Infoceanus Documents

Version en, 2025-12-02

Introduction

JRCS Infoceanus Documentation

Welcome to the documentation pages of the following Infoceanus products by JRCS.

Infoceanus Command

A decision making support platform for your ship commander in assessing and evaluating marine conditions using advanced Computer Vision and Artificial Intelligence (AI)

Infoceanus Connect

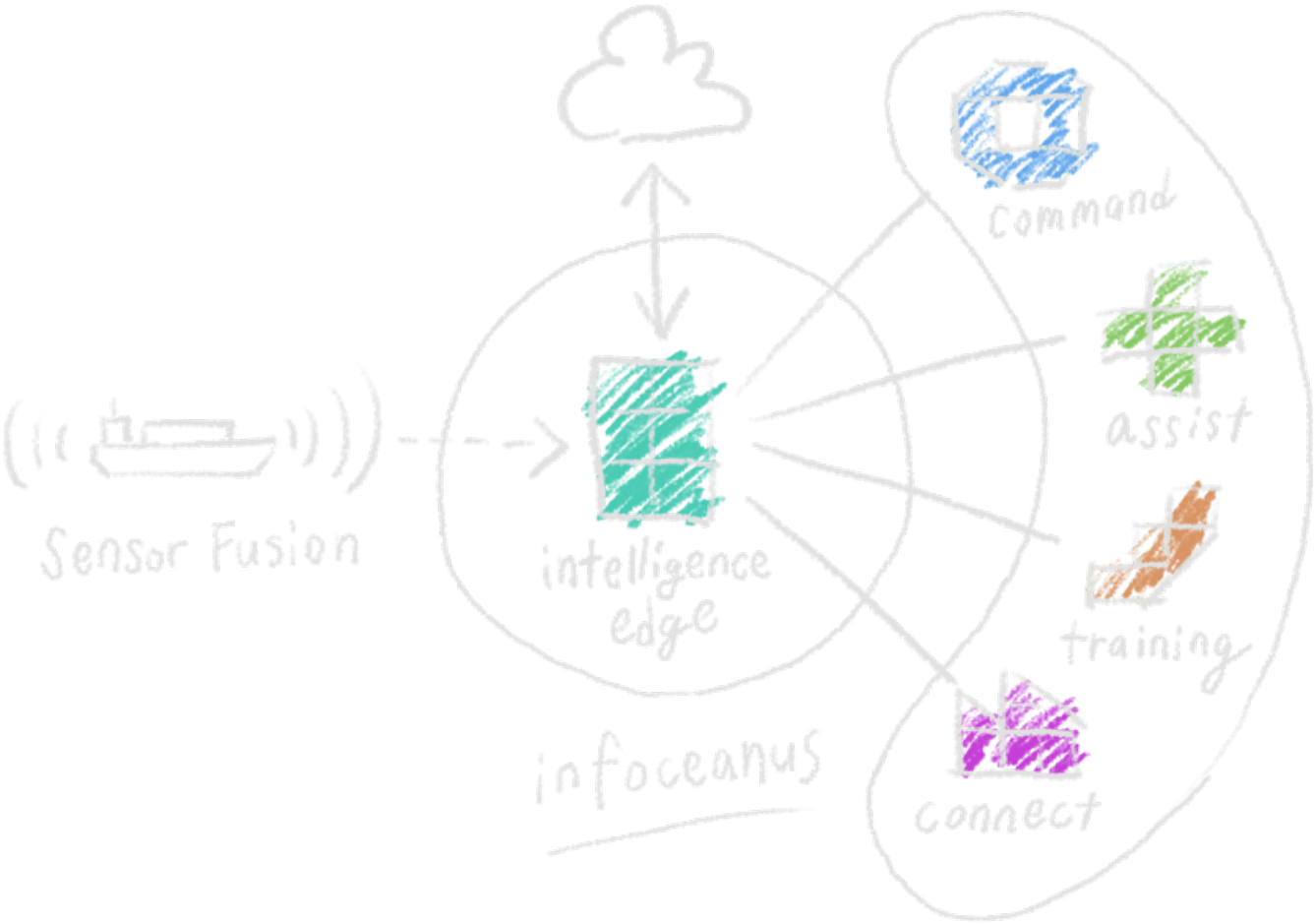
A fleet monitoring and vessel performance tool for a secured access to your vessel's high-speed real-time sensor and engine data.

Infoceanus API

An interface for accessing vessel's data securely in real time, automate systems, enhance business logic and integrate your current applications.

Infoceanus Intelligence Edge

The ship server to collect data from sensors and process, store and distribute it to Cloud and Edge applications.


Command
assist
training
connect
Sensor Fusion
intelligence
edge
infoceanus

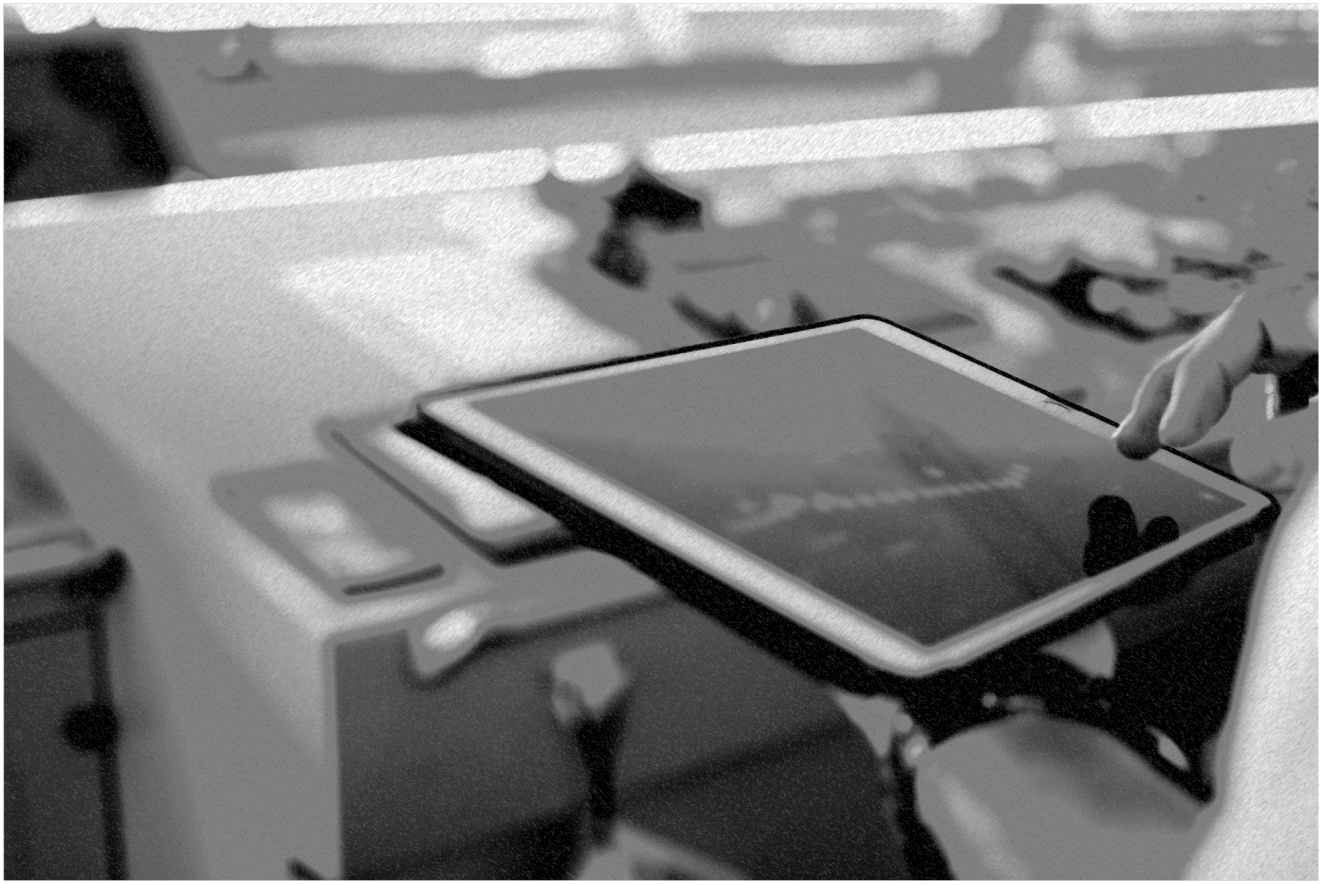
Command

December 2024

SNo. 0001

command

AI Solution for a Safe Voyage



JRCS Co. Ltd.

Command Specification

System Overview

infoceanus command supports the safe operation of ships with situational awareness technology that uses general-purpose visible light cameras and computer vision.

Icons marked up on the map using the map annotation function can be shared not only within your company but also with all users by setting the sharing range. It is also equipped with a route navigation function that displays information in a dialog when approaching preset buoys or targets at sea. We provide criteria for confirming course and safe ship maneuvering.

We will contribute to the safe operation of ships with an unprecedented new communication style.

Equipment specifications

For specifications and details of each equipment, please refer to "2. Component Dimensions".

1. Edge Server : Box type (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**
OS	Ubuntu Server

> It recognizes objects such as ships and buoys on the sea based on images from visible light cameras. It also receives signals from navigational instruments and displays the position of own ship and other ships on the map.
>
> - LCD monitor, keyboard, and mouse included (for maintenance)

2. iPad (1 unit)

Installation location	**Wheelhouse**
OS	iPadOS

> Objects recognized by the edge server are displayed together with visible light camera images. Displays the position of own ship and other ships on the map.

> (electronic navigational chart ENC is optional)

3. Uninterruptible Power System : UPS (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**

> Backs up the power for infoceanus command equipment to prevent power outages such as power outages and land power switchovers. (1kVA)

4. PoE HUB - 10 ports (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**
Specification	1Gbit port x 4, 2.5Gbit port x 2, 5.0Gbit port x 2, 10Gbit port x 1, SFP slot x 1)

> It is used to supply power to the visible light camera and to communicate images from the visible light camera.

5. PoE HUB - 5 ports (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**
Specification	1Gbit port x 5

> It will be used to receive navigational instrument data, supply power to the iPad, and serve as a communication network.

6. IMU（Inertial Measurement Unit） (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**

> Measure the pitch angle and roll angle of the hull.

7. Signal converter (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**

> Input the pitch angle and roll angle data received from the IMU and distribute it to the network.

8. Visible light camera (3 units)

Installation location	**Installed on the compass deck.**

> The orientation of the visible light cameras is one on the port side, one on the front, and one on the starboard side.
>
> *These visible light cameras are installed inside the camera housing.

9. Camera Housing (1 unit)

Installation location	**Installed on the compass deck.**

> *Please make a stand to attach the camera housing.

10. LAN cable connection coupler (3 units)

Installation location	**Installed on the compass deck.**

> A waterproof coupler that connects the LAN cable from the visible light camera and the LAN cable from inside the ship.

11. Wi-Fi Access Point (1 unit)

Installation location	**Wheelhouse**

> An access point that connects the iPad and edge server via a wireless network.

12. Dedicated rack (1 unit)

Installation location	**Electrical equipment room (mounted on a dedicated rack).**

> A dedicated rack for mounting infoceanus command equipment.

Function

Build the infoceanus command using the components in the previous section.

1. Displaying camera images

> Images from a visible light camera installed outside the own ship are displayed in real time on a terminal inside the ship via the network.

2. Recording camera images

> Records images from a visible light camera installed outside the ship.

3. Display of navigation data

> Data from navigational instruments is acquired and the following information is displayed on the ship’s terminal in real time.

a. GNSS ： Ship’s direction and speed
b. GYRO compass ： Heading of the ship
c. Wind direction anemometer ： Wind direction and speed
d. AIS ： Information on other ships

> - Data from navigational instruments is assumed to be output to the system via serial communication or Ethernet using the NMEA communication protocol.

4. Collision warning

> Based on the received AIS information, DCPA (Distance Closet Point of Approach) and TCPA (Time Closet Point of Approach) are calculated and a warning is issued. Alarms can be set by distance (in 0.1 NM increments) with DCPA and time (in 1 minute increments) with TCPA.

5. Display AIS information

> Based on the received AIS information, a list will be displayed on the screen in order of distance from the DCPA. Also, when you select a list, detailed information about AIS will be displayed.

6. Object detection and recognition

> The following types of objects are recognized from visible light camera images, and bounding boxes are displayed for the recognized objects on the image. This makes it possible to identify small vessels, etc. that are not equipped with AIS.

a. Vessel
b. Passenger Vessel
c. Boat (Small ships)
d. Navigation Buoy

e. Fishing Buoy

f. Fishers Facility

7. Display map

> Displays your own ship’s position and the positions of other ships received by AIS on the map. The map display can be either north-up or course-up, centered on your own ship, and you can also freely change the map display angle.

8. Labeling

> You can create labels for locations on the map. You can use this label not only for yourself, but also to make it public to your company’s users or share it with all users.

Note : An internet connection is required to start this system. Please prepare an environment

> where you can connect to the Internet from inside the ship.

Component Dimensions

Component Lists

No	Item	Specification		Qty	Remarks
1	Edge Server	Input voltage: OS: CPU: RAM: HDD: LAN: Weight:	AC100V-220V Ubuntu 2.2 Intel Core i9-10990E(2.8GHz) 64 GB SSD 1TB + HDD 4TB X550-T2(1GbE x 2) 16 kg	1	Electrical equipment room x 1 (mounted on a dedicated rack) The following equipment is included for maintenance LCD monitor Keyboard Mouse

No	Item	Specification		Qty	Remarks
2	iPad	OS: Storage: Display size: Weight:	iPadOS 64 GB 10.2 inch 489 g	1	Wheelhouse x 1 For displaying and operating applications
3	UPS	Input voltage: Output voltage: Output capacity: Backup time: Charging time: Weight:	AC100～120V AC100～120V 1.0 kVA 7 minutes (800W) 8 hours 20 kg	1	Electrical equipment room x 1 (mounted on a dedicated rack) Output frequency (50/60Hz fixed)
4	PoE HUB (10 port)	Input voltage: MPC: Ports: PoE: Weight:	AC100～240V 234.31 W 1GbEx4, 2.5GbEx2, 5GbEx2, 10GbEx1, 10Gb SFPx1 PoE+ (IEEE802.3at)x8 1.9 kg	1	Electrical equipment room x 1 (mounted on a dedicated rack)
5	PoE HUB (5 port)	Input voltage: MPC: Ports: PoE: Weight:	AC100～240V(AC adapter) 4.52 W 1GbEx5 PoE+ (IEEE802.3af/at)x4 220 g	1	Electrical equipment room x 1 (mounted on a dedicated rack)

No	Item	Specification		Qty	Remarks
6	IMU	Input voltage: MPC: Output port: DMP: Weight:	DC4.5～7.2V(USB Type-A) 300 mA D-SUB9pin RS232C Acceleration, Gyro, Magnetic sensor each 3 axis DMP processer 76 g	1	Electrical equipment room x 1 (mounted on a dedicated rack) Include serial module for signal output
7	Signal converter	Input voltage: MPC: Interface: Weight:	DC12～48V（AC adapter） 2.66 W D-SUB9pin x1 (RS232/422/485) 10/100BaseT（RJ45） x1 175 g	1	Electrical equipment room x 1 (mounted on a dedicated rack)
8	visible light camera	Input voltage: consumption: Interface: Sensor size: Focal length: Iris: Protection class: Weight:	PoE(IEEE802.3af) 3.1 W 1000Base-T（RJ45） x1 1/1.55 type CMOS 6 mm F1.9～F16 IP67 167 g	3	Compass deck x 3 Equipped inside the camera housing

No	Item	Specification		Qty	Remarks
9	Camera housing	Material: Painting: Weight:	T=3.2 steel plate White XX kg	1	Compass deck x 1
10	LAN cable connection coupler	Material: cable outer diameter: Protection class:	Polyamide resin UL94V-0 φ6.0～φ6.8 mm IP67	3	Compass deck x 3
11	Wi-Fi Access point	Output voltage: MPC: Interface: Wireless: Weight:	PoE(IEEE802.3af) or DC12V 11 W 1000Base-T(RJ45) x 1 2.4GHz 802.11b/g/n 5GHz 802.11a/n/ac 270 g	3	Wheelhouse x 3
12	dedicated rack	Material: Size: Weight:	2.3 steel plate W700 x D400 x H1000 mm ? kg	1	Electrical equipment room x 1

Edge Server

Unit	Color
mm	Black

iPad

250.6

thickness : 7.5

174.1

Unit	mm
Color	Black

Uninterruptible power system

87

474

438

Unit	mm
Color	Black

PoE HUB（10 port）

43

169

328

Unit	mm
Color	Black

PoE HUB（5 port）

25

98

100

Unit	mm
Color	Black

IMU

50

51.5

thickness : 20.2

Unit	mm
Color	Black

Signal converter

52

80

22

Unit	mm
Color	Black

Visible light camera

122

25

φ39

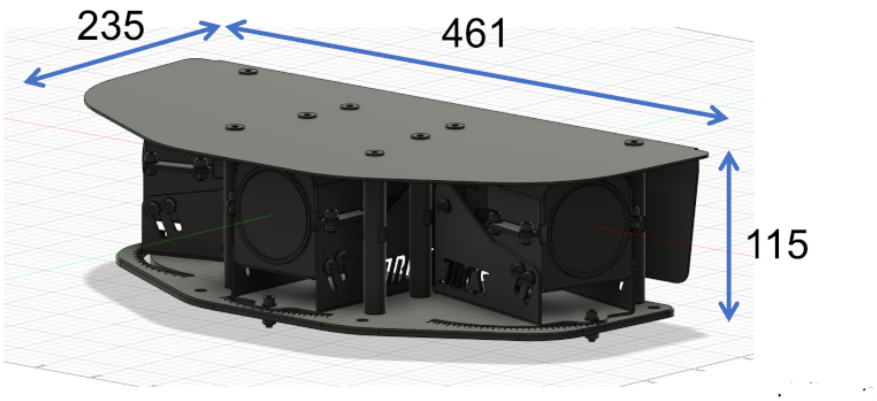
Lens tube attached to the lens

φ68

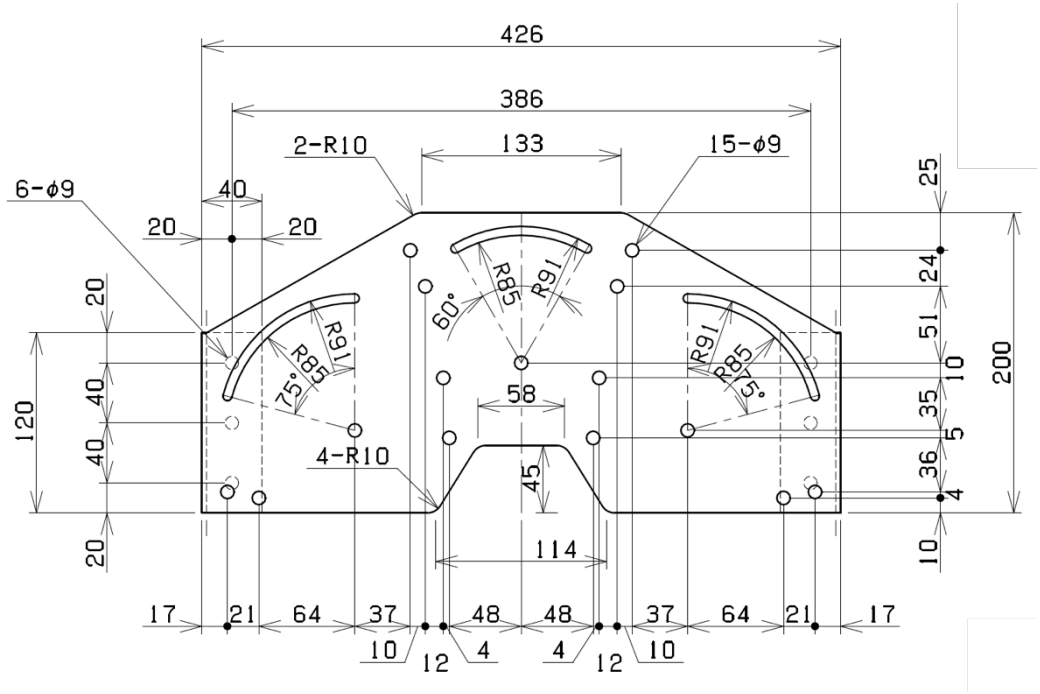
66

Unit	mm
Color	Black

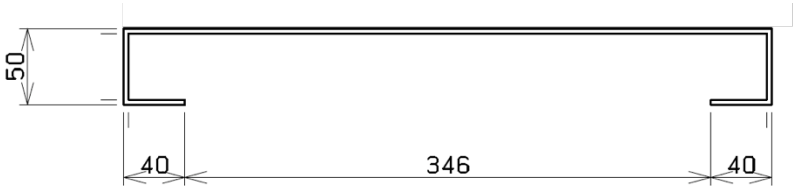
Camera Housing



Mounting base bottom



Mounting holes in the trestle x 6



Unit	mm
Color	Exterior : White Interior : Black

LAN cable connection coupler

115

φ43

Unit	mm
Color	Black

Wi-Fi Access Point

222

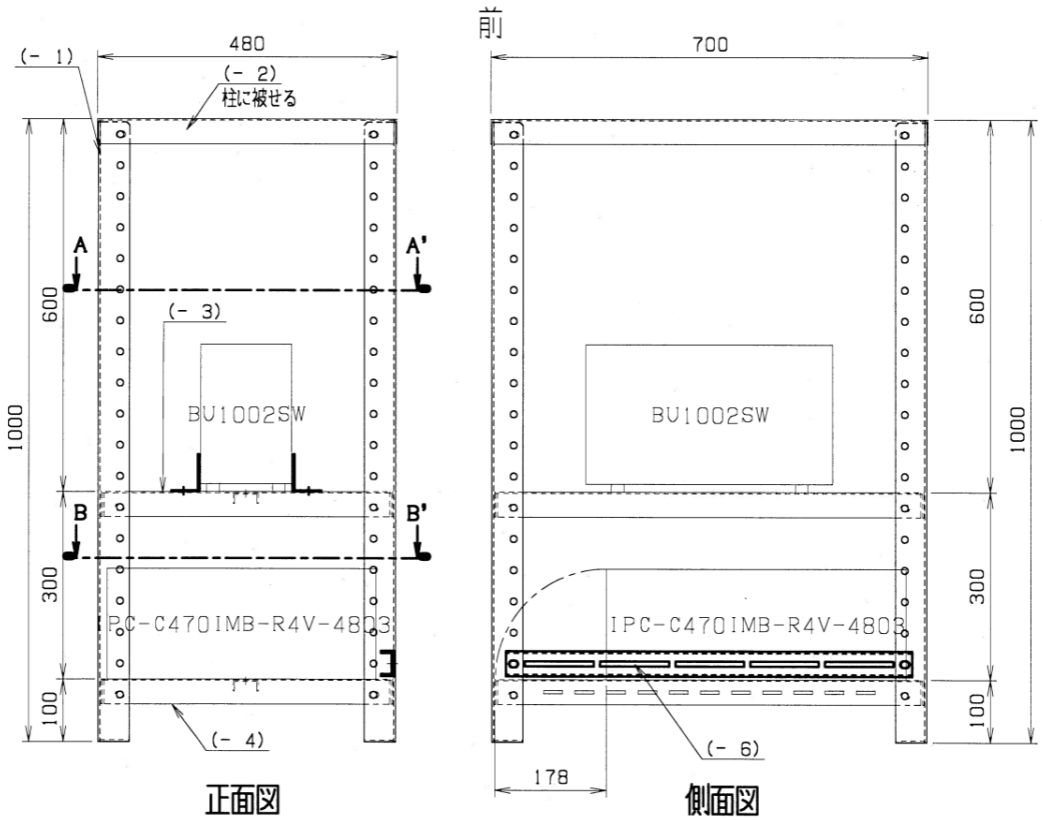
123

26

Unit	mm
Color	White

Dedicated rack

Forward



Side view

Front view

Unit	mm
Color	Black

System configuration

Equipment configuration diagram

Solid line equipment and cables are under the control of JRCS.

Dotted line equipment and cables are outside the control of JRCS.

*1) Three visible light cameras are located inside the camera housing.

*2) LAN cable for visible light cameras. (CAT6A)

*3) LAN cable protected by armor (CAT6E)

*4) Input ship position, ship speed, wind direction, wind speed, heading direction, and AIS data using NMEA signals.

Uninterruptible Power system

(UPS)

(*4)

Signal converter

(*1)

Wheelhouse

LAN cable connection coupler

LAN cable connection coupler

LAN cable connection coupler

Visible light camera

(Starboard)

Visible light camera

(Center)

Visible light camera

(Port)

Camera housing

Compass deck

Onboard AC power supply outlet (input)

LAN(CAT6E)

USB

LAN（CAT7）

LAN(CAT6E)

LAN(CAT6E)

USB Adapter

HDMI

LAN(CAT6E)

SERIAL

Option

Mouse

USB

Keyboard

LCD

Internet

Router

Wi-Fi

AP

USB

LAN

(CAT6E)

VDR

Antenna cable

Antenna cable

ROVER

Antenna

BASE

Antenna

PoE HUB (5port)

Receptacle

Edge Server

LAN

(*2)

LAN

(*2)

LAN

(*2)

LAN

(*3)

LAN

(*3)

LAN

(*3)

PoE HUB (10port)

IMU

Connection diagram

In the connection diagram shown, the cables marked with solid lines are under the control of JRCS, but due to equipment placement and cables marked with dotted lines that go through walls are under the jurisdiction of the shipyard.

【Symbol explanation】

Symbol	Explanation	Symbol	Explanation
ICMD AP	Wi-F Access Point	ICMD KB	Keyboard
ICMD CAM	Visible light camera	ICMD LCD	LCD Monitor for Edge Server
ICMD EDGE	Edge Server	ICMD MS	Mouse
ICMD HSG	Camera housing	ICMD POE10	PoE HUB (10 port)
ICMD IMU	IMU unit	IC RECU	Receptacle (for sharing UPS power)
ICMD IPAD	iPad	ICMD SI	Signal converter
ICMD JNC	LAN cable connection coupler	ICMD UPS	Uninterruptible Poser System

【Notation explanation】

記号表記	内容
	Equipment under the control of JRCS
	Equipment outside the control of JRCS
	Cable under the control of JRCS
	Cable outside the control of JRCS
	Wall outlet
	Outlet attached to the equipment, AC adapter

記号表記	内容
	LAN cable under the control of JRCS
	LAN cable outside the control of JRCS
ICMD RECU ④3P	④ : The circled number is the number of inlet, 3P : Connector shape

Power supply diagram

Solid line equipment and cables are under the control of JRCS.

Dotted line equipment and cables are outside the control of JRCS.

Electrical equipment room

INPUT

Wall outlet

MSB2

AC*V

ICMD UPS

ICMD LCD

ICMD EDGE

ICMD POE10

ICMD

RECU④3P

ICMD IMU

ICMD SI

ICMD POE05

Network connection diagram

Solid line equipment and cables are under the control of JRCS.

Dotted line equipment and cables are outside the control of JRCS.

Electrical equipment room

Compass deck

ICLAN000

CAT7

ICLCD000

Starboard side

USB2

USB1

ICMD

MS

ICMD

KB

Center

Port side

4

ICMD POE05

ICLAN000

CAT6E

en01

ICMD EDGE

HDMI

ICMD

LCD

ICLAN000

CAT7

enp350f0

9

7 6 8

ICMD POE10

ICLAN000

CAT6E

ICLAN000

CAT6E

ICLAN000

CAT6A

ICLAN000

CAT6A

ICLAN000

CAT6A

ICMD

JNC

ICMD

JNC

ICMD

JNC

ICMD HSG

ICMD CAM

ICMD CAM

ICMD CAM

Solid line equipment and cables are under the control of JRCS.

Dotted line equipment and cables are outside the control of JRCS.

Wheelhouse

Electrical equipment room

LAN

ICLAN000

CAT6E

ICLAN000

CAT6E

ICMD

IPAD

3

ICMD

AP

4

VSAT ROUTER

ICMD POE05

NMEA Sentence

- GNSS
- GYRO COMPASS
- ANEMOMATER

VDR

VDR HUB

2

5

LAN

PORT1

ICMD

SI

RS232C

Serial cable

ICMD

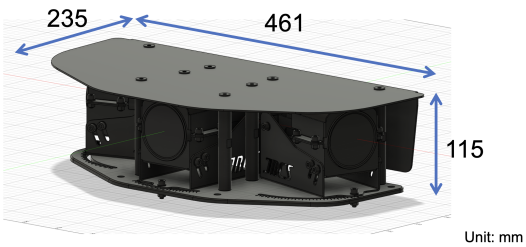
IMU

Command Installation

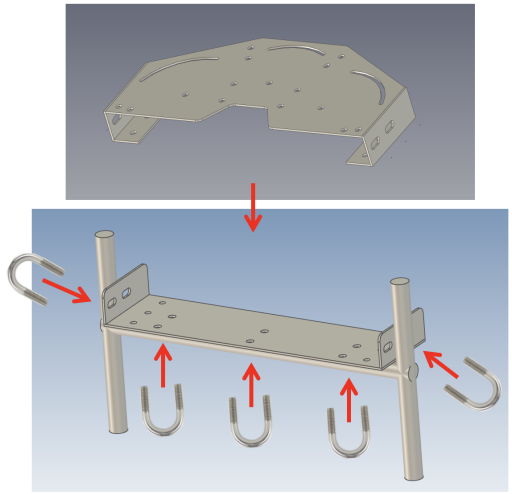
Installation method

Installation of visible light cameras

Mounting a visible light camera (Example: Mounting on a radar mast)

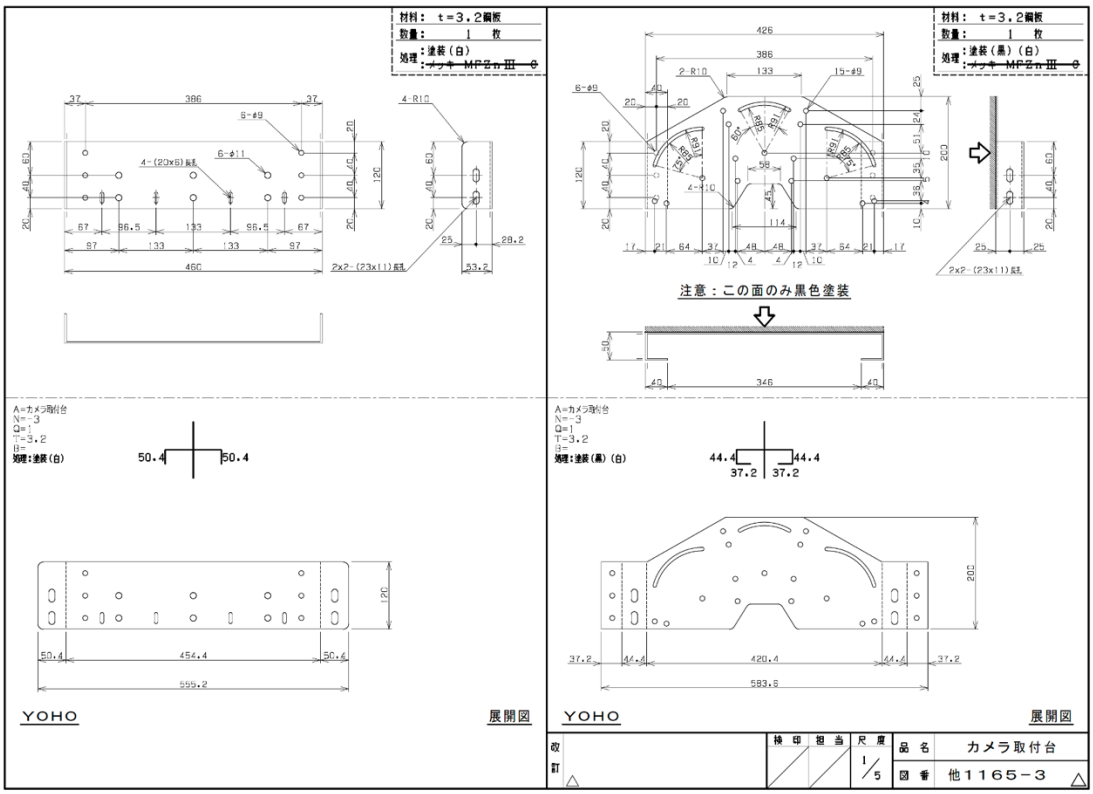
> The visible light camera is fixed to the railing of the ship’s radar mast.
>
> 
>
>
> The visible light camera is mounted on the camera housing, which secures the camera housing to the handrail. It will be a method of fixing and installing the pedestal of the camera housing between the handrails, and then installing the camera housing on top of it. The camera housing is not mounted directly on the pedestal, but is used on the camera housing mounting platform. The handrails and pedestal are fixed from the left and right sides and the bottom with U-bolts, and the pedestal and camera housing mounting base are bolted.
>
> 
>

Camera housing with three visible light cameras



Camera housing mounting

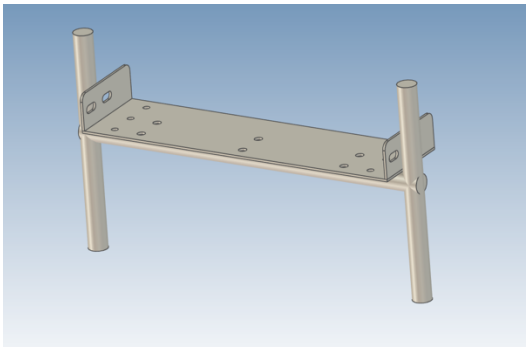
Pedestal



Camera housing mount drawings

1. Secure the pedestal to the railing.

Use U-bolts to secure the bottom three points of the pedestal and the center of the handrail. Fasten with double nuts.



