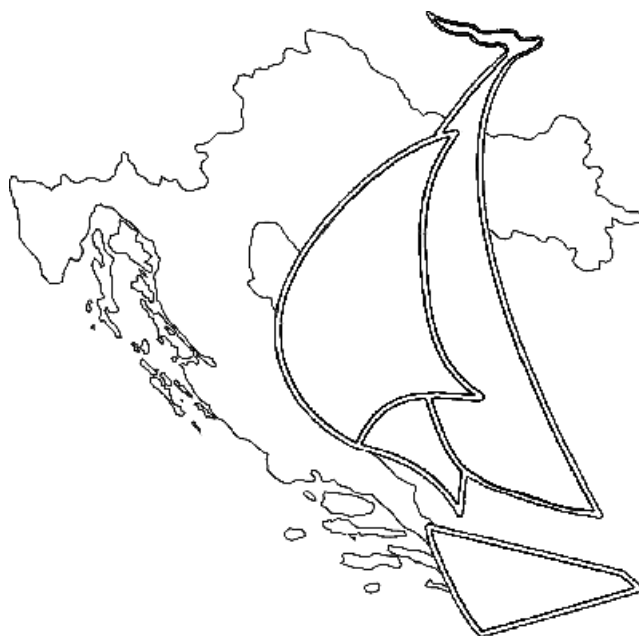




SmArt Nav

intelligent navigation

Users manual

v2.7



www.cvs.hr

March, 2008.

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This users manual provides some basic information on **SmArtNav** navigation system and its components installation procedure and later on it deals with the usage of the **SmArtNav**.

SmArtNav package contents

- CD medium with **SmArtNav** navigation system, vector charts and the Database
- This users manual
- HASP dongle USB - unauthorised usage protection system

Minimum hardware requirements

- PC/IBM compatible computer
- Pentium 600MHz, 128MB of RAM and 400MB of free disk space
- Graphic resolution 800×600 or higher
- RS232 serial or USB port with adequate USB -> serial converter
- Additional serial or USB ports for connecting other marine instruments or NMEA concentrator
- Microsoft Windows 98/Me/NT/2000/XP/Vista operating system
- Microsoft Internet Explorer v5.0 or higher

Installation

Prior to installing the **SmArtNav** system user must assure that adequate operating system and Internet Explorer are preinstalled.



IMPORTANT NOTICE:

*The user will not be able to launch the **SmArtNav** navigation system if HASP key is not connected to the computer. HASP key and its documentation are copyrighted property of the Aladdin Knowledge systems Ltd.*

- Connect HASP key to the computer
- Run the "Setup" program located on your installation CD. That will start the installation procedure in form of the installation wizard. The wizard will guide you through the rest of the installation procedure.
- After successful installation restart the computer

The installation procedure will automatically create a new program group and desktop shortcuts according to the version of the navigation system that was purchased.

After the installation and the **SmArtNav** is started for the first time, it is very important to adjust some parameters in order to make the **SmArtNav** system work correctly. Those parameters are e.g. vessels length, width,

height, draft, displacement etc. and are set on the vessel tab of the application settings dialog box. For more information concerning this subject look at Application settings section of this manual.



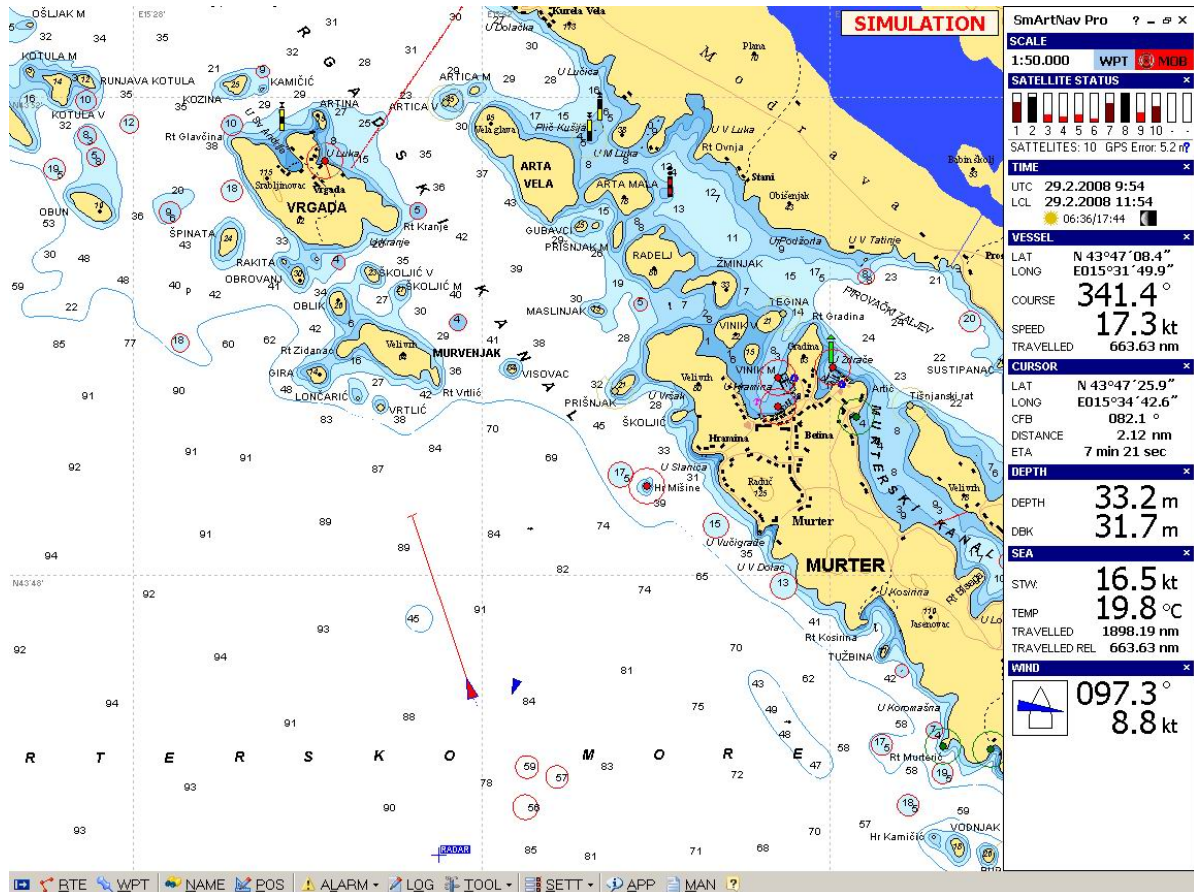
IMPORTANT NOTICE:

HASP key represents a standalone product.

Therefore if the key somehow get lost, the vendor is not bound to supply another one.

If the key is accidentally damaged, the vendor will substitute the damaged key with the new one for the price of new one..

Using the navigation system



SmArtNav user interface

SmArtNav user interface is divided into two basic portions which are as follows: vector chart, application status and information panel.

Scale

- Current scale

Satellite status

- GPS satellite signal intensity
- Number of satellites detected
- Calculated GPS position error (Garmin units only)
- Satellite position on sky after click on blue question mark (?)

Cursor

- UTC date and time (UTC = Universal Time Coordinated)
- Vessel date and time (LCL = Local)

- Cursor position sunset and sunrise time
- Moon phase
- Cursor longitude and latitude
- Cursor course from boat (CFB)
- Distance between cursor and vessel expressed in nautical miles
- Current speed ETA (ETA = Estimated Time of Arrival)

Vessel

- Vessel position (longitude and latitude)
- Vessel course (COG = Course Over Ground)
- Vessel speed (SOG = Speed Over Ground)
- Travelled distance

Depth

- Depth (DPT = Depth)
- Depth bellow keel (DBK = Depth Bellow Keel)

Wind

- Vessel relative wind direction
- Vessel relative wind speed

Sea

- Vessel speed through water (STW = Speed Through Water)
- Water temperature
- Travelled distance
- Relative travelled distance

Mini chart

- Chart with a little square indicating the displayed portion of the chart

Application status and information panel adjustment

The application status and information panel is adjustable in several ways. Firstly, there is a possibility to choose which subpanels will be visible and which won't. One can simply right click the main status and information panel which makes the pop up menu to appear. This menu allows the user to switch on/off individual subpanels and also to choose which side the panel resides on. Vertical subpanel arrangement can be changed by dragging subpanels up and down (drag&drop holding the caption bar).

Moving the chart

There are three ways to move/scroll the chart. These are as follows:

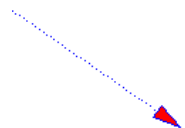
- Drag and drop in any direction desired
- Left click on the mini map
- Simply by pressing the keyboard cursor keys

Main toolbar buttons

	Vessel tracking mode
	Managing routes and waypoints
	Managing individual locations (fishing spots, men over board)
	Find by name (cities, places, rivers, gulfs etc.)
	Find by geographic position
	Customize alarm settings
	Customize log file and logging
	Print chart
	Application settings
	Appendix
	MOB (Man Over Board)

Vessel tracking mode

Vessels position is indicated by a red triangle whose tip indicates vessels bow position. Triangles orientation indicates vessels movement direction. Triangles size is constant and is not in any way related to vessels real size. If the Show vessel trace check box (located on the View tab in the main setup dialog box) is checked then the blue dotted line will be drawn behind the vessel.



Vessel symbol

Tracking mode button (first in the row) is used to switch between the following tracing modes:

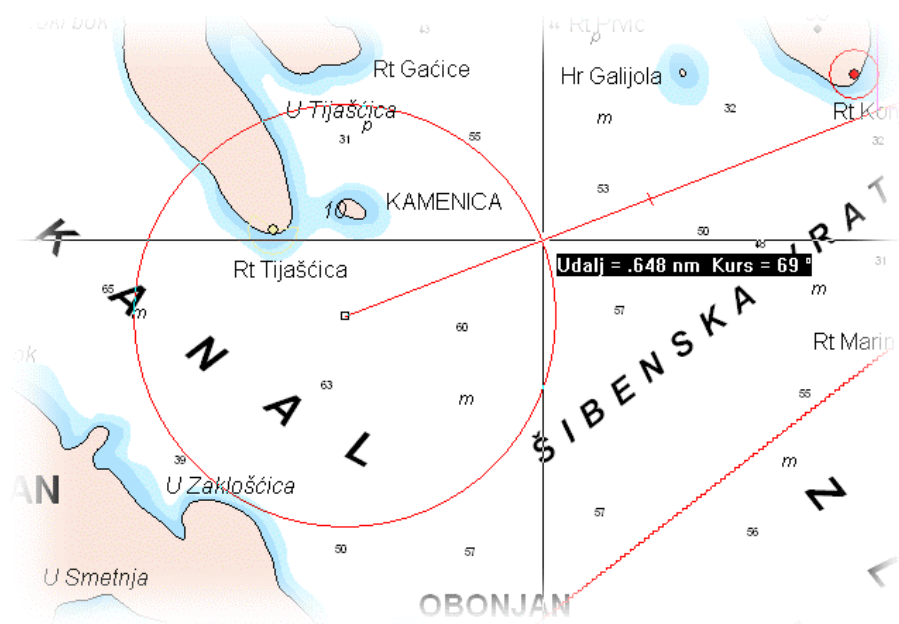
- **Free** - Vessels movement does not affect the chart
- **Follow** - the chart is scrolled automatically so the vessel always remains in the center

Routes

The **SmArtNav** navigation system allows the user to set the route that the vessel will automatically navigate by. In order to make use of this feature the vessel should, beside a GPS, be equipped with an appropriate NMEA compatible autopilot device.

