

Inland ECDIS Manual

Introduction

This manual describes the use of OpenCPN as required by the rules of Inland ECDIS Edition 2.4 (Information Mode).

[Inland ECDIS Edition 2.4 Mandate](#)

[Inland ECDIS Edition 2.4 Technical Specifications](#)

An introduction to Inland ECDIS can be found [HERE](#).

A page of useful links, including national organizations dealing with IENCs is found [HERE](#).

The manual is based on version 5.6.2 of OpenCPN. It does not include information about the Android version of the program.

Inland ECDIS is a defined standard (2.4 is the current one) mandatory for commercial vessels on EU Inland Waters. The corresponding S-57 charts are called InlandENCs and have some specific parameters.

Inland ECDIS should not be confused with IMO ECDIS. The two are completely different types of system.

The water police or other authorities check ships and barges for compliance with Inland ECDIS rules. It is important that OpenCPN appears in the list of approved software.

The Inland ECDIS standard includes starting in Night Mode. OpenCPN has to have predefined scales taken from standard radar ranges. There are also basic chart display modes.

The Inland ECDIS Standard distinguishes two operating modes: Navigation mode and Information mode OpenCPN conforms with the Information mode.

Inland ECDIS 2.4 requires a manual in the languages EN, FR, NL, DE as a minimum.



Correction state of the Manual

The Appendix contains a source list showing the latest amendments to the pages of the manual.

Using the Manual

Buttons

Buttons to perform actions are shown like this:

[**Apply**] [**OK**]

A shortcut for a button's action is shown in italics, for example [**Create Route**] *Ctrl-R*.

Tabs

Select **Chart Downloader** is an example of selecting a tab in a notebook display.

Links

Links can be internal for navigating the manual or external, for the Internet.

[HERE](#) is a link to the **Home Screen** page.

[HERE](#) is an external link to the OpenCPN website.

Hover the mouse over [HERE](#) and the browser shows where the link leads.

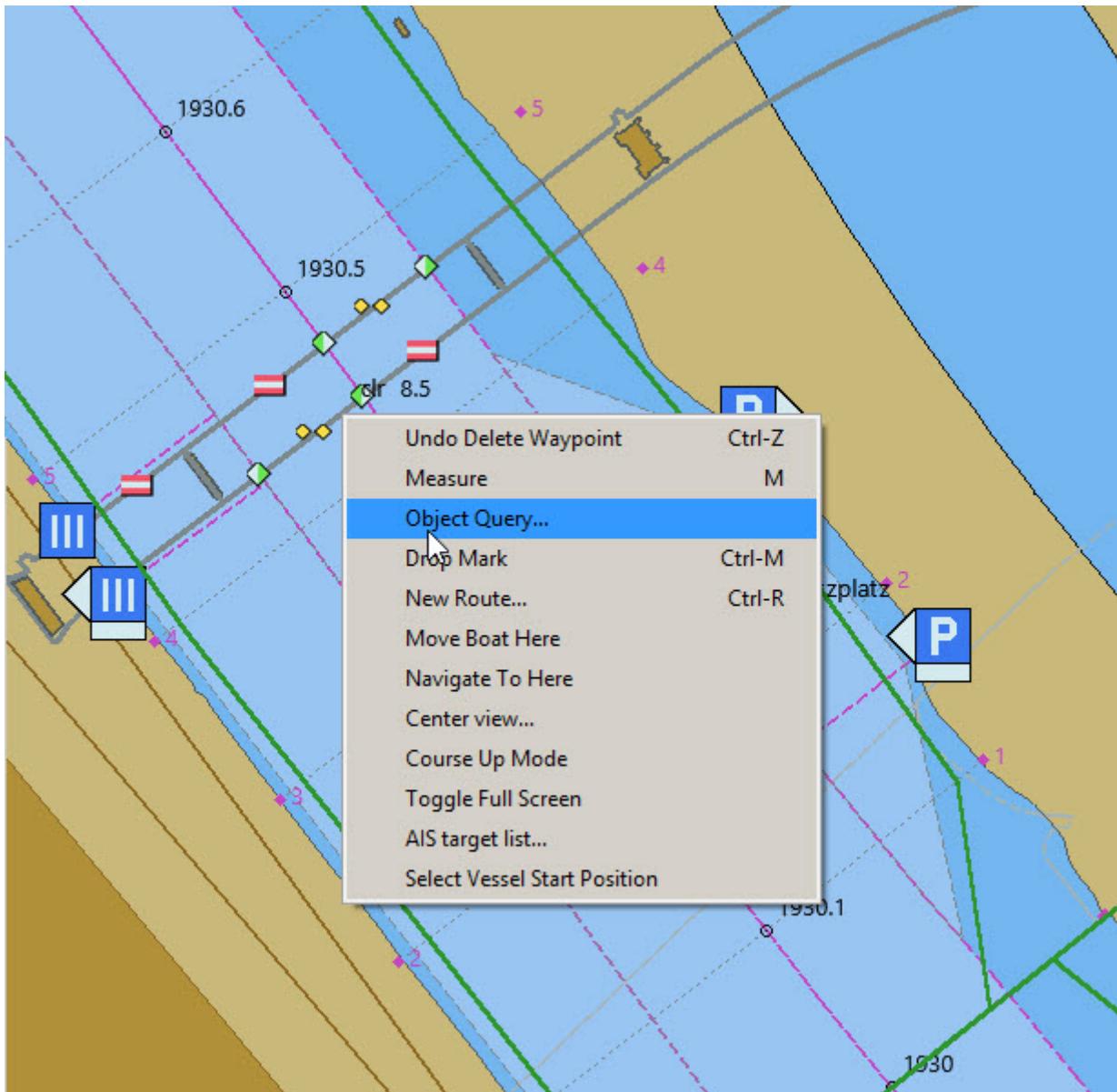
Mouse Actions

click the mouse indicates a click of the mouse (MacOS) or left-click for other OS.

right-click is ctrl-click for the MacOS.

Menu Items

A menu may have been displayed using *right-click*:



Select **Object Query...** indicates a menu selection.

Installing OpenCPN

For the initial installation an Internet connection is needed. With your Internet browser navigate to [HERE](#) and go to the relevant section.

If, during the installation, you are asked to select a directory containing charts skip this step of the process. Charts will be covered [HERE](#).

Windows



Download the .exe file. Open the .exe and follow the instructions.

Mac

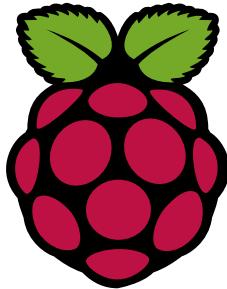


Download the .pkg file. Open the .pkg and follow the instructions in the installer.

Because the program does not come from the app store you may need to give permission to install from an unknown developer.

[\[System Preferences \]](#) [\[Security & Privacy \]](#)

Raspberry Pi



You can install OpenCPN by adding a Ubuntu PPA (Personal Packages Archive). See [Configuring Ubuntu PPA](#)

The simplest way of installing OpenCPN on the Raspberry Pi is to use [OpenPlotter](#) which installs OpenCPN and also some plugins.

Ubuntu



For Ubuntu Linux and it's derivatives (Linux Mint) and Debian Jessie based distributions, OpenCPN is distributed from a PPA. [Configuring Ubuntu PPA](#) explains how this is used.

Flatpak



[Flatpak](#)

OpenCPN Version 5.6.2 is available as a Flatpak package. This packaging system is supported on all major Linux distributions. [Simplified Installation Instructions](#)

--OR--

Manual Installation:

1. Install flatpak on your system as described in flatpak.org/setup

2. Install OpenCPN Flatpak image using:

```
$ flatpak install --user  
https://flathub.org/repo/appstream/org.opencpn.OpenCPN.flatpakref
```

Start OpenCPN:

```
$ flatpak run org.opencpn.OpenCPN
```

Fedora



OpenCPN is not natively supported on Fedora. Use the Flatpak release instead.

Debian



For Debian derivatives, you can use the same packages as for the equivalent Ubuntu release. For Debian Stable (Buster) you can use the packages from the [Ubuntu PPA](#). The compatible Ubuntu Release is Bionic (Ubuntu 18.04).

Other OS

Refer to the [Download page](#) for other Operating Systems.

Getting Started

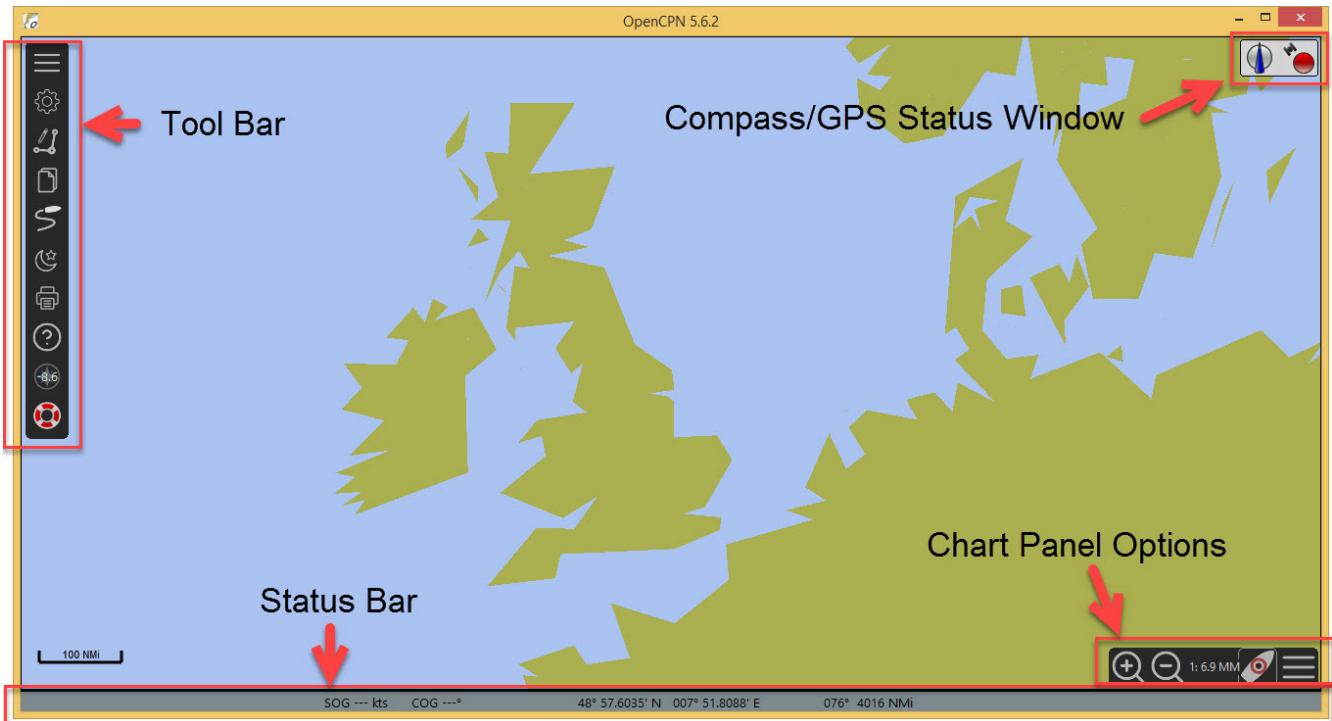
Home Screen

Initial Display

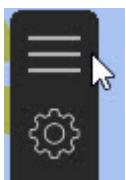
You may have chosen to start OpenCPN at the end of the installation. If not start the program now. You will be presented with a screen like this:



Control areas are displayed on the screen. Many of the options will be explained later. The focus in this manual will be the options needed for basic use.



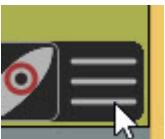
- Tool Bar



[Hamburger]

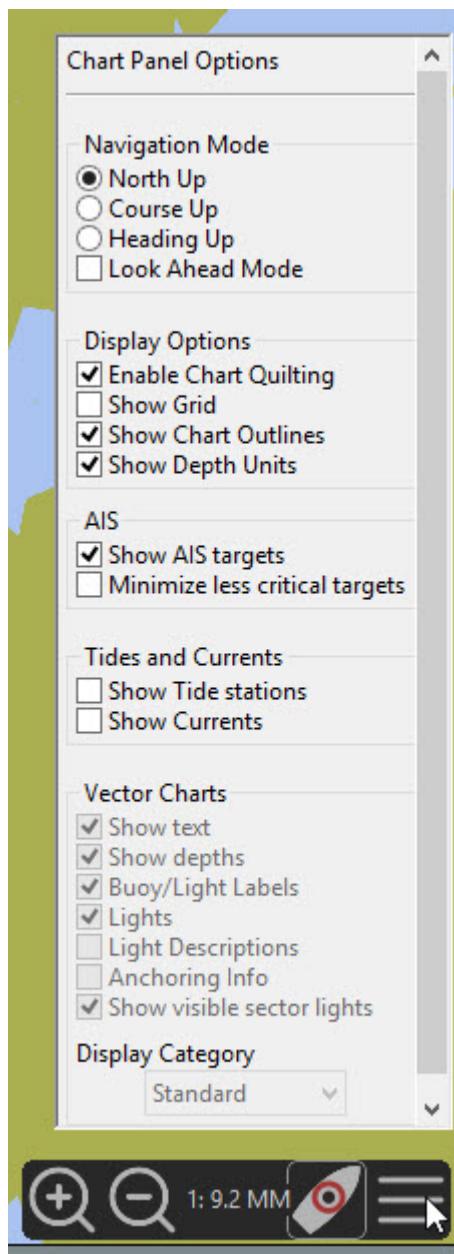
Clicking on the tool bar 'hamburger' symbol makes the tool bar contract/expand.

- Chart Panel Options



[Hamburger]

The chart panel 'hamburger' opens/closes the panel to display a number of options.



- Compass/GPS Status Window
- Status Bar

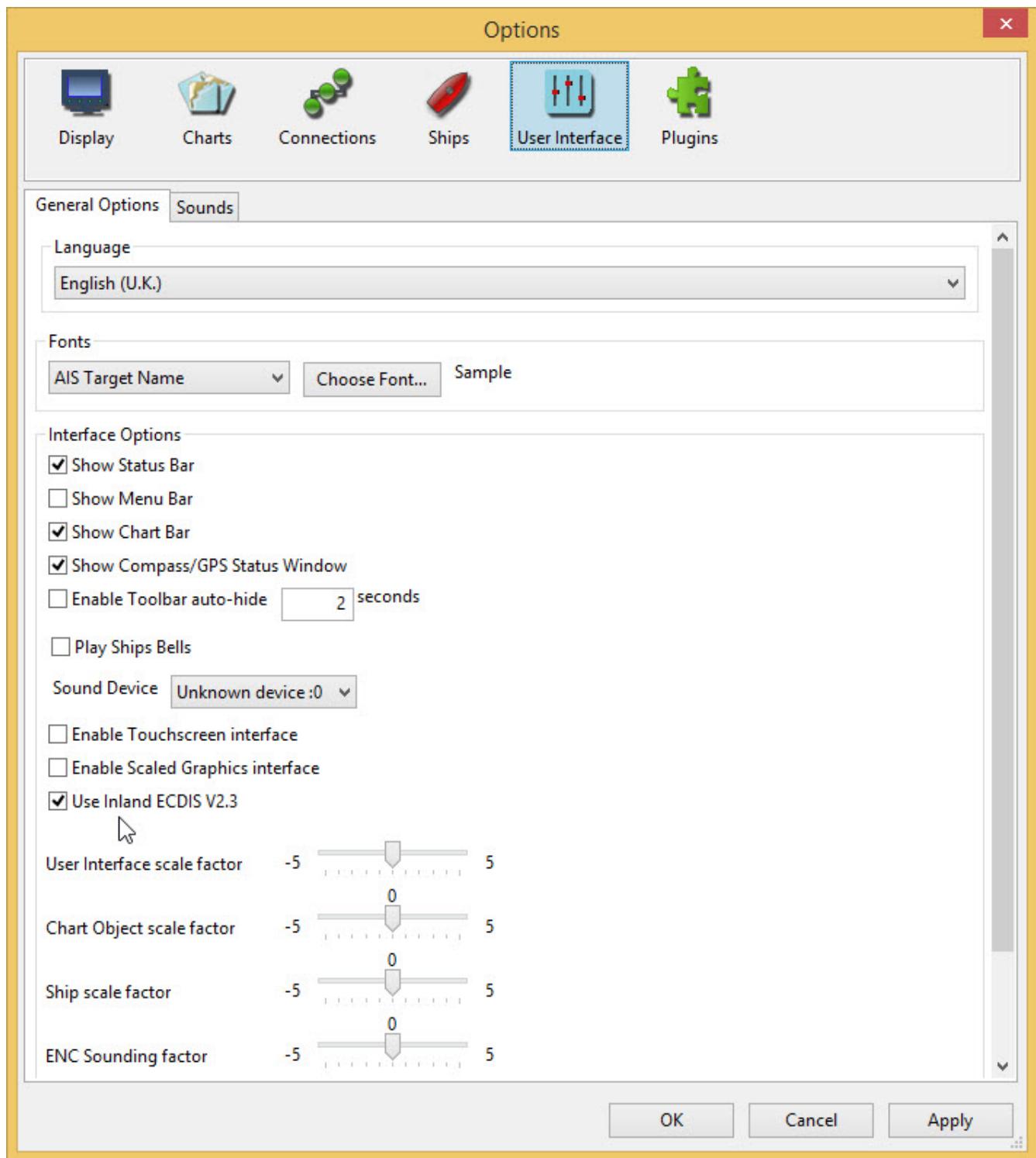


Inland ECDIS Settings

It is important that the display is set up as described in the following section.

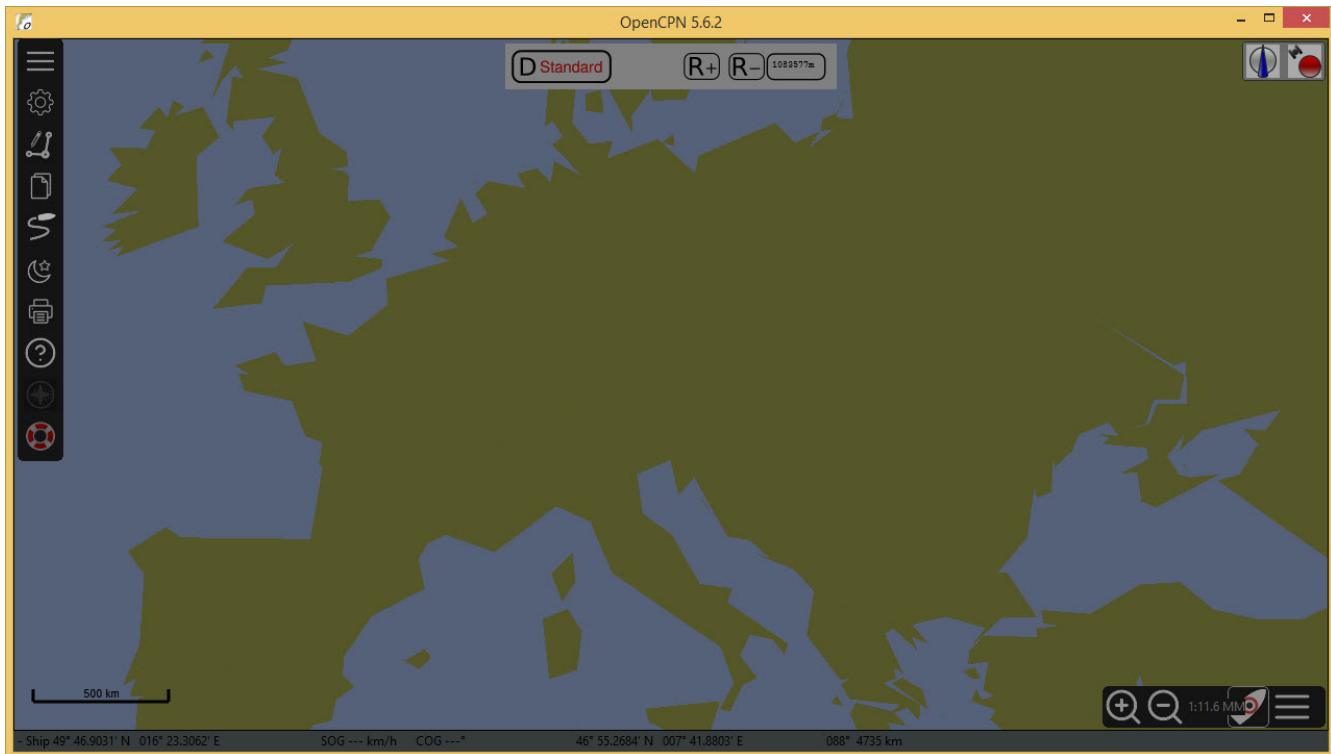
Inland ECDIS Specific Settings





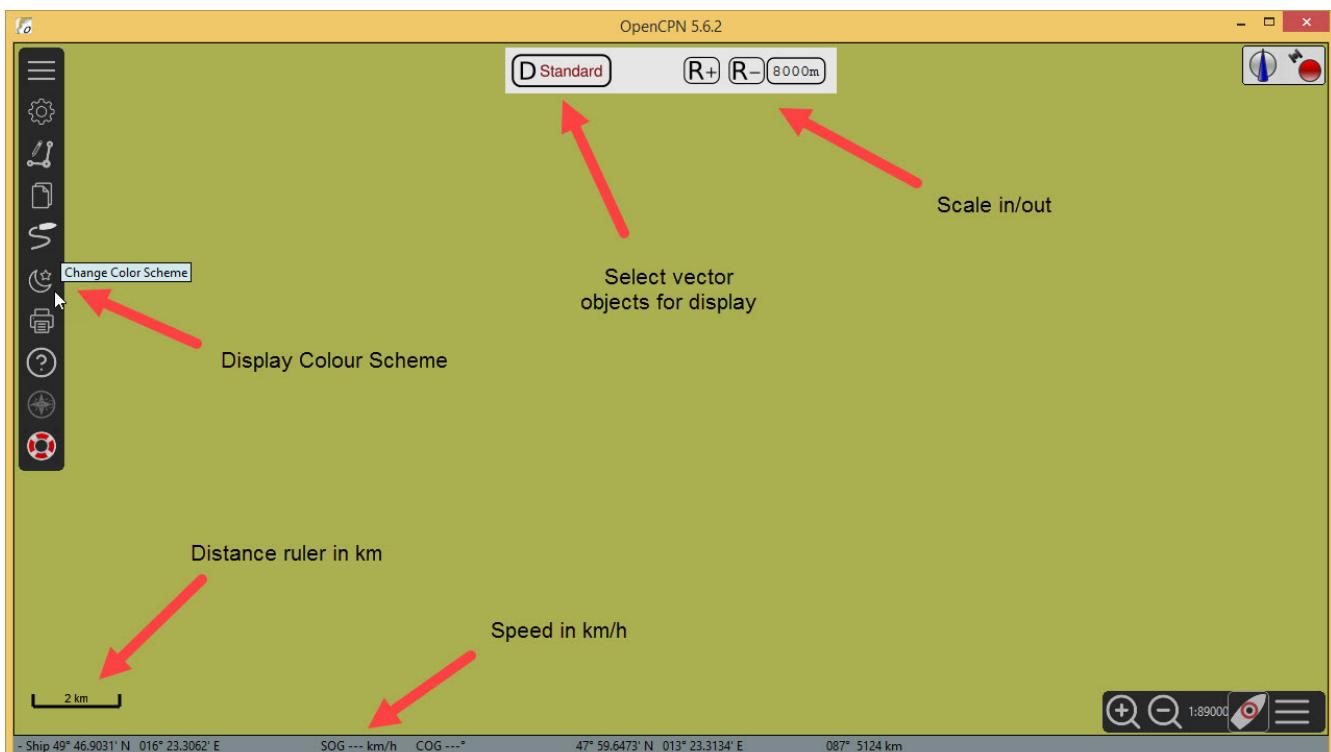
Tick the box for **Use Inland ECDIS**.

[**Apply**] [**OK**]



The display has changed to the 'dusk' colour scheme.

To return to the 'daylight' scheme [**Change Color Scheme**]  The shortcut is [**F5**] on the keyboard. This cycles through the night, dusk, and daylight colour schemes.