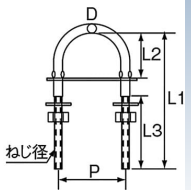
U-bolt (marine / C type)

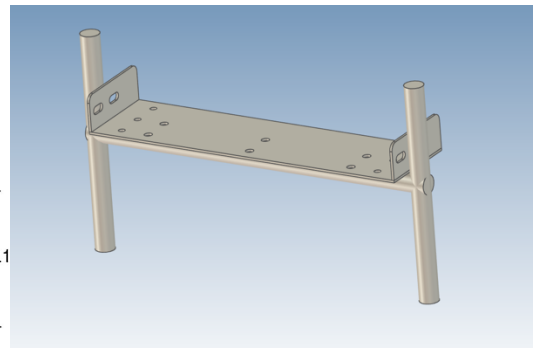
Material ： stainless

Size ： M10

Nominal size ： 20A

Fix the left and right handrails and pedestals. Use long-legged U-bolts. Fasten with double nuts.





U-bolt (marine / C type)

Material ： stainless

Size ： M10

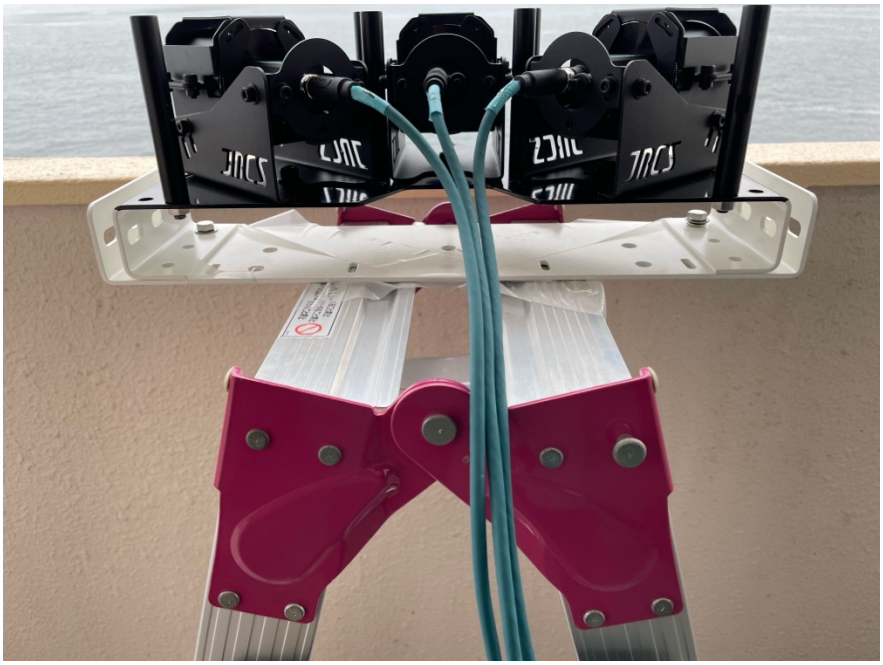
L1 ： 120mm

L2 ： 45mm

L3 ： 55mm

P ： 50mm

2. Fix the pedestal and camera housing mount.



The pedestal and camera housing mount are fastened with 6 M8 bolts.

Note：

1. The visible light camera and the hull must be tilted parallel to each other, so use a level to install the pedestal so that it is parallel to the hull.
2. In order to align the ship’s heading with the visible light camera (center), install the pedestal so that it matches the ship’s heading.
3. After installing the visible light camera, remove the top plate of the camera housing in order to adjust the direction, tilt, and focus of the visible light camera. After adjusting the visible light camera, attach the top plate.

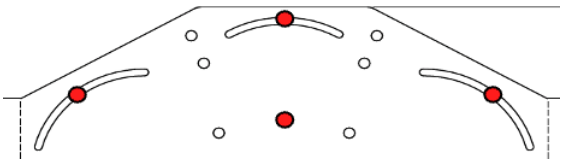
Adjusting the visible light camera

Visible light cameras are basically adjusted before shipping, but during on-site installation, there may be cases where the pedestal cannot be installed parallel to the hull or the pedestal cannot be oriented to match the heading of the ship. If this occurs, adjust the direction and angle of the visible light camera.

1. Adjusting the horizontal angle

> Each visible light camera is fixed to the camera housing mount at two points. Bolts use M5 and M8 nuts. Loosen this nut to adjust the direction of the visible light camera.
>
> 
>
> By aligning with the center of the moving part of each visible light camera, the angle difference between each camera will be 50 degrees. Make sure to orient the center camera to match the heading of the ship. For example, if you decide to shift the direction of the center visible light camera to the right by 2 degrees, please also shift the port and starboard sides by 2 degrees to the right.

Center

> 

Starboard

Port

> Note：
>
> If field adjustments do not allow three visible light cameras to be spaced 50 degrees apart, or if the cameras need to be pointed in different directions due to obstacles in their field of view, the camera angles can be adjusted in software.
>
> In this case, record the camera orientation value.

> Example：

Heading direction (0 deg)

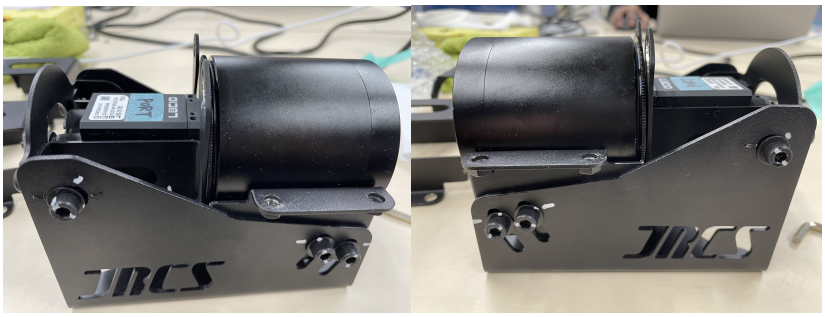
The center camera direction is 351 degrees, so the offset value is -9 degrees.

The starboard camera direction is 43 degrees, so the offset value is 43degrees.

The port camera direction is 312 degrees, so the offset value is -48 degrees.

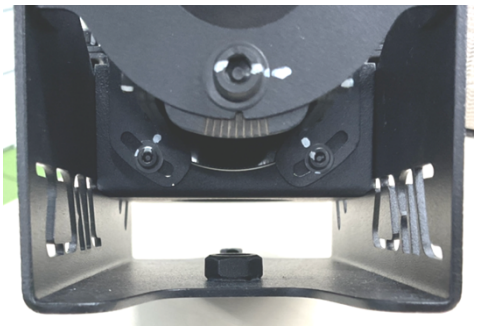
Visible light camera	Offset degree
Port	-48 degree
Center	-9 degree
Starboard	43 degree

2. Adjusting the pitch angle

> To adjust the pitch angle of each visible light camera, loosen the M5 bolts (6 locations in total) on the left and right sides. Use a level to adjust it so that it is parallel to the pitch angle of the hull.
>
> 

3. Adjusting the roll angle

> To adjust the roll angle of each visible light camera, loosen the bolts (7 locations in total) on the rear of the visible light camera. Use a level to adjust it so that it is parallel to the hull roll angle.



4. Adjusting the focus of visible light camera

> Basically, do not adjust the focus of the camera. Please perform the adjustment using the following method only if necessary due to the focus setting being incorrect.
>
> Focus adjustment must be done manually. There is a focus ring on the camera lens body, so turn it to adjust.
>
> Remove the lens tube retainer that secures the camera. Using a hex wrench, remove the four screws on both ends and the two screws on the back.

Lens tube

Lens tube retainer

> Then rotate and remove the lens tube.
>
> 

The lens tube is difficult to turn and your hands may slip, so use work gloves with non-slip to make turning it easier.

> Removing the lens tube will expose the camera lens. The lens has two adjustment rings, and the outer ring is the focus ring.

- Exposure can be adjusted using the iris ring on the inner adjustment ring, but please do not use this adjustment.

> When adjusting the focus ring, it is equipped with a stopper screw to stop the ring from rotating, so loosen this screw and turn the ring. In the photo below, the ring is equipped with two stopper screws, but there may be only one.
>
> 

Focus ring

Stopper screw

Iris ring

Stopper screw

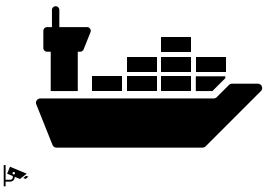
> Focus adjustment is done while displaying the camera image on the iPad, but there is a slight time lag when displaying the image on the iPad. Check

> the image (focus check) by turning the ring little by little.
>
> After adjustment, attach the removed lens tube and lens tube retainer.

5. Attaching the top plate

> The top plate is secured with six M8 extra low head screws. Please install it after adjusting the visible light camera.
>
> 

6. Record the installation height of the visible light camera

> Record the height of the visible light camera installed. Height is the height above the water surface.
>
> 

Visible light camera mounting height

Water surface

How to connect the LAN connection waterproof coupler

> Connect the visible light camera’s LAN cable and the outdoor LAN cable using a LAN connection waterproof coupler using the following steps.

1. A green LAN cable is connected to the visible light camera, so extend it to the point where you will attach the LAN connection waterproof coupler, and cut the LAN cable there.
2. Similarly, extend the outdoor black LAN cable to the point where you will install the LAN connection waterproof coupler, and then cut the LAN cable there.
3. Pass the cut LAN cable through the LAN connection waterproof coupler cap and silicone rubber, and crimp the LAN modular jack connector. The connection wiring of the LAN modular jack is T-568B connection.

Main body

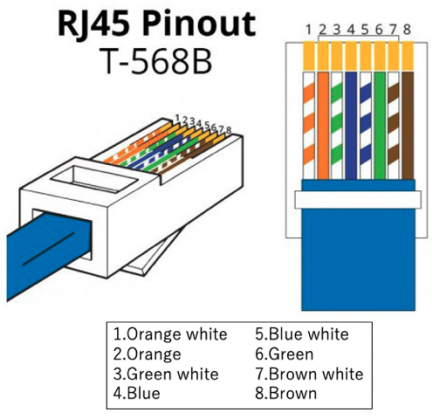
LAN connector

cap

Torque ring

Silicon rubber

LAN repeater



4. After crimping the LAN modular jack connector, pass it through the main body of the LAN connection waterproof coupler and attach it to the LAN repeater (female x female) for connection.
5. Insert the silicone rubber firmly into the main body, close the cap, and turn the torque ring to tighten the cable.

6. Next, wrap the LAN connection waterproof coupler with self-fusing tape. Wrap the self- fusing tape in three layers, overlapping half the width and applying tension.

However, the diameters of the LAN connection waterproof coupler and the LAN cable are different, so wrap it more than the other parts so that the diameters are the same.

7. After wrapping it three times with self-adhesive tape, it is waterproofed with protective PVC tape (vinyl tape). Wrap the PVC tape over the self-adhesive tape in three layers, overlapping half the width.

How to install and configure IMU

(Preparations)

The pitch angle and roll angle values of the IMU are output in NMEA format from the connected serial cable, but in order to check the data, software or a computer that displays serial data is required. This IMU is equipped with Bluetooth communication as standard, so you can easily check it using an Android app on your smartphone. This document explains how to check using the Android app.

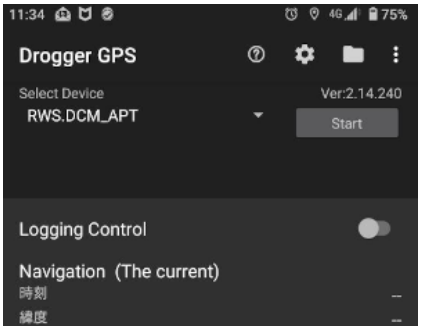
> Please download and use the Android app from the Google Play Store.
>
> Android application name : Drogger GPS for DG-PRO1

IMU initial settings

1. Rotate the IMU.

> Before installing the IMU, turn it on and rotate it ±2 rotations around each axis in the XYZ (yaw, roll, and pitch directions). By doing this, you can find out the minimum and maximum values of magnetic flux density, and you can calculate magnetic north.

2. Connect the Android app and IMU.
3. Start Bluetooth on the device with the Android app installed and connect to the device RWS.DCM_APT.
4. In the system settings of your Android device, switch the "temporary current location app" in developer options to Drogger GPS.
5. Launch the Drogger GPS app on your Android device. Press the “Start” button to check the IMU output value via Bluetooth communication.

> 
>

3. Initial adjustment of IMU.
4. Place the IMU body in a horizontal place (pitch angle 0 degrees, roll angle 0 degrees) and point it in the direction of true north (0 degrees).

0 degree

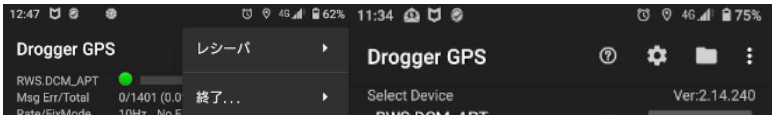
> 
>

2. Click the icon in the DMP/MB Gyro item of the Drogger app.

>

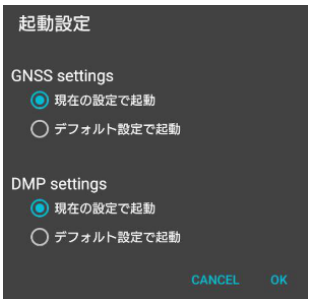
3. The installation offset setting screen(取付オフセット設定画面) will be displayed, so check all the items and finally press the OK button.

4. Save the settings
5. ⋮Select the menu at the top right of the screen and select “レシーバ“.



Select 「起動設定．．．」 in the receiver menu.

Select "現在の設定で起動" for each item and press the OK button.



When you press the OK button, the following message will be displayed, so please turn the IMU power off and on and restart it. If the following message is not displayed, repeat the startup settings again.

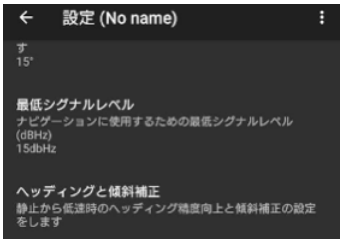
Installing the IMU

> Since the IMU is used to measure the roll angle and pitch angle of the hull, please install the IMU in the same direction as the ship’s heading.
>
> 
>

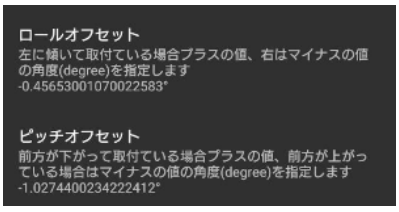
Heading direction of the ship

> If the IMU is misaligned and the inclination of the IMU is different from the inclination of the ship, you can adjust the offset of the IMU to match the inclination of the ship.
>
> 

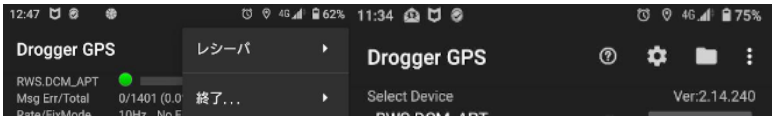
1. Press the gear icon at the top of the screen.
2. Select "ヘディングと傾斜補正" on the settings screen.

> 
>

3. Select "ロールオフセット" and "ピッチオフセット" on the Heading and Tilt Correction screen and enter the offset value to correct the tilt.

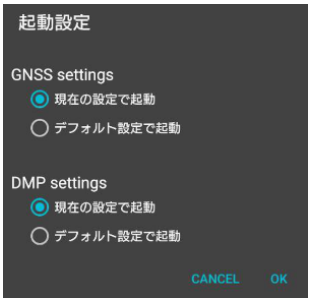
> 
>
>
> After entering the offset value, check the DMP/MB Gyro screen and adjust the level to match the inclination of the ship.

6. Save the setting values.
7. ⋮Select the menu at the top right of the screen and select “レシーバ”.



Select 「起動設定．．．」 in the receiver menu.

Select "現在の設定で起動" for each item and press the OK button.



When you press the OK button, the following message will be displayed, so please turn the IMU power off and on and restart it. If the following message is not displayed, repeat the startup settings again.

supplement：How to confirm the DMP/MB Gyro screen

(Example)　　Y: 346.3 R:-0.21 P: -0.02

Yaw angle (Y)	**North is 0.0, and values up to 359.9 are displayed.**
Roll angle ®	If you tilt it to the right, it will be displayed as a negative value, and if you tilt it to the left, it will be displayed as a positive value.
Pitch angle (P)	If you tilt it forward, a negative value will be displayed, and if you tilt it backward, a positive value will be displayed.

Command User Guide

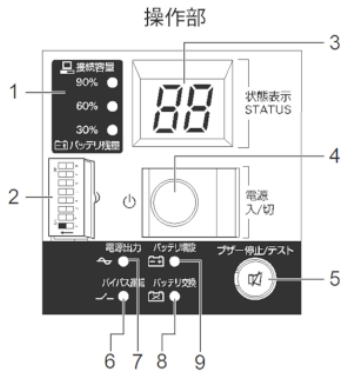
How to start and shutdown the system

How to start the system

> Boot the system using the following steps.

1. An Internet connection is required to start the Edge server. Before starting the system, please make sure that you can connect to the Internet.
2. Start the uninterruptible power supply (UPS).

> Press the power button on the front operation panel shown below.



Power button

3. Power on the edge server.

> Press the power button inside the front door of the edge server. (The button to the left of the power button is the restart button)

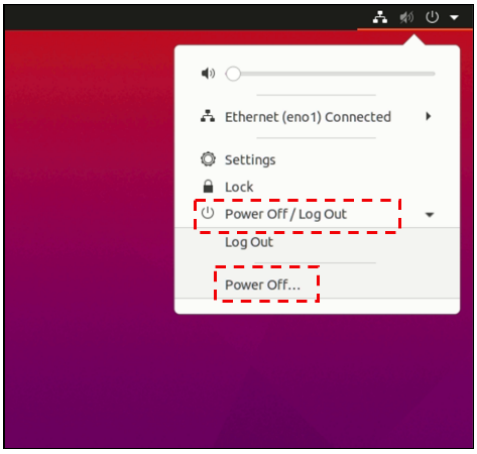
Power button

How to shutdown the system

> This system is always running, but when it needs to be shut down, follow the

steps below to shut it down.

1. Shutdown the edge server OS.

> Click the power icon at the top right of the edge server screen and select “Power Off/Logout”. Furthermore, click “Power Off...” to start the shutdown.
>
> 
>
>
> The above steps are performed from the edge server screen, but shutting down can also be started automatically by pressing the edge server’s power button.

2. After the edge server has been shutdown, press the power button on the uninterruptible power supply (UPS) to turn it off.

infoceanus command screen

How to start and close the application

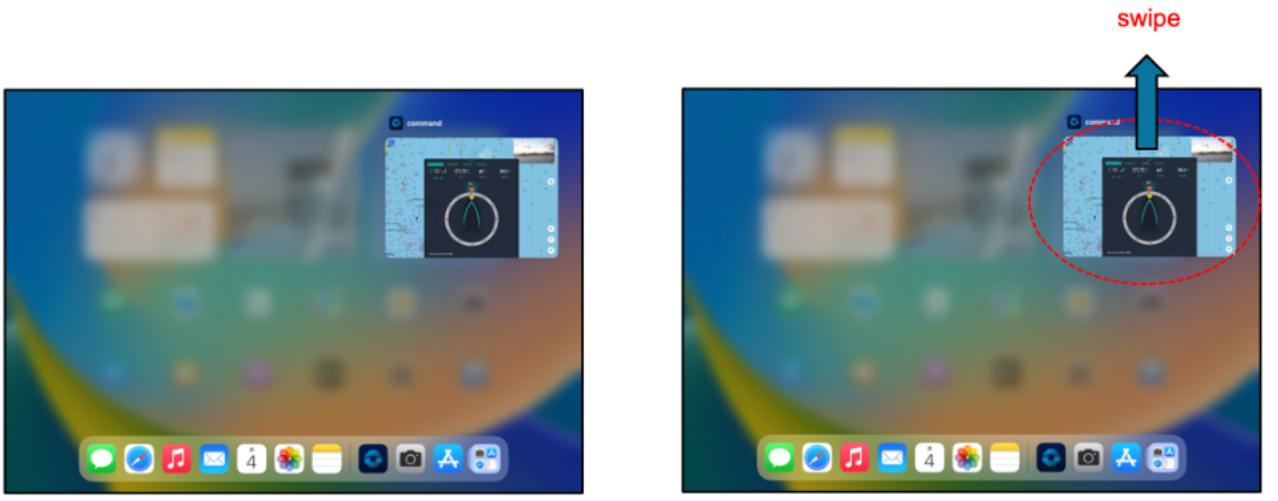
> The infoceanus command application is installed on the iPad terminal. Tap the icon shown below (touch the screen lightly with your finger and quickly release it) to start the application.
>
> 
>
> The map view is displayed when the application starts. The camera image is displayed in the picture-in at the top right of the screen, so tap this to switch to camera view. Also, in camera view, a map icon is displayed at the bottom right of the screen, so tap this to switch to the map menu.

- In the map view example above, the Electronic Nautical Chart (ENC) is displayed, but displaying the ENC is optional. Usually a simple map is displayed.

To close the application, swipe your finger upwards from the outer frame at the bottom of the iPad screen and release your finger when the screen becomes smaller. (It will look like the screen below) Next, swipe the reduced application screen up again to remove it from the screen.

(Please refer to section 2.3.1 for swiping instructions)

> swipe



> === How to login and logout

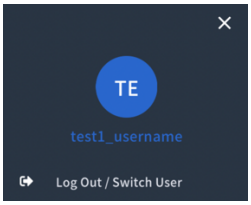
The application has a login function. You do not need to log in to use only the normal display functions, but please note that there are some functions that cannot be performed without logging in.

> ==== How to login

1. Tap the person-shaped icon  at the top left of the screen.
2. The login screen will be displayed, so tap on the word "Login".
3. When you tap the words "Select User" on the user selection screen, a list of registered users will be displayed, so select the user to log in.
4. Enter the PIN number of the selected user.

==== How to logout

1. Tap the person-shaped icon  at the top left of the screen.
2. Tap the words "Log Out / Switch User".



=== Map view screen and functions

==== Map display operations

The displayed map can be operated in the following ways.

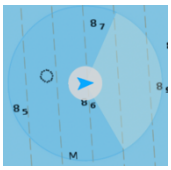
目的	操作方法
Zoom in on the map	Pinch out the area you want to zoom in with two fingers.  Place two fingers on the screen and spread them apart.
Zoom out on the map	Pinch in with two fingers the area you want to zoom out.  Place two fingers on the screen and move them closer together.
Moving the map	Swipe in the direction you want the map to move.  Sweep your finger across the screen by moving it up, down, left or right.
Rotate the map	Rotate the map by pinching it with two fingers.  Place two fingers on the screen and rotate them.
Center on own ship’s position	 Tap the icon at the bottom right of the screen.
Course up display	 Tap the icon at the bottom right of the screen.

目的	操作方法
North up display	 Tap the icon at the bottom right of the screen.

==== Map icon

1. Own ship icon

Own ship is displayed on the map with a blue arrow icon. The direction of the arrow is toward the bow.



2. Other ship icon

Other ships are displayed as pentagonal icons, and the direction with the sharp corner is the direction of the ship's bow. Receive AIS information and display it on the map.

The color definitions of other ship icons are as follows.

Color	**Type of ship**
Yellow green	Cargo Vessels
Red	Tankers
Blue	Passenger Vessels
Yellow	High Speed Craft
Light blue	Tug & Special Craft
Orange	Fishing
Pink	Pleasure Craft
Gray	Unspecified Ships

4. Displaying AIS information

If you tap the icon of another ship, information about that ship will be displayed.

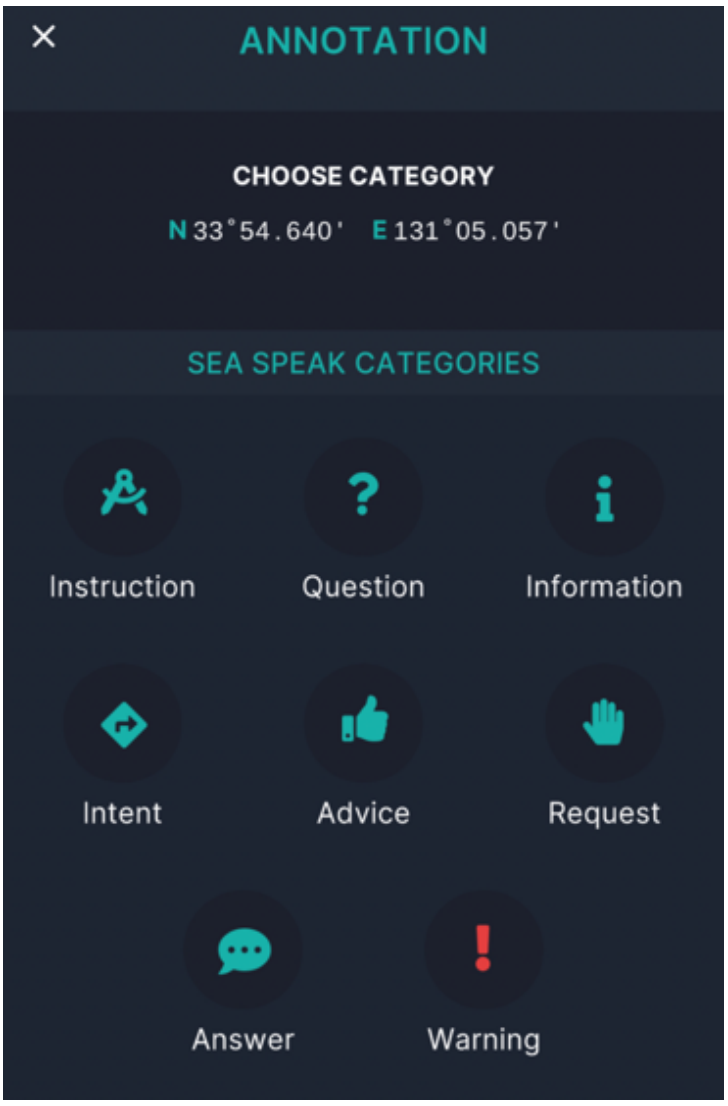
DIST (distance from own ship to the selected ship) and SPD (speed of the selected ship) are displayed, and if the AIS information includes CPA (closest point of approach) and BRG (collimation azimuth), that information is also displayed.

Furthermore, by tapping the displayed list, more detailed information about the selected vessel will be displayed on the screen.

> 5. Annotation function

Individuals can paste annotation icon on the map. You will need to log in to use this annotation feature, as it will show who created it. You can write comments on the annotations you create, and the icon can be changed depending on the type.

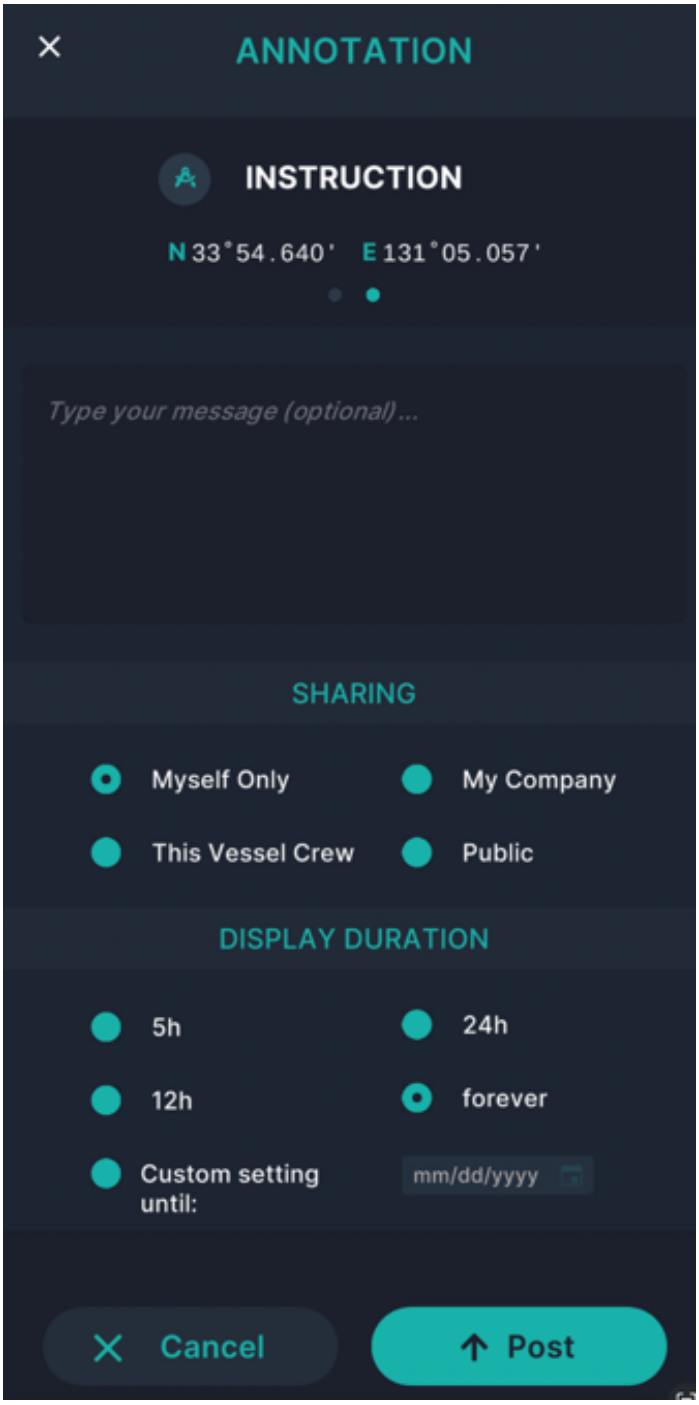
> 1. Touch and hold your finger where you want to create the annotation icon.
> 2. The annotation screen will be displayed on the screen, so select the sea speak categories.