Creating a new route

One can create a new route by right clicking anywhere on the chart (except ground or shallow sea). The spot you have clicked on will be used as your starting waypoint. The other waypoints are marked by left clicking anywhere on the chart (except ground or shallow sea). The number of waypoints is unlimited. Routes ending waypoint is placed by double clicking the left mouse button or by pressing the Enter key on your keyboard. When you are done setting waypoints, the dialog box will appear asking you to enter your routes name which is obligatory and also the name of starting and ending waypoint which is optional.

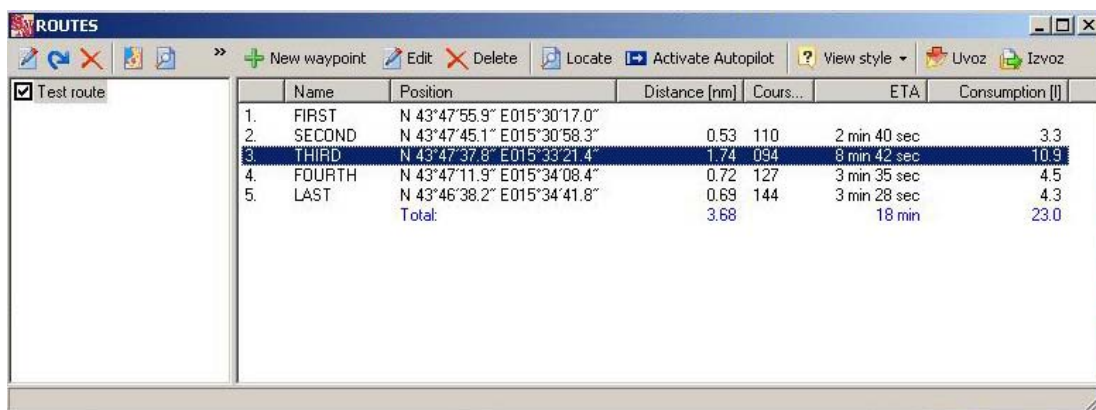


Creating new route

To abort drawing current route simply press Esc key on your keyboard or click the right mouse button.

Updating routes

Click the Routes button on main toolbar to brings up the routes dialog box. This dialog is the central location for managing routes.



Update routes

Left side contains complete list of created routes and right side of the dialog shows list of waypoints that make selected route. If there are no routes selected waypoint list will be empty. There is a possibility to show/hide routes. Little check mark next to routes name indicates if the route is visible or not and can be turned on/off.

Every waypoint is determined by its geographic coordinates, course, distance between it self and the previous one, ETA and fuel consumption.

Route commands

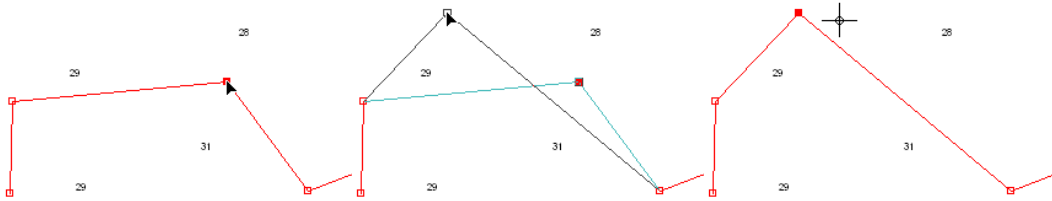
-  Edit route properties: name, first and last waypoint name and route color
-  Reverse route
-  Delete route
-  Show/hide route
-  Find route
-  Print route
-  Activate the autopilot and navigate by selected route

Route waypoint commands

-  Insert waypoint
-  Edit waypoint properties: name and geographic position
-  Delete waypoint
-  Find waypoint
-  Activate the autopilot and navigate toward selected waypoint
-  Customize waypoint display (without label, name label or number label)

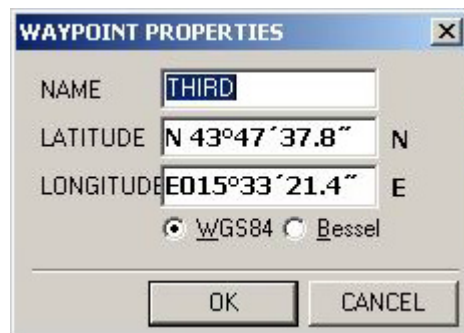
When the autopilot is activated, it automatically finds the nearest waypoint (in relation to vessels current position) and suggests to navigate toward that waypoint. It calculates the routes closest waypoint and offers it as the starting waypoint. There is still a possibility to navigate towards any other waypoint by simply selecting the desired waypoint in the waypoint list and activating the autopilot.

There is a possibility to change individual waypoint position by a simple drag 'n' drop procedure. The routes dialog box has to be opened in order to change waypoint position in that way. Only then it is possible to drag the waypoints around.



An example of waypoint drag 'n' drop

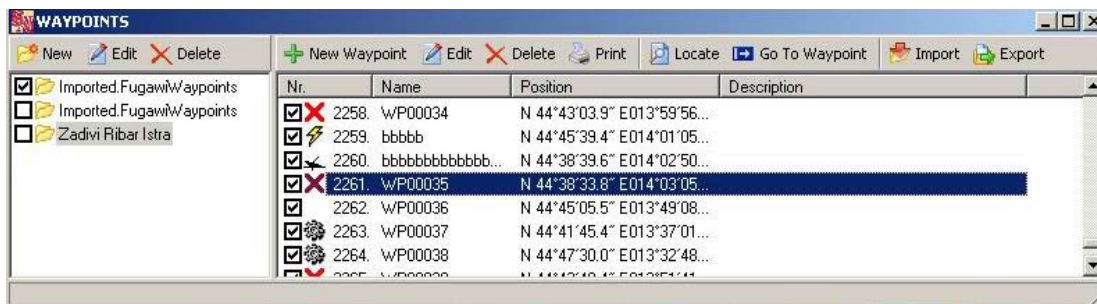
There is a possibility to enter waypoint geographic position in two different formats: WGS84 and Mercators projection - Bessels ellipsoid (official charts made by Croatian Hydrographic institute in Split). This is done in waypoint properties dialog box.



Edit waypoint properties

Waypoints

SmArtNav navigation system features creating and editing individual waypoints. Individual waypoints can be used to mark some interesting places or sites like e.g. good fishing spots, diving locations, anchoring places, dangerous locations etc. Every individual waypoint has its little icon, name and description.



Updating waypoints

Individual waypoints are organised into groups. Every one of this groups can contain an infinite number of waypoints. There is a possibility to show/hide waypoint groups as well as the waypoints.

Waypoint group commands



Create a new waypoint group



Change waypoint group name



Delete the selected waypoint group and all its waypoints

Individual waypoint commands



Create a new waypoint



Edit waypoint properties: name, icon, position and description



Delete waypoint



Print waypoint list

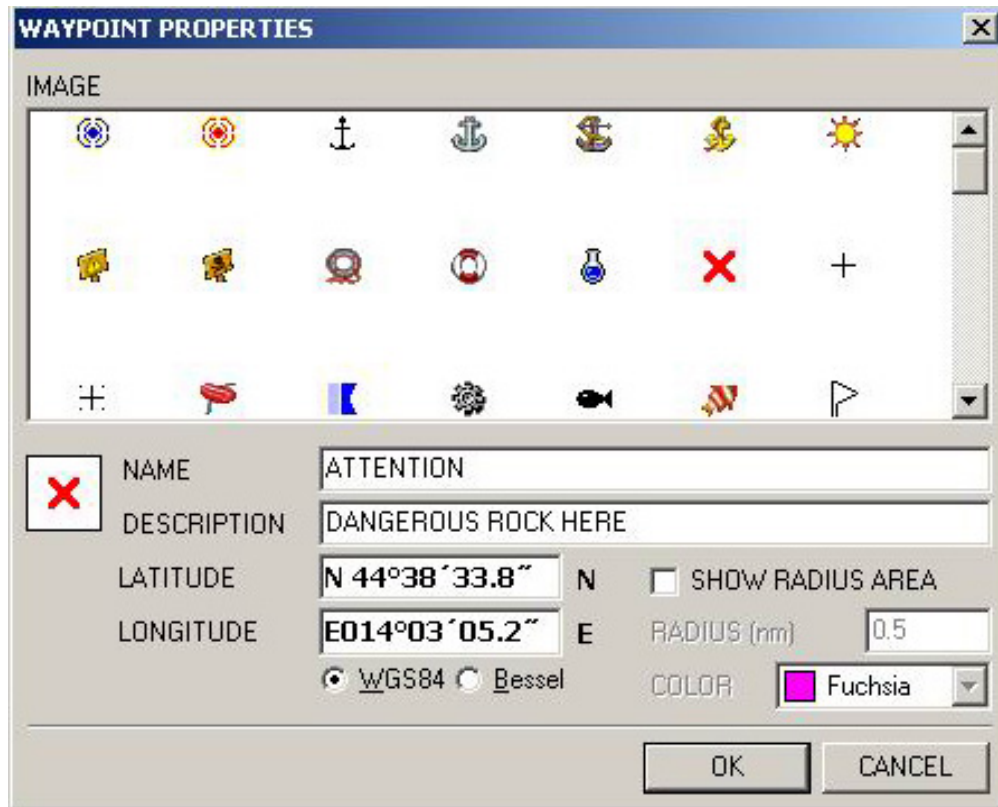


Find waypoint



Activate the autopilot and navigate toward selected waypoint

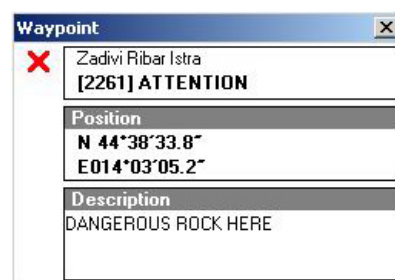
When in waypoint creation mode the cursor turns to a small cross and then it is required to select location for the waypoint simply by clicking the desired spot on the chart. After marking the location for the waypoint, a dialog box appears that allows the user to select an icon and name for the waypoint.



