SIMRAD®

ECDIS900

Technical manual

ENGLISH



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Warranty

The warranty card is supplied as a separate document. In the case of any queries, refer to the brand website of your unit or system: **www.navico-commercial.com**.

About this manual

Manual version

This manual is written for the software version in effect at the date of release for this manual. It is continually updated to match new software releases.

The latest available manual version can be downloaded from **www.navico-commercial.com**.

Intended audience

This manual is written for marine electronics technicians. It assumes the reader has prior knowledge and skills relevant to the type of work to be carried out.

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Standard SIMRAD ECDIS900 installation

The standard installation of the SIMRAD ECDIS900 includes two workstations connected by LAN: the monitoring workstation and the planning workstation used as a backup.

In this chapter, learn more about:

- Monitoring and planning workstations
- System description
- Functional description
- Redundancy in the system
- Tests facilities
- Input/output management - Sensor Monitor application
- Failure detection
- Security
- Maintenance
- Power

Monitoring and planning workstations

The monitoring workstation acquires position, Gyro/Log and ARPA Targets data via serial lines, and a second DGPS delivers position information to the planning workstation. All serial sensor inputs are broadcast on the network and shared by the two ECDIS900 workstations.

➔ ***Note:*** *The second DGPS is optional and the same DGPS can be used on both workstations. However, it is recommended to use two different DGPS for redundancy and safer installation.*

Installation

During the ECDIS900 installation process, select the Monitoring option for the monitoring workstation and Planning for the other ECDIS900 workstations.

However, it is possible to switch between monitoring and planning modes by right double-clicking in the window title of the ECDIS900 and activating the menu Set as planning station or Set as Monitoring station. Only one monitoring workstation can exist in the ECDIS900 LAN. As soon as the planning workstation is switched to monitoring, all monitoring functions are available on this PC.

Shared data

The charts and routes databases are installed on both workstations. Therefore, if there is a breakdown of the monitoring workstation, the planning workstation can immediately be used as the main ECDIS900. Then it is required to switch from planning to monitoring mode as described above to access all route monitoring functions.

Planned routes

When routes have been planned on a planning workstation, they can be copied to another ECDIS900 workstation. Right-click on the route and access the Synchronize menu. The route will be copied to all active ECDIS900 workstations.

Alternatively, it's possible to import routes using the following procedure:

- On the target PC, open the dialog Load/Unload objects, and from the Routes tab select

Import

- Select the folder containing the route located on the Planning station: `C:\\ECDIS_userdata\Routes`
- Select Routes to be imported
- Select OK and the routes are copied on the local PC.

Another way to copy a route to all active ECDIS900 workstations is to right-click on the route and select Synchronize.

Active route

A route can be activated only on the monitoring workstation. When the route has been activated, it will be automatically transferred and displayed to the other ECDIS900 workstations running on the LAN.

⚠ **IMPORTANT: Activating a route is only possible on the monitoring workstation.**

Charts

To synchronize ENC or ARCS chart collections, use the Copy database function available in the chart handling dialog.

Hardware platforms

SIMRAD ECDIS900 systems come in several variants:

Stand-alone unit:

- SIMRAD ECDIS900 MK15B 19”
- SIMRAD ECDIS900 MK15B 24”
- SIMRAD ECDIS900 MK15B 27”

SIMRAD ECDIS900 MK5B can be delivered with two different monitors:

- Simrad® M5024
- Simrad® M5027

For more information about hardware, see the SIMRAD® ECDIS900 System Installation Manual.

USER INPUT

General

The ECDIS900 is a window-based, human computer interface (HCI) where operator-requested information is obtained from menus and dialog boxes on the display. The mouse is the main operating tool for the system. A keyboard is also necessary for alphanumeric data entry.

Storage media

Hard disk

The ECDIS900 workstation is delivered with Windows and necessary system drivers and libraries already installed. When the ECDIS900 is installed on the computer, the necessary files are copied to the hard disk and four folders are created:

- `C:\Program Files(x86)\SIMRAD` containing:
  - The application ECDIS900 and necessary libraries in the Bin folder
  - The Sensor Monitor application
  - Utilities
- `C:\Charts` containing all data related to chart collections
- `C:\Ecdis_UserData` containing user data like routes, tracks, object editor, tide database, weather, logbook
- `C:\Program Data\SIMRAD` containing:
  - Configuration files
  - S-52 presentation library components
  - Log files for the ECDIS900, including listing of chart installation and updates.

Memory stick

Memory sticks are used to:

- Install chart permits when S57 or ARCS permits are transmitted by memory stick or received by email
- Update S57 chart database when the updates are received by memory stick or email
- Backup and restore routes, logbooks and user data stored on the hard disk
- Boot the system when a complete restoration of the hard disk is necessary.

CD(DVD)-ROM

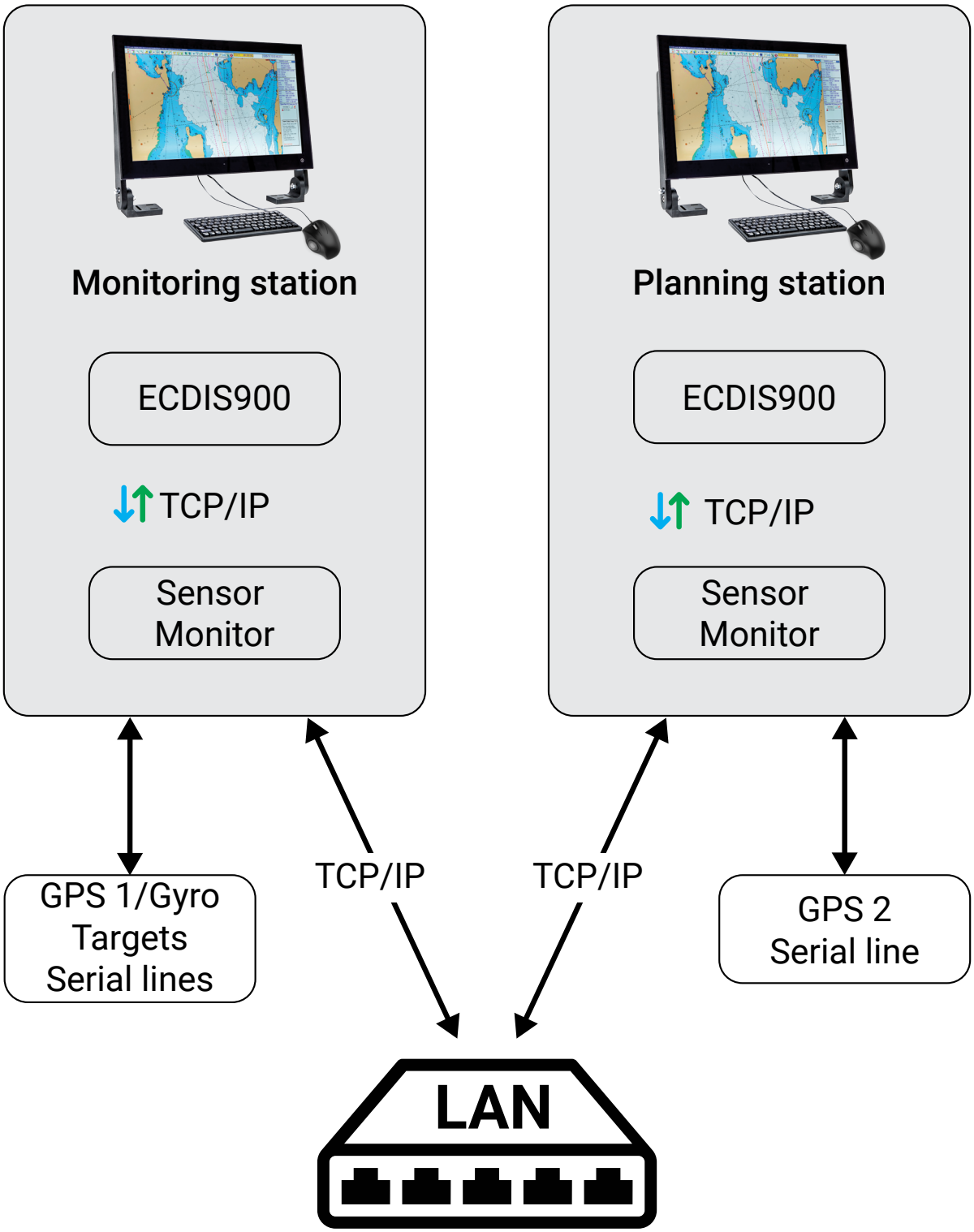
CD-ROM are used to install and update charts.

Sensors

For a complete description of the interface between sensors and the ECDIS900, see the **Input/Output** chapter.

Ethernet: Internal and external data flow

Ethernet and TCP/IP protocol are the core of the system for the intercommunication between software modules and for data exchange between the ECDIS900 planning (backup) and monitoring workstations.



Intercommunication

LAN communication is the technology used in the system for communication between ECDIS900 applications. For example, the ECDIS900 application launches the application called Sensor Monitor responsible for I/O of the system. This application runs in parallel with the ECDIS900 and manages serial and TCP/IP input/output. ECDIS900 and Sensor Monitor use TCP/IP protocol for data and command exchanging.

External data exchange

Monitoring and planning workstations on the same LAN communicate using TCP/IP protocol.

Notes:

- The two ECDIS900 workstations share the same sensor data information. Serial data is analyzed and broadcast on the LAN and therefore the other ECDIS900 workstation can use the same sensor input data.
- Routes are usually planned on the planning workstation and then transferred to the monitoring workstation via Ethernet.
- The monitoring workstation oversees the active route and waypoint. Information about the active route and waypoint is sent to the planning workstation via Ethernet.
- The ship's settings and safety parameters are synchronized on the network. The ship's settings and safety parameters can be adjusted on the monitoring workstation and then the parameters will be updated on all planning workstations.
- Alarm acknowledgement is also synchronized. When an alarm is acknowledged on the monitoring workstation, it is also acknowledged on other planning workstations.

Chart databases on both ECDIS900 workstations can be updated in two different ways:

- The update procedure can be run twice on both workstations.
- The update procedure is run once, and the updated chart database is transferred to the other workstation via Ethernet.

Redundancy

Backup system

The ECDIS900 dual system installation includes an ECDIS900 monitoring workstation working as master, and an ECDIS900 planning workstation working as a slave. If the main ECDIS900 monitoring workstation breaks down, the planning workstation can immediately replace the master and can be used for navigation.

Continuous monitoring

To avoid any interruptions in the ship's position monitoring, the ECDIS900 backup is connected to the second GPS. If the master ECDIS900 breaks down, the ship is monitored on the backup system.

Active route

The monitoring workstation is responsible for the active route and waypoint. The active route and waypoint information is sent continuously to the planning workstation, which displays the same route. Any changes of active route are prohibited.

Duplicate databases

All ECDIS900 workstations should use the same chart databases. It is the user's responsibility to maintain the consistency of the chart collections and to transfer routes from the planning workstation to the monitoring workstation.

Logbook

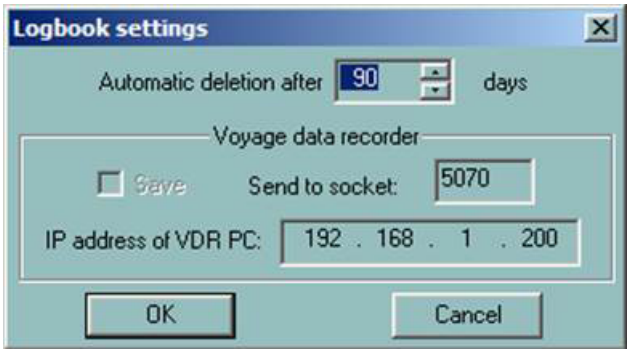
The logbook database, which contains all navigation information of the current voyage, is stored on both workstations. If there is a breakdown, no data is lost and the second PC continues to store navigation data to the logbook. The time interval of logbook recording cannot be changed and is equal to 15 seconds.