Speeds and distances are in km/h and km/meters when in iECDIS mode

Charts

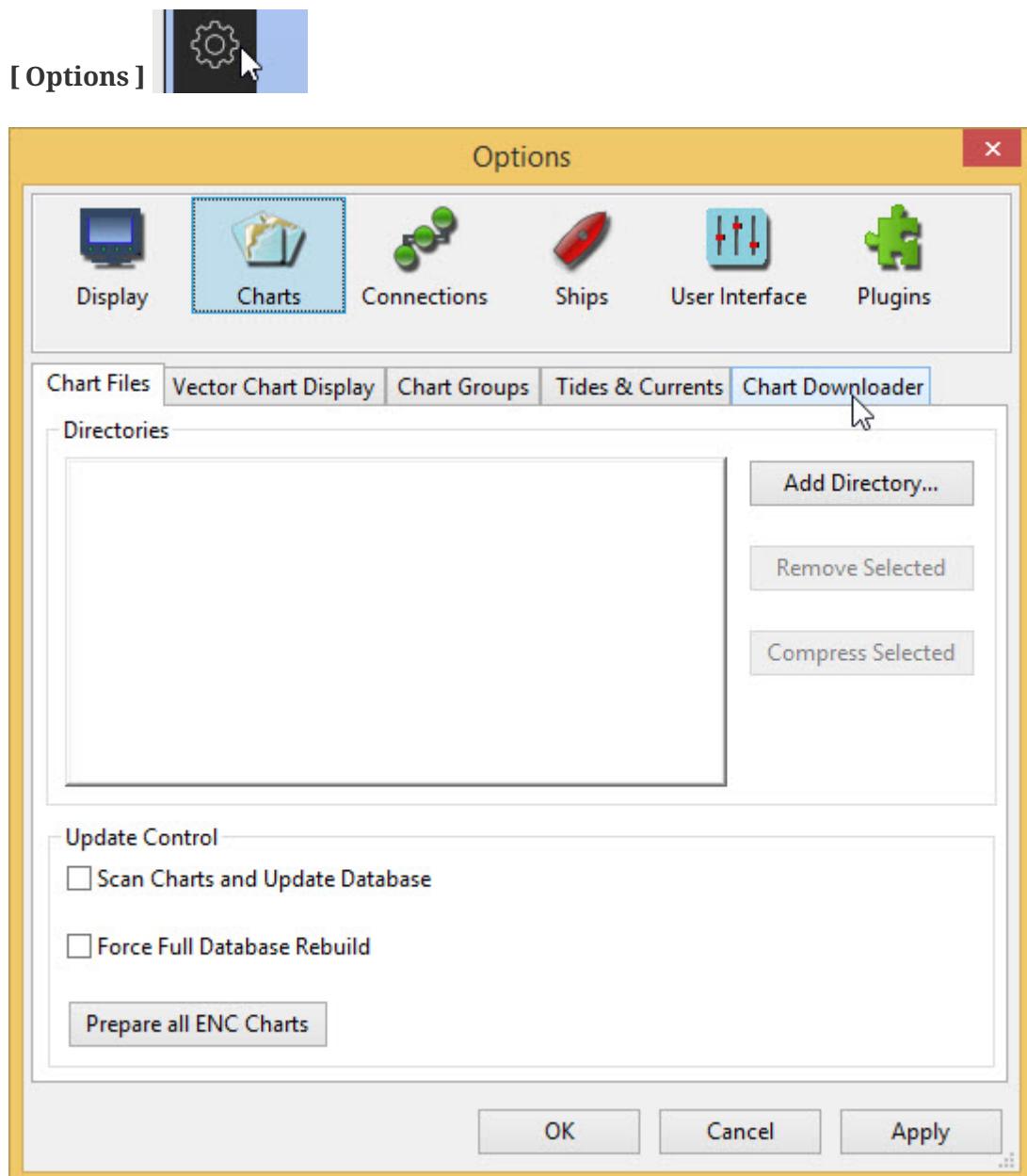
Introduction

Chart symbols and other information is shown [HERE](#)

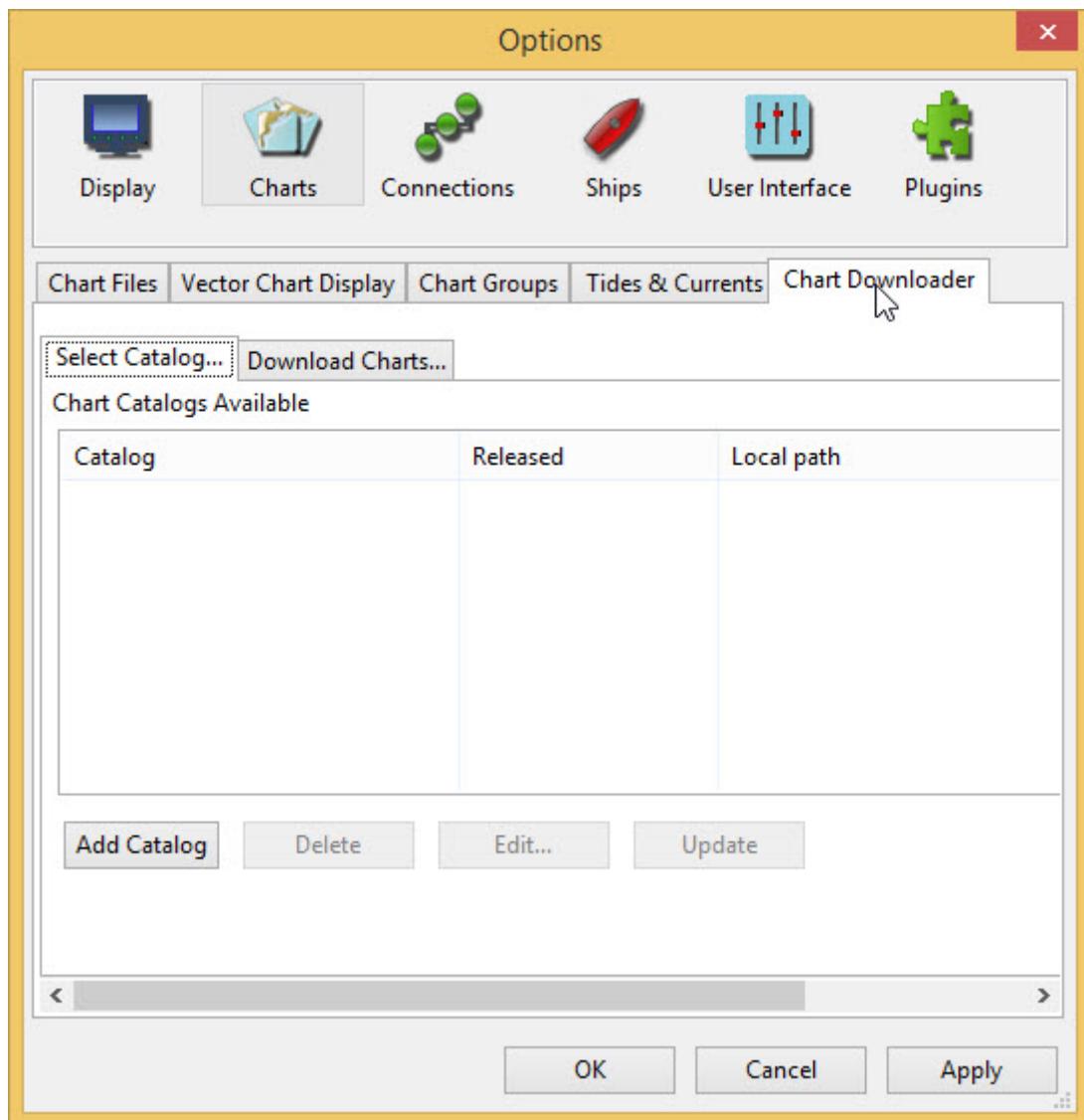
Inland ENC charts (IENC) for EU Countries can be found [HERE](#)

OpenCPN makes downloading and updating IENC easier by using the **Chart Downloader** plugin. This is installed as part of the main OpenCPN installation.

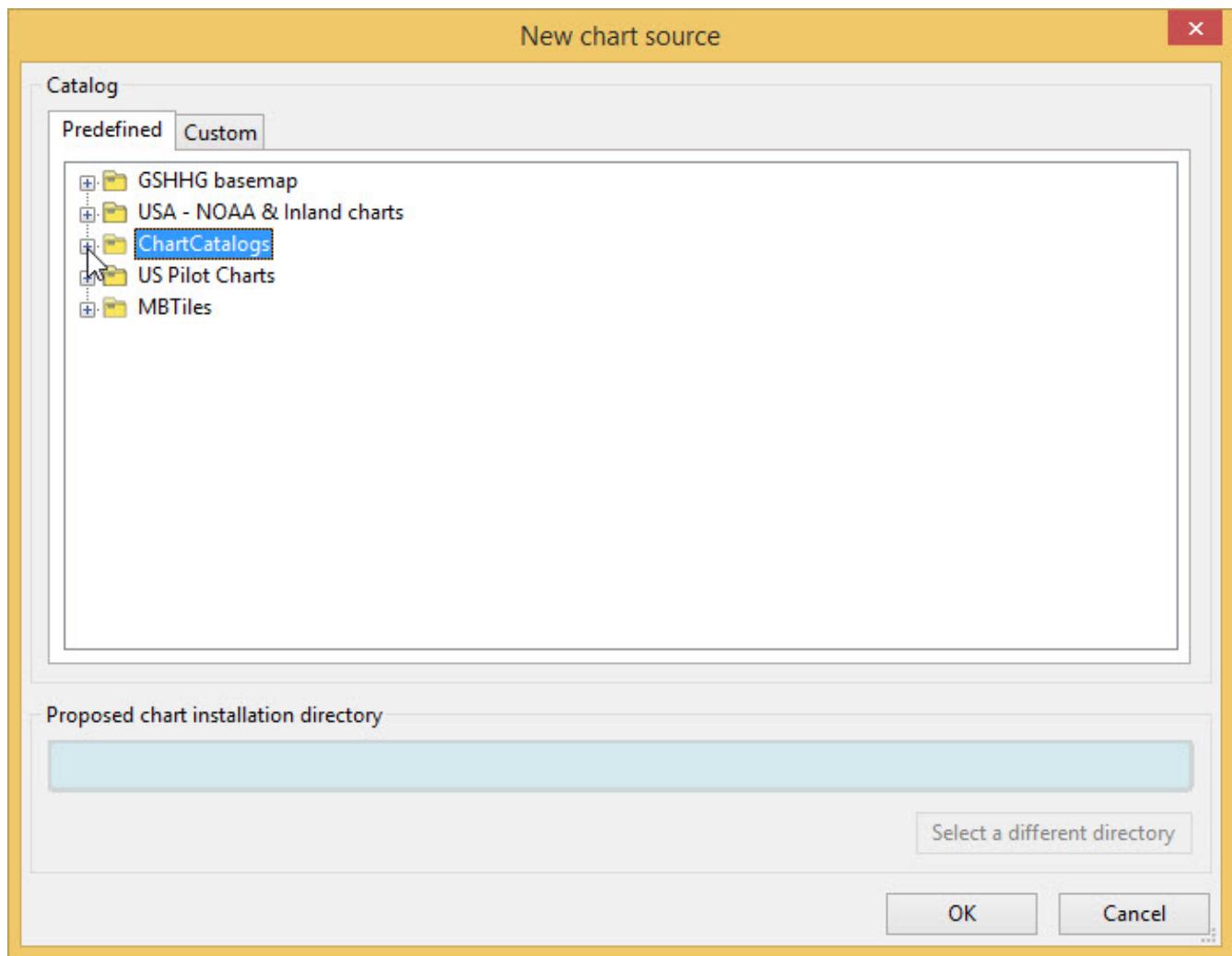
Downloading and installing Inland ECDIS Charts



[Charts] Select the *Chart Downloader* tab

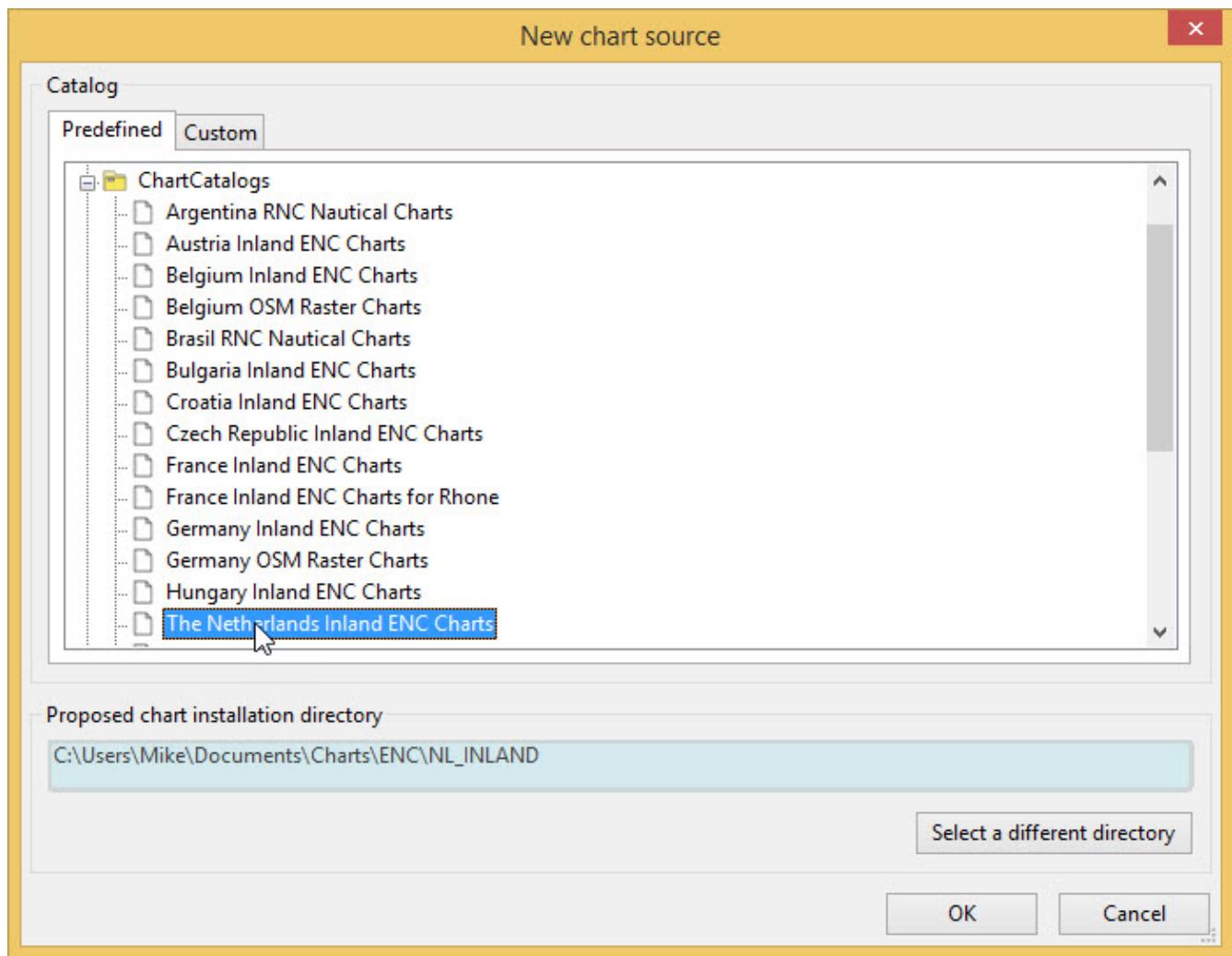


[Add Catalog]



Select *ChartCatalogs* and press **[OK]**

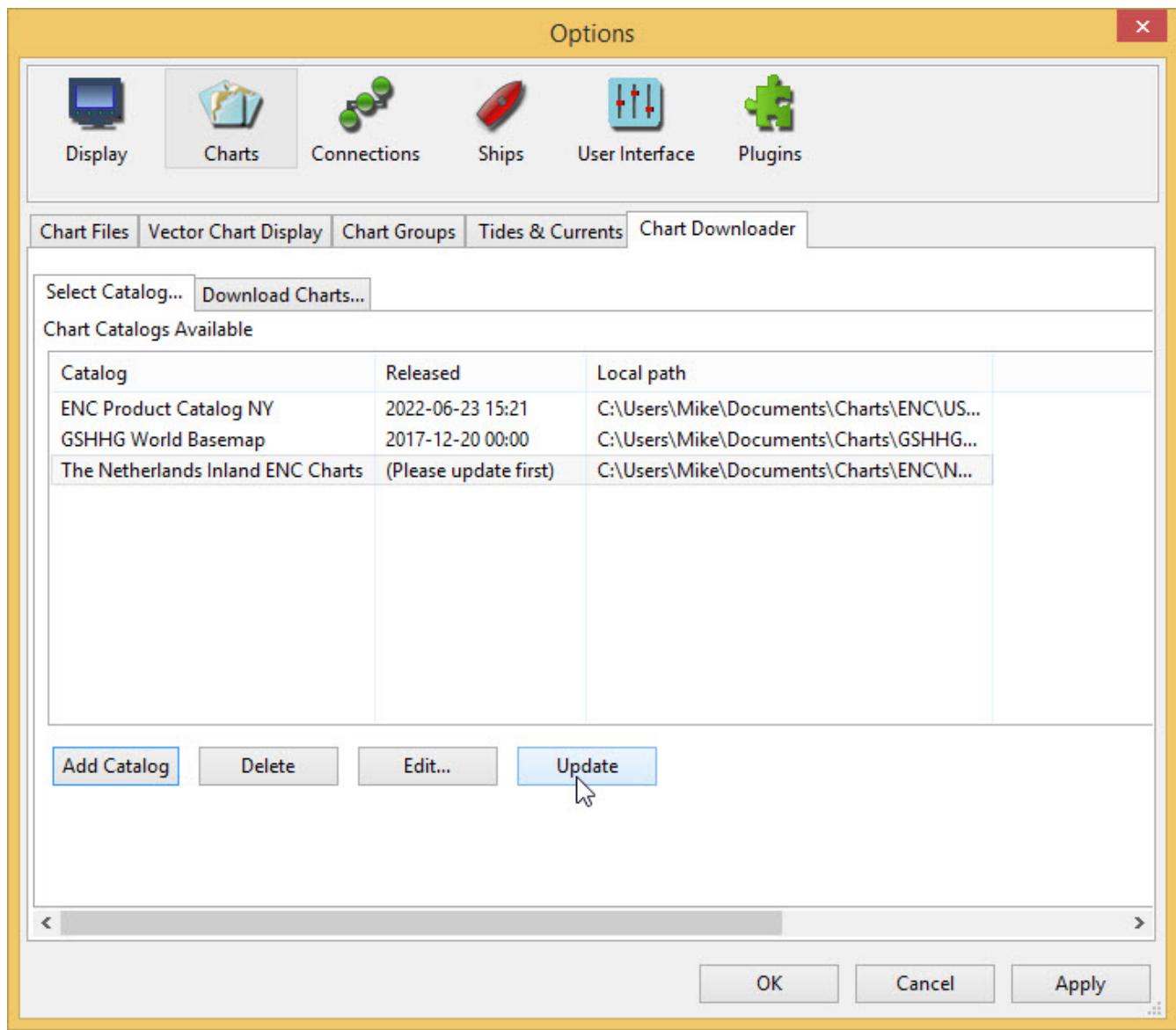
ENC Electronic navigational charts are charts where the objects and amount of detail needed for Inland ECDIS can be selected by the user. These charts are used in the Inland ECDIS Information Mode.



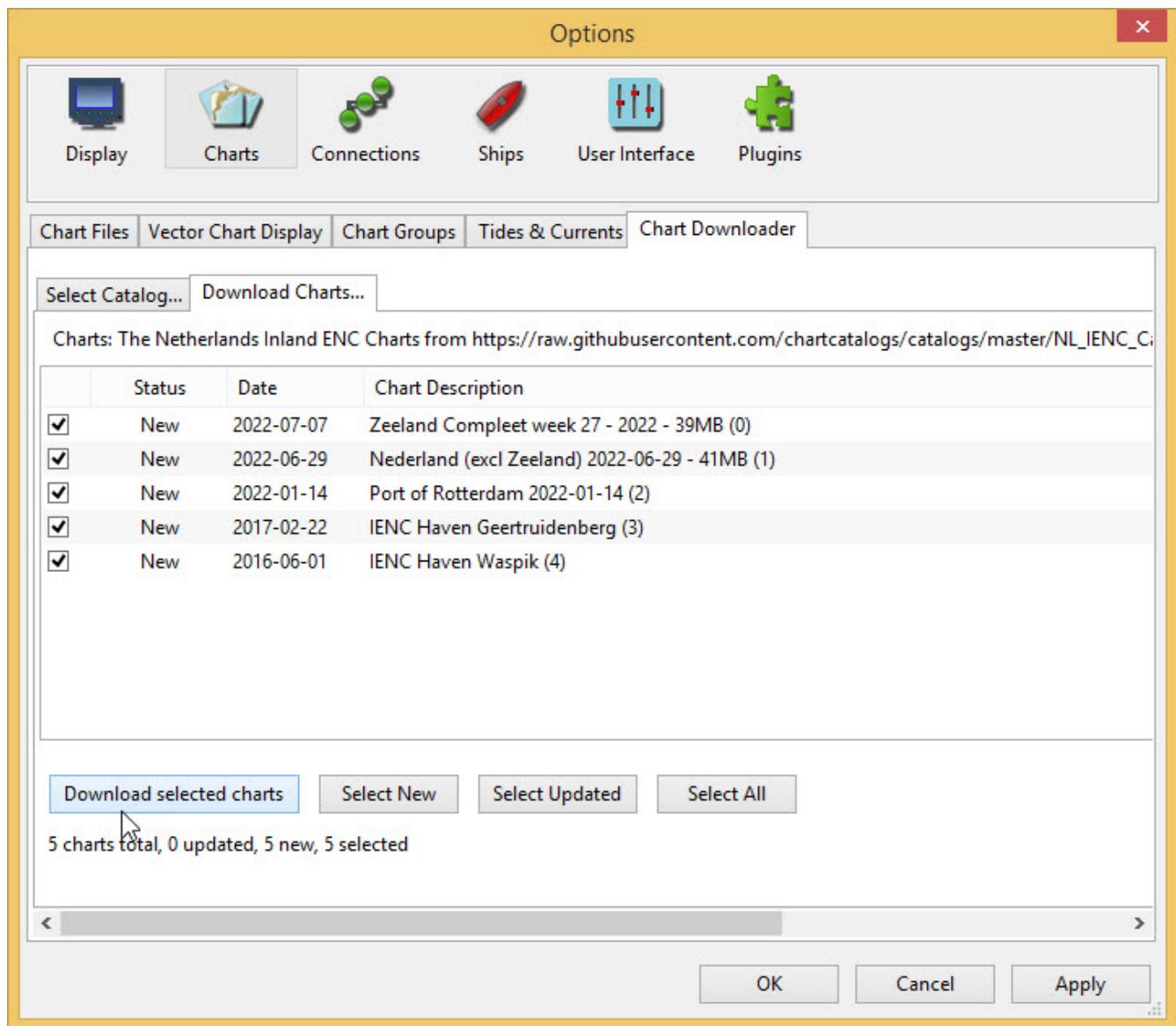
Select *The Netherlands Inland ENC Charts*

[OK]

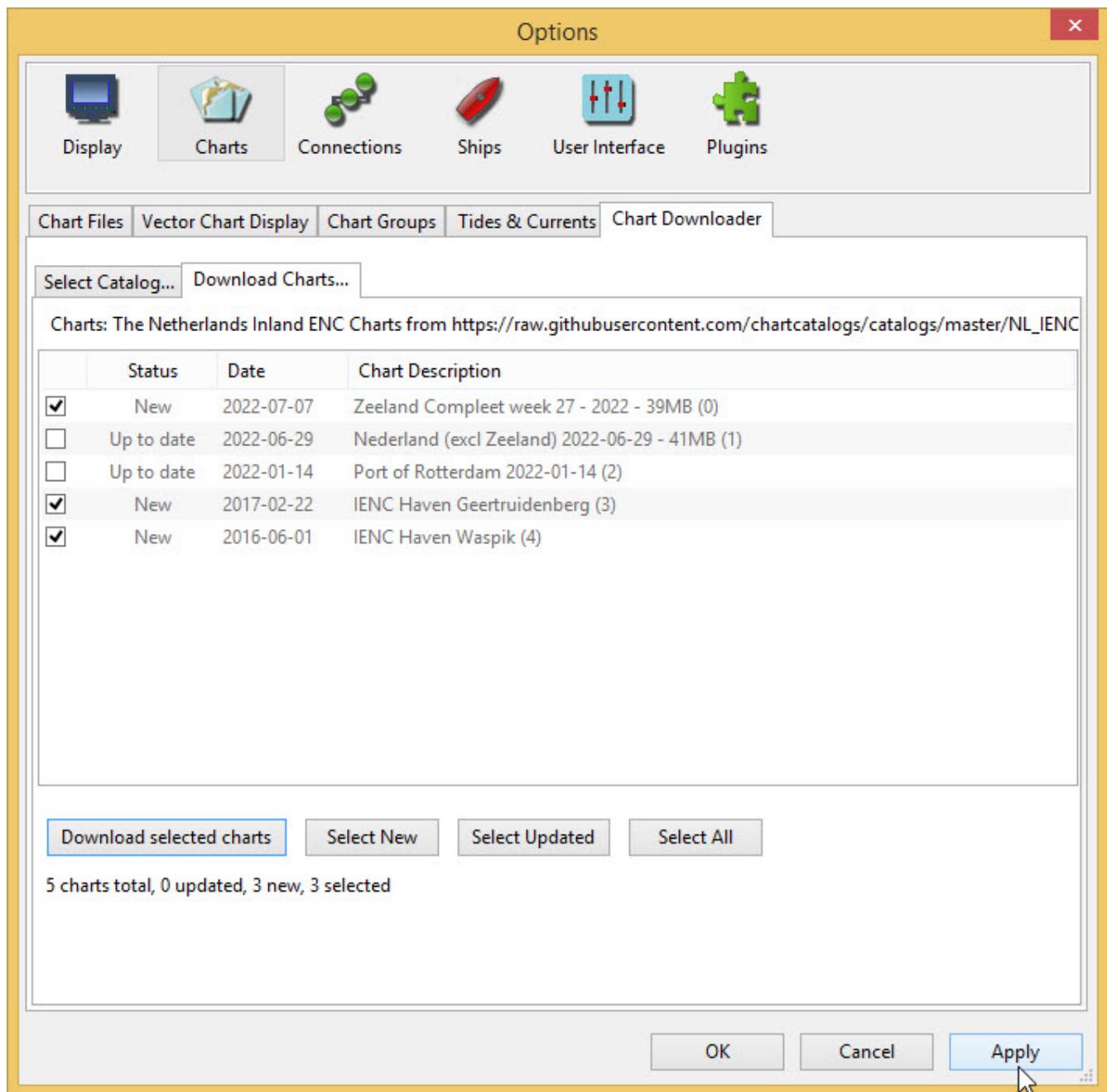
An entry for the Netherlands charts appears in the catalog.



