ECDIS
HAND BOOK

Electronic Chart Display and Information System

» From 2012 onwards to 2018

Planned route

Own ship's information

AIS information

FURUNO

ECDIS

Electronic Chart Display and Information System

HAND BOOK
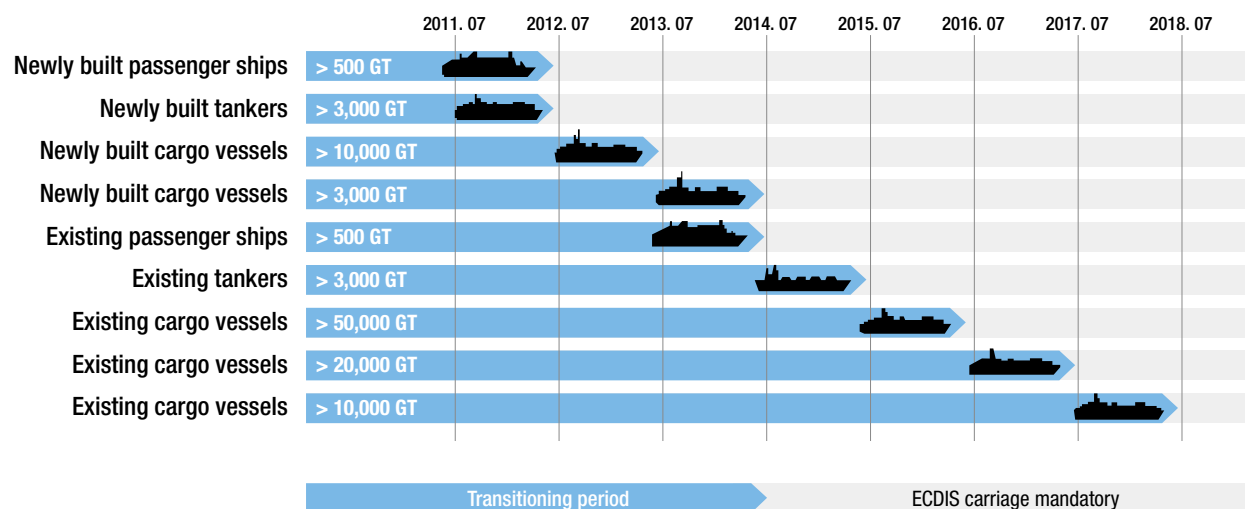
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Introduction

How to get ready for the ECDIS carriage requirement?

The first step is to determine the effect on your fleet, when your vessels have to be ready to comply with the new carriage requirement. From 2012 onwards to 2018 all IMO vessels over 10,000 GT on top of other vessel types specified in the table below are requested to install and operate ECDIS. Please refer to the below overview to find the implementation schedule for your vessels. Vessels may be exempt from this obligatory carriage of ECDIS if they are taken out of operation in less than two years after the implementation date.

Implementation schedule for mandatory carriage ECDIS

At the NAV-54 work group assembly in 2008, IMO has decided to make ECDIS mandatory for all IMO vessels > 3,000 GT (passenger vessels > 500 GT) with a transitioning period as shown below.
The new carriage requirement is for one ECDIS with suitable back up arranagements, which can be fulfilled either by a type-approved backup ECDIS or official, up-to-date paper charts.

		2011. 07	2012. 07	2013. 07	2014. 07	2015. 07	2016. 07	2017. 07	2018. 07
Newly built passenger ships	> 500 GT								
Newly built tankers	> 3,000 GT								
Newly built cargo vessels	> 10,000 GT								
Newly built cargo vessels	> 3,000 GT								
Existing passenger ships	> 500 GT								
Existing tankers	> 3,000 GT								
Existing cargo vessels	> 50,000 GT								
Existing cargo vessels	> 20,000 GT								
Existing cargo vessels	> 10,000 GT								

Transitioning period — ECDIS carriage mandatory

Approval from the Authorities on compliance of mandatory carriage of ECDIS

The implementation of ECDIS installation onboard vessels will need to be type-approved and they have to issue a certificate of compliance which is used by the classification society, the port state control and vetting administration to ensure that the vessel is in full compliance with the requirement to carry type approved ECDIS with suitable back-up facilities. In some cases you can expect that port state control or vetting administration will verify if the crew is properly trained and has a sufficient understanding of the operation of ECDIS.

General overview of the FURUNO ECDIS

Why choose ECDIS?

Besides that ECDIS will become a mandatory system onboard vessels, the implementation and use of ECDIS provides a wide range of advantages. It makes the voyage planning easier by allowing optimization according to time, speed and other parameters, and any modification is accomplished by a simple drag and drop action or by a click and inserting a modified value. It gives a reason for better safety in the voyage planning by taking the ship's draft into consideration when planning the route and combine this with dangerous areas or areas of special attention. Part of the planning job is the chart management, and this is made easier by using official electronic navigation charts (ENC) or ARCS. Updating charts can be done either from a CD-ROM/DVD received from the chart vendor or via satellite using an intermediate PC onboard or through a direct connection to the ECDIS through Service Gateway. If additional charts are required they can be bought via e-mail or from the internet, while onboard. This all saves time and resources on the bridge, which can be used for other important tasks.

When performing the voyage the navigator can be advised by the ECDIS if he is in his planned track and if he is approaching shallow water and dangerous areas. The ECDIS monitors the data received from the many navigation data sensors connected to the ECDIS and the ECDIS validates the data and emits a warning signal or alarm in case ECDIS detects that navigation data are corrupted. In addition, the ECDIS can be preprogrammed to indicate to the navigator on watch if the vessel has reached a position or area which require special attention by the navigator or planned actions.

The ECDIS logs the navigation data and chart usage during the voyage and this data is available for reporting after the voyage is finished.
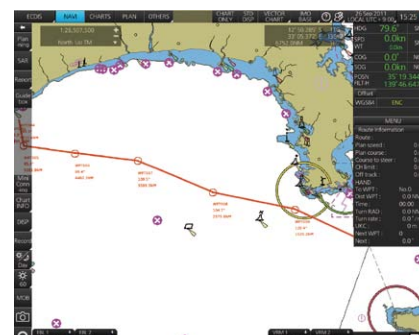
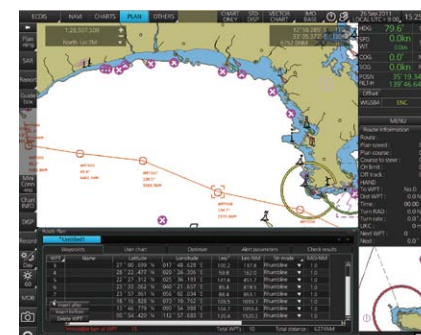### FURUNO ECDIS FEA-2107/2807
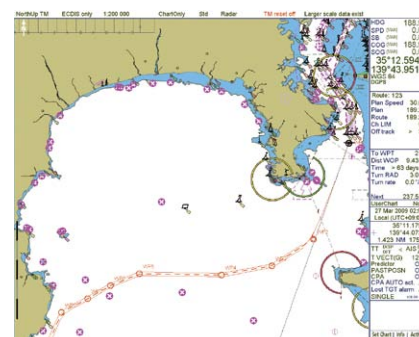
Route monitoring
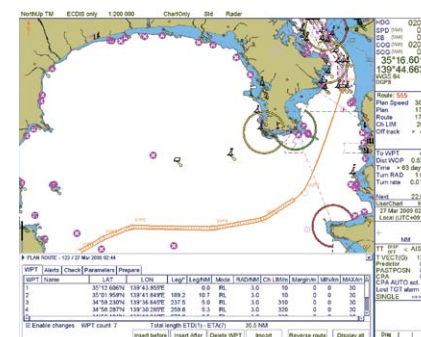
Route planning

