

NaviPro ECS

- USER MANUAL -



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1 INTRODUCTION

1.1 NaviPro ECS

AMEC NaviPro is an Electronic Chart System (ECS) software designed and developed for use as navigation information system on vessels for non-SOLAS applications.

The **NaviPro ECS** can be used for different types of vessels, such as, a non-SOLAS passenger vessel, a small fishing vessel, a recreational vessel, a tug or work boat, etc.

NaviPro can be integrated with AIS (automatic identification system) equipment to support collision warnings and risk alerts to achieve greater voyage safety.

1.2 S-57/S-63 ENC Electronic Navigational Charts

S-57/S-63 ENC (Electronic Navigational Chart) is a vector chart based on S-57/S-63 object categories and attributions. S-57/S-63's spatial objects hold vector spatial data including symbol descriptions. All these information is encapsulated in S-57/S-63 ENC.

The S-57/S-63 vector data is based on paper and raster charts with the approved nautical survey data released by the authorities. The goal is to provide the most accurate nautical information for navigation.

S-57/S-63 ENC is a collection of information exchange sets. Through AMEC NaviPro ECS, S-57/S-63 chart data is displayed and converted internally for the NaviPro's drawing engine to achieve faster processing.

1.3 NaviPro ECS Features

- Display S-57/S-63 vector charts
- Chart compatibility: ChartWorld, Admiralty AVCS, ENC (S-57/S-63), NOAA ENC®
- Chart portfolio management tools
- Seamless "quilted" chart display
- North-up, Heading-up, Course-up chart orientation
- Detailed query of chart feature objects
- Chart scale table
- 5 Color scheme (Day bright, Day white, Day black, Dusk, Night display modes)
- Show graticule
- AIS vessel display
- AIS information panel
- Scaled vessel display (for ownship and AIS targets)
- ARPA target display
- Full-screen cruise mode
- Screen configuration (size) setting

- Route and marker management
- Unlimited routes
- Unlimited waypoints
- Unlimited position fix (marker)
- Unlimited boundary lines with alarms
- Route obstacle detection
- Advanced voyage planning tool
- EBL/VRM tool
- Target searching

- Support multiple GPS receivers and other sensors
- GPS navigation
- Auto scroll
- Simulated navigation ("dead reckoning" mode)
- Estimated position (EP)

- Record tracks
- Record log
- Replay log

- Guard zone
- Safty navigation
- Safty alarm (depth, height, collission, CPA/TCPA, boundary)
- Device alarm (low GPS signal, device failed)
- Monitoring alarm (anchor watch alarm, XTE alarm)

- Multilanguage UI (English/Chinese/Japanese)

2 NAVIPRO ECS INSTALLATION

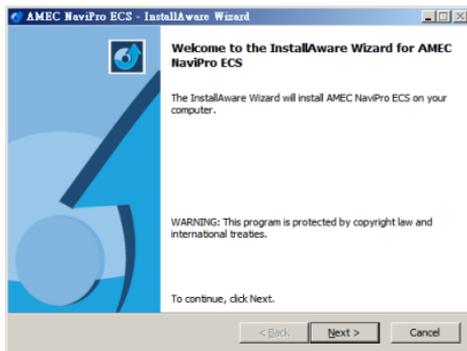
2.1 System Requirement

Before installing NaviPro ECS, please ensure PC meets the following minimum system requirements:

- Operating system: Microsoft® Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8/8.1, Windows 10
- CPU: 500 MHz or above
- RAM: 256 MB or above
- Hard drive space: 500 MB or above
- Resolution: 1024x768 or above
- CD-ROM drive
- One available USB port

2.2 Installation

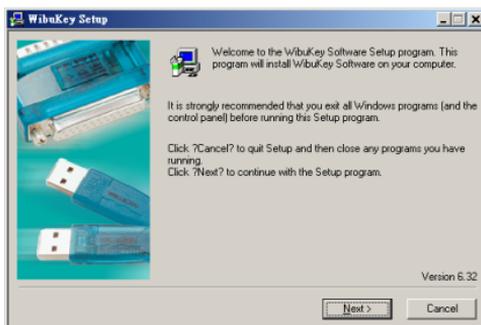
Please insert NaviPro ECS installation CD into the CD-ROM drive then double click Setup.exe to run. The installation screen appears as follows:



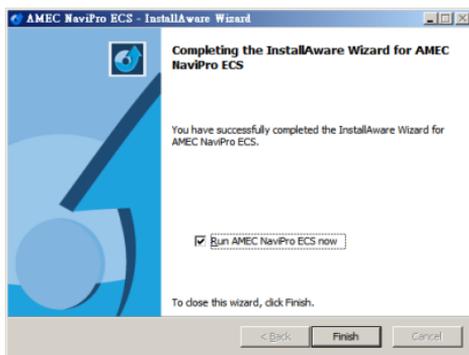
Click “Next” to begin the installation process. During the installation a CodeMeter Runtime Kit software window will appear. This software must be installed in tandem with NaviPro ECS to work properly; follow the screen display for CodeMeter wizard installation, as shown in the screenshot.



Once the CodeMeter Runtime Kit is successfully installed on the system please proceed with WibuKey Setup by following on-screen instructions.



Please follow the wizard to finish all installation procedure. When installation completes, it creates NaviPro ECS program shortcut. The following screen shows the installation is successfully completed.



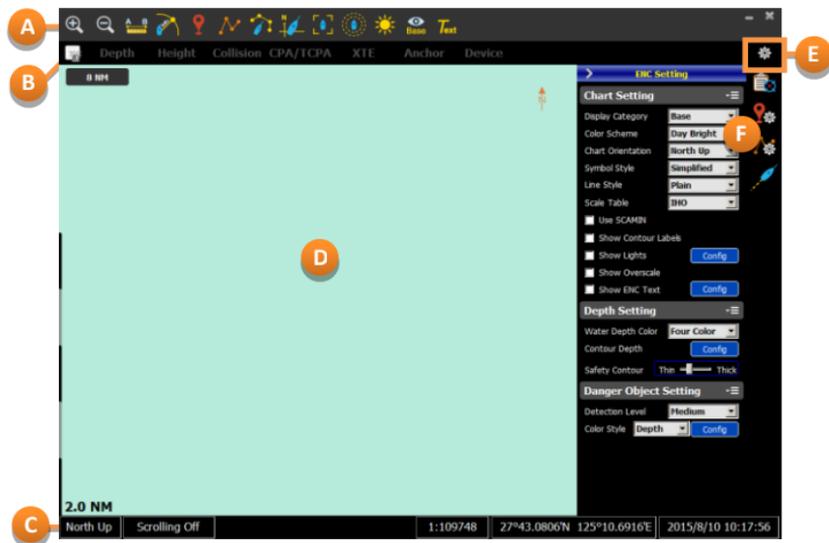
Before initiating NaviPro ECS ensure that you have the dongle key properly connected to the PC. The software can be launch once the PC has successfully detected the dongle key.



The dongle key is required to be plugged-in for NaviPro ECS to function properly.

3 USER INTERFACE

NaviPro ECS interface is as follows:



<p>A</p>	<p>Multifunction Bar</p>	<p>The Multifunction Bar is separated in two sub-categories:</p> <ul style="list-style-type: none"> ● Tool Bar: the Toolbar contains the most common functions such as magnifying glass, divider, color scheme selection modes, and much more. ● Navigational Info: provides quick navigational data such as Latitude, Longitude, COG, SOG and HDG.
<p>B</p>	<p>Alarm Function Bar</p>	<p>This area displays current alarms. The alarms are shown highlighted and highlighted with flicker. To turn off the flickering alarms the user must acknowledge by clicking it. The user can also click on the left icon of the Alarm Function Bar to display all alarms in a list format.</p>
<p>C</p>	<p>Information Bar</p>	<p>Provides current system time, the mouse cursor's location, system information and others.</p>

D	Chart View	Chart displays detailed information and enables quick object searching.
E	Main Menu	Dropdown menu provides NaviPro settings and functions.
F	Function Panel	System preference settings enable user to perform functions and operations.

3.1 Multifunction Bar

The Multifunction Bar has two functions; it displays the Toolbar and Navigational Info.

3.1.1 Tool Bar

The toolbar provides commonly used shortcuts to functions and tools. See screenshot below:



	Zoom In/Out : provide user a comfortable chart viewing scale.
	Divider : measure distance and bearing between two points.
	EBL/VRM : measure distance and bearing, provide azimuth information, from own ship point of view.

	<p>Marker Tools: this function allows to quickly add a Markers and Position Fix to the chart.</p> <div style="display: flex; justify-content: center; gap: 20px; margin: 10px 0;">   </div> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Marker</div> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Position Fix</div> </div>
	<p>Create Route : quickly establish new route on the chart.</p>
	<p>Create Boundary: use this function to create secure boundary around own vessel.</p>
	<p>Chart Orientation Modes: provide different chart view orientations. Click the icon to rotate through the different modes or use the Glance Toolbox to select the desire orientation.</p> <div style="display: flex; justify-content: center; gap: 20px; margin: 10px 0;">    </div> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">True North up</div> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Course up</div> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Head up</div> </div>
	<p>Auto Scroll Mode : enable chart automatically scroll through the chart as the ship sails. Click the icon to rotate through the different modes or use the Glance Toolbox to select the desire scroll mode.</p> <div style="display: flex; justify-content: center; gap: 20px; margin: 10px 0;">    </div> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Look Ahead Auto</div> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Vessel Centered</div> <div style="border: 1px solid gray; padding: 2px 10px; background-color: #f0f0f0;">Scroll Off</div> </div>
	<p>Show Distance Rings : enable on/off option to view ship distance contour lines. When enabled, value on the current ring distance shows on Chart Scale/Ring Circle Menu.</p>

	<p>Color Scheme : switching color schemes for different weather or sunlight conditions for best viewing experiences. Click the icon to rotate through the different modes or use the Glance Toolbox to select the color scheme.</p> <div style="display: flex; justify-content: space-around; align-items: center;">      </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> Day Bright Day White Day Black Dusk Night </div>
	<p>Display Category: user may select one of viewing modes to view chart. Each mode displays objects differently. Click the icon to rotate through the different modes or use the Glance Toolbox to select the display category.</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">    </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> Base Display Standard Display All </div>
	<p>ENC Text Enable Button : enable text description for places, lighthouses, etc.</p>

3.1.2 Navigational Info

The navigational info provides a quick overview of your vessel navigation status, when a GPS position has being acquired.

Pos. 33°57.0490'N 130°56.9485'E
COG 33.0°
SOG 14.9 Kn
HDG 35.0°

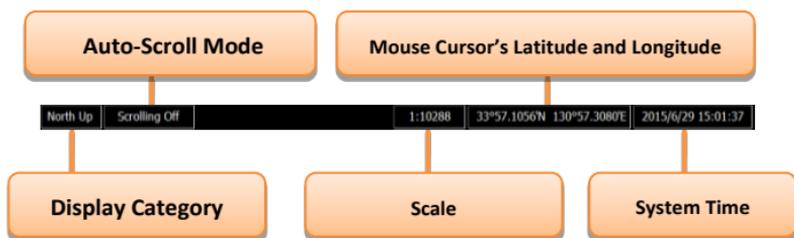
Pos.	Display own vessel Latitude and Longitude
COG	Display own vessel Course Over Ground
SOG	Display own vessel Speed Over Ground
HDG	Display own vessel Heading

3.2 Alarm Function Bar

The Alarm Function Bar provides system status alerts and navigational status; when an alarm occurs, the corresponding alarm text lights up, and alert sound are audible according to different levels of alert. For more details, please refer to the chapter "Alarm."