> Select from eight categories: Instruction, Question, Information, Intent,

Advice, Request, Answer, and Warning.

3. When you select a sea speak categories, the comment input screen will appear, so enter your comment. Also, select the sharing and display duration, and press the post button to create the annotation.



Sharing	Content
Myself Only	The annotation icon you create will only be displayed on your screen.

Sharing	Content
This Vessel Crew	The created annotation icon will also be displayed on the screens of other users on the same ship.
My Company	The annotation icon you created will be displayed on the screen of all users in the company you belong to.
Public	The annotation icon you created will be displayed on the screen of all users (including users of other companies) using infoceanus command.

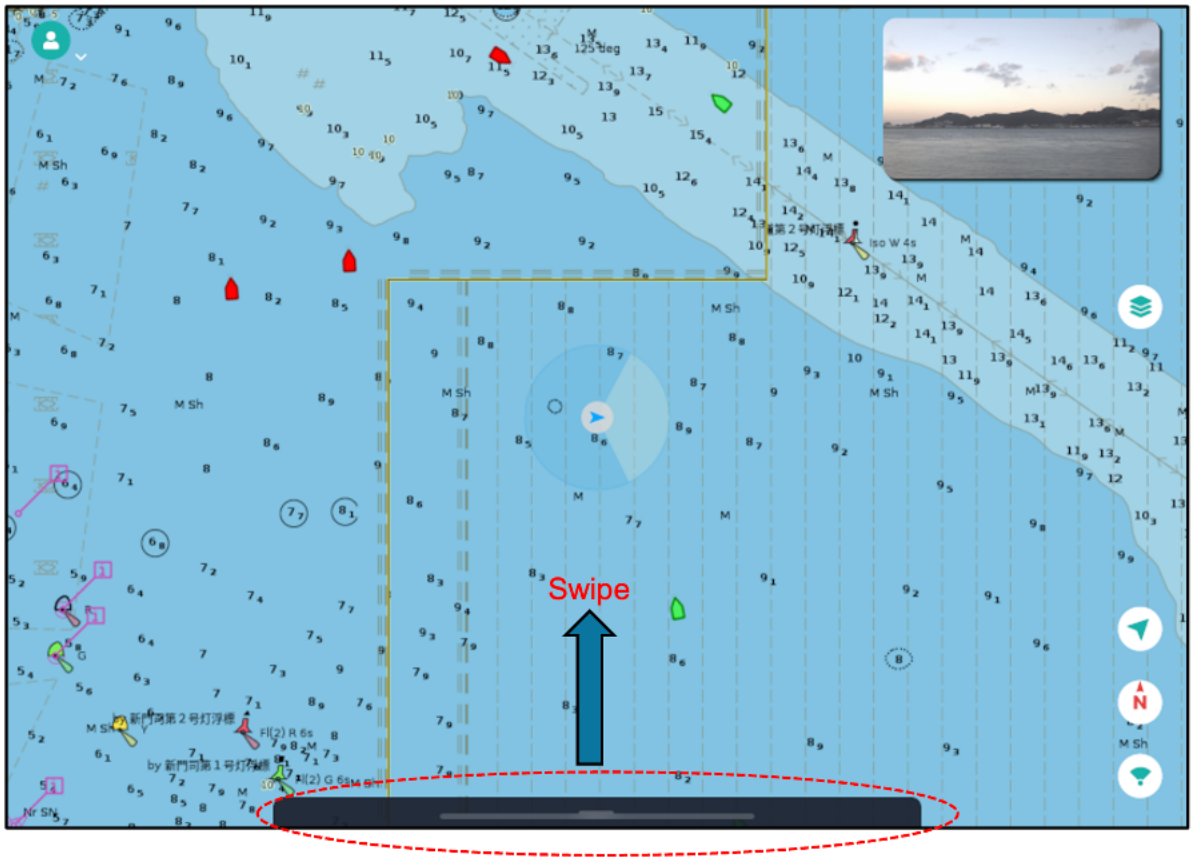
Select the display duration from 5h, 12h, 24h, forever, or custom settings.

Custom settings can be specified by year, month, and day.

4. If you want to delete an annotation icon, tap the annotation icon on the screen and a delete button will appear. Press the delete button to delete it. However, you cannot delete annotation icons created by other users.

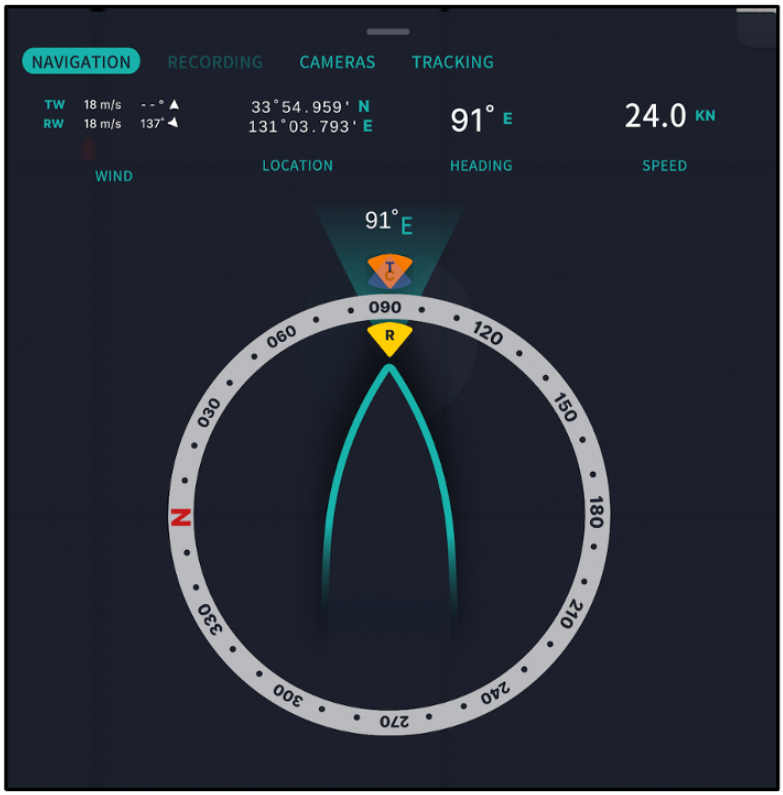
6. Pull-up screen

A pull-up screen is hidden at the bottom of the application screen. Swipe up on this to display the following function screen.



> Swipe
>
> 1. Navigation screen

The navigation screen displays information about your own ship. Numerical information includes wind direction and wind speed (true/relative), own ship’s coordinates (latitude and longitude), heading, and ship speed relative to the ground. In addition, an animated compass is displayed, and the wind direction (true/relative) and course direction are displayed as icons. (The heading will be fixed upwards)



The direction of the pointed end is the direction.

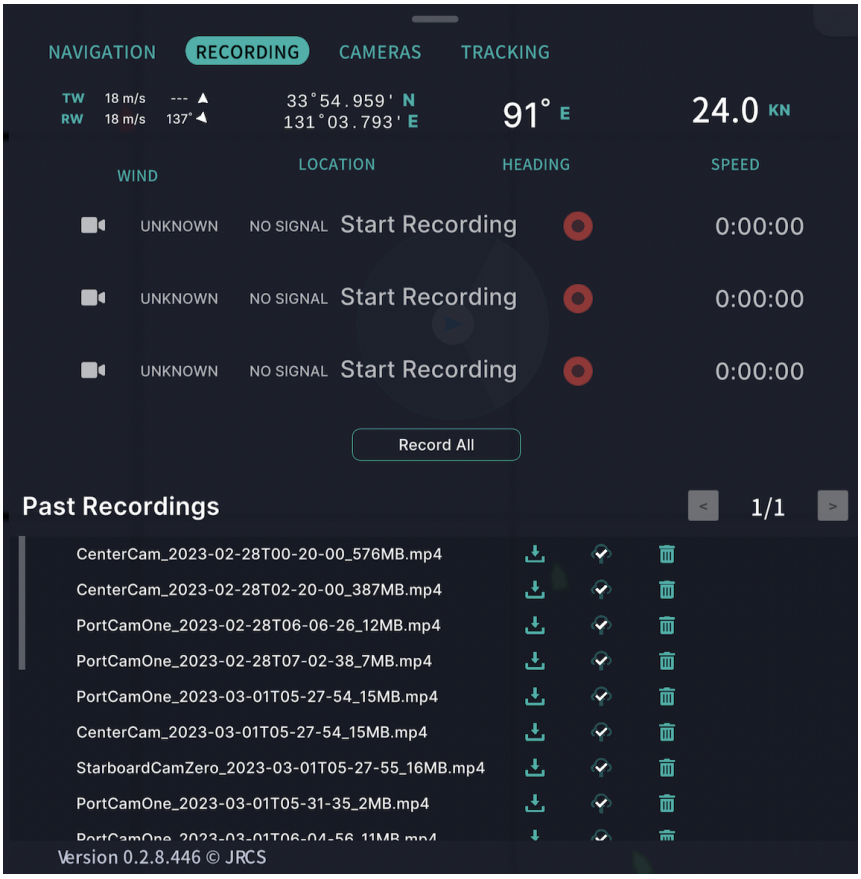
T： Ture wind direction

R： Relative wind direction

C： Course

(direction of movement)

2. Recording screen



You must be logged in to operate this screen.

> Record button Press once to start recording for that camera, press again to stop recording.
>
> While recording, the current recording time will be displayed to the right of the button.

All record button Record All Start and stop recording for all cameras.

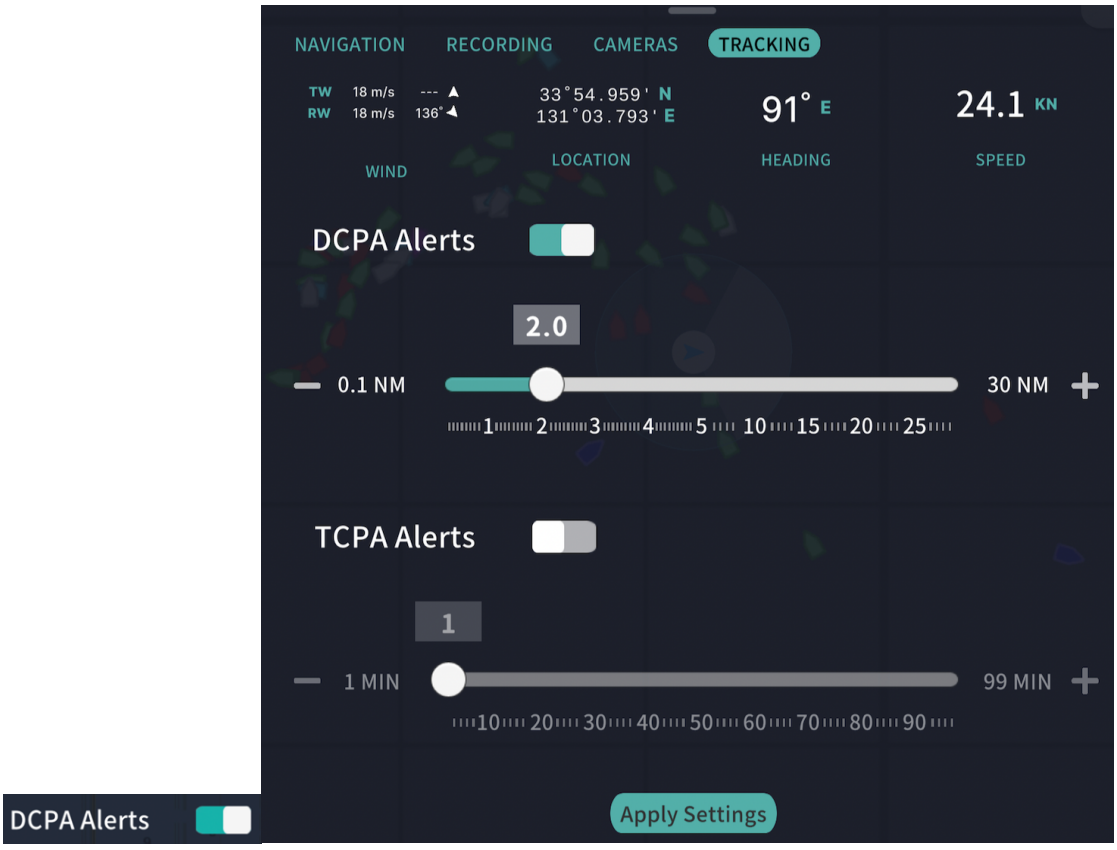
> Download button
>
> You can download the recorded data file saved on the edge server to your iPad and play the recorded data.
>
> Upload button
>
> Upload recorded data to cloud storage. This allows you to view recorded data from land. (Storage size on the cloud is limited to a maximum of 500GB)
>
> Delete button Delete recorded data from the edge server.

3. Camera switching screen

> Switch the displayed camera image. By using this function in map view, you can switch the picture-in camera image displayed at the top right of the screen. The currently displayed camera is displayed in green.

4. CPA setting screen

> Set DCPA and TCPA values.



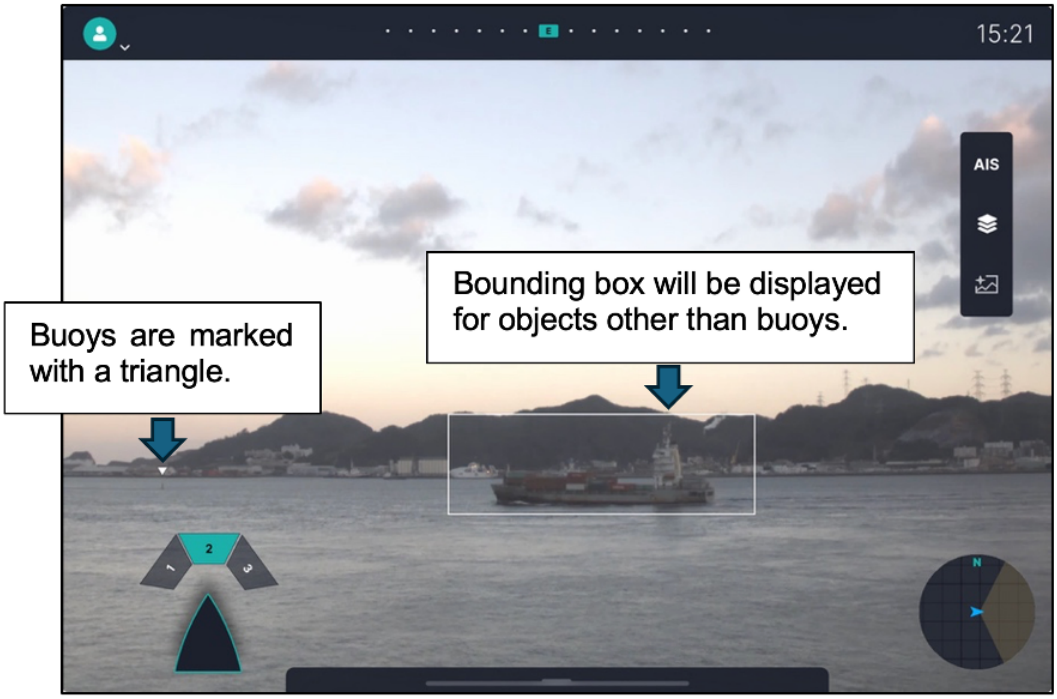
By turning on the DCPA Alerts and TCPA Alerts switches, you can set the values.

After changing the settings, press the ‘Apply Settings’ button to confirm the settings.

Camera view screen and function

Bounding box display

> A rectangular bounding box will be displayed on ships and navigation buoys recognized by AI from camera images. If the type is a buoy, a triangle mark will be displayed.



Bounding box will be displayed for objects other than buoys.

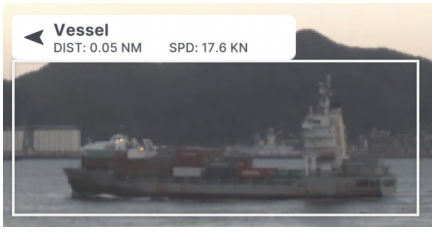
Buoys are marked with a triangle.

> The following types of object are recognized.
>
> Type of recognized object

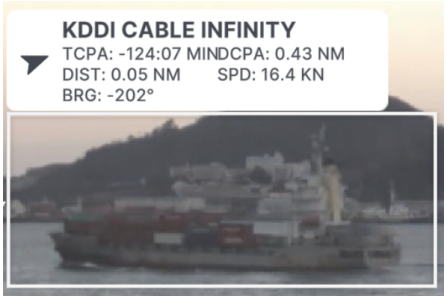
Type	Remarks
Vessel	Cargo, Tanker, Bulk carrier, etc.
Passenger Vessel	Passenger
Boat	Small ship such as pleasure boart, yachts, canoes, etc.
Navigation Buoy	Navigation buoy in the shape of a triangle.
Fishing Buoy	Fishing buoy with round type or flag.
Fishers Facility	Fishers facility such as rafts.

By tapping the bounding box of these recognized objects, you can display their detailed contents. The displayed information includes the type, distance, speed, and direction of movement of the recognized object.

The distance is calculated from the position of the image where the object is recognized. The speed is relative speed as seen from the own ship, and the direction of movement is indicated by an arrow, which is also the relative direction of movement.

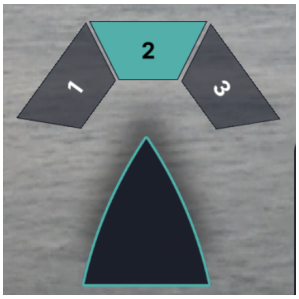


Additionally, when this object recognition data and AIS data match, the AIS ship name will be displayed as shown below, and if the CPA setting is enabled, the TCPA and DCPA values will also be displayed. Bearing angle BRG indicates the relative direction from own ship to the object.



Switching camera images

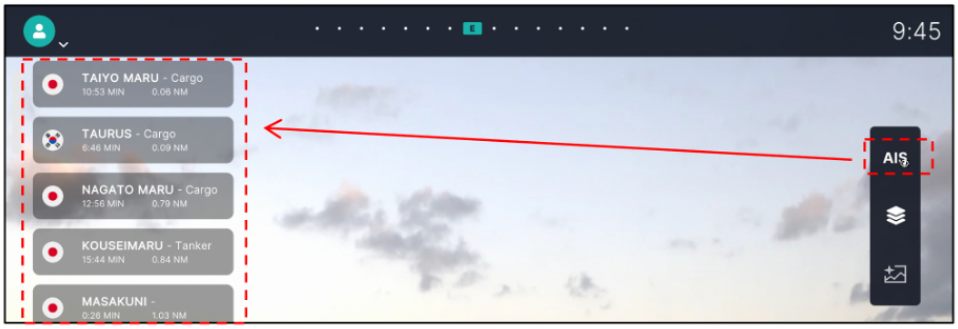
In camera view, the icon shown below is always displayed at the bottom left of the screen. The triangle icon represents the bow, 1 means port camera, 2 means center camera, and 3 means starboard side camera. The currently displayed camera image is displayed in green. By tapping the icon representing this camera, you can switch to the video from each camera.



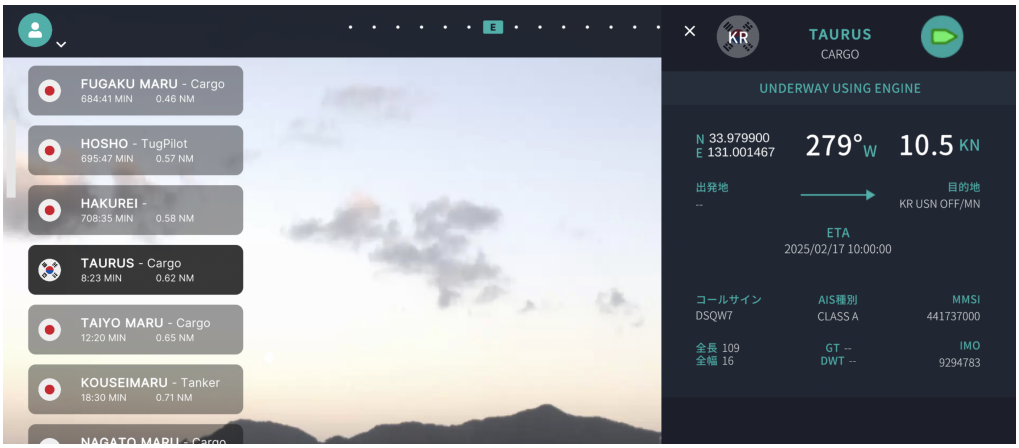
AIS information display

The following icons are always displayed on the right edge of the camera view screen. By tapping AIS on this icon, a list of AIS that your ship is receiving will be displayed on the camera view.

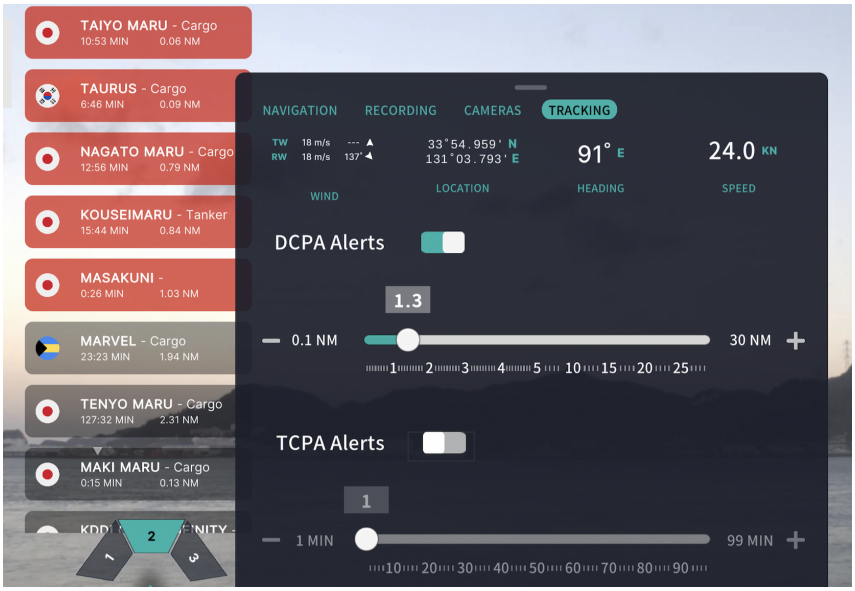
You can also scroll the AIS list by swiping up or down.



If you want to check the details of a vessel displayed in the AIS list, tap once on the list of vessels you want to check to select it, then tap again to display the AIS information on the right side of the screen.



If an alert has been set using the CPA settings, the AIS list of vessels that will receive an alert based on the conditions will be displayed in red to alert you.



Layer display

> You can turn on/off the information displayed on the camera view screen. The types of information are as follows.

- Horizon+

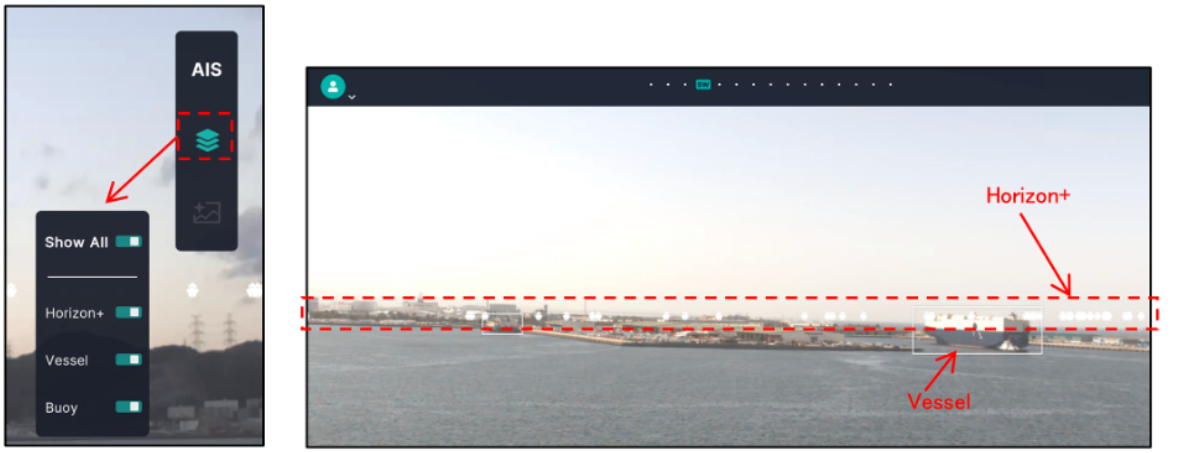
> Displays the AIS information of ships in that direction on the horizon of the camera image as an icon, and turns it ON/OFF.

- Vessel

> Turn on/off the bounding box display of ships recognized by AI.

- Buoy

> Turn on/off the icon display of buoys that AI has recognized as objects.
>
> This operation can be performed using the layer button on the right side of the screen. When you tap the layer icon shown below, a sub-screen will appear where you can perform ON/OFF operations.



Vessel

Horizon+

Image adjustment function

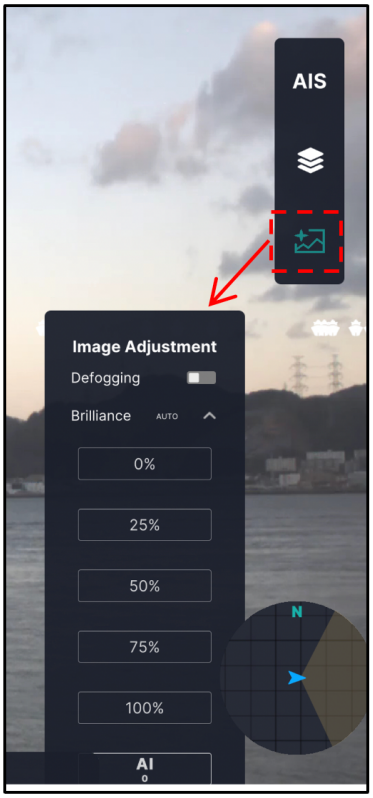
> The image adjustment function allows the user to adjust the camera image. There are two types of functions.

- Defogging

> When visibility is poor due to mist or fog, turning on Defogging will make the camera image clearer.

- Brilliance

> You can adjust the brightness of the image at night in 5 levels. Normally, the AI mode is set and the brightness is adjusted automatically, but you can change the brightness level manually.
>
> AI mode is recommended during daytime use.



The Brilliance setting is 0% dark and 100% bright.

If you select AI, the brightness will be adjusted automatically.

Communication specification

Information on objects recognized by infoceanus command can be sent to the outside via the network from the application in the edge server.

The communication algorism uses HTTP RESTful API, and webhooks are used to receive detection results.

1. Register the webhook endpoint URL that receives data recognized by the edge server in the edge server application.
2. The edge server periodically posts detection results in JSON format to the webhook endpoint URL.

Edge Server

Application

External Application

1. Register the webhook endpoint URL

JSON

Webhook endpoint URL for receiving results

2. Continuously posts detection results to the registered webhook endpoint URL.

Initial registration process

How to register a webhook endpoint URL

> The edge server will continue to POST (output) detection results from the time you register the webhook endpoint URL.
>
> Note:
>
> If the edge server is stopped due to rebooting, etc., the record of the registered webhook endpoint URL will be lost, so you will need to register it again.

Item	Value
Edge Server IP address	192.168.5.10 (temporary)
Connection port number	5888
Endpoint URL	http://192.168.5.10:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-version=2019-01-01-preview

- 'name' in the endpoint URL above is the registered name of the endpoint. When registering multiple endpoints, make sure that the registered names do not overlap. Also, the name must be the same as the content written in the registration BODY on the next page.

To register the webhook endpoint URL, PUT the following content.

PUT

http://192.168.5.10:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-version=2019-01-01-preview

Header is "Content-Type" "application/json"

The BODY of the PUT command is as follows.

\{

"name": "name",

"properties":

\{

"topicName": "ObjectDetectionTopic",

"eventDeliverySchema": "CustomEventSchema",

"retryPolicy":

\{

"eventExpiryInMinutes": 120,

"maxDeliveryAttempts": 30

},

"persistencePolicy": \{

"isPersisted": “false”

},

"destination":

\{

"endpointType": "WebHook",

"properties":

\{

"endpointUrl": "http://{your-url}",

"maxEventsPerBatch": 10,

"preferredBatchSizeInKilobytes": 1033

}

}

}

}

Please use the same registered name

Please enter the webhook endpoint URL to output the detection results here.

How to change the webhook endpoint URL

> To change the webhook endpoint URL, delete the registration and then re-register it.
>
> Delete registration:
>
> DELETE
>
> http://192.168.5.10:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-version=2019-01-01-preview
>
> After deleting the registration using the above command, re-register it using the method described in Section 3.1.1.

Detection results

Contents of detection results

> The detection results will be posted in JSON format to the registered webhook endpoint URL.
>
> For example：

\{

"frame_id": "001078",

"inference_time": 1.05351,

"bboxes": [

\{

"location": [

447,

706,

590,

138

],

"class_name": "Vessel",

"class_id": 0,

"score": 0.5651599764823914,

"course_angle": -1.5833088695182274,

"object_id": 11,

"distance": 306.0867636429704,

"angle": 0.029405518541549186,

"angle_to_object": 1.6848121068244561,

"length": 87.83195089404641,

"size": "large",

"speeds": 40,

"object_gps_coordinates": [

33.97075991841673,

130.9717999958437

]

}

],

"timestamp": "2023-04-07T12:14:01.752Z",

"payload_per_second": 0.78,

"gyro_true_heading": 158.6,

"vessel_gps_coordinates": [

33.973371666666665,

130.97067666666666

],

"height": 1080,

"width": 1920,

"source": "udp://239.0.0.3:9556",

"model_id": "Combined_Model",

"stream_id": "GigEStarboardCamZero",

"ais_object": [],

"v_avg": 109.18871865354939,

"horizon_coord": [

0,

1919,

1074,

1074,

"succeeded",

"day"

]

}

Multiple pieces of information about the detected objects are listed in “bboxes”:[] separated by \{ }.

- In the example on the left, there is only one detected object.

