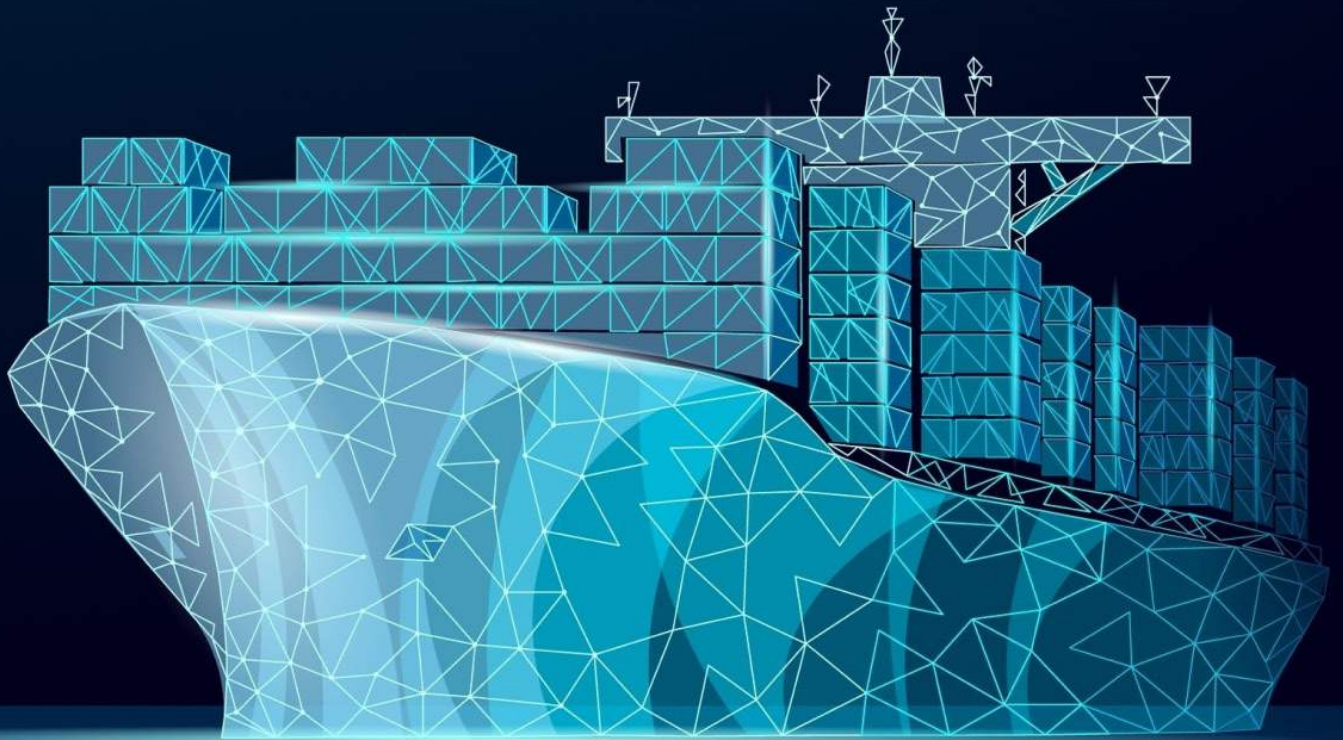


Avikus

MARITIME AUTONOMOUS PIONEER

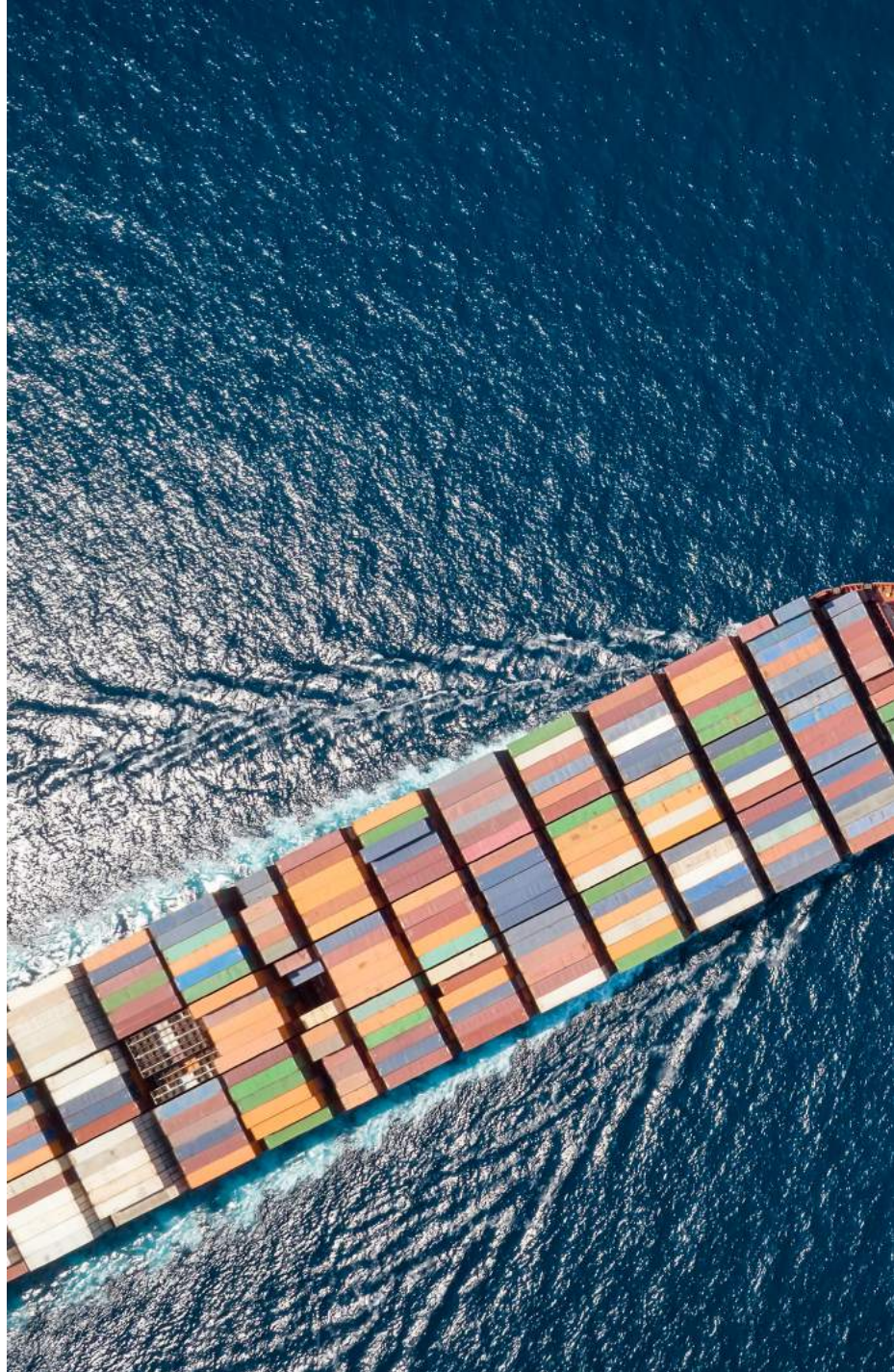


BEYOND NAVIGATION

Your partner for a safer voyage



ABOUT



Avikus founded by HD Hyundai group, specializes in developing autonomous navigation solutions.

Avikus takes its name from AVVIKER, a Viking term meaning "taking a new path", implying our vision to be a pioneer in autonomous navigation.

Avikus succeeded in commercializing the world's first autonomous navigation assistant system for ships in 2020 and continuously making an effort to take a step further.



Mission & Vision

Our mission is to realize the infinite potential of the ocean by leading the paradigm shift of marine mobility.

Our vision is to lead the disruptive innovation by fundamentally revolutionizing maritime logistics and democratizing the boating experience.

Solutions

We provide two solutions - **HiNAS** for ships and **NeuBoat** for boats.

Both solutions use the same underlying technology and have great market synergies.

Through this, we will leverage increasing performance, accuracy, and reliability.

Autonomous Navigation Technology



Detection

Vision sensing
Sensor fusion



Recognition

AR visualization
Surround-view



Decision

Route planning
Collision avoidance



Control

Speed control
Autonomous nav.