Synchronization

Ship's settings and safety parameters (safety contour and safety depth) are synchronized on the network. On the monitoring workstation, the ship's settings and safety parameters can be adjusted and these parameters will regularly be updated on all planning workstations. Alarm acknowledgement is also synchronized.

Setup

The logbook window gives access to the **Change Settings** button. Tick the **Save** checkbox in the **Voyage Data recorder** section to make sure the logbook will be recorded by VDR. A logbook recorded in VDR could be replayed in ECDIS900 together with other data.



⚠ IMPORTANT:
Logbook settings are not synchronized on the LAN.

Positioning systems

Two ECDIS900 workstations are connected independently to two different GPS sensors. However, they share the same data and both ship's positions are displayed on the chart: GPS1 data, acquired by one of the ECDIS900 workstations is sent to the other one by Ethernet and vice versa. GPS2 data acquired by the second workstation is sent to the first one.

Master GPS

When two different GPS sensors are used, you can select which GPS sensor is the master positioning system, i.e. which position data is used for route monitoring calculations. If the master GPS fails or sends faulty data, you can select another GPS sensor as master.

Gyro and log data

Gyro as source of heading is interfaced to both workstations.

Test facilities

Boot tests

When you power on or restart the computer, it goes through power on self-test (POST) routine, which determines:

- The amount of real memory
- Whether the required hardware components are present.

Once the computer has run its POST routine, each adapter card with BIOS runs its own POST routine. The computer and adapter card manufacturers determine what appears on the screen during the POST processing.

Windows operating system consistency

Windows does not start up or operate correctly if any hardware components do not initialize correctly. Startup fails if any of the files required to start Windows are not present in the correct folder or if one of the files has been corrupted.

Failure Detection

Computer hardware failure

Audible failure detection

During the boot process, an audible alarm is triggered when there are RAM or video problems. The sound sequences differ, depending on the type of problem.

Visual detection

- If the hard disk cannot start during the boot process, a warning is displayed in grey on a black background screen.
- During Windows operating system boot, the system displays the log of all events on a blue background screen.

Communication failure

After Windows has started, ECDIS900 is automatically launched, and the network initialized. If there is an Ethernet problem, the different sockets cannot be created, and a warning is displayed. If the connection with the sensors cannot be well established or a failure occurs, ECDIS900 warns the navigator.

Software failure

Software failures are reported in two different ways:

- Exception and memory errors messages are displayed in an alarm dialog.
- The error freezes the system, for example, the mouse is still moving but menus are no longer accessible.

Security

Computers running ECDIS900 are dedicated to navigation purposes and SHOULD NOT be used for any other tasks.

System set-up

Access to system setup and configuration functions is restricted, and the main window of ECDIS900 is not resizable. Hiding that window is not possible and the Windows task and caption bars are not displayed. Other applications are accessible only when operating Application Manager in service mode.

When the computer boots, ECDIS900 is automatically launched, and Windows system functions are not accessible when ECDIS900 is running in operational mode.

System hot keys are disabled

In operational mode, ECDIS900 restart and shutdown functions are only available through the Application Manager. All windows system hotkeys are disabled.

Access

The two workstations are used for navigation purpose only and no other application can interfere with ECDIS900, except for approved applications and Application Manager. The workstations are connected by a point-to-point Ethernet connection and are not a part of the ship's network. Therefore, no access from outside of the ship is possible.

Software modules

Software modules necessary to run ECDIS900:

Name	Version	Description
`C:\Program Files (x86)\SIMRAD\SIMRAD_ECDIS900\ECDIS900\bin\ECDIS900.exe`	5.3.X	ECDIS900 application Chart display, and route and logbook
`C:\Program Files\SIMRAD\SIMRAD_ECDIS900\AppMan\appman.exe`	1.0.X	Application Manager controls access to Windows settings
`C:\Program Files (x86)\SIMRAD\SIMRAD_ECDIS900\ECDIS900\bin\CaptureScreenClient.exe`	1.1.4.0	Application that sends ECDIS900 image to VDR
`C:\Program Files (x86)\SIMRAD\SIMRAD_ECDIS900\SMonitor\SMonitor.exe`	4.1.0	Sensor Monitor is the application that manages the I/O for the ECDIS900

Input filtering

Keyboard inputs are secured, i.e. filtering functions check that the use of letters and numbers is correct and the values are within defined limits.

If there is insufficient input, the system cancels the input or asks for additional data.

Color tables and black adjustment

In the presentation library V4.0, three color schemes are available:

- Day bright
- Dusk
- Dark night.

The colors can be selected from the **Chart setting** dialog or by pressing **F8** on the keyboard.

Backlight adjustments

The monitor backlight level is automatically adjusted to the calibrated value when a color scheme is selected. Three levels of backlight corresponding to the three color tables have been defined during the color calibration process.

Manual adjustment

The monitor Pot meter is disabled. To increase or decrease the backlight level from the predefined backlight value, press the key combination "**Ctrl +**" or "**Ctrl –**". The minimum display brightness is maintained to keep ECDIS900 alarms visible under any conditions.

⚠ **IMPORTANT: Manually changing the backlight level may alter the colors in the ECDIS900.**

Color differentiation – chart 1

The presentation library contains a color differentiation test diagram to check that the display can be used to discriminate important features by color. The cell called AA5C1W00 (displayed at the scale 1/25 000 and located at 15N, 5W) contains several colored differentiation diagrams. To access the Chart1 cell, open **Chart handling**, select the **Chart1** tab and double-click on one of cells in the list. Data will load and the appropriate cell displays. Use the scroll and zoom tools to review neighboring cells from the Chart1 collection.

Restore procedure

Restore ECDIS

The ECDIS900 is delivered with restore functionality, i.e. it is possible to restore the hard disk to its factory settings. For more information, refer to the SIMRAD ECDIS900 Backup/Restore Procedures User Guide.

⚠ **IMPORTANT: HDD sharing: C drive should not be shared.**

- `C:\\Chart` — shared with full access for everyone
- `C:\\ECDIS_UserData` — shared with full access for everyone
- `C:\\ECDIS_UserData\Routes` — shared with full access for everyone

Settings

Color palette	65536	**Desktop area**	1280 * 1024
Frequency	60 Hertz	**Fonts**	Small
Keyboard	English	**HD**	shared

ECDIS900 runs automatically at boot with the login “Administrator”, password “admin”.

User accounts

Administrator. No password.

Guest. No password

Standard CMOS setup

Halt on: All but keyboard.

Tests

Functional testing before delivery

The different parts of the system must be tested for correct functionality. They must first be verified as <OK> by the system itself (BIOS). Before and after burn-in, a special test program (CheckIT) must be run, with test reports printed and saved for each unit.

Computer

Check the BIOS self-test reports and verify there are no errors.

CD(DVD)-ROM

Verify reading. Test throughput.

Hard disk

Verify read/write performance. Test throughput.

I/O ports

Network

Ethernet 10/100 MB TP: Test connection

Ethernet 1Gb TP: Test connection

Speaker

The frequency of audible alarms is about 750 Hz and the volume is set to maximum, which gives an audio level of 75 dB at a distance of 1 meter from the ECDIS900 workstation.

LCD monitor

The testing of the monitors must be done PRIOR TO DISMANTLING. If errors are found, the monitor MUST NOT BE OPENED, but returned for warranty replacement.

Alphanumeric data, text, symbols, and graphical information, including alerts, are readable from 1 m away under all lighting conditions.

Back light

Verify the intensity, both maximum and minimum, to be subjectively within normal range.

Graphics

Verify there are no 'hanging pixels', cracks, stripes or other visible flaws on the units, by connecting them to a PC running at 1280 x 1024 px resolution. There should not be any visible 'ghosting' or blurring.

System performance

Upon power-up, automatically start the ECDIS900 software. Test it is possible to zoom and pan maps. Using the integrated simulator (Dead Reckoning and Simulation active functions), test that both 'own ship' and 'target ships' move on the map.

Functional tests

Indicators and alarms

- Disconnect the GPS cable. After the GPS alarm timeout, the GPS alarm is triggered.
- Start the logbook replay function: the GPS indicator is changed to Replay and the normal alarm concerning the replay status is shown.
- In the panel D.R. of the ship's properties dialog, select the simulation mode.

Route alarms

- Activate the route in simulation mode and when the ship arrives to the active waypoint, all active alarms should be triggered.
- Activate the route in simulation mode and when the ship is out of safety passage, the XTE alarm is shown.

Chart alarms

Set the display scale to be half the size of the compilation scale of the cell:

overscale symbolization and overscale indicator are used.

Target alarms

- Plot a manual target close to the ship's position. Enter the speed and course of the target and, in simulation mode, check the CPA / TCPA alarms are generated properly.

S57 Charts: Technical features

Standards

The ECDIS900 chart kernel comprises several hundred software components that are compliant to the IMO Performance Standard for ECDIS, the IHO Standards S-52 V3.4 / S-57, PL 4.0, IEC 61174 Ed.4 and IEC 62288 Ed.3.

ENC

It is impossible to alter the contents of the ENC. If an ENC cell is modified, the ECDIS900 detects the modification and rejects the cell during the installation procedure. Official ENC content is converted and stored with a proprietary format. The conversion maintains the precision of the data and does not alter the accuracy of the data.

Chart area and resolution

The chart area size of the ECDIS900 is bigger than 270 x 270 mm. The pixel size of the screen is about 0.29 mm median for all screen sizes.

Presentation

ECDIS900 chart information is designed to be clearly visible for more than one observer under different light conditions. The symbols are always drawn with the size described in the presentation library V4.0. The character size of the text may be adjusted to be clearly visible. For more details, refer to the Maris ECDIS900 System Operator Manual.

All superimposed windows are temporary and can be moved and hidden at any time. The 64 colors used for chart and MMI displays are compliant with S52 Publications.

The redraw of the chart, including scale changes or scroll of the chart, never takes more than 5 seconds. During the re-generation of the data, the display is maintained until the new display is ready for redraw.

Dangers and warnings

The Route Checking function (Route Planning and Route Monitoring) checks all dangers inside the safety zone against the ship's draught and air draught. The ECDIS900 senses alarms related to both ENC cells and manual updates. The list of object classes to be warned about by the ECDIS900 is displayed below:

OBJECT	TYPE	COMMENTS
ACHBRT	ANCHOR	WARNING
ACHPNT	ANCHOR	WARNING
BCNCAR	BEACON	WARNING
BCNISD	BEACON	WARNING
BCNLAT	BEACON	WARNING
BCNSAW	BEACON	WARNING
BCNSPP	BEACON	WARNING
BERTHS DEPTH DRVAL1	BERTHING	DANGER
BOYCAR	BUOY	WARNING
BOYINB	BUOY	WARNING
BOYISD	BUOY	WARNING
BOYLAT	BUOY	WARNING
BOYSAW	BUOY	WARNING
BOYSPP	BUOY	WARNING
BRIDGE HEIGHT VERCCL	BRIDGE	DANGER
BRTFAC	BERTHING	WARNING
CAUSWY	CAUSEWAY	WARNING
CBLOHD HEIGHT VERCLR VERCSA	CABLE	DANGER
CHNWIR	CHAIN	WARNING
COALNE	COAST	WARNING
#CONVYR HEIGHT VERCLR DANGER	CONVEYOR	DANGER
CTNARE	CAUTION	WARNING
CTSARE	CARGO	WARNING
DEPARE DEPTH DRVAL1	DEPTHAREA	DANGER
DEPCNT DEPTH VALDCO	DEPTHCONTOUR	DANGER
DIFFUS DEPTH VALSOU	DIFFUSOR	DANGER
DRGARE DEPTH DRVAL1	DREDGEDAREA	DANGER
DRYDOC	DOCK	WARNING
FAIRWY DEPTH DRVAL1	FAIRWAY	DANGER
FLODOC	DOCK	WARNING
FSHFAC	FISHING	WARNING
FSHHAV DEPTH VALSOU	FISHING	DANGER
GATCON DEPTH DRVAL1	GATE	DANGER
HULKES	HULK	WARNING
ICNARE	INCINERATION	WARNING
ITDARE	INTERTIDAL	WARNING
LIGHTS	LIGHT	WARNING
LITFLT	LIGHT	WARNING