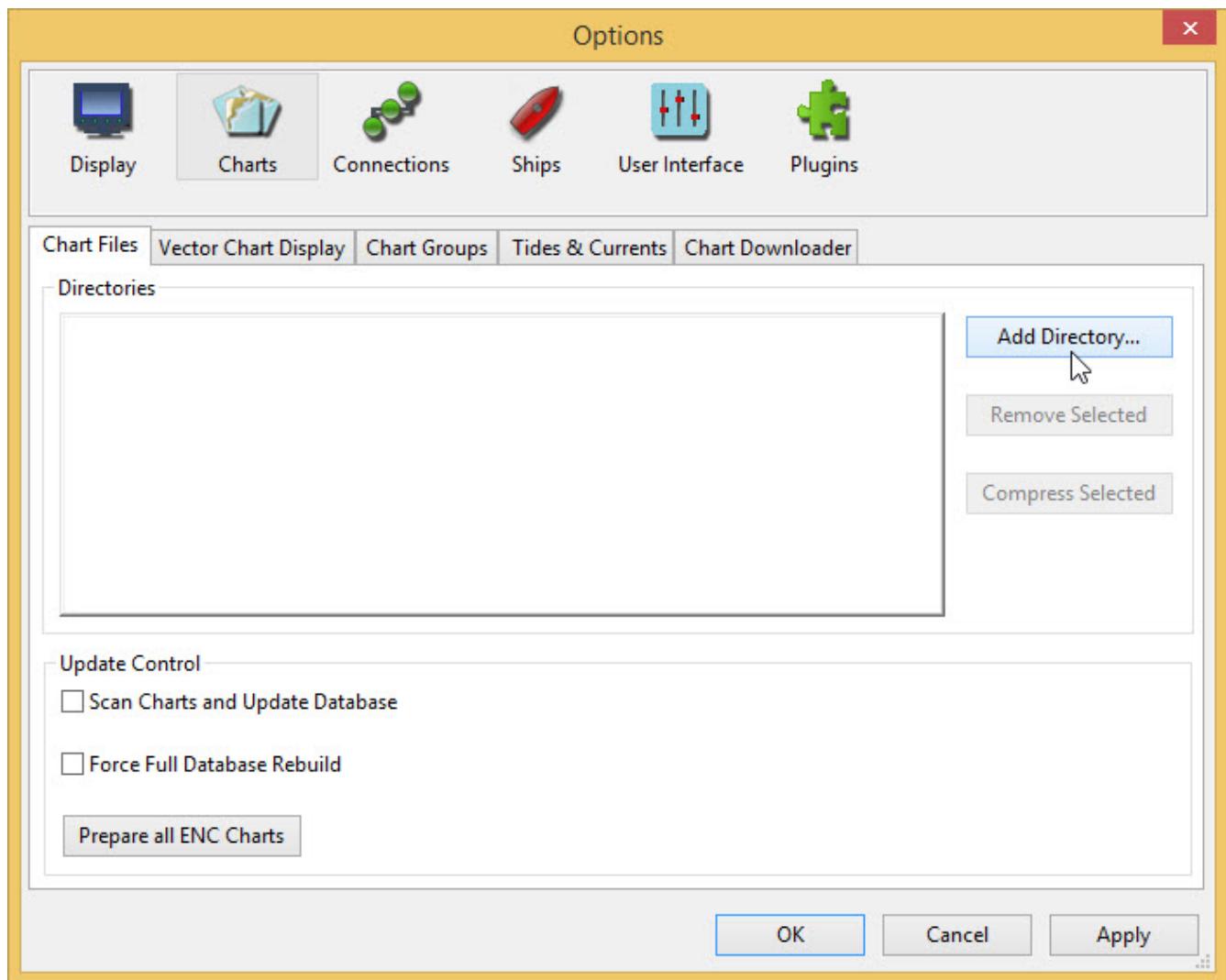
[Update]



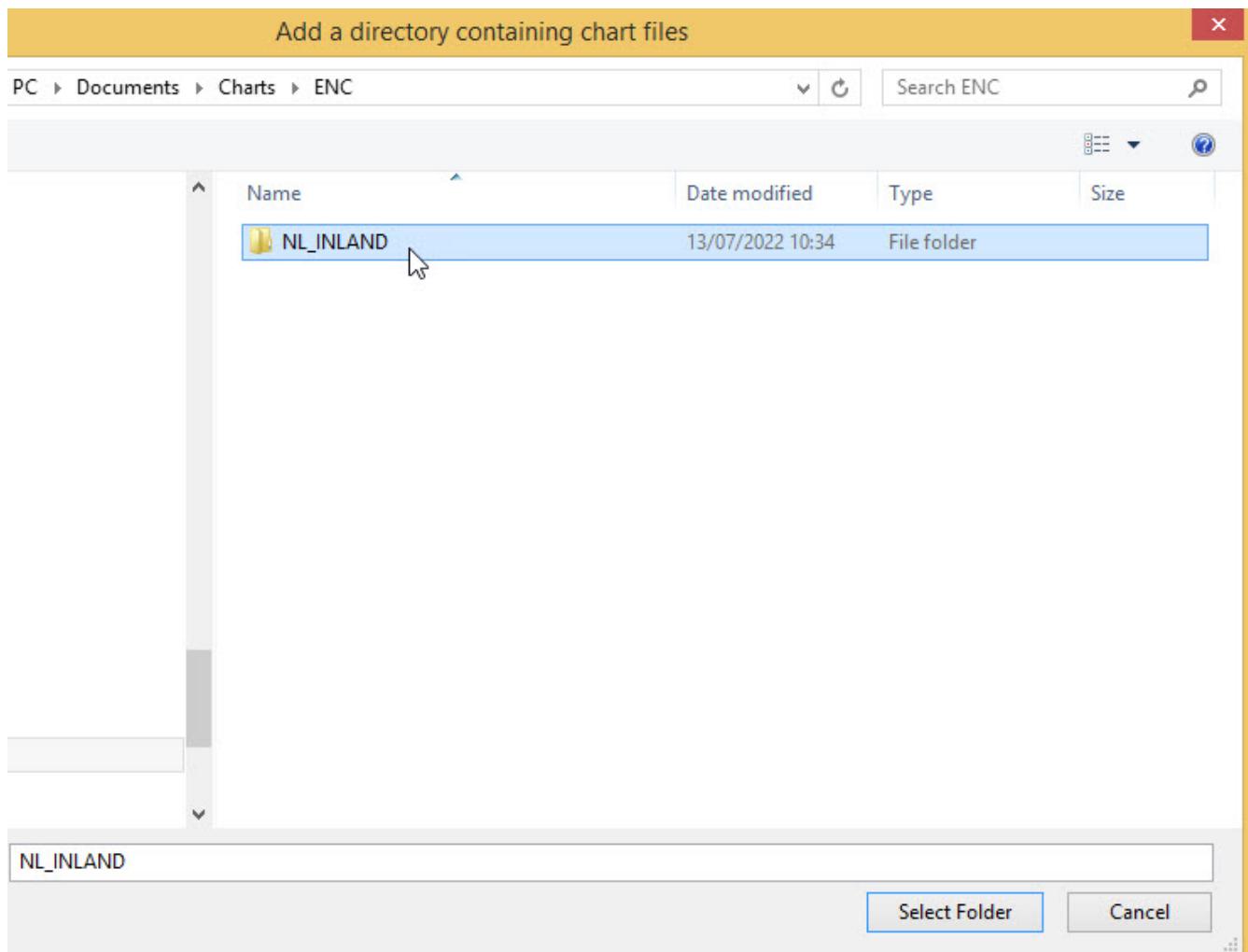
[Download selected charts]



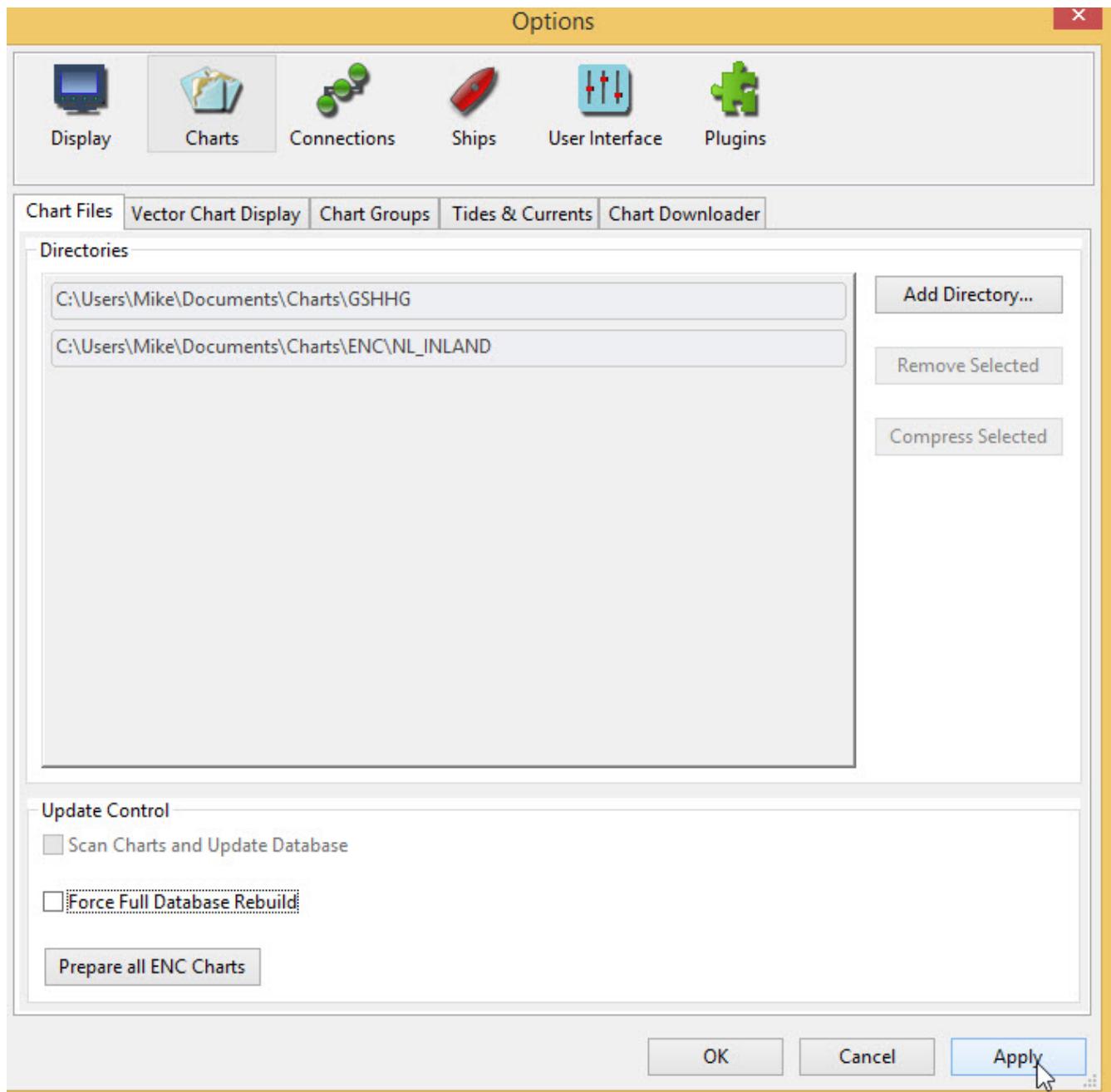
[Apply]



[Add Directory]



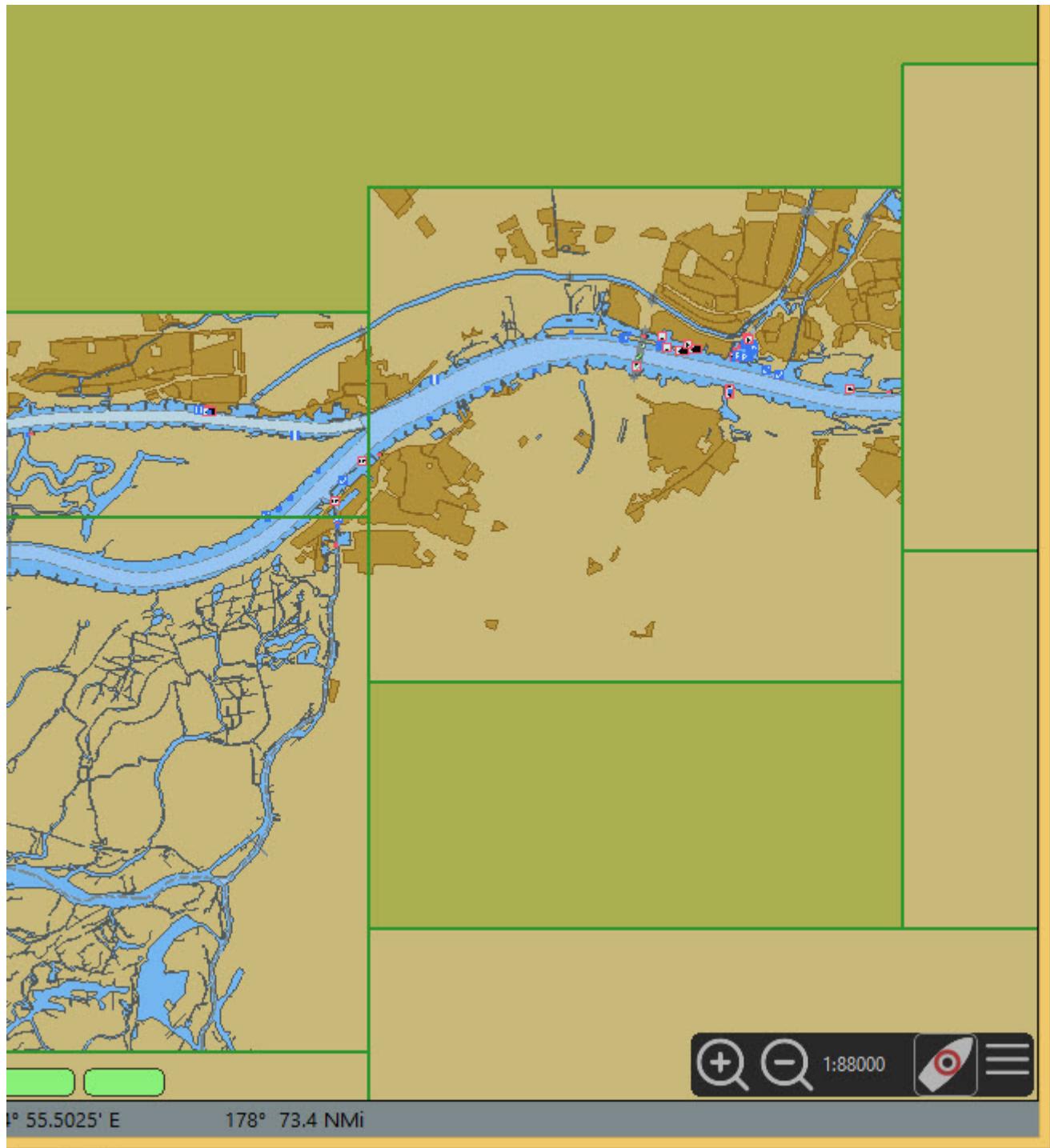
[Select Folder]



[Apply] [OK]

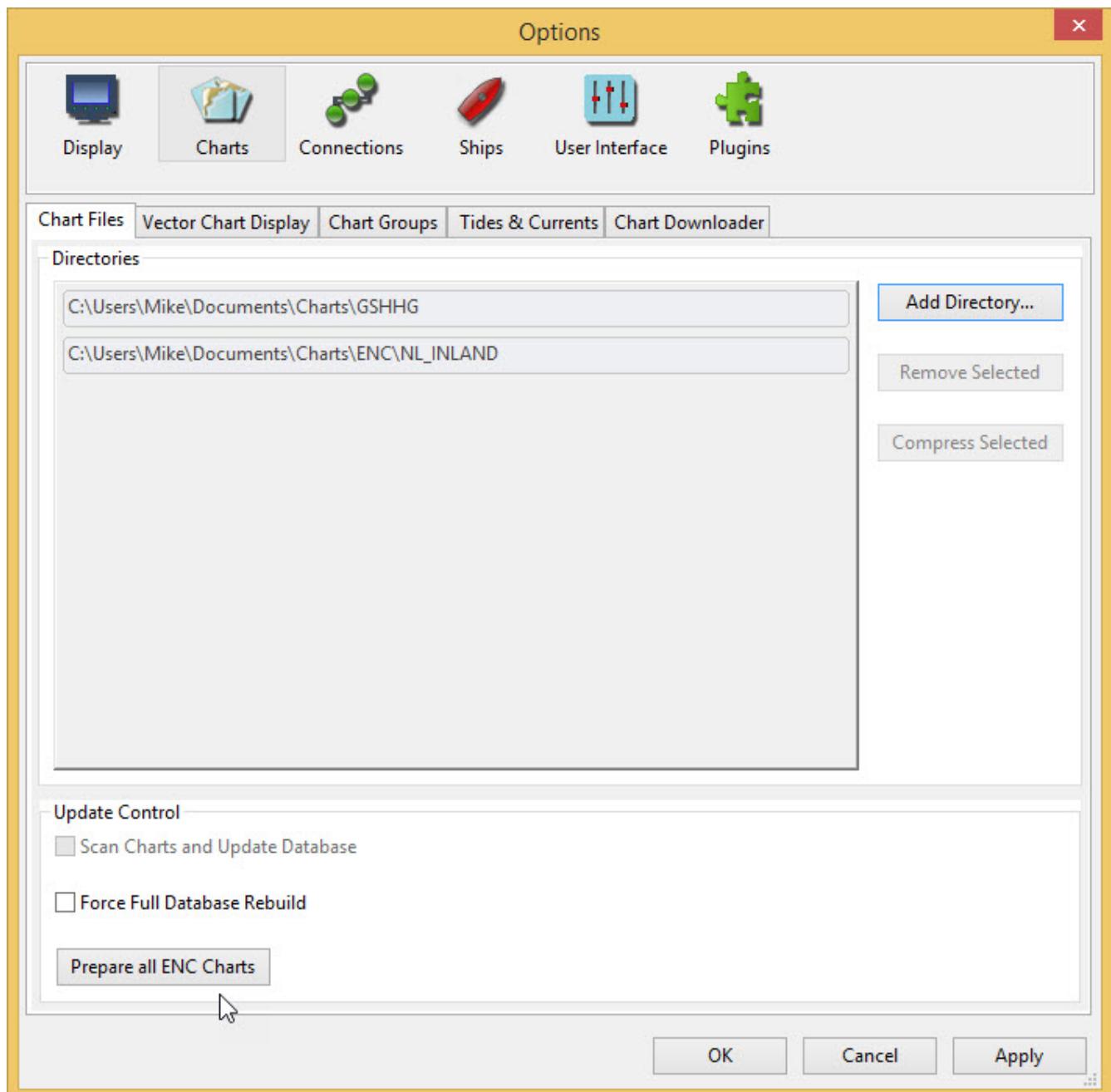
Customising the chart display

Move the base chart until you can see the Netherlands.

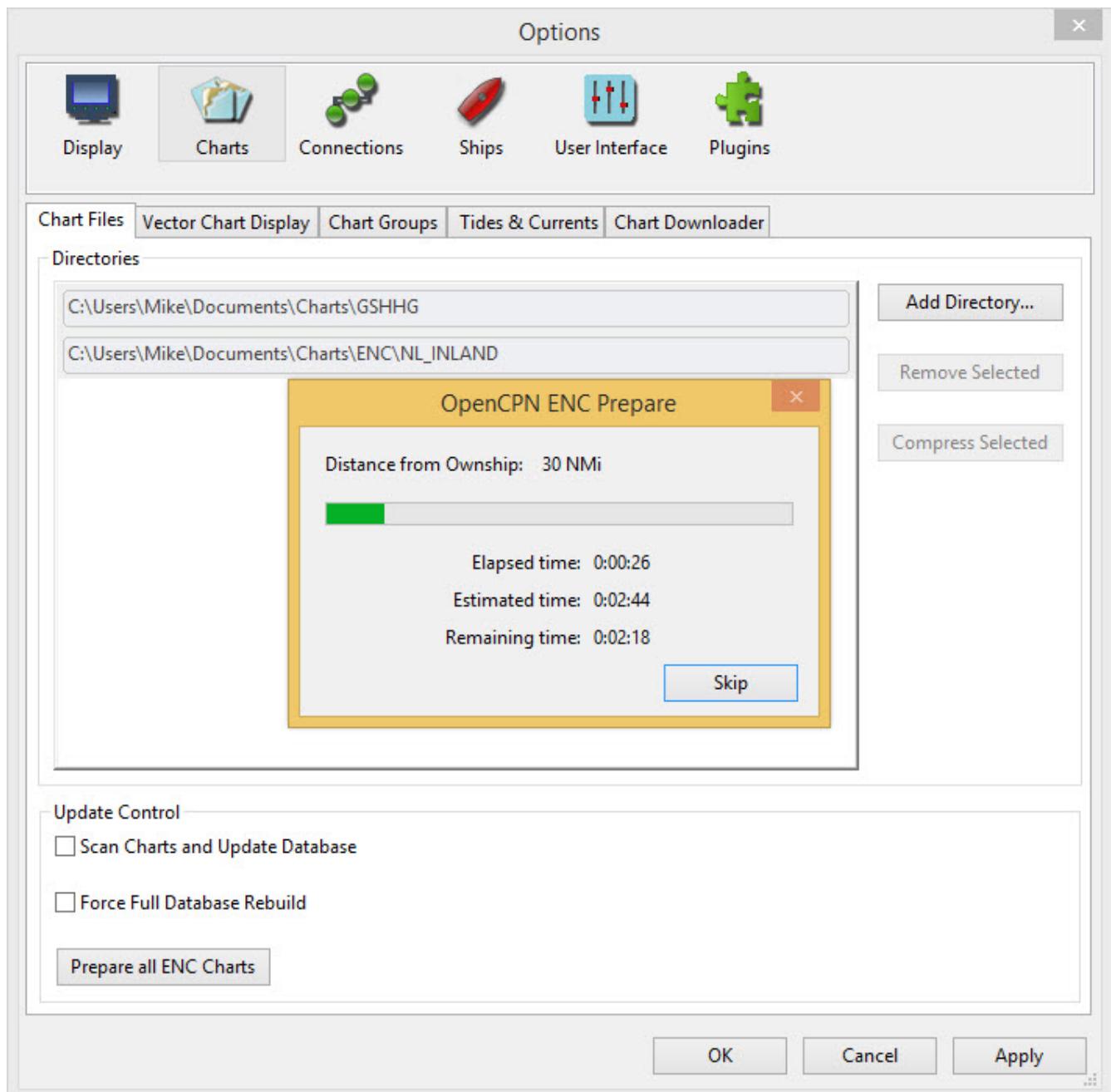


On the right of the display some of the chart cells have not appeared. They will become visible if the cell is moved towards the centre of the display, as the cell is loaded. To avoid this delay:

[Options] [Charts]