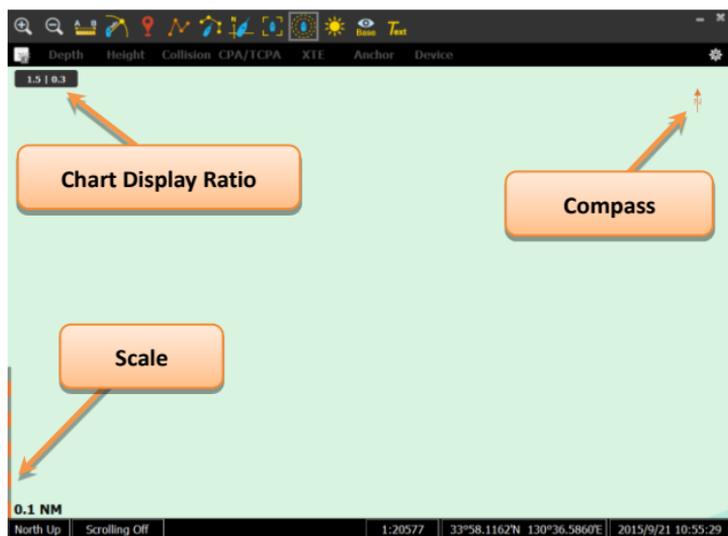
3.3 Information Bar

The Information Bar displays the current system information such as:



System Time	Machine system time.
Mouse Cursor's Latitude and Longitude	Cursor's corresponding latitude and longitude in chart.
Scale	It provided map scale ratio.
Auto-Scroll Mode	Display Auto-Scroll Mode status.
Display Category	Display chart category.

3.4 Chart View



Compass	Display chart orientation. Display is based on North orientation.
Chart Display Ratio	Measures are based in ratios. The first number display the chart ratio vertically relative to the vessel and the second number display measurement of the Distance Ring function when enabled. This function shows the radius between each Distance Ring. Units are in nautical miles.
Scale	Display current chart scale. Units are in nautical miles.

3.4.1 Chart Boundary Line

The chart boundary line uses different border colors to indicate expiration date status on the enclosed map data.

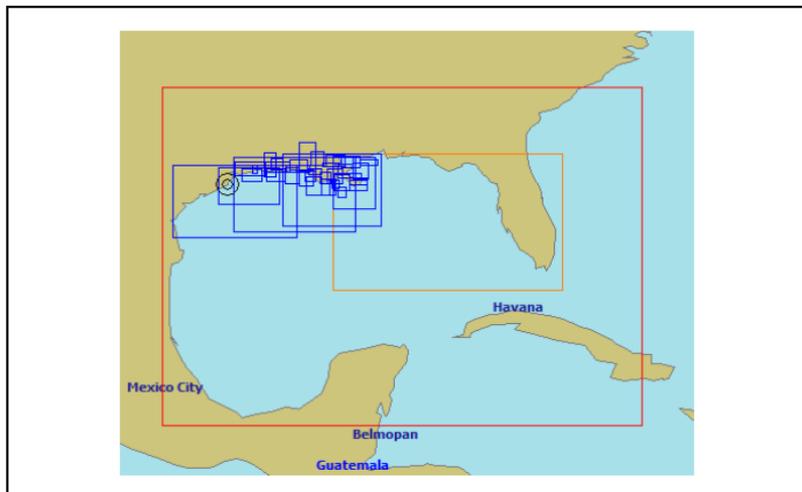


Chart Lifespan	Chart Boundary Line Color
Valid within the time limit	Blue
Within 30 days after the expiration	Orange
Expired	Red

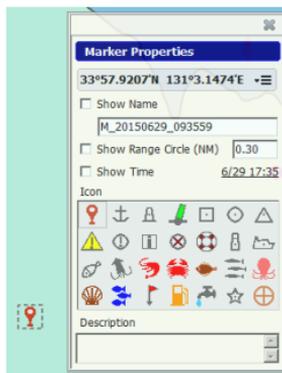
3.4.2 Access Menu

3.4.2.1 Information Panel

Information panel display information and provide simple setups.

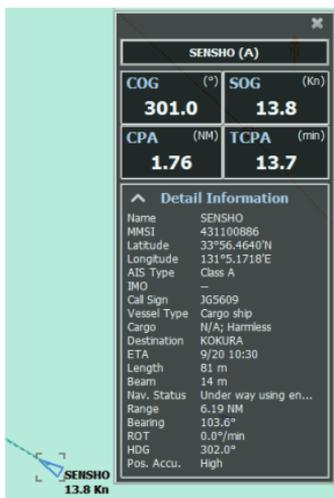
■ Properties

Shows marker and route options and properties. As when this option is activated, any click on a selected marker or route brings up information panel and it can be used as a setting panel as well. As shown in figure below:



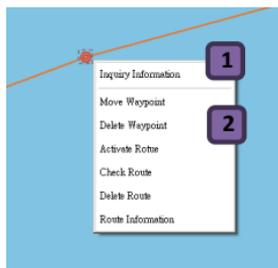
■ AIS Properties

When this option is enabled you can simply click the vessel on the chart. The vessel details will be display on the side. As shown below:



3.4.2.2 Contextual Menu

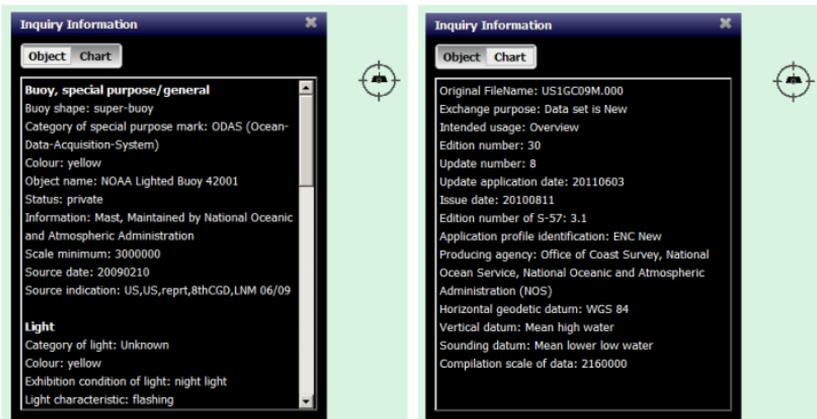
Right mouse click brings up the context menu. In addition to query additional function, the context menu provides different functions depending on the type of object.



1	Function 1	Provides chart information.
2	Function 2	Provides user object operation functions.

3.4.2.3 Inquiry Information

The inquiry information displays the selected object's attributes. The information is grouped by object and chart attributes.



■ Object Information

Shows ENC object information. Select any chart object to see information about this particular object.

■ Chart Information

Shows ENC chart information. Select any chart object to see information about this particular object.

3.5 Main Menu

The main menu provides chart management and setting.

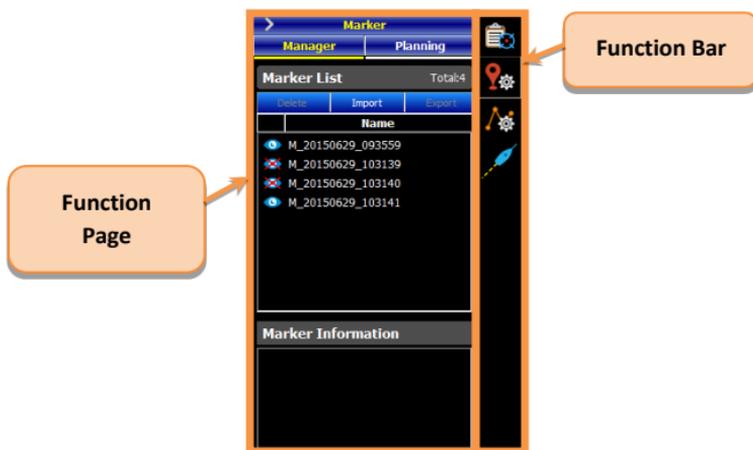


Main Menu	Sub-Menu	Description
Tool	Monitoring Tools	Provide monitoring navigational functions
	Generals Tools	Provide measurement tools and aids
	Navigation Position	The tool is used when the vessel has lost its position. It provides Dead Reckoning and Manual Observation estimations.
Marker	Marker Manager	Provide Marker Detail and Information.
	Marker Planning	Provide Marker Planning.
Route	Route Manager	Provide Route List and details.
	Route Planning	Provide Route Planning function.
	Route Navigation	Provide planned voyage interval and estimated time of arrival.
Track	Track Manager	Provide Track List and details.
	Track Setting	Provide Track View settings.
Boundary List		Provide Boundary List information.
Target List		Provide targeted vessels list and details.
ENC Setting		Provides ENC chart display settings.

View Setting	Provides user view customizations such as Own Vessel Position, Show Graticule, Show Information Bar and Show Quick Function Bar.
Chart Control Panel	The chart management interface supports information exchange on standard S-57 and S-63 file formats. The Chart Control Panel provides quick chart installation onto AMEC NaviPro ECS software. Basic charts information can be found here.
Connection and Log	Settings for external device connections and Log file playback operations.
Options	Provide system-related settings, including display size, text size, and latitude and longitude display formats.
Language	Different languages are available for user preference. (Different language are available to choose from)
About	Display AMEC NaviPro ECS copyright information.
Help	Open and access to the user manual.

3.6 Function Panel

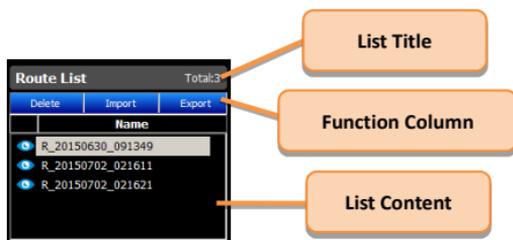
Tools / function / management / navigation settings are all in one panel for easy and quick operation. The Information Page offers quick access too many key functions to easily perform and operate such functions. Click on the to hide or unhide the Function Page.



	Target List	Display all target vessels in a list format and their respective details.
	Marker	Marker management and planning settings.
	Route	Route management and planning settings.
	Track	Custom track management and settings.

3.6.1 Manager List

User can use the Manager List function to manage the data of the Function Page.



■ List Title

Display list name and on the top right shows total number of listed items.

■ Function

List functions: delete / import / export.

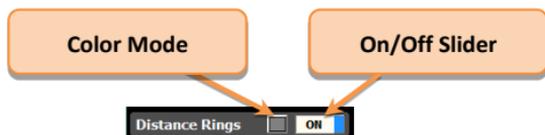
■ List Content

List items are listed by rows. Click on the first column to show / hide List items. By definition, Markers do not have navigation properties.