OBJECT	TYPE	COMMENTS
LITMOI	LIGHT	WARNING
LITVES	LAND	WARNING
LNDPLC	LAND	WARNING
LNDSTS	LAND	WARNING
LOGPON	POND	WARNING
MONUMT	MONUMENT	WARNING
MORFAC	MOORING	WARNING
MSTCON	MAST	WARNING
OBSTRN DEPTH VALSOUN	OBSTRUCTION	DANGER
OFSPLF	PLATFORM	WARNING
OILBAR	BARRIER	WARNING
PILPNT	PILE	WARNING
PINGOS	OBSTRUCTION	DANGER
DEPTH VALSOU	DEPTH	DANGER
PIPOHD HEIGHT VERCLR	PIPELINE	DANGER
PIPSOL DEPTH DRVAL1	PIPELINE	DANGER
PONTON	PONTON	WARNING
PRDINS	INSTALLATION	WARNING
PYLONS	PYLON	WARNING
RESARE	RESTRICTION	WARNING
RSCSTA	RESCUESTATION	WARNING
RTPBCN	BEACON	WARNING
SLCONS	CONSTRUCTION	WARNING
SLIPWY	SLIPWAY	WARNING
#SOUNDG DEPTH VALSOU	DEPTH	DANGER
#SPLARE	SEAPLANES	WARNING
SWPARE DEPTH DRVAL1	SWEPTAREA	DANGER
TELPHC HEIGHT VERCLR	HEIGHT	DANGER
TOWERS	TOWER	WARNING
TSELNE	TRAFFICZONE	WARNING
TSEZNE	TRAFFICZONE	WARNING
TSSBND	TRAFFICZONE	WARNING
UWTROC DEPTH VALSOU	OBSTRUCTION	DANGER
WIRLNE	WIRE	WARNING
WRECKS DEPTH VALSOU	WRECK	DANGER
ZEMCNT	ZEROMETER	WARNING
DNGHLT	DANGERZONE	DANGER
VESSEL	VESSEL	WARNING
AISTAR	VESSEL	WARNING

Time dependent warning

Each ENC object may have a time-dependent behavior. A specific object can be dangerous during a limited time, starting and ending at times specified by the data producers.

Accuracy

The accuracy of calculations performed by the ECDIS900 is independent of the characteristics of the display and the calculation error is always less than the data accuracy of the most accurate SENC. The resolution of the screen gives the limits of the accuracy of the displayed bearings and distances.

IEC 61162-450 Compliance

System function block

The ECDIS900 uses UDP communication and datagrams.

Network requirements

All equipment connected to the ECDIS900 network must be tested against the relevant requirements contained in IEC 60945. See relevant certificates.

Error logging function

Errors occurring during transmission or reception of route, as well as binary files, are stored in two log files titled 61162-450Route.log, and Error61162-450.log.

The log files are located in the folder: `Programdata/SIMRAD/Log/ECDIS900`.

Error logs and error type counters are stored in: `C:/Programdata/SIMRAD/Capture/Capture.ini`

Error types:

- ERROR2: Transmission stopped!
- ERROR4: ACK ERROR
- ERROR5: QUERY RECEIVED
- ERROR6: Corrupted Header error
- ERROR7: Transmission stopped! Error in header
- ERROR8: WRONG Destination
- ERROR9: Non re-transmittable route error.

The error log files and error counters are reinitialized every week.

Unique system function ID (SFI)

The ECDIS900 SFI is coded and stored in the Capture.ini file. It can be edited using the CaptureScreenClientApp.

Multicast group

Open the Capture.ini file using the CaptureScreenClientApp and in the Network and [RouteProtocol] sections enter the IP addresses/port numbers and DestID for the recipients of the binary file and for route sending.

Other network function (ONF)

Sensor Monitor is used as ONF. It sends 61162-1 sentences to the network using broadcast messages and internal format. Sensor Monitor doesn't use multicast, IPs and ports from the standard.
It uses ports 8001 and 8005, and broadcast IPs `192.168.3.255 (255.255.255.0)`.

Network protocol

The ECDIS900 uses network IP Version 4 protocol.

The IP datagram binary description can be checked with Wireshark:

4	4	8	16	16	3	13	8	8	16	32	32	bits	
VERS	HLEN	TOS	Total length	ID	Flags	Frag offset	TTL	Protocol	Header checksum	SA	DA	IP Options	Data

IP address assignment

- MONITORING ECDIS: `192.168.1.150` (LAN PORT 1 for ECDIS900 interconnection), and 192.168.123.150 (LAN PORT 2 for Internet access).
- PLANNING ECDIS: `192.168.1.151` (LAN PORT 1 for ECDIS900 interconnection), and 192.168.123.151 (LAN PORT 2 for Internet access).
- SIS4000 Mk2 NMEA Serial to Ethernet converter `192.168.4.200`.

→ ***Note:*** *ECDIS900 does not reserve any sub-nets.*

In an ECDIS900 network, each datagram is transmitted and received within the multicast address range `239.192.0.1` to `239.192.0.64`.

Network interface

The Ethernet switch Moxa EDS-405A Series is used in an ECDIS900 installation. It provides IGMP Snooping, QoS, IEEE 802.1Q VLAN, port-based VLAN support, and supports standards IEEE 802.3u for 100BaseT(X), 100BaseFX and IEEE 802.3x for flow control. For more information, refer to the EDS-405A Managed switch installation guide.

The Ethernet cables used in an ECDIS900 system are CAT5 STP four shielded twisted pairs, or ISO/IEC 11801 (Class D).

Datagrams

The maximum datagram input rates are:

A 1000 for the maximum number of datagrams per second received, intended for and processed by the equipment.

B 500 for the maximum number of datagrams per second received by, but not intended for the equipment.

C 300 for the maximum number of datagrams per second received by, but not intended for the equipment, at 50 % of the maximum load for item (**A**) in this list.

Maximum outgoing rate

The ECDIS900 uses 100MB LAN. Significant network traffic is split between sensor data traffic, radar overlay when it exists, and communication with VDR.

Sensor traffic is limited to a maximum of 3000 datagrams, which is about 1 MB per second.

Traffic to send image to VDR is 100 KB once per 15 seconds.

→ ***Note:*** *For the ECDIS900, it is recommended to not set the UDP packet send limit lower than the default setting (150 000 datagrams per second).*

Datagram types

All UDP multicast datagrams used in the ECDIS900 contain one of the following strings, followed by a null character (all bits set to zero) as the first six bytes of the datagram:

- "RaUdP" for transmission of binary file e.g., screen dump to VDR.
- "RrUdP" for transmission of re-transmittable binary files e.g., route transfer to and from the ECDIS900.

Bridge alert management interfaces

The system supports Bridge Alert Management (BAM). The ECDIS900 uses a communication protocol based on an interface using a series of sentences: ALF, ALC, ACN, ARC and HBT.

The interface for alerts complies with the IEC 61162-1 standard.

Alert list

The alerts can be category A, or category B.

Alert type abbreviations:

- A: Alarm
- C: Caution
- W: Warning

Category A alerts

Information	Type
Crossing safety contour	A
Crossing area with special conditions (selectable)	C or W
Crossing navigational hazards	C
Deviation from route	A
Approach to critical point	A or W
CPA/TCPA	A
AIS target processing/display capacity is about to be exceeded	C
AIS target processing/display capacity have been exceeded	W
Outside anchor watch area (escalation)	A or W
User defined alarm	A
Course change (TCS)	A
Back-Up Navigator (TCS)	A
End of track alert (TCS)	W

Category B alerts

Information	Type
Position system failure	W
Gyro failure	W
STW failure	W
Different geodetic datum. (If the local datum on the GPS is different from the WGS-84 datum, a warning is generated.)	W

→ ***Note:*** *The ECDIS900 doesn't handle emergency alarms, or category C alerts.*

Alert ID and text

When BAM is connected by serial line to the monitoring workstation, the ECDIS900 sends alarms, warnings and cautions to the BAMS.

The alert titles sent to BAM may be shorter and slightly different from the alert text displayed on the ECDIS900.

Alert titles and alert IDs sent to BAM

Alert title	Alert ID
Back up navigator	99
Different geodetic datum	3005
Position system failure	3015
Failure of GYRO	3016
Master GPS changed	3017
Failure of STW	3018
Dev from pld route off-trk alm	3024
End of track	3025
Early COG change indication	3027
Crossing safety contour	3030
Anchor watch - (Alarm)	3033
Anchor watch - (Warning)	3032
Area with spec. conds	3035
Crossing navig. hazard	3037
Approach critical point	3038
User object alarm	3040
Target capacity exceeded	3042
CPA-TCPA	3044

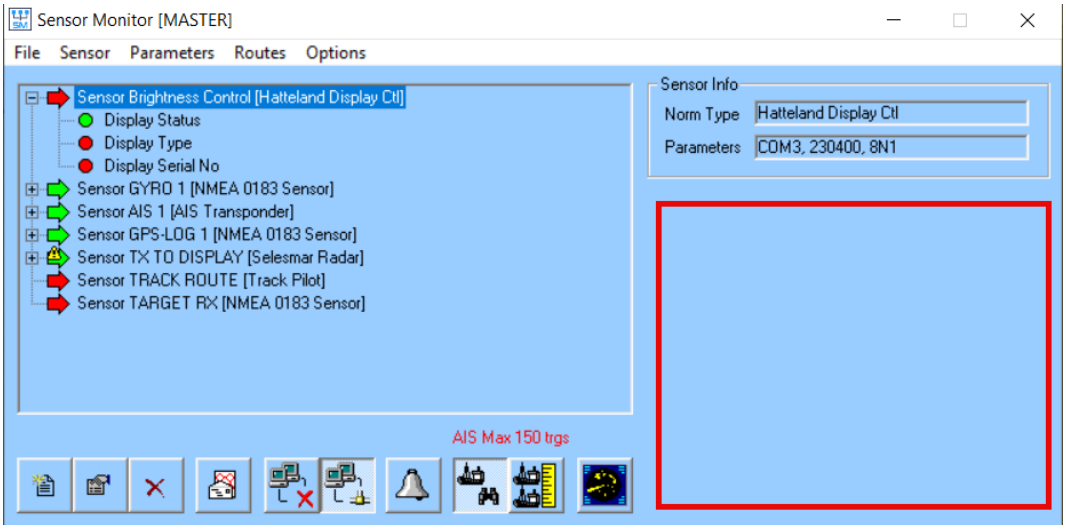
Sensor monitor

Sensor Monitor is the application that manages the I/O for the ECDIS900.

Sensor Monitor is automatically launched when the system starts and runs in parallel with the ECDIS900. For Sensor Monitor, select the type of communication (serial or network), configure the input media, check the input and the communication status, select the master parameters, and eventually route data to other receivers.

To bring Sensor Monitor to the front, click the switch to Sensor Monitor icon  on the toolbar.

To customize the I/O according to the sensors connected to the PC, the technician must create new sensors and adjust the settings.