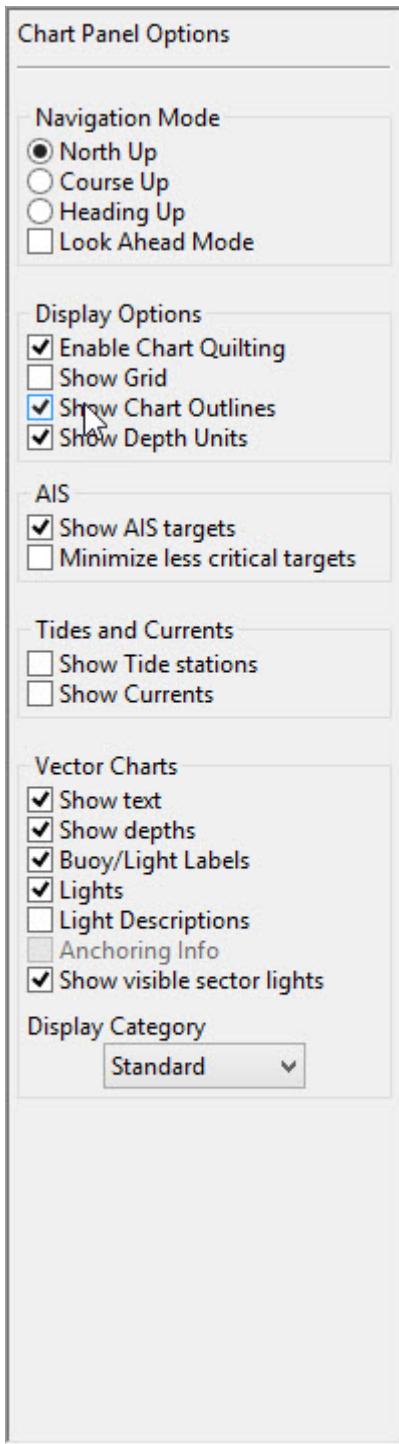


[Prepare all ENC Charts]

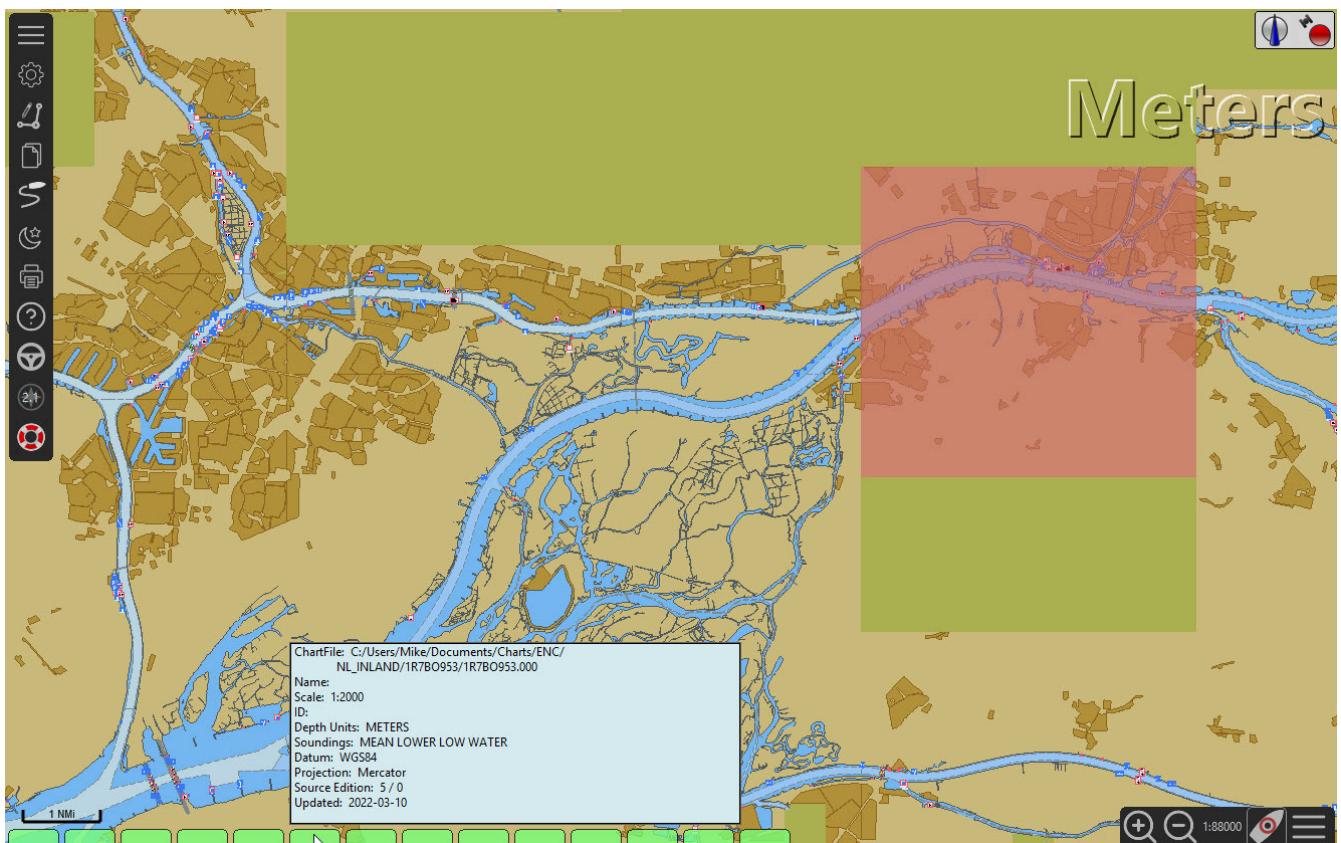


It may take some time to load all the cells.

[Apply] [OK]



Untick **Show Chart Outlines** in **Display Options**



A **Piano Bar** shows the bottom of the display. This indicates the charts available for the field of

view. Hovering the cursor over a button highlights the area covered by the cell and displays information about the cell, such as the date last updated.

Updating your Charts

Chart Updates

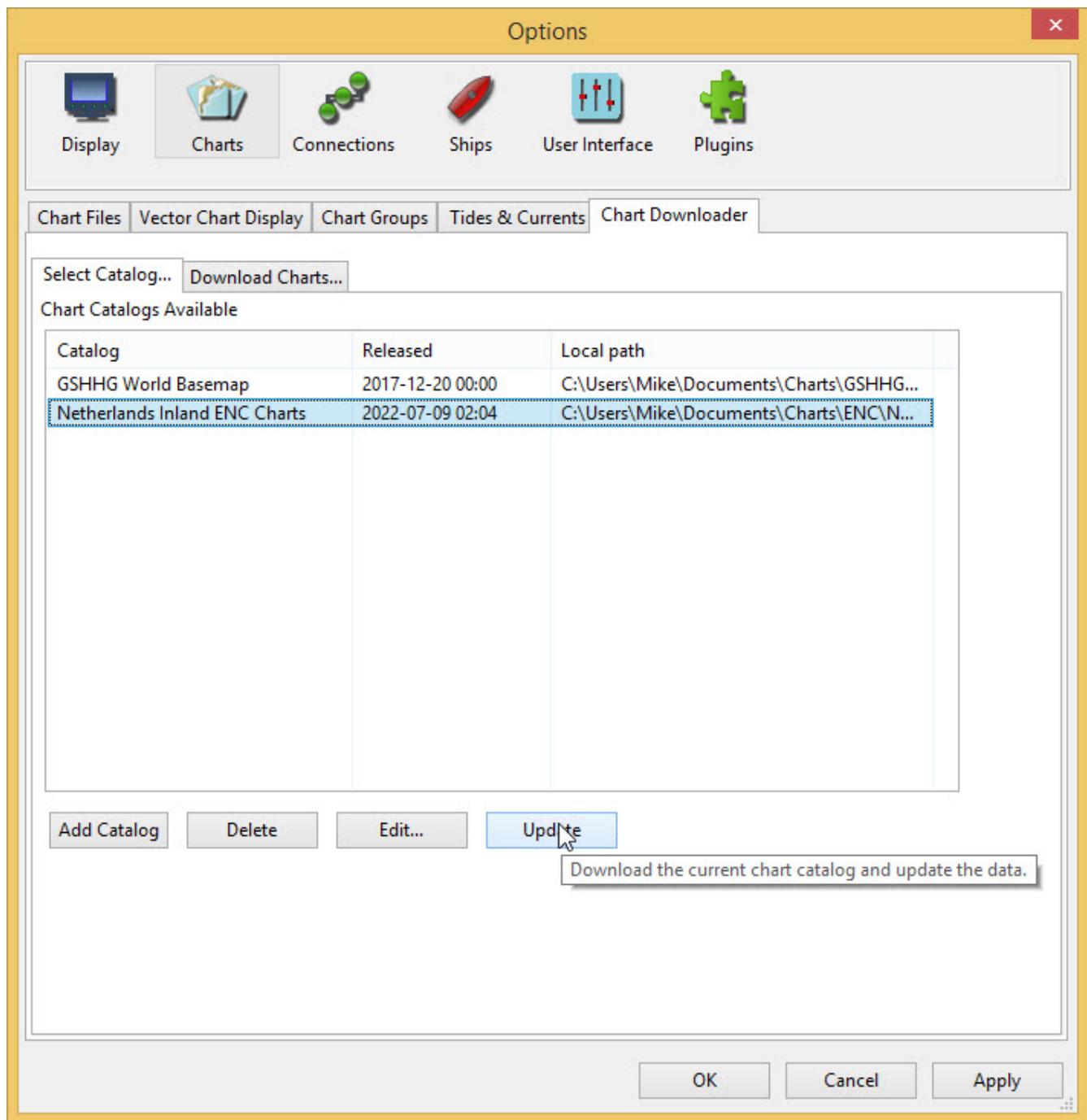


It is important that regular checks are made for updates for the charts in use.
<https://www.vaarweginformatie.nl/frp/main/> This multilingual website has links for downloading the latest charts.

[Options] [Charts]

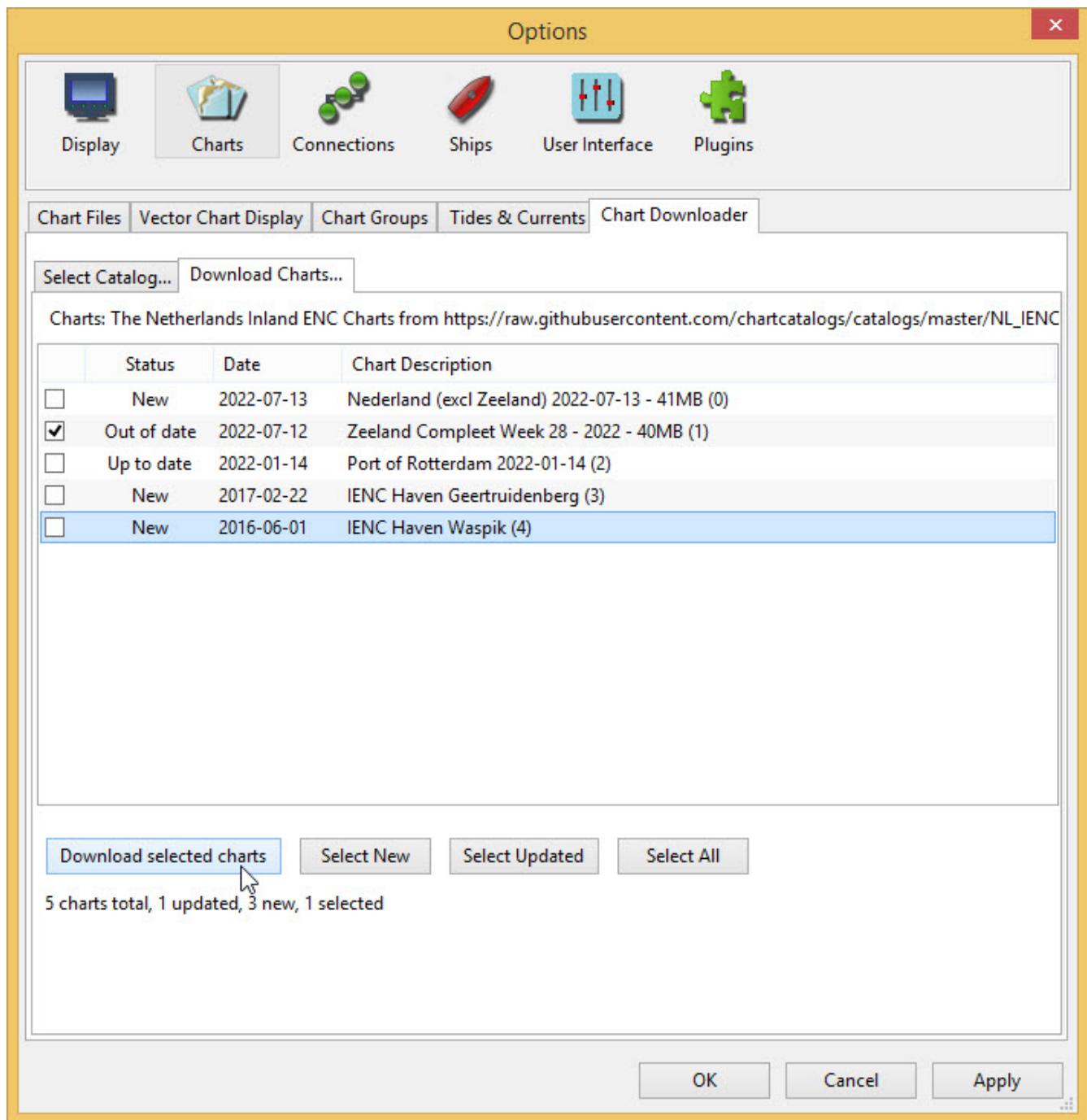
Chart Downloader

Select Catalog...

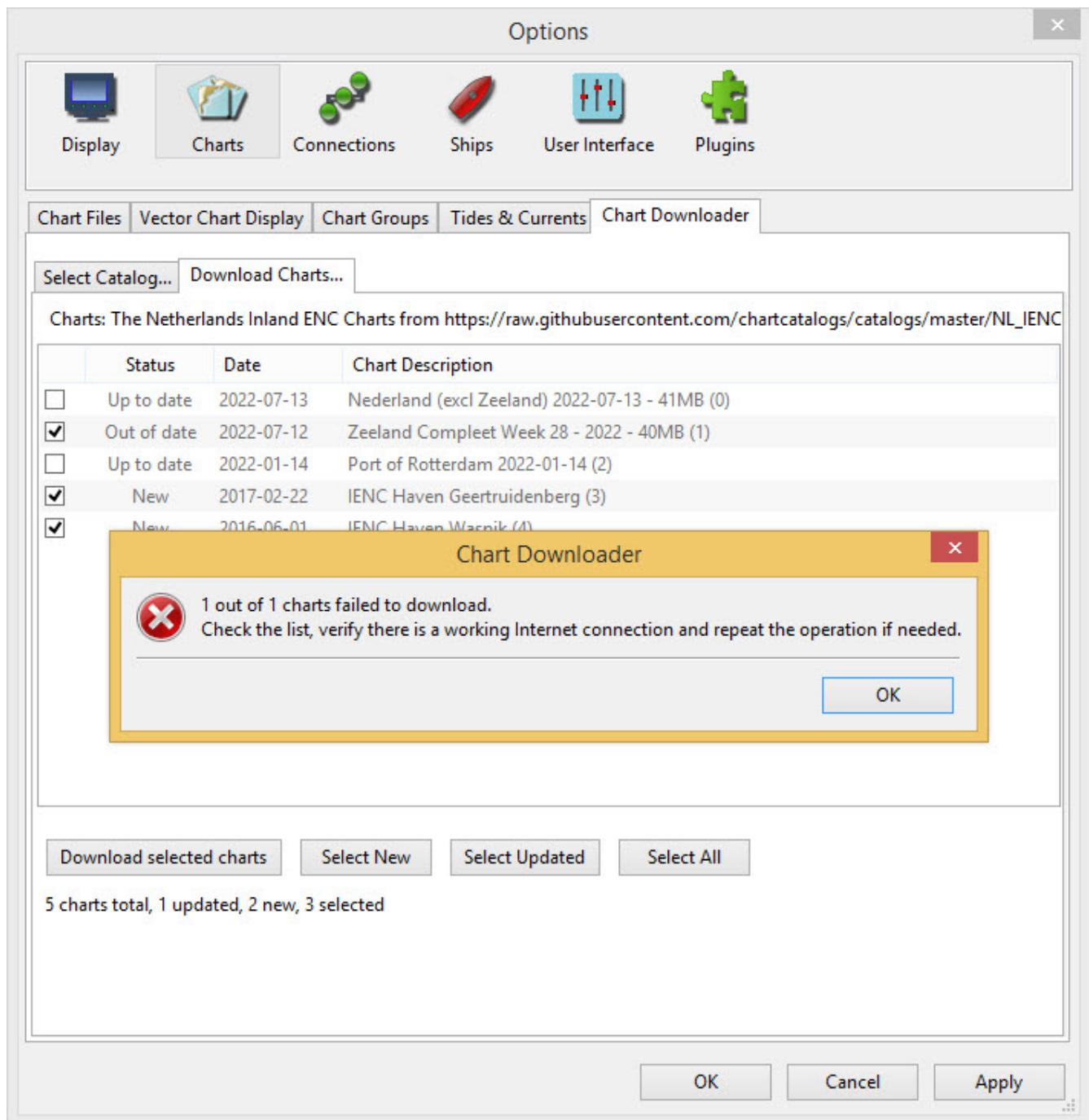


[Update]

Download Charts...



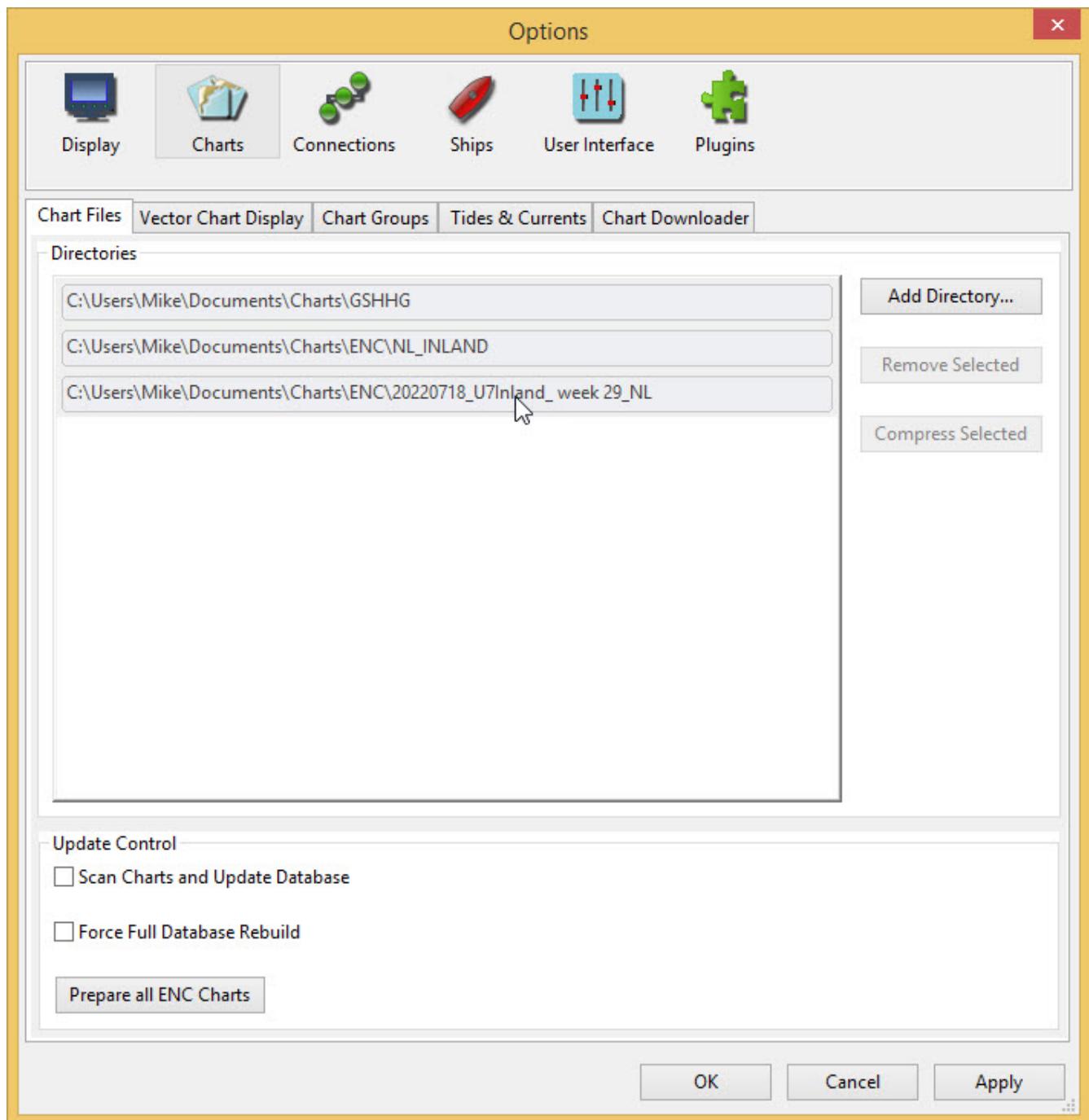
Download selected charts



Zeeland Compleet Week 18-2022 has failed to update. In this case it was necessary to use the link:

<https://www.vaarweginformatie.nl/frp/main/>

Here you see *Zeeland Compleet Week 19-2022*. Download and extract the files from the zip to the ENC directory. Then add a new directory for charts:



[Prepare all ENC Charts]

Week 19 files will be used instead of Week 18.

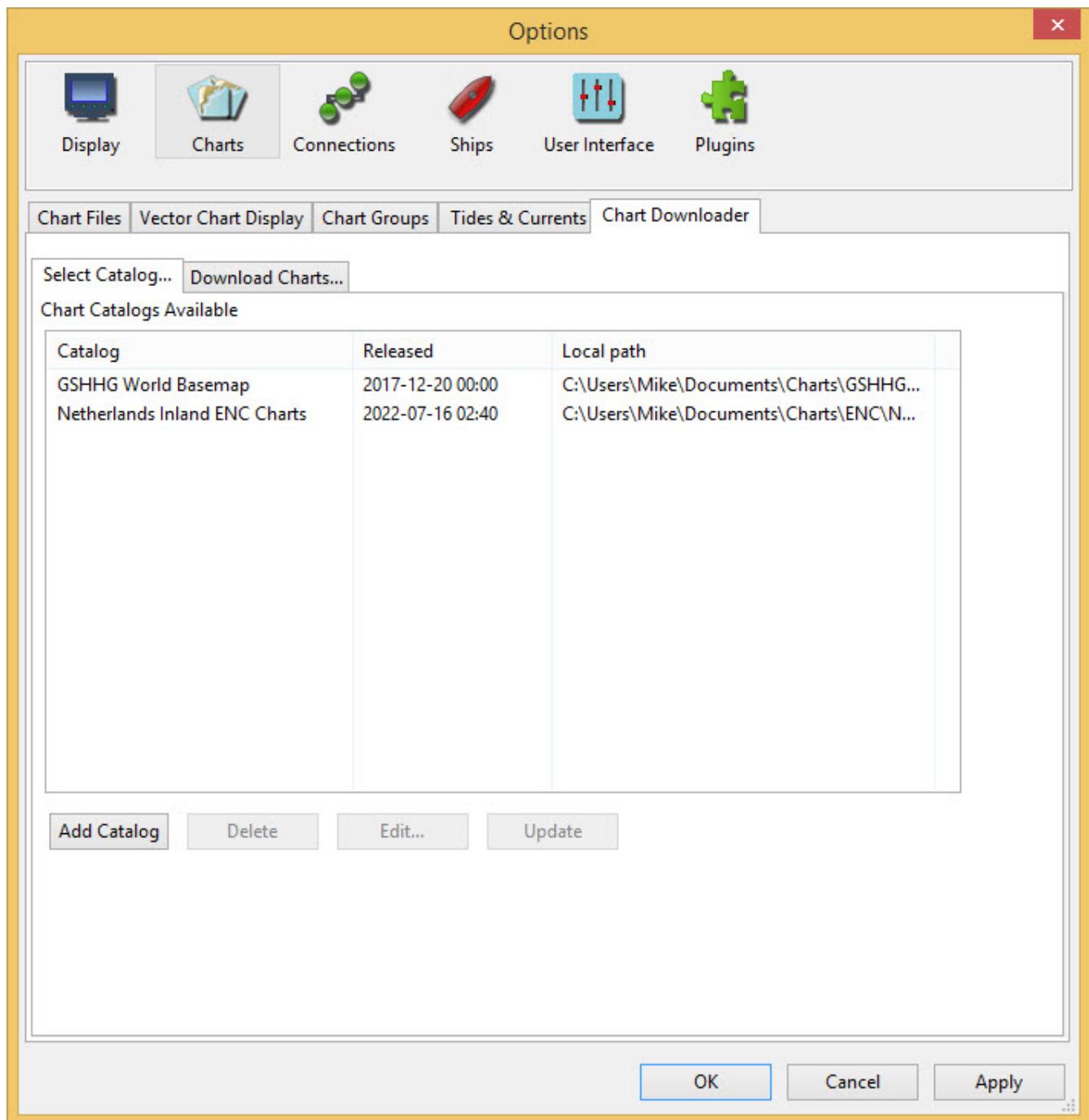
Add more Charts

This is straightforward for adding German charts.