FURUNO ECDIS FMD-3200/3300 `NEW`

Route monitoring

Route planning

FURUNO ECDIS solutions

Features of FURUNO ECDIS

▸ Compatible with IMO MSC.232(82), IMO A.694(17), IEC 61174 Ed. 3, IEC 61162-1. Ed. 4, IEC 61162-2. Ed.1, IEC 62288 Ed. 1

▸ Navigation data overlay, including ship's position, heading, speed and others to facilitate safe and efficient navigation

▸ Radar and AIS overlay Radar TT as well as AIS targets can be displayed for enhanced situation awareness

▸ Route planning applicable both to Mercator's sailing and great-circle sailing

▸ 19"/23.1" high resolution SXGA/UXGA color LCD

▸ True Motion and Relative Motion orientations available

FEA-2107 (19″LCD) FEA-2807 (23.1″LCD)

▸ **Compatible cartography**
  · IHO/S-57 Edition 3 vector chart (IHO S-63 ENC data protection scheme)
  · ARCS raster chart
  · C-MAP ENC

▸ **Network expandability with radar, autopilot and other navigation sensors**
  Up to four radar systems and ECDIS can be networked via 100 Base-TX Ethernet, and navigation sensors and autopilot can be incorporated through LAN adaptors using serial communication.

▸ **Ergonomically designed control panel provides ease-of-use**

FMD-3200 (19″LCD) FMD-3300 (23.1″LCD)   *Available from spring 2012*

▸ **Compatible Cartography**
  · IHO/S-57 Edition 3 vector chart (IHO S-63 ENC data protection scheme)
  · ARCS raster chart   · C-MAP ENC

▸ **Multifunction display capability available, featuring ECDIS, conning information display, radar* and alert management system (AMS)****

  * Radar sensor is to be required.
  ** Radar and AMS display capability is to be implemented as software update.

▸ **FURUNO's new user interface delivers straightforward operation, very much like PC-based operation scheme**

▸ **Instantaneous chart redraw delivered by FURUNO's advanced chart-drawing algorithm**

▸ **Simplified cabling in sensor-to-ECDIS interface thanks to Sensor Adaptor**

▸ **Interface with Jeppesen Dynamic Licensing service**

FEA-2107/2807

Control Unit	Trackball Control Unit	Display Unit
RCU-018	**RCU-015**	**MU-190/231**

FMD-3200/3300

Control Unit	Trackball Control Unit	Display Unit
RCU-024	**RCU-026**	**MU-190/231**

System configurations

General Preparation for Mandatory ECDIS

Diagram for Standalone ECDIS Configuration

▶ Up to date paper chart covering the area of operation required

ECDIS Model FEA-2107/FEA-2807

Control Unit

Display Unit
MU-201CE/
231CE

RCU-018
or

Processor Unit
EC-1000C

RCU-015

Conning Monitor

IMO Radar*

FAR-21x7series
FAR-28x7series

*Up to four systems can be connected

HUB
HUB-100

LAN Adapter
EC-1010

With 8 ports
*Up to two LAN
adapters connectable

B Adapter
EC-1020

AIS
FA-150

GPS Navigator
GP-150

Echo Sounder
FE-700

Doppler Speed Log
DS-60

Autopilot
Alarm System
Route Backup
Anemometer
Gyrocompass
Water Temp Indicator
etc.

Gyrocompass (Synchro)
Log (200 p/nm)
Alarms
Analog Sensors

ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024
or

Display Unit
MU-190/MU-231

RCU-026

Processor Unit
EC-3000

Conning Monitor

IMO Radar

Models
FCR-21x9 series
FCR-28x9 series

Intelligent HUB
HUB-3000

Switching HUB
HUB-100

Sensor Adaptor
MC-3000S/3010A/
3020D/3030D

AIS
FA-150

GPS Navigator
GP-150

Echo Sounder
FE-700

Doppler Speed Log
DS-60

Autopilot
Alarm System
Route Backup
Anemometer
Gyrocompass
Water Temp Indicator
Log (200 p/NM)
Rudder Indicator
etc.

Minimum configuration

Optional/Connectable equipment

As part of the preparation you will also have to consider the back-up arrangement for ECDIS if you want to have your fleet operate without paper charts. Another possibility is to upgrade your bridge system to include additional functions such as TCS made possible by ECDIS. The installation and operation of ECDIS has to be approved by the flag register.

The back-up arrangement can be either up-to-date paper chart folio covering the area of operation or an additional ECDIS. When using a back-up ECDIS, it is required to be mounted in the main bridge. By using single or dual ECDIS solution, you can benefit from the easy chart management and update as well as the increased safety provided by the ECDIS. Below system diagrams show the two solutions which have been described.
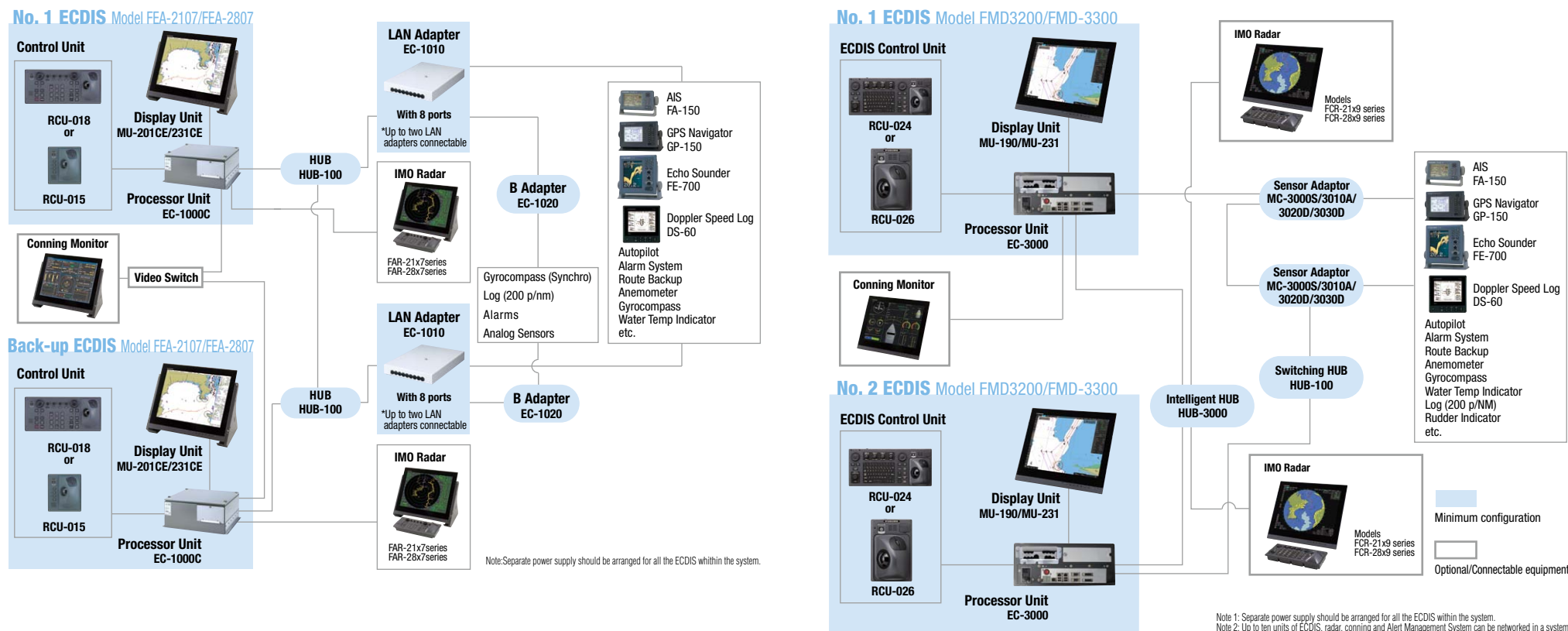
Diagram for Dual ECDIS Configuration
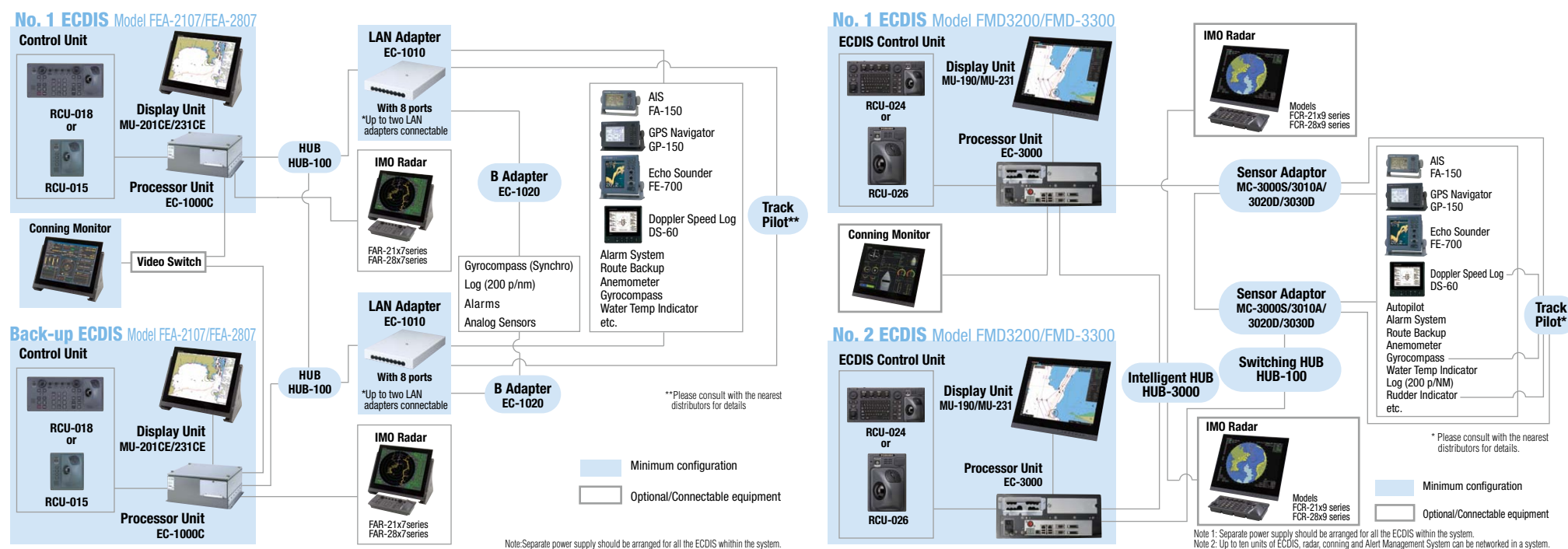
▶ For paperless operation