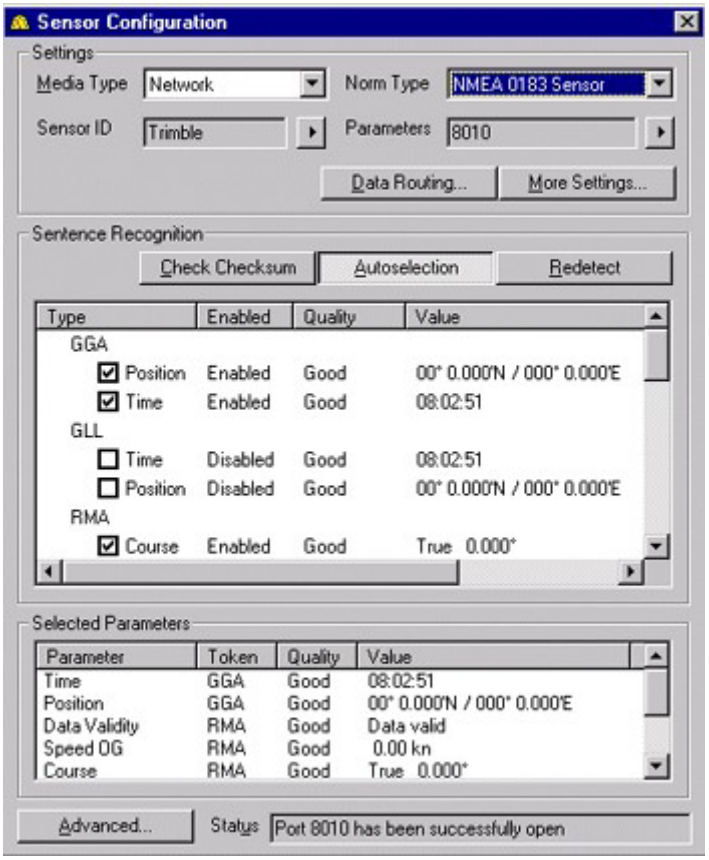
Main window

Toolbar

Icon	Description
	Create new sensor (by default, NMEA 0183® sensor; media type – serial; COM1; 8N1)
	Open sensor configuration window for selected item
	Delete selected sensor
	Send route from the ECDIS900 user data folder to GPS or radar
	Local mode. Forces Sensor Monitor to send all data locally
	Broadcast mode. Sensor Monitor will broadcast all data unless settings for those data demand other method. See below for details.
	Browse alarm journal
	Switch on/off AIS target filtering
	Change AIS target filter range
	Activate/deactivate radar target tables

Sensor configuration

To configure a newly created sensor, select the sensor and click the  icon.

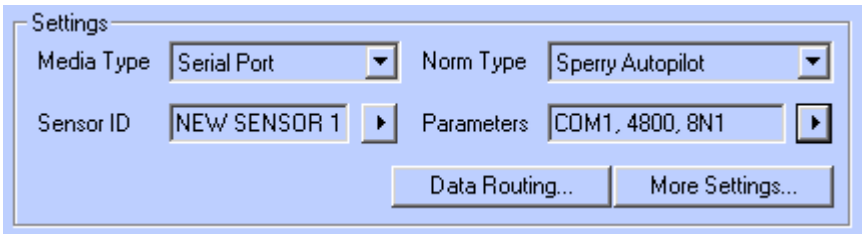


The Configuration dialog is used to:

- Modify the communication and sensor settings
- List the input messages automatically selected
- Access advanced functions to adjust the selection of input messages
- Check the communication with the terminal window and the serial status.

→ ***Note:*** *Sensor Monitor can accept the same data type from different sensors, but only the data master is used in the ECDIS900.*

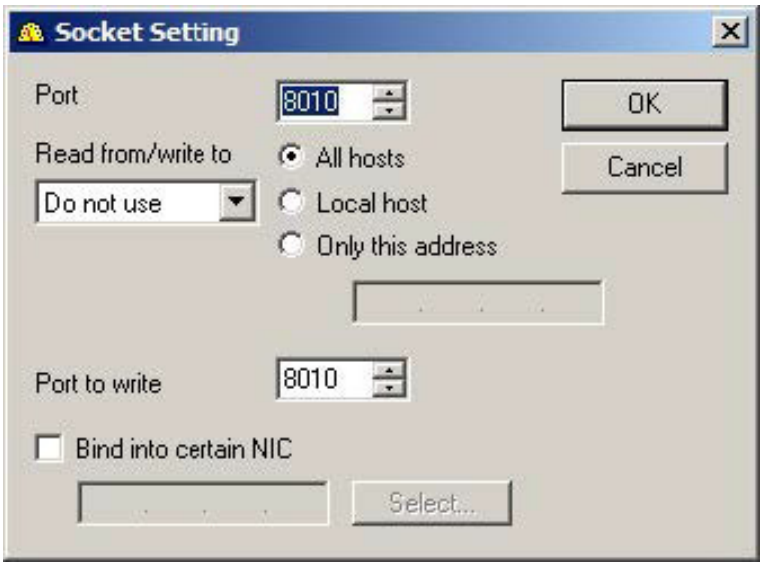
Settings



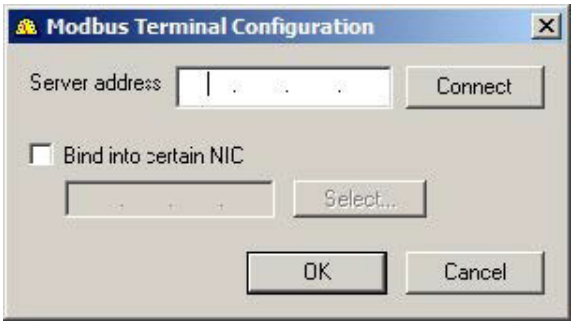
- **Media Type**: Select between serial port of Network with the pop-up menu.
- **Sensor ID**: Press the arrow and enter a proper name for the sensor.
- **Norm Type**: Select the type of norm used for the communication with the sensor.
- **Parameters**: Press the arrow and adjust the parameters: port number, baud rate, parity, stop bits for serial interface or the socket port for LAN communication.

Media type

- **Serial communication**: Select the COM port and parameters.
- **Network**: Data is read and sent to the selected UDP ports. Generally, input and output ports are different. Reading can be optionally filtered by sender IP address. Writing can be sent broadcast, multicast, locally or to the certain IP address.



- File, Internet, NC Node Manager: Used only by technicians.
- Modbus: A protocol used for communication with complicated hardware such as programming logic controllers. Sensor Monitor can work with Modbus only by TCP.



Settings: Remote host IP

Data outing

Data received on a selected serial port can be routed on the network to a specified IP Port. This advanced function allows other applications to use the same raw data received on the serial port.



More settings

Depending on the selected norm, additional settings may be required:

- **NMEA 0183®**: Use when a GPS is connected to set up the route transfer between the ECDIS900 and the GPS.
- **E/T Target Output**: Targets acquired by the Maris PC Radar Kit can be sent on serial line with NMEA format. The target table can then be used by another application.
- Lehmkuhl Gyro.
- **AIS Transponder**: Adjustment may be necessary during installation.
- **NMEA® Gyro Emulator**: Sensor Monitor can be used as Gyro repeater.
- **Network repeater**: Use when several PCs run ECDIS900.

➔ ***Note:*** *Other norms are related to the VDR and are not described in this documentation.*

Auto detection

When the adequate norm is selected in the list, NMEA for example, the input data flow is automatically analyzed by Sensor Monitor and the different parameters extracted from the sentences (speed through water, wind direction, etc.).

When auto detection is ON and Sensor Monitor starts, the Sensor Monitor application selects the first valid sentence for each data type. For example, a GGA sentence may be selected for a position.

To select another sentence for the same data (GLL for example), it is necessary to set auto detection OFF and toggle the check box for GLL.

➔ ***Note:*** *This feature may be used to ignore a specific sentence and data.*

Checksum validation

NMEA-based and NMEA-like protocols provide CRC-based checksum to validate integrity check for all sentences.

Checksum validation increases data reliability but takes some time and resources. For strong and fast data flow (such as AIS), it could be significant.

Advanced

The Advanced button allows you to check an input and output data flow with a terminal window, which displays the raw data acquired on the specified serial port.

The left side of the window displays the input data and the right side the output.

Log files

It is possible to record the input and output data flow and save the data in files for further analysis. To log files:

1 Press **Write Log**.
2 Select input or/and output.
3 Browse to get the destination folder and enter a name.
4 Press **OK**.
5 After few minutes, press **Write Log** again to stop the recording and close the file(s).

Communication status

Parameter icons

- **Green circle**: Indicates the parameter is correctly analyzed.
- **Red circle**: Indicates the parameter is either no longer received or is received with errors or false value.

Sensor icons

- **Green arrow**: Indicates the sensor is working properly and receives data.
- **Red arrow**: Indicates the sensor has stopped sending data.
- **Arrow with exclamation mark**: Indicates some parameter data is missing.

Master icons

- **Master Parameter Indicator ON**: Indicates the parameter is the master. This is important when several sensors deliver the same data type.
- **Use for Extractor ON**: Indicates the value is sent to the Extractor Tracker board.

Master and slave modes

Sensor Monitor can work in two modes: master and slave. The mode is linked to the ECDIS900 monitoring and planning mode, i.e. switching an ECDIS900 from monitoring to planning mode automatically switches Sensor Monitor from master mode to slave mode

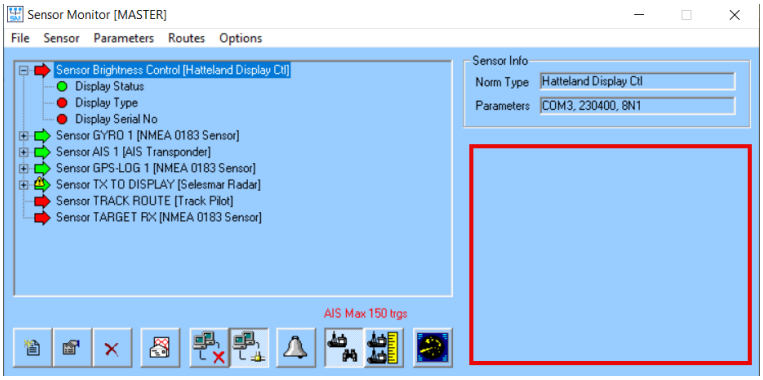
Local or broadcasting mode

Sensor Monitor may be used in local mode or broadcast mode. In local mode, data acquired by Sensor Monitor is used locally. In broadcasting mode, data is sent on the LAN to be shared with all ECDIS900 installed on the LAN.

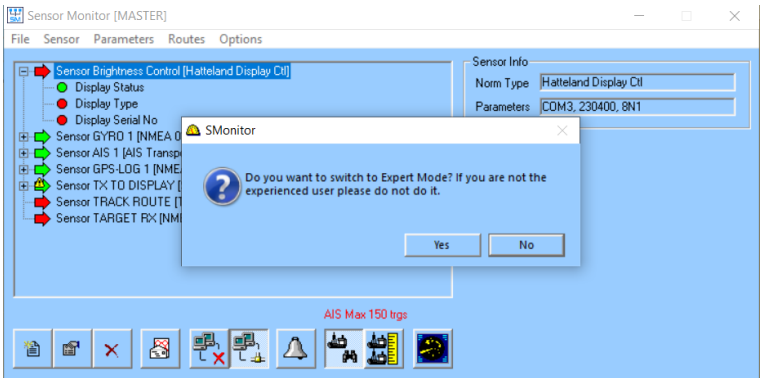
→ ***Note:*** *Local mode is set automatically by Sensor Monitor when it detects there is no network connection or three is a failure in the LAN connection.*

Expert mode

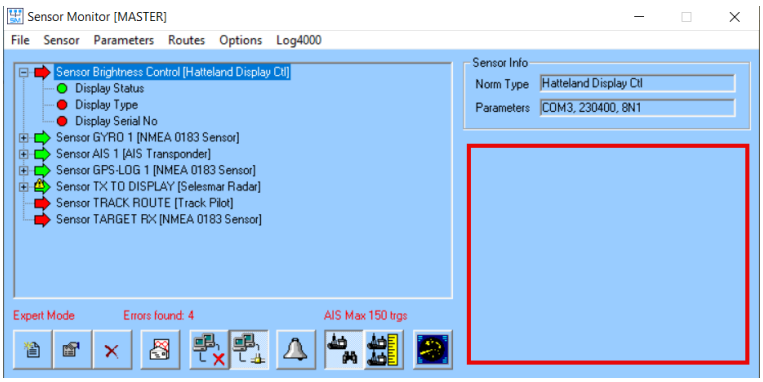
Sensor Monitor can work in two different levels: basic and expert. To switch from one level to the other, double right-click the grey area in the main window.



