

# The time for unmanned ships has arrived

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Figure. 1(a) Maritime RobotX competition: KAIST USV (shown in front) is navigating in the course in Marina Bay, Singapore during the competition. Credit: KAIST

Unmanned ships have received relatively little media attention compared to aerial drones and self-driving cars. Researchers in Korea have been developing technologies to enable and facilitate the realization of unmanned autonomous ships in the near future.

Unmanned [ships](#) (i.e. robotic ships or drone ships) have received relatively little media attention compared to [aerial drones](#) and [self-driving cars](#). However, their potential benefit and impact to scientific, defense, and industrial applications could be immense. Researchers at

Korea Advanced Institute of Science and Technology (KAIST) have been developing technologies to enable and facilitate the realization of unmanned autonomous ships in the near future.

Aerial drones and self-driving cars have been prominently featured in news headlines lately. Although there are numerous technical challenges and skepticism in fully replacing manned vehicle systems with unmanned ones, their common appearance in our daily lives does not seem to be very far away.

Compared to unmanned aerial and ground vehicles, relatively little public attention has been paid to unmanned robotic ships, which are more commonly known as unmanned surface vessels (USVs). In fact, USVs have long attracted research interest in defense sectors for their applicability toward unmanned reconnaissance and surveillance missions. Recently, greater emphasis has been placed on USV intelligence and autonomy, and, in particular, USV usage in scientific and [industrial applications](#) has been more seriously investigated.



Figure. 1(b) Testbed USV platforms for sea trials: KAIST is participating in a joint-research project led by Korean Research Institute of Ships and Ocean

Engineering (KRISO) to develop multi-purpose USVs. Credit: KAIST

In line with this, the inaugural Maritime RobotX Challenge (MRC), sponsored by the U.S. Office of Naval Research (ONR), was held in Singapore in 2014. The competition was composed of five mission tasks that were designed considering the capability and potential applicability of USVs in the future. Intelligence was a key factor, and all the mission tasks were required to be performed autonomously with no human intervention. Team "Angry Nerds" led by Prof. Jinwhan Kim in the Department of Mechanical Engineering at KAIST participated in the competition. After a fierce week-long competition, the KAIST team advanced to the final and took the second place out of 15 teams from many world-renowned universities including KAIST, Seoul National University, MIT, University of Tokyo, and National University of Singapore(See Figure. 1(a)).

The KAIST research team has continued to carry out research projects for developing USV system technologies, funded by the Korean government. The team has been particularly focusing on developing vehicle autonomy and perception capabilities by fusing various sensor information. The developed USV system is expected to be applied to time-consuming and/or dangerous operations in marine environments such as hydrographic surveys, environmental monitoring, illegal fishing control, pollution management, and search and rescue (See Figure. 1(b)).



Figure. 2(a) Autonomous cargo ships whose concepts were designed by Rolls Royce. Credit: KAIST

The team is also pursuing research towards automation of commercial ships for improved operational safety and efficiency. This has been an important issue in marine shipbuilding and transportation industries with increasing labor and energy costs and the new energy efficiency regulations imposed by the International Maritime Organization (IMO). Major research institutions and companies in Europe are already devoting great research effort (see Figure. 2), and KAIST has been trying to support the world's leading Korean shipbuilding industries to maintain their competitiveness and initiatives in next-generation shipping technology.

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(KAIST)

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