Waypoint properties

Individual waypoints can be moved to another group by a simple drag 'n' drop procedure. Just pick a waypoint and drag it to a different group (same as editing route waypoints described earlier).

Waypoints are represented by a small icons on the chart and are in some way interactive. This means that one can click its symbol which will bring up the waypoint information window.



Waypoint information

Find by name

SmArtNav navigation system features instant find by name procedure which allows the user to find any object on the map by its name (cities, places, rivers, gulfs...). The feature is activated by clicking the *NAME* button on the main toolbar which will cause the following dialog box to appear:



Find by name

When *Find by name* window has appeared simply type the name of the object or view a complete list of objects by unfolding the dropdown list. When the desired location is marked click the *Find* button or press Enter. Searched object will be immediately displayed in the middle of the screen.

There are nine types of objects that can be found by their name:

- **Cities:** font color is black, all caps
- **Smaller cities and other places:** font color is black, small caps
- **Airports, hydroelectric power plants:** dark gray
- **Large and larger islands:** purple font, all caps
- **Smaller islands:** purple
- **Shallows:** dark blue
- **Passages, channels, and gates:** dark blue, all caps
- **Mountain tops, plains and alike:** brown purple
- **Other:** gray

Find geographic position

Another feature is finding the geographic position. Bring up the *Find position* dialog box by clicking the *POS* button on the toolbar. When the dialog box appears enter longitude and latitude and click the Find button or press Enter. The desired position will be shown in the center of the screen.



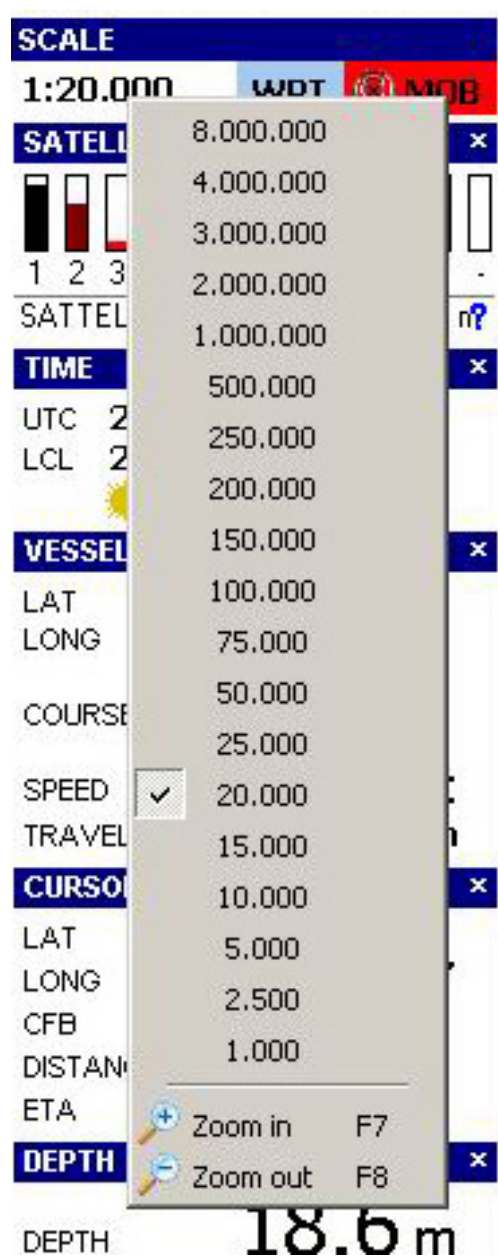
Find by geographic position

You can enter geographic coordinates in two formats: WGS84 and Bessel.

Changing scale

Vector chart can be displayed in different scales: from 1000 up to 8.000.000
Current scale can be changed in several different ways:

- Right click the current scale display on the main status-info panel and then simply choose the desired scale from the pop-up menu
- By keyboard shortcuts (see the keyboard shortcuts section)
- By scrolling the mouse button



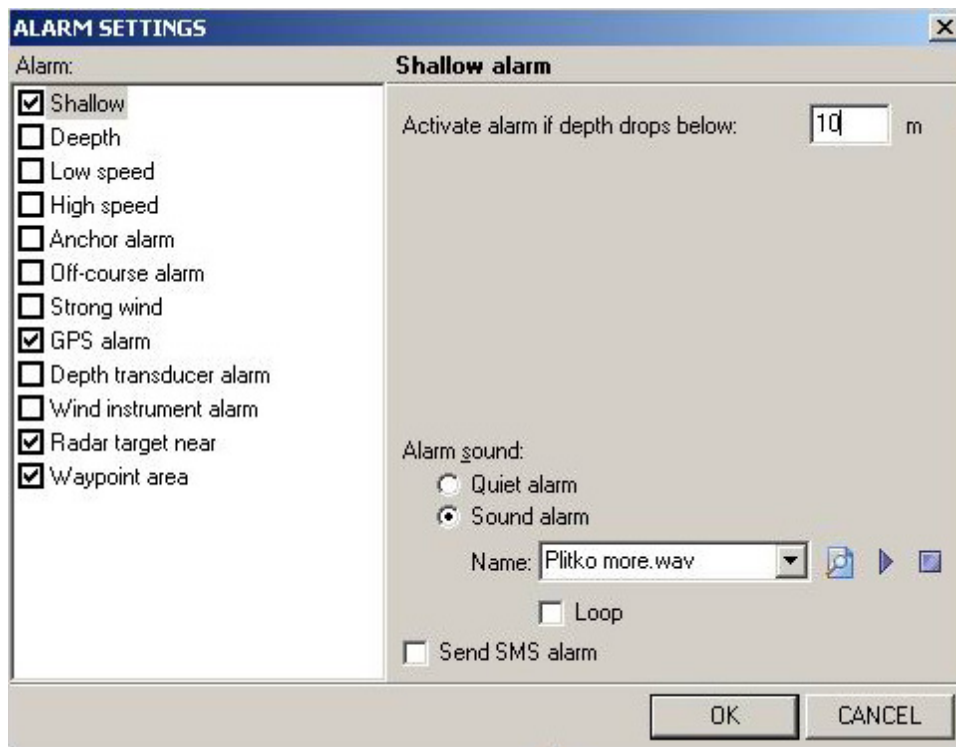
Changing scale

Alarms

Alarm settings

SmArtNav navigation system features the following alarms:

- **Shallow alarm** – Warns when the depth below the vessel is smaller than specified. The alarm is functional only if the vessel is equipped with the NMEA compatible depth sounder device.
- **Depth alarm** – Warns when the depth below the vessel is larger than specified. The alarm is functional only if the vessel is equipped with the NMEA compatible depth sounder device.
- **High speed alarm** - Warns when speed exceeds the specified value
- **Low speed alarm** - Warns when speed drops under the specified value
- **Anchor drag alarm** – Warns the user that the vessel has moved outside the specified radius
- **Off-course alarm** – Warns the user that the vessel exceeded route deviation tolerance
- **Strong wind alarm** – Warns the user that the wind speed exceeded the specified value. The alarm is functional only if the vessel is equipped with the NMEA compatible wind sensor.
- **GPS Alarm** – Warns the user that the GPS communication error occurred. There is a number of reasons for this type of error to occur but the most common reasons are GPS power supply failures, bad communication parameters, bad wiring, low signal etc...
- **Depth sounder alarm** – Warns the user that the depth sounder communication error occurred
- **Wind sensor alarm** – Warns the user that the wind sensor communication error occurred
- **Radar target nearness alarm** – Warns the user that the vessel has come too close to the radar target. The alarm can function properly only if the vessel is equipped with the appropriate radar device (ARPA-MiniARPA and NMEA)



Alarm settings

Customizing the alarm sound

Every alarm consists of an on-screen textual message and an appropriate alarm sound. There are several predefined alarm sounds that can be chosen from the alarm name field. Other sounds can be chosen by browsing for other sound files on local or remote hard drive. The alarm sounds can be played once or in loop mode.

Alarm archive

Every alarm event is logged in the alarm archive with all related parameters and status.

ALARM ARCHIVE							
Alarm status: K - Active G - Inactive Q - Acknowledged							
	Date/time	Alarm	State	Value	Position	SOG	COG
368.	25.2.2008 15:53:47	Anchor alarm	KQ		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
369.	25.2.2008 15:53:48	Shallow	KQ		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
370.	25.2.2008 15:53:40	Radar target near	KGQ		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
371.	25.2.2008 15:53:50	GPS alarm	K		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
372.	25.2.2008 15:53:53	GPS alarm	KQ		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
373.	25.2.2008 15:53:40	GPS alarm	KGQ		N 42°53'41.4" E 016°19'19.3"	30.0 kt / 55.6 km/h	047.3 °
374.	25.2.2008 15:54:28	Shallow	KGQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
375.	25.2.2008 15:54:28	Anchor alarm	KGQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
376.	25.2.2008 15:54:38	GPS alarm	K		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
377.	25.2.2008 15:54:40	GPS alarm	KQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
378.	25.2.2008 15:54:29	GPS alarm	KGQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
379.	25.2.2008 15:54:38	GPS alarm	K		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
380.	25.2.2008 15:54:40	GPS alarm	KQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
381.	25.2.2008 15:54:29	GPS alarm	KGQ		N 42°53'55.2" E 016°19'41.7"	30.0 kt / 55.6 km/h	047.1 °
382.	25.2.2008 15:55:29	Waypoint area	WP00142 K		N 42°54'14.3" E 016°20'10.0"	30.0 kt / 55.6 km/h	044.4 °

Alarm archive

Alarm archive commands



- Find location
- Print archive
- Delete archive



NOTICE:

For more information on alarms see the Alarms section



Logging

The purpose of logging is to make the evidence of vessels status over a given period of time.

Logging service is always active and it handles recording of various parameters over a specified stages of trip. These parameters are date and time, geographic position, speed (SOG), course (COG), depth and wind data. The period is defined in the amount of nautical miles or meters and can be set in *Log settings* dialog box.