No. 1 ECDIS Model FEA-2107/FEA-2807

Control Unit

RCU-018 or RCU-015

Display Unit MU-201CE/231CE

Processor Unit EC-1000C

Conning Monitor

Video Switch

HUB HUB-100

LAN Adapter EC-1010
With 8 ports
*Up to two LAN adapters connectable

IMO Radar
FAR-21x7series
FAR-28x7series

B Adapter EC-1020

Gyrocompass (Synchro)
Log (200 p/nm)
Alarms
Analog Sensors

AIS FA-150
GPS Navigator GP-150
Echo Sounder FE-700
Doppler Speed Log DS-60
Autopilot
Alarm System
Route Backup
Anemometer
Gyrocompass
Water Temp Indicator
etc.

Back-up ECDIS Model FEA-2107/FEA-2807

Control Unit

RCU-018 or RCU-015

Display Unit MU-201CE/231CE

Processor Unit EC-1000C

HUB HUB-100

LAN Adapter EC-1010
With 8 ports
*Up to two LAN adapters connectable

B Adapter EC-1020

IMO Radar
FAR-21x7series
FAR-28x7series

Note:Separate power supply should be arranged for all the ECDIS whithin the system.

No. 1 ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024 or RCU-026

Display Unit MU-190/MU-231

Processor Unit EC-3000

Conning Monitor

IMO Radar
Models FCR-21x9 series FCR-28x9 series

Sensor Adaptor MC-3000S/3010A/3020D/3030D

Sensor Adaptor MC-3000S/3010A/3020D/3030D

Switching HUB HUB-100

AIS FA-150
GPS Navigator GP-150
Echo Sounder FE-700
Doppler Speed Log DS-60
Autopilot
Alarm System
Route Backup
Anemometer
Gyrocompass
Water Temp Indicator
Log (200 p/NM)
Rudder Indicator
etc.

No. 2 ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024 or RCU-026

Display Unit MU-190/MU-231

Processor Unit EC-3000

Intelligent HUB HUB-3000

IMO Radar
Models FCR-21x9 series FCR-28x9 series

Minimum configuration

Optional/Connectable equipment

Note 1: Separate power supply should be arranged for all the ECDIS within the system.
Note 2: Up to ten units of ECDIS, radar, conning and Alert Management System can be networked in a system.

System configurations

General Preparation for Mandatory ECDIS: Possibility through ECDIS integration to the navigation bridge

Interconnection Diagram for Dual ECDIS with Track Control System

▶ For Paperless operation

No. 1 ECDIS Model FEA-2107/FEA-2807
- Control Unit
  - RCU-018 or
  - RCU-015
  - Display Unit MU-201CE/231CE
  - Processor Unit EC-1000C
- Conning Monitor
- Video Switch

Back-up ECDIS Model FEA-2107/FEA-2807
- Control Unit
  - RCU-018 or
  - RCU-015
  - Display Unit MU-201CE/231CE
  - Processor Unit EC-1000C

- HUB HUB-100
- LAN Adapter EC-1010
  - With 8 ports *Up to two LAN adapters connectable
- IMO Radar
  - FAR-21x7series
  - FAR-28x7series
- B Adapter EC-1020
- Gyrocompass (Synchro)
- Log (200 p/nm)
- Alarms
- Analog Sensors

- AIS FA-150
- GPS Navigator GP-150
- Echo Sounder FE-700
- Doppler Speed Log DS-60
- Alarm System
- Route Backup
- Anemometer
- Gyrocompass
- Water Temp Indicator etc.
- Track Pilot**

**Please consult with the nearest distributors for details

Minimum configuration
Optional/Connectable equipment

Note:Separate power supply should be arranged for all the ECDIS whithin the system.

No. 1 ECDIS Model FMD3200/FMD-3300
- ECDIS Control Unit
  - RCU-024 or
  - RCU-026
  - Display Unit MU-190/MU-231
  - Processor Unit EC-3000
- Conning Monitor

No. 2 ECDIS Model FMD3200/FMD-3300
- ECDIS Control Unit
  - RCU-024 or
  - RCU-026
  - Display Unit MU-190/MU-231
  - Processor Unit EC-3000

- IMO Radar
  - Models FCR-21x9 series FCR-28x9 series
- Sensor Adaptor MC-3000S/3010A/3020D/3030D
- Sensor Adaptor MC-3000S/3010A/3020D/3030D
- Intelligent HUB HUB-3000
- Switching HUB HUB-100
- IMO Radar
  - Models FCR-21x9 series FCR-28x9 series

- AIS FA-150
- GPS Navigator GP-150
- Echo Sounder FE-700
- Doppler Speed Log DS-60
- Autopilot
- Alarm System
- Route Backup
- Anemometer
- Gyrocompass
- Water Temp Indicator
- Log (200 p/NM)
- Rudder Indicator etc.
- Track Pilot*

* Please consult with the nearest distributors for details.