HiNAS


HYUNDAI INTELLIGENT NAVIGATION ASSISTANT SYSTEM


Modules of HiNAS


Navigation | Surround-View Monitoring

Control

Applied Technology

 Detection

 Recognition

 Decision

 Control

Improve safety

—
80% of human caused
accidents were removed
from maritime accidents

Assist seafarers

—
Assist with algorithms to
incorporate experienced
captains know-how

Reduce GHG

—
Reduce GHG emission
by increasing fuel efficiency

HiNAS

Navigation

HiNAS Navigation shows detected ships and navigation information in panoramic view using a wide array of advanced technologies such as computer vision, image processing, sensor fusion, deep learning, etc.



IR Camera
Infrared camera
120 deg. FOV

EO Camera
Electro optical camera
180 deg. FOV

Situational Awareness

Computer vision & deep learning-based target detection



Night Vision

IR camera-based target detection at night or restricted visibility



Zooming

Auto target tracking using PTZ camera



Collision & Grounding Alarm

Intuitive collision & grounding alarm with 180-degree super wide AR view



SVM

HiNAS SVM (Surround-View Monitoring) shows a 360-degree top-view AR image converted from input images recorded by multiple fish-eye cameras installed around the ship.



32-channel LiDAR

360 ° Top-View Image

Intuitive surround view monitoring stitching individual camera images and showing them as one image



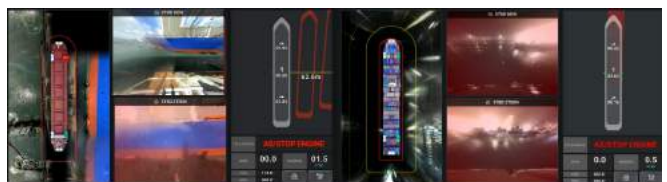
Distance Estimation

Distance estimation between a ship and its surroundings accurately using 32-channel LiDAR and deep learning technology



Distance Alarm

Distance alarm considering LiDAR measurement distance and predictive ship dynamics



3D SVM

More intuitive situation awareness without blind spot and available for anti-piracy



Control

HiNAS Control is an autonomous navigation system that has the functions of autonomous navigation, maneuvering, collision detection, and collision avoidance.

It is a partially autonomous system that is not yet fully autonomous, so all the responsibility for autonomous operation belongs to the certified crews onboard.

Route Optimization

Providing optimal route and speed considering weather information and ship dynamics, etc.



Autonomous Collision Avoidance

Incorporating experienced captains' know-how into algorithms, basically based on COLREGs



Monitoring by the Portable Device

Monitoring from anywhere onboard using the portable device



Cloud Service

Providing schedule monitoring, location tracking, OTA software update, black box function, etc.



HiNAS
Navigation



Interface with
Autopilot



Interface with
BMS



*Bridge Maneuvering System



WORLD'S FIRST AUTONOMOUS TRANSOCEANIC VOYAGE WITH HiNAS

In 2022, Avikus successfully conducted an autonomous transoceanic voyage of a 180K LNG Carrier called 'PRISM COURAGE' using HiNAS.

This is not a self-proclaimed success. It is verified by ABS (American Bureau of Shipping) who supports these facts on the basis of SOF(Statement Of Fact) and AIP (Approval In Principle) certification.



OUR SOLUTIONS IN THE MARKET

HiNAS
received orders of
over **350** sets



- * HiNAS is HD Hyundai (HHI) new building spec-in.
- * This order book includes non-HHI shipyard orders.



Even though it was not a fully autonomous navigation system, this voyage proved that HiNAS provides enough customer value in terms of safety and economic efficiency as evidenced by the order book.



During the entire voyage from the eastern USA to South Korea, the vessel navigated autonomously for about 360 hours 10,000km from the right after passing the Panama Canal to southwestern Japan without any human intervention.

The autonomous navigation system detected about 100 potential collision situations and after a collision risk assessment, it successfully conduct action to avoid the risk of collision.

Also, in terms of economic operation, through route optimization, fuel efficiency was increased by about 7%, while reducing greenhouse gas emissions by 5%.

Avikus

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