Active log file: labActiveLogName Interval: 10m

Period: [Other...] From: 1.5.2004 To: 20.10.2008 23:50:00 Search

Show Find Print Statistics Settings

	Date/Time	Position	SOG	COG	Depth	Wind speed	Wind angle
1.	12.9.2004 9:14:46	N 43°32'43.1" E016°24'12.9"	0.6 kt / 1.1 km/h	227.9 °	0.0 m	0.0 kt	000.0 °
2.	12.9.2004 9:15:37	N 43°32'43.0" E016°24'12.4"	1.2 kt / 2.2 km/h	210.2 °	0.0 m	0.0 kt	000.0 °
3.	12.9.2004 9:15:50	N 43°32'42.7" E016°24'12.2"	1.5 kt / 2.8 km/h	210.3 °	0.0 m	0.0 kt	000.0 °
4.	12.9.2004 9:16:00	N 43°32'42.5" E016°24'11.9"	1.7 kt / 3.1 km/h	219.6 °	0.0 m	0.0 kt	000.0 °
5.	12.9.2004 9:16:11	N 43°32'42.3" E016°24'11.6"	1.6 kt / 3.0 km/h	232.7 °	0.0 m	0.0 kt	000.0 °
6.	12.9.2004 9:16:24	N 43°32'42.2" E016°24'11.1"	1.5 kt / 2.8 km/h	246.2 °	0.0 m	0.0 kt	000.0 °
7.	12.9.2004 9:16:37	N 43°32'42.2" E016°24'10.6"	1.6 kt / 3.0 km/h	261.6 °	0.0 m	0.0 kt	000.0 °
8.	12.9.2004 9:16:46	N 43°32'42.2" E016°24'10.2"	2.0 kt / 3.7 km/h	276.4 °	0.0 m	0.0 kt	000.0 °
9.	12.9.2004 9:16:53	N 43°32'42.3" E016°24'09.8"	2.4 kt / 4.4 km/h	276.6 °	0.0 m	0.0 kt	000.0 °
10.	12.9.2004 9:17:00	N 43°32'42.3" E016°24'09.3"	3.3 kt / 6.1 km/h	275.4 °	0.0 m	0.0 kt	000.0 °
11.	12.9.2004 9:17:05	N 43°32'42.3" E016°24'08.8"	3.7 kt / 6.9 km/h	276.0 °	0.0 m	0.0 kt	000.0 °
12.	12.9.2004 9:17:09	N 43°32'42.3" E016°24'08.3"	4.0 kt / 7.4 km/h	276.2 °	0.0 m	0.0 kt	000.0 °
13.	12.9.2004 9:17:14	N 43°32'42.4" E016°24'07.9"	4.2 kt / 7.8 km/h	274.9 °	0.0 m	0.0 kt	000.0 °

Logging route

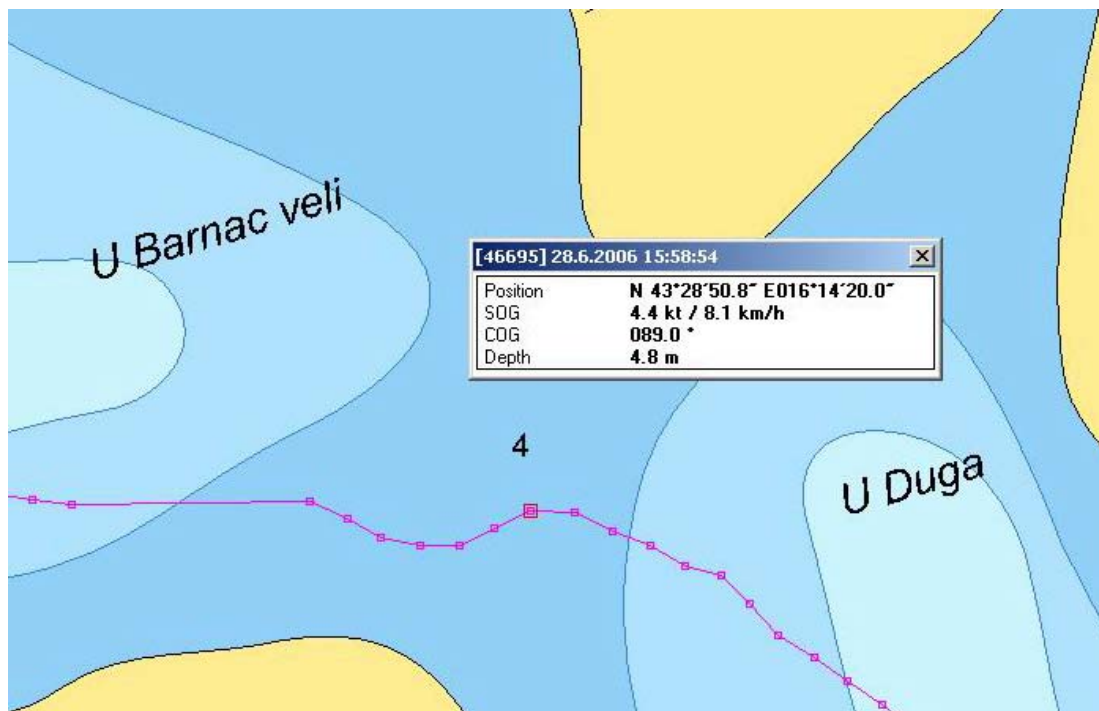
Left portion of the log window contains the list of all existing log files and the right portion contains a list of all log records with belonging parameters. After defining the period click the *Find* button.

Log commands



- Redraw route from log
- Find route waypoint
- Print log
- Log statistics
- Log settings

Logging service is always active and every day the navigation system creates a new log file. Currently active log name file is typed bold. There is a possibility to automatically delete all log files older than the date specified. Log files are named according to the date they were created.

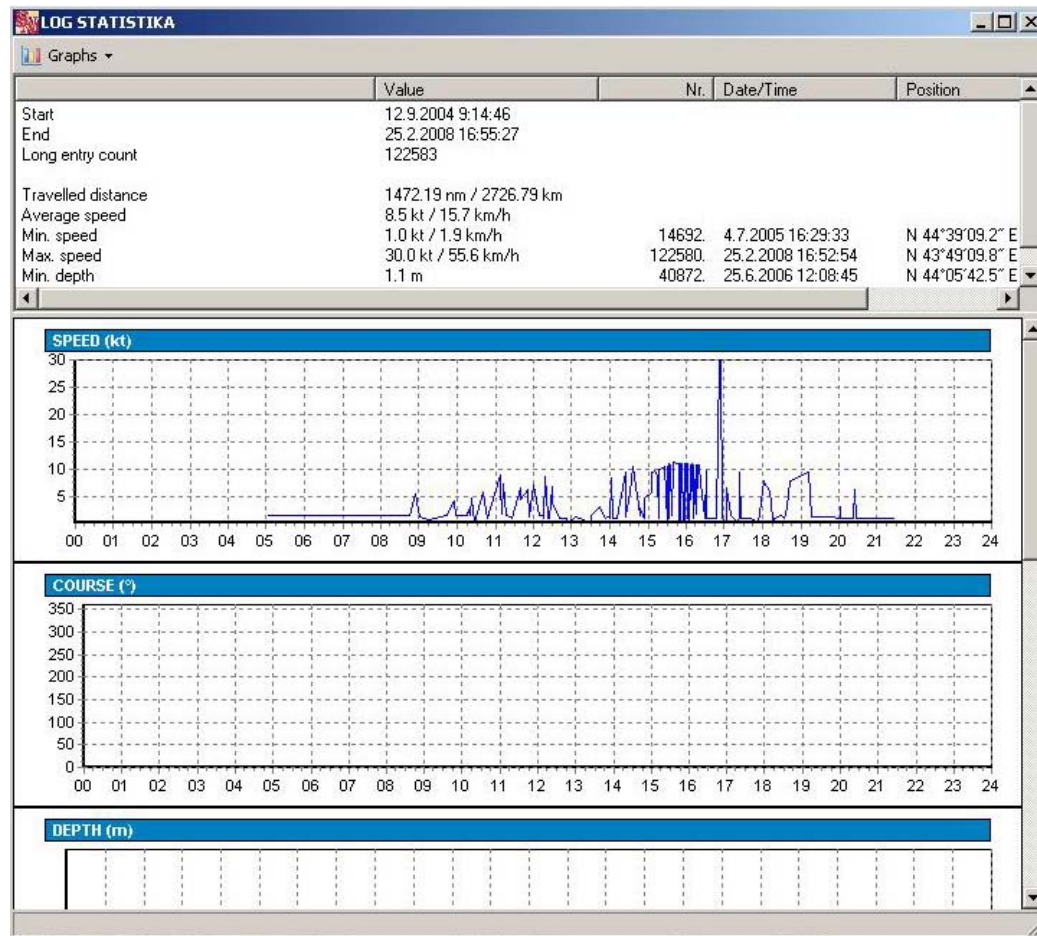


Log display

Every displayed Log point is selectable. Left click on the selected point will display window with all logged information for that point.

Log statistics

Log statistics demonstrates chosen log summary.



Log statistics

Log settings

Within this dialog box the user can customize log settings:

The LOG SETTINGS dialog box contains the following controls:

- Logging interval:** A numeric input field with the value 10, and a radio button for meters (selected) and a radio button for miles.
- Auto delete off old logs:** A checkbox that is currently unchecked.
- Delete after:** A numeric input field with the value 30, followed by the text "days".
- Buttons:** OK and CANCEL buttons.

Log settings

Logging interval (specified in nautical miles or meters) sets the gap between two log records (a set of recorded values).



Printing chart

SmArtNav features a possibility to print currently displayed portion of the chart with all related data (time, date and vessels geographic position).



Settings

After installing **SmArtNav** it is required to configure vessel parameters and controllers for proper functionality. Application settings is done in the *Application settings* dialog box which can be accessed by clicking the *SETT* button located on the main toolbar.

Application settings

Application settings dialog box contains the following tabs:

- Vessel
- View
- Colors
- Controllers
- Devices
- GSM modem
- Activation

Vessel tab

The screenshot shows a software window titled "APPLICATION SETTINGS" with a close button (X) in the top right corner. Below the title bar is a tabbed interface with the following tabs: "Vessel", "View", "Colors", "Controllers", "Devices", "GSM modem", and "Activation". The "Vessel" tab is currently selected. The main area of the dialog contains two columns of text labels followed by input text boxes. The first column includes "Vessel name:", "Length (m):", "Width (m):", "Height (m):", "Displacement (t):", and "Draft (m):". The second column includes "License number:", "Maximum speed (kt):", "Traveling speed (kt):", "Consumption (l/h):", and "Fuel tank capacity (l):". The input boxes contain the following values: "MV Sve pasa", "16", "4.6", "5.2", "25", "1.5", "992 ZD", "18", "12", "75", and "1750". At the bottom right of the dialog are three buttons: "OK", "APPLY", and "CANCEL".