[Options] [Charts]

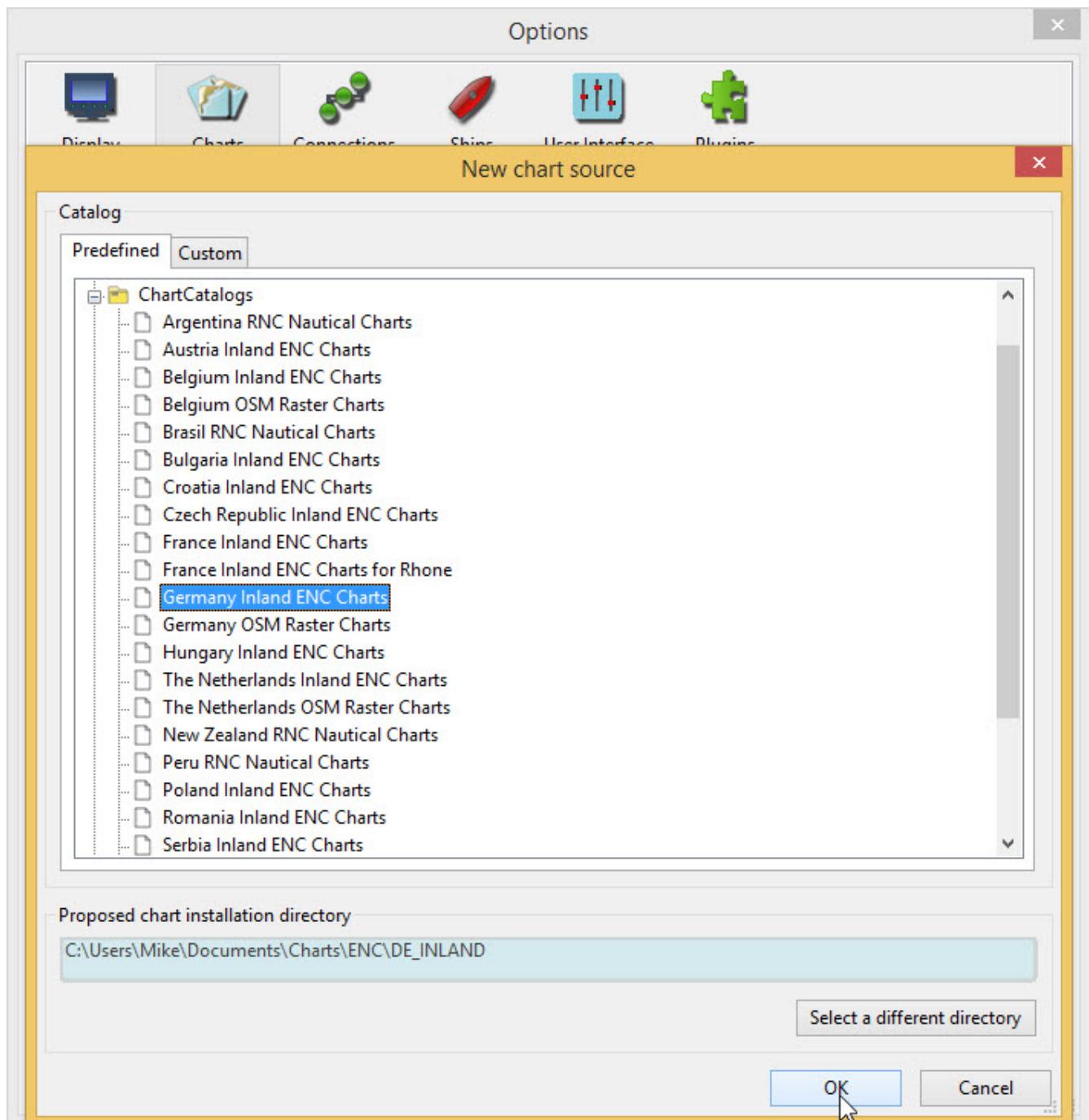
Select Catalog...

*

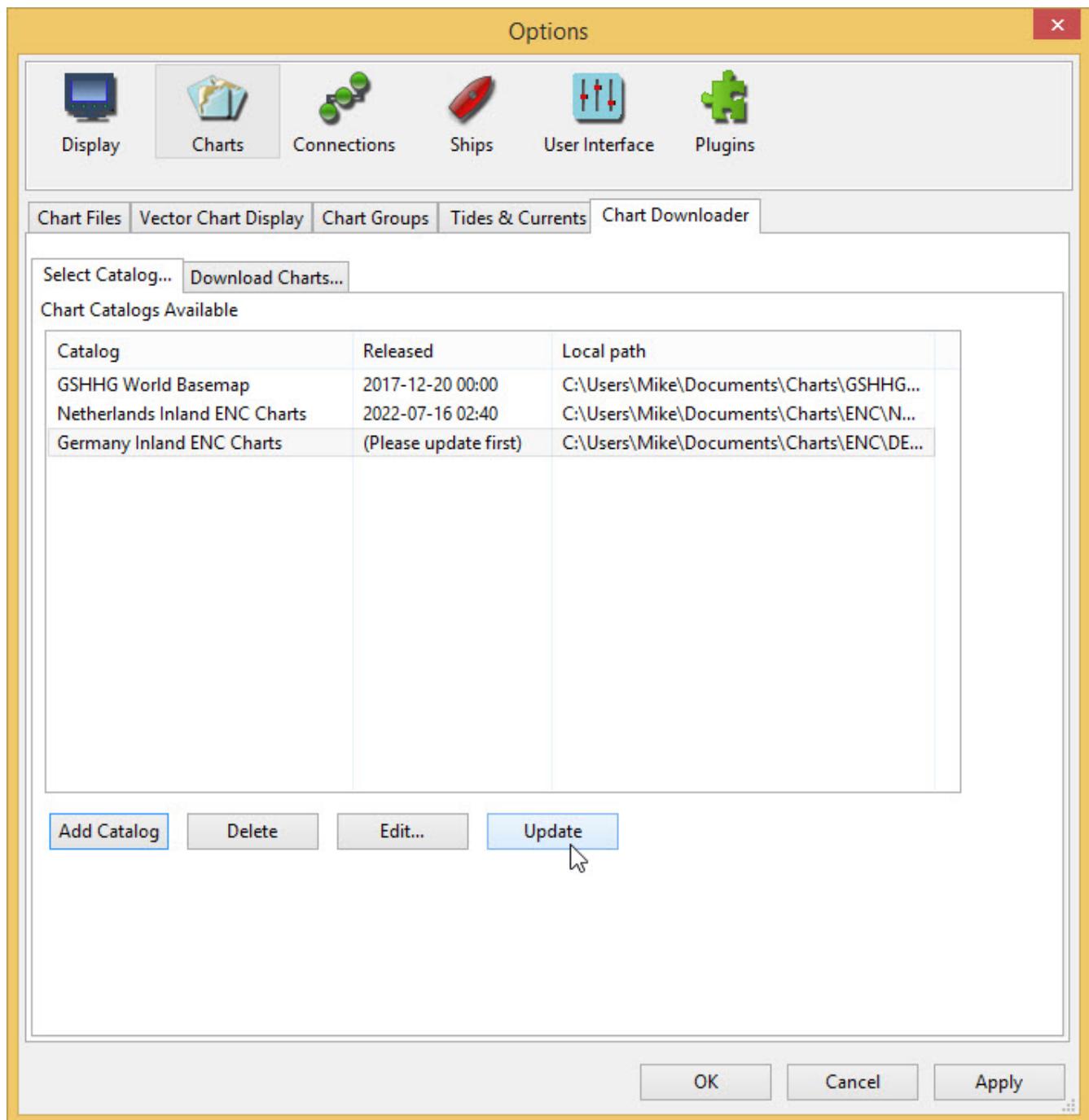


Add Catalog

Browse for *Germany Inland ENC Charts*

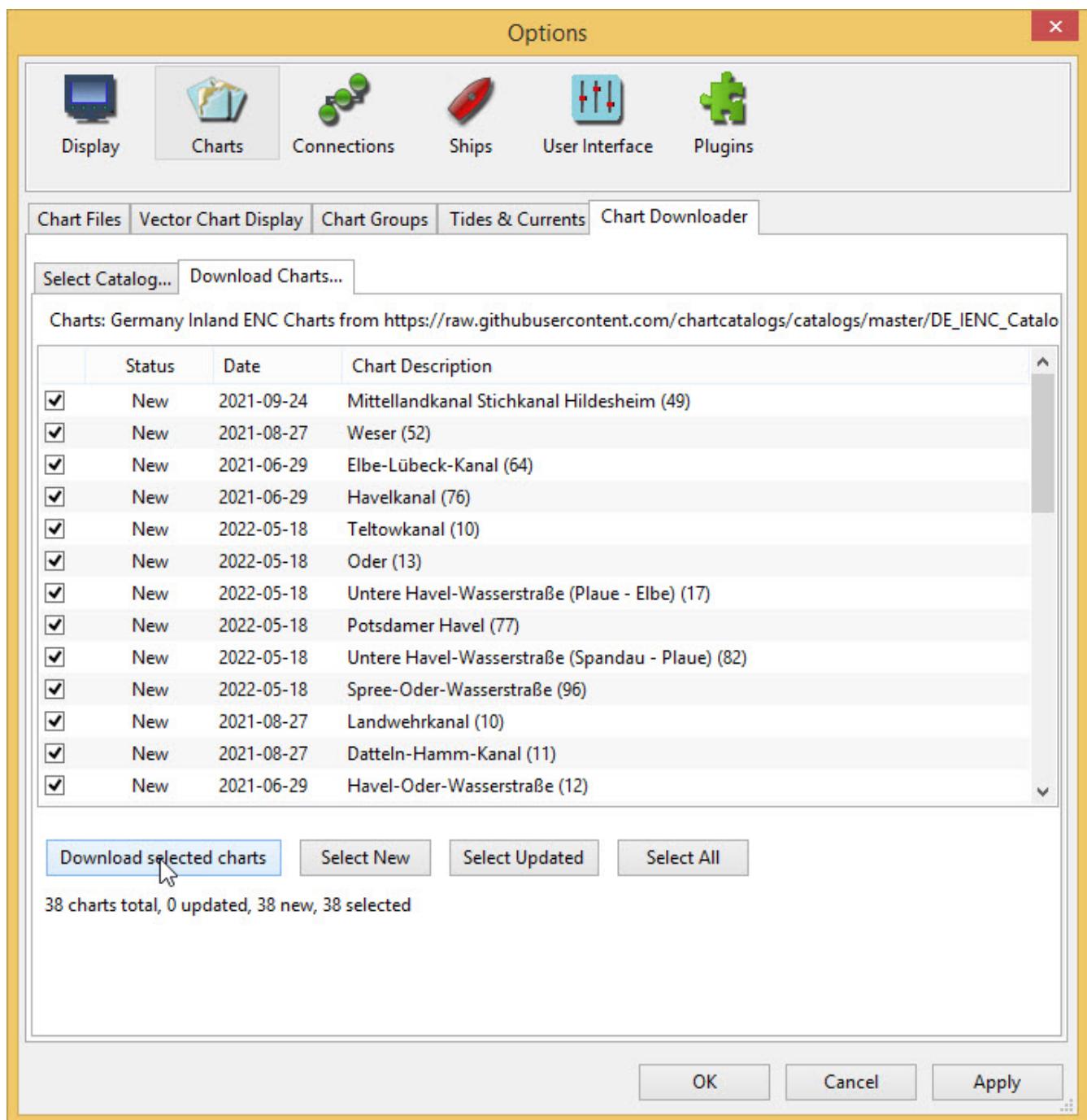


[OK]



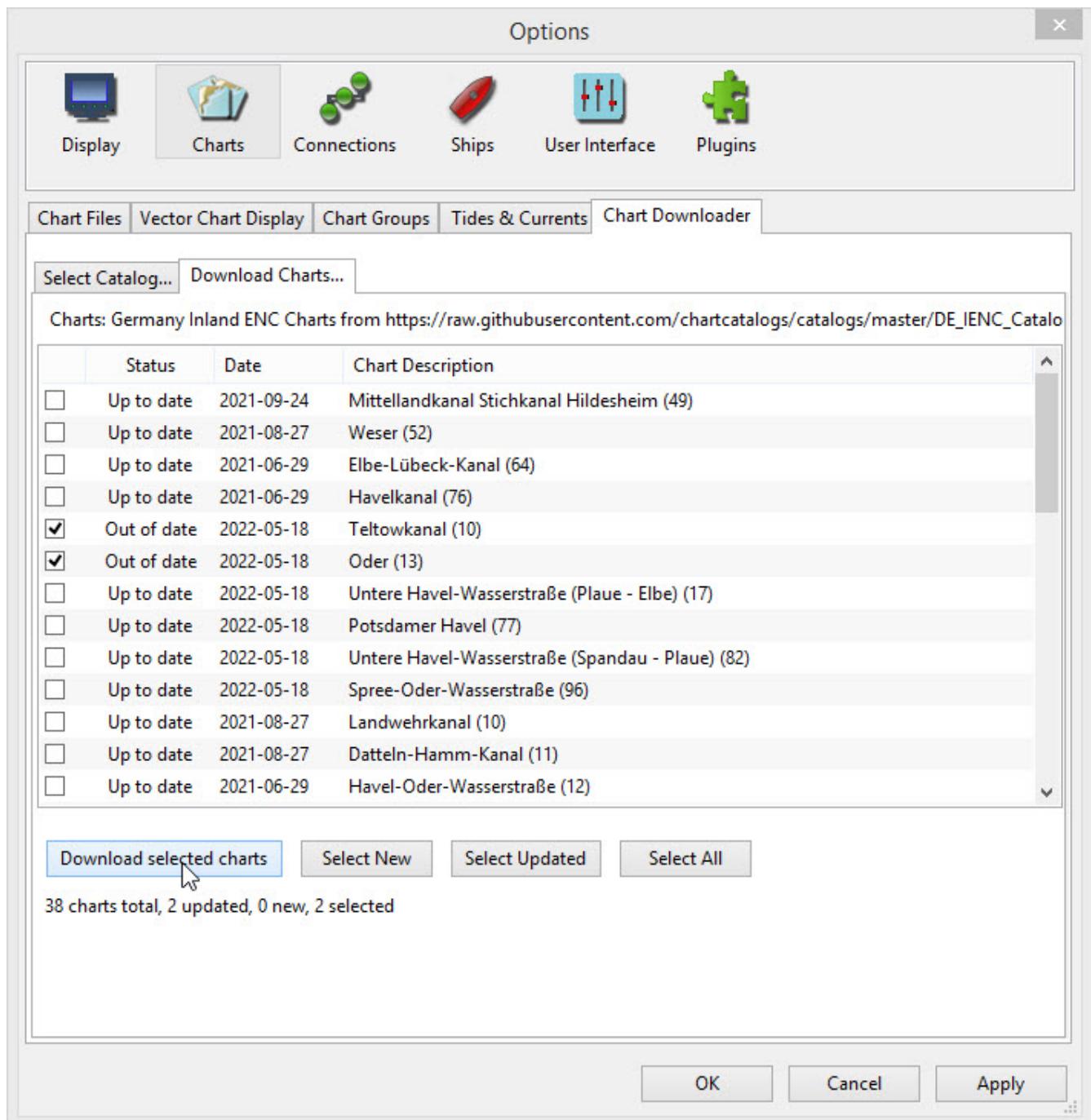
[Update]

Download Charts...



[Download selected charts]

This can take some time.

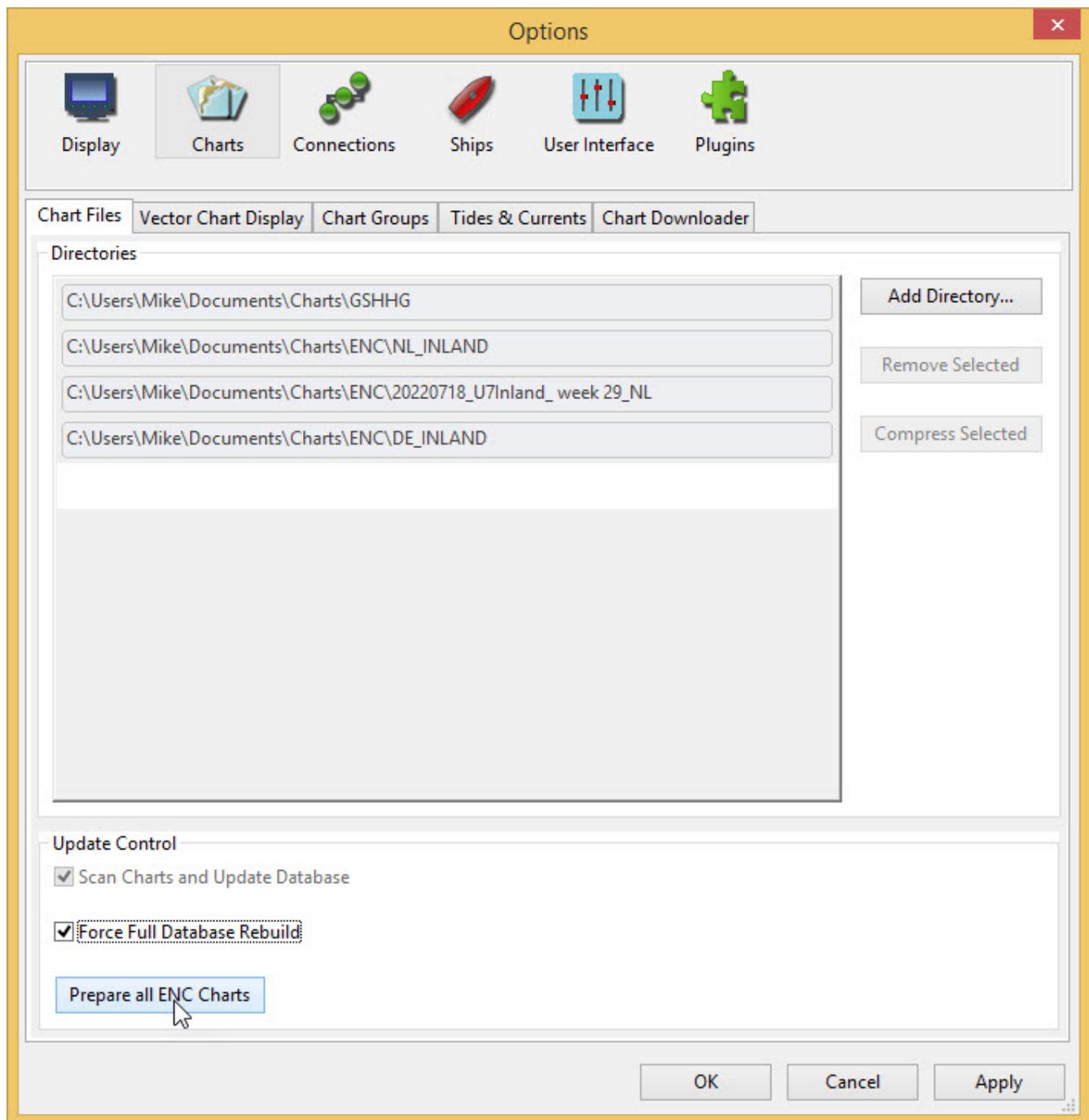


Two 'Out of date' charts are found.

[Download selected charts]

[Options] [Charts]

Chart Files



To avoid delay in quilting.

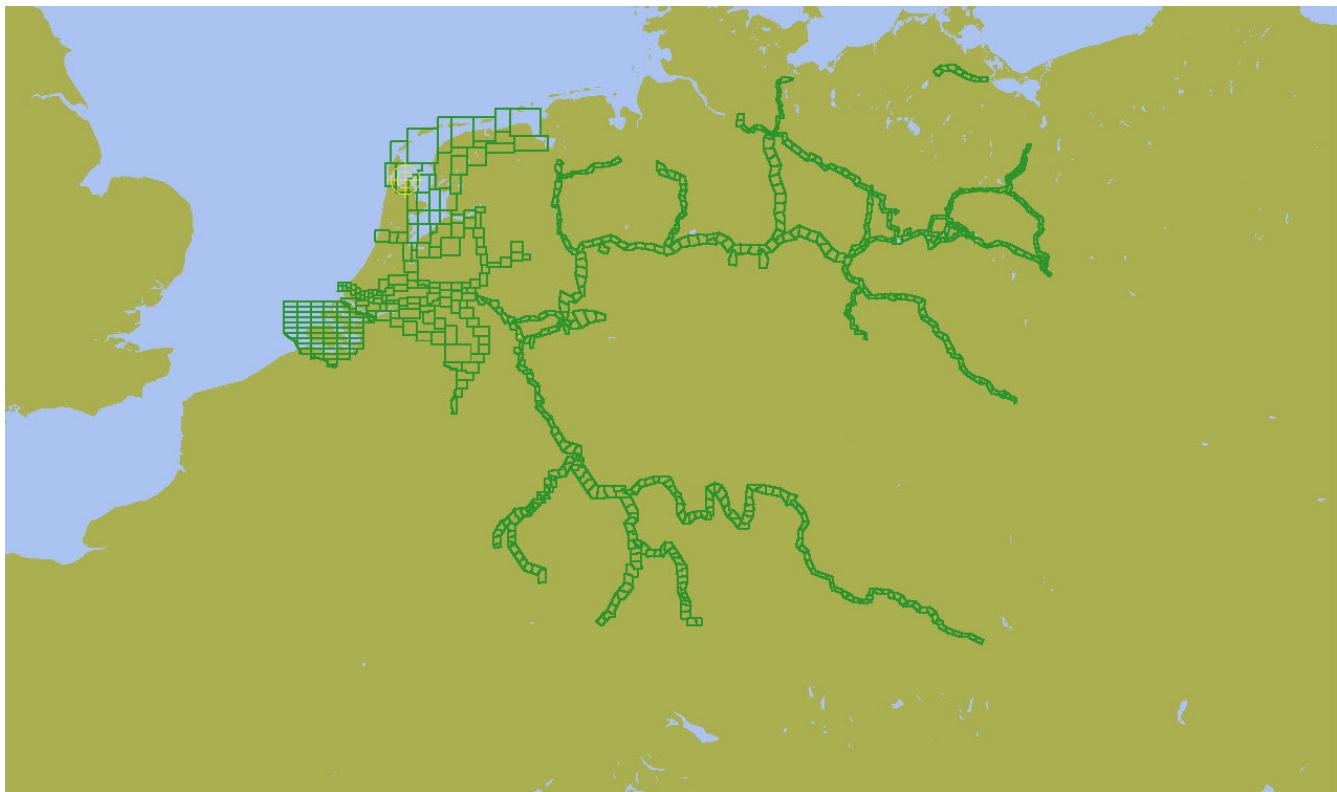
[Prepare all ENC Charts]

[Apply] [OK]

We have now added Dutch and German ENC charts to OpenCPN.

Chart Panel Options

Show Chart Outlines will show the ENC cells available.