Name	Enable item	Disable item	Show navigation setting	Hide navigation setting
Icon				

3.6.2 Title Bar Control

Used this function to set Title Bar preferences.



■ Color Mode

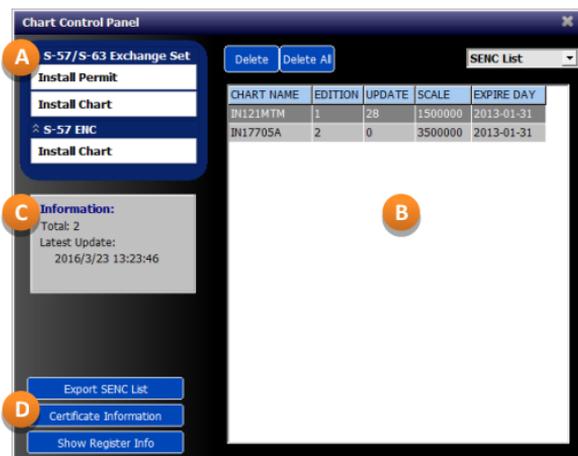
Select user color preferences.

■ On/Off Slider

Turn On or Off the function control.

4 CHART CONTROL PANEL

Chart management support S-57 information exchange standard file management for installation and removal. This interface enables chart quick installation to NaviPro ECS system. Chart map data information, and number of charts installed can be found under this panel. **Interface Functional Overview** Chart configuration management interface is divided into three main parts:



A	Chart Installation Menu	Provide the installation on S-57/S-63 charts.
B	Chart List	Shows charts map data / chart permits information. The columns provide current chart and statistical information. Chart delete function and information mode change function are both available above this list.
C	Information	It display installed Chart statistic data such as total chart installed and when it was last updated.
D	Other Features	Provide additional features such as: <ul style="list-style-type: none"> ● Export SENC List in HTML format. ● Certificate Information: provides and manage certificates details (default is set to IHO.CRT). ● Show Register Info displays the user permit.

Steps:

① Main Menu → Chart Control Panel

4.1 Chart Installation Menu

4.1.1 S-57/S-63 Exchange Set → Install Permit

The permit file (e.g. PERMIT.TXT) is installed to the system after the installation is complete. To view the licensing status, please refer to the “Cell Permit List”.

Steps:

- ① S-57/S-63 Exchange Set → Install Permit

4.1.2 S-57/S-63 Exchange Set → Install Chart

Install S-57/S-63 Exchange Set to the system.

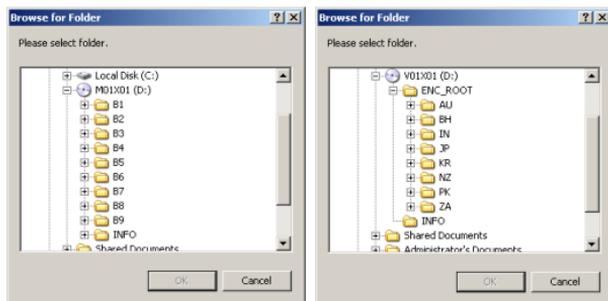
Steps:

- ① S-57/S-63 Exchange Set → Install Chart

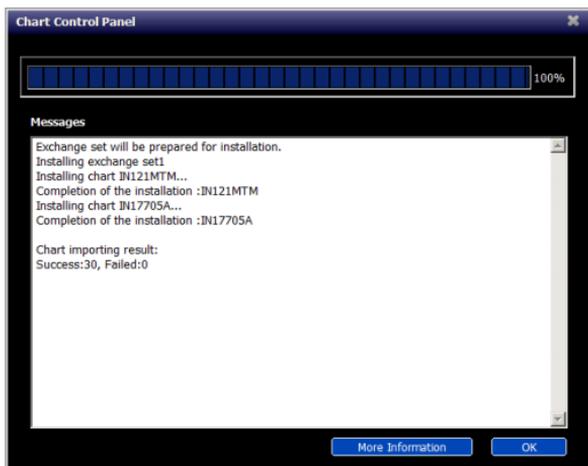
Please note that the permit file and the certificate must be correctly installed in system before chart installation. If installed incorrectly, a warning or error message like one below will appear.



When install S-57/S-63 Exchange Set, choose direct file path to disc or folder S-57/S-63 Exchange Set. Commonly, it is found on the top folder of the disk or on top of ENC_ROOT folder. Once accessed successfully, the installation process continues.



During chart installation, the screen switches to installation progress page followed by map data conversion process. S63 Chart installation and map data conversion success and failure result are shown in “More Information” after the process is complete.



4.1.3 S-57 ENC → Install Chart

This feature supports S-57 information exchange standard file installation and provides two types of importing methods. One method is through S-57 ENC Catalog installation and the other method is direct S-57 ENC map data installation. During chart installation, the screen switches to installation progress page followed by map data conversion procedures. Installation result is shown after it completes.

Steps:

- ① S-57 ENC → Install Chart

4.2 Chart List

The dropdown list provides three types of information, Cell Permit List, S-63 Chart List, and SENC List.

4.2.1 Cell Permit List

Shows the current permit information in the system. There are mainly three permit statuses, legal, expire within 30 days, and expired; expired permit file will be listed in red. Permit can be removed through the delete button. Statuses are reflected through map border indicator.

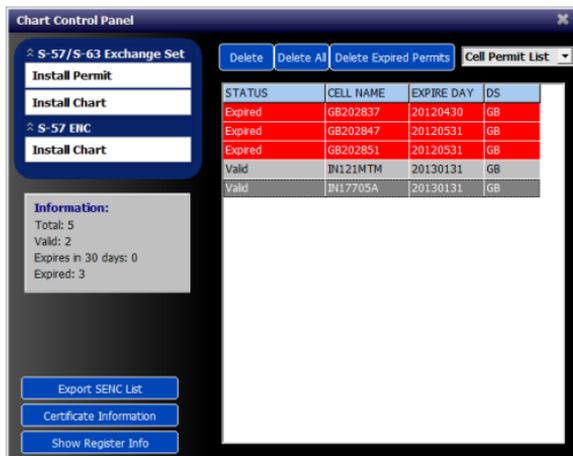


Chart Control Panel

STATUS	CELL NAME	EXPIRE DAY	DS
Expired	GB202837	20120430	GB
Expired	GB202847	20120531	GB
Expired	GB202851	20120531	GB
Valid	IN121MTM	20130131	GB
Valid	IN17705A	20130131	GB

Information:
 Total: 5
 Valid: 2
 Expires in 30 days: 0
 Expired: 3

4.2.2 S-63 Charts List

Displays all installed S-63 Exchange Set charts.

PERMIT STATUS	DS	CHART NAME	ISSUE DATE
No Permit	GB	BH51501A	20110922
No Permit	GB	BH51501B	20110727
No Permit	GB	BH51503B	20110628
Valid	GB	IN121MTM	20050731
No Permit	GB	IN122BCC	20041014
No Permit	GB	IN132KVM	20041014
No Permit	GB	IN141ANS	20091007
Valid	GB	IN17705A	20111019
No Permit	GB	IN17706B	20111019
No Permit	GB	IN2268CL	20101130
No Permit	GB	IN2271AG	20101101
No Permit	GB	IN2291GD	20050731
No Permit	GB	IN2292DM	20041014
No Permit	GB	IN2293MN	20100202
No Permit	GB	IN2352GP	20100914
No Permit	GB	IN2353KG	20100914
No Permit	GB	IN2356CR	20070601
No Permit	GB	IN2471KS	20100325

4.2.3 SENC List

Show installed charts in system. Charts can be deleted through the delete function.

CHART NAME	EDITION	UPDATE	SCALE	EXPIRE DAY
IN121MTM	1	28	1500000	2013-01-31
IN17705A	2	0	3500000	2013-01-31

4.3 Other Features

4.3.1 Exporting SENC List

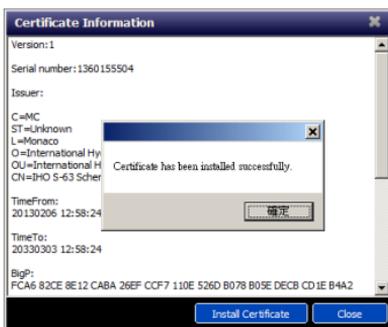
Use this feature to export current chart list in HTML file format.

4.3.2 Certificate Information

Use this feature to install certificate from purchased chart into system. If the certificate is not IHO signed, a warning appears.



Information on the successfully installed certificates can be viewed.



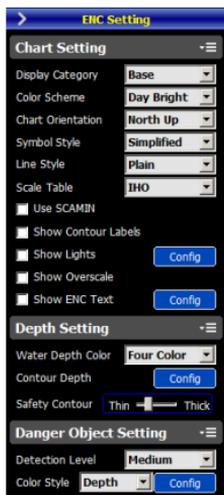
4.3.3 Show Register Info

This function provides USERPERMIT information. As shown in figure below:



5 CHART

The setting page will be seen on the function panel, providing detailed chart setting option. As shown in figure below:



Steps:

① Main Menu → ENC Setting

5.1 Chart Setting

■ Display Category

Base: displays land area, depth area, and shoreline.

Standards: in addition to the basic display, the important navigation objects are shown: Buoys, aids to navigation, restricted zones.

Other: display all chart items (excluding lighting symbols) like submarine communication cables, land roads.

■ Color Scheme

Day Bright: suitable to use under strong daylight.

Day White: suitable to use under normal daylight.

Day Black: suitable to use under cloudy daylight.

Dusk: suitable for use in the dusk low light.

Night: suitable for use at night hours.

■ Chart Orientation:

North up: chart will display True North Up mode.

Head Up: chart will display Head Up mode.

Course Up: chart will display Course Up mode.

■ Symbol Style

Simplified: S52 standardized electronic chart symbols are relatively simpler than average paper chart symbols. They are fast and easier to distinguish objects. See below left illustration.

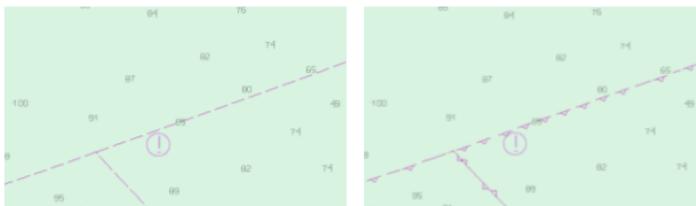
Paper Chart: S52 standard paper chart symbols, generally same as paper chart symbols. See below right illustration.



■ Line Style

Plain: S52 specification simple lines to represent the region. See below left illustration.

Symbolized: S52 specification symbol lines to represent the region. See below right illustration.



■ Scale Table

IHO: according to IHO standards, defined scales are used to display map data.

Custom: provide custom display scale to display map data.

Overview	200 NM
General	96 NM
Coastal	24 NM
Approach	6 NM
Harbour	1.5 NM
Berthing	0.25 NM
Default	
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

■ Use SCAMIN

S-57 ENC charts object properties to automatically determine the natural scale in the display.