Parameter	Value
Vessel name	MV Sve pasa
License number	992 ZD
Length (m)	16
Width (m)	4.6
Height (m)	5.2
Displacement (t)	25
Draft (m)	1.5
Maximum speed (kt)	18
Traveling speed (kt)	12
Consumption (l/h)	75
Fuel tank capacity (l)	1750

Vessel tab

Vessel tab contains the text boxes used for following parameters:

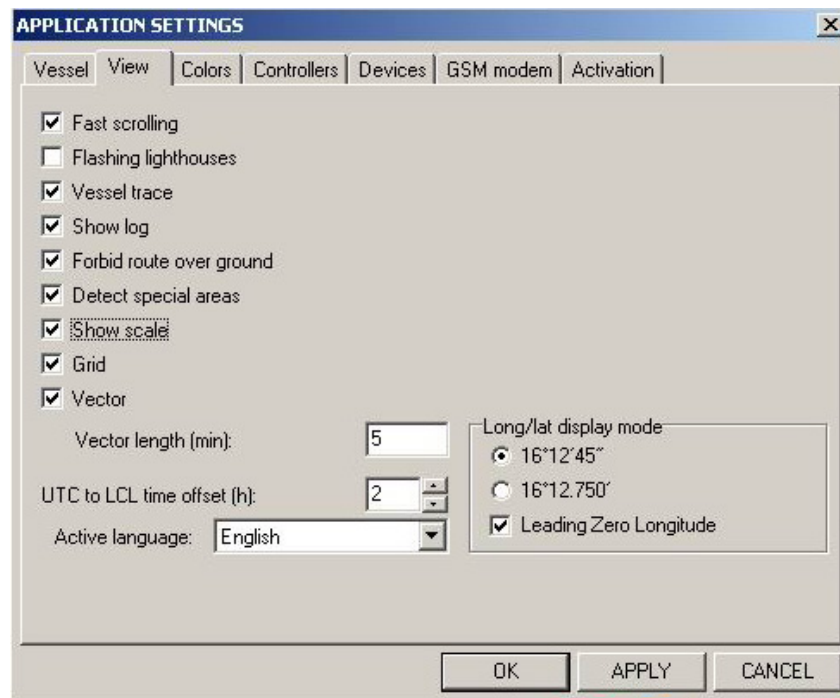
- Vessel name
- Licence plate
- Length (m)
- Width (m)
- Height (m)
- Displacement (t)
- Draft (m)
- Maximum speed (kt)
- Travelling speed (kt)
- Fuel consumption (l/h)
- Fuel tank capacity (l)



IMPORTANT NOTICE: It is highly advisable to enter all parameters as precisely as possible because many further calculations is done based on the data supplied in this dialog box..

View tab

This tab contains view customizing controls.



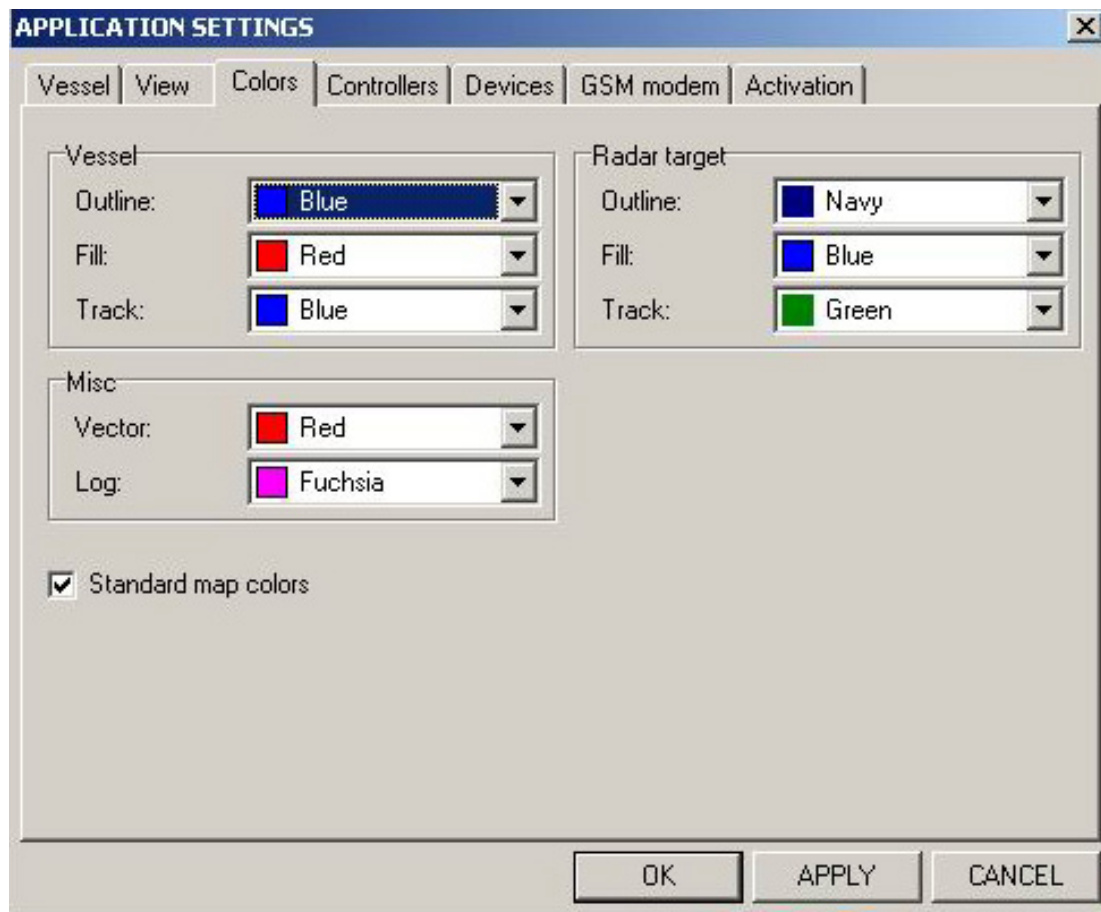
View tab

This tab provides the following options to be customized:

- **Fast scrolling** - This option can improve chart rendering speed
- **Flashing lighthouses** - toggles flashing lighthouses on/off
- **Vessel trace** - toggles vessel trace on/off
- **Show log** - toggles vessel log on/off
- **Forbid route over ground** - This option is used during the route creation process and should always remain turned on except when doing some measurement over ground.
- **Detect special areas** – toggles Special areas warning after entering them (forbiddenn anchoring, explosive materials...)
- **Show scale** – toggles on/off on chart scale display
- **Grid** – toggles on/off on koordinate grid display
- **Vector** – toggles vessels direction vector display (time component must be entered). If enabled, vector with variable length (depends upon the vessels speed) will be shown in front of the vessel.
- **UTC to LCL time offset** - Universal time coordinated offset. This is used when calculating local time in relation to the UTC time.
- **Active language** – toggles between posible languages
- **Long/Lat display mode** - Choose between the Long/Lat format

Colors tab

This tab contains controls that allow the user to chose different colors for different objects like e.g. vessel symbol border color, vessel symbol fill color, vessel trace color etc.



Colors tab

Standard map colors option enables chart display in standard colors for nautical charts.

Controllers tab

Communication controllers are set in this tab. Communication controller can be either a serial port or a TCP/IP connection, both handling inbound and outbound traffic.

Serial port parameters:

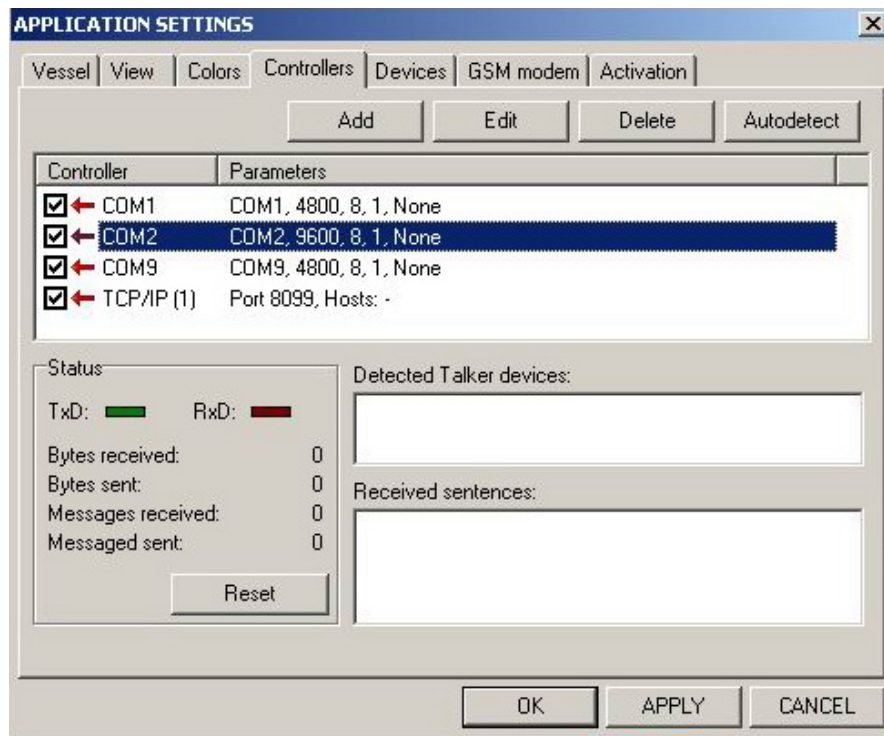
- **Port** – serial port number which the NMEA device is connected to
- **Baud rate** - Communication speed. According to NMEA-0183 standard, communication speed has to be set to 4800 baud.
- **Data bits** - Standard value is 8
- **Parity** – Standard value is no parity
- **Stop bits** - Standard value is 1

TCP/IP connection parameters:

- **Port** - TCP/IP port number that the navigation system communicates through with the remote computer or computers. 8099 is standard.
- **Destination IP addresses** - A list of IP addresses that the navigation system communicates with. This option is enabled only if the data transmission over the controller is enabled.

Common parameters:

- **Listener sentences** - enables data reception and provides the possibility to choose which sentences the controller will process. If the data reception is enabled, the received data will be processed by the program or forwarded to another listener device or service.
- **Talker sentences** - enables data transmission and provides the possibility to choose which sentences the controller will send to another device or service. If the talker is enabled the valid sentences will be transferred to another device connected to the controller. Messages that need to be sent have to be selected or checked in the list of available messages.
- **Interval (ms)** - Time gap between two messages. This option is active only if data transmission is active. When working with serial connection, recommended interval is between 1000 and 2000ms and in case of TCP/IP connection recommended interval is 200ms. If the interval is too small, communication congestion is likely to occur.
- **NMEA prefix** - The NMEA prefix determines how the controller represents it self to other NMEA devices. Typical NMEA prefix is "GP".