Minimum configuration
Optional/Connectable equipment

Note 1: Separate power supply should be arranged for all the ECDIS within the system.
Note 2: Up to ten units of ECDIS, radar, conning and Alert Management System can be networked in a system.

When introducing ECDIS onboard a vessel you might be able to connect the ECDIS to the radars to allow for transfer of route information to the radar display and radar overlay and TT data transfer to the ECDIS. Another possibility is to upgrade the steering system to perform track control by adding a track pilot, which is connected to the ECDIS. The track pilot is receiving the steering instructions from the ECDIS and performs the steering according to the set parameters in the E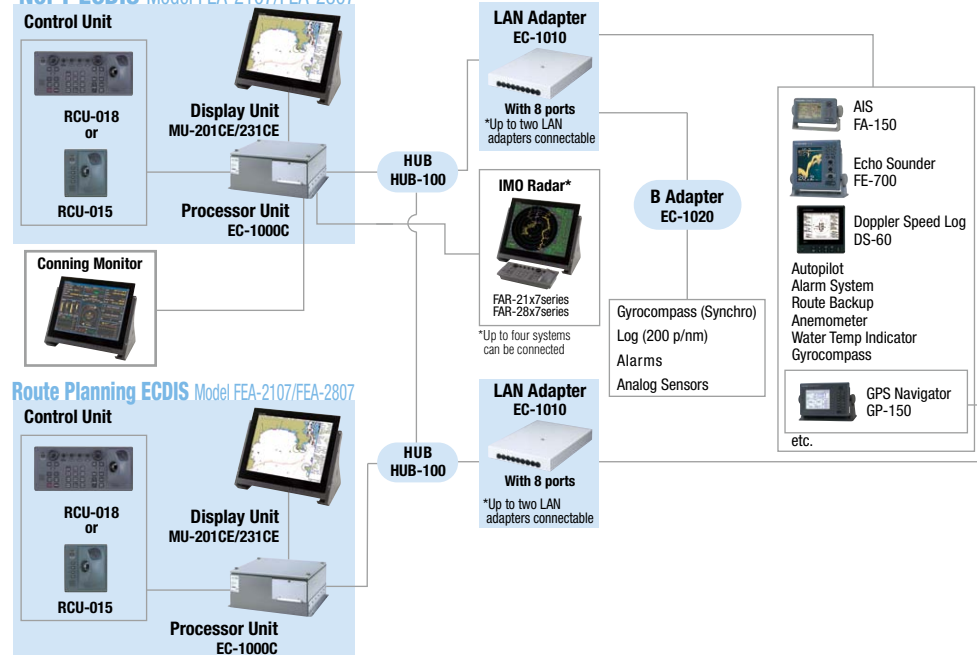CDIS. The Track Control System –TCS– can transfer the track pilot data to the radar to allow the display of curved EBL, which is a feature that shows the turn to be performed by the TCS as a curved EBL on the radar. This way the navigator can predict the turn circle and determine if the turn is in accordance with his intentions. Please note that when upgrading to the bridge system, you will need to obtain acceptance from the flag register and the classification society.

General Preparation for Mandatory ECDIS: Extended system suggestions using ECDIS

Interconnection Diagram for Single ECDIS with Route Planning ECDIS

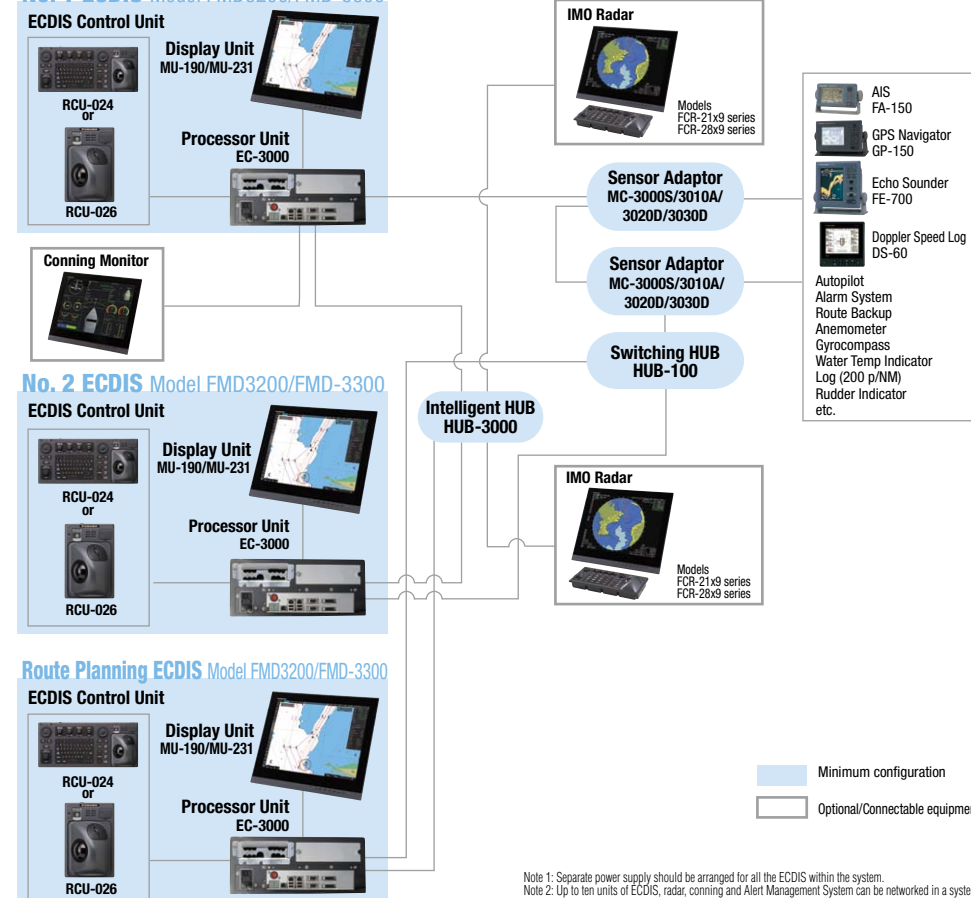▶ Up to date paper chart covering the area of operation required

▶ For Paperless operation

No. 1 ECDIS Model FEA-2107/FEA-2807

Control Unit

RCU-018 or
RCU-015

Display Unit
MU-201CE/231CE

Processor Unit
EC-1000C

Conning Monitor

HUB
HUB-100

LAN Adapter
EC-1010

With 8 ports
*Up to two LAN adapters connectable

IMO Radar*

FAR-21x7series
FAR-28x7series

*Up to four systems can be connected

B Adapter
EC-1020

Gyrocompass (Synchro)
Log (200 p/nm)
Alarms
Analog Sensors

AIS
FA-150

Echo Sounder
FE-700

Doppler Speed Log
DS-60

Autopilot
Alarm System
Route Backup
Anemometer
Water Temp Indicator
Gyrocompass

GPS Navigator
GP-150

etc.

Route Planning ECDIS Model FEA-2107/FEA-2807

Control Unit

RCU-018 or
RCU-015

Display Unit
MU-201CE/231CE

Processor Unit
EC-1000C

HUB
HUB-100

LAN Adapter
EC-1010

With 8 ports
*Up to two LAN adapters connectable

Note:Separate power supply should be arranged for all the ECDIS whithin the system.

Voyage planning can be performed using the back-up ECDIS as long as it does not affect or disrupt the navigation performed by the Officer of the Watch (OOW). Alternatively, ECDIS for voyage planning can be installed at the voyage planning work station, which allows for voyage planning without disturbing the navigation performed by the OOW. Please note, however, that the back-up arrangement has to be approved by the flag register.