Detection result details

> Detected object information : bboxes[ ]

Item	Value
location[x, y, w, h]	Position of detected object in image. x : X coordinate of center of Bounding box (Pixel) y : Y coordinate of center of Bounding box (Pixel) w : Bounding box width (Pixel) h : Bounding box height (Pixel)
class_name	Detected object class name (*1)
class_id	Number of class (*1)
score	Confidence score on detection
course_angle	Direction of movement of detected object (Angle relative to camera orientation : radian)
object_id	Identification number of detected object
distance	Distance to detected object (m)
Angle_to_object	Direction in which the detected object was captured (Direction relative to camera orientation: positive on the right, negative on the left : degree)
length	Length of object to be detected (m)
size	Size of detected object (Less than 10m：small, 10 to Less than 50m：medium, Over 50m：large)
speeds	Speed of detected object (km/h)
object_gps_coordinates[Lat, Long]	Coordinates of detected object （Lat : Latitude, Long：Longitude）

> (*1) Definition Class id and Class name

class_id	class_name
0	Vessel
1	Fishing_Buoy
2	Navigation_Buoy
3	Passenger_Vessel
4	Boat
5	Fishers_Facility

> Other informations

Item	Value
timestamp	Detection date and time (UTC)
payload_per_second	Number of processes per second
gyro_true_heading	Heading direction (true direction)
vessel_gps_coordinates[Lat, Long]	Own ship coordinates （Lat : Latitude, Long：Longitude）
height	Image height (pixels)
width	Image width (pixels)
source	Multicast address to receive camera images
model_id	ML model name
stream_id	Camera name of detected video (*2)
ais_object[ ]	AIS Information Enter multiple pieces of AIS information received at the same time. (There may be cases where there is no description as in this example)
v_arg	Indicates the brightness level of the image (0-255)

> (*2) Definition camera name

カメラの場所	**stream_id**
Port camera	GigEPortCamOne
Center camera	GigECenterCam
Starboard camera	GigEStarboardCamZero

Troubleshooting

iPad application startup problems

Trouble event	Assumed cause	Workaround
iPad applications do not start.	The version of the iPad application is outdated.	If the version of the iPad application is old, there may be problems communicating with the edge server and the application may not start. Please check the current version and contact JRCS.
The iPad application starts, but nothing is displayed.	iPad is not connected to the network.	Please check your iPad’s Wi-Fi settings. Open the iPad settings screen and check that the Wi-Fi you are connecting to is "JRCS WiFi AP" in the Wi-Fi item. If not, please connect to "JRCS WiFi AP".
	The Wi-Fi access point is in an abnormal state.	Please disconnect and reconnect the LAN cable connected to the Wi-Fi access point. When the Wi-Fi access point’s lamp lights up in green, startup is complete, so try starting the application on your iPad after that.
	The iPad application is in an abnormal state.	Please restart the iPad application.
	The software on the edge server is not starting.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

AIS data display issues

Trouble event	Assumed cause	Workaround
AIS information is not displayed.	There is a connection failure in the cable receiving the AIS signal.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.

Trouble event	Assumed cause	Workaround
	AIS signal is not output.	Please check whether AIS data is included in the data sent from VDR.
	The object recognition software in the edge server is stopped.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Display problems of visible light cameras

Trouble event	Assumed cause	Workaround
可視光カメラ映像が表示されない。	There is a poor connection between the visible light camera and the edge server.	Please check if there is a connection failure between the LAN cable of the visible light camera connected to the PoE HUB (10port) and the LAN cable of the edge server.
	The visible light camera and edge server are unable to communicate.	Please restart the visible light camera. Please disconnect and reconnect the LAN cables connected to ports 6, 7, and 8 of PoE HUB (10port). The left lamp of each port blinks orange, and the right lamp lights green.
	The software on the edge server is in an abnormal state.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
The image from the visible light camera was displayed, but the image stopped.	The iPad application can no longer receive video.	Please switch the visible light camera image on iPad application.

Trouble event	Assumed cause	Workaround
		If the above changes do not resolve the issue, please restart the iPad application.
Visible light camera images are displayed with a delay.	The processing load on the iPad is high.	Please restart the iPad application.
The image from the visible light camera moves back and forth on the time axis or contains noise.	Wi-Fi communication load is high.	Close the iPad application and reconnect the Wi-Fi connection (turn it OFF and then ON) on the iPad settings screen. Then, start the application on your iPad.

Sensor data display issues

Trouble event	Assumed cause	Workaround
Wind direction and wind speed data are not displayed.	There is a poor connection in the cable receiving the signal from the anemometer.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	Data from the wind direction and speed meter cannot be received.	Please confirm that the NMEA data ($XXMWV) of the anemometer is being output. *It will not be displayed if the ship does not have a wind direction and speed meter.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
True wind direction and true wind speed data are not displayed.	Anemometer problem.	True wind direction and true wind speed are calculated and output by an anemometer. There are wind direction and speed meters that only output relative wind direction and speed, so please check the specifications.

Trouble event	Assumed cause	Workaround
Latitude and longitude data are not displayed. Ship speed data is not displayed.	There is a poor connection in the cable receiving the signal from GNSS.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	Data from GNSS cannot be received.	Please confirm that the NMEA data ($XXGGA) of the GNSS is being output.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Display problem for object recognition

Trouble event	Assumed cause	Workaround
Unable to recognize objects. (Bounding boxes are not displayed on ships that can be recognized in visible light camera images)	The object recognition software in the edge server is stopped.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Own ship icon display problem

Trouble event	Assumed cause	Workaround
Own ship is not displayed on the map. Own ship’s icon does not move.	The map display is shifted from the own ship’s position.	Tap the arrow icon at the bottom right of the screen.
	Data from GNSS cannot be received.	Please confirm that the NMEA data ($XXGGA) of the GNSS is being output.

Trouble event	Assumed cause	Workaround
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
The bow of own ship is always facing north.	Data from the GYRO sensor cannot be received.	Please confirm that the NMEA data ($XXHDT) of the GYRO sensor is output.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Map display issues

Trouble event	Assumed cause	Workaround
Map is not displayed.	The map software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
	The map software license has expired. (When using ENC for the map)	You will need to purchase a map software license. Please contact JRCS.

Annotation icon display issue

Trouble event	Assumed cause	Workaround
Annotation icons are not displayed on the map.	You do not have permission to display labeling icons.	Please log in as a user who has permission to display labeling icons.

Trouble event	Assumed cause	Workaround
Unable to create annotation icon.	You do not have permission to create labeling icons.	Please log in as a user who has permission to create labeling icons.
Unable to delete annotation icon.	You do not have permission to delete labeling icons.	Labeling icons can only be deleted by the user who created them. Please log in as the user who created the labeling icon.

Compass animation display issue

Trouble event	Assumed cause	Workaround
Compass ring is not working.	There is a connection failure in the cable receiving the signal from the GYRO sensor.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	Data from the GYRO sensor cannot be received.	Please confirm that the NMEA data ($XXHDT) of the GYRO sensor is output.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
The C icon (course) is displayed in gray.	There is a poor connection in the cable receiving the signal from the GNSS sensor.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	Data cannot be received from the GNSS sensor.	Please confirm that the NMEA data ($XXGGA) of the GNSS is being output.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Trouble event	Assumed cause	Workaround
The T icon (true wind direction) is displayed in gray.	There is a poor connection in the cable receiving the signal from the anemometer.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	The anemometer is not designed to output true wind direction and true wind speed.	True wind direction and true wind speed are calculated and output by an anemometer. There are wind direction and speed meters that only output relative wind direction and speed, so please check the specifications.
	Data from the wind direction and speed meter cannot be received.	Please confirm that the NMEA data ($XXMWV) of the anemometer is being output. *It will not be displayed if the ship does not have a wind direction and speed meter.
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.
The R icon (relative wind direction) is displayed in gray.	There is a poor connection in the cable receiving the signal from the anemometer.	Please check that the LAN cable of the VDR connected to the PoE HUB (5port) and the LAN cable of the edge server are not disconnected.
	Data from the wind direction and speed meter cannot be received.	Please confirm that the NMEA data ($XXMWV) of the anemometer is being output. *It will not be displayed if the ship does not have a wind direction and speed meter.

Trouble event	Assumed cause	Workaround
	The sensor software in the edge server is down.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Problems with recording function

Trouble event	Assumed cause	Workaround
Recording fails.	The disk size for saving recorded data is full.	Display the list of recorded data and delete past recorded data to free up disk space.
	The recording software in the edge server is stopped.	Please restart the edge server. The Edge Server must be connected to the Internet when it starts. Please check the internet connection environment (VSAT etc.) and restart the edge server.

Command Troubleshooting

Basic matters

In the event of a problem, please record the details of the incident as a basic matter.

- Record a snapshot of a problem.
- Record the environment at the time of trouble.

> （Date and time of occurrence, operating method, software version, etc.）

Also, use the following method to collect logs from the edge server.

How to collect logs

1. Log in to the Edge Server.
2. Run the terminal application.

> The current directory is /home/iotadmin.

3. Create a directory to collect logs and move to that directory.

> Exp:
>
> mkdir Logfile
>
> cd Logfile

4. Create a log file with the following command.

> sudo iotedge support-bundle –since 1d

- '1d' in the above command means to collect logs from one day ago.
  For example, if you want to collect logs from 4 days ago, specify 4d.

5. A zip format log file will be created, so get that file.

Application-wide issues

Command application does not start

Command application version is old

> If the version of the Command application on the iPad is outdated, there may be a problem communicating with the edge server and you may not be able to start it. Check the current version, and if the version is old, update the Command application to the latest version.

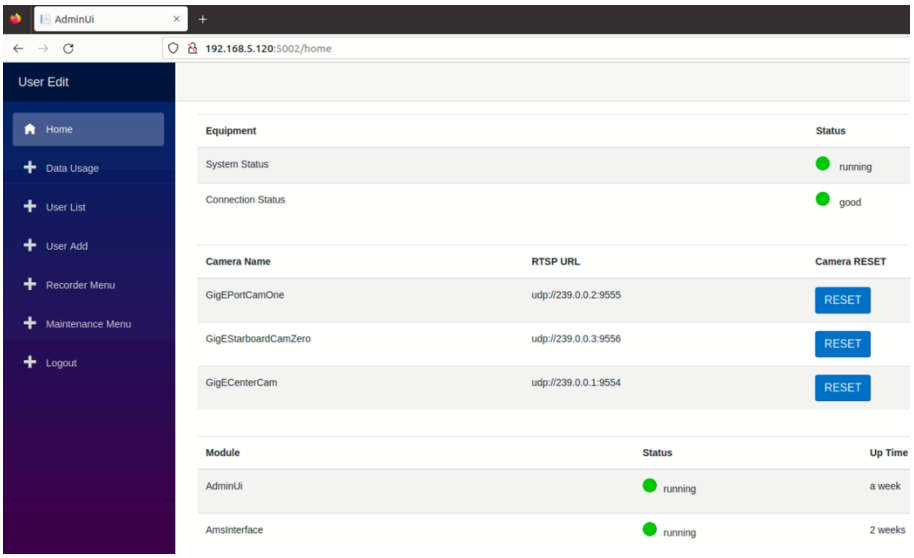
Unable to display map, camera's video, sensor data, etc.

ServiceApi module is stopped

> If the ServiceApi module in the edge server is stopped, restart the module to recover. The steps are as follows.

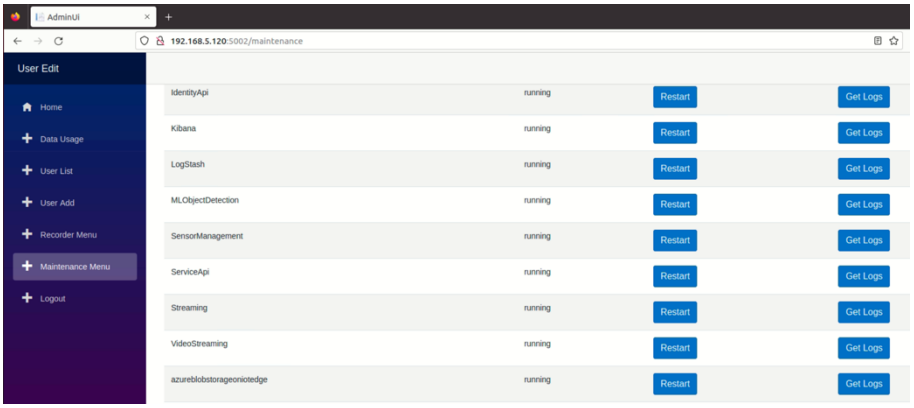
1. Launch AdminUi from the edge server's browser.

> URI : http://[Edge server IP address]:5002/home
>
> (Login is needed. Login user name is jrcs_admin)



2. Display the Maintenance Menu page and press the Restart button of the

> ServiceApi module.



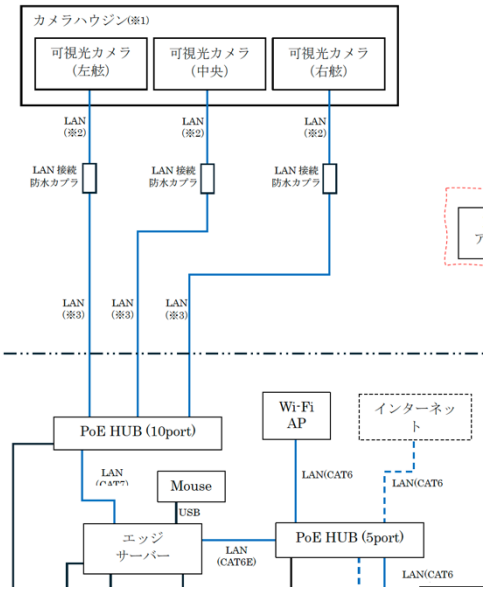
Camera image issues

Camera image is not displayed

There is a problem with the connection between the camera and the edge server.

> Please check the connection between the edge server and each camera.

1. Check that the PoE hub (Netgear PoE switch) for the camera is activated.
2. Check that the camera's LAN cable is connected to the PoE hub.
3. Check that the LAN cable of the edge server is connected to the PoE hub.



①

③

②

VideoStreaming module is still starting

> Immediately after starting the edge server, each module may still be starting. Please wait about 1 minute and check the camera image display again.

VideoStreaming module is stopped

> If the VideoStreaming module in the edge server is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

VideoStreaming module and camera cannot communicate

> Please restart the camera.

> Please disconnect and reconnect the cable② in Section 3.1.1.

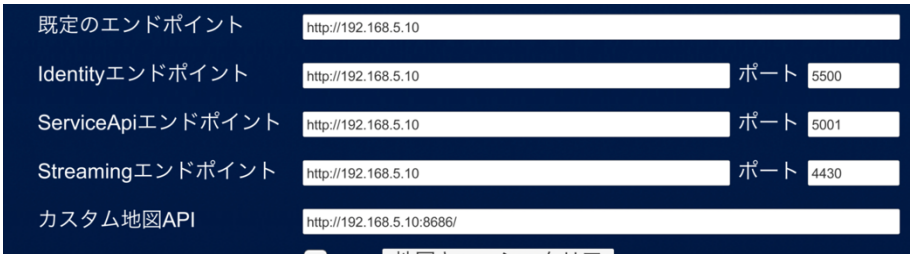
AzureEventGridonIotEdge is having an error

> To restore the state of Docker in the edge server to a normal state, rebuild Docker using the procedure in section 9.2.1.

Streaming IP settings are incorrect

1. Launch the Command application on your iPad and log in as an administrator role.
2. Press the settings button at the bottom of the dashboard to open the settings screen.
3. Confirm that the settings for the 'Streaming endpoint' are as follows.

> http://[Edge server IP address]



Streaming parameter settings are incorrect

1. Launch the Command application on your iPad and log in as an administrator role.
2. Press the settings button at the bottom of the dashboard to open the settings screen.
3. Make sure that both the Ffmpeg option and Ffplay option settings have the following values.

> Setting valule： -fflags nobuffer -flags low_delay -analyzeduration 0 -probesize 32

Camera image stopped

Unable to receive streaming data

In order to re-receive the streaming data, please perform camera switching operations (display images from other cameras and re-display images from the camera where the

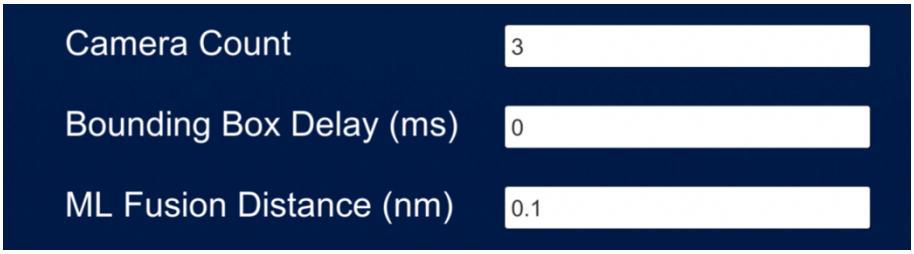
image stopped) on the Command application.

Camera video is delayed

Bounding Box delay settings are incorrect

> If the Bounding Box is displayed faster than the camera image, the Bounding Box delay setting is incorrect. Please change the Bounding Box delay setting value using the following method.

1. Launch the Command application on your iPad and log in as an administrator role.
2. Press the settings button at the bottom of the dashboard to open the settings screen.
3. Increase the value of Bounding Box Delay (ms) larger than the current value and adjust it to a value that displays the detected object in the camera image and the bounding box overlapping.



iPad processing load is high

> Close the Command application and restart it.

The camera image appears shaky (moving forward and backward)

Wi-Fi communication load is high

> The iPad’s Wi-Fi connection is poor, so please reconnect Wi-Fi.

1. Close the Command application.
2. Turn off the iPad’s Wi-Fi connection.
3. Turn on the iPad’s Wi-Fi connection
4. Launch the Command application and check the status of the camera image.

> If the above does not solve the problem, try moving closer to the Wi-Fi access point. Also, if the communication band is 2.5GHz, please reconnect to 5GHz.

Vertical noise or green lines appear in the camera image

Wi-Fi communication load is high

> The iPad’s Wi-Fi connection is poor, so please reconnect Wi-Fi.

1. Close the Command application.
2. Turn off the iPad’s Wi-Fi connection.
3. Turn on the iPad’s Wi-Fi connection
4. Launch the Command application and check the status of the camera image.

> If the above does not solve the problem, try moving closer to the Wi-Fi access point. Also, if the communication band is 2.5GHz, please reconnect to 5GHz.

Display a message that streaming is unavailable

VideoStreaming module is stopped

> If the VideoStreaming module in the edge server is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

VideoStreaming module and camera cannot communicate

> Please restart the camera.
>
> Please disconnect and reconnect the cable② in Section 3.1.1.

ServiceApi module is stopped

> If the ServiceApi module in the edge server is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Else

If the above measures do not resolve the issue, please restart the Edge server and Command application.

Object recognition Issues

Ships, buoys, etc. are not recognized

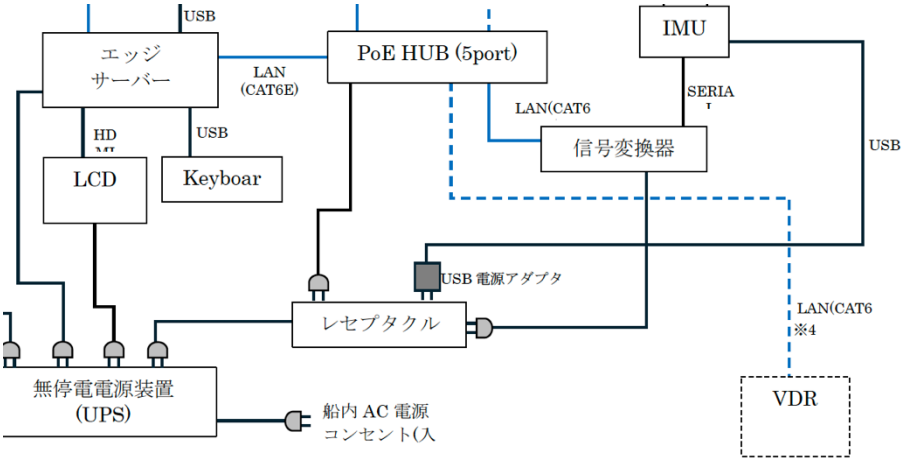
MLObjectDetection module is stopped

> If the MLObjectDetection module in the edge server is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

AIS data not displayed

VDR and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving AIS data and the LAN cable connection status of the edge server.



SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

MLObjectDetection is stopped

> If the MLObjectDetection module in the edge server is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Map issue

Map not displayed

Map API settings are incorrect

1. Launch the Command application on your iPad and log in as an administrator role.
2. Press the settings button at the bottom of the dashboard to open the settings screen.

3. Confirm that the settings for the Custom map API are as follows.

> （In case of using Free Map Server）
>
> Custom map API： http://[Edge server IP address]:8181/
>
> WMS Server： no check
>
> Use Carmenta Server: no check
>
> （In case of using Geomod Map Server）
>
> Custom map API： http://[Edge server IP address]:8686/
>
> WMS Server： check
>
> Use Carmenta Server: no check
>
> （In case of using Carmenta Map Server）
>
> Custom map API： http://[Edge server IP address]:8989/
>
> WMS Server： check
>
> Use Carmenta Server: check

seachart module is stopped

> If the seachart module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Map license has expired

> If you are using a map server (Geomod, Carmenta), there is an issue with the usage license period. If the usage period has expired, please purchase a continued usage license and update the license file.

Own ship icon is not displayed on the map

Own ship is far away from the center of the map and I can't see it.

> Click the arrow icon at the bottom right of the map view to center your ship's position on the map.

GNSS receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GNSS data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Own ship icon always faces north

GYRO sensor receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GYRO (heading) data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Other ship icons are not displayed on the map

AIS data cannot be received

> Please check the contents of Section 4.2.

Annotation icons are not displayed on the map

No permission to view annotations

> Log in as a user with annotator privileges in the Command application.

Unable to create annotations

No permission to create annotations

> Log in as a user with annotator privileges in the Command application.

Annotations cannot be deleted

permission to delete annotations

> Annotations can only be deleted by the user who created them. Please log in as the user who created the annotation on the Command application.

Sensor data issues

Anemometer data is not displayed

Anemometer receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving wind direction and wind speed data, and the connection status of the LAN cable of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

AzureEventGridonIotEdge is having an error

> To restore the state of Docker in the edge server to a normal state, rebuild Docker using the procedure in section 9.2.1.

True wind direction and true wind speed data are not displayed

> Please check whether the anemometer used on the own ship is compatible

> with true wind direction and true wind speed. Some devices only output relative wind direction and relative wind speed.

Latitude and longitude data are not displayed

GNSS receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GNSS data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

AzureEventGridonIotEdge is having an error

> To restore the state of Docker in the edge server to a normal state, rebuild Docker using the procedure in section 9.2.1.

Heading data is not displayed

GYRO sensor receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GYRO (heading) data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

AzureEventGridonIotEdge is having an error

> To restore the state of Docker in the edge server to a normal state, rebuild Docker using the procedure in section 9.2.1.

Ship speed data is not displayed

GNSS receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GNSS data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

AzureEventGridonIotEdge is having an error

> To restore the state of Docker in the edge server to a normal state, rebuild Docker using the procedure in section 9.2.1.

Compass ring is not moving in compass animation display

GYRO sensor receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GYRO (heading) data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

The C icon (course) is grayed out in the compass animation display

GNSS receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving GNSS data and the LAN cable connection status of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

The T icon (true wind direction) is grayed out in the compass animation display

Anemometer receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving wind direction and wind speed data, and the connection status of the LAN cable of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

The anemometer does not support to true wind direction and true wind speed

> Please check whether the anemometer used on the own ship is compatible with true wind direction and true wind speed. Some devices only output relative wind direction and relative wind speed.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

The R icon (relative wind direction) is grayed out in the compass animation display

Anemometer receiver and edge server cannot communicate

> Please check the connection status of the LAN cable of the VDR receiving wind direction and wind speed data, and the connection status of the LAN cable of the edge server.
>
> Please refer to Section 4.2.1 for the confirmation location.

SensorManagement module or Streaming module is stopped

> If the SensorManagement module that receives sensor data in the edge

> server or the Streaming module that outputs sensor data is stopped, restart the module to recover. Please refer to section 2.2.1 for the procedure.

Image recording function issue

“NO SIGNAL” is displayed on the recording screen

Problem with Docker cache on edge server

> Restart the VideoStreaming module to recover.
>
> Please refer to section 2.2.1 for the procedure.

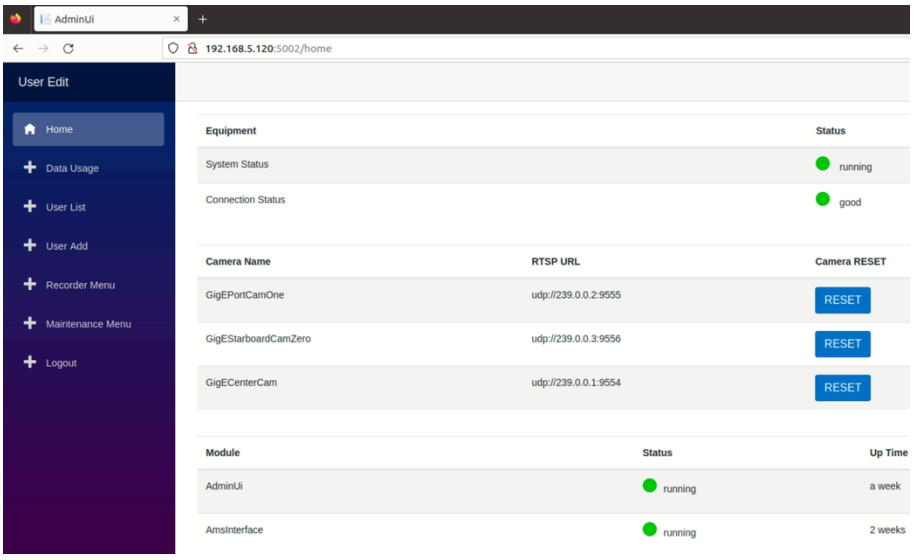
Recording fails

The disk size for saving recorded data is full

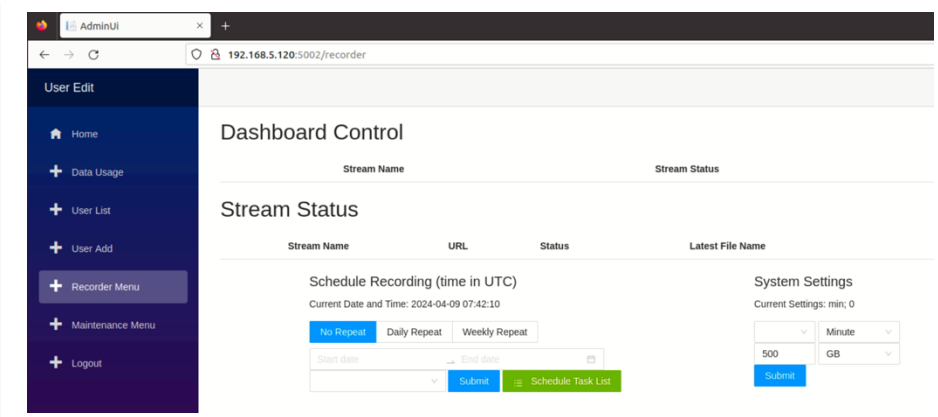
> Delete past recorded data displayed in ‘Past Recordings’ on the recording screen of the Command application to secure disk space for recording.
>
> Alternatively, increase the storage disk size for recorded data set on the edge server using the following method.

1. Launch AdminUi from the browser of edge server.

> URI : http://[Edge server IP address] 5002/home
>
> （Login is needed. Login user name is jrcs_admin）



2. Display the Recorder Menu page, increase the disk size set in the System Settings item, and press the Submit button.



Setting details

Command application settings

Item	Value	Remarks
SEQ Logging	OFF	Send Command application logs to the edge server. Set ON when an investigation is required. If so, also set ON Verbose Logging.
Verbose Logging	ON	
Simulation Mode	OFF	By setting it to ON, the following pseudo data will be used. (Video, GNSS, AIS, Gyro, Anemometer, ML output) When set to ON, the items (*1) will be displayed.
Main Display Camera	OFF	When turned on, the camera view will be displayed when the application starts.
GigECamera	ON	This setting should always be ON.
Enable Test Video	OFF	When set to ON, recorded video data is used instead of camera footage. Generally please set it to OFF.
Video Player	Webrtc	Choose Webrtc.
Port Video URL(*1)	FORE1	Video data for simulation. (Use only Simulation Mode)

Item	Value	Remarks
Center Video URL(*1)	FORE2	〃
Starboard Video URL(*1)	FORE3	〃
Port Video ID	FORE1	Don’t to change.
Center Video ID	FORE2	〃
Starboard Video ID	FORE3	〃
Set GigECamera Settings	OFF	unused. (*2) All relevant settings regarding camera configuration are unavailable.
GigECamera(*2)	CenterCamID	Camera ID name. (unused)
DisplayRange(*2)	Higher	Display range level. (unused)
Min(*2)	18000	Minimum setting value of display range. (unused)
Max(*2)	65000	Maximum setting value of display range. (unused)
OffsetX(*2)	0	Cutting start position of camera image (1920x1080). If you want to cut in the center, the OffsetX value is 480. (not use)
OffsetY(*2)	0	Cutting start position of camera image (1920x1080). If you want to cut in the center, the OffsetY value is 390. (unused)
Gain Auto(*2)	ON	Camera gain setting. (not use)
Exposure Auto(*2)	ON	Camera exposure setting. (unused)

Item	Value	Remarks
Exposure Auto Algorithm(*2)	Pixel Median	Camera exposure algorithm setting. (unused)
Target Brightness(*2)	128	Camera image brightness(0 to 256). (unused)
HDR Tuning(*2)	OFF	When set to ON, the camera's HDR function is enabled. When set to ON, the settings for item *3 will be displayed. (unused)
HDR Output(*2)	HDR	Choose HDR. (unused)
HDR Exposure Time(*2, *3)	30000	Exposure time of HDR. (unused)
HDR Analog Gain(*2, *3)	30	Gain value of HDR. (unused)
API Preset	Blank	Selecting this will reflect the endpoint settings for reference.(*4)
Default Endpoint(*4)	http://XXX	XXX is Edge server IP address
Identity(*4)	http://XXX (port 5500)	〃
ServiceApi(*4)	http://XXX (port 5001)	〃
Streaming(*4)	http://XXX (port 4430)	〃
Custom Map AP(*4)I	http://XXX:8181	Depends on the map server you install
WMS Server	OFF	ON when map server is installed
Use Carmenta Server	OFF	ON when installing Carmenta map server
SEQ Endpoint	http://XXX:8123	XXX is Edge server IP address

Item	Value	Remarks
AIS Camera Cache Refresh	1 min	Time to continue displaying even if AIS data is no longer received.
Ffmpeg Options	-fflags nobuffer -flags low_delay -analyzeduration 0 -probesize 32	
Ffplay Options	-fflags nobuffer -flags low_delay -analyzeduration 0 -probesize 32	
Camera Count	3	Number of install cameras
Bounding Box Delay(ms)	0	Adjust the timing of camera image display and BBOX display.
ML Fusion Distance(nm)	0.1	Setting the distance to fuse ML detection and AIS data. (unused)
ML Distance in Meters?	OFF	When turned on, the distance to the recognized object is displayed in meters.
Show CPA Data	ON	When turned on, CPA data will be displayed.
Enable panoramic view	OFF	When turned on, you can switch cameras by swiping.
Additional Debug Info	OFF	Display debug data in bounding box.
Memory usage info	OFF	Shows memory usage on screen.
Always Restart Streams	OFF	Restart Video Streaming module periodically. (unused)

Troubleshooting Microsoft Azure

Azure IoT HUB issues

Unable to deploy to edge server

> Updating the IoT Edge runtime may help. In that case, please update the runtime using the following command.
>
> sudo apt-get update
>
> apt list -a aziot-edge
>
> sudo apt-get install aziot-edge Defenseer-iot-micro-agent-edge
>
> sudo iotedge config apply
>
> Then restart the edge server.
>
> If the above methods do not resolve the issue, there may be other issues. If the time difference between your Edge server and Azure is more than 5 minutes, restarting the Edge Agent may not work. If all the modules in the edge server disappear and you cannot deploy due to an error in the Azure portal, use the following method to deal with it.
>
> Run the command below
>
> sudo systemctl stop aziot-edged
>
> sudo rm /var/lib/aziot/edged/*
>
> sudo rm /var/run/iotedge/*
>
> sudo systemctl start aziot-edged

AzureEventGridonIoTEdge issues

When deploying a template, an error occurs with AzureEventGridonIoTEdge

> Follow the steps below to clear the iotedge container in the edge server.
>
> sudo iotedge system stop
>
> sudo docker container prune
>
> sudo docker image prune
>
> sudo iotedge system restart

> After executing the above command, deploy the template again.