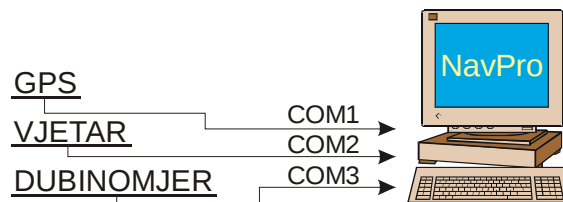


Controller tab

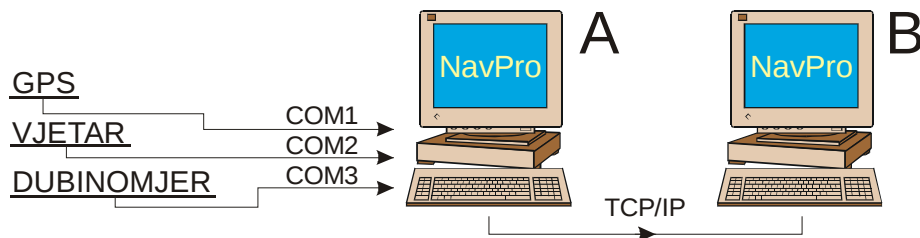
The status panel contains the following information:

- Reception (RxD), transmission (TxD) indicators, activity indicator
- Number of NMEA messages sent and received
- Number of bytes sent and received

Typical navigation system configuration:

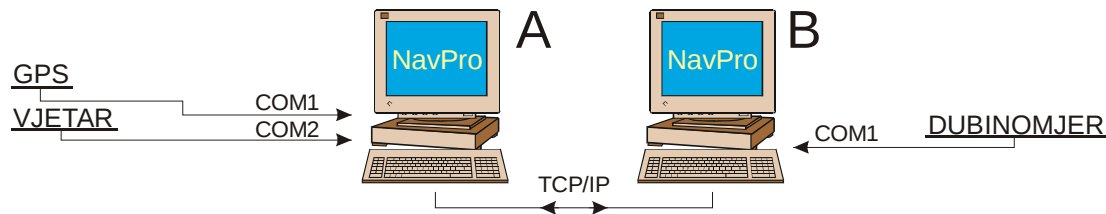


Create three serial port controllers on computer **A** and enable reception of all messages.



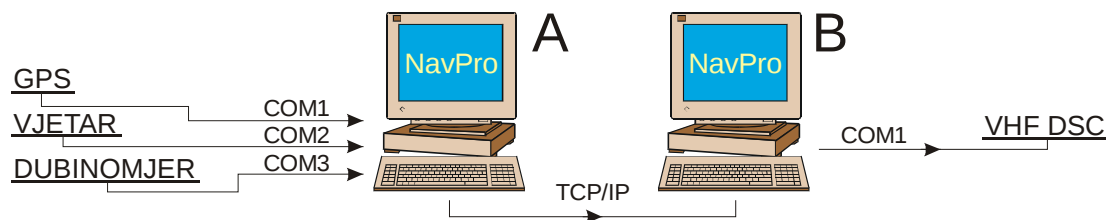
Create three serial port controllers on computer **A** and enable reception of all messages. It is also required to create one outbound traffic TCP/IP controller. Destination address is IP address of the destination computer (**B**).

On computer **B** create one TCP/IP inbound traffic and enable reception of all messages.



On computer **A** create two serial port controllers and enable reception of all messages. Also create one TCP/IP controller both inbound and outbound traffic enabled. Destination address is IP address of the destination computer (**B**).

On the destination computer (**B**) create one data receiving serial controller. Also create one TCP/IP controller both inbound and outbound traffic enabled. Destination address is IP address of the destination computer (**A**).



Create three serial controllers on computer **A** and enable reception of all messages. On the same computer create one outbound traffic only TCP/IP controller with the destination address of computer **B**.

Create one TCP/IP inbound data only controller on computer **B** and enable reception of all messages. It is also required to create one outbound traffic only serial controller. In the list of available messages to be sent choose only GGA, GLL and RMC messages



IMPORTANT NOTICE:

SmArtNav navigation system can work in the simulation mode too. The simulation mode is activated by clicking the "Settings / Simulation / Active" button located on the applications main toolbar. The simulation mode can be used to learn how to use the program or for presentation purposes. Everything that happens in simulation mode is not in any way related to vessels real position, speed or direction. All values and vessel movement when in the simulation mode are randomly generated computer values..

Devices tab

This tab provides space for the user to specify parameters of devices connected to the computer.

The screenshot shows the 'APPLICATION SETTINGS' dialog box with the 'Devices' tab selected. The dialog has several tabs: Vessel, View, Colors, Controllers, Devices, GSM modem, and Activation. The 'Devices' tab is active, showing settings for GPS, Wind, Depth transducer, and Autopilot.

GPS

Antenna position:

From bow (m): 10

From port side (m): 3.5

Wind

Angle correction (°): 8

Depth transducer

Transducer position (m): 1.2

Autopilot

Controller: COM2

Waypoint radius (m): 50

☒ APB - Heading/Track Controller (Autopilot) Sentence "B"

☒ BOD Bearing - Origin to Destination

☒ BWC - Bearing and Distance to Waypoint

☒ RMB - Recommended Minimum Navigation Information

☒ XTE - Cross-Track Error, Measured

☒ XTR - Cross-Track Error - Dead Reckoning

Message prefix: IN

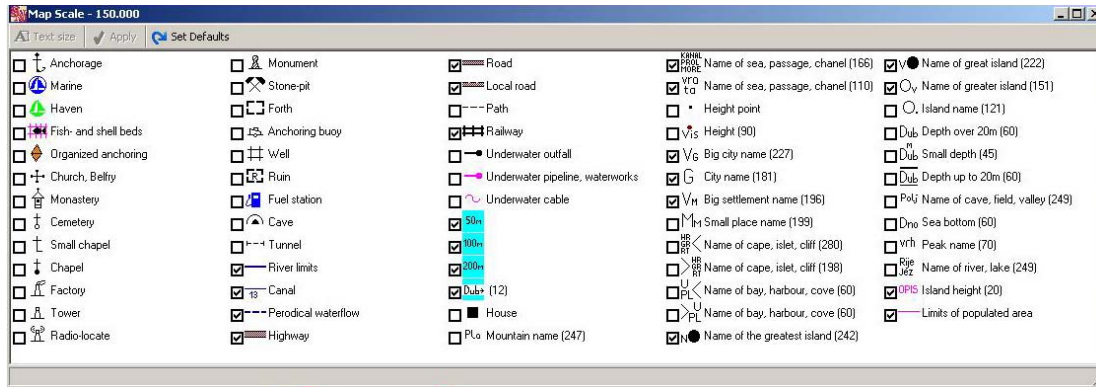
Buttons: OK, APPLY, CANCEL

Devices tab

- **GPS** – **GPS antenna position** from vessels bow and port side. This is used to correct vessel position on the chart.
- **Autopilot**
 - o **Controller** – An outbound controller through which the data will be sent to the autopilot. The controller list contains controllers created in the *Controllers tab* of the same dialog box.
 - o **Waypoint radius** – Waypoint radius determines the radius around waypoints. When the vessel reaches the circle around the waypoint, the navigation system will consider that the waypoint is reached and direct the vessel toward next waypoint if it exists.
- **Wind sensor**
 - o **Angle correction** - corrects the wind angle value. the specified value can be negative.
- **Depth sounder**
 - o **Transducer position** - Probe depth. This parameter is required in order to calculate the depth below the vessel and depth below keel.

Symbol settings

Settings/Symbols button brings up the Symbols dialog box which allows the user to choose among many symbols available in chart display system. These symbols can be either visible or not. There is a separate symbols settings for each scale which means that the **SmArtNav** navigation system remembers which symbols are visible on every separate scale.



Symbol settings

Every symbol located in this dialog box can be marked visible or not for current scale. When selection is done it is required to click the *Apply* button on the toolbar in order to save symbols settings. There is also a possibility to set a default setting. Default setting consists of a number of symbols that will be visible and is same for each scale.

Time synchronization

If there is a GPS connected to the computer, there is a possibility to synchronize system time with GPS time.

Clear boat track

Deletes current boat track.

Color scheme

The navigation system has several predefined color schemes to choose upon. A standard color scheme is appropriate during daytime and there are also some darker schemes that can be used during the night.

Nautical appendix

SmArtNav Nautical appendix contains various manuals and information that have proven themselves to be very handy while sailing.

Nav Appendix

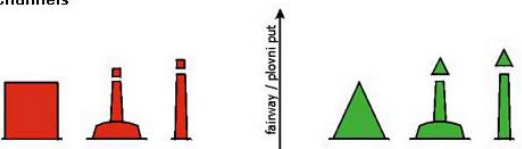
Hide Back Print Options

Contents Search Favorites

- About this Appendix
- Sailing Marks
 - Cardinal marks
 - Lateral marks**
 - Lonely danger
 - Special marks
 - Safe waters
- Signalization
- Radio Telephony
- Sea and Wind
- Informations and Contacts
- English-Croatian Dictionary

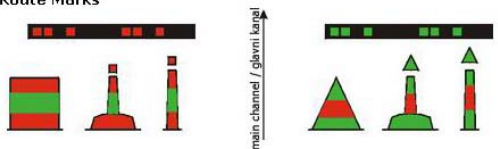
Lateral marks

Marks of Sailing Channels



	Left side	Right side
TOP MARK	red cylinder	green cone, top upwards
COLOR	red	green
SHAPE	cylindric with post or bar	coned with post or bar
LIGHT	red	green
RHYTHM	what ever, except flashes in groups (2+1)	what ever, except flashes in groups (2+1)

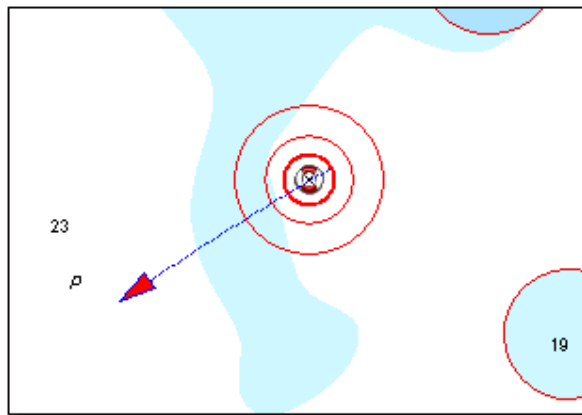
Branching Sailing Route Marks



SmArtNav Nautical appendix

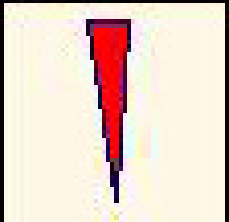
MOB (Man Over Board)

MOB feature is used to quickly mark the spot where e.g. the crewman or the passenger has fallen into sea. When MOB is activated, the flashy mark looking like this appears on the chart:



MOB mark

Upper left corner of the screen contains a little panel with detailed MOB information:

MOB	
POSITION	N 44°14'08.9"
	E 015°06'54.7"
COURSE	102.0°
DISTANCE	0.02 nm
	
 LOCATE	 AUTOPILOT
 TURN OFF	

MOB information

- Position - Geographic MOB position
- Course - Course needed to arrive at the MOB position
- Distance - distance from MOB