■ Show Contour Labels

Turn on / off the display, isobaths value function. See below illustration (left: function enabled; right: function disabled)



■ Show Lights

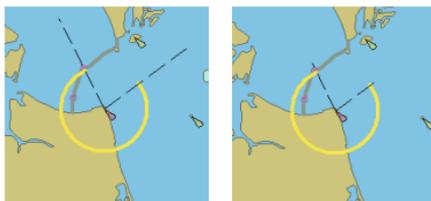
Turn on / off the light symbols. See below illustration (left: function enabled; right: function disabled)



Click on “Config” to evoke Show Lights Sectors configuration menu. As shown in figure below:



Turn on / off Show Light Sectors function. Dotted line represents the actual distance (of the emittance of the light). See below illustration (left: function enabled; right: function disabled)



■ Show Overscale

With this function turn on NaviPro will display horizontal lines across the charts to warn the user that the charts have been magnified beyond its original designed scale. As shown in figure below (left: function enabled; right: function disabled):



■ Show ENC Text

Turn on / off display ENC text function. Click configuration for more detailed ENC text display settings. As shown in figure below:



Text Language: ENC text display are available in English / local languages / regional language (country abbreviation). Regional language is the local

language text displayed on the chart based on the origin of ENC; regional language (country abbreviation) uses national language of the region corresponding to that ENC, and English language will be used if the regional language is not available for that area.

Country: available when selection is regional language by country, this feature displays the country's ENC regional language.

Auto-Select Country: available when selection is regional language by country, the system automatically selects a language based on most installed charts.

5.1.1 More Setting

Click on the icon  for additional settings which includes reset to factory default.



■ Isolated Danger Display

Symbol Size: provides symbol resizing functions for isolated danger objects, large/ medium/ small.

OBSTRN: enable/disable OBSTRN (obstruction) function. Turning symbols on/off.

UWTRC: enable/disable Underwater, Awash rock symbols. Turning symbols on/off.

WRECKS: enable/disable Wreck symbols. Turning symbols on/off.

■ Meta Object Display

M_NSYS: when Other is selected for Display Category, it provides option to enable/disable Navigational system of marks. Turns symbols on/off.

M_QUAL: when Other is selected for Display Category, it provides option to enable/disable Quality of Data. Turns symbols on/off.

■ Other

Filter Style: drop down menu for user to choose between different filter styles which ranges from None, Symbol, Text or Both (Symbol and Text).

Show DIAMOND1: depth under the safety depth are displayed in a diamond pattern format.

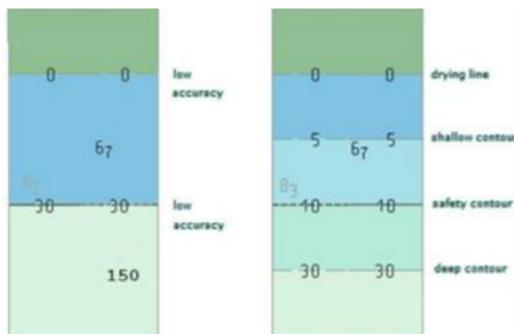
Show Chart Boundary Line: disable or enable Chart boundary line.

■ Reset All Setting

Restored to the original preset settings.

5.2 Depth Setting

Water depth are divided with four lines creating five depths. The division lines starts from shallower “Drying Line” → “Shallow Contour” → “Safety Contour” → “Depth Contour” in that descending order. The first three shallower areas which are shallow, very shallow and seashore are non-navigable areas and the last two are navigable which are named deep depth and medium depth. As shown in figure below:



■ Water Depth Color

Color depth is shown beginning from the dry line. The user can select two different display modes which are a 2-color and a 4-color mode.

Two Color: this mode uses the safety contour to determine and to display two different depth area.

Four Color: this mode uses the safety contour to determine and to display four different depth contours which are Shallow Contour, Safety Contour and Depth Contour.

■ Contour Depth

By user preference, the safety depths can be defined. Click on Configuration to enter preference depth values.

Shallow Depth (m)	3.00
Safety Depth (m)	15.00
Deep Depth (m)	30.00
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

Shallow Depth: use this field to set shallow line contour depth line.

Safety Depth: use this field to set for safety contour depth line.

Deep Depth: use this field to set for deep contour depth line.

■ Safety Contour

The setting slider allows tuning the thickness of the safety line.

5.2.1 More Setting

Click on the icon  for additional settings which includes reset to factory default.

5.3 Danger Object Setting

Settings for Guard Zone monitoring range and route's XTE Alarm Width range for danger objects.

■ Detection Level

The chart provides a variety of object types, degree of risk is divided into high / medium / low monitoring levels. The higher the level, the more danger objects are listed.

Low: detects only basic types of danger objects, Depth, Land Area, Underwater rock/ awash rock. Since this level only monitor and detects basic danger object types, it is recommended choosing medium or above for safe navigation.

Medium: in additional to basic danger objects, most common danger objects are included, such as beacon, buoy, and obstruction.

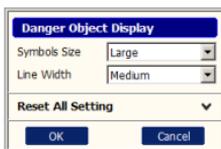
High: detects all types of danger objects. Any object that is dangerous to navigation is considered.

■ Color Style

Three danger categories are classified by colors: depth, height, and collision.

5.3.1 Danger Object More Setting

Click on  icon for further settings.



■ Symbol Size

Symbols resize option for danger objects. Available sizes are large / medium / small.

■ Line Width

Line Width provides options to adjust line thickness on line type symbols. Options are very thin / thin / medium / thick / very thick, five types of width options.

■ Reset All Setting

Return to original factory preset.

6 TOOLS

6.1 Monitoring Tools

6.1.1 Auto Scroll

When Auto Scroll function is turned on, chart will automatically scroll in sync with the ship. When the ship sails pass the Auto Scroll frame, chart scrolls accordingly to stay locked. This feature eases monitoring vessel's surroundings. As shown in figure below:



■ Mode

Two modes, Look Ahead / Vessel Centered, are available for Auto Scroll preferences.

■ Show Frame

Show / Hide the frame boundaries for Auto Scroll.

■ Frame Size

Use the setting slider to adjust the size of Auto Scroll frame.

■ View Range

This option is only available when Auto Scroll mode is Look Ahead. The slider is used to adjust the viewable navigation region ahead.

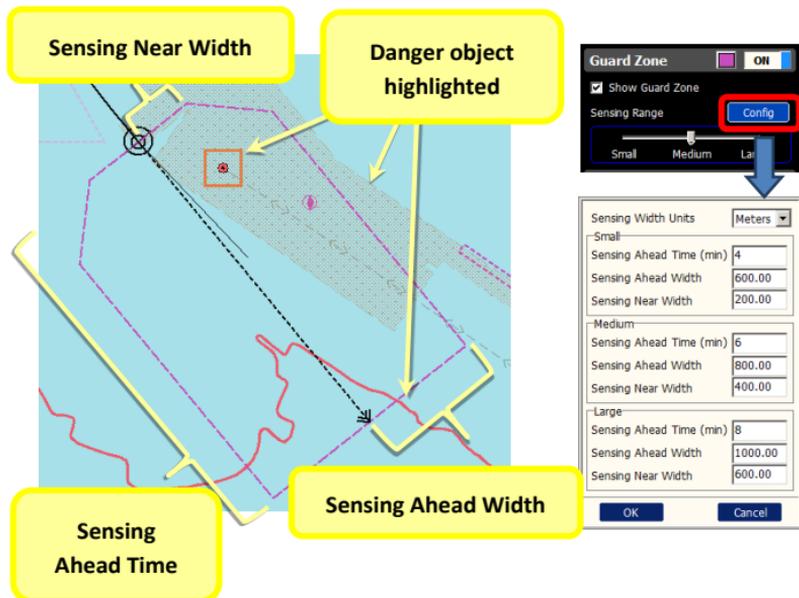
Steps:

① Toolbar →

② Menu → Tool → Monitoring Tools → Auto Scroll

6.1.2 Guard Zone

With this feature is turn on, NaviPro automatically detects guard zone for safety navigation. As danger objects are detected, alarm would be triggered for notification.



■ Show Guard Zone

Provide show / hide Guard Zone.

■ Sensing Range

Provide small/medium/large three customer preset for fast configuration.

■ Sensing Ahead Time

Sensing Ahead Time is the time-based furthest traveling distance of the Guard Zone that system monitors.

■ Sensing Ahead Width

Set the width of Guard Zone area that system monitors.

■ Sensing Near Width

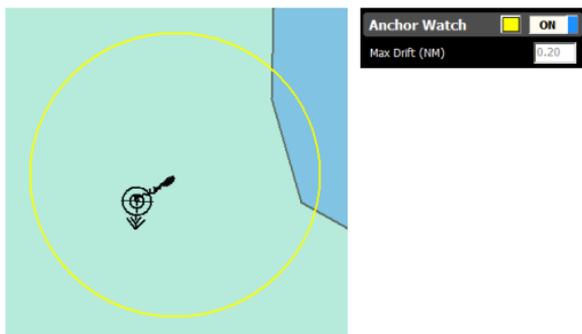
Extended Guard Zone width near the vessel.

Steps:

① Main Menu → Tool → Monitoring Tools → Guard Zone

6.1.3 Anchor Watch

During anchor monitoring, the vessel is the monitored object. If the vessel drifts away from the defined anchor perimeter, Anchor Watch alarm is triggered with the anchoring ring flashing.



■ Max Drift

Adjust monitoring perimeter size to allow maximum drifting distance.

Steps:

① Main Menu → Tool → Monitoring Tools → Anchor Watch

6.2 General Tools

6.2.1 Divider

The Divider measuring tool is used to measure between two points by simply selecting the two points that you want to measure. As shown in figure below:

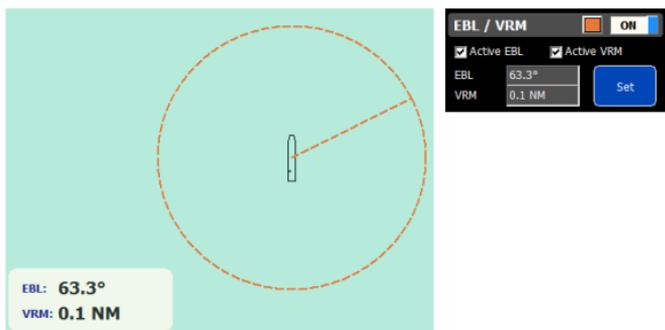


Steps:

- ① Toolbar → 
- ② Main Menu → Tool → General Tools → Divider

6.2.2 EBL/VRM

When EBL / VRM is on, it uses the vessel as the starting point for measuring. Moving mouse to any location shows the distance and bearing from the vessel on the lower left corner. As shown in figure below:



■ Active EBL

Enable / Disable EBL display function.

■ Active VRM

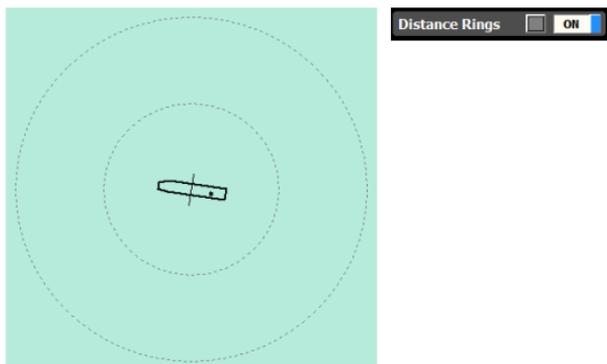
Enable / Disable VRM display function.