Basic mode with area to click for switching the mode



Switch dialog box



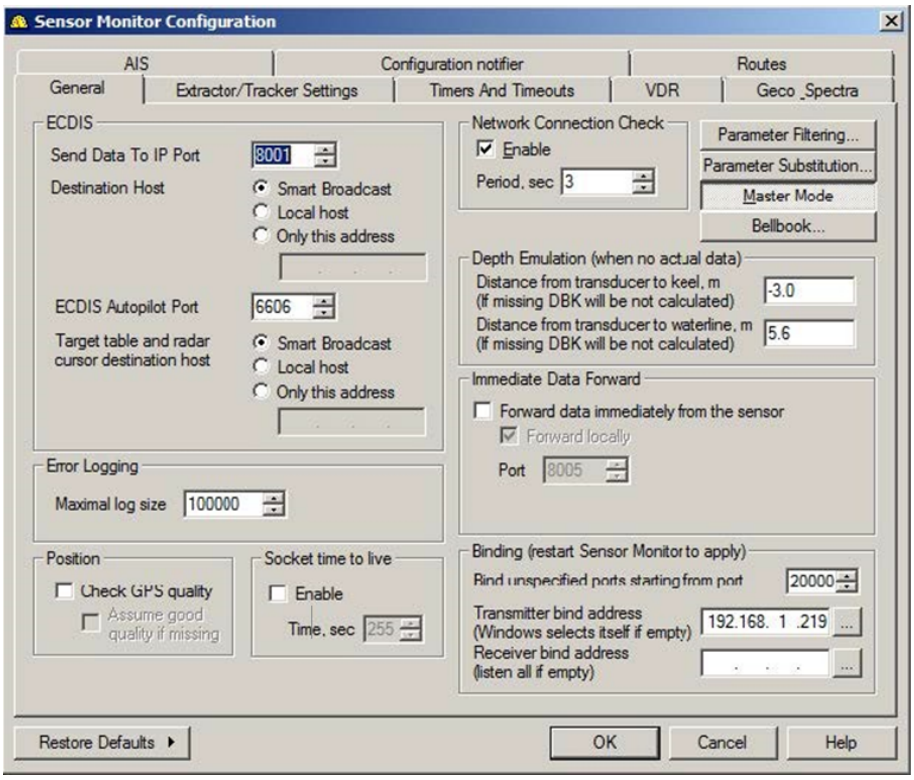
Expert mode

Expert mode offers more possibility to tune Sensor Monitor and is reserved for qualified persons. Restoring default settings for the current page is possible by pressing the Restore Default button.

Alarm log

Each significant event is logged into the special Alarms Log. To display the log, press the Alarm Journal button in the main window.

General settings



Settings in export mode

- **Send data to IP port**: Specifies main output UDP port to which parameter data and target tables (non-AIS) will be sent to.
- **Destination host**: Specifies destination mode for this port. Smart broadcast means that Sensor Monitor will broadcast data if there is a network connection, otherwise it sends data to 127.0.0.1.
- **ECDIS autopilot port**: Specifies port for receiving different ECDIS900 feedback (autopilot data and so on). ECDIS900 always broadcasts this data if possible.
- **Check GPS quality**: Controls "position quality protection". The position is marked as faulty if there is no GPS quality indicator or if the quality is different from Autonomous or differential. Important: AIS sensor does not send position quality indicator.
- **Assume quality if missing**: When ticked, forces to assign good quality state to the position when GPS quality indicator is missing but not present and invalid. This allows you to use position sources like AIS transponders.
- **Socket time to live**: Allows limiting number of packet hops between network routers. It is possible to not allow packets to be sent outside of certain subnets. This feature is an alternative to multicast groups.
- **Network connection check**: Specifies if it is necessary to check the network connection periodically. If this mode is activated, Sensor Monitor will periodically check the network connection.
- **Depth emulation**: Allows Sensor Monitor to emulate depth below keel and surface using given offsets in situations where there is only depth below the transducer.
- **Immediate data forward**: Sets up special quick data transmission protocol that is used for Radar Kit and for some OEM solutions. Activate it only when it is really needed (i.e. Radar Kit presents) as it loads LAN traffic. You also can force it to be local only.
- **Bind unspecified ports**: Sets up how to assign "implicit" (unspecified) UDP ports to avoid collision with other software.
- **Transmitter bind address** and **receiver bind address** (when specified): Allows the use of only one LAN interface card for the computer that has more than one. If these fields are empty, the transmitter and/or receiver will use all LAN cards instead.
- **Parameter filtering button**: Accesses the parameter filtering setup dialog (see above)
- **Parameter substitution button**: Accesses the parameter substitution setup dialog (see above).
- **Master mode button**: Switches Sensor Monitor from master mode to slave mode and back. This immediately affects the ECDIS900.ini file so, if ECDIS900 is running, it will be switched from monitoring mode to planning mode and back.

Extractor/Tracker settings

When the Simrad MK6.0 radar interface box is used, Sensor Monitor master is in charge of sending appropriate data to the extractor/tracker application responsible for radar video delivery.

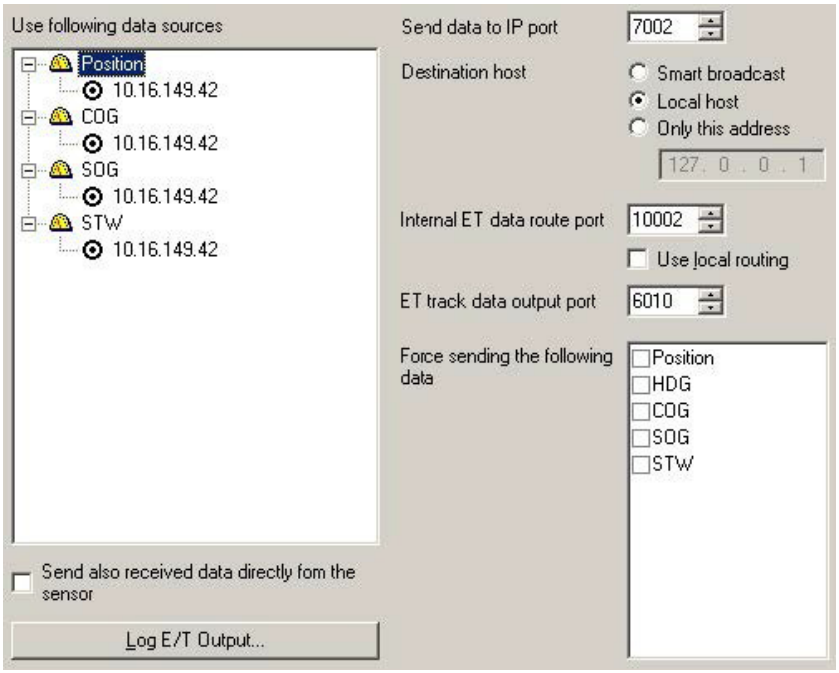
It collects all information related to Extractor Tracker from other Sensor Monitor applications running on the LAN and sends the appropriate data to the Extractor Tracker board.

For instance, the Gyro source is the most important and must be selected as follows:

If one Gyro is connected to the planning workstation and another Gyro to the monitoring workstation, you must select which gyro data is used by the Extractor Tracker software.

On the master ECDIS900 workstation, it is necessary to select the source of data for Extractor Tracker as follows:

1 From the Options tab, select Settings. The Sensor Monitor Configuration dialog will open.
2 Select the Extractor/Tracker Settings tab.
3 Select the sensor that provided the data parameter you want as the Extractor Tracker data source.
4 Expand it if it is not already expanded.
5 Select the parameter to be selected as the Extractor Tracker data source.
6 Tick the Extractor Tracker data source check box.



Settings in expert mode

- **Send data to IP**: Port specifies main output UDP port to which Extractor Tracker data is sent.
- **Destination host**: Specifies the destination mode for this port. Smart broadcast means that Sensor Monitor broadcasts data if there is a network connection, otherwise it sends data to `127.0.0.1`.
- **Use following data sources** tree: Shows all usable data presented in the network. Data is grouped first by kinds and then by sending host. Only one data of each kind can be chosen. By default, Sensor Monitor chooses first coming data of each kind, but you can change this layout.
- **Send also received data directly from the sensor**: Specifies if the master or slave Sensor Monitor that receives Extractor Tracker-related data must send it out directly from the sensor (immediately when received) instead of normal data dispatching.
- **Internal ET data route port**: Specifies UDP port that is used to send Extractor Tracker related data internally from slave Sensor Monitors to master Sensor Monitor. If local routing is switched on (applicable for standalone installation only), this routing will be completed only for the local PC.
- **ET track data output port**: Specifies UDP port to read set and drift information.
- **Force sensing the following data**: Allows Sensor Monitor to send some kinds of data even they are not present in the input data flow (in this case data will be filled with zeros).

Autopilot

The ECDIS900 can be interfaced with standard NMEA compatible auto pilots and with different Track pilots including Emri Track pilot.

⚠ **IMPORTANT: Bearing out parameter to be ignored.**

PLC and ADC/DAC

PLC (programming logic controller) could be used for different purposes. They are used as analog-digital converter and input and output relays. That means, PLC can measure voltage or current in the electrical chain, recognize the trigger state (high/low voltage level) and generate output trigger signal.

NMEA XDR sentence set belongs to the same sensor group because transducers provide analog signal measurement results or trigger/valve states. So, this sensor is described here and uses the same protocol to transfer data.

Alarm relay box

This sensor is communicating with DigitalLogic PLC DL05. This device has 6 input and 8 output relays that can be queried/ scheduled.

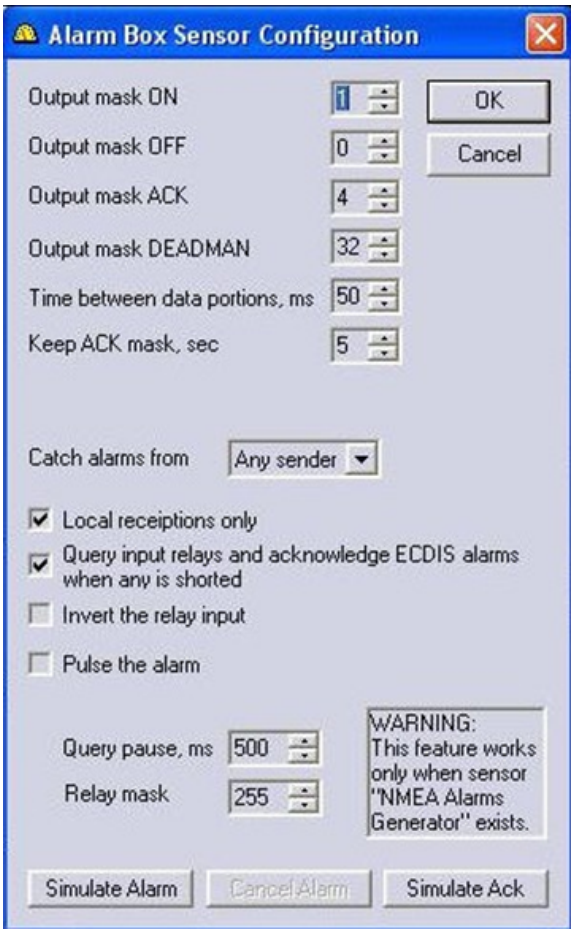
Usually, DL05 is used as the link between the software and alarm control system such as BNWAS for Dead Man alarm or Alarm buzzer.

The sensor accepts from ECDIS900 current alarm status and if the status is non-zero, the sensor switches output relays into "alarm on" state.

When the Acknowledge button is pressed in the ECDIS900, the sensor switches output relays into "Acknowledge alarms" state. Normally this state is used to tell the hardware alarm system to clear any alarm sound. This state will be kept for some given time and then cleared again.

Optionally, the sensor can switch output relays into "Deadman alarm" state. This happens when nobody touches the ECDIS900 for some certain period. Note that Application Manager must be installed and configured on the same computer.

Optionally, the sensor can query periodically input relays (that can be connected to "acknowledge" or "horn off" buttons of the hardware alarm system). If they are shorted, the sensor will force the ECDIS900 to acknowledge alarms. Note that this feature works only if you have created and configured the "NMEA alarms generator" sensor.