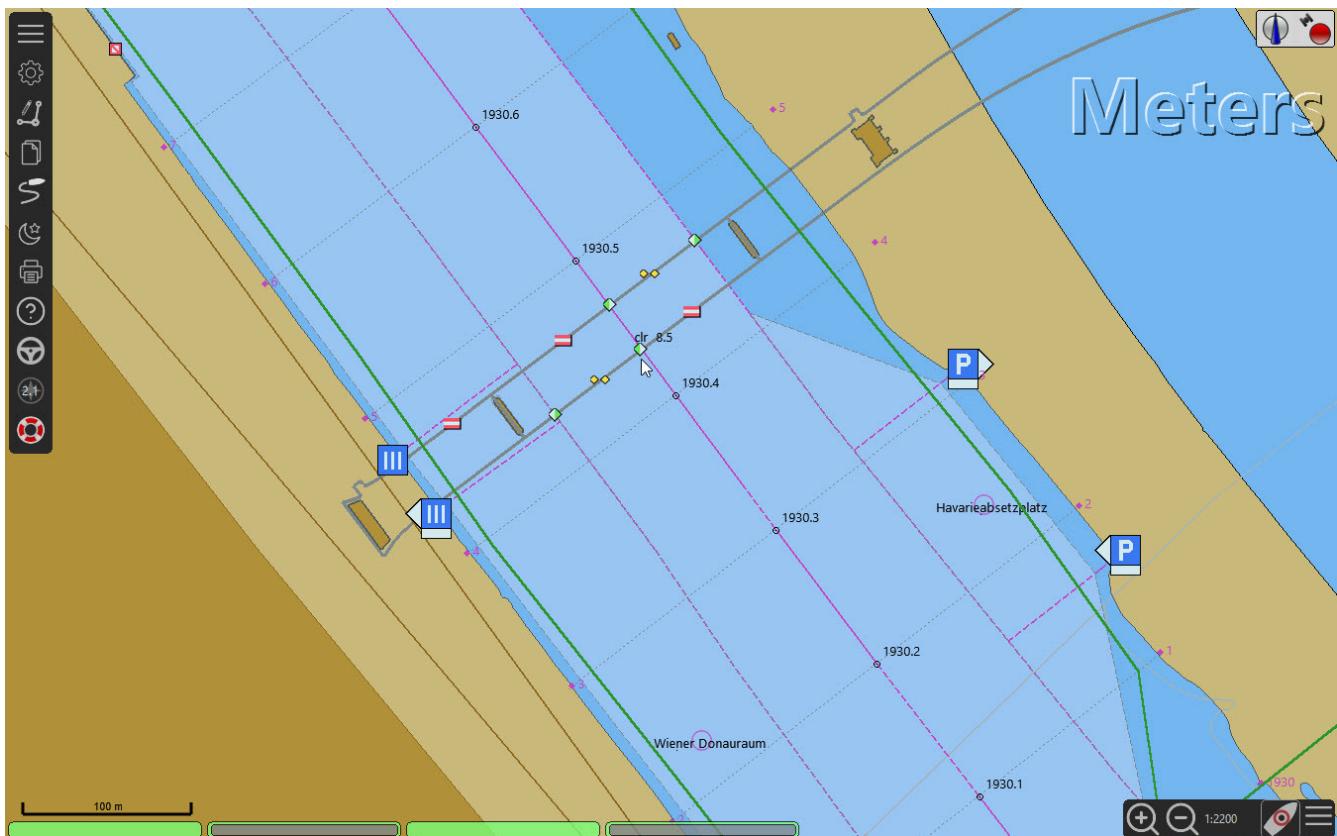


Zoom in for the chart detail.

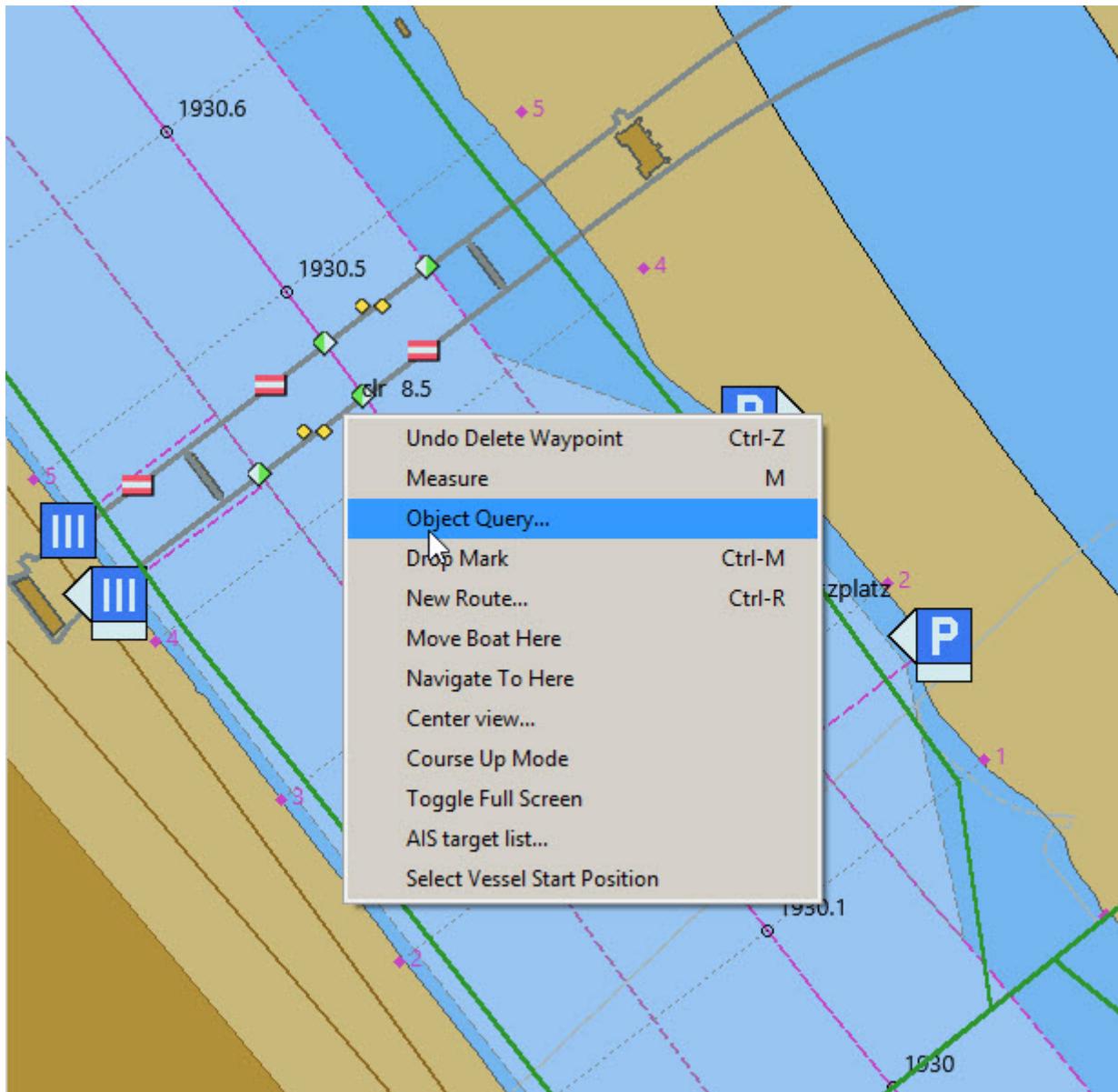
Additional Information from Chart Cells

As well as the standard chart view extra detail is provided.

This is an Austrian chart in an area close to Vienna.



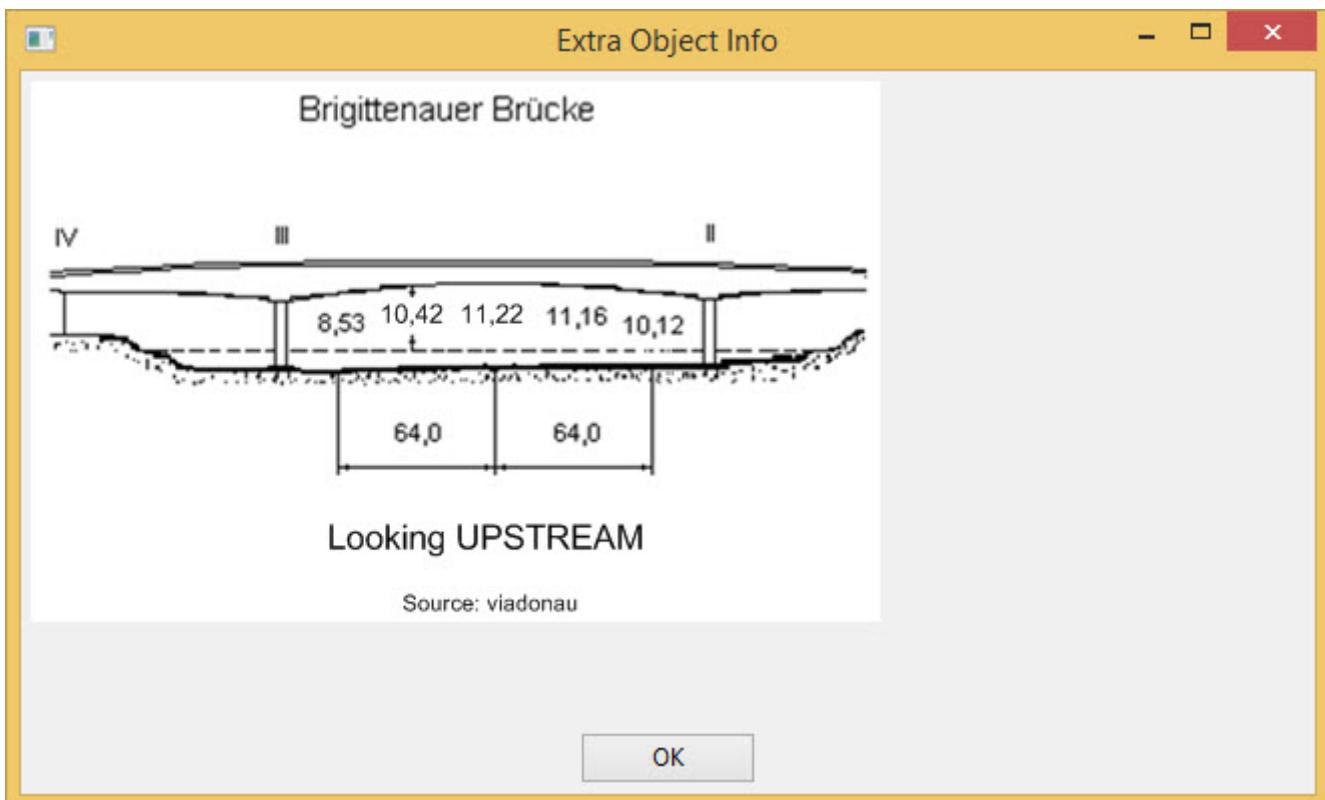
right-click



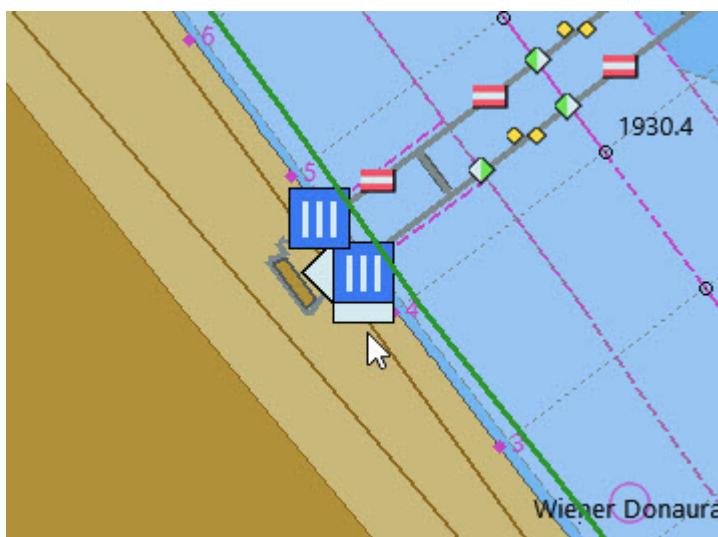
Object Query...

Object Query	
Bridge (bridge)	
CATGEO	Area
CATBRG	fixed bridge (1)
wtwdis	1930.4 m
SCAMIN	(90000)
HORCLR	128 m
PICREP	2W7D193001.TIF
VERCLR	8.5 m
unlocl	ATVIE00001B011219304
<hr/>	
Notice mark (notmrk)	
48° 14.2578' N 016° 23.6399' E	
CATGEO	Point
catnmk	(D.1b) recommended channel only in the direction indicated, passage in the opposite direction prohibited (at bridges)(45)
fnctnm	recommendation mark(4)
SCAMIN	(8000)
dirimp	upstream (1)
ORIENT	325°
<hr/>	
Railway (RAILWY)	
CATGEO	Line
SCAMIN	(45000)
<hr/>	
Road (ROADWY)	
CATGEO	Line
CATROD	minor road(3)
OBJNAM	Handelskai
SCAMIN	(45000)
<hr/>	
<input type="button" value="OK"/>	

The attribute **PICREP** has a link to an image file for the bridge.



Interesting to note that the clearance 8.5m is shown on the chart close to the centreline of the channel. From the image 11.22m is available at the centre of the bridge.



right-click



The object is a *Notice mark*.

Attribute **catnmk** maximum number of vessels permitted to berth abreast.

Attribute **INFORM** maximum number of vessels allowed to berth 3, but no cargo vessels.

<https://ienc-kennisportaal.nl/wp-content/uploads/2016/09/O.3.1-Notice-Marks.pdf>

Much greater detail for the encoding of IENC:

https://ienc-kennisportaal.nl/wp-content/uploads/2021/10/2019_12_24_RIS_Index_Encoding_Guide_v3p0-rev.2.pdf

Adding a GNSS Device

There are a variety of GNSS devices that can provide OpenCPN with position data. We use "GNSS" here instead of "GPS" because today the receivers usually use several constellations. Besides GPS, for example, Galileo, GLONASS or Beidou. For simplicity the Globalsat BU-353S4 GPS is used to demonstrate installing and using a GNSS with OpenCPN



Other GNSS devices that are available are listed [HERE](#).

It is possible to use an existing ship's GNSS receiver interfaced with a serial-to-USB adapter.

The GNSS needs line of sight with satellites. You may need to move the GNSS until it has a clear view of the sky. On a boat you could find that sufficient signal is received through a fibreglass deck.

Device Drivers

Device drivers for various OS can be downloaded [HERE](#)

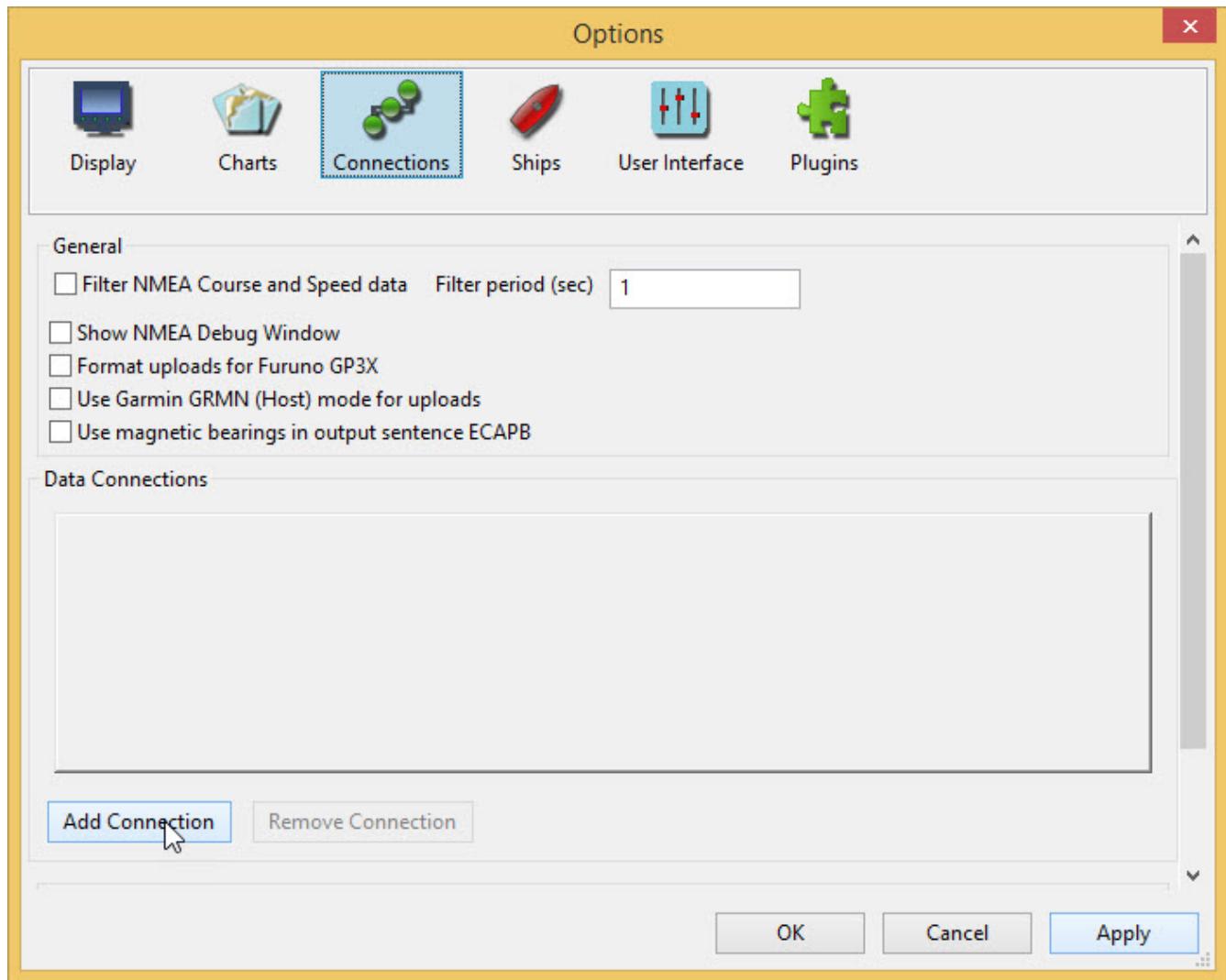
Windows

Download the installer for the version of Windows you are running.

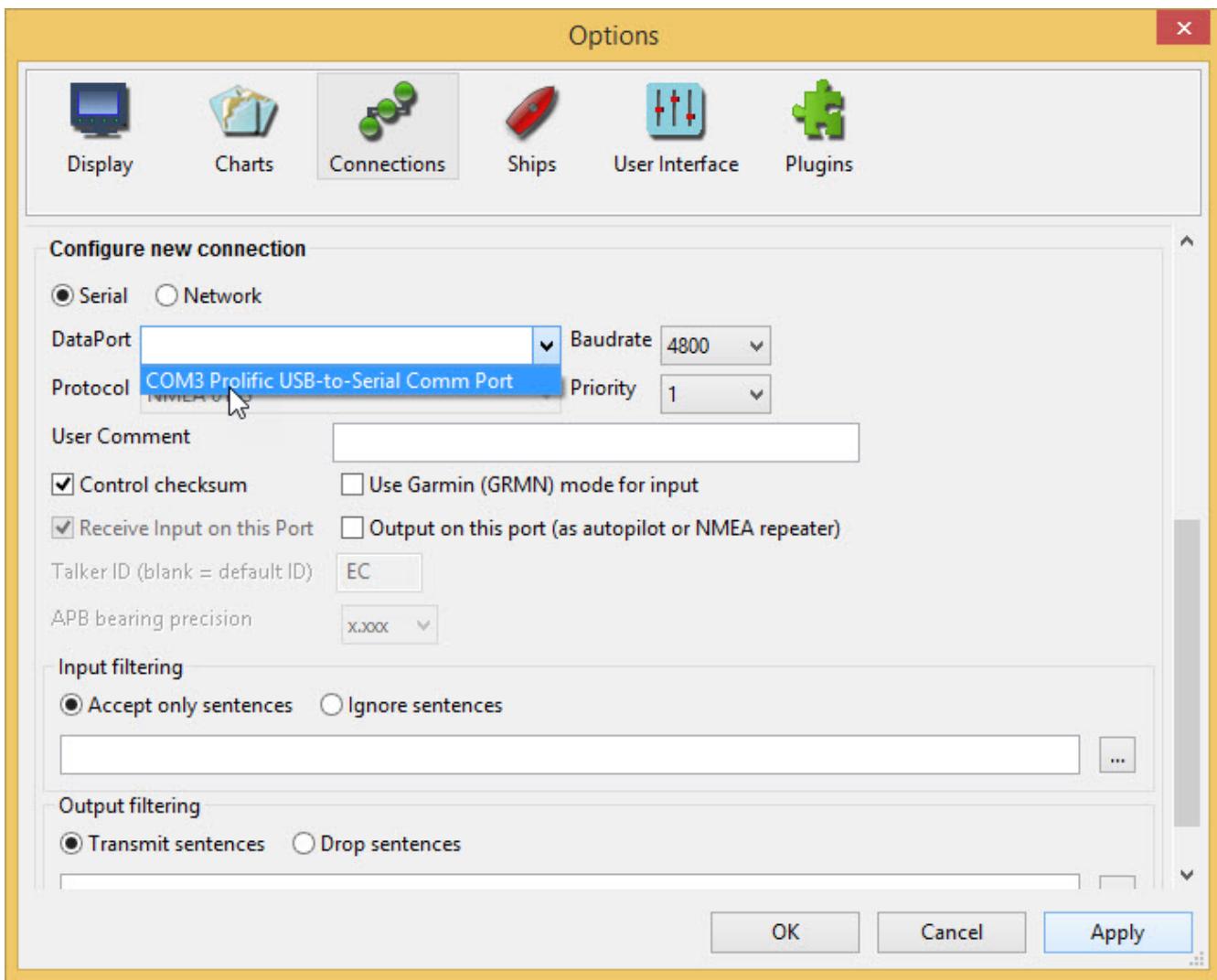
Install the driver using the installer .exe.

Plug in the GNSS. Windows should recognise the device and use the appropriate driver for it.

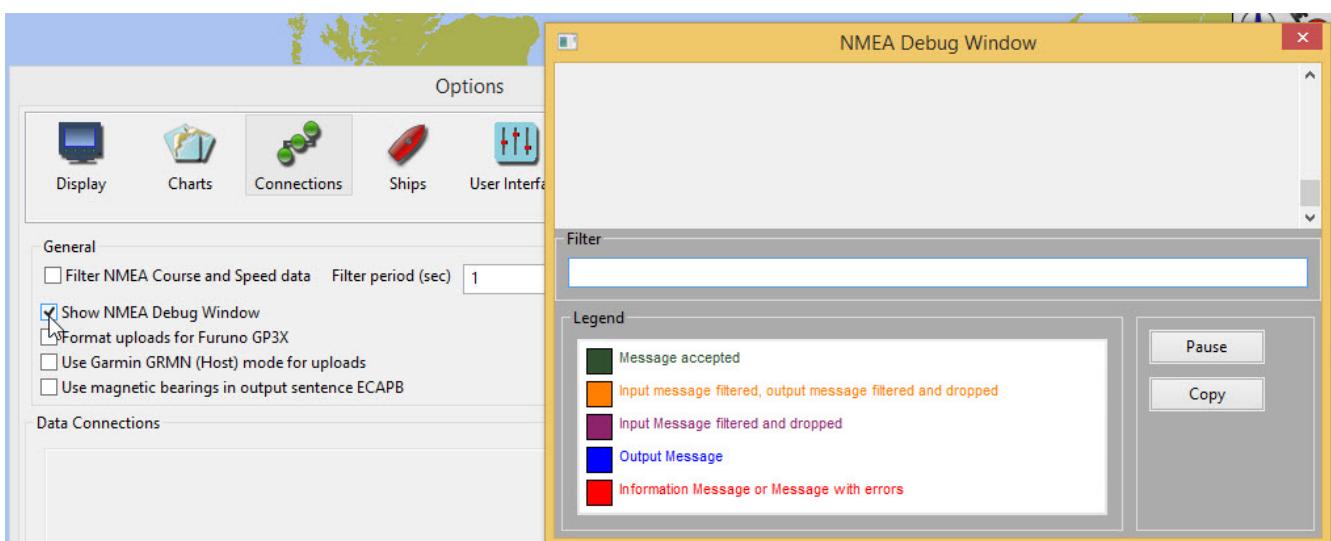
[Options] [Connections]



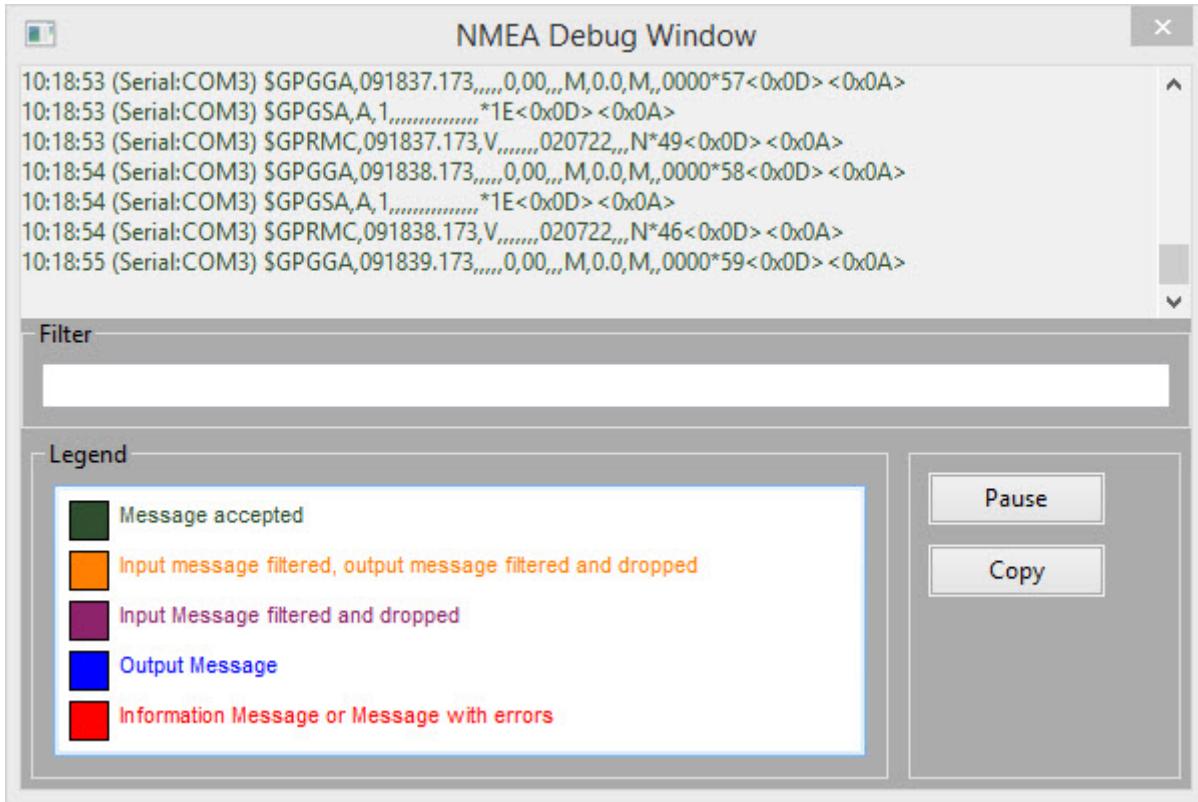
[Add connection]



Using the **DataPort** dropdown select the Prolific USB port.