Steps

- ① Toolbar → 
- ② Main Menu → Tool → General Tool → EBL/VRM

6.2.3 Distance Rings

With vessel centered in the distance rings, each ring indicates distance from the vessel. All rings have equal distance from one another. With these rings, it is easier to determine the distances of objects from the vessel.



Steps

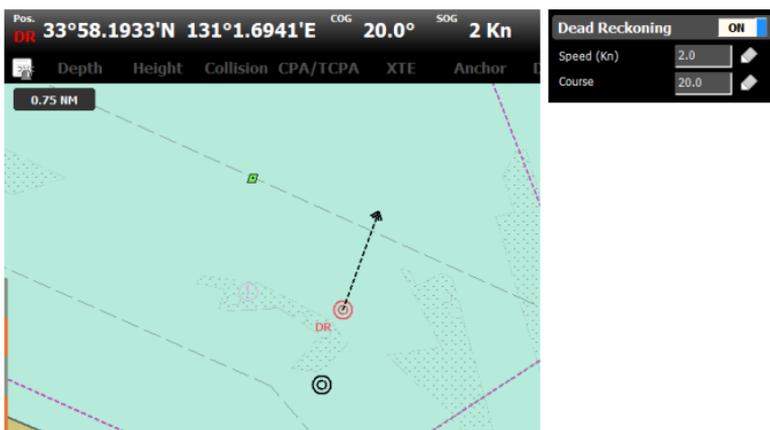
- ① Toolbar → 
- ② Main Menu → Tool → General Tool → Distance Ring

6.3 Navigational Position

When a navigational positioning device has failed the user can use the below tools to help with navigation.

6.3.1 Dead Reckoning

Dead Reckoning function can be used when position device has failed to aid navigation by using the final acquired positioning, speed and course, to estimated position of the ship. As shown in figure below:



Steps:

① Main Menu → Tool → Navigational Position → Dead Reckoning

6.3.2 Manual Observation

Manual Observation can be used when position device has failed to estimated vessel position using LOP (line of position). Estimated lines are drawn on the chart, and display the corresponding number and set-up time. As shown in figure below:



Set EP: it is calculated via the system, to predict whether there was a position of the ship. The prediction is display on the chart with a timestamp. As shown in figure below:



Estimated Position: display EP coordinates and it also provides Position Fix as a Marker Symbol.

Accept EP: predicted ship location is mark in the chart with a DR symbol.

Steps

- ① Main Menu → Tool → Navigational Position → Manual Observation

7 MARKER

7.1 Marker Management

The marker management function page is divided into two sections, the Marker List and Marker Information.

Steps:

① Function Panel →  → Management

② Main Menu → Marker → Marker Management

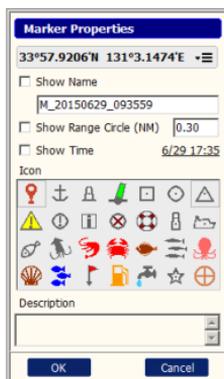
7.1.1 Marker List

Marker List shows all current markers in NaviPro. Use toolbar to remove / import / export selected markers. Click the icon in first column to hide or unhide marker. Detailed descriptions refer to Chapter "User Interface → Manager List".

7.1.2 Marker Information

Marker Information shows the details of a selected marker in Marker List.

The icon  by the Marker Information provides proper settings, such as naming and icon changing.



■ Marker Properties

Coordinates: show Marker coordinates; coordinates can be manually entered to change the Marker position.

Show Name: provide enable / disable function the marker name on chart

screen.

Show Range Circle: show / hide marker range circle.

Show Time: show marker creates time.

Name: set custom the marker name.

Icon: set a custom marker icon.

Description: leave a description for this marker.

7.2 Marker Planning

Marker planning page is group into two sections, Marker Operations and Maker Function. To cancel activated marker function, right mouse clicks or click directly on the status bar to cancel the setting.

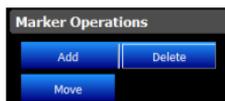
Steps:

① Function Panel →  → Planning

② Main Menu → Marker → Marker Planning

7.2.1 Marker Operations

Common marker operations are listed here. As shown below, available functions are Add, Remove, and Move.



■ Add

Create a new Marker on chart.

■ Delete

To remove a marker, select it with mouse and then hit Delete.

■ Move

Relocate marker to different position on chart.

7.2.2 Marker Function

Provides marker import / export functions.



■ Import

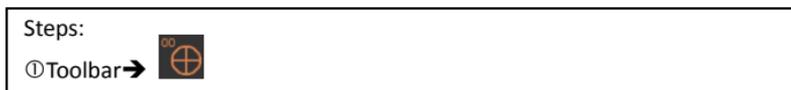
To import a marker, select file path and choose the marker file that is with extension .amk. If the marker is already existed in NaviPro, the system will prompt for deletion before importing.

■ Export

To export a marker, select a file path and assign a name for the marker file. Marker files have .amk file extension.

7.2.3 Position Fix

Position Fix creates time stamp and location using graphical representation based on vessel location.



8 ROUTE

8.1 Route Management

Route management function page is divided into three parts, Route List, Route Information, and Route Detail.

Steps:

- ① Function Panel →  → Management
- ② Main Menu → Route → Route Management

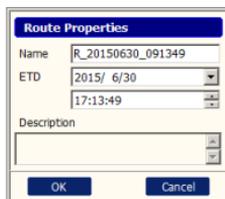
8.1.1 Route List

Route List displays all routes in system. Use the function column to select routes for deletion / import / export operations. Use first column to enable / disable route status. For more information, refer to Chapter "User Interface → Manager List".

Note: Under Active Route navigation the Delete and Hide function are automatically disabled.

8.1.2 Route Information

Route Information shows details on the current selected route in Route List. Use the Route Information icon  to view Route Properties and attributes settings.



The dialog box titled "Route Properties" contains the following fields:

- Name:** R_20150630_091349
- ETD:** 2015/ 6/30 (dropdown menu)
- Time:** 17:13:49 (dropdown menu)
- Description:** (text input field)

Buttons: OK, Cancel

■ Route Properties

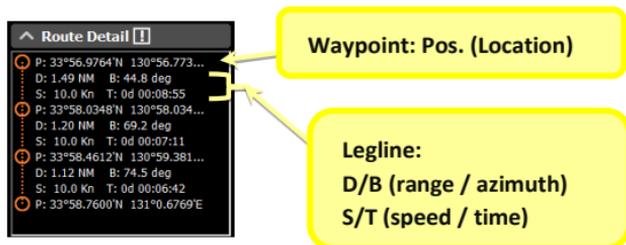
Name: custom route naming.

ETD: ETD (Estimated Time of Departure) estimates ETA (Estimated Time of Arrival) using configured Plan Speed.

Description: enter descriptions and remarks for this route for references.

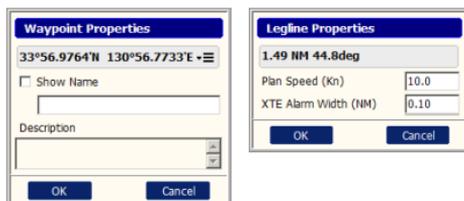
8.1.3 Route Detail

Route Detail shows route and waypoints details on a selected route on Route List. Information includes waypoint locations, route distances, bearing, speed, and time.



Each waypoint / route attribute properties can be modified. Click on Route

Detail Icon  for Waypoint Properties settings / Legline Properties settings.



■ Waypoint Properties

Coordinates: show waypoint coordinates; coordinates can be manually entered to change the waypoint position.

Show Name: show / hide waypoint names.

Name: custom waypoint naming.

Description: enter waypoint description / remarks for user references.

■ Legline Properties

Plan Speed: set planned sailing speed. This value is used with ETD to estimate ETA time.

XTE Alarm Width: set route XTE alarm distance used on route navigation.

8.2 Route Planning

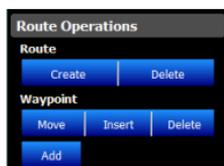
Route planning function page has three sections: Route Operations, Route Control, and Route Function. Right mouse click or click Cancel on the chart status bar allows canceling the route planning functionality.

Steps:

- ① Function Panel →  → Planning
- ② Main Menu → Route → Route Planning

8.2.1 Route Operations

Provides route common operations, such as route creation/deletion, waypoint moving, inserting, and, deletion function.



■ Create Route

To start creating Route by simply selecting the Create button to begin adding Waypoint into the chart and continue the steps until you have established the Route creation.

■ Delete Route

Delete a selected route on chart.

■ Move Waypoint

Move a selected waypoint to any other place on chart.

■ Insert Waypoint

Insert waypoint into the current selected route.

■ Delete Waypoint

Delete a selected waypoint in a route. The route will automatically link the waypoints.

■ Add Waypoint

Waypoints can be created from the start or the end of each Waypoint. It can also be extended from either side of the Waypoint by simply selecting a new location and thus adding/extending the Waypoint. Repeat the action until you have completed the task.

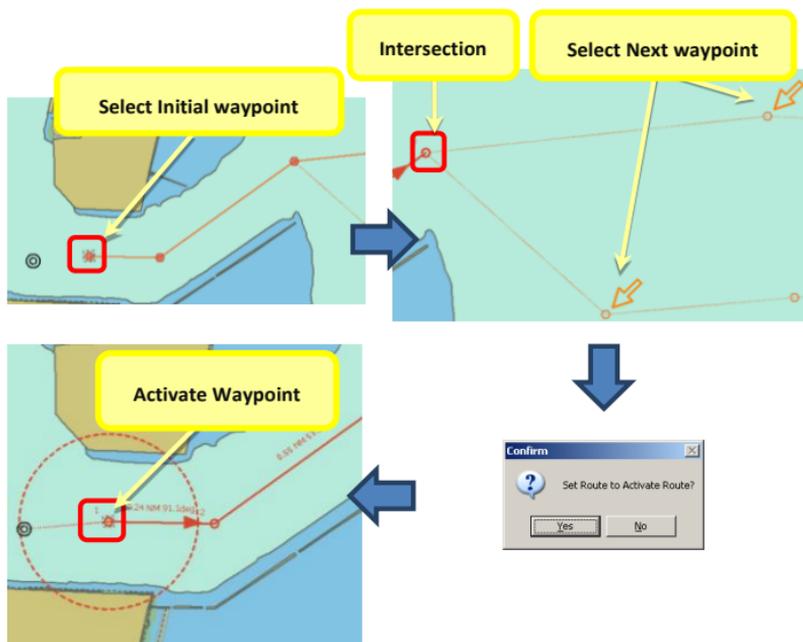
8.2.2 Route Control

Route Control provides common control settings. Settings include route checking on dangerous objects and waypoints.