No. 1 ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024 or
RCU-026

Display Unit
MU-190/MU-231

Processor Unit
EC-3000

Conning Monitor

IMO Radar

Models
FCR-21x9 series
FCR-28x9 series

Sensor Adaptor
MC-3000S/3010A/
3020D/3030D

Sensor Adaptor
MC-3000S/3010A/
3020D/3030D

Switching HUB
HUB-100

AIS
FA-150

GPS Navigator
GP-150

Echo Sounder
FE-700

Doppler Speed Log
DS-60

Autopilot
Alarm System
Route Backup
Anemometer
Gyrocompass
Water Temp Indicator
Log (200 p/NM)
Rudder Indicator
etc.

No. 2 ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024 or
RCU-026

Display Unit
MU-190/MU-231

Processor Unit
EC-3000

Intelligent HUB
HUB-3000

IMO Radar

Models
FCR-21x9 series
FCR-28x9 series

Route Planning ECDIS Model FMD3200/FMD-3300

ECDIS Control Unit

RCU-024 or
RCU-026

Display Unit
MU-190/MU-231

Processor Unit
EC-3000

Minimum configuration

Optional/Connectable equipment

Note 1: Separate power supply should be arranged for all the ECDIS within the system.
Note 2: Up to ten units of ECDIS, radar, conning and Alert Management System can be networked in a system.

Chart management

ECDIS Chart Management Scheme

ECDIS can operate a variety of charts. The official charts are known as Electronic Navigational Charts (ENC) and Admiralty Raster Chart Service (ARCS) . The charts are made and distributed by the hydrographic offices through a distribution network and the vessel has to subscribe to the chart service. ENC are vector charts, which are provided in the S-57 format. ARCS charts are raster charts and can be considered as being a scanned paper chart.

All flag registers accept ENC charts, which is not the case with ARCS charts. You, therefore, have to check with your flag register on what charts they accept. Many ECDIS can, in addition to the official chart materials, operate private charts, which do not comply with the carriage requirement set out by IMO. The private charts are often provided in the official S-57 format. Please consult your flag register and your chart supplier when you select your electronic charts.

FEA-2107/2807
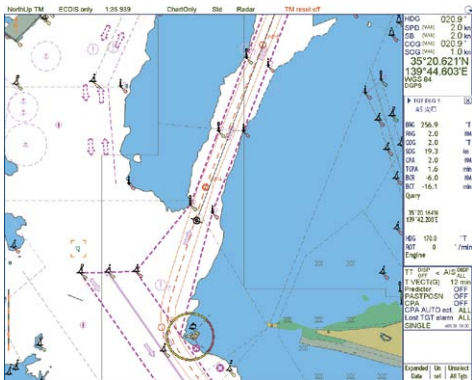
Electronic Navigational Chart
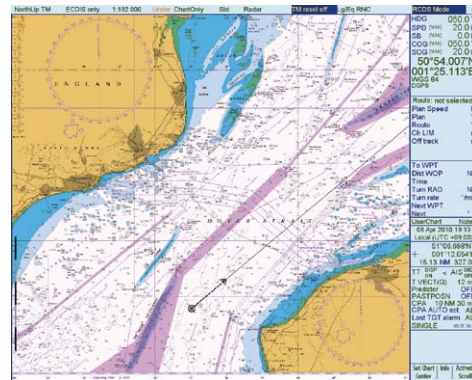
Raster Navigational Chart

FMD-3200/3300
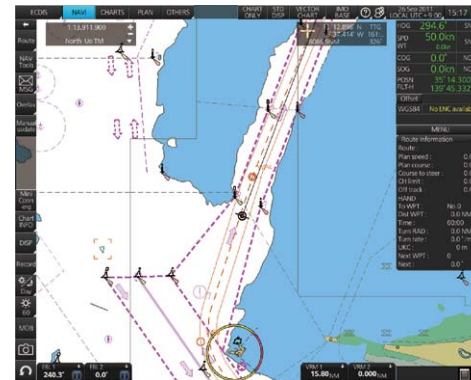
Electronic Navigational Chart
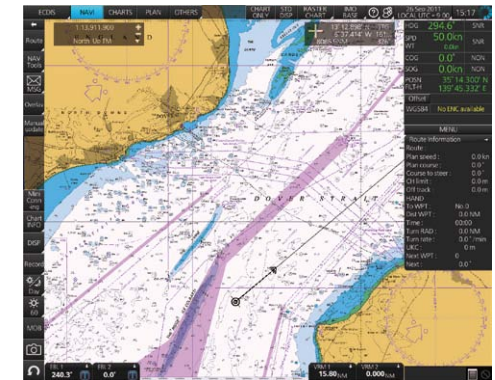
Raster Navigational Chart

Glossary for Electronic Charts to be used with ECDIS

ENC   Electronic Navigational Chart: Official vector chart containing a database of individual geo-referenced objects taken from Hydrographic Offices' documentations and record, inclusive of paper charts.
It is issued for use with ECDIS on the authority of national hydrographic offices.

RNC   Raster Navigational Chart: Digital copies of paper charts complying with IHO S-61 Product Specifications for Raster Navigational Chart, authorised by national hydrographic offices.
Some flag states allow RNC to be used for back-up purposes in the areas not covered by ENC.

SENC   System Electronic Navigational Chart: ENC dataset converted into the system language of the ECDIS, which facilitates rapid chart drawing of the ENC data on the ECDIS.

S-57   ENC Chart data format defined by IHO Transfer Standard for Digital Hydrographic Data

S-52   IHO defined symbols and colors for chart presentation

S-63   IHO Data protection (encryption) scheme for ENC against unautorised amendment or illegal copying

CM-93 Edition 3   Distribution format for C-MAP electronic charts intended to be used in ECDIS and similar systems.

Advantage of FURUNO ECDIS

FURUNO's provision of thoroughgoing ECDIS Training

Training is required to ensure an efficient and safe operation of ECDIS. Implementing ECDIS onboard a vessel is an investment and it is in the interest of the ship owner to benefit from the advantages provided by ECDIS. This includes less time spent on chart management and voyage planning and the increased safety obtained through the proper setup and operation of the ECDIS, which can remarkably reduce the risk of groundings, etc. This can be accomplished through proper training programs. Training comes in many forms and the crew should undergo both generic training to get the full understanding of the ECDIS as a concept, the rules governing ECDIS and the influences on the bridge operation as well as the type specific ECDIS training, which helps the operator familiarize themselves with the specific ECDIS onboard the vessel.

FURUNO provides both of the aforementioned ECDIS operation training programs with relevant certifications at our training facility FURUNO INS Training Center (INSTC) in Copenhagen. Also, at recently-established INSTC Singapore, local seafarers residing in Asia can receive the 2-day type specific ECDIS training course. INSTC offers a wide range of training courses, which can be combined with the ECDIS training.

INSTC Denmark can offer the following training courses with certification in accordance with the relevant IMO model courses:
▸ ECDIS IMO model course 1.27, certified by DNV SeaSkills
▸ INS/IBS IMO model course 1.32, certified by DNV SeaSkills

In addition, INSTC can provide training aimed at the shore staff in relation to ECDIS rules and regulations and technical solutions, which can be of assistance to the purchasers or superintendants in their daily works.

ECDIS Training courses provided by FURUNO INSTC

IMO ECDIS Model Course 1.27 (generic ECDIS training): available at INSTC Denmark

STCW requires that all masters and officers in charge of a navigational watch (Officer of the Watch: OOW) on a ship fitted with ECDIS shall have completed a generic ECDIS course and hold an ECDIS certificate in accordance with IMO model course 1.27.

This ECDIS training provides the trainees with knowledge of the ECDIS as a system, the ECDIS operation, electronic chart materials and practical navigation by using ECDIS. Also, the course includes terms and conditions for implementing paperless navigation. The training course focuses upon many advantages and safety features obtained by operating ECDIS. Also, the limitations of ECDIS are taught throughout this training course.