Command SOLO

Editions	date	Revision details
Version 1	2025/05/13	Initial creation
2nd edition	2025/08/01	Added horizontal line display function and camera image zoom function when adjusting the IMU
3rd edition	2025/10/15	Allows customers to set the camera installation height and orientation parameters using the AdminUI tool instead of JRCS.

System Overview

> Infoceanus Command Solo (hereinafter referred to as Command Solo) supports the safe operation of ships with general-purpose visible light cameras and computer vision-based situational awareness technology. The Command Solo is a simple configuration of the Infoceanus Command product, changing the edge server from a large box computer to a laptop computer, and changing the camera from three to one specification to make it more compact and portable.

Equipment Overview

> Describe the equipment that makes up Command Solo. The specifications and details of each device are described in "2.Component Outline Diagram"

1. Edge server: Laptop type (1 unit)

> Based on the image from the visible light camera, it recognizes objects such as ships and buoys reflected in the sea. It also receives signals from navigation instruments and displays the location of its own and other ships on the map.

- 2m LAN cable included.

2. PoE HUB (5 Ports) (1 Unit)

> It is used as a network for communication of navigation instrument data and fluctuation data from the IMU. It is also used to power visible light cameras and signal converters.

3. IMU (Inertial Measurement Unit) (1 unit: optional)

> The pitch angle and roll angle of the hull are measured and output.

4. 2 IMU antennas: optional

> If the GNSS signal or GYRO compass signal cannot be obtained from the ship, the antenna can be attached to the IMU to acquire the ship's position, speed, time, and heading data.

5. Signal Converter (1 unit: optional)

> The pitch angle and roll angle data of the serial signal output from the IMU are converted and distributed to the network.

- 2m LAN cable included.

6. Visible Light Camera (1 unit)

> Camera images are output with a GigE camera equipped with a focal length 6mm lens.

- A 2m dedicated camera cable is included.
- When installing a visible light camera outdoors, a separate camera housing with an IP67 degree of protection is required.

7. Carrying Case (1 Set)

> A carrying case that stores a set of equipment for this product.

Feature Overview

> Below is an overview of the key features of Command Solo.

1. Camera image display

> Display the visible light camera image in real time on the edge server screen.

2. Camera Video Recording

> The image output from the visible light camera is recorded on the edge server's disk.

3. Nautical Information Display

> It acquires data from navigational instruments and displays the following information on the edge server screen in real time.

Nautical instrument	substance	NMEA Sentence
GNSS	Vessel position and speed	$GPGGA, $GPVTG, $GPZDA
GYRO Compass	Bow Bearing	$HEHDT
Wind direction anemometer	Wind direction and speed	$WIMWV
AIS	Other ship information	! AIVDM

- The above navigational instrument data must be entered into the system via Ethernet. For information on how to enter the data, refer to 4.1.4 Sensor Data Entry Settings.

4. Conflict Alert

> Based on the AIS information received, the nearest approach distance DCPA (Distance Closet Point of Approach) and the nearest approach time TCPA (Time Closet Point of Approach) are calculated and alarm notifications are given. Alarms can be set by distance (in 0.1 NM increments) at DCPA and time in TCPA (in 1 minute increments).

5. AIS Information Display

> Based on the AIS information received, the DCPA is displayed on the screen in order of closest distance. You can also select the list to view the AIS details.

6. Object recognition function

> The following types of objects are recognized from the visible light camera image, and bounding boxes are displayed for the recognized objects on the video. This allows you to understand small ships that are not equipped with AIS.

a. Vessel : General Ship

b. Passenger Vessel :passenger ship

c. Boat : Small boats
d. Navigation Buoy : Navigation buoy
e. Fishing Buoy : Fishing Buoy
f. Fishers Facility : Fishing facilities (rafts, etc.)

7. Map view

> The map display is displayed by switching with the camera image display, and the position of the ship and the position of other ships received by the AIS are displayed on the map. The map can be north-up or course-up with your ship as the center.

- The map is simple, so there is no display of detailed topography or features.

8. Labeling Capabilities

> You can create labels for locations on the map. This label is not only exclusive to you, but you can also make it available to your own users or share it with all users.
>
> Note: An Internet connection is required to start this system. Connect to the Internet from your ship
>
> The environment shall be provided.

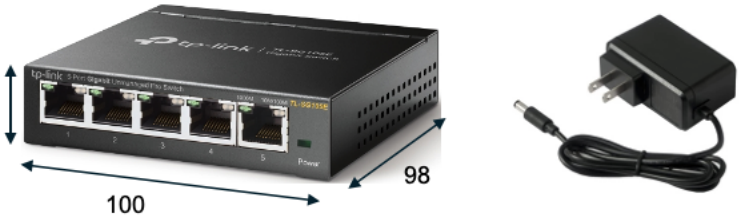
Component Outline Drawing

> List of components

Edge Server

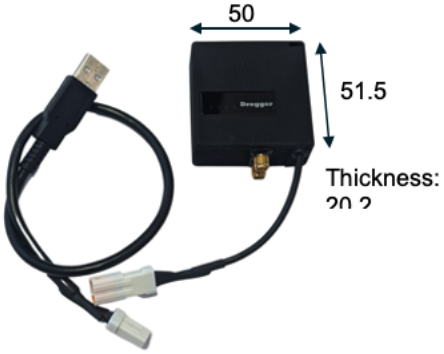
unit	color
mm	black

PoE HUB（5 port）



unit	color
mm	black

IMU (optional)



*The serial module is connected to the IMU body.

unit	color
mm	black

unit	color
mm	black

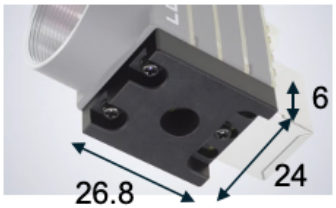
IMU Antenna (Optional)

unit	color
mm	black

Signal Converter (Optional)

unit	color
mm	black

Visible light camera



Mounting hole size (ϕ 1/4"-20)

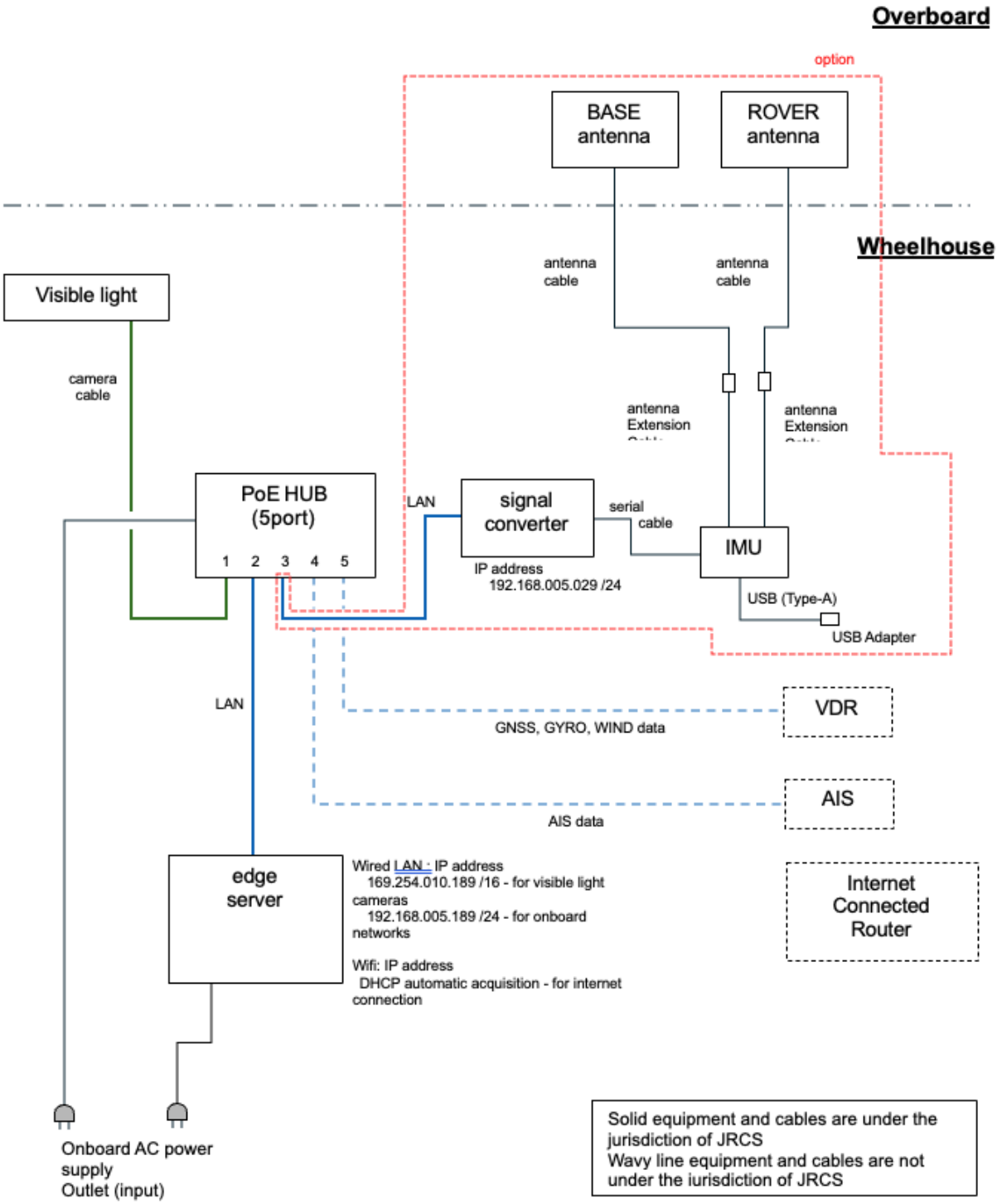
unit	color
mm	black

Carrying case

unit	mm
color	black

System Configuration

Equipment configuration diagram



Setup Instructions

Equipment installation

Installation of visible light cameras

> The bottom of the visible light camera is equipped with an adapter for mounting a tripod, so attach the camera arm or other fixing hardware to it and install it in the wheelhouse.

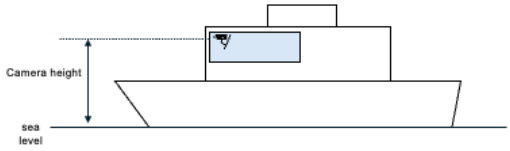
> Notes:

- The mounting hole for the visible light camera is 1/4"-20", so please use a camera arm that fits this size.
- When a visible light camera vibrates, the image becomes blurry, affecting the accuracy of object recognition. Choose a camera arm that does not cause vibration in the visible light camera.
- Handle the camera cable so that objects and feet do not get caught.
- Visible light cameras are designed for indoor use. When equipped outdoors, it must be installed in a camera housing with an IP67 degree of protection.

- Use a level to mount the visible light camera so that it is level with respect to the hull.
- To measure the distance from the camera image to the detected object, the following parameter data must be set in the software: This setup work is described in "7. See the section Fine-tuning the IMU.

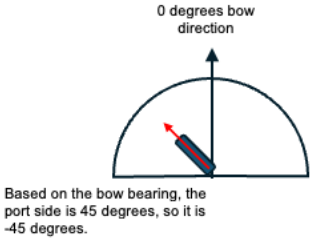
1. Installed Visible Light Camera Installation Height

> It will be higher than sea level. Example: 18.2m

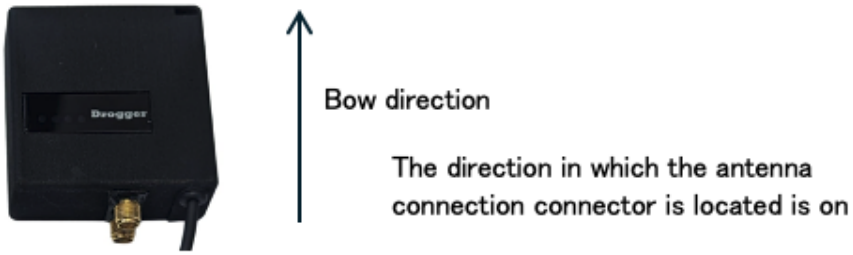


2. Orientation (angle) of the mounted visible light camera

> The bow bearing is angled to 0 degrees. If it is 45 degrees to starboard, it will be +45 degrees, and if it is 45 degrees to starboard, it will be -45 degrees.



Installation of the IMU (optional)

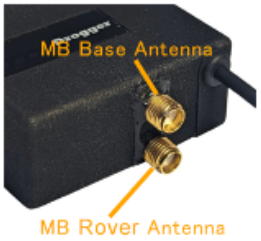
> Since the IMU measures the inclination of the hull (roll angle, pitch angle), the mounting orientation of the IMU should be in the same direction as the bow bearing. Please fix it firmly so that it does not shake due to hull vibration.
>
> 
>
>
> The IMU is powered by a USB (Type-A) connector. If you want to install it near an edge server, you can power it from the USB port on the edge server. If not, use the included 5VDC USB adapter to power it.

Installation of IMU antenna (optional)

> If you are unable to capture GNSS and GYRO compass signals from your ship, you can install an optional IMU antenna to capture these signals into the system. This antenna needs to be installed outdoors to receive data from satellites. The cable length of the IMU antenna is 8m, including the extension cable, so please pay attention to the mounting position of the IMU itself.
>
> Notes:

- The IMU antenna cable is thin, so it may break if strong tension is applied when handling the cable, so install it so that it does not get tensioned. In addition, it is recommended to use cable protection tubes for outdoor wiring.

> There are two types of antennas: MB Base antennas and MB Rover antennas. The MB Base antenna receives the GNSS signal and measures the GYRO compass signal (heading) with two antennas, the MB Base antenna and the MB Rover antenna.
>
> IMU Antenna Connection Position
>
> Connect the MB Base antenna to the top of the antenna connector and the MB Rover antenna to the bottom.

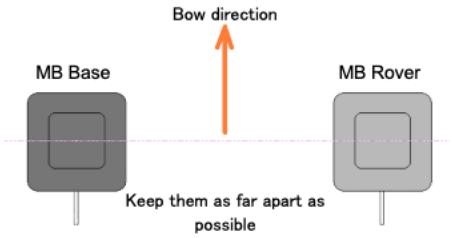


The two antennas will be the same. The location of the connection determines MB Base, MB Rover.

IMU antenna installation orientation

The two IMU antennas should be installed perpendicular to the bow bearing (port side, starboard side).

The satellite measures the position of these two antennas to measure the heading of the ship. Install MB Base antennas on the port side and MB Rover antennas on the starboard side. As for the orientation of the antenna body, there is no problem in any direction.



Changing IMU Settings

When installing the optional IMU antenna, you need to change the data output from the IMU. There are two types of data output by default, pitch angle and roll angle, but we will change it to output GNSS signals and GYRO compass signals as additions.

(Preparations)

Bluetooth communication is standard on the IMU itself, so you can use an Android app such as a smartphone to set it up.

Please download the Android app from the Google Play Store.

Android App Name: Drogger GPS for DG-PRO1

(Setup Procedure)

After launching the above Android app, follow the steps below to connect to the IMU and change the settings.

1. Start the IMU.

> Connect the power supply of the IMU and start it.

2. Connect to the IMU.

> Launch Bluetooth on the device with the Android app installed and click the device (RWS. DCM03).

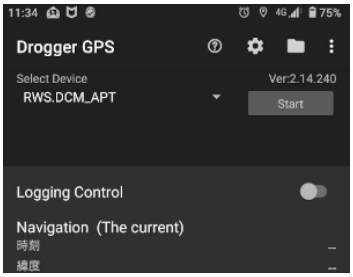
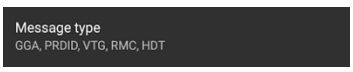
3. Set up development options.

> In your Android device’s system settings, switch the developer option "Temporary Location App" to Drogger GPS.
>
> Settings→ System→ Advanced→ Developer options
>
> → Select a temporary location app.

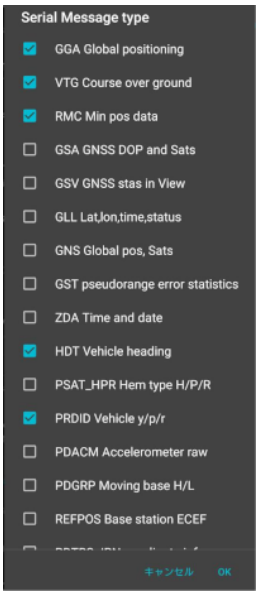
4. Launch the Drogger GPS app.

> Launch the Drogger GPS app installed on your Android device.

5. Change the message output settings.

> Press the Settings button at the top of the screen.
>
> 
>
>
> Click Message Output.
>
> 
>
>
> Click Message type.
>
> 
>
>
> Add a Serial Message type.
>
> PRDID Vehicle y/p/r (yaw, roll, pitch) is set as the default, so check the GGA, VTG, RMC, HDT message types to add them. After adding it, press the OK

button.

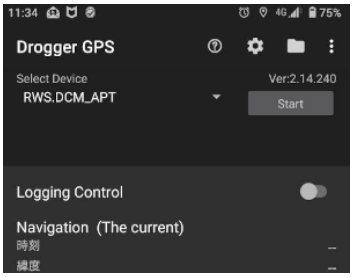


6. Initialize the heading settings of the IMU.

The heading data output from the IMU is calculated from the position of the IMU antenna installed using the satellite, but if communication with the satellite is not possible, the heading value is output from the orientation of the IMU body. For this reason, initialize the heading value of the IMU itself by following the steps below.

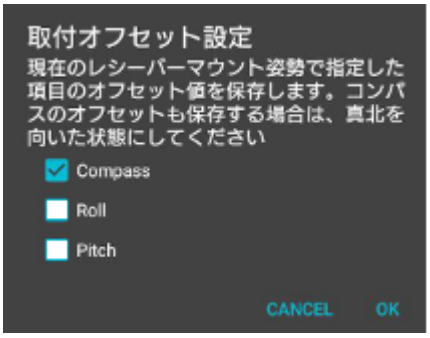
Orient the IMU body to true north (0 degrees).

Press the Start button in the Drogger GPS app to output the IMU value.



The DMP/MB Gyro item displays the yaw angle, roll angle, and pitch angle, click the icon.

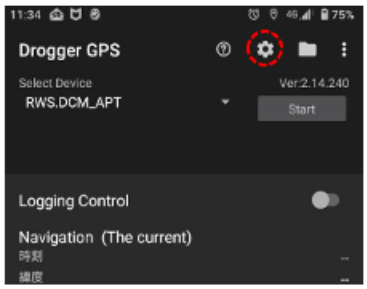
Check only the Compass items and press the OK button. This operation resets the yaw angle (heading) to 0 degrees.



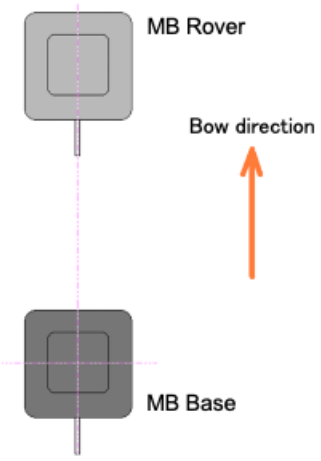
7. If you want to change the antenna installation position direction

The two IMU antennas can be left and right (port side: MB Base antenna, starboard side: MB Rover antenna), but if installation problems do not allow installation on the left or right, it can also be installed in front and rear. In this case, the MB Base antenna is at the rear and the MB Rover antenna is in front. If you want the IMU antenna to be installed in the front and rear directions, please change the settings by following the steps below.

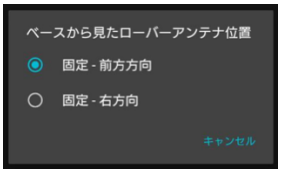
Press the Settings button at the top of the screen.



Click MB (Moving base).



Click "Rover Antenna Position from Base" and select "Fixed/Forward Direction".



Changing the Signal Converter Settings

The above IMU output settings have changed to output GNSS signals and GYRO compass signals, but the data must be delivered to the edge server. To achieve this setting, follow these steps to change the signal converter settings:

1. Open the signal converter settings screen and log in.

Open a browser (Firefox) on the Edge Server screen and access the following URL.

http://192.168.5.29

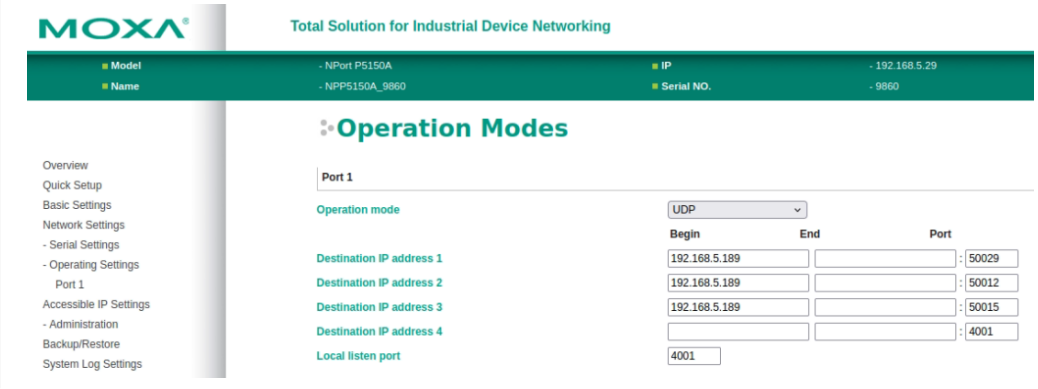
On the screen below, enter admin for Username and command1solo for Password and press the Submit button.

2. Configure the output settings for GNSS signals and GYRO compass signals.

Open the Port 1 screen of the Operation Settings and add the following settings:

item	Set value	remarks
Destination IP address 2	(Begin) 192.168.5.189	GNSS signal output destination when the optional IMU antenna is installed
	(End) vacuum	
	(Port) 50012	

item	Set value	remarks
Destination IP address 3	(Begin) 192.168.5.189	Where to output the GYRO compass signal when the optional IMU antenna is installed
	(End) vacuum	
	(Port) 50015	



Output Settings for IMU Signals

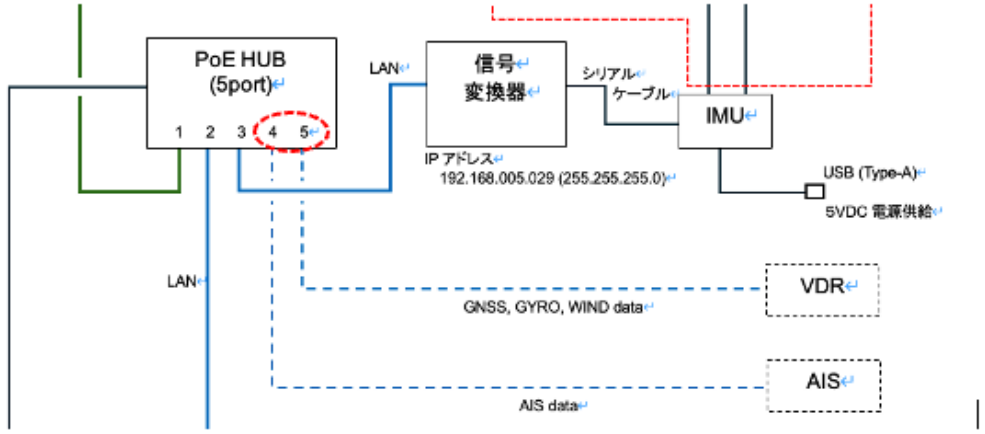
GNSS Signal Output Settings

Output Settings for GYRO Compass Signals

> After setting up, press the Submit button and then the Save/Restart button

Sensor Data Entry Settings

> The following sensor data (NMEA data) must be entered into the system. Please enter the following settings. Convert the sensor data in NMEA format to the UDP protocol and connect to the free ports (ports 4 and 5) of the PoE HUB on the network.



The figure above shows an example of inputting data from the VDR for GNSS, wind direction anemometer, and GYRO compass from VDR, and AIS data separately. In this case, the output settings for these data are as follows:

sensor	NMEA Signals	UDP Destination Address	Output destination Port Number
VDR	$GPGGA,$GPVTG,$GPZDA	192.168.5.189	6501
	$WIMWV		
	$HEHDT		
AIS	! AIVDM	192.168.5.189	50016

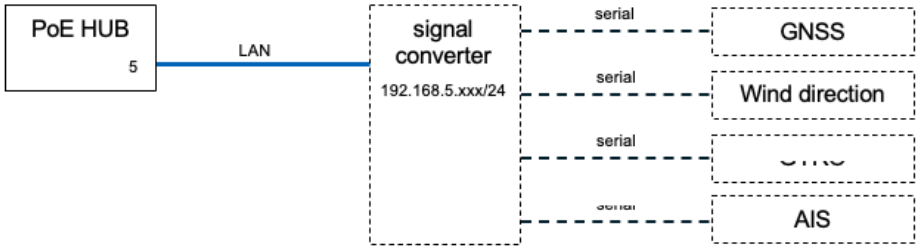
- Port number 6501 is the number on the port where all NMEA signals can be entered. This port number is used when outputting multiple sensor data together.
- The destination port of AIS data is 50016. If the VDR can also output AIS data, there is no need to connect to the LAN port 4 of the PoE HUB.

If each sensor is independent, use a signal converter with a 4-port input to output NMEA data, as shown in the example below.

(e.g.) All sensor data is converted to a network with a signal converter and output

- Set the IP address of the signal converter to 192.168.5.xxx/24.

(192.168.5.29 and 192.168.5.189 are already used, so set them to something else.))



sensor	NMEA Signals	UDP Destination Address	Output destination Port Number
GNSS	$GPGGA,$GPVTG,$GPZDA	192.168.5.189	50012
Wind direction anemometer	$WIMWV	192.168.5.189	50013
GYRO Compass	$HEHDT	192.168.5.189	50015
AIS	! AIVDM	192.168.5.189	50016

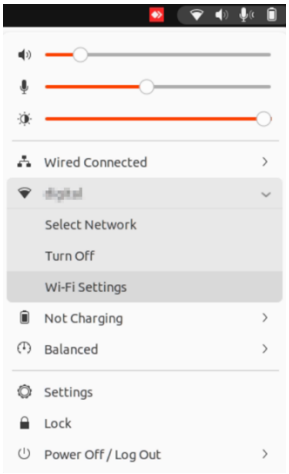
Network Configuration for Edge Servers

> Edge servers need to be connected to the internet. Connect the wireless LAN of the edge server to the Internet connection router.
>
> The edge server network is set up by default:

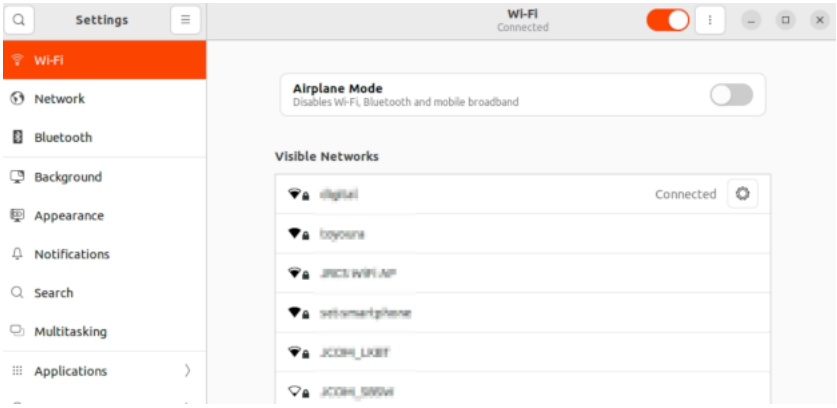
network adapter	IP address	Subnet mask	remarks
Wired LAN	192.168.5.189	255.255.255.0	sensordata entry
	169.254.10.189	255.255.0.0	for visible light camera connection
Wireless LAN	Automatic Acquisition	Automatic Acquisition	For Internet connection

> Please connect to the Internet by following the steps below.

1. Click the icon in the upper right corner of the Edge Server screen to display the following screen and select Wi-Fi Settings.



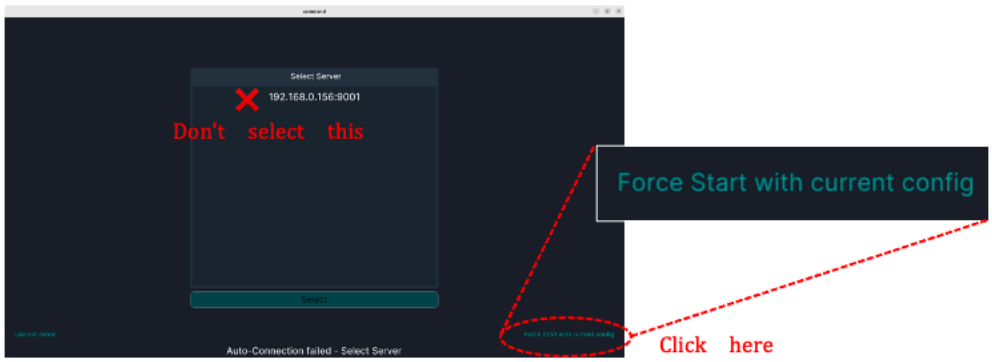
2. Select the SSID of the Wi-Fi router you have prepared and connect to the Internet.



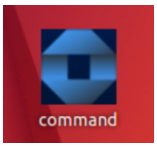
How to start and exit

How to boot the system

> After connecting all the devices and turning them on, press the power button on the edge server to start it.
>
> The command solo application will start automatically, but if the Select Server screen like the one below is displayed, click "Force Start with current config" in the lower right corner of the screen.
>
> Notes:
>
> The IP address displayed in the Select Server dialog is the IP address when connected to Wi-Fi. The command solo application is launched on the wired adapter 192.168.5.189, so if you see a list of other IP addresses, do not select them.

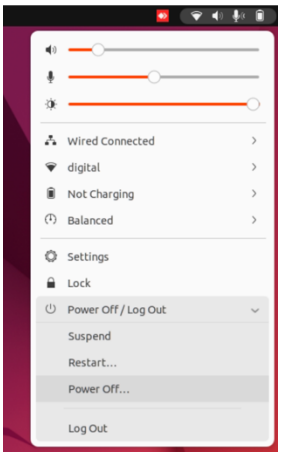


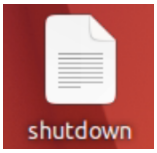
If you exit the application with the × button in the upper right corner of the screen, you can launch the Command Solo application by double-clicking the Command icon on the desktop screen.



How to terminate the system

Shut down the Edge Server when you terminate it. To shut down, click the icon in the upper right corner of the screen to bring out the menu, and select [Power Off/Log Out] → [Power Off...]or double-click the shutdown icon on the desktop screen.