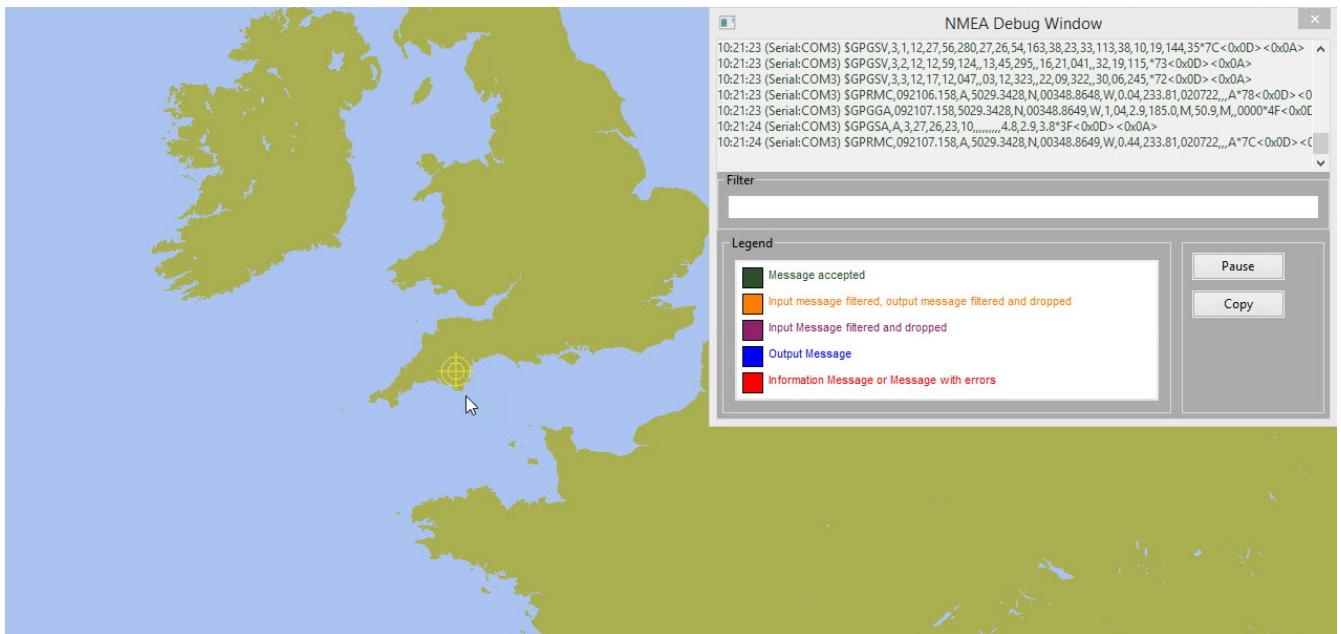


Scroll up and tick the **Show NMEA Debug Window**. This is not strictly necessary but gives a good indication of whether the GNSS is functioning correctly.



[Apply] [OK]

You may need to move the chart a little but the ship's position appears.



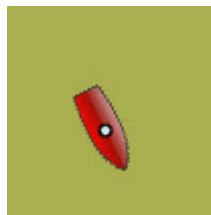
The NMEA Debug Window can be closed with the **Close** button.



The **Compass/GPS Status Window** shows a green bar which indicates the strength of

the GNSS signal.

The **Status Bar** shows the ship's position.

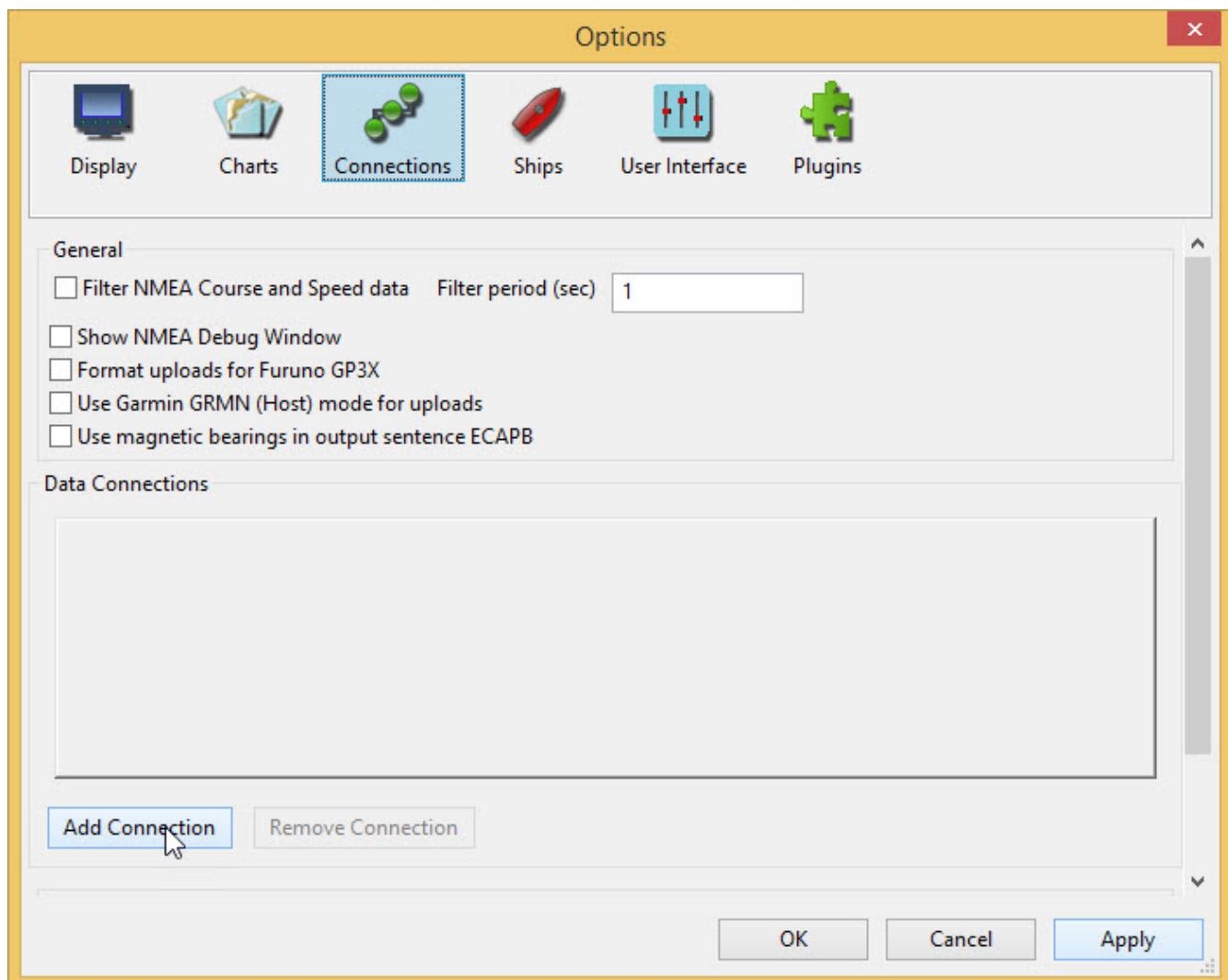


Zooming in the icon for the ship changes to a boat outline . The mouse scroll button can also be used to zoom in/out.

MacOS

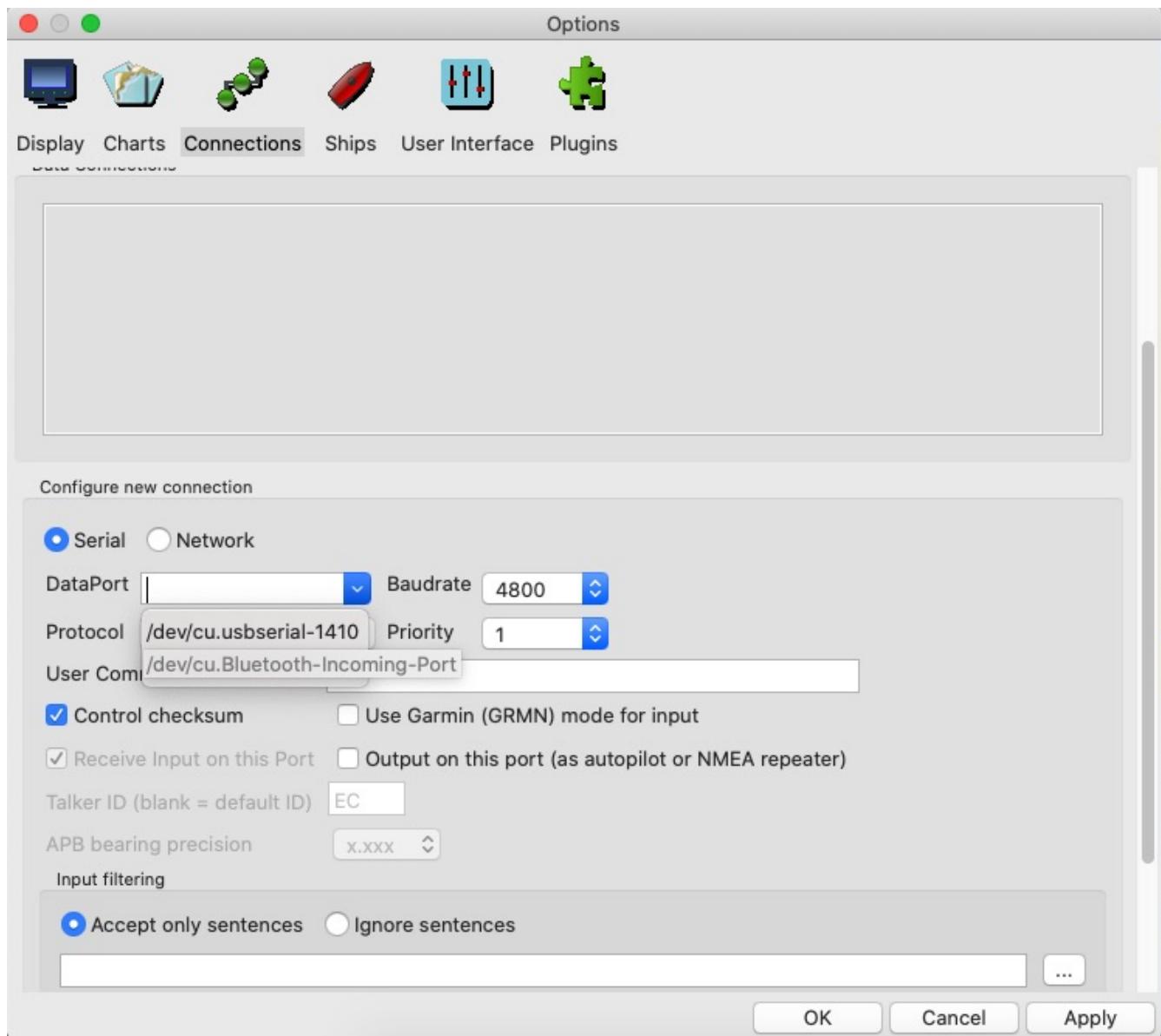
Plug in the GNSS.

[Options] [Connections]

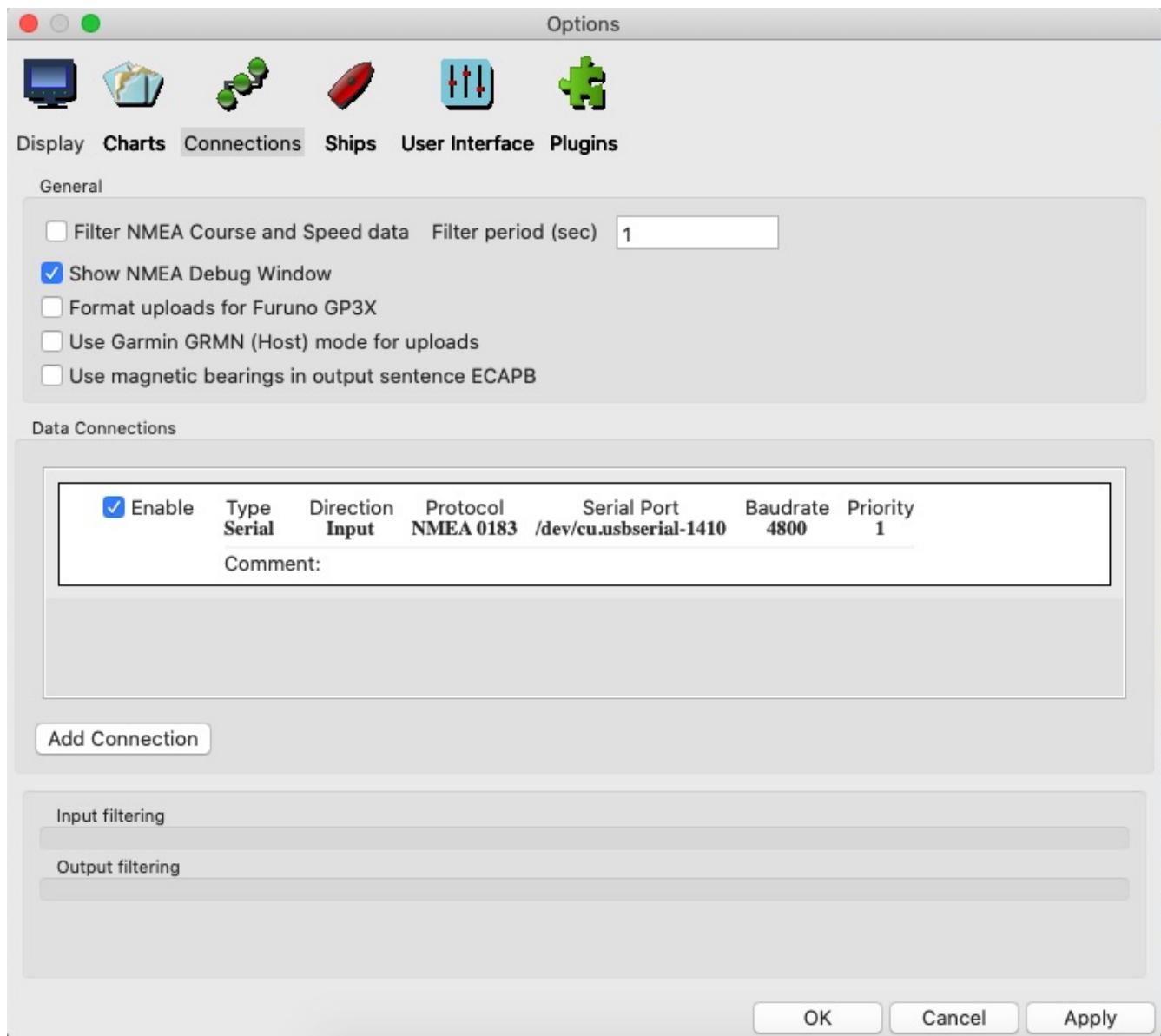


[Add connection]

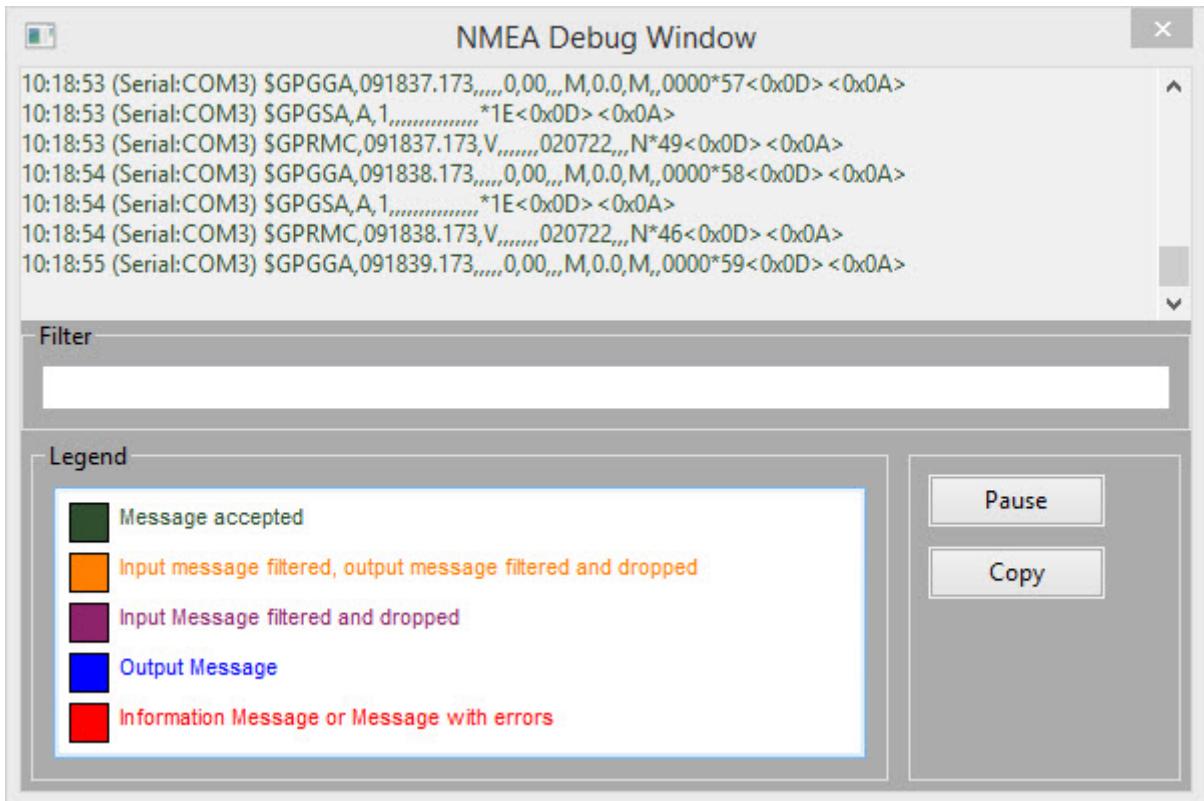
Use **Serial**



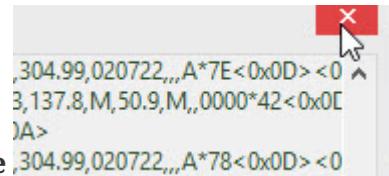
With the **DataPort** dropdown select the **/dev/cu.usbserial-1410** option.



Tick the **Show NMEA Debug Window** to view the GNSS output.



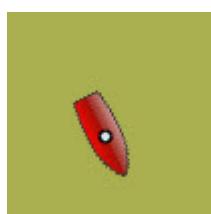
The NMEA Debug Window can be closed with the **Close** button.



The **Compass/GNSS Status Window** shows a green bar which indicates the strength of the GNSS signal.



The **Status Bar** shows the ship's position.



Zooming in the icon for the ship changes to a boat outline. The mouse scroll button can also be used to zoom in/out.

Linux

[Options] [Connections]

[Add connection]

Using the serial connection the DataPort dropdown has an entry /dev/ttyUSB0-Prolific

Options



Display Charts **Connections** Ships User Interface Plugins

Data Connections

Configure new connection

Serial Network

DataPort Baudrate

Protocol Priority

User Comment

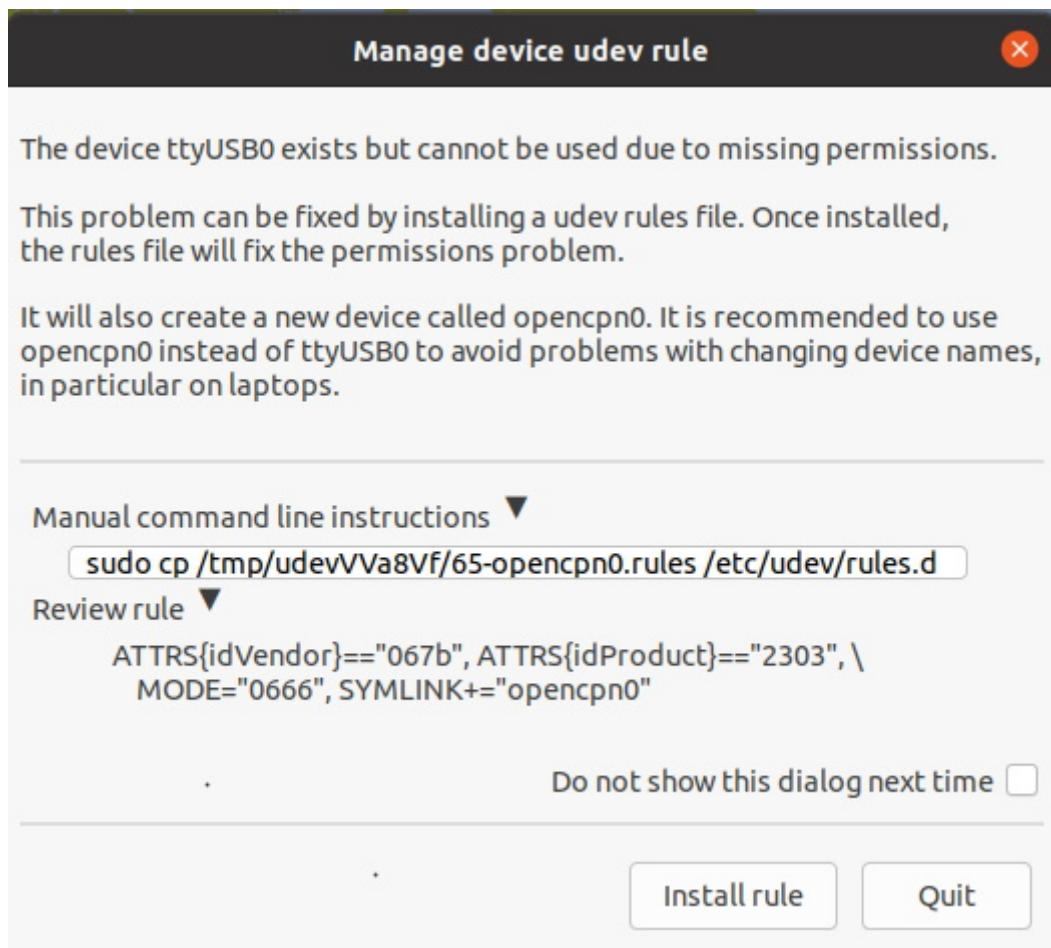
Control checksum Use Garmin (GRMN) mode for input

Receive Input on this Port Output on this port (as autopilot or NMEA repeater)

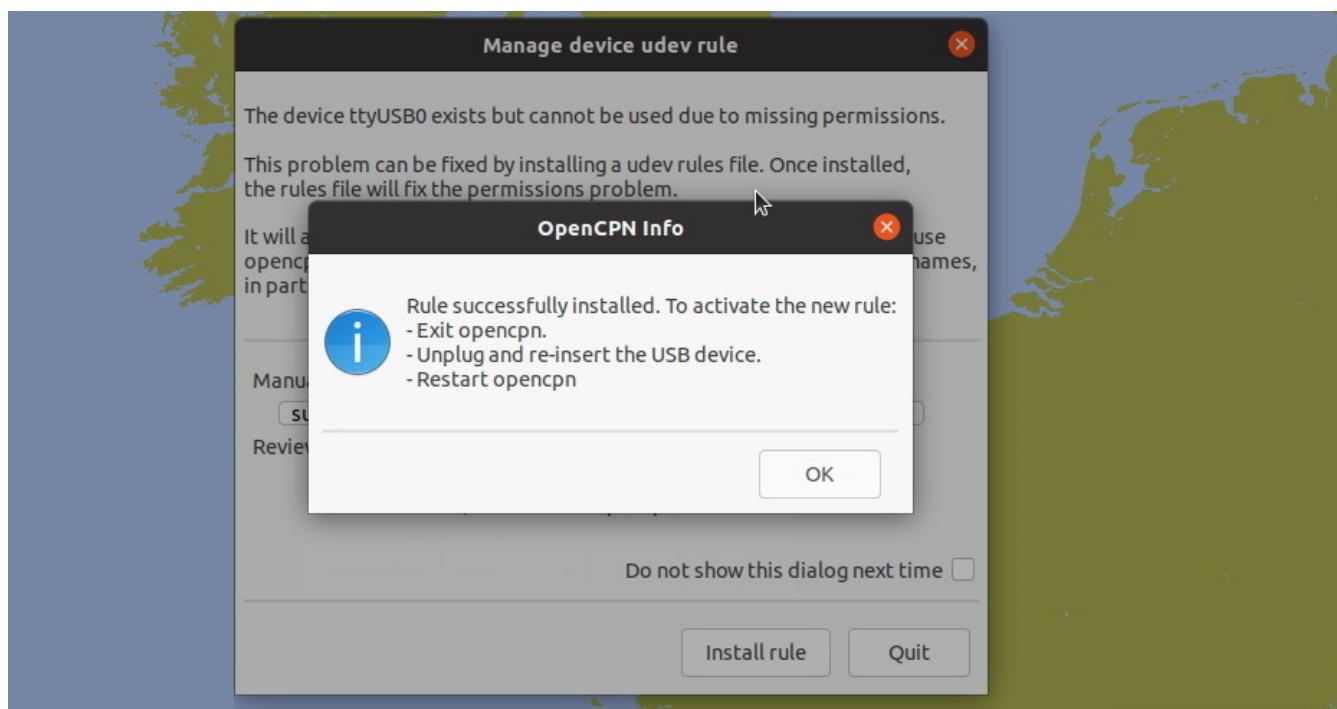
Talker ID (blank = default ID)

[**Apply**] and then tick **Enable** for this connection.