Advanced configuration dialog

- **Output mask ON**: Specifies which relays must be shorted when Sensor Monitor is informed of unacknowledged alarms. This value is a mask where bit 0 represents relay No.1, bit 1 represents relay No.2, etc. Value 63 means all 6 output relays must be shorted.
- **Output mask OFF**: Specifies which relays must be shorted when Sensor Monitor is informed there is no unacknowledged alarm.
- **Output mask ACK**: Specifies which relays must be shorted when Sensor Monitor is informed that the Acknowledge button has been pressed.
- **Output mask DEADMAN**: Specifies which relays must be shorted when Sensor Monitor is informed that nobody has touched any button of the navigational computer for a certain time.
- **Time between data portions**: Specifies how often Sensor Monitor should send control signals to the PLC.
- **Keep ACK mask**: Specifies how long Sensor Monitor should keep ACK state. After this time, PLC will be reverted to OFF state.
- **Catch alarm from**: Specifies from which software Sensor Monitor must receive and take the alarm state into account. Alarm state received from other software will be ignored. If the user chooses "any sender", Sensor Monitor will accept any alarm state.

- **Local receptions only**: Specifies if Sensor Monitor should ignore any alarm-related information received from other PCs.
- **Query input relays and acknowledge ECDIS alarms when any is shorted**: When ticked, Sensor Monitor will query input relay(s) connected to "acknowledge" or "horn off" buttons of the hardware alarm system. If the buttons are pressed, the Sensor Monitor forces ECDIS900 to acknowledge all its alarms.
- **Invert relay inputs**: Specifies if the relay is open when "acknowledge" or "horn off" buttons are pressed and shorts the relay(s) inversely.
- **Pulse the alarm**: Specifies if Sensor Monitor must make short pulse when it receives information that "acknowledge" or "horn off" buttons are pressed.
- **Query pause**: Specifies how often Sensor Monitor should query input relays.
- **Relay mask**: Specifies which input relays must be queried.
- **Simulate alarm**, **Simulate Ack** and **Cancel Alarm** buttons imitate certain situations.

Export/Import routes to/from GPS

To export and import routes to or from a GPS, it is necessary to activate the export function and select the format for the data transfer. The protocol can be different from one GPS to another. To activate the route transfer function, select the GPS type by pressing the **More Settings** button in the **Configuration** window of the GPS port and select the format from the **Route Download** pop-up menu.

⚠ **IMPORTANT: The two ways communication between ECDIS900 and GPS requires a three wires RS 232 connection (Rx, Tx and Ground) or RS 422 connection.**

Reception in ECDIS

The routes sent from the GPS are automatically converted to ECDIS900 format and placed in the Route/GPS folder and then can be loaded on the chart.

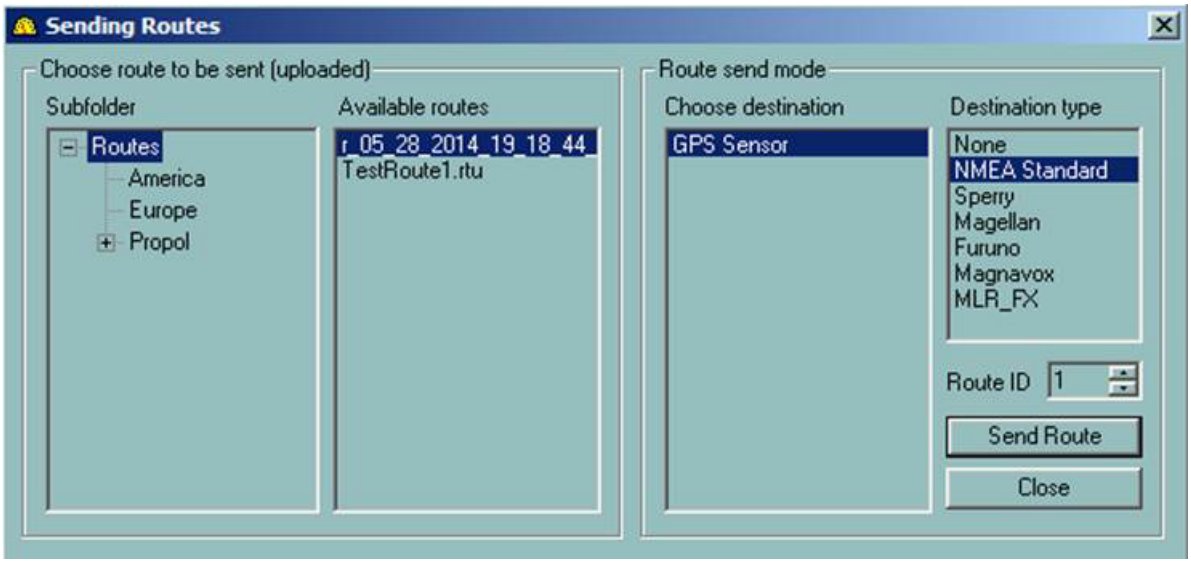
Two different types of route can be sent from GPS: an active route or a complete route. The first waypoint of an active route sent to ECDIS900 is the active waypoint.

- When an active route is received by the ECDIS900, it is stored in the route database and automatically loaded and activated in the ECDIS900.
- When a non-active route is received, it is stored in the database but not loaded automatically.

Sending routes from ECDIS

The routes created in ECDIS900 can also be sent to the GPS.

Click the  icon and then select the route, the available serial port and the address. The route is sent by default with an integer as the route name and each waypoint ID of the route is identified by an integer starting at 0.



BAMS, Bridge alarm management system

The ECDIS900 system provides alerts and indications to inform about critical or noncritical failures and other events. Alerts are indicated on each ECDIS workstation and are synchronized with BAMS (Bridge Alert Management System).

ECDIS900 may be interfaced to BAMS on board.

The certified interface ECDIS900 - BAMS a serial interface and uses a communication protocol based on an interface using a series of sentences, ALF, ALC, ACN, ARC and HBT. The type of interface for the alerts is IEC 61162-1.

When ECDIS900 is connected to BAMS by serial line the alert management procedure in ECDIS900 is facilitated by the centralized alert management. This includes:

- Remote display of alerts with their status on BAMS display
- Remote silencing of the alert sound signal from BAMS
- Remote acknowledgement of selected alerts of category B from BAMS.
- Limitation: category A alerts (safety contour alerts for instance) cannot be remotely acknowledged from BAMS.

Sound notifications

By default a sound signal accompanies an alert message that is not acknowledged and the pulse frequency of the flashing of the alert button is 1 Hz. The following sound patterns are used:

- Alarm: 3 beeps each 10 seconds; the alarm can be silenced once without acknowledgement for the next 30 seconds.
- Warning: 2 beeps each minute.

Alarms and warnings are accompanied by an appropriate audible signal pattern emitted by a buzzer located in the front frame of the monitor or in a panel.

Alerts

The alerts in ECDIS900 are displayed in a dedicated panel which is scrollable depending on the number of alerts raised in ECDIS900 are Interfaced with BAMS by serial line, ECDIS900 sends all alerts information to BAMS including clear text, ID, silence, or acknowledgement commands.

List of alerts and identifiers:

- 55=Stop track control,B,W,55,
- 54=Stop track control,B,A,54,
- 99=Back up navigator,C,A,99,
- 111=Heading monitoring,B,W,111,
- 114=Position monitoring,B,W,114,
- 159=Low speed TCS,A,W,159,
- 1054=Change to manual steering,B,W,1054,
- 1111=Master GYRO changed,B,W,1111,
- 1171=Danger in streamer zone,A,W,1171,
- 3005=Different geodetic datum.,B,W,3005,
- 3015=Position system failure,B,W,3015,
- 3016=Failure of GYRO,B,W,3016,
- 3017=Master GPS changed,C,W,3017,
- 3018=Failure of STW,B,W,3018,
- 3024=Dev from pld route off-trk alm,A,A,3024,
- 3025=End of track,B,W,3025,
- 3026=End of track,B,A,3026,
- 3027=Early COG change indication,A,W,3027,
- 3028=Actual COG change indication,A,A,3028,
- 3031=Crossing safety contour.,A,A,3031,
- 3033=Anchor watch.,A,A,3033,
- 3032=Anchor watch.,A,W,3032,
- 3035=Area with spec.cond.,A,C,3035,
- 3037=Crossing navig.hazard,A,C,3037,
- 3038=Approach critical point,A,A,3038,
- 3040=User object alarm,A,A,3040,
- 3042=Target capacity exceeded,A,W,3042,
- 3044=CPA-TCPA,A,A,3044,
- 3052=Lost target alarm.,A,W,3052,

APPLICATION MANAGER

General

Application Manager is the special software which works as Shell on the computers.

Application Manager is specialized for the tasks. At the same time, Application Manager gives the administrator the minimal set of required system functions to restrict access to the system.

The application runs in two modes:

- Service mode
- Operation mode

Operation mode

ECDIS900 computer access is restricted to those functions necessary for the ECDIS900 and other delivered applications allowed after configuration.

In this mode, it replaces Windows Explorer and takes some important functions which improve the reliability of the software.

In approval mode, all standard shortcuts except those used in the applications, are unavailable. Ctrl-Alt-Del is disabled too.

Views modes

Application Manager can work in two different view modes:

- Iconic (collapsed small, square or thin bar on the right)
- Full (bar window).

Application Manager can run in two security-level modes:

- Operational mode (restricted access)
- Administrator mode (full access)

Application manager iconic view

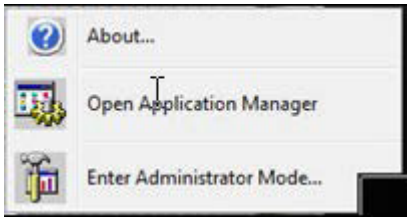
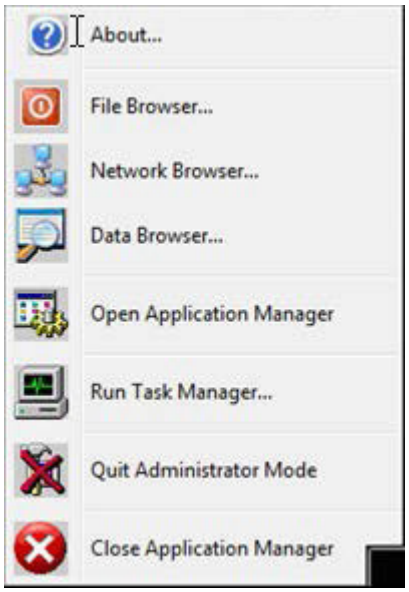
Display

Iconic view is the normal state of the application. Two iconic representations are available (option available during installation):

Icon	Description
	Movable icon. This icon can be placed trough the screen at any position. The last position is remembered
	Application manager is automatically hidden on the right side of the window when not in use. Click the extreme right side of the window near the console area to reopen it.

Menu

Double-click or right-click the menu option Open Application manager to access the Application Manager's full window. There are two possible modes: operational and administrator.

Mode	Description
Operational 	• Show information about the application • Open Application Manager window in full view mode • Change to administrator mode: password is required
Administrator 	• Show information about the application • Activate file browser (manage files and folders) • Activate network browser (manage remote computers and shared resources) • Activate data browser (analyze MARIS internal data protocols) • Open Application Manager window in full view mode • Run Task Manager • Switch to operational mode • Stop the software (not recommended).

Application manager full view

Full view provides maximum functionality of the application. You are shown a vertically oriented window with four main areas – button area, system tray and two task lists – approved tasks and additional tasks.

If you move the mouse away from the window and keep it there for more than 3 seconds, the window collapses back to iconic view.



Operational mode



Admininstrator mode

Security level mode

Operational mode

Icon	Description
	Reboot computer
	Switch off computer
	Open Security Settings dialog

In the operational mode, Application Manager completes the following functions:

- Acts as a shell.
- Keeps all approved applications running. If some of them crash, it restarts them. If some of them freeze, it restarts them too.
- Shows all enabled applications in the System Tray (see Security Settings dialog)
- Controls the applications protection system (each application is password-protected in approval mode)

Administrator mode

Icon	Description
	Reboot computer
	Switch off computer
	Open Security Settings dialog
	Open Administrative Settings dialog
	Run an external application using Windows Run dialog

In the administrator mode, additional functions are available:

- Administrative settings
- Control Panel (other than standard Control Panel offered by Windows Explorer)
- Run Windows Explorer (not recommended in approval mode because some shell functions will be cached by Explorer)
- Open Administrative Tools folder (and open some tools if necessary)
- Open My Documents folder
- Find files
- Run an external application
- Edit all three task lists (approved applications, additional applications, system tray applications)
- File browser (other than Windows Explorer)
- Network browser (other than Windows Explorer)
- Data browser (analyzes SIMRAD internal data protocols, informs administrator about size, number, and type of data packets)
- Run Windows Task Manager
- Change SIMRAD application passwords.