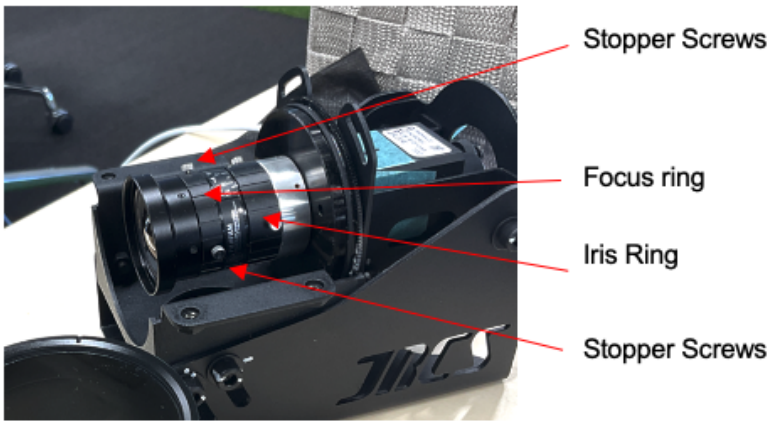


Shut down from the menu Shut down with the shutdown icon

Image Adjustment for Visible Light Cameras

Focus Settings

> The lens part of a visible light camera has two adjustment rings. The outer ring is the focus ring, and the inner ring is the iris (exposure) ring. When adjusting the focus, loosen the stopper screw and then turn the focus ring to adjust it. Adjustments will be made while watching the camera image in the Infoceanus Command Solo application, but there is a slight time lag in the display of the video, so please adjust it by turning the ring little by little.



Iris (Exposure) Settings

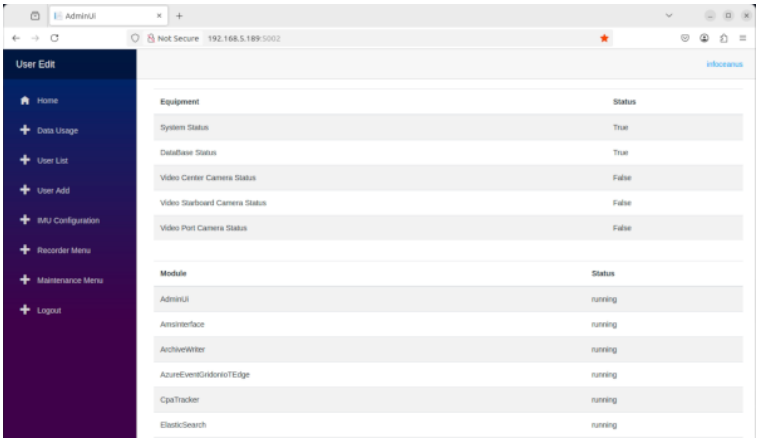
> The exposure adjustment is initially adjusted by JRCS, so please do not make any adjustments in general. If you really need to adjust the brightness, loosen the stopper screw on the iris ring and then turn the iris ring to adjust it.

Tweak the IMU

> The hull tilt data such as pitch value (front and rear tilt) and roll value (left and right tilt) are output from the installed IMU, and the distance to the detected vessel or buoy is calculated based on these values, but depending on the installation condition, the distance may not be calculated correctly. Since it is very difficult to fine-tune the mounting state of the IMU, it is possible to utilize software to offset the pitch and roll values. Also, set the installation height and orientation values of the cameras installed in "4.1.1 Installing Visible Light Cameras" here.

1. Launch the Admin UI application.

> Launch a browser (Firefox) on the edge server and access the URL below.
>
> http://192.168.5.189:5002



2. Log in to the Admin UI application.

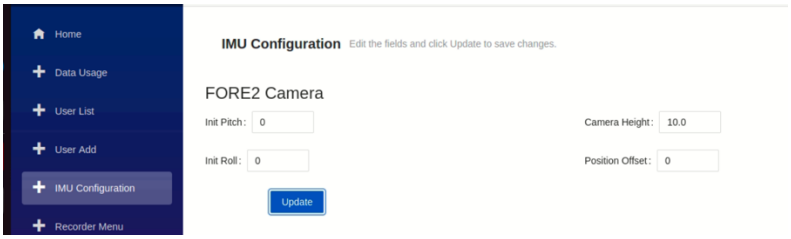
> If you select the Home menu on the left side of the screen, the following login screen will be displayed, so please enter your username and password to log in.

Username	Password
jrcs_admin	111111

3. Set the camera installation information.

> Select the IMU Configuration menu on the left side of the screen to display the following screen. Here you set the values for the camera installation height and camera orientation.

Camera Height	Position Offset
Camera height (m)	Camera orientation (degrees)

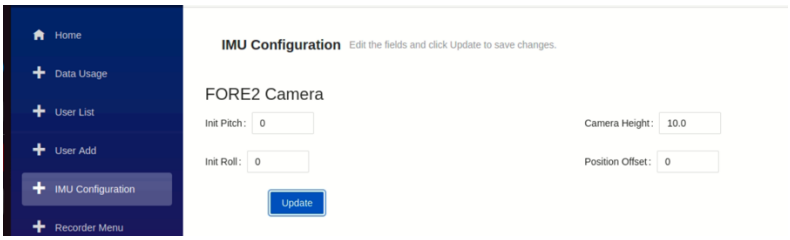


> After setting, press the Update button to reflect the value.

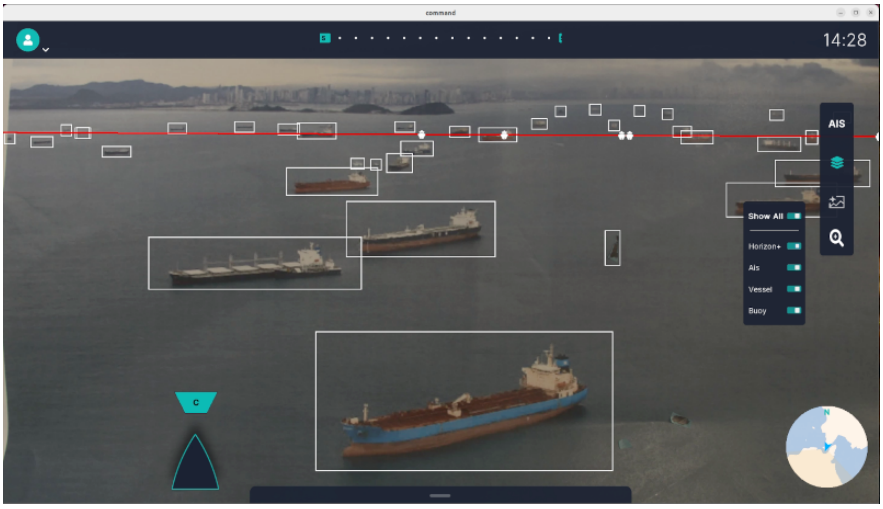
4. Fine-tune the IMU.

> While looking at the camera image, adjust the pitch angle and roll angle offset below to adjust the position of the horizontal line.

Init Pitch	Init Roll
Pitch Angle Offset	Roll Angle Offset



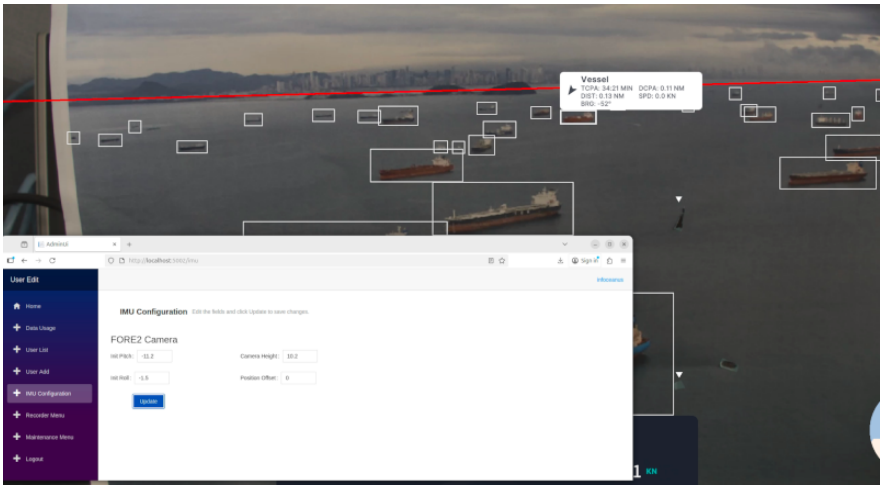
Press the layer button on the right side of the screen and check the Horizon+ item to display a red horizontal line. Adjust the pitch and roll values so that this horizontal line matches the horizontal line in the video. (Distance measurement cannot be done for objects detected above this line.)



If you set the pitch value in a positive direction, the line will go down, and if you set it in a negative direction, it will go up.

Setting the roll value in a positive direction will tilt it to the right, and setting it in a negative direction will tilt it to the left.

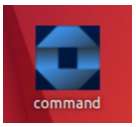
The settings are reflected in real time by pressing the Update button after entering the number, so please adjust it while looking at the screen. After adjusting the horizon position, check the distance of the actual detected object and fine-tune the pitch and roll values to match the distance. After setting the value, press the Update button to reflect the value.



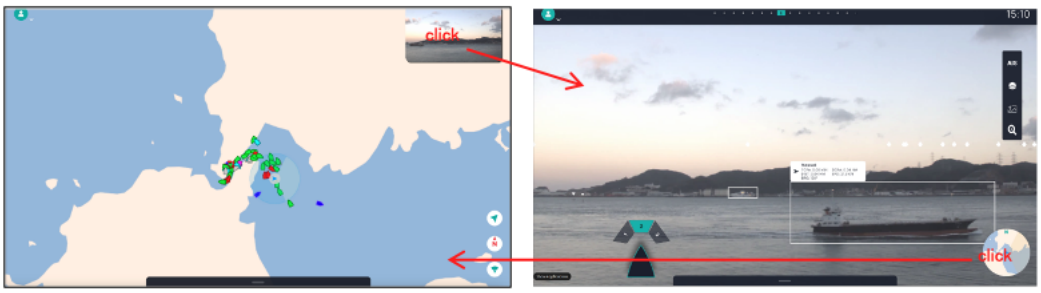
Instructions for handling

How to start and close the application

The Command Solo application is installed on the edge server terminal. Edge Server will start automatically when you start it, but if you want to start it manually, double-click the icon below on the desktop screen to launch the application.

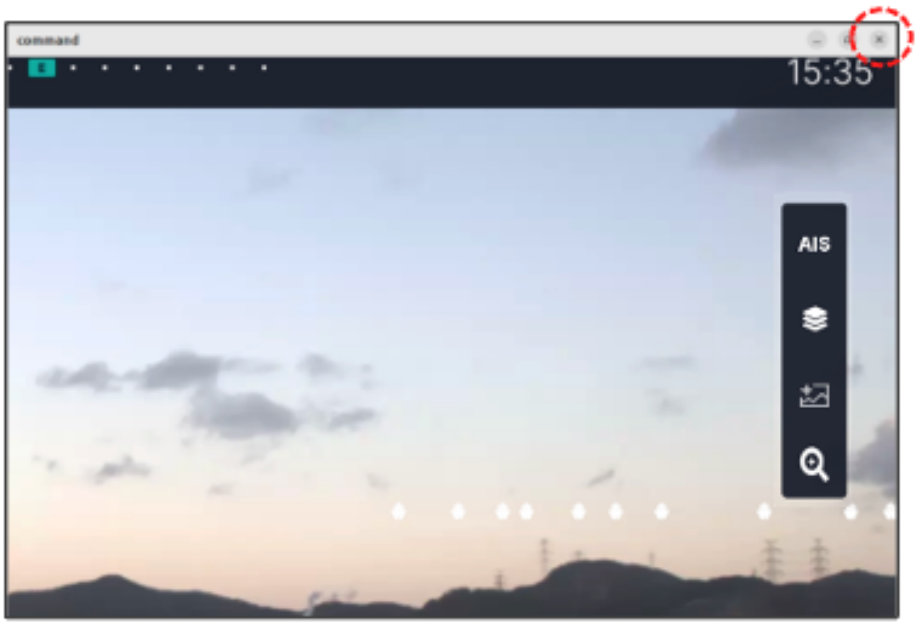


When the application is launched, the map view is displayed. The camera image is displayed in the picture in the upper right corner of the screen, so click it to switch to the camera view. In the camera view, a map icon is displayed in the lower right corner of the screen, so click it to switch to the map view.



Map View Camera View

If you want to close the application, click the × button in the top right corner of the screen to do so.



Login and Logout

> The application has a login feature. You do not need to log in with the normal display function alone, but please note that there are functions that can only be performed without logging in.

How to log in

1. Click the person icon in the top left corner of the screen.
2. The login screen will appear, click on the word "Login".
3. Click the word "User Selection" on the user selection screen to display a list of registered users, so select the user you want to log in.
4. Enter the PIN number of the selected user.

How to log out

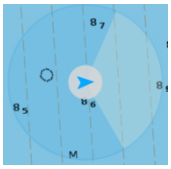
1. Click the person icon in the top left corner of the screen.
2. Click the word Logout User Switch.

> 
>

Map View Screens and Features

Map icon

1. Ship icon

> Your ship will be displayed on the map with a blue arrow icon. The direction of the arrow is in the bow direction.
>
> 

2. Other ship icons

> Other ships are displayed with a pentagonal icon, and the direction in which the corner is pointed is the bow direction. Receive AIS information and display it on the map.
>
> 
>
> The definition of the color of the other ship icon is as follows.

Icon colors	Vessel type
yellow-green	Cargo Vessels
red	Tankers
blue	Passenger Vessels
yellow	High Speed Craft
light blue	Tug, Special Craft

Icon colors	Vessel type
orange	Fishing
pink	Pleasure Craft
grey	Unspecified Ships

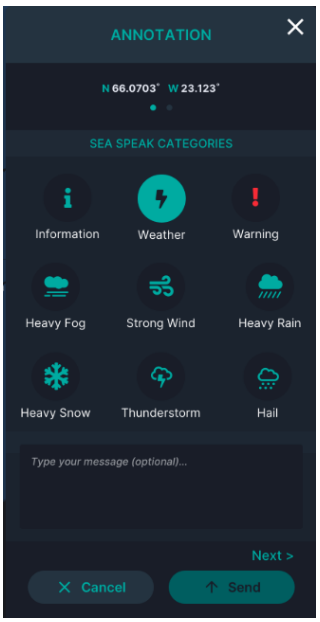
3. Viewing AIS Information

> Click on the icon of another vessel to display the information of that vessel.
>
> It displays the DIST (distance from your vessel to the selected vessel), the SPD (the speed of the selected vessel), and the AIS information if there is any CPA (reapproach point) and BRG (collimating azimuth) information.
>
> In addition, by clicking on the displayed list, more detailed information about the selected vessel is displayed on the screen.

4. Labeling Capabilities

> Individuals can apply labels on the map. This will indicate who created it, so you will need to log in to use this labeling feature. The labels you create can include comments, and depending on the type, you can change the icon.

1. Press and hold the location where you want to create a label.
2. A labeling screen will appear on the screen, select a label category.



Choose from 8 different categories: Point, Question, Information, Intent, Advice, Request, Answer, and Alert.

3. When you select a label category, you will be taken to the comment input screen, so enter a comment. You can also select the label sharing and the duration for the label to be displayed, and then press the submit button to create the label.

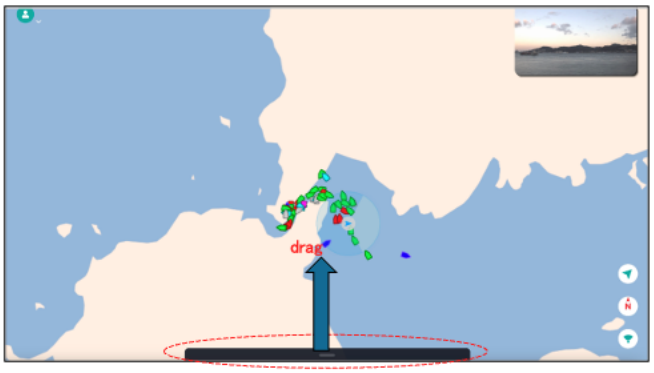
Common types	substance
Only myself	The labels you create will only show your screen.
inboard	The labels you created are also displayed on the screens of other users on the same ship.
in-house	The labels you created are displayed on the screens of all users of your company.
disclosure	The labels created are displayed on the screen of all users using Infoceanus Command (including users from other companies).

Choose from 5 hours, 12 hours, 24 hours, no limit, or custom settings. You can specify custom settings by year, month, and day.

4. If you want to delete a label, click on the label on the screen to display the erase button, press the erase button to delete it. However, labels created by other users cannot be erased.

5. Pull-up screen

The pull-up screen is hidden at the bottom of the application screen. Drag it upwards to display the screen of the following features:



1. Navigation screen

The navigation screen displays information about your ship. Numerical information includes wind direction and wind speed (true and relative), coordinates of your ship (latitude and longitude), heading, and ground vessel speed. In addition, the compass is displayed in the anime display, and the wind direction (true relative) and course direction are displayed with icons.

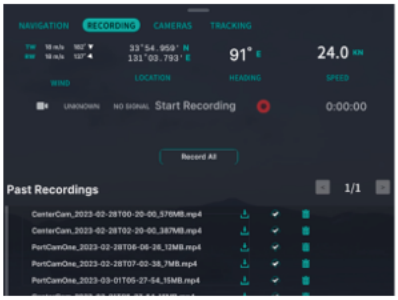
(The bow heading is fixed upwards)

The direction of the pointed tip is oriented.

T: True wind direction
R: Relative wind direction
C: Path (direction of movement)

2. Recording screen

The operation of this screen requires that you are logged in.



Record button
Press once to start recording the camera and press again to end the recording. While recording, the current recording time will be displayed on the right side of the button.

Record All

Record All Button
Start and end recording for all cameras.

Download button
You can download the recording data file stored on the edge server to your iPad and play the recorded data.

Upload button
Upload your recordings to storage in the cloud. This allows you to refer to the recorded data from land. (Storage size on the cloud is limited to a maximum of 500GB)

Delete button
Delete the recorded data from the edge server.

3. CPA Settings Screen

Set DCPA and TCPA values.

DCPA Alerts

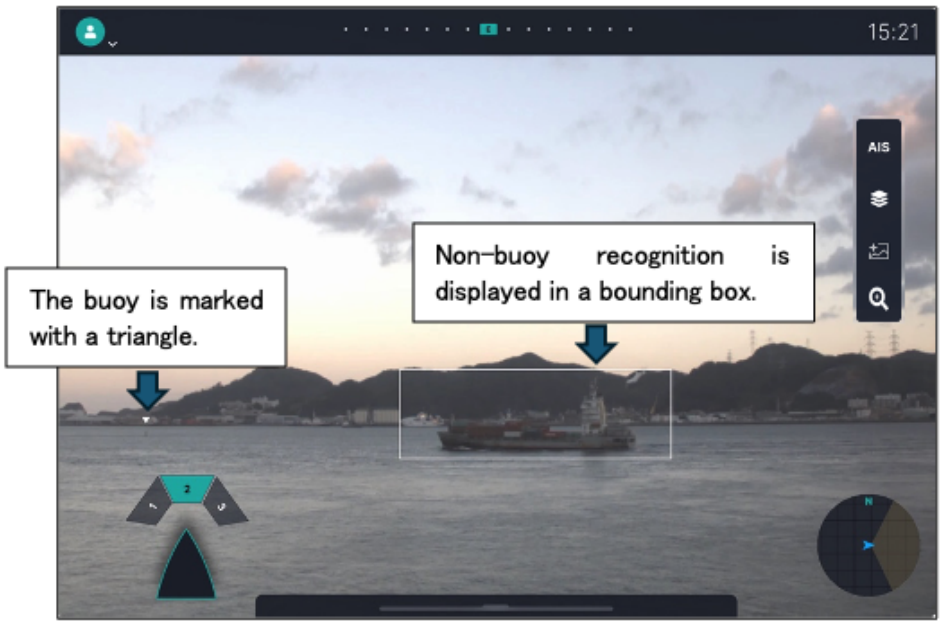
You can set the values by turning on the DCPA Alerts and TCPA Alerts switches.

After changing the settings, press the Apply Settings button to confirm the settings to reflect the settings.

Camera View Screen and Features

Bounding Box Display

Ships and navigation buoys recognized by AI from the camera image will be displayed in a square bounding box. If the type is a buoy, a triangle mark will be displayed.



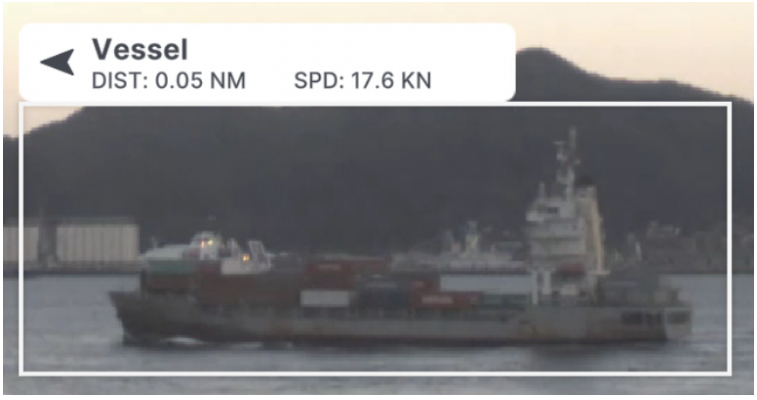
There are the following types of objects that are recognized:

Types of recognizable objects:

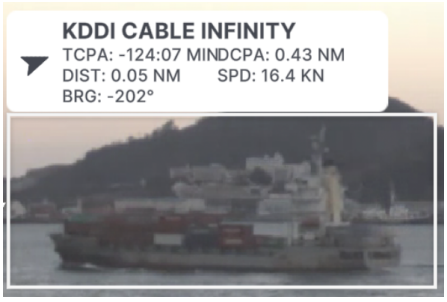
Type	Explanation
Vessel	Cargo ships, tanker ships, bulk carrier ships, etc.
Passenger Vessel	passenger ship
Boat	Small boats such as pleasure boats, yachts, and canoes
Navigation Buoy	Navigation buoy

Type	Explanation
Fishing Buoy	Fishing buoy
Fishers Facility	Fishing facilities such as rafts

> By clicking on the bounding box of these recognized objects, you can view their detailed contents. The display includes the type of recognized object, distance, speed, and direction of movement.
>
> The distance is calculated from the position of the image that recognized the object. The relative speed and direction of movement from your ship are indicated by arrows, which are also the relative direction of movement.

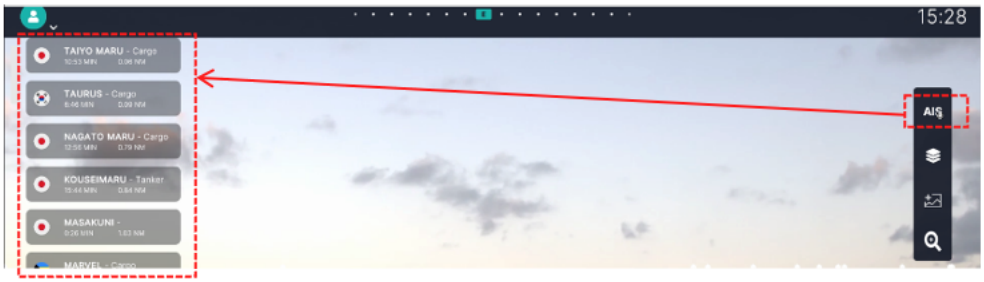


> In addition, when the data recognized by this object matches the AIS data, the AIS ship name is displayed as follows, and when the CPA setting is enabled, the TCPA and DCPA values are also displayed. The bearing angle BRG indicates the relative direction from the ship to the object.

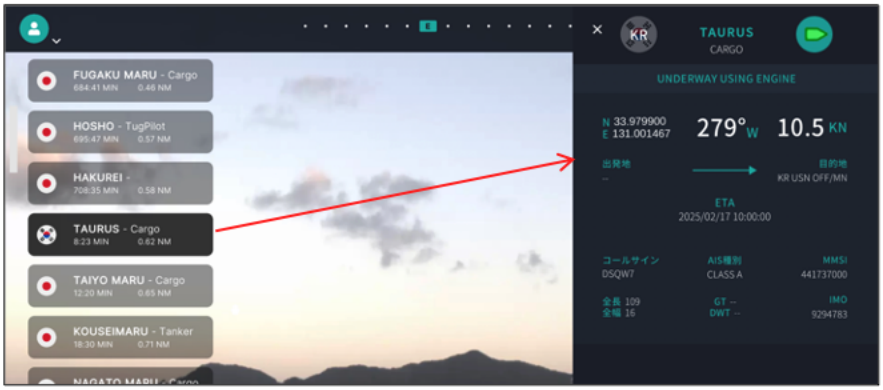


AIS Information Display

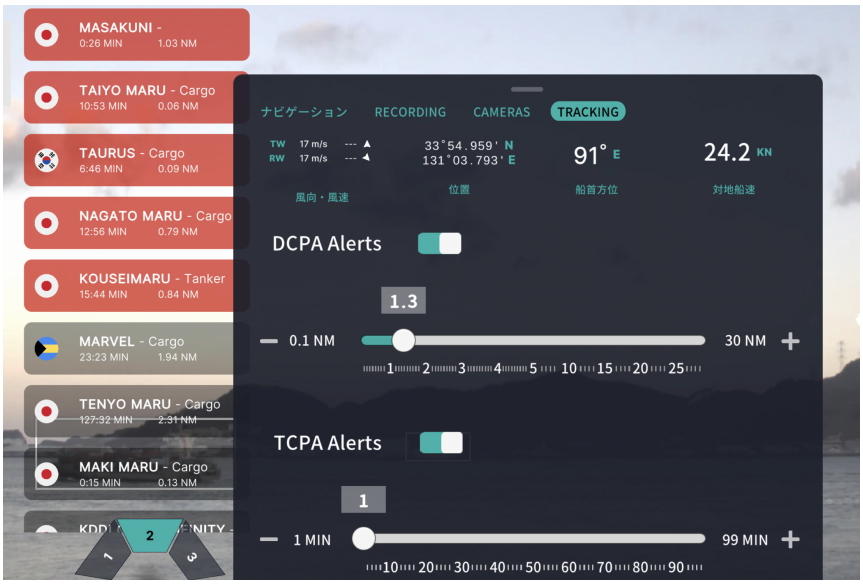
> The following icons are always displayed on the far right side of the camera view. By clicking on the AIS on this icon, a list of AIS received by your vessel will be displayed on the camera view.
>
> You can also scroll up and down the AIS list with the mouse wheel.



If you want to see the details of the vessels displayed in the AIS list, click on the list of vessels you want to check once to select it, and then click again to display the AIS information on the right side of the screen.



If you have set up an alert with the CPA setting, the AIS list of vessels that will be alerted to that condition will be displayed in red to alert you to your attention.



Layer view

You can turn on/off the information displayed on the camera view screen. There are the following types of information:

- Horizon+

> Show the horizontal line. It is used to check the position of the horizon line when adjusting the IMU's offset, and then turn it on and off. (At initial startup, it is in the OFF state by default.)

- AIS

> The AIS information of the vessel in that direction is displayed as an icon on the horizon of the camera image, and it is turned on/off.

- Vessel

> Turn on/off the bounding box display of the vessel recognized by AI.

- Buoy

> Turn on/off the icon display of buoys recognized by AI.
>
> You can do this with the layer button on the right side of the screen. If you click on the layer icon in the figure below, a sub-screen where you can turn on/off operations will appear.

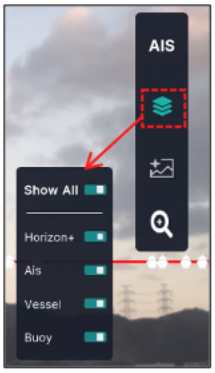


Image Adjustment

> The image adjustment function allows the user to adjust the camera image. There are two types of functions:

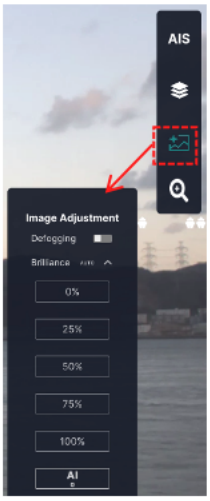
- Defogging

> When poor visibility occurs due to haze or fog, you can turn on Defogging to make the camera image clearer.

- Brilliance

You can adjust the brightness of the image at night in 5 levels. It usually has an AI mode set and automatically adjusts the brightness, but you can manually change the brightness level.

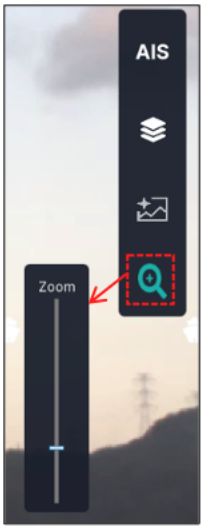
When using it during the day, it is recommended to set it to AI mode.



The Brilliance setting is 0% dark and 100% light.
When you select AI, the brightness will be automatically adjusted.

Zoom function

Click the zoom icon to display the zoom slider. By dragging the slider, you can zoom in (zoom in or out) the camera image. After zooming, you can change the display position of the image by dragging the screen.



*When the mouse is attached, you can also zoom by using the scroll wheel of the mouse.

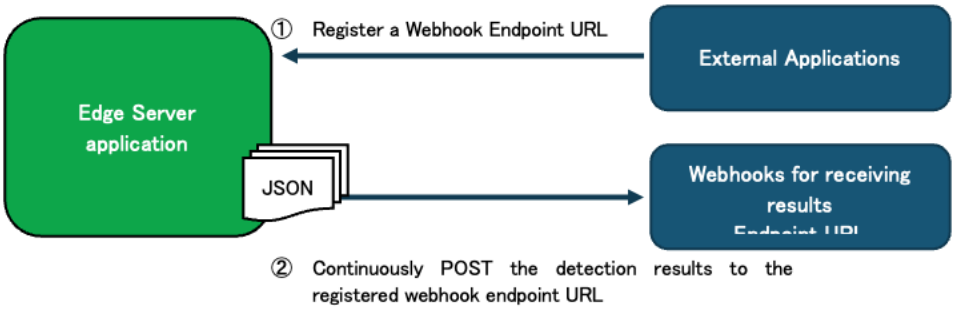
##Communication specifications

The information of the object recognized by Infoceanus Command can be communicated to the outside world through the network from the application in the edge server. The notification mechanism utilizes the HTTP

> RESTful API and uses webhooks to receive findings.

Initial Registration Process

How to register a webhook endpoint URL

> The edge server continues to POST the detection results from the time the webhook endpoint URL is registered.
>
> ① Register the webhook endpoint URL with the edge server application to receive the data recognized by the edge server.
>
> ② The edge server periodically POSTs the findings in JSON format to the webhook endpoint URL.
>
> 
>
>
> Notes:
>
> If the Edge Server is stopped once due to a restart, etc., the registered Webhook endpoint URL record will disappear and must be re-registered.