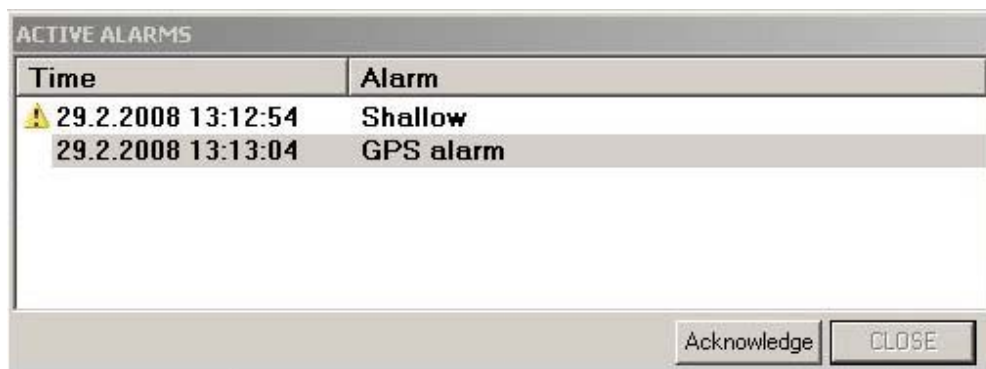
The red triangle displays vessels movement direction related to MOB position. If the triangle is pointing downwards then the vessel is moving away from the MOB position

SmArtNav navigation system monitors all relevant sailing parameters and according to these values it is able to sound and alarm.

Every alarm can be in one of the following states:

- Activated
- Deactivated
- Acknowledged

When an alarm goes off, an appropriate sound is played and the Active alarms window appears showing the list of currently active alarms.



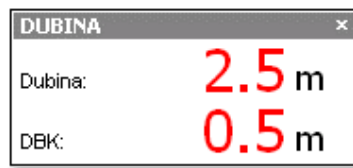
Active alarm list

User must acknowledge every active alarm for turning off the alarm sound. When all active alarms have been confirmed, the *Active alarms* dialog box turns off. There is alarm warning sign in the upper left screen corner. If the alarm is active and not confirmed warning is flashing. Clicking the warning sign brings up the *Active alarms* dialog box.



Alarm warning sign

If the alarm is related to main panel displayed value, this value will change color to flashing red until the alarm is acknowledged or deactivated.

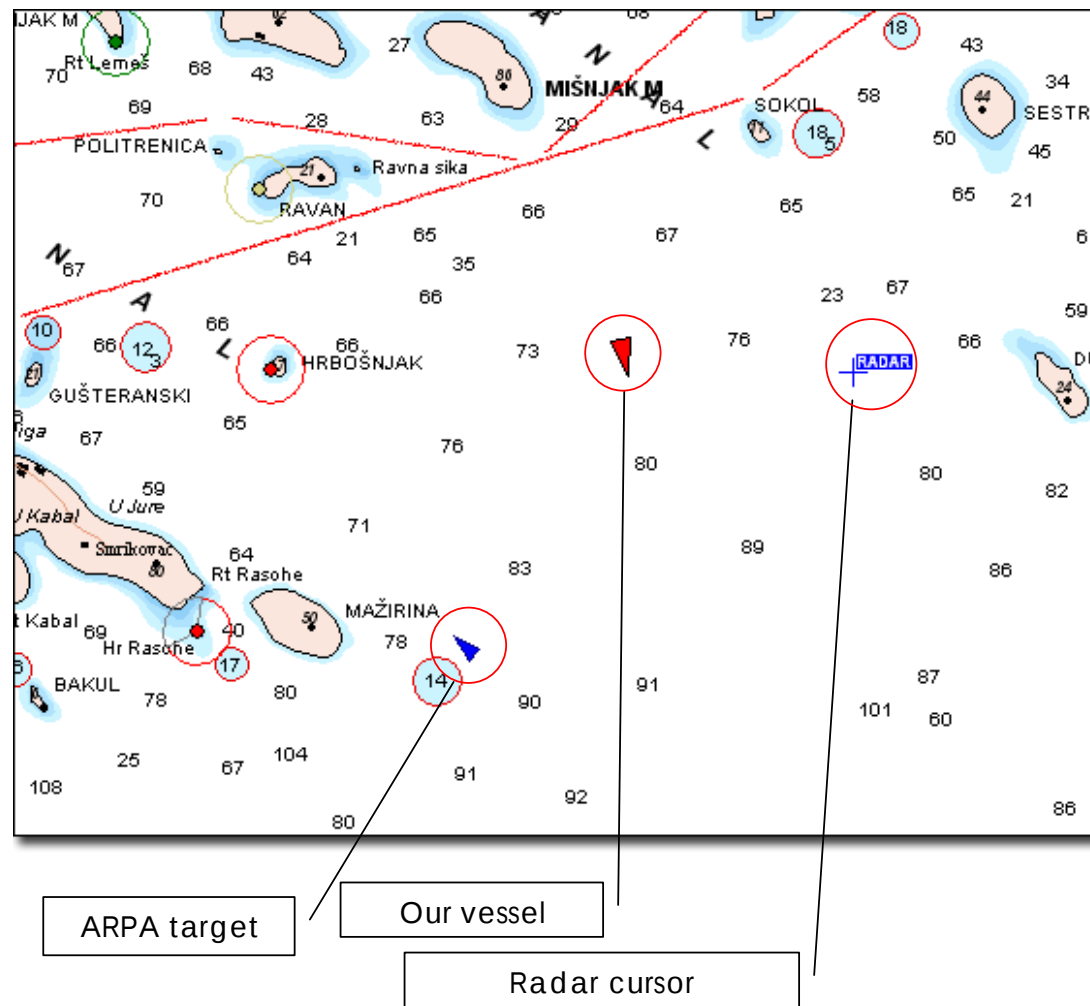


Alarm indication

All alarm events are automatically logged.

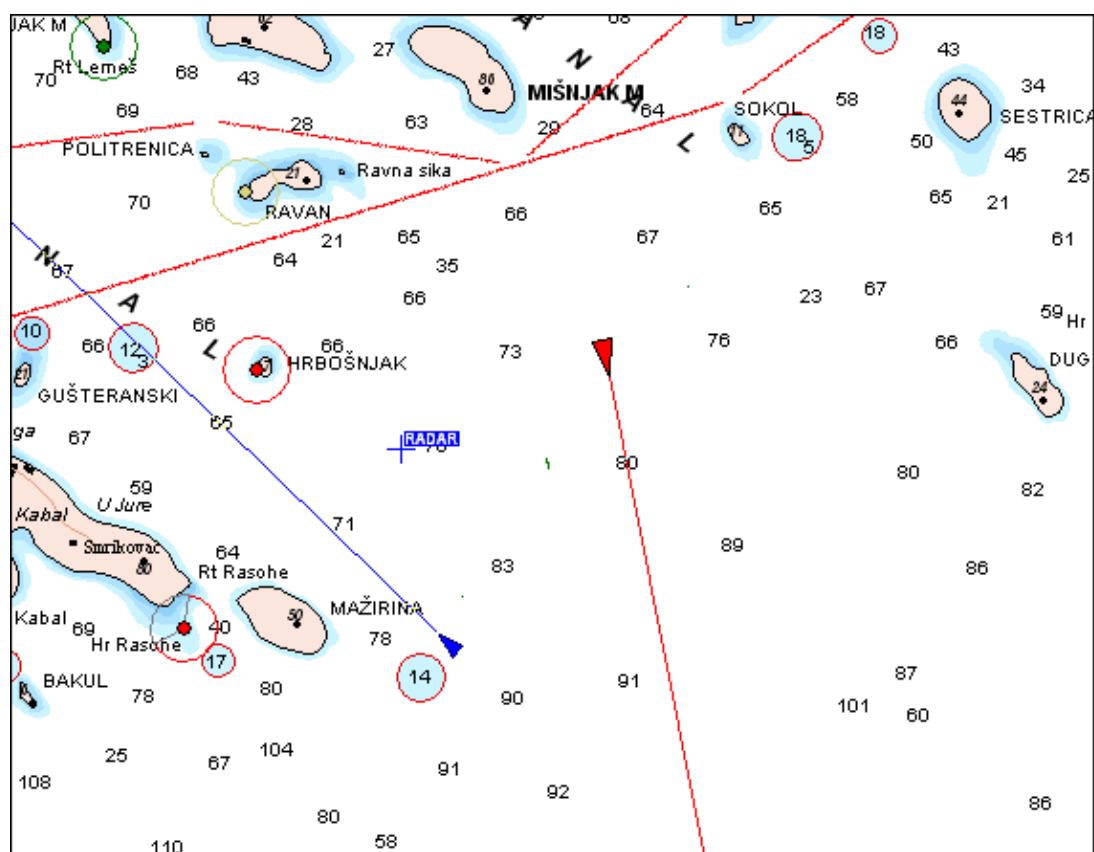
ARPA (radar) device

SmArtNav navigation system provides a possibility to receive data from ARPA radar subsystem connected to the computer which means that it supports display of the radar target on the chart.



It also shows the radar cursor position which can be useful if there is a problem with radar picture visibility. In that kind of situation it is required to click the unknown target object and look upon its position on the chart.

When a radar target is clicked, the navigation system will show some additional information about the target, targets movement parameters and also a vessel and its movement parameters.



Vessel movement direction

Radar Target [00]	Radar Target [00]	Radar Target [00]
Name: Radar Target 01 Status: Tracking	Name: Radar Target 01 Status: Tracking	Name: Radar Target 01 Status: Tracking
Position Latitude: N 44°14'19.5" Longitude: E015°04'00.3" Course: 310.7° Speed: 20.3 kt	Navigation Distance: 0.4 nm Bearing: 307.5°	CPA Latitude: N 44°14'41.1" Longitude: E015°03'59.7" Distance to CPA: 0.0 nm Time to CPA: 00:00:00

Target information

SmArtNav navigation system contains a very detailed nautical database which contains a great number of pilot information, pictures, sailing instructions, chart plans etc.