This training is concluded with 3 compulsory tests, and, if passed, a certificate is issued, which confirms the trainees'

successful completion of the generic ECDIS training in accordance with IMO Model Course 1.27, reviewed by DNV SeaSkills™.

This training course provides the navigators with the knowledge and tools to safely shift from traditional paper chart navigation to electronic chart navigation by use of ECDIS.

This training course complies with the IMO STCW code.

Type specific ECDIS training course: available both at INSTC Denmark and INSTC Singapore.

The FURUNO type specific ECDIS training provides the trainees with the specific knowledge about functionality and effective use of FURUNO ECDIS for navigation onboard.

The training covers the following aspects of FURUNO ECDIS operation:

▸ Familiarisation with available functions
▸ familiarisation with the menu structure
▸ Display setup
▸ Setting of the safety value
▸ Recognition of alarm and malfunction indicators and the actions to be taken
▸ Route planning
▸ Route monitoring
▸ Changing over to backup systems
▸ Loading and updating of charts and licences
▸ Updating software

The training is concluded with a compulsory test. Upon successful completion of the test, the navigators is issued a certificate that confirms the successful completion of the FURUNO type specific ECDIS training course.

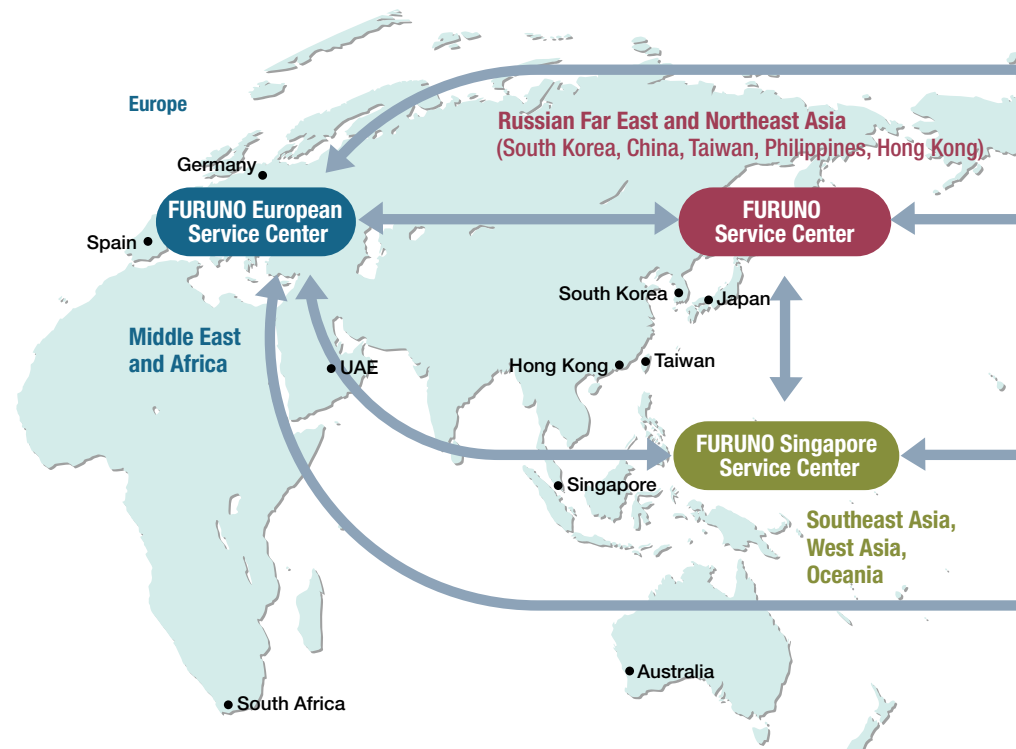This training complies with the STCW and ISM Codes, audited and certified by ClassNK.
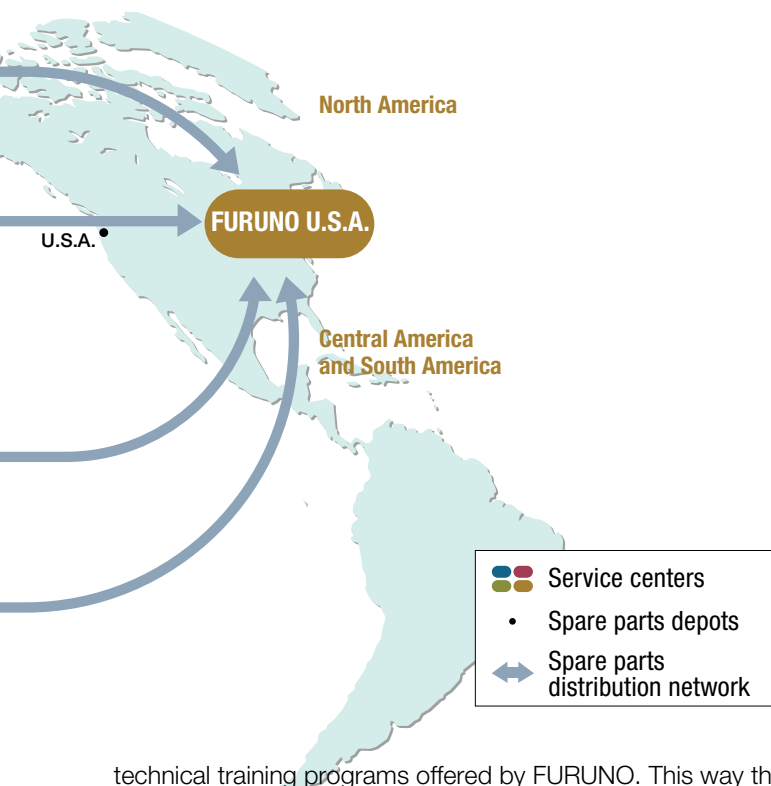
Advantage of FURUNO ECDIS

FURUNO's solid product Quality Assurance Scheme

Quality and reliability of the products is a vital issue when selecting navigation equipment to be installed onboard your vessels, for the navigation equipment needs to be in proper working conditions throughout lengthy ocean-crossings, and it is undeniably true that equipment failure in the midst of those voyages has negative impact upon safety and efficiency at sea. It is often the case that equipment failure stems from two causes: defect in equipment itself and improper equipment installation and setup. FURUNO tackles this issue with a two-tiered approach: thorough product testing before the equipment is installed and thoroughgoing inspection prior to ship's delivery on whether or not equipment is properly installed.

FURUNO's after-sales service and support provision Scheme

Europe

Russian Far East and Northeast Asia
(South Korea, China, Taiwan, Philippines, Hong Kong)

Germany

FURUNO European Service Center

Spain

FURUNO Service Center

Middle East and Africa

South Korea ● ● Japan

● UAE

Hong Kong ● ● Taiwan

● Singapore

FURUNO Singapore Service Center

Southeast Asia, West Asia, Oceania

● Australia

● South Africa

Service availability in your area of operation is vital to comply with this new carriage requirement, because you are requested to have an operational ECDIS onboard the vessel at all times. When deciding your ECDIS solution, you may consider your area of operation and the service scheme offered by your ECDIS provider in your area of operation. It is important to make sure that you have easy access to skilled service technicians and spare parts at all times. FURUNO provides easy access to skilled service technicians and spare parts through our global service network and continental service centers, which have a huge variety of spare parts in stock for fast delivery to any location around the world. The service technicians receive education through the comprehensive

North America

FURUNO U.S.A.

U.S.A.

Central America
and South America

Service centers

• Spare parts depots

⬌ Spare parts
distribution network

technical training programs offered by FURUNO. This way the technicians are kept up to date with their technical knowledge. The coordination of services worldwide is made more efficient through FURUO's Service Management System (SMS), which is a database and coordination platform that allow for easy transfer of service jobs between the service stations and acquisition of vessel specific data covering equipment installation, technical documentation, software versions and service history, which provides the service technician with valuable information for planning the service call to your vessel.