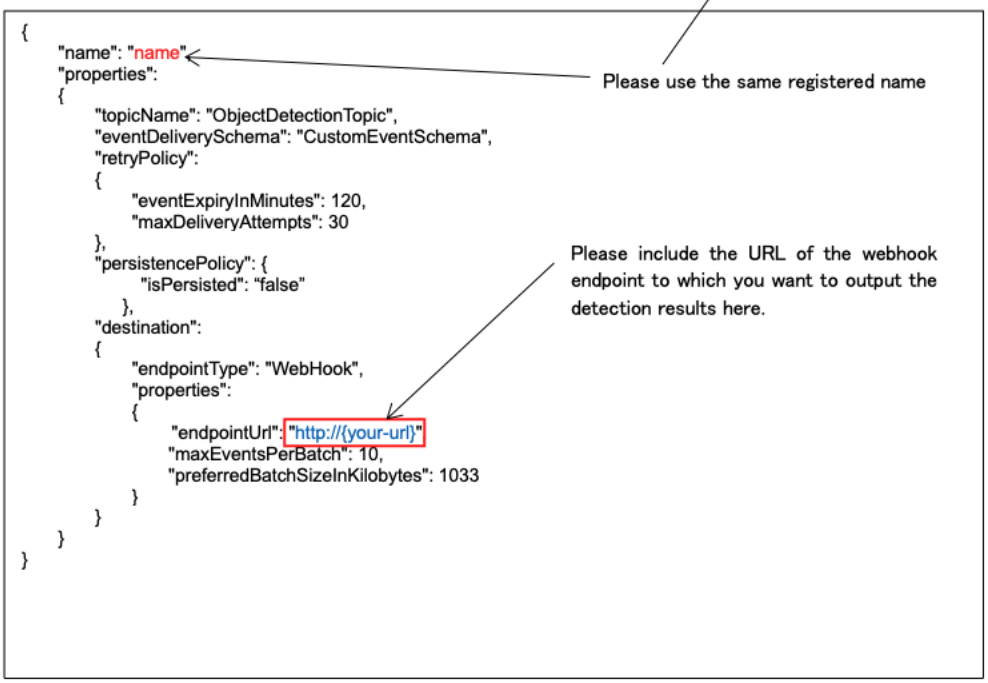
item	value
Edge Server Address	192.168.5.189
Connection Port Number	5888
Endpoint registration URL	http://192.168.5.189:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-version=2019-01-01-preview

> The name of the endpoint URL above is the registered name of the endpoint. If you want to register multiple endpoints, make sure that the registration names do not duplicate. It must also have the same name as the content listed in the registration BODY on the next page.

Registering a webhook endpoint URL PUTTs the following contents.

PUT
http://192.168.5.189:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-version=2019-01-01-preview

Header is "Content-Type" and "application/json"
The BODY of the PUT command is as follows:



How to change the webhook endpoint URL

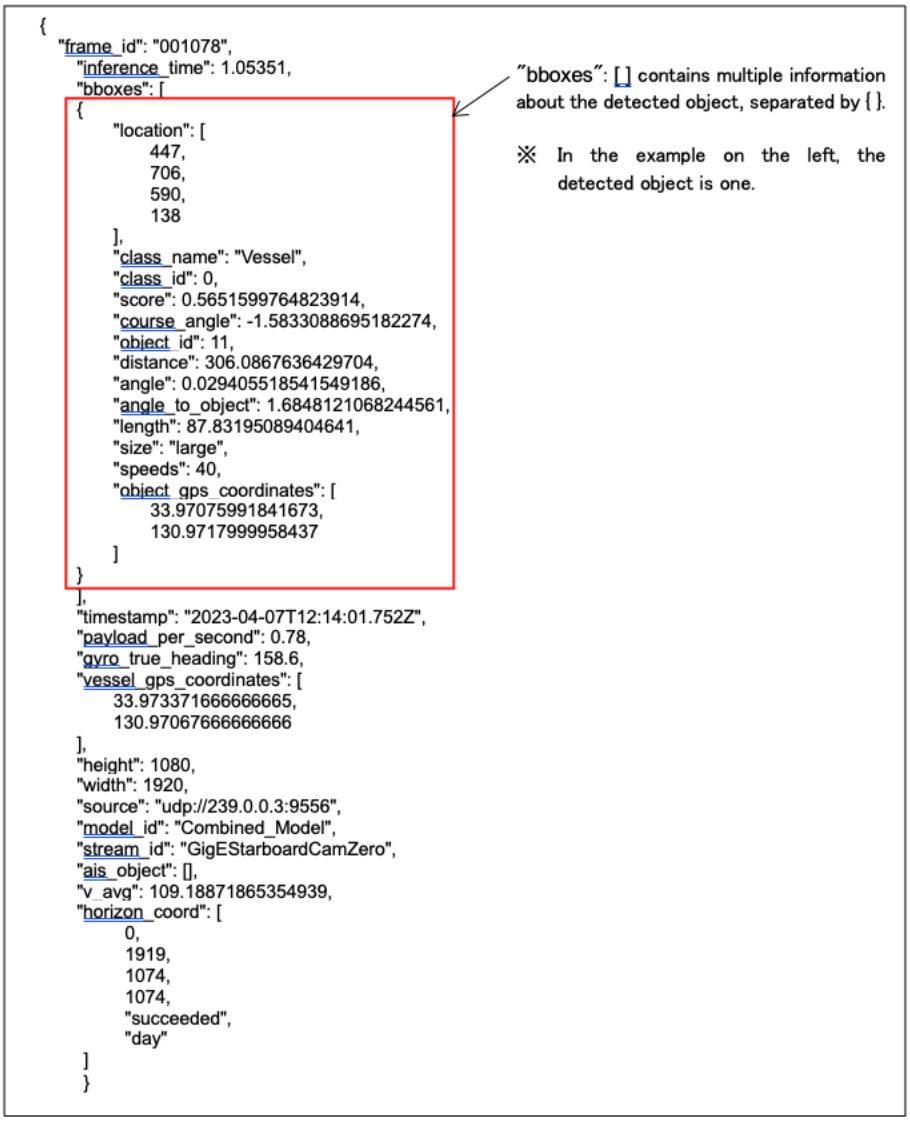
> If you change the webhook endpoint URL, delete the registration once and then register it again.
>
> Deleting a Registration
>
> DELETE
>
> http://192.168.5.189:5888/topics/ObjectDetectionTopic/eventSubscriptions/name?api-
>
> version=2019-01-01-preview
>
> After deleting the registration with the above command, re-register it as described in Section 9.1.1.

Findings

Findings

> The detection result is POSTed in JSON format to the registered webhook endpoint URL.

Example:[_Toc164433406 .anchor]#



Finding details

Detector Information bboxes[]

item	value
location[x, y, w, h]	Position of the detected object in the image x : X coordinate (Pixel) in the middle of the detector (Bounding Box) y : Y coordinate (Pixel) in the middle of the detector (Bounding Box) w : Bounding Box Width (Pixel) h : Bounding Box Height (Pixel)

item	value
class_name	Class name of the detected object (*1)
class_id	Class name number (*1)
score	Reliability score at detection
course_angle	Direction of movement of the detected object (relative angle to camera orientation: unit radian)
object_id	Identification Number of the Detected Object
distance	Distance to detection object (in m)
angle_to_object	The direction in which the detected object was captured (relative to the camera orientation: right plus, left minus: in degrees)
length	Detector length (in m)
size	Size of the detected object (less than 10 m: small, less than 10 to 50 m: medium, more than 50 m: large)
speeds	Detector speed (in km/h)
object_gps_coordinates[Lat, Long]	Coordinates of the detected object (Lat: latitude, Long: longitude)

> (*1) Class name and class ID

class_id	class_name
0	Vessel
1	Fishing_Buoy
2	Navigation_Buoy
3	Passenger_Vessel
4	Boat
5	Fishers_Facility

> Additional information

item	value
timestamp	Detection date and time (UTC)
payload_per_second	Number of Processes in 1 Second

item	value
gyro_true_heading	Heading Direction (True Direction)
vessel_gps_coordinates[Lat, Long]	Coordinates of your ship (Lat: latitude, Long: longitude)
height	Image height (pixel)
width	Image width (pixel)
source	Multicast address to receive camera footage
model_id	ML Model Names
stream_id	Camera name of the detected video (*2)
ais_object[ ]	AIS Information Multiple AIS information received at the same time is listed. (In some cases, as in this example, there may be no description.)
v_arg	Indicates the level of brightness of the image (0-255)

> *2 Camera name

Camera location	stream_id
Camera on the port side	GigEPortCamOne
Central camera	GigECenterCam
Starboard side camera	GigEStarboardCamZero

- In the case of Command Solo, there is only one camera, so only GigECenterCam.

troubleshooting

Command application launch issues

Trouble Event	Hypothetical Reasons	What to do
The command application does not start.	The version of the command application is outdated.	If the Command application version is outdated, there may be problems communicating with the edge server and it may not start. Please check the current version and contact JRCS.

Trouble Event	Hypothetical Reasons	What to do
The command application starts but shows nothing.	The edge server is not connected to the network.	Check the Wi-Fi settings of the edge server. Make sure that the edge server is connected to the Internet.
	The command application is in an abnormal state.	Command application.
	The software in the edge server is not starting.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check your internet connection and restart it.

AIS Data Display Problems

Trouble Event	Hypothetical Reasons	What to do
AIS information is not displayed.	There is a faulty connection to the cable receiving the AIS signal.	Check whether the AIS LAN cable connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The AIS signal is not output.	Please make sure that the data sent from the AIS is correct.
	The object recognition software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Visible light camera display problems

Trouble Event	Hypothetical Reasons	What to do
Visible light camera images are not displayed.	There is a poor connection between the visible light camera and the edge server.	Check whether the LAN cable of the visible light camera connected to the PoE HUB (5port) and the LAN cable of the edge server are connected to the connection defect.

Trouble Event	Hypothetical Reasons	What to do
	The visible light camera and the edge server are not communicating.	Restart the visible light camera. Unplug the LAN cable connected to port 1 of the PoE HUB (5port). The left light on each port will flash orange, and the right light will be solid green.
	The software on the edge server side is in an abnormal state.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.
The visible light camera image was displayed, but the video stopped.	The command application is no longer able to receive video.	Command application.
The visible light camera image is displayed late.	The processing load on edge servers is increasing.	Restart the Edge Server.

Sensor data display problems

Trouble Event	Hypothetical Reasons	What to do
Wind direction and wind speed data are not displayed.	There is a faulty connection to the cable receiving the signal from the wind direction anemometer.	Check whether the LAN cable of the wind direction anemometer connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The data from the wind direction anemometer has not been received.	Make sure that the NMEA data ($XXMWV) of the wind direction anemometer is output. If your ship does not have an anemometer, it will not be displayed.

Trouble Event	Hypothetical Reasons	What to do
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.
True wind direction and true wind speed data are not displayed.	Problems with the wind direction anemometer.	True wind direction and true wind speed are calculated and output by wind direction anemometer. There are also wind direction anemometers that only output relative wind direction and relative wind speed, so please check the specifications.
Latitude and longitude data are not displayed. The vessel speed data is not displayed.	There is a faulty connection to the cable receiving the signal from GNSS.	Check whether the GNSS LAN cable connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The data from the GNSS is not being received.	Make sure that the GNSS NMEA data ($XXGGA) is output.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Object recognition display problems.

Trouble Event	Hypothetical Reasons	What to do
Object recognition is not possible. (The bounding box is not displayed on the vessel that can be recognized by the visible light camera image)	The object recognition software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Display problems with your ship icon

Trouble Event	Hypothetical Reasons	What to do
There is no sign of your ship on the map. Your ship's icon doesn't move.	The map display is out of position of your ship.	 Click the arrow icon in the bottom right corner of the screen.
	The data from the GNSS is not being received.	Make sure that the GNSS NMEA data ($XXGGA) is output.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.
The bow of your ship is always facing north.	The data from the GYRO sensor is not being received.	Make sure that the NMEA data ($XXHDT) of the GYRO sensor is output.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Map display issues

Trouble Event	Hypothetical Reasons	What to do
The map is not displayed.	The map software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Labeling icon display issues

Trouble Event	Hypothetical Reasons	What to do
The labeling icon does not appear on the map.	You don’t have permission to display the labeling icon.	Please log in as a user with permission to display the labeling icon.
Unable to create a labeling icon.	You don’t have permission to create labeling icons.	Log in as a user with permission to create labeling icons.
Labeling icons can’t be removed.	You don’t have permission to remove the labeling icon.	Labeling icons can only be deleted by the user who created them. Please log in with the user who created the labeling icon.

Compass anime display issues

Trouble Event	Hypothetical Reasons	What to do
The compass ring is not moving.	There is a faulty connection to the cable receiving the signal from the GYRO sensor.	Check whether the LAN cable of the GYRO sensor connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The data from the GYRO sensor is not being received.	Make sure that the NMEA data ($XXHDT) of the GYRO sensor is output.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Trouble Event	Hypothetical Reasons	What to do
The C icon (heading) is grayed out.	There is a faulty connection to the cable receiving the signal from the GNSS sensor.	Check whether the GNSS LAN cable connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The data from the GNSS sensor is not being received.	Make sure that the GNSS NMEA data ($XXGGA) is output.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.
The T icon (true wind direction) is grayed out.	There is a faulty connection to the cable receiving the signal from the wind direction anemometer.	Check whether the LAN cable of the wind direction anemometer connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The wind direction anemometer does not correspond to true wind direction and true wind speed.	True wind direction and true wind speed are calculated and output by wind direction anemometer. There are also wind direction anemometers that only output relative wind direction and relative wind speed, so please check the specifications.
	The data from the wind direction anemometer has not been received.	Make sure that the NMEA data ($XXMWV) of the wind direction anemometer is output. *If your ship does not have a wind direction anemometer, it will not be displayed.

Trouble Event	Hypothetical Reasons	What to do
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.
The R icon (relative wind direction) is grayed out.	There is a faulty connection to the cable receiving the signal from the wind direction anemometer.	Check whether the LAN cable of the wind direction anemometer connected to the PoE HUB (5port) and the LAN cable of the edge server are missing.
	The data from the wind direction anemometer has not been received.	Make sure that the NMEA data ($XXMWV) of the wind direction anemometer is output. *If your ship does not have a wind direction anemometer, it will not be displayed.
	The sensor software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

Problems with the recording function

Trouble Event	Hypothetical Reasons	What to do
Recording fails.	The disk size that stores the recorded data is full.	Delete past recordings by displaying a list of recorded data to free up disk space.
	The recording software in the edge server is down.	Restart the Edge Server. When the Edge Server starts, the Edge Server must be connected to the Internet. Check the Internet connection and restart the edge server.

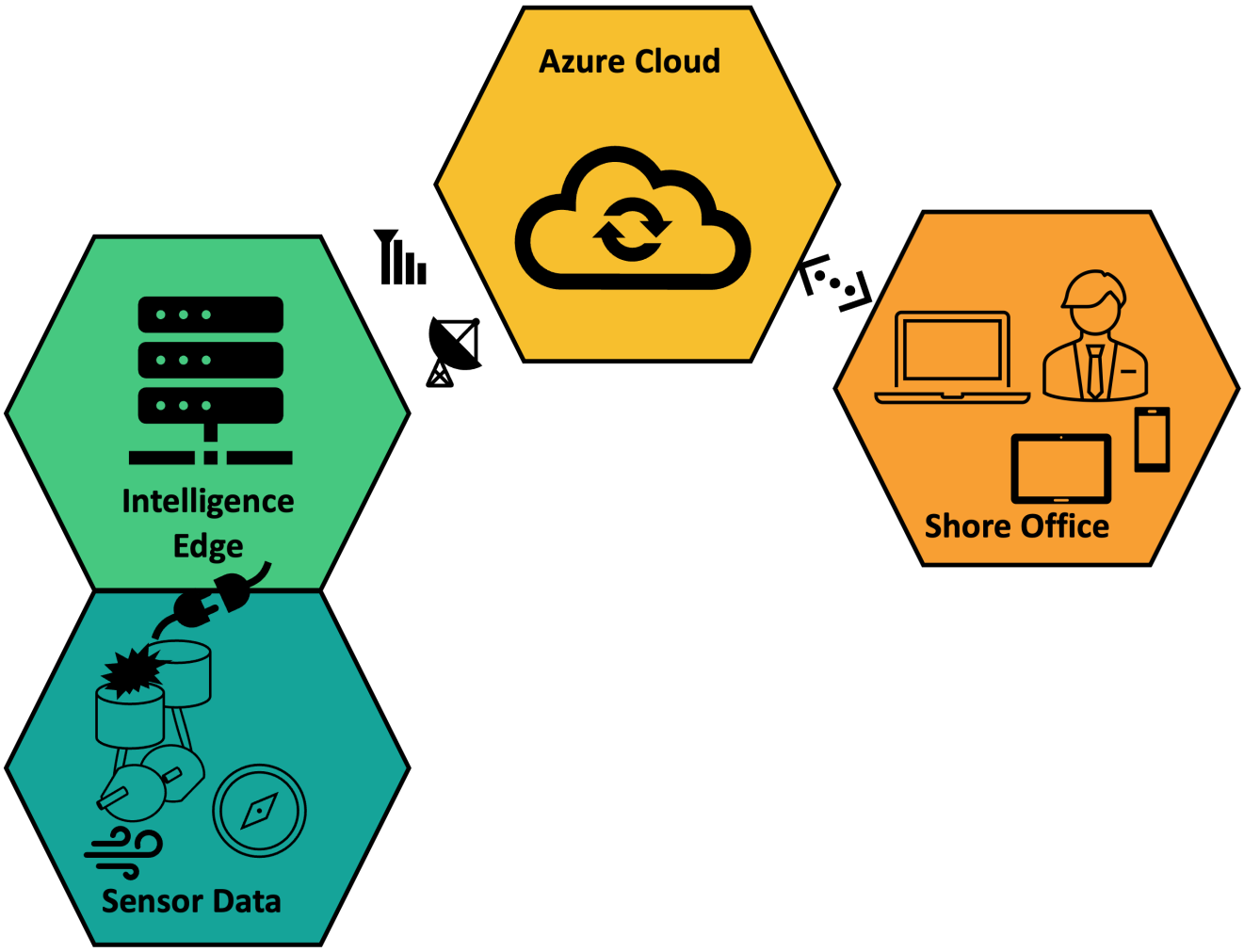
Connect

December 2024

SNo. 0001

connect

Continuous data transmission from Vessel to Shore



JRCS Co. Ltd.

Connect Specification

System Overview

infoceanus connect enables stable and secure connected vessels through ship-to-shore communications and a cloud-based platform that enables two-way communication between ships and shore. We provide solutions for visualizing and analyzing the performance information of fleets and onboard equipment. Continuous equipment condition monitoring and analysis throughout the life of a ship contributes to optimizing operation costs and preventive maintenance. Furthermore, integrating onboard equipment operation information with weather and oceanographic information enables energy-saving operation and reduced environmental impact.

Equipment specifications

For specifications and details of each equipment, please refer to "2. Component Dimensions".

1. Edge Server : Box type (1 unit)

Installation location	**Engine monitoring control room**
OS	Ubuntu Server

> It collects navigational and engine information and transmits the data to a cloud platform.

1. Switching HUB - 5 ports (1 unit)

Installation location	**Engine monitoring control room**
Specification	1Gbit port x 5

> It will be mainly used as a network for receiving engine data.

1. Switching HUB - 5 ports (1 unit)

Installation location	**Electrical equipment room**
Specification	1Gbit port x 5

> It is mainly used for receiving navigational information and for the outside ship communication network..

1. Gateway station : Box type (1 unit)

Installation location	Electrical equipment room (mounted in Engine Control Console).

> Gateway unit for collecting engine data from the Alarm Monitoring System(AMS).

Function

Build the infoceanus connect using the components in the previous section. The application uses a browser to access the platform on the cloud and displays the following information:

1. Fleet Overview Display

> The current location of each of your vessels is displayed on a map in real time.

1. Dashboard display

> Selecting a vessel’s icon on the map will display key information and data for that vessel.

1. Navigation information display

> Data from navigational instruments is acquired and the following information is displayed on the ship’s terminal in real time.

a. GNSS ： Ship’s direction and speed
b. GYRO compass ： Heading of the ship
c. Wind direction anemometer ： Wind direction and speed
d. AIS ： Information on other ships

> - Data from navigational instruments is assumed to be output to the system via serial communication or Ethernet using the NMEA communication protocol.
>
> It also displays the route taken from the previous location to the present on a map.

1. Engine information display

> The following information is displayed by obtaining engine data from the

> ship’s Alarm Monitoring System.

a. Main engine load
b. Main engine speed
c. Fuel consumption (main engine and auxiliary engines)
d. Generator power
e. Cylinder exhaust gas temperature and deviation
f. Equipment temperatures
g. Cooling water temperature
h. Equipment pressures
i. Display AIS information

> Based on the received AIS information, a list will be displayed on the screen in order of distance from the DCPA. Also, when you select a list, detailed information about AIS will be displayed.

1. Animation display

> The following information is displayed from the acquired data.

a. Compass display of heading and wind direction (true and relative)
b. Load diagram, power curve, generator power
c. Power curve
d. Trend graph display

> The following information is displayed from the acquired data.

a. Main engine load
b. Cylinder deviation, exhaust gas temperature
c. Cooling water temperature
d. Cylinder temperature, exhaust gas temperature
e. Temperature (various temperatures)
f. Pressure (various pressures)
g. Generator power
h. Trend graph comparison

> You can specify the trend graphs of the main engine and generator for a specified period (year, month, day, hour, minute), and compare the trend graphs for that period.
>
> You can also compare with trend graphs of other ships, not just your own ship.

1. Alarm display

> Displays the alarm details, alarm history, and operation log of the ship's Alarm Monitoring System.

1. Display list of channel

> Displays real-time channel data from the ship's Alarm Monitoring System.

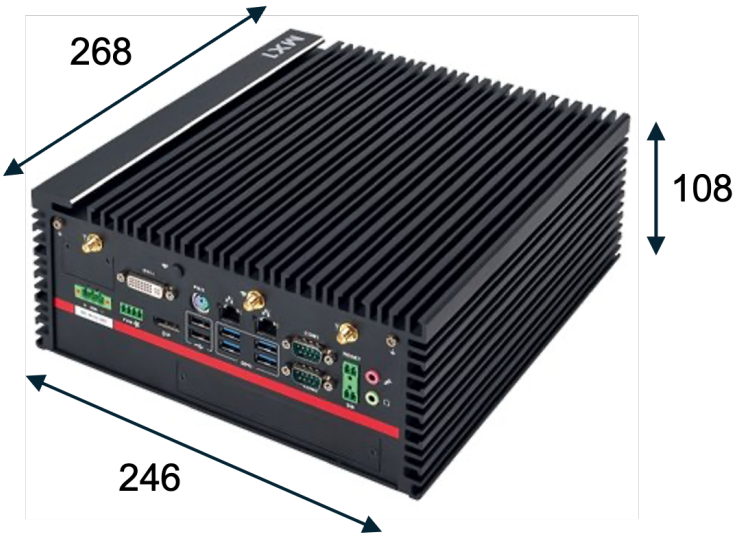
Component Dimensions

Component Lists

No	Item	Specification		Qty	Remarks
1	Edge Server	Input voltage: OS: CPU: RAM: HDD: LAN: Weight:	DC9V-48V Ubuntu 2.2 Intel Core i7-8700(3.2GHz) 32 GB SSD 1TB 1GbE x 2 6.9 kg	1	AC adapter included
2	Switching HUB (5 port)	Input voltage: MPC Ports: Weight:	AC100～240V(50/60Hz) 2.66 W 1GbEx5 290 g	2	AC adapter included

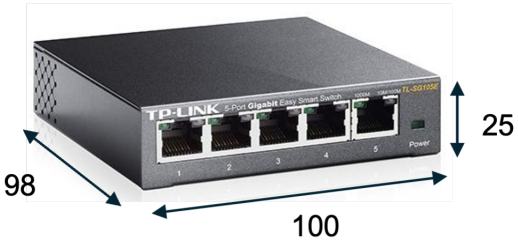
No	Item	Specification		Qty	Remarks
3	Gateway station	Input voltage: MPC: Interface: Weight:		1	

Edge Server



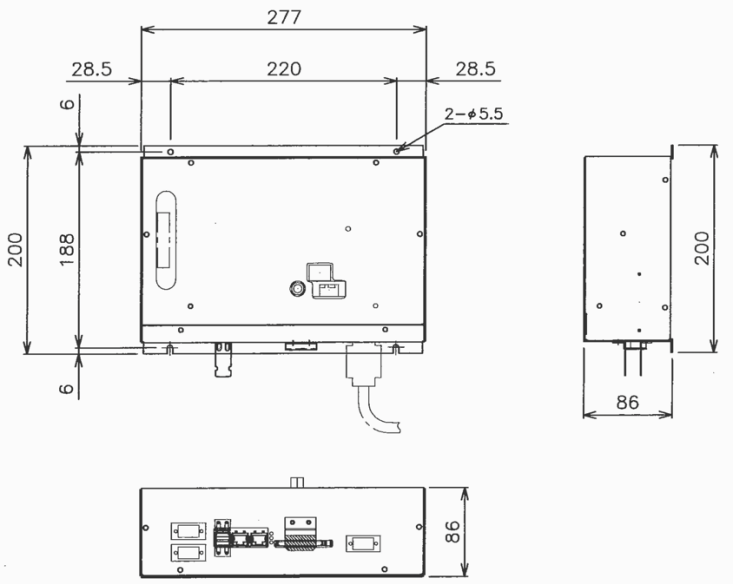
Unit	Color
mm	Black

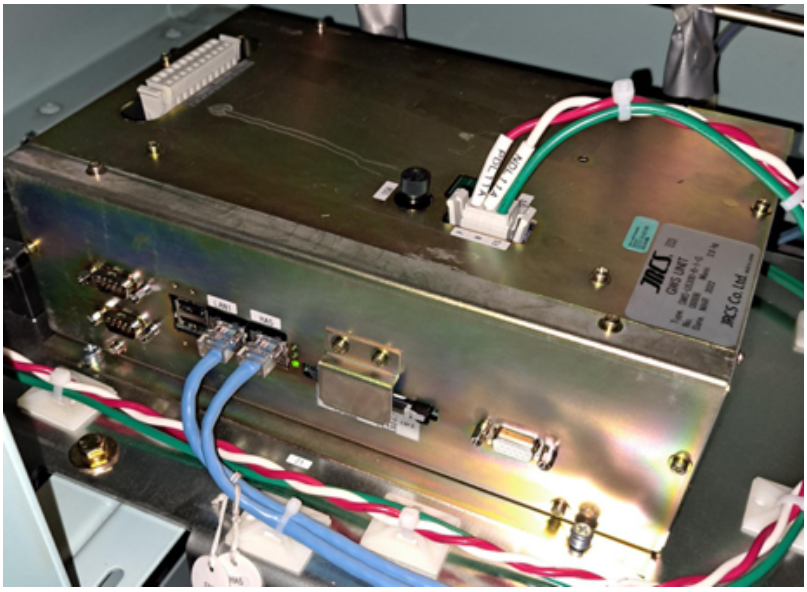
Switching HUB



Unit	Color
mm	Black

Gateway station





Unit	mm
Color	Gold

System configuration

Equipment configuration diagram

infoceanus connect

equipment

ECC

Alarm Monitoring System(AMS)

JRCS HUB-A

（built into ECC）

↑ ↓ Internet connection

↓ Navigational

information

↑ engine data

VSAT

VDR

192.168.51.44

SW HUB(5 port)

SW HUB(5 port)

192.168.51.42

(VSAT RACK)

GWS

192.168.51.41

(NAV. & RADIO LKR)

Edge Server

192.168.51.40

Connection diagram

In the connection diagram shown, the cables marked with solid lines are under the control of JRCS, but due to equipment placement and cables marked with dotted lines that go through walls are under the jurisdiction of the shipyard.

【Notation explanation】

記号表記	内容
	Equipment under the control of JRCS
	Equipment outside the control of JRCS
	Cable under the control of JRCS
	Cable outside the control of JRCS
	Wall outlet
	Outlet attached to the equipment, AC adapter
	LAN cable under the control of JRCS
	LAN cable outside the control of JRCS

Power supply diagram

LAN cable

LAN cable

LAN cable

AC220V

Outlet

RECEPTACLE

AC220V

Outlet

VSAT

RACK

VDR

SW HUB

SATELITE

COMMUNICATION

SW HUB

LAN4

AC100/220V

ADAPTER

AC100/220V

LAN Cat5e

LAN3

LAN3

EDGE SERVER

LAN Cat5e

LAN1

LAN1

P N FG

HA6

4 FG 3

NOISE FILTER

HA6

HUB-A

LAN Cat5e

GWS

Alarm Monitoring System

LAN4

Solid line equipment and cables are under the control of JRCS.

Dotted line equipment and cables are outside the control of JRCS.

Connect Installation

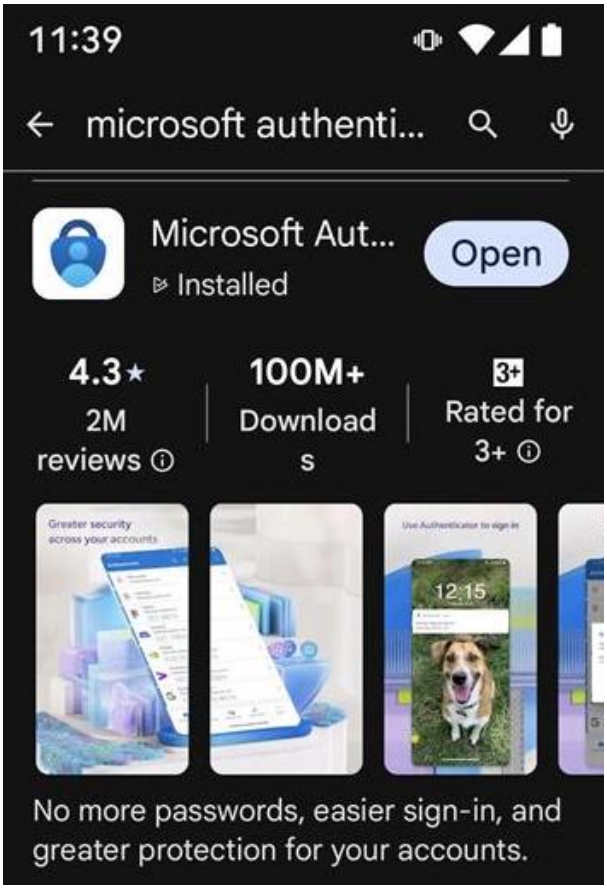
COMING SOON

Connect User Guide

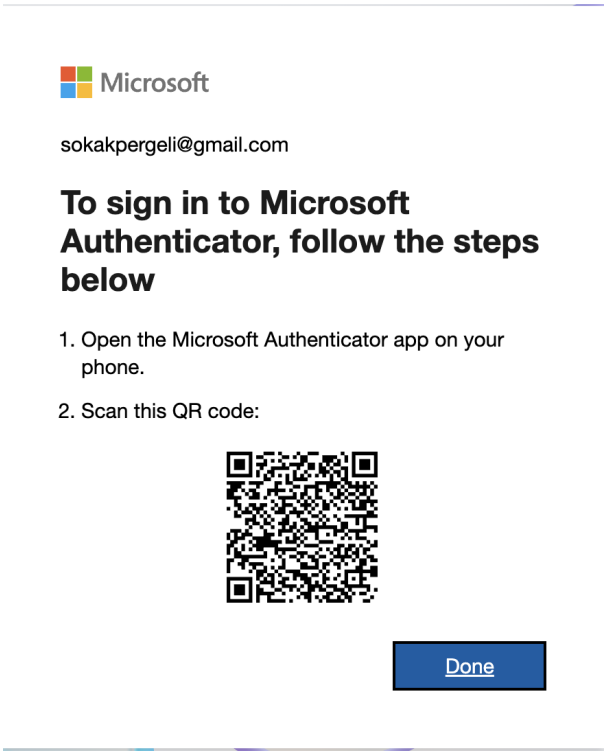
infoceanus connect registration

Create a Microsoft account and setup Microsoft Authenticator

1. Go to the official Microsoft page at https://account.microsoft.com/.
2. Click "Create a Microsoft account".
3. Enter your email address.
    - Please enter your company’s email address.
4. Enter an arbitrary password (at least 8 alphanumeric characters) and click "Next". *We recommend that you write down your password.
5. The Microsoft Account Team will send you a 4-digit security code to your email.
6. Enter the security code.
7. Enter the characters that appear in the image. This completes the creation of a Microsoft account.
8. Select "Security" on your microsoft account page and click Two-step verification.
9. Select Microsoft Authenticator as the verification method.
10. Download the Microsoft Authenticator app from the App Store or Google Play.



