

# PRESS RELEASE

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## Autonomous cruising solution developed by Avikus to be exhibited at CES 2022



*An autonomous cruising leisure boat developed by Avikus, Hyundai Heavy Industries Group's newly established subsidiary specializing in autonomous navigation technology. Avikus plans to exhibit the boat at the CES 2022 in Las Vegas from January 5 to 8, 2022. ©Avikus*

SEOUL, SOUTH KOREA, December 15, 2021 – Avikus, Hyundai Heavy Industries (HHI) Group's newly established subsidiary specializing in autonomous navigation technology, announced that it will participate in the annual Consumer Electronics Show 2022 (CES 2022) to be held in Las Vegas from January 5 to 8, 2022 to exhibit its recent achievement -- an autonomous cruising leisure boat.

Avikus successfully completed the fully autonomous, unmanned operation of a cruise ship with twelve passengers on board at a demonstration event held in June 2021 in Pohang City, South Korea. The ten-kilometer-long Pohang Canal is known for complex and challenging navigational environments, as the average width of the waterway is ten meters, and the inner and outer ports are highly crowded.

Building on this successful demonstration, Avikus is expected to commercialize the world's first self-sailing leisure boats next year. To that end, it will conduct a transoceanic voyage of a large merchant ship relying on autonomous navigation technologies in the first half of next year.

Lim Do-hyeong, CEO of Avikus said, "By applying autonomous navigational technology to leisure boats, users can greatly reduce the time required for berthing and unberthing as well as the risk of accidents during operation."

The ship automation is divided into four degrees identified by the International Maritime Organization (IMO): on Degree One ships, some operations may be automated and can at times be unsupervised but with seafarers on board ready to take control. Avikus has already commercialized this Degree One technology and will present the Degree Two autonomous driving boat during CES 2022.

Under Degree Two, seafarers are on board and input the destination. And the system makes a route according to which the ship is controlled and operated. The boat can automatically recognize and avoid obstacles and automatically dock at the marina.



*Avikus successfully completed the fully autonomous, unmanned operation of a cruise ship for twelve passengers at a demonstration event held in June in Pohang City, South Korea. ©Avikus*

Avikus is also focusing on autonomous navigation assistance systems for large merchant ships. It developed a state-of-the-art autonomous navigation technology called HiNAS (Hyundai Intelligent Navigation Assistant System). HiNAS automatically recognizes objects surrounding the vessel and the route to identify risk of collision based on augmented reality (AR). HiNAS is equipped with six special cameras and LiDAR (Light Detection And Ranging), a remote sensory technology that uses the pulse from a laser to collect measurements as adopted by a large number of autonomous vehicles, which have achieved a higher level of autonomous functioning that allows ships, without the help of seafarers, to cope with various unexpected situations, such as adverse weather conditions, strong currents, and appearance of fishing boats. Avikus installed HiNAS for the first time on a large merchant ship in April last year and received an additional 70 orders this year alone.

CEO Lim said, "Deep learning technology is applied to HiNAS, which greatly increases navigational safety because it automatically detects obstacles missed with the existing sensors and prevents collisions. If HiNAS is widely used, we can prevent hundreds of collisions and stranding accidents annually."

Autonomous navigational technology is making considerable changes in the shipbuilding and maritime industries. This is because the logistical costs of shipping are only one-thousandth of that of aircraft, and one-tenth of that of trains. And it is because ships are expected to become a center of logistics in the future. Therefore, self-driving ships will lead to a next-generation logistics revolution in line with changes in land logistics by autonomous delivery trucks and drones.

According to Acute Market Reports, a global market research service provider, the market for autonomous ships and related equipment is expected to grow at a CAGR (compound annual growth rate) of 12.6%, reaching US\$235.7 billion by 2028.

**About Hyundai Heavy Industries Group**

Hyundai Heavy Industries Group (HHI Group) is the world's largest shipbuilding and heavy Industries conglomerate. HHI Group started as a shipbuilder in 1972 in a small fishing village in Ulsan, the southeast of South Korea. With acquisitions and expansions into related sectors, it completed its shift to a holding company structure by launching Hyundai Heavy Industries Holdings in March 2018. On the foundation of solid leadership in the shipbuilding industry, it is now progressing to become the most innovative solution provider in the heavy industry and energy sectors, ranging from shipbuilding and offshore engineering to the refinery, petrochemical, and smart energy management businesses. The market capitalization of the HHI Group's eight listed subsidiaries reached USD 21.1 billion as of November 30, 2021.

**About Avikus**

HHI Group founded Avikus as its first in-house company in December 2020 to help advance and deepen the group's technologies and expertise relating to autonomous ships. Avikus is the etymology of "Viking" and is derived from "Avviker," which means a person who has gone out to sea. It contains Avikus' vision to become a leading company in the field of autonomous ship navigation. Now, it is growing into a leader in high-tech navigation assistance systems and autonomous navigational solutions.

**About LIM Do-hyeong, Chief Executive Officer, Avikus**

After joining Hyundai Heavy Industries in 2000, Mr. Lim served as Head of Hyundai Heavy Industries' Dynamics Research Center in 2017, Head of the Digital Technology Research Center in 2018, and Head of the Autonomous Driving Research Center of Korea Shipbuilding & Offshore Engineering in 2019. He was named CEO of Avikus in 2021. He received his master's degree in mechanical engineering from the Korea Advanced Institute of Science and Technology (KAIST).

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