FURUNO's satellite broadband solution, SafeComNet

FURUNO can accommodate easy and inexpensive satellite services to your fleet through the SafeComNet satellite service using VSAT and FleetBroadband solutions. FURUNO has our own VSAT and FBB hardware terminals, and, through our broadband service centers located in Copenhagen, Denmark, and Nishinomiya, Japan, FURUNO can assist you with suitable all-inclusive satellite communication solution package, including airtime, hardware and service provision according to the requirement on your vessels. By integrating a cost efficient satellite service and a suitable chart subscription Scheme onboard your vessels, you can get easy access to chart purchases and chart updates for your ECDIS.
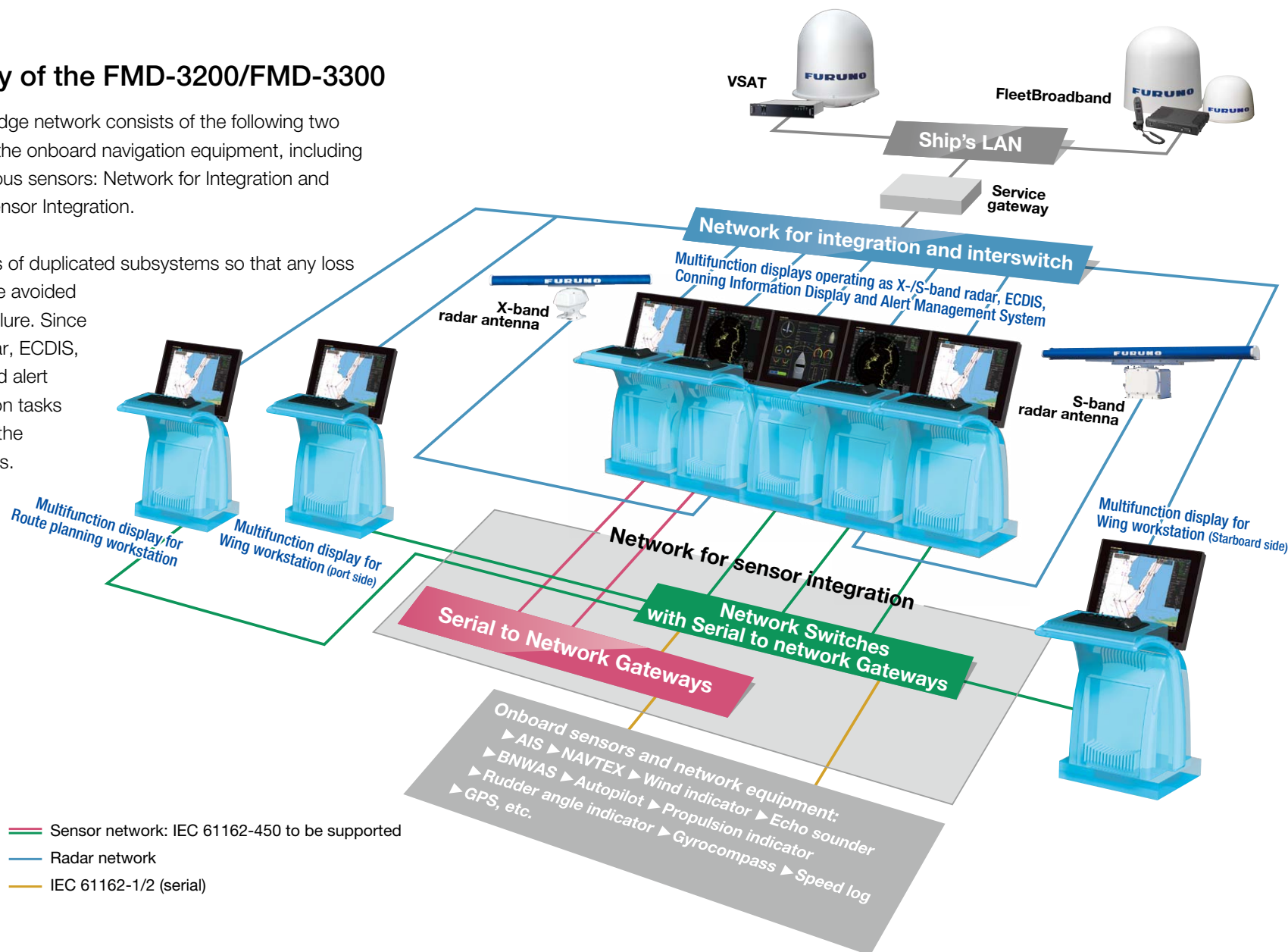
Ku-band
Satellites

Inmarsat
Satellites

SafeComNet™

Internet

Voice communication

Emailing

Video-streaming
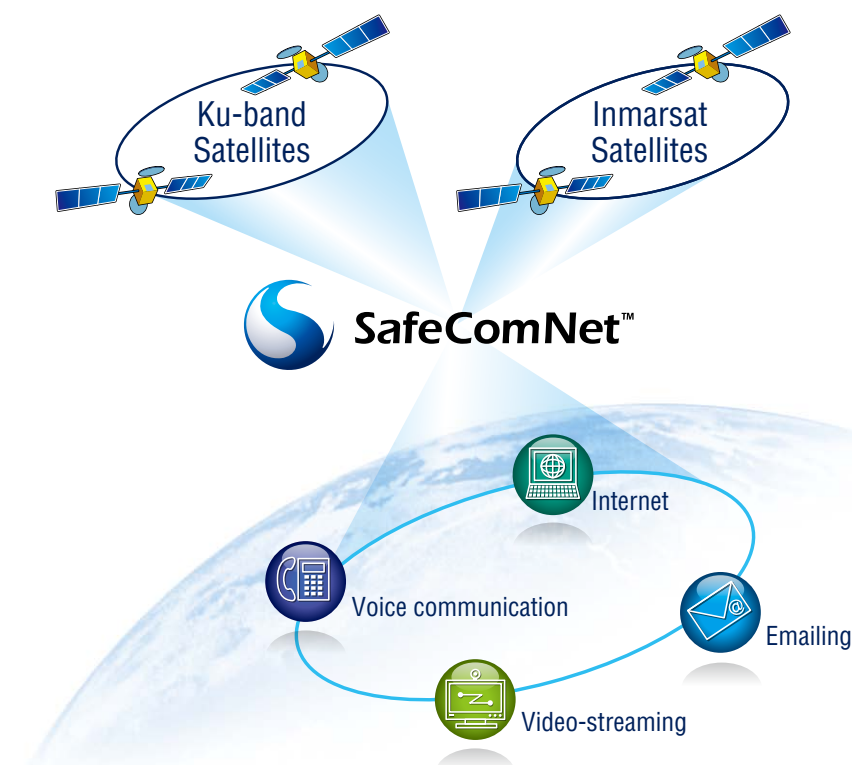
Future expandability with FMD-3200/FMD-3300

Future expandability of the FMD-3200/FMD-3300

FURUNO's next generation bridge network consists of the following two separate networks that link all the onboard navigation equipment, including multifunction displays and various sensors: Network for Integration and Interswitch and Network for Sensor Integration.

The navigation system consists of duplicated subsystems so that any loss of navigational functions can be avoided in an event of single point of failure. Since MFD is able to function as radar, ECDIS, conning information display and alert management system, navigation tasks can be performed from any of the interfaced multifunction displays.