1. Open the app and tap "Add account".
2. Select "Work or school account".
3. Use your phone’s camera to scan the QR code displayed on your computer screen.



User registration on infoceanus platform

In order to start using the service, we will ask you to contact us with your account information for the vessel and the user.

1. Vessel Name: ABC Maru （Ship building / SNo. / IMO No）
2. Account Information (E-mail Address): sample@abc.com
    - Your account must be registered with a Microsoft account.

How to start using infoceanus connect

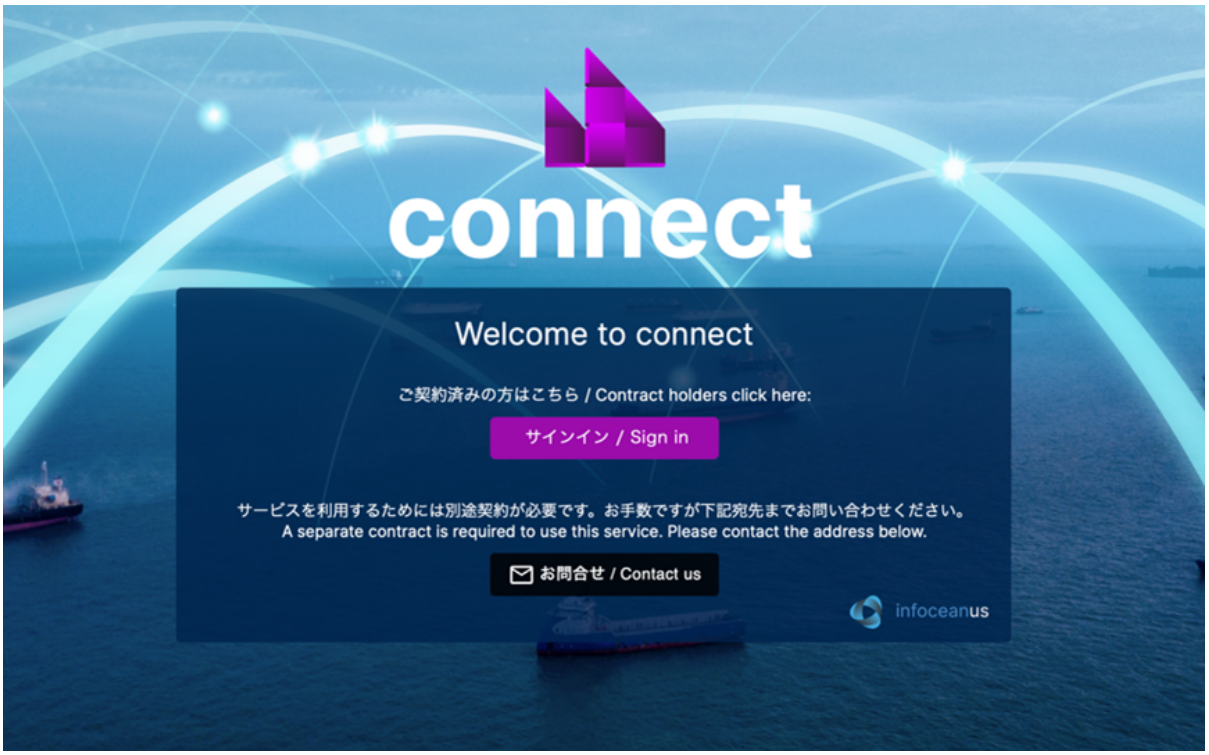
After your account is registered, you will receive an email from Microsoft as in below:

Please follow the instructions in the email to complete your registration by clicking infoceanus connect url: https://infoceanus.connect-jrcs.com/.

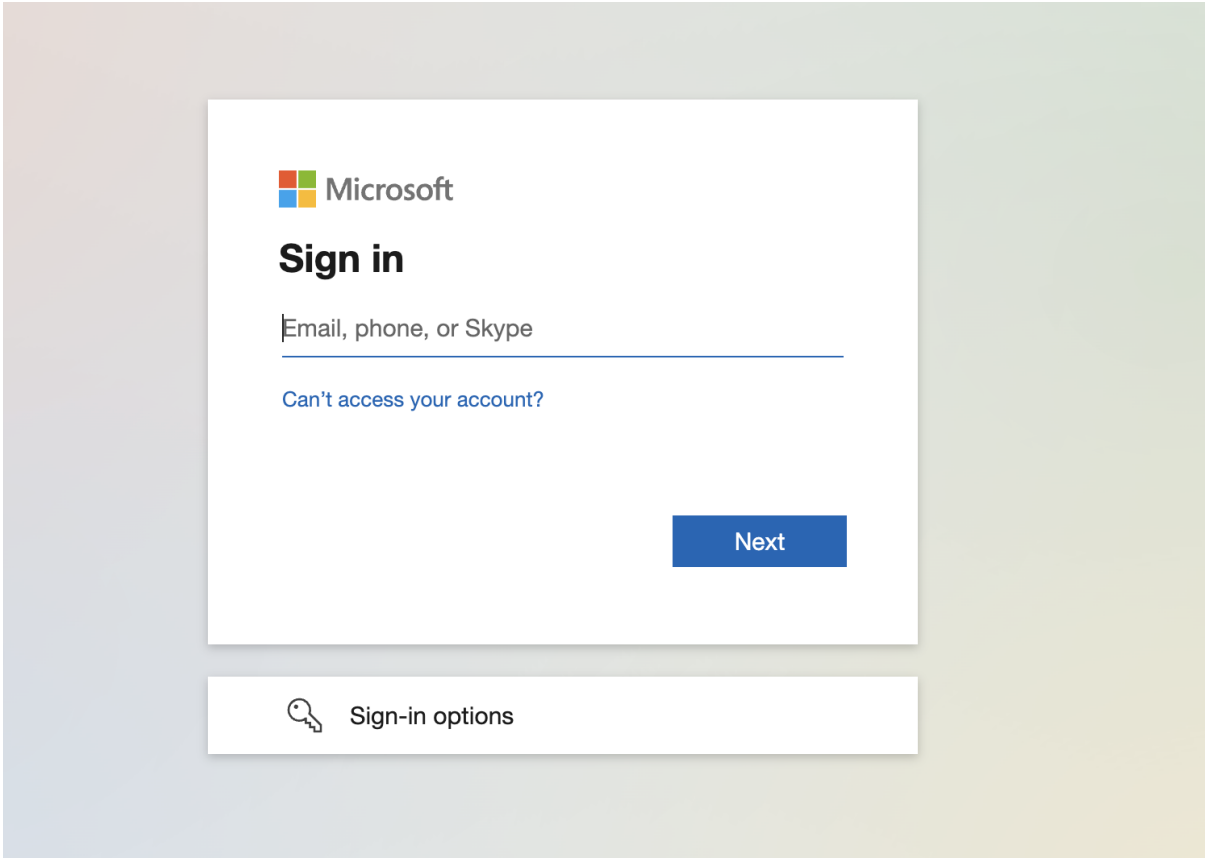
How to use Microsoft Authenticator for infoceanus connect

When you log in to infoceanus connect, you will be asked to verify your identity using the Microsoft Authenticator app.

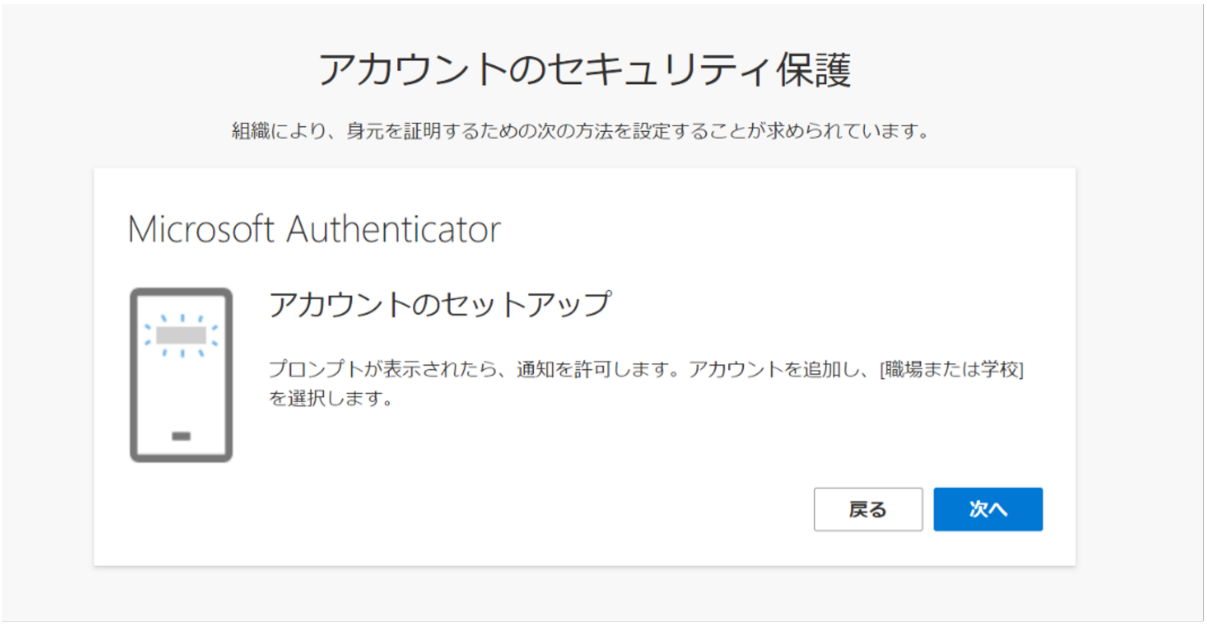
1. Log in to the Connect app



2. Sign in to you microsoft account

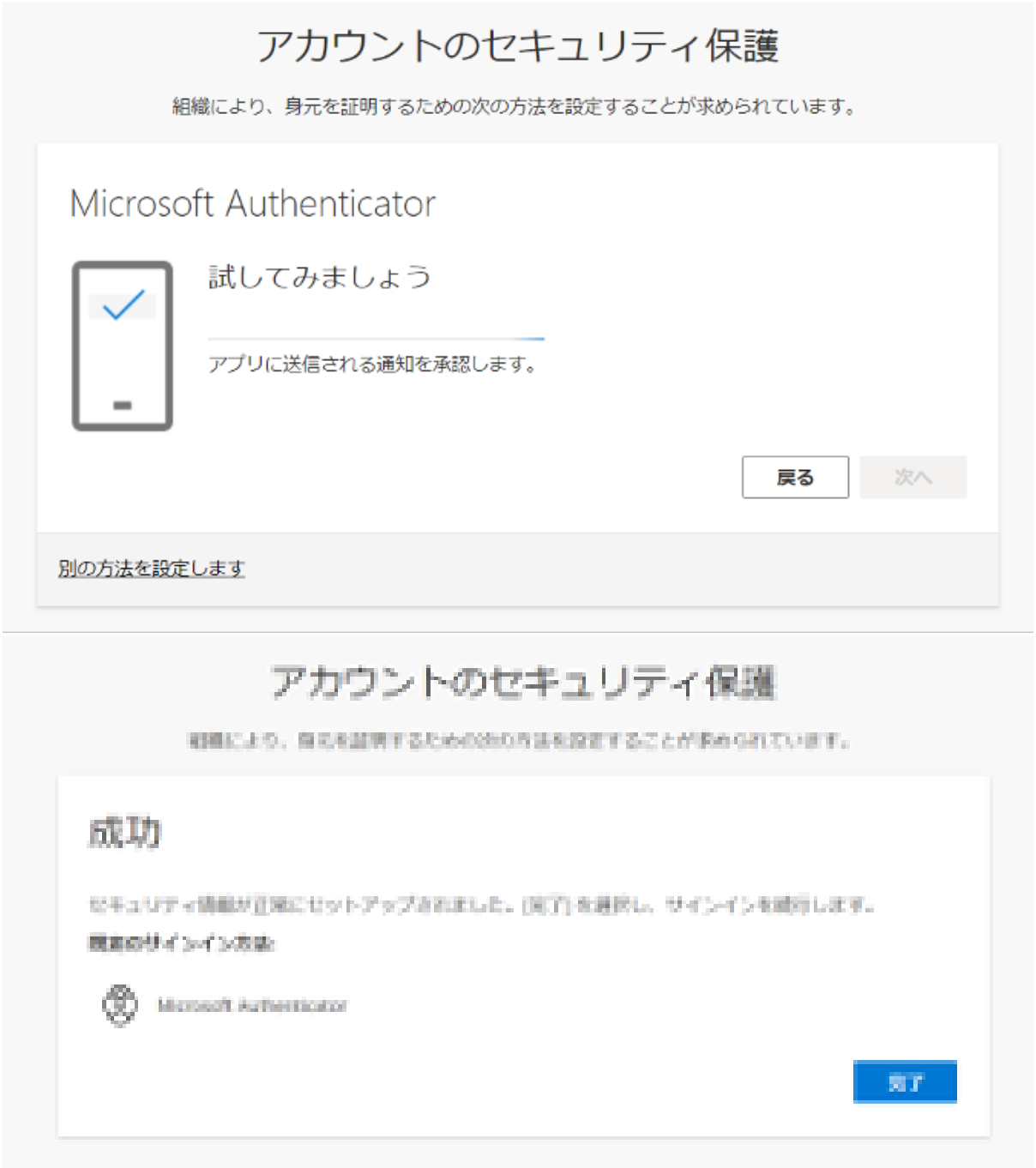


3. Set up your Microsoft Authenticator app
   - If you have not set up the Microsoft Authenticator app, you will be prompted to do so.

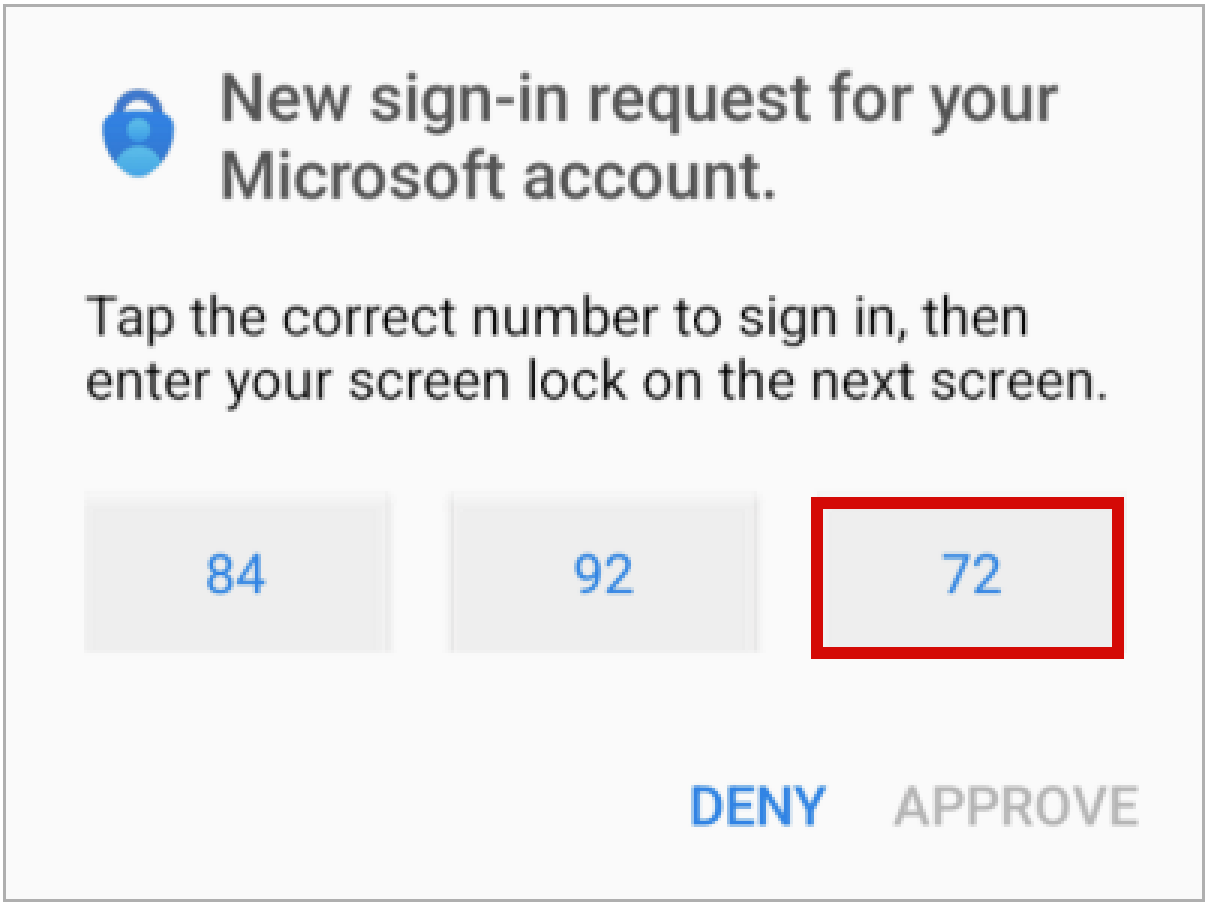


4. Use your phone's camera to scan the QR code displayed on your computer screen.

5. Complete authenticator setup



6. On your mobile device, open Authenticator, or tap the New sign-in request notification.
   - Note: If you're a work or school account user, you may need to unlock Authenticator before confirming sign-in.
7. Tap or enter the corresponding number, then Approve.



infoceanus connect screens

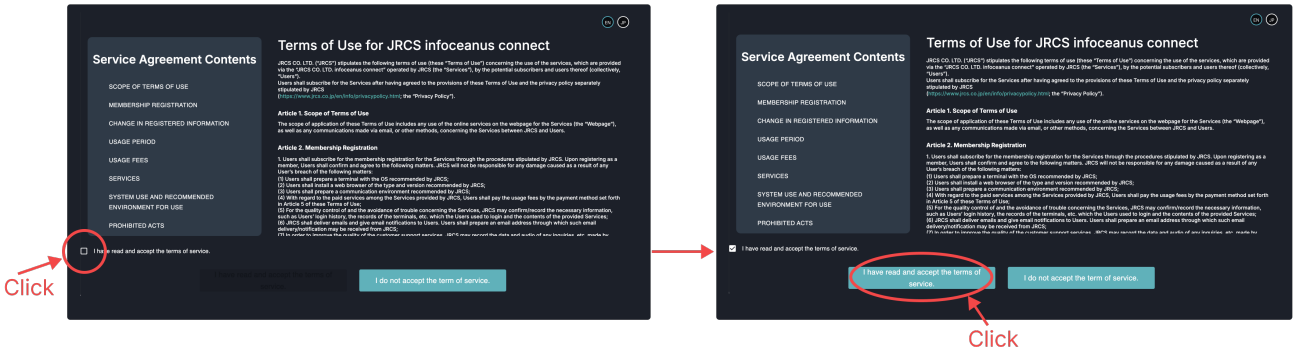
Terms & Conditions

The launch the infoceanus connect application, open the following URL in your browser:

URL: https://infoceanus.connect-jrcs.com

The supported browsers are the following: ① Microsoft Edge ② Google Chrome ③ Apple Safari

The first time you open the URL, you will be asked to accept the terms of use. Scroll down to the end of the screen and check the checkbox of “I accept the terms of use”, and then click the button “I accept the terms of use”. If you have already accepted the terms of use, you will be redirected to fleet monitoring page.



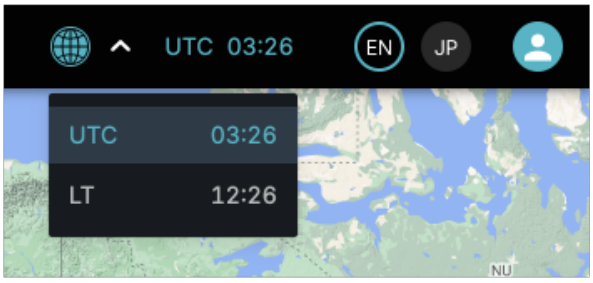
Top Bar

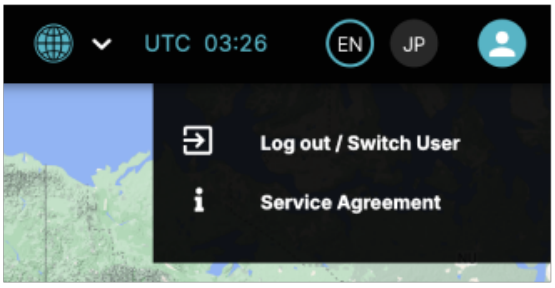
All infoceanus connect pages have a common top bar for navigation.

On the left side of the top bar, the name of the current screen and the vessel selection can be found. Clicking on the vessel selection shows a dropdown menu with all available vessels. Click to select a vessel.

(PICTURE)

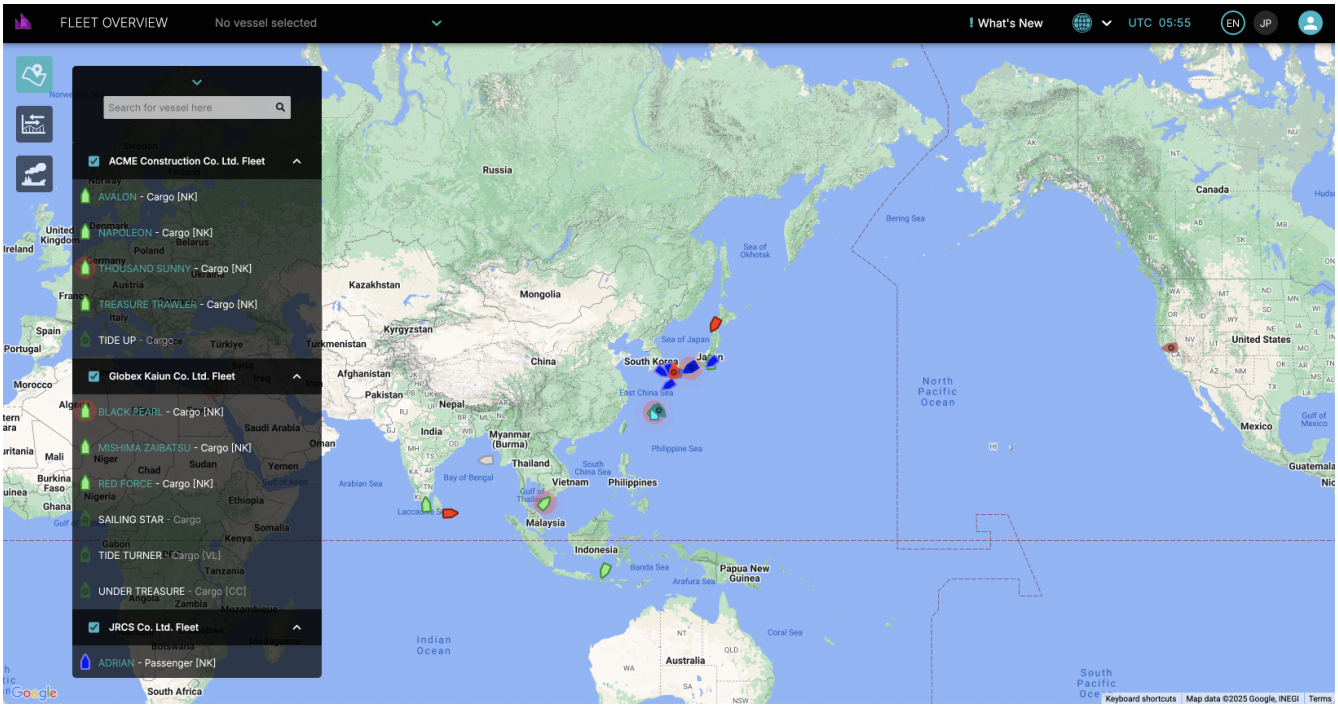
The right side of the top bar displays the current date and time (UTC: Universal Standard Time and LT: Local Time). You can switch between English language and Japanese language by clicking on the EN and JP buttons. The circled button is the active language. Clicking on the user profile icon lets you switch or log out as well as show the terms of conditions.





Fleet Overview Screen

After the login, the fleet overview page shows the vessels related to the users affiliation in the map as well as in list from on the left side.

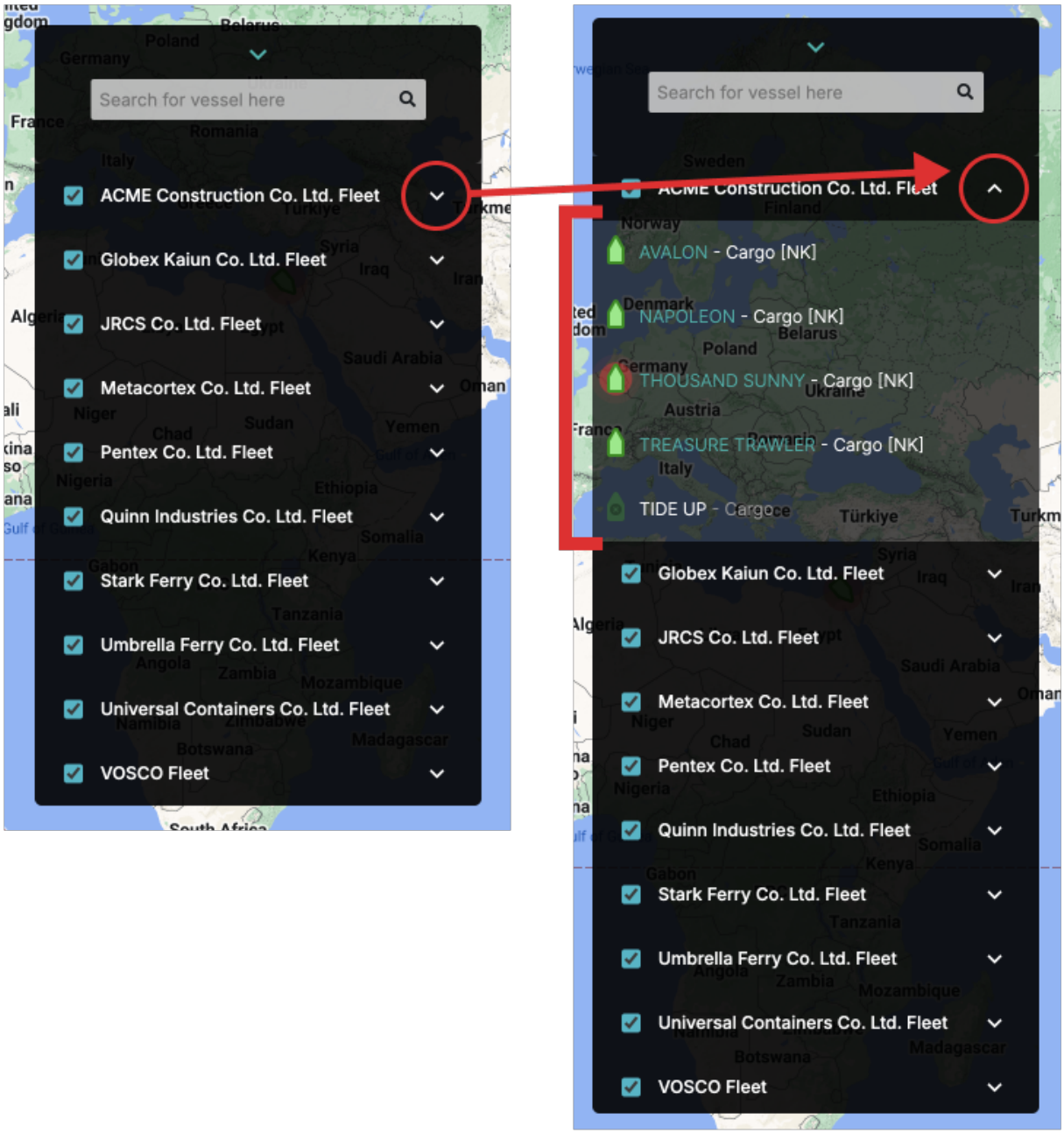


There are 3 ways to select a vessel.

1. You can click the drop down from the top menu to display the vessel list and select a specific vessel by clicking on it. (Search and select by name)
2. Select the target vessel by clicking on it via the displayed vessel list on the screen. (Search and select by name)
3. Click on the vessel icon on the map. (Search and select by location)

(PICTURE)

The displayed vessel list features the otion to select vessel sorted by companies. You can open and close certain companies to not display the vessels in the list. Vessels from selected companies (only closed via the arrow, checkbox is selected), are still shown on the map.



Deselecting the company checkbox will hide all vessels from that specific company from the map.

A vessel that is shown greyed out with a little (x) in the middle is currently offline and cannot be reached.

Vessels on the map and icon meanings

Vessels are represented by pentagon shaped icons on the map. Their sharpest point is the front/bow of the vessel and shows the direction of heading.

The colors of the vessel categories are defined as follows:

Vessel Icon Color Identifiers

Icon Color	Vessel Category
green	Cargo Vessels
red	Tankers
blue	Passenger Vessels
yellow	High Speed Craft
light blue	Tug & Special Craft
orange	Fishing
pink	Pleasure Craft
grey	Unspecified Ships

When selecting a vessel, a quick summary of vessel information will be displayed on the side of the screen.

Display information	Content
Vessel picture	Photo of the target ship
Vessel’s flag	Region of the ship
Vessel name	Name of the vessel
IMO No.	International Maritime Organization Registration Number
Vessel type	Type of vessel
Call sign	Vessel’s signal letters
MMSI No.	Maritime Mobile Service Identification Number
Ship Class	International class given by classification societies
Destination	Current destination
Estimated time of arrival	Estimated time of arrival at destination
Ship speed	Current ship speed over the ground
Ship position	Current position (latitude, longitude)
True wind speed	True wind speed at current position
True wind direction	True wind direction at current position

Display information	Content
Local time	Local time at current position
Local weather	Weather and temperature at current position
Sea water temperature	Sea water temperature at current position
Main engine basic data	• Main engine load: Current load factor of main engine • Main engine RPM: Current RPM of main engine • Main engine fuel consumption: Fuel consumption of main engine/day • Auxiliary engine fuel consumption: Fuel consumption of auxiliary engine/day
Alarm data	• Number of alarms: Number of alarms currently occurring • Number of alarms paused: Number of alarms currently paused
Cylinder deviation, exhaust gas temperature (※1)	Exhaust gas temperature deviation of main engine cylinder: 24h Numerical and graphical display
Generators (※1)	• Power: Power consumption of each generator (numerical and graphical display) • Load %: Load factor of each generator • Operating time: Operating time of each generator

※1） Generally, the above items are displayed, but the displayed information may differ depending on the type of ship.

Connect Troubleshooting

How to start and shutdown the system

How to start the system

> The Edge Server will automatically start when the power is turned on. To turn on the power, press the power button as shown below.

1. An Internet connection is required to start the Edge server. Before starting the system, please make sure that you can connect to the Internet.

> Press the power button on the front operation panel shown below.
>
> 
>

How to shut down the system

This system is designed to operate continuously and should only be shut down in emergency or other specific situations. However, if you need to shut it down, press and hold the power button until the light on the main unit goes out. The system is now shut down.