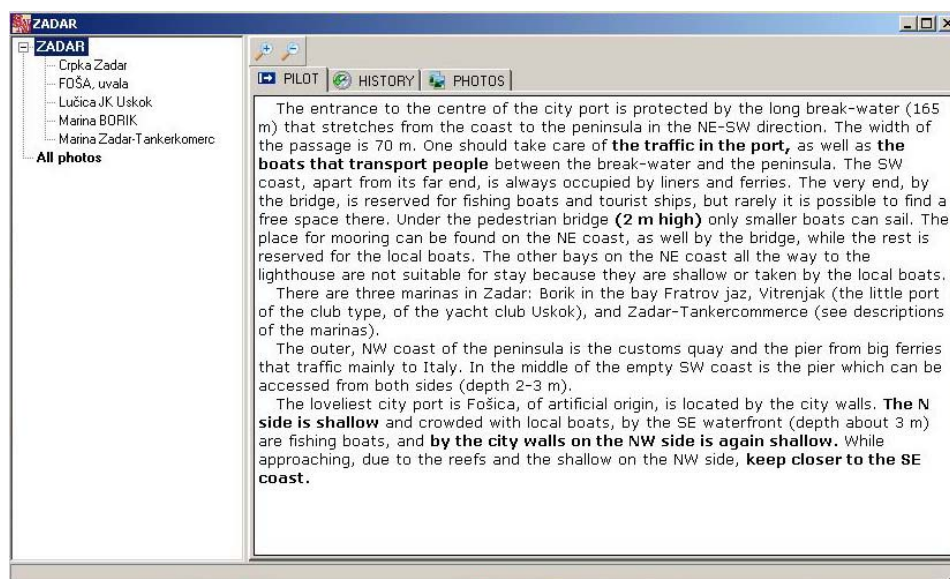


NOTICE:

*The **SmArtNav** database is under construction all the time because it is not possible to collect all the relevant information about all locations. Therefore, we want to use this opportunity to politely appeal on the user to inform us about all incorrect information he encounters and also to inform us about the information he finds important but not mentioned. **Thank you in advance !***

Displaying database information

Some chart object captions are clickable and they behave similarly to hyperlinks in web browsers which means that they react on mouse over event by changing caption color to red and becoming underlined. If the object caption turns to red that means that there is some information on that object in the database. Now, it is only required to click the caption to bring up the database window and read the information on the object.



Database information example

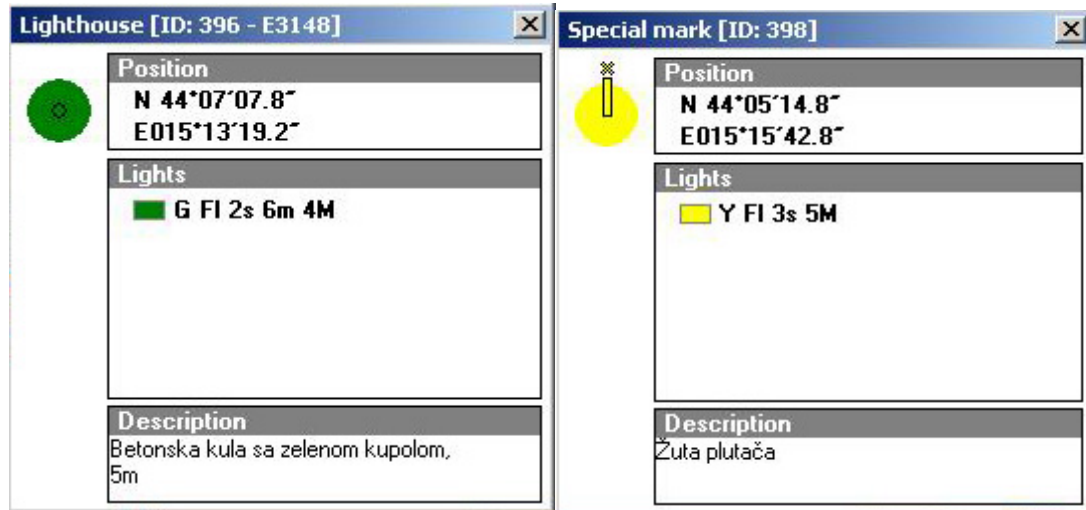
Every object can be related to another object or to a number of objects. If these connections exist, they are displayed in the left portion of the database window. E.g. database information window on an island will also make available database information on all the cities and places located on the island in a hierarchical manner.

The database consists of five separate parts. These are as follows:

- Pilot data
- Common data and touristic information
- Historical information
- Plans
- Photographs

Lighthouses, buoys and other nautical marks

Lighthouse, buoy and beacon objects contain all relevant information.



Lighthouse and buoy information example

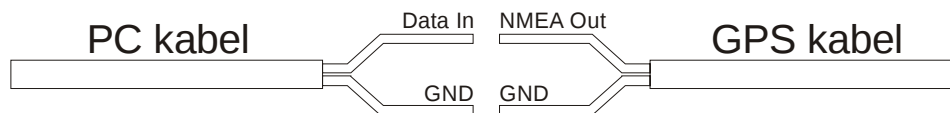
Additional information concerning object type and appearance can be found in the [SmArtNav](#) Nautical appendix.

Connecting vessel devices

Connecting the GPS device

In order to make the **SmArtNav** navigation system fully functional, it is required to connect a GPS device to the computer. The GPS device has to be NMEA 0183 communication standard compatible. Connecting is done in a few simple steps:

1. GPS device has to be set up to transmit data in WGS 84 format and communication parameter has to be set to No IN / NMEA OUT. According to the NMEA 0183 communication standard (v2.0 or later), standard parameters are as follows: 4800 baud (bd), 8 bit, 1 stop bit, no parity. For more information on GPS device settings read the GPS device users manual.
2. Port number parameter has to be set to port which the GSP device is connected to and port speed has to be set to 4800 baud (bd). This is done when creating or editing a controller.
3. GPS is connected with PC in the follwing way:
 - **GPS Data GND** connect to **PC Data GND** (pin 5 on RS 232 DB9)
 - **GPS NMEA Out** connect to **PC Data In**
 - **Shield** - It is recommended to connect the Shield labeled wire with vessel grounding
 - Secure the connections by soldering and insulating



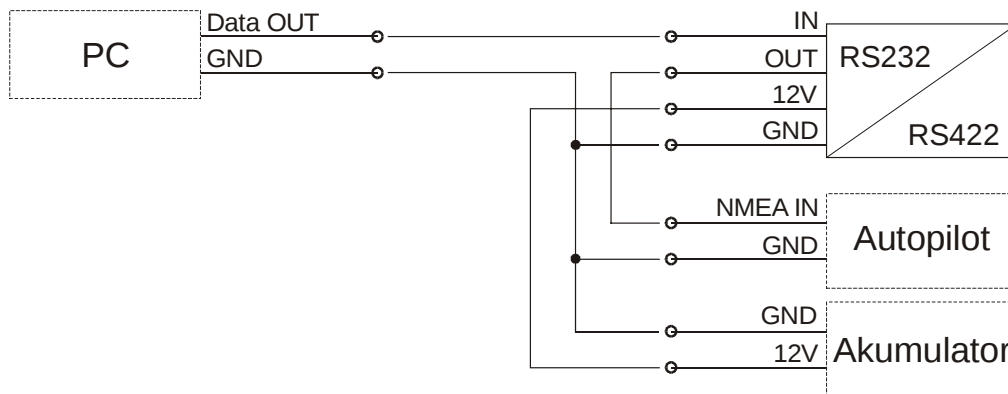
GPS and PC cable connection scheme

Shortly after connecting is done, the data transmitted by the GPS device should be read, processed and displayed by the **SmArtNav** navigation system. There isn't any danger for the computer or the GPS device if the wires somehow get mixed up or connect wrongly.

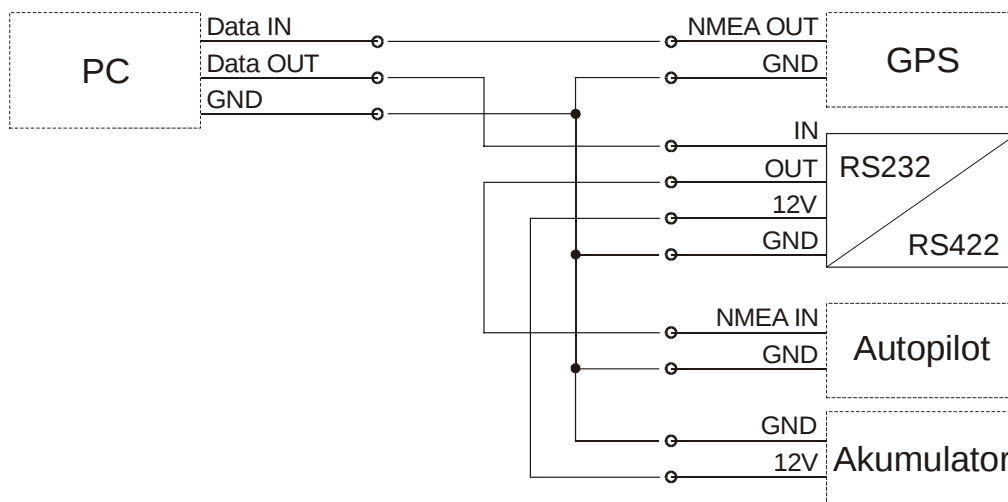
Connecting the autopilot

Additional cable is required for connecting the autopilot to the computer. It is required to connect an autopilot device to the computer in order to make use function that the **SmArtNav** navigation system provides. Autopilot must be NMEA 0183 compatible. Connecting is done in a few simple steps:

1. Autopilot device has to be set to receive data in WGS 84 format and the communication parameter has to be set to No IN / NMEA OUT. According to the NMEA 0183 communication standard (v2.0 or later), standard parameters are as follows: 4800 baud (bd), 8 bit, 1 stop bit, no parity. Detail information can be found in Autopilot User Manual.
2. Autopilot controller port parameter has to be set to port which the autopilot device is connected to. Port speed is 4800 baud (bd).
3. Autopilot is connected to PC cable in the following manner:



Autopilot and computer connection scheme



Autopilot, computer and GPS connection schme (over the same port)

4. Autopilot has to be set to AUTO + TRACK MODE.

Shortly after connecting is done, the data transmitted by the *SmArtNav* navigation system should be read by the autopilot device. There isn't any danger for the computer or the autopilot device if the wires somehow get mixed up or connect wrongly.

The RS232/RS422 adapter is provided on demand.

Keyboard shortcuts

Main interface

Cursor keys	Move chart
Shift + Cursor keys.....	Move cursor
Left Mouse Button	Object information
LMB + move	Move chart
Right mouse button	Create new route
Space bar	Center vessel on screen
Ctrl+Shift	Show all database objects
F1	Help
F5	Refresh screen
F7	Zoom in
F8	Zoom out
Ctrl+Q	Add current location
Ctrl+P	Print chart
Ctrl+F.....	Find by name
Ctrl+G	Find geographic position
Ctrl+T.....	Toogle tracking modes

Updating routes, waypoints and logs

Ins	New record
Del.....	Delete record
Enter.....	Find record on chart
Alt+Enter	Edit record
Ctrl+S.....	Show/Hide
Ctrl+P	Print

SmArtNav team wishes you a calm sea!