HYUNDAI
HEAVY INDUSTRIES
GROUP

Avikus

HYUNDAI INTELLIGENT
NAVIGATION ASSISTANT SYSTEM
BERTHING ASSISTANT SYSTEM

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COMPANY INTRODUCTION

AVIKUS is a company specializing in autonomous ship navigation solution which was established by Hyundai Heavy Industries Group, the world's leading shipbuilder, in January 2021.

The name AVIKUS is derived from 'AVVIKER', which is also the root of the word 'Viking', and implies the vision of the company to become the pioneer of the autonomous navigation.

AVIKUS succeeded commercializing the world's first navigation assistance system for large commercial ships in 2020 and will take a step further from the commercialization of navigation assistance solution to enhance navigation safety, reduce operation costs, and lead the global autonomous ship navigation technology .

A demonstration of fully autonomous navigation of 12-seater cruise using Avikus' HiNAS/HiBAS conducted at 10km-long Pohang Canal in June 2021

HINAS

Hyundai I ntelligent Navigation Assistance System

HiNAS (Hyundai intelligent Navigation Assistant System) is an advanced navigation assistant system that assists the safe navigation by displaying detected ships and navigation information in augmented reality images.

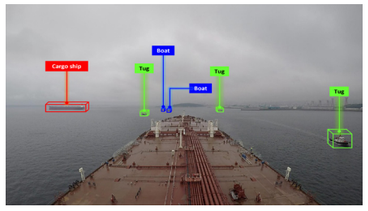
HiNAS applies a wide array of advanced technologies such as image processing, sensor fusion and deep learning for automatic detection of obstacles.

KEY FEATURE

- **Deep Learning based Automatic Object Detection**
  – AI supported Camera based Lookout Assistance
- **Sensor Fusion based Situational Awareness**
  – Radar, AIS, Camera sensor fusion for Accuracy and Robustness
- **AR(Augmented Reality) Visualization**
  – Intuitive Navigation Assistance and Collision & Grounding Alarm

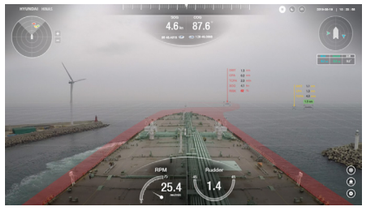
Vision based Object Detection

- Accurate & Robust Ship Localization



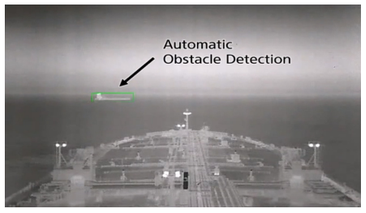
AR Visualization

- Intuitive Collision & Grounding Alarm



Night Vision Using IR Camera

- Useful for Restricted Visibility Condition such as Night and Heavy Fog



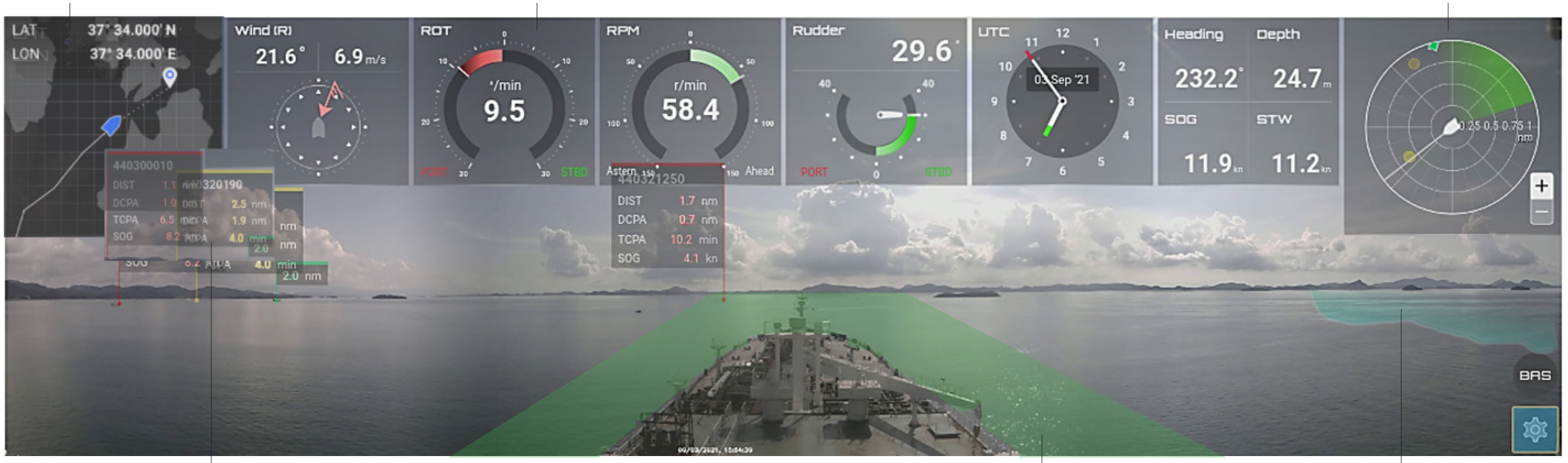
SUPPER WIDE VIEW SCREEN

Valuable information show on screen

Mini map
- Display of the route of ship

Digital overhead indication
- Display of main conning information

Target indication
- Display of the targeted ship



Collision Alert
- Display of the information of the targeted ship
- Display of the different color information box as per risk level (Red / Yellow / Green)