■ Activate Route

The select function is applied to waypoints for planning. In route selection, system determines route automatically with a selected waypoint. As route encounters intersection, user needs to select the next waypoint for the route to continue. This process stops when there are no more waypoints to route and a pop-up menu will appear for user confirmation and after the confirmation is confirmed the waypoint planning is activated. As shown in figure below:

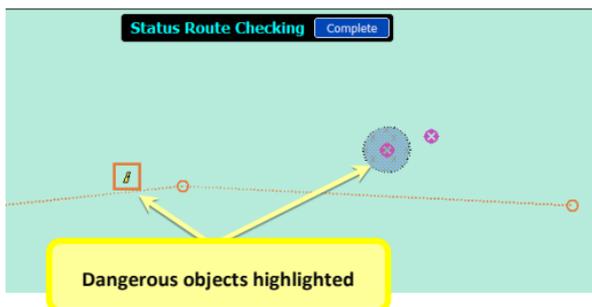


■ Deactivate Route

Use Deactivated function to cancel activated route.

■ Check Route

Use Check function to detect objects that may endanger navigation. Dangerous objects are highlighted.



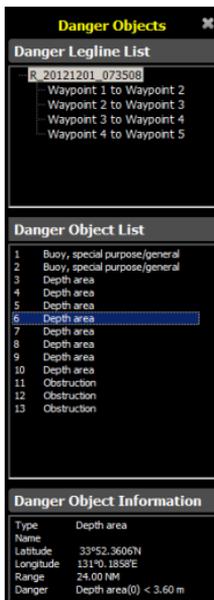
■ Danger Objects

Check Route function results dangerous objects highlighted. Information on these objects is divided into three sections.

Danger Legline List: all route segments. Route segments or entire route can be selected.

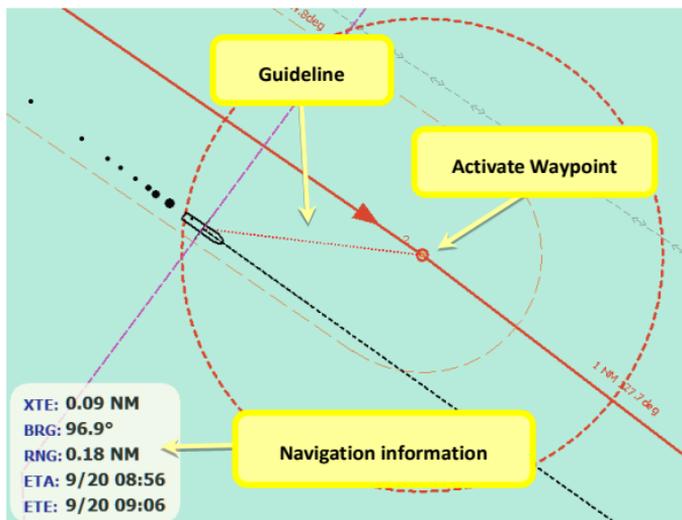
Danger Object List: displays the list of all dangerous objects on route.

Danger Object Information: details on the selected dangerous object on list.



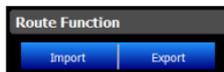
■ Activate Waypoint

As a navigation tool during navigation, the activate waypoint shows the closest waypoint on the activated route to the boat. System automatically switches next activate waypoint during navigation.



8.2.3 Route Function

Route import / export functions.



■ Import

To import a route, select file path and choose the route file that is with extension .art. If the route is already existed in NaviPro, the system will prompt for deletion before importing.

■ Export

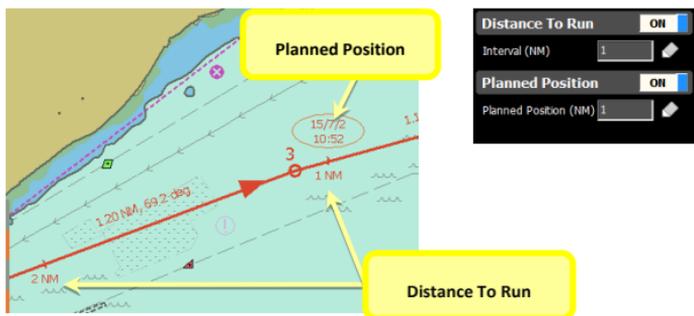
To export a route, select a file path and assign a name for the route file. Marker files have .art file extension.

8.3 Route Navigation

Function settings for Distance To Run and Planned Position

Steps:

- ① Function Panel →  → Navigation
- ② Main Menu → Navigation → Route Navigation



8.3.1 Distance To Run

This function creates interval point within the navigational route and alerts the user Distance To Run within these intervals.

8.3.2 Planned Position

Planned Position function is used to show estimated arrival date and time based on user planned distance.

9 Track

9.1 Track Management

All current stored tracks and track details are saved here. The Track Management feature page is divided into three parts, Track List, Track information, and Timeline.

Steps:

① Function Panel →  → Management

② Main Menu → Track → Track Management

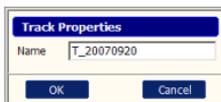
9.1.1 Track List

Track List displays all current track entries in the system. Track List allows deleting, importing, exporting on tracks. Use the first column to show / hide tracks. Please refer to chapter "Interface → Manager List".

9.1.2 Track Information

Information on the selected track in Track List is displayed for reference. Click

the Icon  right by the track information for track properties.

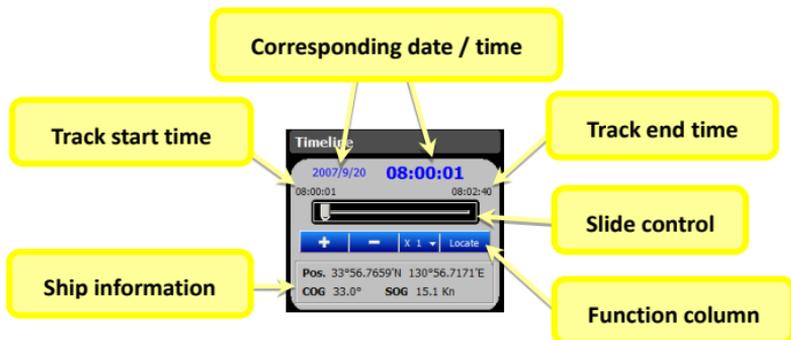


■ Track Properties

Name: custom Track naming.

9.1.3 Timeline

The slide button allows accessing track recording. Dragging the slide control or clicking +/- buttons to see a specific time in the recording. Use the position button to locate and view the position on the chart.



9.2 Track Setting

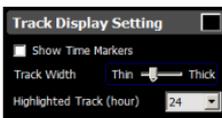
Track setting function page contains Track Display Settings.

Steps:

- ① Function Panel →  → Setting
- ② Main Menu → Track → Track Setting

9.2.1 Track Display Setting

Provides track displaying options.



■ Show Time Markers

Show / Hide function of time marked on Track.

■ Track Width

Use the slide control to set track line thickness.

■ Highlighted Track

Within a set time, highlight the track, for example: set at 24 hours, which the track will be highlighted for 24 hours.

10 TARGET

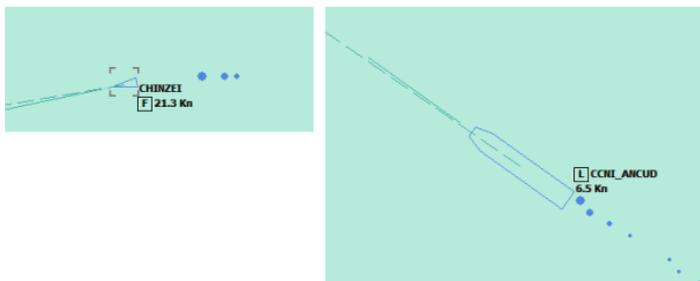
10.1 Target Symbol Description

Symbol for each target displayed on the NaviPro is described below :

	AIS
	Active AIS
	AIS Dangerous Target. (Dotted Line signify the Course Line and Solid Line signify the Heading Line)
	AtoN (Real)
	AtoN (Virtual)
	Base Station
	SART : Search and Rescue Transponder
	SAR : Search and Rescue Device
	ARPA
	ARPA Dangerous Target (Dotted Line signify the Course Line)
	ARPA Query
	Lost Target
	Selected Target

10.1.1 Target Quick View

By selecting active target present on the chart it will display the selected target vessel name (or MMSI), speed and pass track. As shown in figure below:



<div style="border: 1px solid black; padding: 2px; display: inline-block; width: 20px; height: 20px; text-align: center; line-height: 20px;">L</div>	Symbol is shown in from of the vessel name for vessels that has a length greater than 160 meters.
<div style="border: 1px solid black; padding: 2px; display: inline-block; width: 20px; height: 20px; text-align: center; line-height: 20px;">F</div>	Symbol is shown in from of the vessel speed when the vessel has a speed of 20Kn or greater.

10.2 Target Information

The menu settings are shown on function panel providing Target information and search function.

Steps: ① Main Menu → Target List

10.2.1 Target List

The Target List panel will display all targets within the receiving range of the vessel. The list can be sorted by ID or name by clicking ID or name menu sorting arrow.

Moreover, if there are signals of the ship, the ship's information will be displayed at the information window. Target that is in danger of collision will be displayed in red. Lost target are shown in dark gray. Click the target in the list of items to select the target, double click to display target details and the system will automatically center the selected target on the display. As shown below:

Target List Total:61

ID ▲	Name
432480000 (Own)	KASHIMA MARU NO.7
01	
02	
03	
431500654	MUTSUJO MARU
004310606	
004310608	
04	
257993000	
312217000	
312266000	YUN XING
312415000	TONG MAO 2
351896000	MV VISAYAN TRADER
352147000	SAFE VOYAGER
352710000	
352977000	XIANG XIU
353927000	
354642000	MORNING SUN
355438000	
355713000	CHEER KANDA
356621000	
356706000	
357461000	
369310000	ALLIANCE NEW YORK
371446000	G DUCKLING
427246000	

Target Information Detail

Name	KASHIMA MARU NO.7
MMSI	432480000
Latitude	33°42.5468'N
Longitude	131°36.2173'E
AIS Type	Class A
Range	N/A
Bearing	0.0°
HdG	111.0°
COG	111.0°
SOG	12.2 Kn
CPA	N/A
TCPA	N/A

10.2.2 Target Search (select binoculars)

Select binocular icon to turn on the search function. Type-in the name or ID into the search field to start searching. Partial string search capability is also supported; simply type-in the first initial letter of the name or ID number to commence searching. Moreover, you can use the Up/Down arrow to select the previous or the next in line as shown in figure below:



10.2.3 Target Information

Target information can be display by selecting each Targets found in the Chart or from the target list panel. More target details information can be display simply by checking the “Details” check box found in Target Information menu bar as shown below:

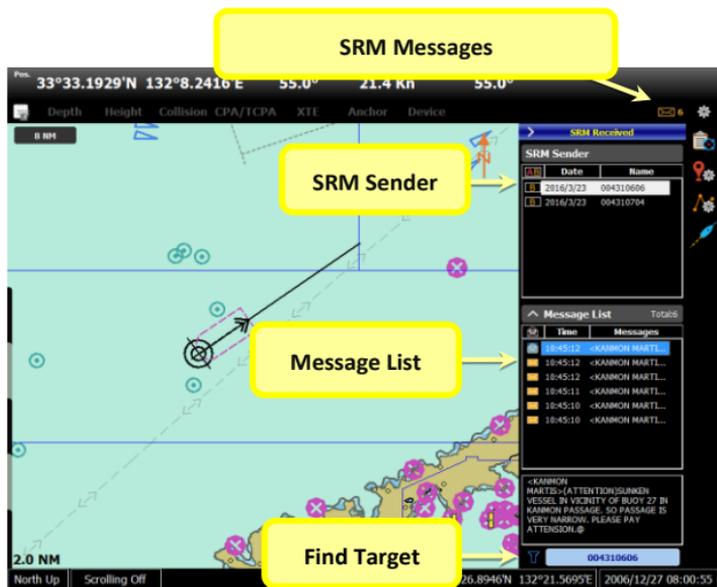
Target Information	<input type="checkbox"/> Detail
Name	J.PIONEER
MMSI	376019000
Latitude	33°58.2449'N
Longitude	130°58.3401'E
AIS Type	Class A
Range	1.33 NM
Bearing	44.2°
HDG	245.0°
COG	246.0°
SOG	10.5 Kn
CPA	0.14NM
TCPA	3.7 min

Target Information	<input checked="" type="checkbox"/> Detail
Name	J.PIONEER
MMSI	376019000
Latitude	33°58.2449'N
Longitude	130°58.3401'E
AIS Type	Class A
IMO	9116711
Call Sign	J8JX9
Vessel Type	Cargo ship
Cargo	N/A; Harmless
Destination	YANTAI
Length	113m
Beam	19m
Nav. Status	Under way using engine
Range	1.32 NM
Bearing	44.3°
ROT	0.0°/min
HDG	245.0°
COG	246.0°
SOG	10.5 Kn
CPA	0.14NM
TCPA	3.6 min
Pos. Accu.	High

10.3 SRM

Display AIS SRM messages.