Approved applications

Approved applications must be running all the time. If some of them crash (or are closed), Application Manager starts them again. The built-in watchdog identifies those applications if they freeze and restarts them then. In Administrator mode, some of them could be suspended temporarily. Each application has its own button. Any user (not administrator only) can activate any approved application and open its window by a click of the button.

Application manager watches "missing" applications. This means if some application is included into Approved Tasks List and the corresponding executable file is missing or corrupted, Application Manager periodically tries to run it and immediately when problem is resolved, the application will start.

If the application is OK, the corresponding button shows an image – the first icon from the resource list of the executable. If the application is suspended by the administrator, the button is grayed out. If the application is not running for some reason (except missing or corrupted file), the button blinks. If there is a missing or corrupted file, the image is a red question mark.

Additional applications

The additional (other) application list is like the approved applications list. There are the following differences:

- Application Manager does not keep other applications working. If some of them crash or are closed, Application Manager just shows their new state but does not restart them.
- No freeze watchdog
- No suspend
- No auto-start.

All other points are identical to Approved applications list.

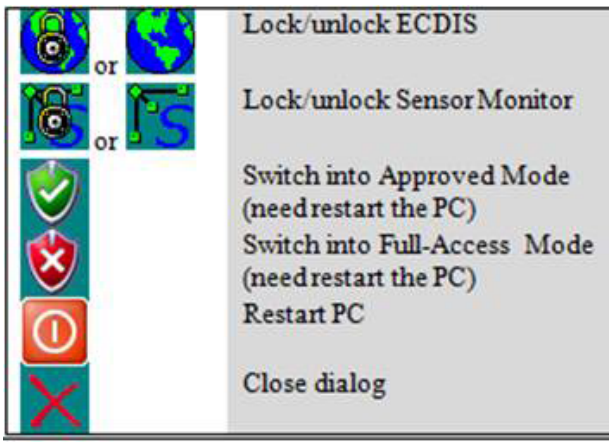
System tray applications

The icons for Windows applications that are not running in the foreground are displayed in the System tray section of the Application Manager.

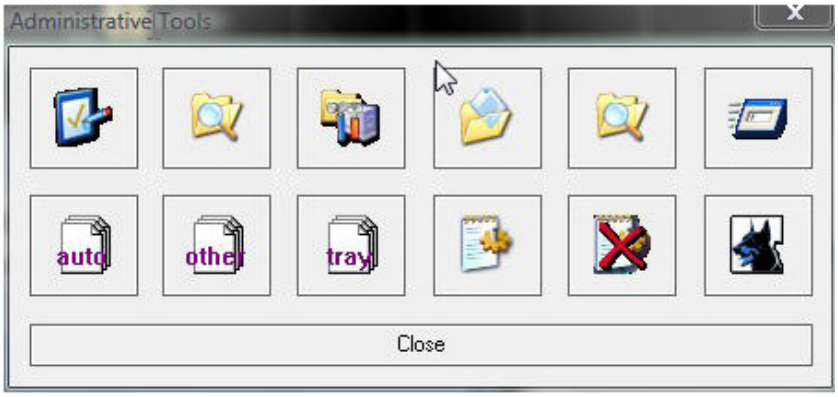
Security settings



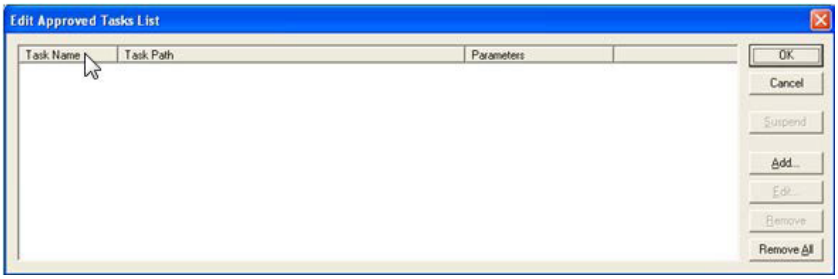
The icons provide the following functionality:



Administrative settings



Editing task list



The above is the common view of all three task list editing windows. The only difference is that the Approved (Auto) Task List includes the **Suspend** button.

- **OK** — Save changes and close the window
- **Cancel** — Do not save changes and close the window
- **Suspend** — Approved (Auto) Task List only. If pressed, the selected application won't be traced/restarted etc.
- **Add...** — Add new task into list
- **Edit...** — Edit current task properties (see below)
- **Remove** — Remove task from the list
- **Remove all** — Clear task list

Task list member editing



- Icon area — If an executable module is chosen, its first icon displays
- Task name — Label of the path. This string shows in the tooltip when you move the mouse cursor to the corresponding button
- Task path — Path and name of the executable module
- Parameters — List of command-line arguments
- Hot Key — Optional keyboard accelerator used to activate this task. This is not relevant for the System Tray Task List.
- Keep this window active all the time — If checked, Application Manager will keep this window active all the time (and keep it in front). It will behavior like Windows Task Manager.
- Watchdog — Task freeze watchdog on/off
- Timeout — Assume task to be frozen if it does not respond within this time
- OK — Save changes and close
- Cancel — Do not save changes and close

Default profile

The default profile is a set of standard settings which control all three task lists. To create a set of your own common settings, press the **Create Standard Profile** button.



Select the software installed on your PC and press OK.

➔ ***Note:*** *You can completely clear all three task lists using the Clear Profile button.*

File browser

Application Manager File Browser works like Windows Explorer. In the path line you can manually enter the path to browse. Or you can press the second button on the right to choose a path in the dialog. Alternatively, you can choose the root folder of any logical drive.

Popup	Item		In the context menu	Purpose
File	Choose Drive...		Yes	Choose root folder of selected logical drive
	Open		Yes	Open selected item (or first selected if more than one is selected). The operation is completed according to Windows associations. Use Windows Explorer to edit them.
	Open As...		Yes	Open standard **Open As** Windows dialog box
	Print...		Yes	Print selected item to the default printer. If more than one item is selected, first one will be printed out.
	Add printer...		Yes	Run Add Printer Windows wizard
	Browse		Yes	Browse for folder
	Sharing		Yes	Open standard Windows Properties dialog on Sharing page
	Properties		Yes	Open standard Windows Properties dialog
	Create folder		Yes	Create new folder
	Map Network Drive		Yes	Open standard Windows Map Network Drive dialog
	Empty Recycle Bin			Empty recycle bin
	Close			Close File Browser window
Edit	Undo		Yes	Undo last operation (not implemented yet)
	Cut		Yes	Cut selection
	Copy		Yes	Copy selection into clipboard
	Delete		Yes	Delete selection
	Paste		Yes	Paste from clipboard
	Copy to...		Yes	Copy selection into selected folder
	Move to...		Yes	Move selection into selected folder
	Rename		Yes	Rename selected (or first selected) item
	Select All		Yes	Select all items.
View	Sort	Name	Yes	Change sort order Sort and arrange items
		Extension		
		Creation time		
		Modification time		
		Size		
	Large icons		Yes	Change the representation (not implemented yet)
	Small icons		Yes	
	List		Yes	
	Details		Yes	

⚠ IMPORTANT:

- Items are selected the same way as in Windows Explorer.
- You can open as many instances of File Browser as you need. They use the same clipboard format so you can easily copy files and folders from one to the other. However, this format is not compatible with Windows standard clipboard format, so you can't copy to and from another file manager.

Network browser

File Browser is an analog of Windows Explorer like Network Browser is an analog of Network Neighborhood. It is a simple and effective tool that lets you to browse other workgroups, computers, and their shared resources. Shared resources can be mapped using File Browser.

When you open Network Browser, it scans the network and shows you the found network components.

There are few menu items:

- **Open** — Browse the selected shared resource using File Browser.
- **Map** — Run standard Windows Map Network Drive dialog for the selected shared resource.
- **Close** — Closes the window.

You can open as many instances of Network Browser as you need.

Drive browser

Drive Browser is simple window that lets you choose an existing drive of any type and browse its content.

The following icons are used for drives:

Icon	Description
	Hard disk
	Compact disk (CD/DVD)
	Mapped network resource
	Removable drive (flash memory stick, etc.)

If you right-click any drive, the context menu displays.

It contains the following menu items:

- **Select** — Select logical drive and close Drive Browser
- **Refresh** — Refresh drives list (for instance when new flash disk has been mounted)
- **Browse...** — Browse root folder of the selected drive using File Browser (see above)
- **Map Network Drive...** — Open standard Windows Map Network Drive dialog
- **Cancel** — Close Drive Browser.

Data browser

Data Browser is a tool that analyzes network traffic and recognizes some data packets which are passing through. It uses mostly standardized protocols, and any data could be classified by type and sender.

Choose the UDP port you want to trace, and press **Listen**. The most useful ports are 8001 (most of the data from Sensor Monitor to the ECDIS900, ARPA and VDR), 6606 (most of the data from the ECDIS900 to Sensor Monitor), and 4101 (ECDIS900 internal change port).

If you need to, you can record (log) caught data. Press the **Record** button, choose the log path and name and keep the button pressed for a while, then release and you can use the log file. Warning: This button is only visible when Data Browser is listening.

For each sender, Data Browser shows its IP address and a list of packet types received. For each packet type, it shows the name of the packet, the program sender (different programs could send packets from the same IP), number of bytes, number of received packets, and the time and date for the last packets received.

Running an external application

You can run an external application like you would using the Run option from the Windows Start menu. The standard Windows Run dialog opens.

Opening administrative tools

Application Manager opens a special Windows folder called Administrative Tools using File Browser (see above). You can work with shortcuts in that folder like any other folder.

Launching control panel

Application Manager opens a special window that contains all Control Panel applet shortcuts. You can work with them the same way as Windows Explorer.

Changing software passwords

Any delivered software is protected using two passwords – user and administrator. Some functions need user password, some need administrator password. Here you can change those passwords.

The following dialog shows:



Enter the old password and then the new password twice. Press **OK** to confirm.

Deadman alarm

To use the deadman alarm, you need Application Manager version 1.1.0.0 or later.

During the installation of Application Manager, answer yes to the question, "Use DeadMan watchdog?".

The default pause period is 600 seconds.

Application manager configuration

In Administrative Tools, press  (administrator mode is required).



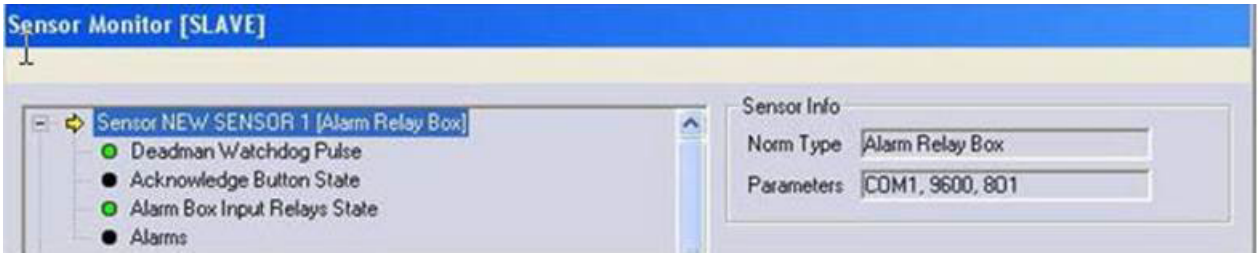
Check the **Use Deadman Watchdog** option.

A pulse will be sent according to the value in the **Pulse period, sec** field (in this case, every 600 seconds or 10 minutes) if the mouse or keyboard were moved during the last 10 minutes.