VSAT

FleetBroadband

Ship's LAN

Service gateway

Network for integration and interswitch

Multifunction displays operating as X-/S-band radar, ECDIS, Conning Information Display and Alert Management System

X-band radar antenna

S-band radar antenna

Multifunction display for Route planning workstation

Multifunction display for Wing workstation (port side)

Multifunction display for Wing workstation (Starboard side)

Network for sensor integration

Serial to Network Gateways

Network Switches with Serial to network Gateways

Onboard sensors and network equipment:
▶ AIS ▶ NAVTEX ▶ Wind indicator ▶ Echo sounder
▶ BNWAS ▶ Autopilot ▶ Propulsion indicator
▶ Rudder angle indicator ▶ Gyrocompass ▶ Speed log
▶ GPS, etc.

Sensor network: IEC 61162-450 to be supported

Radar network

IEC 61162-1/2 (serial)

Network for Integration and Interswitch (Gigabit Ethernet) is used to communicate the following data:
- ▶ Radar interswitching
- ▶ TT and AIS target data
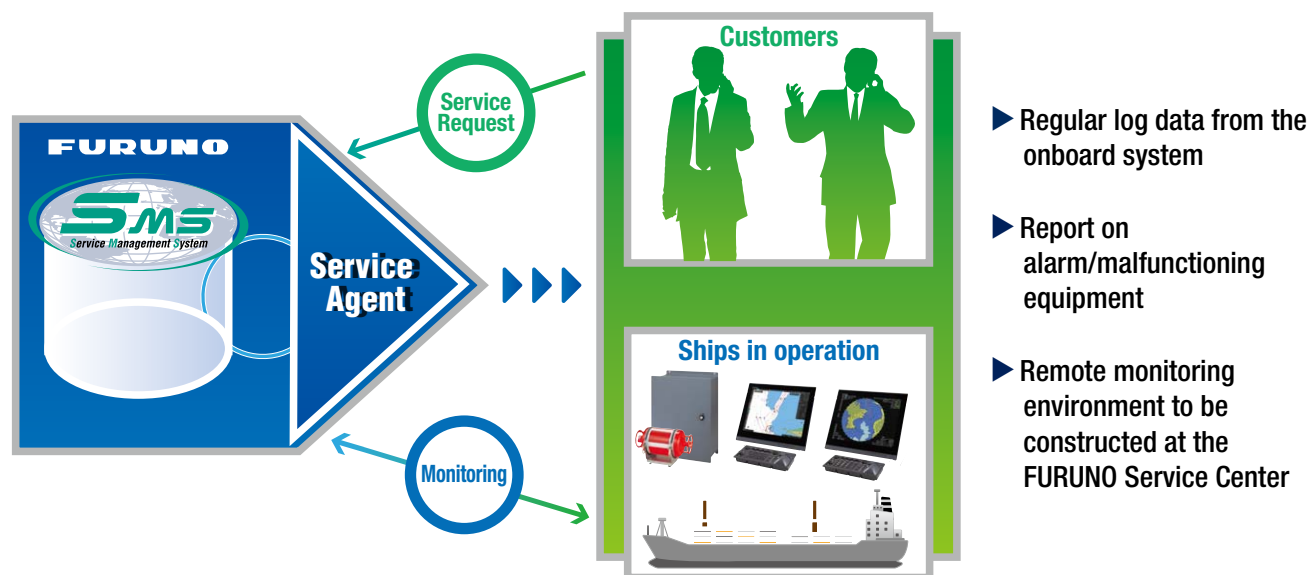- ▶ Harmonization of databases (charts, routes, etc.)

Network for Sensor Integration (combination of 100 Base-TX Ethernet & IEC 61162-1/-2) is used to communicate the following data:
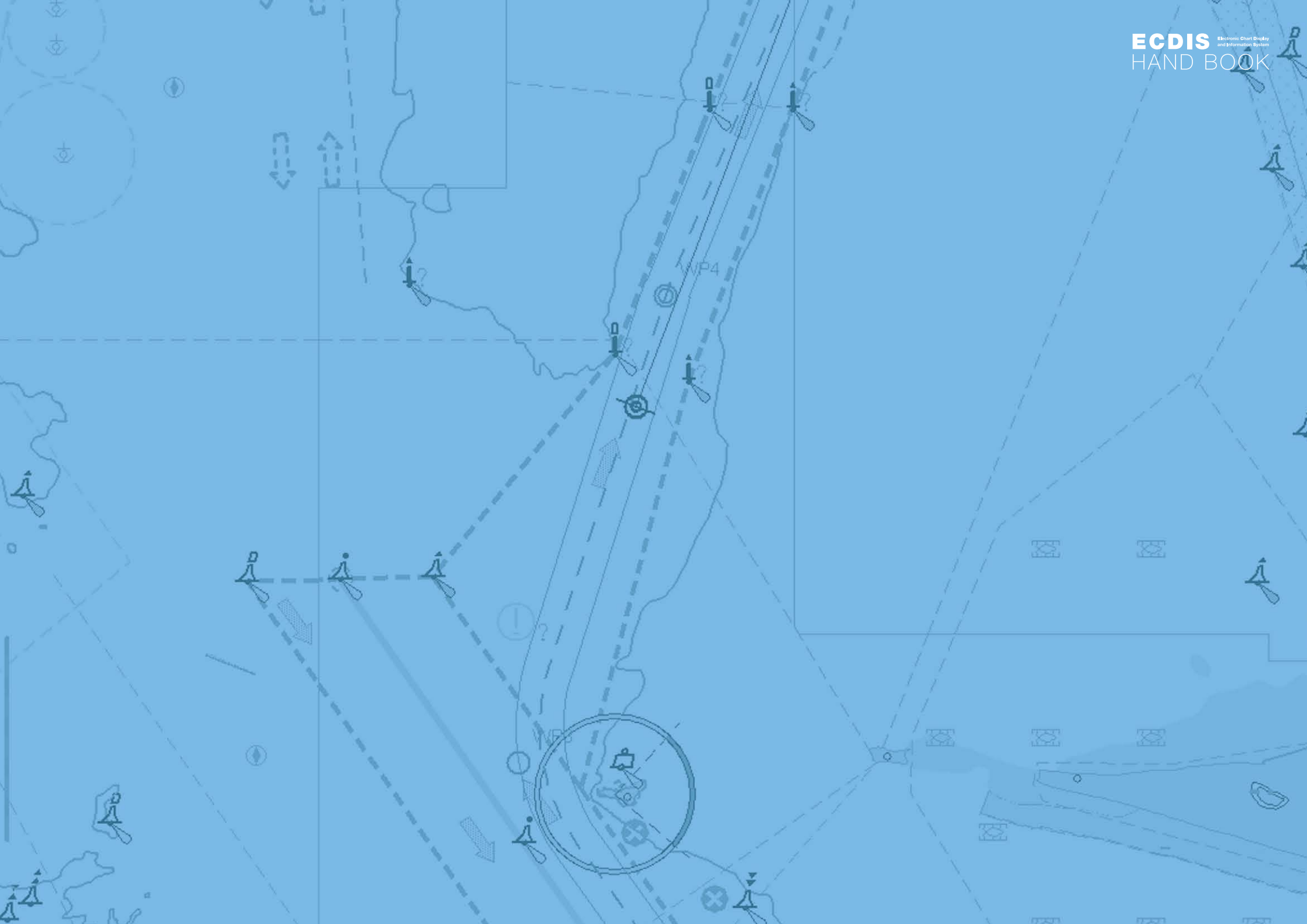- ▶ Sensor data

FURUNO Remote Maintenance Service

FURUNO will shortly start incorporating remote monitoring service into the service provision scheme by which remote onboard monitoring environment will be constructed to enable us to react swiftly to any malfunctioning equipment reported. This way, we will be able to coordinate and optimize our service provision scheme.

- ▶ Regular log data from the onboard system
- ▶ Report on alarm/malfunctioning equipment
- ▶ Remote monitoring environment to be constructed at the FURUNO Service Center

Note

ECDIS
Electronic Chart Display and Information System

FURUNO ELECTRIC CO., LTD.

www.furuno.com