10.3.1 SRM Received

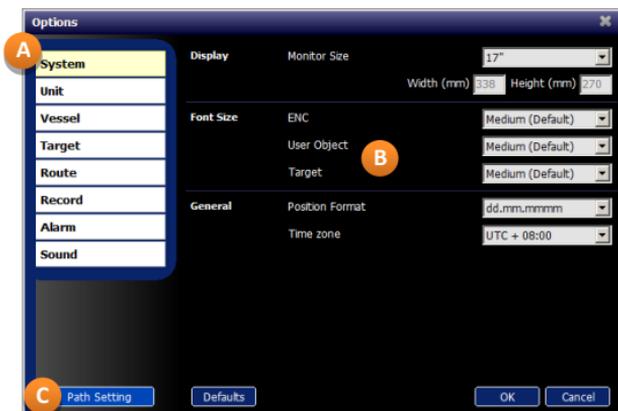


SRM Messages	Provides a list of read or unread SRM messages. Upon receiving a “Addressed” SRM message the icon will flash every ten seconds. The SRM Notifications can store up to 99 unread messages.
SRM Sender	Received SRM messages are displayed in this window by means of MMSI or name of the vessel. It is listed with the most recent date at the top. Moreover, the symbol A and B at the front of each message represent the type of received Message. The letter A represent for Addressed message and B for Broadcast message. Read messages are presented in a darker color.

Message List	<p>Display SRM sender details such as time and message. Messages can be sorted by clicking on this  icon, by default the Messages are automatically sorted in order of Addressed then Broadcast with the most recent at the top. They are four SRM message types and there are as follows:</p> <div style="display: flex; justify-content: center; gap: 20px; align-items: center;"> <div style="text-align: center;">  Broadcast (Read) </div> <div style="text-align: center;">  Broadcast (Unread) </div> <div style="text-align: center;">  Addressed (Read) </div> <div style="text-align: center;">  Addressed (Unread) </div> </div>
Find Target	Display the live location of the SRM sender.

Note: SRM Recording (under Options menu) must be enabled to start receiving SRM Messages.

11 OPTIONS



	Menu	Settings for NaviPro ECS. Click on the Menu for more detail settings.
	Details Settings	Further settings are provided here.
	Path Setting	System file path: change all system file storage location. ENC Path: change chart storage location.

Steps

① Main Menu → Options

11.1 System

System settings.

■ Display

Set the actual size of the viewing screen. The system will automatically adjust the objects on the chart to the right size. A variety of viewing sizes are pre-configured for user easy selection. If there is no matching size, a custom size

can be defined by user preference.

■ Font Size

Text size adjustment settings for text on chart. A custom font and size can be selected.

User can use this setting to adjust chart display, customs objects and target text size.

■ General

Settings for latitude, longitude and time zone display format.

11.2 Unit

Settings for preferred speed and distance units.

■ Unit Setting

Provides unit setting per user preference.

Speed: Knots / Kilometers per Hour / Miles per Hour

Distance: Nautical Miles / Kilometers / Meters / Statutory Miles / Feet

Depth: Meters / Feet / Fathoms

Height: Meters / Feet

11.3 Vessel

Advanced settings for vessel properties.

■ Vessel Setting

Settings for vessel name, size, call sign, vessel dimensions, and draught value. Setting vessel depth auto-syncs with chart safety depth value.

■ Symbol Style

Additional settings for vessel symbol, including Show Outline, Show Course Line, Show Vector Stabilization, and Show Time markers.

■ Guard Range

Guard Range sets the vessel active guard zone and when object enters the preset range it becomes an active target.

11.4 Target

Settings for Target.

■ Target Display

Provide target type of display switching function. AIS targets can be changed (Class A, Class B, AtoN, SART, Base Station, SAR, etc.) settings and display ARPA target.

■ AIS Symbol Style

Additional settings for vessel symbol, including Show Outline.

■ Time Out

Set AIS signal lost time tracking and delete the AIS target after lost target time frame is reach. SART target are not deleted.

■ Active Target

To enable or disable target details when it enters own vessel Active Range. The details that a user can enable or disable are: Course Line and Heading Line. All Targets Active turns all targets into active state.

11.5 Route

Settings for Route properties.

■ Preset

Provides Route planned speed and XTE alarm width setting.

■ Arrival Circle

It provides Arrival Circle adjustments. Arrival Circle is an imaginary circle that provided the user a visual cue that the boat has arrived at or passes a waypoint.

Range: adjust the size of the arrival circle in nautical miles.

Delay Control Time: the time delay when arrival circle moves to the next waypoint.

11.6 Record

Advanced Record settings.

■ Log

Record settings and its parameters.

Log Recording: enable/disable recording function. The function automatically started as when system detects input information.

Record Incoming GPS Log: record received GPS information in the log.

Record Incoming AIS Log: record received AIS information in the log.

Record Incoming Other Log: record input information from other devices into the log.

File Maximum Record Time: sets log maximum time limit a log can hold. During recording, the system creates a new log whenever a log reaches its limit.

File Maximum Keeping Period: provides the maximum period that logs are kept on system before removing.

■ Track

Track Recording: display stored Track Recording data and settings customization.

File Maximum Keeping Period: use this function to choose how long Track history is stored on the system. When stored Track history exceeds the user set time it is automatically deleted by the system.

■ SRM

Recorded SRM data: display stored SRM data and settings customization.

File Maximum Keeping Period: use this function to choose how long SRM history is stored on the system. When stored SRM history exceeds the user set time it is automatically deleted by the system.

11.7 Alarm

Advanced Alarm settings.

■ Safety Alarm

Alerts can be enabled / disabled through this setting.

Enable Depth Alarm: base on water depth defined value; the function detects

water depth areas that are too shallow for navigation.

Enable Height Alarm: base on vessel height, the function detects objects that lower than the defined height value. Such objects are bridges, power lines, cables, etc.

Enable Collision Alarm: detect and alert all possible collidable objects or areas. Such objects or areas could be buoys, rocks, etc.

Enable Boundary Alarm: enable user pre-defined Boundary alarm.

Enable CPA/TCPA Alarm: enable / disable AIS alarm also provide CPA and TCPA timeout setting. Value settings of CPA (Close Point of Approach) as well as TCPA (Time to Close Point of Approach) can also be adjusted here.

■ Device Alarm

External alarms can be enabled / disabled through this setting.

Enable Device Failed Alarm: given device connected to enable or disable alarm warning for any connected device that have failed.

Enable Low GPS Signal Alarm: if device setting for signal wait time. Given GPS device connected, alarm activates as system is unable to obtain a fixed GPS location within the time period.

Enable Checksum Error Alarm: given device connected, if information check sum error is detected, alarm activates.

■ Monitoring Alarm

Provides navigation route XTE enabling/disabling function.

■ Alarm Setting

Settings for alert duration. This duration time defines how long an alert would stay in active once it is triggered.

11.8 Audio

Settings for sound related configurations.

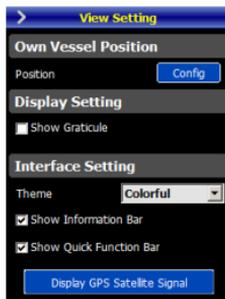
■ Alarm Sound

Enabling / disabling of alarm sound.

12 SETTING

12.1 View Setting

The View Settings provides chart display, interface adjustment options, and other settings.



Steps :

① Main Menu → View Setting

12.1.1 Own Vessel Position

■ Position

Manually set Own Vessel Position when ship GPS positing has failed to acquired GPS data.

12.1.2 Display Setting

■ Show Graticule

Turn On or Off the Graticule function.

12.1.3 Interface Setting

■ Theme

The four color themes are available to select from: Colorful, White Tone, Blue Tone, and Yellow Tone.

■ Show Information Bar

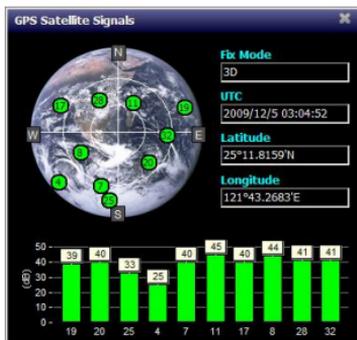
Show / Hide Information Bar.

■ Show Quick Function Bar

Show / Hide the Quick Function Bar.

■ Display GPS Satellite Signal

Display GPS Satellite Signal function provides received GPS signal statuses.



13 CONNECTION AND LOG



A	Message Source	Provide Devices Connection and Logs settings <ul style="list-style-type: none"> ● Device: shown external connected sources such as GPS, AIS, and others. ● Log: provide Log playback.
B	Connection	Device connection settings: <ul style="list-style-type: none"> ● Connection List: use this panel to add new devices and it also lists all connected source. ● Settings: provide settings for the selected connected source.
C	Messages	List all communications messages from connected device source and Logs.

Steps:

① Main Menu → Connection and Log

13.1 Message Source

Select between Device and Log for additional settings.

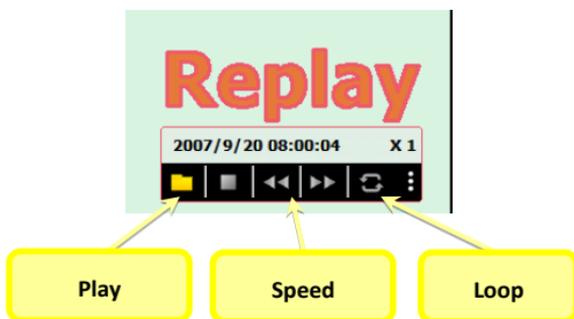
13.1.1 Devices

Use this menu to add new external device to NaviPro.

