has the technology to properly simulate the environment surrounding an operating ship.

<https://www.forum8.co.jp/>