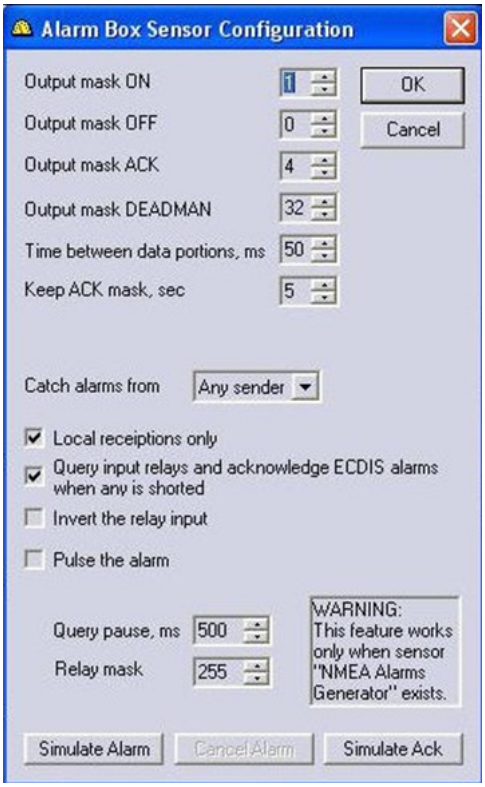
Sensor Monitor configuration

Create (if it doesn't already exist) an Alarm Relay Box sensor.

Connect the dedicated serial port to the relay box using the proper cable (here is COM1).



Alarm box sensor configuration



In the **Alarm Box Sensor Configuration** dialog, the **Output mask DEADMAN** option sets up which pins should be pulsed when Application Manager sends a message that the mouse or keyboard were used since the last check (in the example above, 32 gives the function to the 6th led). Normally, the pulse takes 2 seconds, but you can change this using the **Keep ACK mask, sec** option.

VDR watchdog

Installation

VDR watchdog requires Application Manager and a VDR module which is running as a service (VdrMon) on the VDR Computer.

- Copy vdrmon.exe into VDR program folder
- Copy vdrmon.ini into VDR program folder
- Command "run vdrmon.exe –ia"
- Start the service with command line -s or via MMC.

The service broadcasts notifications immediately when VDR changes the currently writing file on the alternative data storage (normally, root folder of D: drive). Usually this happens once per hour but if the crew wants to have this check more often, they could reduce the timeframe length in VDR Configuration Manager.

Configuration in Application Manager

The settings in Application Manager are in the same window as the Deadman alarm settings:

1. Enter administrator mode.
2. Click the **Administrative Settings** button.
3. Click **Watchdog Settings** icon to display the **Watchdog Settings** dialog.
4. Check **Listen VDR software watchdog**.
5. Choose a proper port (by default it is 41117).
6. Choose the timeout (for instance, if VDR writes new file to D: once per hour, choose something like 3620 seconds).
7. Choose a period of check. When the alarm window displays, the information will refresh once per the specified number of seconds.
8. Press **OK**.



Alarm

If there is no file change within the given timeout, Application Manager displays an alarm window with the text "VDR recorder is not writing data for ..."



The warning is refreshed once per check period.

If Application Manager receives the notification from the VDR software watchdog, this window disappears immediately.

If the **Acknowledge** button is pressed, the window is hidden temporarily; but if there is no notification in the timeout period, the window appears again.

View log

To see the alarm log, press the **View Log** button.

Multi hardware

The ECDIS900 has been approved with different PCs and monitors. The ECDIS900 needs a proper color table to be used. During installation of the ECDIS900 software, it is necessary to select the targeted display.

➔ ***Note:*** *When MK5B monitors are used, the color table is automatically uploaded from the monitor to the PC.*

Operational limits

Operational limits of the ECDIS900 are listed here.

Tests

Regular, on-board tests must be performed to check all components of the system work properly.

Launch and quit ECDIS900

⚠ **IMPORTANT: All software, including ECDIS900, should run with Application Manager operating as Shell on SIMRAD computers.**

The ECDIS900 runs under Windows 10.

When the workstation is powered, Application Manager and ECDIS900 are automatically launched, therefore Windows file management is not accessible in the Operational mode (see Security level mode for details).

It is impossible to hide the application or to access to the file system not operating in the Administrator mode.

To quit the ECDIS900 application, the computer should be switched off or rebooted. These operations are performed via Application Manager.

Backup

Back up is essential and should be done regularly. For more information, refer to the Maris ECDIS900 Backup/Restore Procedures User Guide.

Troubleshooting

Wiring NMEA and RS-232 instrument systems

Most installation issues and faults stem from one of two causes:

- The connecting cables are not wired correct, or are picking up interference, resulting in a non-working or unreliable installation.
- Instruments have not been set up to ensure the correct data gets from one point in the system to the other.

Getting the cable connection right is the first step in troubleshooting.

Connection tests

When one or more input and/or output devices are connected to the computer, the connections must be tested to ensure that all is working correctly. The ECDIS900 provides a useful tool to help perform this test.

Hyperterminal is an application built into Windows XP and Windows 7 that allows testing of connections to the input devices. If input devices are connected correct, Hyperterminal displays recognizable characters. Incorrect connected input devices either show no information, or garbled characters.

➔ ***Note:*** *The Sensor Monitor application must be closed before using Hyperterminal.*

Serial port busy

Depending on the Windows OS configuration, the serial port COM1 could be automatically closed (busy) due to the mouse management. This will prevent any more usable data being available for input.

To free the port COM1:

- Open the file `C:\boot.ini`
- Add the option `/noserialmice` twice at the end of the two last lines
- Restart.

Automatic log on process

The system starts using the latest settings, including the user name and password.

Windows

1 Enter **netplwiz** in the **Run** field of the **Start** menu.
2 The **User accounts** dialog appears.
3 Tick **User must enter a user name and password to use this computer**.
4 Click **Apply**.
5 Go to the **Advanced** tab.
6 Press the **Advanced** button in the **Advanced** user management group.
7 Check **Password never expires** is ticked for the required groups.
8 Restart the PC.

Failures and fix

Power supply

Equipment	Failure detection	Cause	Effect	Action to fix
Power cables Power switch P11	Black screen. No audible start of the computer (hard disk or fan)	No connection to an external power source. Cables unplugged. Power switch failure.	Computer won't run	Connect to an external power source. Check cables plug. Change power switch.
12 V power unit P12	Black screen. Audible start	Defective 12 V power unit	Computer won't run	Replace 12 V power unit.
5 V power unit P13	No data on screen. Faint back light visible when back light is fully on	Defective 5 V power unit	Computer won't run	Replace 5 V power unit.
Fan P14	Computer powered off automatically according to BIOS settings	The unit temperature was exceeded. The fan may be blocked.	Computer stops	Unit is in an exceedingly warm environment. Let it cool down. Ensure computer air vents are not blocked. Check the internal fan is running. Replace the fan if necessary.
Backlight P16	Black screen	Backlight failure	Black screen	Check cabling. Replace backlight card.
Buzzer P17	No Audible start	Power or Buzzer unit failure	No audible alarms	Replace buzzer board. Replace mother board.

Boot

Equipment	Failure detection	Cause	Effect	Action to fix
RAM	Long beep (4 s) Silence 2s. No Picture.	RAM failure	Computer won't boot.	Check the RAM plugs. Replace faulty RAM module.
Keyboard	None	Bad plug. Keyboard failure	No light on the keyboard. Keyboard does not respond	Reconnect the keyboard with computer off. Ensure none of the keys are depressed. Replace the keyboard.
Processor Main board P13	Fan on. No audible start.	Mother board failure. Processor failure.	No boot	Check that the motherboard and the processor are well plugged. Replace the motherboard.
Hard disk controller	Long response time. HDD failure.	Hard drive circuitry error	HD does not start	Run Computer set up. Check cables seating. Run HD diagnostics. Replace the HD. Replace mother board.
Hard disk	Long response time HDD failure. Fan on. Bios starts	Hard drive error	Warning in the system configuration window:" Pri. Master disk None. Sec. disk	Run Computer set up. Check cables. Run HDD diagnostics. Replace the HDD.
Ethernet controller	Network driver does not detect network controller.	Network controller is disabled.	No access to network	Run computer set up and enable controller network.
Ethernet controller System software set up.	Network status link light does not turn on or flashes.	No active network is detected. Network controller is not set up properly. Network driver is not correctly loaded.	Sensor Monitor cannot be launched.	Check cabling. Use the network control application to verify the device is working properly. Reinstall network drivers. Replace system board.

Video

Equipment	Failure detection	Cause	Effect	Action to fix
Video cable V1	Black screen	The video cables are unplugged.	No display	Check cables seating
Backlight Front panel P12, P16	Black screen	Backlight is turned down. On/Off display button of the front panel Off.	No display	Adjust the back light. Button on.

Data acquisition

Equipment	Failure detection	Cause	Effect	Action to fix
System set up	Cannot use the 4 serial ports	IRQ conflicts.		Quit ECDIS900. Launch Windows NT diagnostic. Open the panel: "Resources". IRQ for serial ports should be 03, 04, 07, 08. If not, reboot the computer, enter the set up and change IRQ. Run the recovery CD. Check the board plug. Replace the serial board.
Serial ports. Serial cables Sensor output set up. Sensor Monitor configurations	Monitoring workstation: Warning "GPS – DR alarm" in ECDIS900 In Sensor Monitor GPS1 data not available or faulty. Same for the second GPS and planning workstation.	Bad connection with the GPS 1. GPS 1 failure. Bad selected data format	The ship's position is not monitored on the chart.	Check the serial cable plugged in the computer and in the GPS. Check the wiring RS232 or RS422 (Refer to ECDIS900 Installation manual). Open the terminal window in Sensor Monitor and check the incoming data format. Select another format in the configuration window of the serial port if necessary. Check the output configuration of the GPS. Right-click the GPS indicator and select GPS1 as master.
Serial ports. Serial cables Sensor output set up. Sensor Monitor configurations C1	Other data acquisition faulty in Sensor Monitor	Bad connection with the sensor. Sensor failure. Bad selected data format.	Data not correctly acquired. No display.	See above.
Serial ports. Ethernet com. Serial cables Sensor output set up. Sensor Monitor configurations	Second GPS position not correctly acquired in the monitoring workstation. Same on planning workstation.	GPS2 failure. Bad Ethernet connection.	Second ship's position not available (No cross icon displayed on the chart at the second GPS location).	Check the cabling. (Serial and Ethernet). Ethernet problem: see above S1 and S2.

Operational limits

Overscaling charts

The accuracy of the overscaled charts is not as good as it should be for a safe navigation.

Output datum selection for the GPS

When the GPS sensor does not deliver on serial line information about the datum used for the positioning, ECDIS900 supposes the datum in use is WGS84. Therefore, it is required to select the datum WGS84 in the GPS sensor.

S57 limited coverage

S57 database coverage is still limited, therefore ARCS must be used when no vector data are available.

Move the routes

When the route is not locked, it is extremely easy to move and modify them in the ECDIS900.

No password control for chart and route management

No password is required to load or delete charts or edit the routes.

Route database

When a route is created or modified on the planning workstation, there is no automatic update of the route database on the monitoring workstation. The update is performed manually.

Back up manually for logbook, route user data

It is the user's responsibility to make his back up regularly and in the proper way.

Logbook

One logbook file is created every 24 hours. To use the Log replay function you must manually select the file.

System tests

DVD-ROM

The test of the DVD reader can be done when the chart is updated. Insert the update CD (S57 update CD or ARCS update CD) and run the update procedure.

Sensor input

Sensor Monitor displays a list of sensors and serial ports. Check that data flow is correct. Then for each serial port, check the data is analyzed correctly.

Ethernet communications

Check the data received from a sensor connected to the workstation is available for all ECDIS900 workstations. For example, when two different GPS are connected to the two workstations, check that the two GPS positions are displayed on the chart.

Mouse and keyboard

Perform a visual check of the screen with a mouse or a trackball.

In the waypoint information window, or any kind of text edit box, enter a string with the keyboard. The keyboard can also be tested with the chart hot keys. When the focus is on the chart scroll the chart with the arrow keys.

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