13.1.2 Log

Enable/disable playback control functions. The playback control appears at the lower right of the chart.

In the playback control, the folder allows replaying pre-recorded log. While playing the user can manipulate the play speed, play, pause, replay and loop from this simple control. As shown in figure below:



Note: when playing recorded files device alarms will be ignore.

13.2 Connection

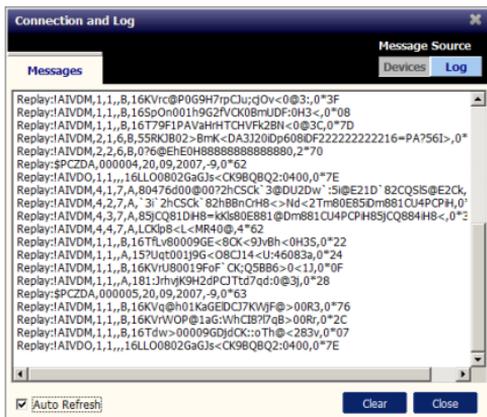
The connection menu serves two purposes. The first purpose is used to connect devices by simply clicking “Add New Connection”. The second purpose of this menu is listed all connected device and their connection status. Connected device status is show with a symbol. See below illustration for their classification:

Status Symbols	 : Connected ,  : Lost Connection ,  : Connection Failed
----------------	---

The user can use the Serial Port, TCP and UDP to connect to external devices. Moreover, user can also set device primary during this setup.

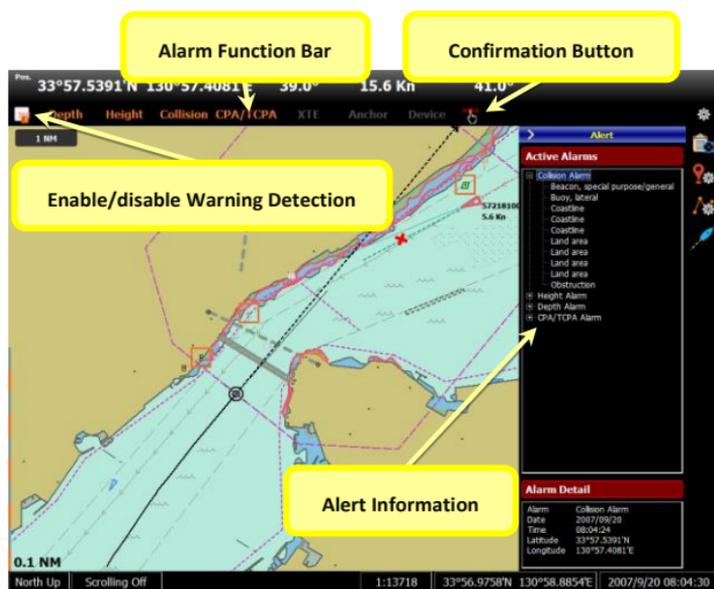
13.3 Message

List all messages from the connected devices. Messages are auto refresh when Auto Refresh checkbox is checked. The clear button clears all received messages. As shown in figure below:



14 ALARM

Provide navigational system alerts. When a GPS position is successfully acquired the system will automatically detect navigation safety alarms and display them on the Alarm Function Bar. The Alarm Function Bar displays current alarms by severity of the risk and type of the alert. Alarms with higher priorities will require user immediate attention by confirming the alarm by clicking on the Confirmation Button (the alert text will continue to blink); additional details can be query by left clicking the Confirmation Button as shown in figure below:



14.1 Alarm Classification

Warnings types are classified by different colors on the chart. The colors are red (device risk), orange (safety risk), and yellow (monitoring risk). By the degree of the risks, there are three warning alarms with different sound pitches: long, normal, short. The warnings that require user immediate attention will continually sound till user's acknowledgement.

Information on warning types is listed below:

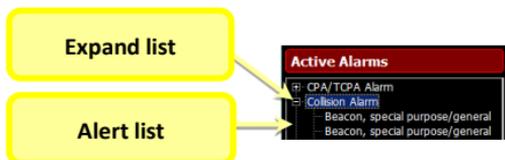
Alert	Category	Description	Alarm Pitch	Confirm Required
Device Failure Alarm	Device type	This alarm message will prompt when connected device has lost connection for a set period of time.	Long pitch	Yes
Low GPS Signal Alarm	Device type	GPS was connected, but cannot obtain of GPS fix for a period of time.	Long pitch	Yes
Checksum Error Alarm	Device type	When connected with devices, alert prompts when check code error occurs in messages.	Short pitch	No
Depth Alarm	Safety type	NaviPro alerts when guard zone detects an area with water depth is less than the configured boat safety depth value.	Normal pitch	No
Height Alarm	Safety type	NaviPro alerts when guard zone detects an object (bridge, power line, etc) with a height that is lower than the configured boat safety height value.	Short pitch	Yes
Collision Alarm	Safety type	NaviPro alerts when guard zone detects an object (rock, buoy) that is possible in a collision course.	Short pitch	No
Boundary Alarm	Safety type	This Alarm will sound when the vessel Guard Zone come in contact with the Boundary Line.	Short pitch	Yes
CPA/TCPA Alarm	Safety type	CPA and TCPA alarm warning will alarm based on preset settings.	Short pitch	No
XTE Alarm	Monitoring type	NaviPro alerts as vessel is sailing away beyond the defined time the XTE alarm distance of the route (XTE Alarm Width).	Normal pitch	No
Anchor Watch Alarm	Monitoring type	With Anchor Watch enabled, NaviPro alerts as boat drifting away from the maximum drift distance (Max Drift).	Short pitch	Yes

14.2 Alarm Information

Click on Alarm Function Bar to access warning information and details. The information is divided into Active Alarms and Alarm Detail. A highlighted alarm in Active Alarms is shown in Alarm Detail.

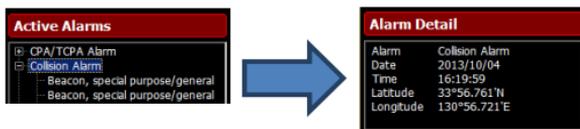
14.2.1 Active Alarms

Displays the current activated alarms. Alarms such as depth alarm, height alarm, collision warning are displayed in tree structures. Click the + sign to expand the list.

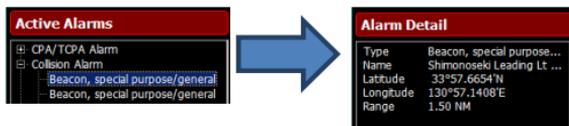


14.2.2 Alarm Detail

Alarm Detail displays the information of highlighted alarm in Active Alarms. Information includes alarm type, date and time, and the subject's latitude and longitude position.



When alarm types are Depth Alarm / Height Alarm / Collision Alarm, the details of the hazardous object causing alert such as object type, name, latitude and longitude position, chart displaying scale, and risk reason.



15 APPENDIX

15.1 S-57 / S-52 Abbreviations and Illustrations

ENC text information

Acronym stands for significance	
bn = Beacon (INT1)	Plt = Pilot
by = Buoy	Prod = offshore production (INT1)
clr = Overhead clearance	LtV = light vessel
clr cl = clearance closed	Varn = magnetic variation
clr op = clearance open	ch = Communication channel
sfclr = safe clearance	NMT = not more than "CLEARING BEARING"
No = Number (INT1)	NLT = not less than "CLEARING BEARING"

Natural and man-made features

Icon	Description	Icon	Description
	Temple		Church, chapel
	Mosque		Single building
	Chimney		Hill or mountain top
	Dome		Tower
	Water tower		Flare stack
	Monument		Windmill
	Wind motor		Mast
	Radar scanner		Radio, television tower
	Dish aerial		Tank

	Yacht harbor, marina		Fortified structure
	Mine, quarry		Flagstaff, Flagpole
	Tank farm		Refinery
	Wind generator farm		Quarry

Obstruction

Icon	Description	Icon	Description
	Wreck showing any portion of hull or superstructure at level of chart datum		Non-dangerous wreck, depth unknown
	Dangerous wreck, depth unknown		land as a point at small scale
	Offshore platform		Installation buoy, paper-chart
	Weed, kelp		Sand waves
	Fish stakes		Flare stack
	Fish farm		Fish haven
	Fishing ground		Underwater hazard with depth greater than 20 meters
	Square or rectangular daymark, simplified		Underwater hazard which covers and uncovers
	Obstruction, depth not stated		Obstruction in the intertidal area
	Obstruction which covers and uncovers		Arrowhead for own ship vector for course and speed over the ground
	Dangerous underwater rock of uncertain depth		Area of wrecks or obstructions

Traffic Routes

Icon	Description	Icon	Description
	One-way deep water route centerline, not based on fixed marks		Two-way deep water route centerline, not based on fixed marks
	Deep water route centerline, direction not defined in the data		One-way deep water route centerline, based on fixed-marks
	Two-way deep water route centerline, based on fixed marks		Regulated recommended route centerline, details not defined
	Regulated one-way recommended route centerline, based on fixed marks		Regulated two-way recommended route centerline, based on fixed-marks
	Ferry route		Regulated one-way recommended route centerline, not based on fixed marks
	Regulated two-way recommended route centerline, not based on fixed marks		Fairway with one-way traffic in direction indicated
	Recommended traffic direction between parts of a traffic separation scheme, or for ships not needing a deep water route		Recommended route between parts of a traffic separation scheme, or for ships not needing a deep water route, with the direction not specified in the data
	One way lane of a traffic separation scheme, with the direction not defined in the data		Reciprocal traffic directions in a two-way route of a traffic separation scheme
	Two-way route of a traffic separation scheme, with the direction not defined in the data		Radio calling-in point for traffic in one direction only

	Radio calling-in point for traffic in both directions		Radio calling-in point whose direction is not known
	Point symbol for traffic precautionary area		Traffic separation scheme
	Inshore traffic zone		Precautionary area
	Archipelagic sea lane		Seabed area
	Deep water route part		Two-way route part
	Ferry route		Fairway
	Anchorage area as a point at small scale, or anchor points of mooring trot at large scale		designated anchor berth for a single vessel
	Floating hazard to navigation		Anchorage area
	Restricted area, anchoring, prohibited		Restricted area, fishing prohibited
	Restricted, entry prohibited		ESSA (environmentally sensitive sea area) area
	PSSA (particularly sensitive sea area) area		Caution area, caution area, a specific caution note applies

	Military practice area		Administration area
	Cargo transshipment area, area with minor restrictions or information notices		

15.2 Abbreviation

AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
AtoN	Aids to Navigation
BRG	Bearing
COG	Course Over Ground
CPA	The Closest Point of Approach
EBL	Electronic Bearing Line
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
ENC	Electronic Navigational Chart
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
ETE	Estimated Time En-route
GPS	Global Positioning System
HDG	Heading
IMO	International Maritime Organization
IHO	International Hydrographic Organization
RNG	Range
SENC	system Electronic Navigational Chart
SOG	Speed Over Ground
SRM	Safety Related Messages
TCPA	The Time to Closest Point of Approach
VRM	Variable Range Marker
XTE	Cross Track Error



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