Display Planned ship's route

No-go area
- display based on ENC

Web browser on mobile phone & tablet on ship

Equipment	Specification
E.O. camera	1920 × 1080, HFOV 85°
I.R. camera	640 × 512, HFOV 50°
Single board computer	8-Core ARM v8.2 64-Bit CPU, VLIW vision processor
Main server	2TB HDD, 16GB DDR4, Class Type approval
Monitor	27 inches (1920 × 1080) or 49.5 inches (1920 × 540)

HARDWARE CONFIGURATION

I.R. camera : Total Field of Visibility of 120°

E.O. camera : Total Field of Visibility of 180°

Single board computer : image processing

Main Server

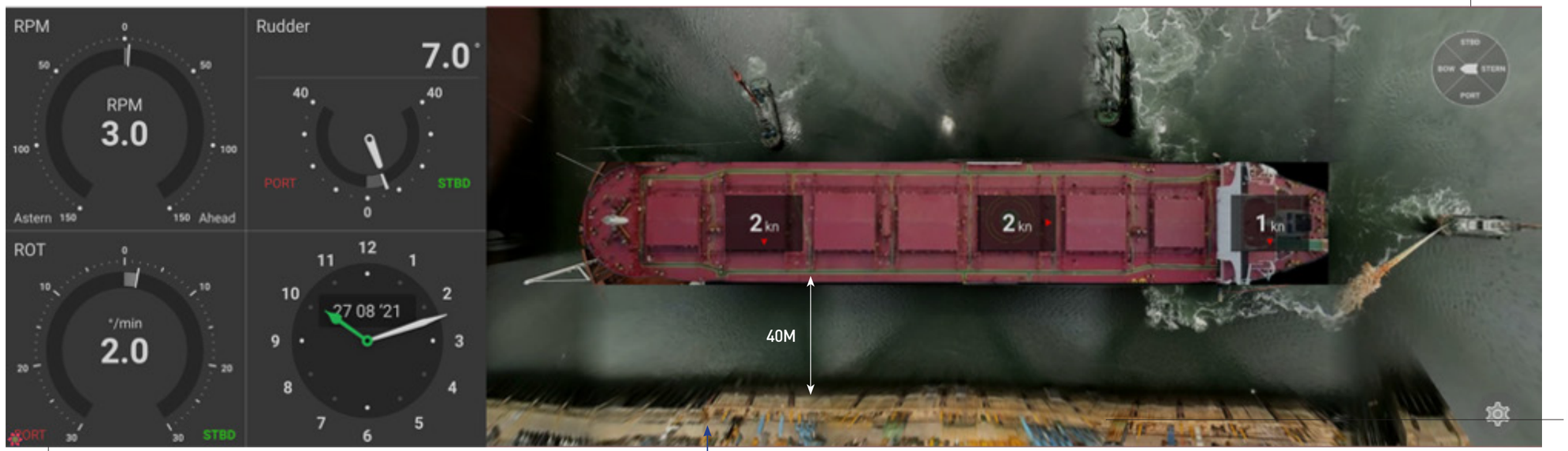
Supper Wide View Screen

HIBAS

Hyundai Intelligent Berthing Assistance System

HiBAS (Hyundai intelligent Berthing Assistant System) is an advanced berthing assistant system which displays the situations around the ship in 360-degree top view augmented reality image to assist the crews with safe berthing and unberthing.

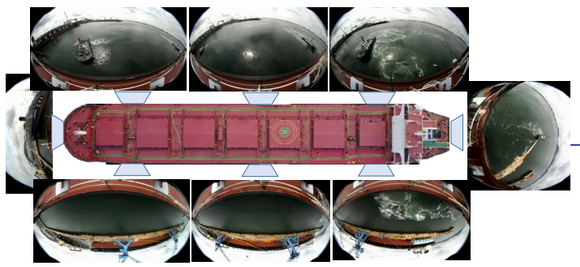
HiBAS shows a top view image converted from input images recorded by multiple fish-eye cameras installed around the ship.



Individual camera image
- Display of zoom in camera

Digital overhead indication
- Display of main conning information

AR visualization Top-View image
- Top-View Image
- Ship speed
- Distance between ship and object



Stitching of Several cameras for top-view

Camera	Specification
E.O. camera	HFOV 195º with Fisheye Lens
Lidar	32 channels, Range abt. 100m
Single board computer	Quad-core ARM A57 CPU
Main server	2TB HDD, 16GB DDR4, Class Type approval
Monitor	27 inches (1920x1080) or 49.5 inches (1920x540)

▲ Web browser on mobile phone & tablet on ship

HARDWARE CONFIGURATION