This presents a message about permissions.



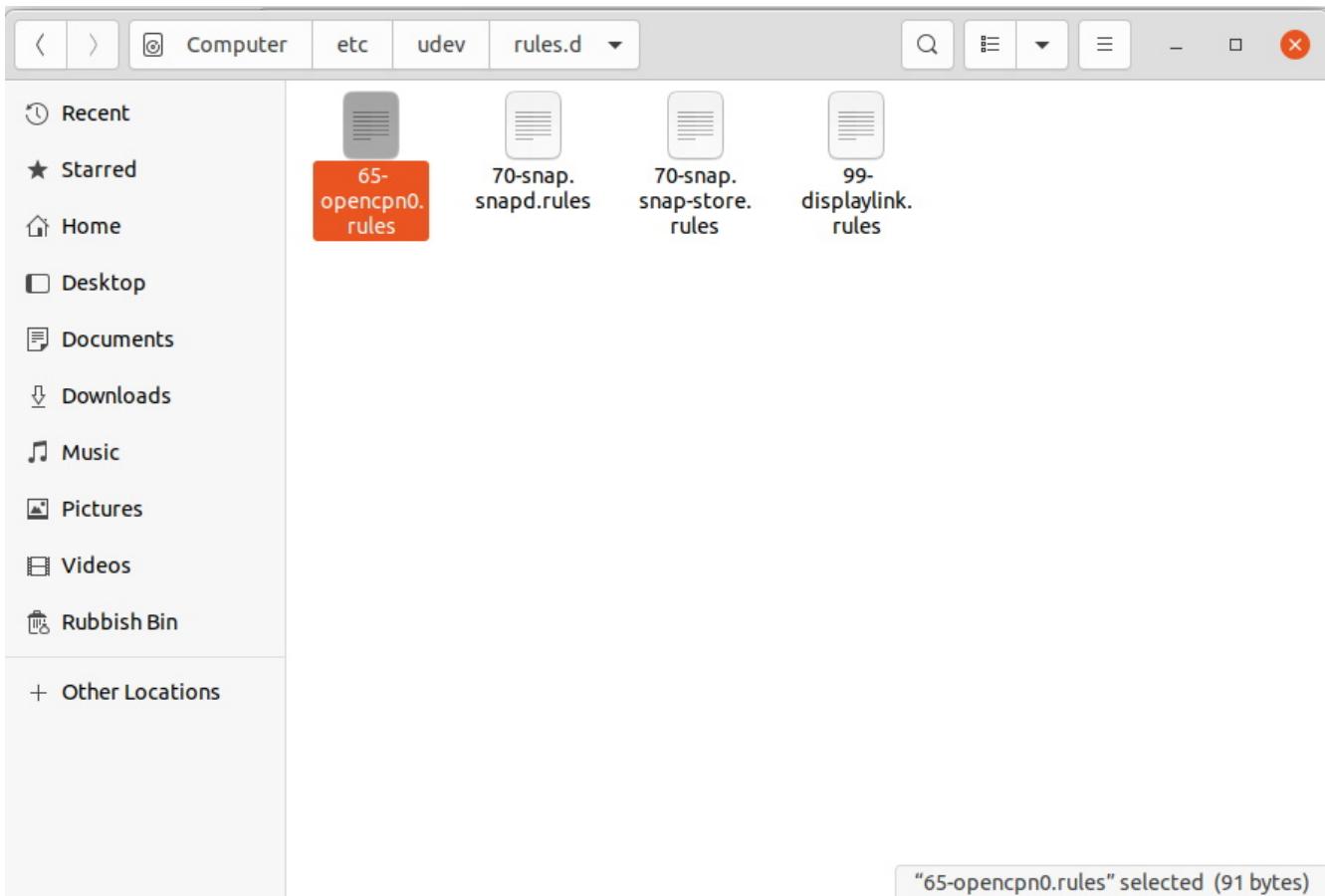
[Install rule]



[OK]

Follow the advice for restarting OpenCPN.

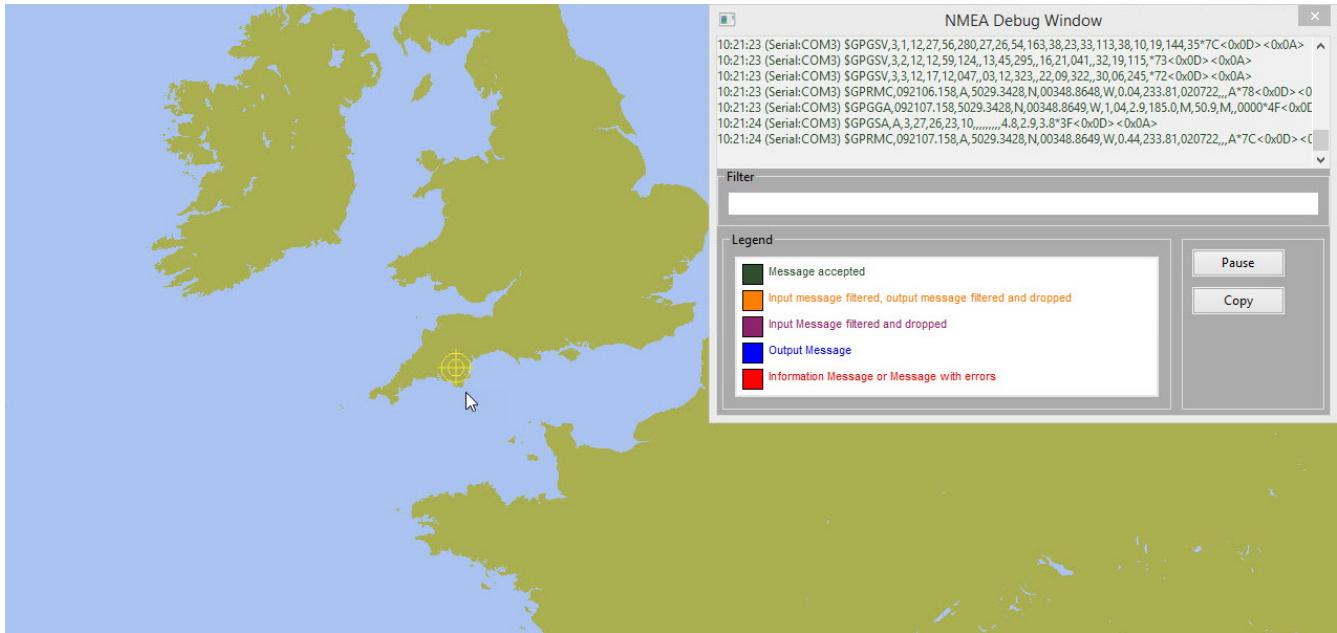
A rule (symlink) has been created for using the GNSS advice.



If you need to remove the GNSS and clean up the installation the symlink can be removed using **Terminal**.

```
mike@mike-Satellite-C660D:/etc$ cd udev
mike@mike-Satellite-C660D:/etc/udev$ ls
hwdb.d  rules.d  udev.conf
mike@mike-Satellite-C660D:/etc/udev$ cd rules.d
mike@mike-Satellite-C660D:/etc/udev/rules.d$ ls
65-opencpn0.rules    70-snap.snap-store.rules
70-snap.snapd.rules 99-displaylink.rules
mike@mike-Satellite-C660D:/etc/udev/rules.d$ sudo rm 65-opencpn0.rules
mike@mike-Satellite-C660D:/etc/udev/rules.d$
```

After restarting OpenCPN and editing the **DataPort** connection to use the symlink **opencpn0** the ship's position appears on the map.



Zoom in and the boat icon appears.

AIS



"AIS Pilotplug to USB" cable



Basic AIS receiver

OpenCPN AIS Settings



To achieve the best performance and avoid cluttering the screen the AIS Target settings need adjusting. This will help in reducing the number of irrelevant alarms.

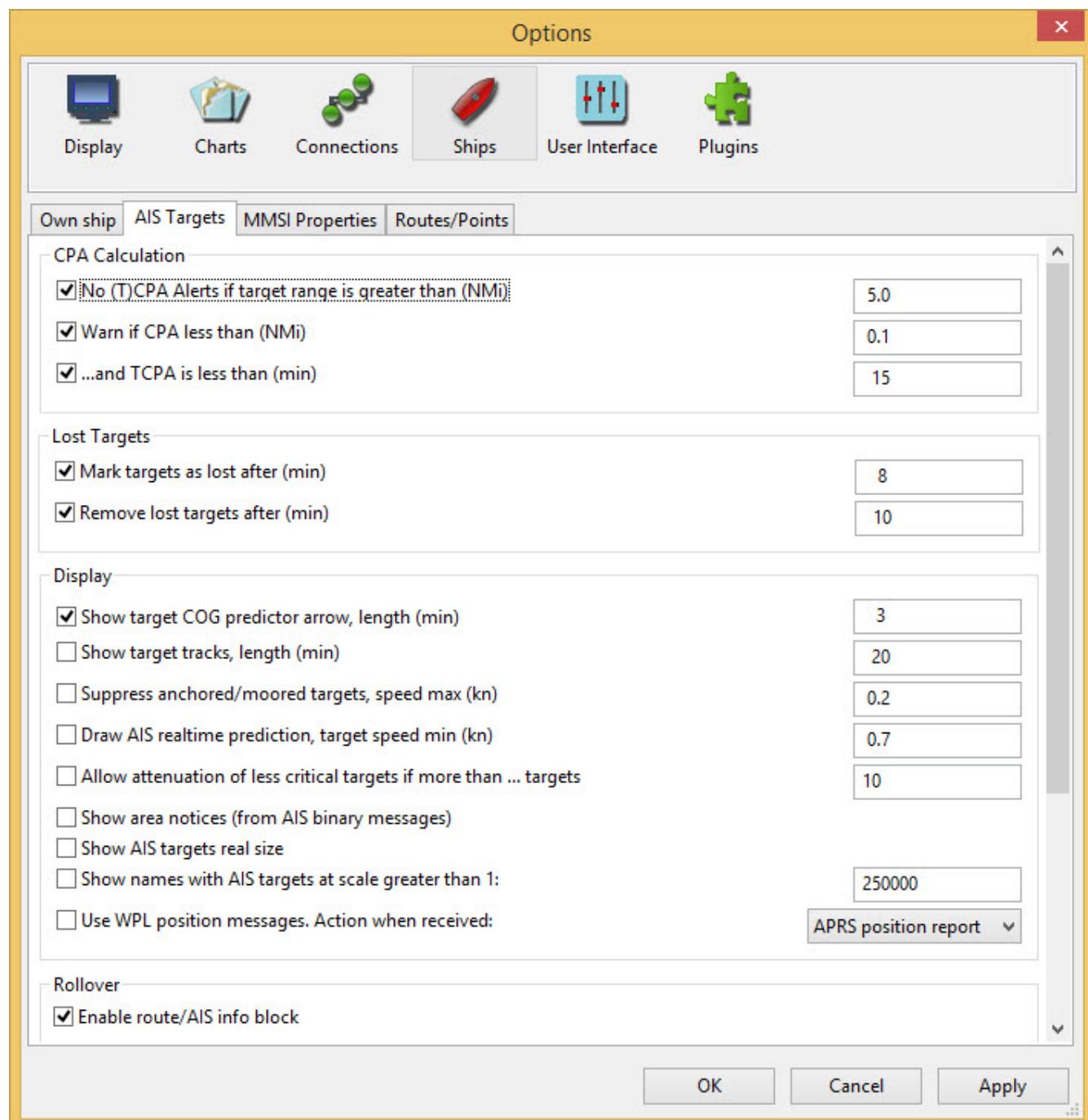
Connecting the AIS

An AIS receiver may be connected in the same way as the GPS. The typical AIS data rate is 38400, instead of 4800. However the easy way is get yourself a "AIS Pilotplug to USB" cable. This will also give you a GPS position (No need for a separate GPS)

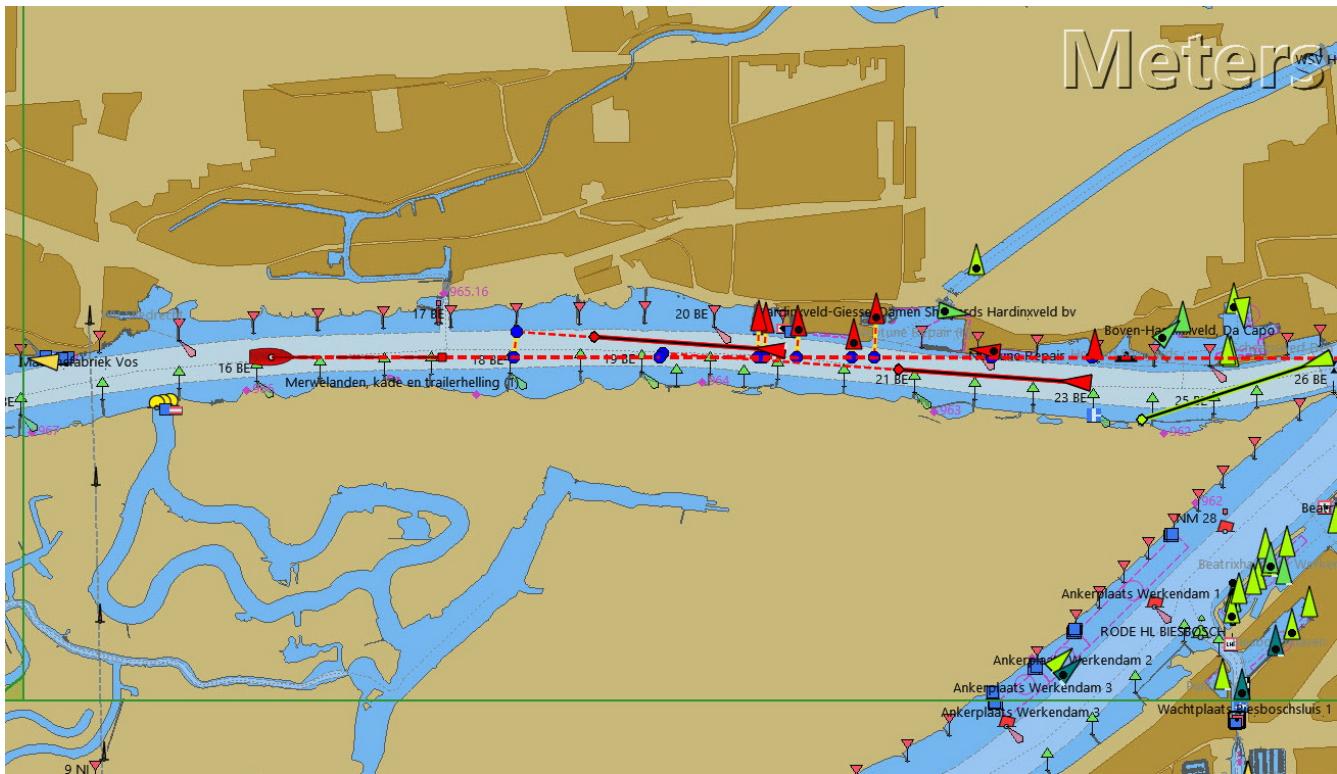
AIS Target Settings

[Options] [Ships]

AIS Targets

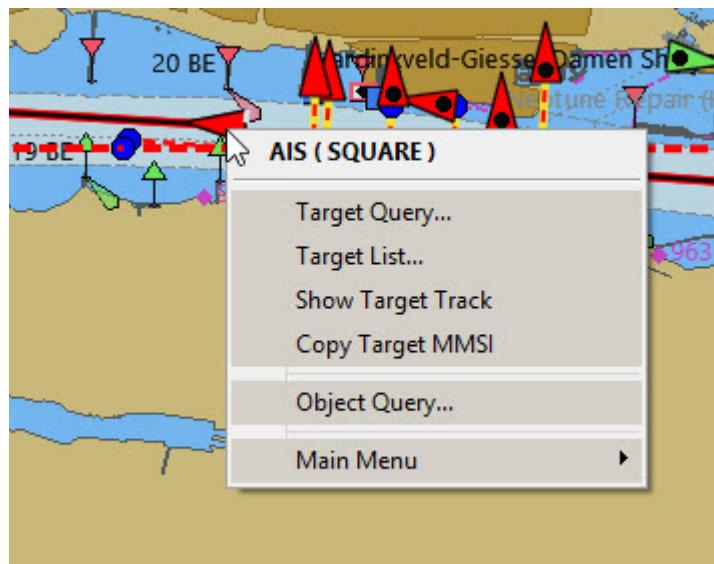


Typical settings are shown.

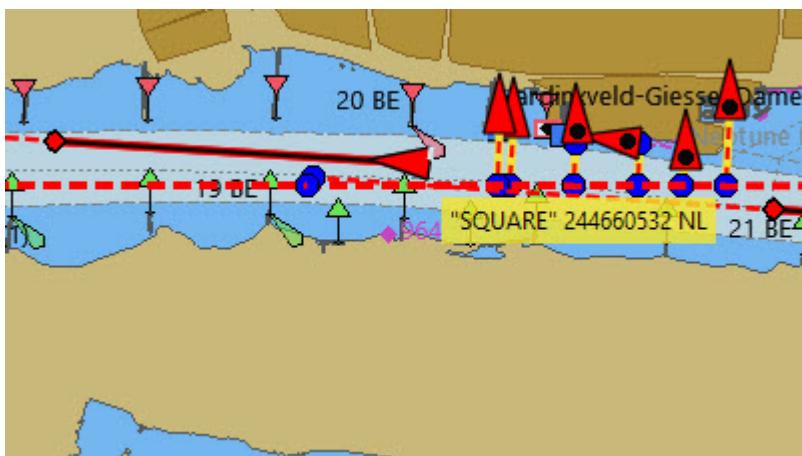


AIS Target Information

right-click



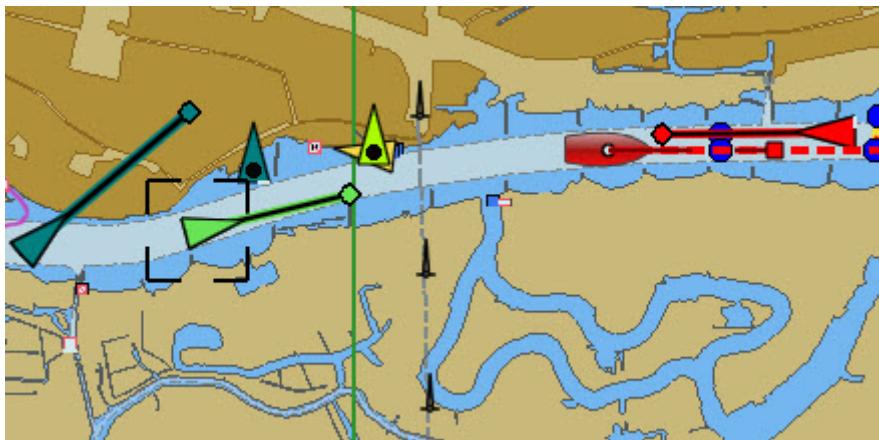
Rollover text shows the name, MMSI number and nationality of the vessel.



Target Query... (Class A AIS)



The vessel of interest is highlighted by a broken rectangle.



Target Query... (Class B AIS)

AIS Target Q... x

HIPPOCAMPUS

MMSI	244070749	Class	B
Flag	Netherlands		
Unknown			
0m x 0m			
Position	Report Age		
52° 31.6746' N	6s		
005° 09.1691' E			
Speed	Course	Heading	
7.40 kts	179°	---	
Range	Bearing	Turn Rate	
---	---	---	

Target List...

AIS target list

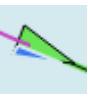
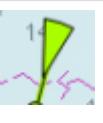
T...	Name	Call	M...	▲	Class	Type	Nav Status	Brg	Range	CoG	SoG	▲
I	YI HANG J...	12Q	413361210	A	Unknown	Underway ...	-	-	-	-	-	
I	LATINA	DC7...	211670030	A	Sailing V...	Undefined	-	-	-	-	-	
I	GOOD HO...		316030325	A	Unknown	Undefined	-	-	-	-	-	
I	ASCENTE	CFN...	316030322	B	Pleasure ...	-	-	-	289	0.0	-	
I	CARPE DIEM	LG60...	258221680	A	Pleasure ...	Undefined	-	-	-	-	-	
I	YUVA		235068705	B	Unknown	-	-	-	-	0.0	-	
I	MODI		211669950	A	Unknown	Moored	-	-	-	-	-	
I	HARTELST...		244900072	A	Unknown	Undefined	-	-	-	-	-	
I	HINOMINE		431008467	A	Unknown	Undefined	-	-	-	-	-	
I	WHITE LO...		211522450	A	Unknown	Undefined	-	-	-	-	-	
I	LYDIE		338347484	A	Pleasure ...	Undefined	-	-	-	-	-	
I	MOON DA...		338396623	A	Pleasure ...	Undefined	-	-	-	-	-	
I	MX5	2JPD3	235117759	B	Pleasure ...	-	-	-	344	0.0	-	
I	NORTHER...	A8M...	636091385	A	Cargo S...	At Anchor	-	-	052	0.2	-	
I	SEAYOU! (...	FAG...	227989940	A	Sailing V...	Undefined	-	-	-	-	-	
I	IRISH ROVER		338249086	B	Unknown	-	-	-	-	-	-	
I	SALTY CREW		316030117	A	Sailing V...	Undefined	-	-	-	-	-	
I	AH0370RU...		273214360	A	Unknown	Undefined	-	-	-	-	-	
I	MOONSTO...		368038210	A	Unknown	Undefined	-	-	-	-	-	
I	KALLISTI	SVA...	239885900	A	Pleasure ...	Undefined	-	-	-	-	-	
I	SANDVIKNES		257238320	A	Unknown	Undefined	-	-	-	-	-	
I	BLUE EAST	9HA...	248685000	A	Pleasure ...	Moored	-	-	062	0.0	-	
I	ROGUE	ROG...	503121630	A	Unknown	Undefined	-	-	-	-	-	
I	RIO GRANDE	PF99...	244260857	A	Unknown	Undefined	-	-	-	-	-	
I	TAUMAR	LFWM	257090830	A	Cargo S...	Moored	-	-	098	0.0	-	
I	JASMINE L...	2JO...	235117618	A	Pleasure ...	Undefined	-	-	-	-	-	
I	2 N-JOY	PB77...	244850690	A	Pleasure ...	Undefined	-	-	-	-	-	
I	CATHIMA	PDV/D	246522000	A	Cargo S	Undefined	-	-	-	-	-	

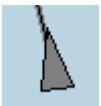
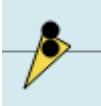
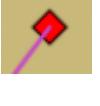
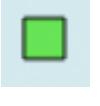
Target info
Center view
Create WPT
Hide All Tracks
Show All Tracks
Toggle track
Copy MMSI
 AutoSort
Limit range: NM

Target Count

Interpreting AIS Information

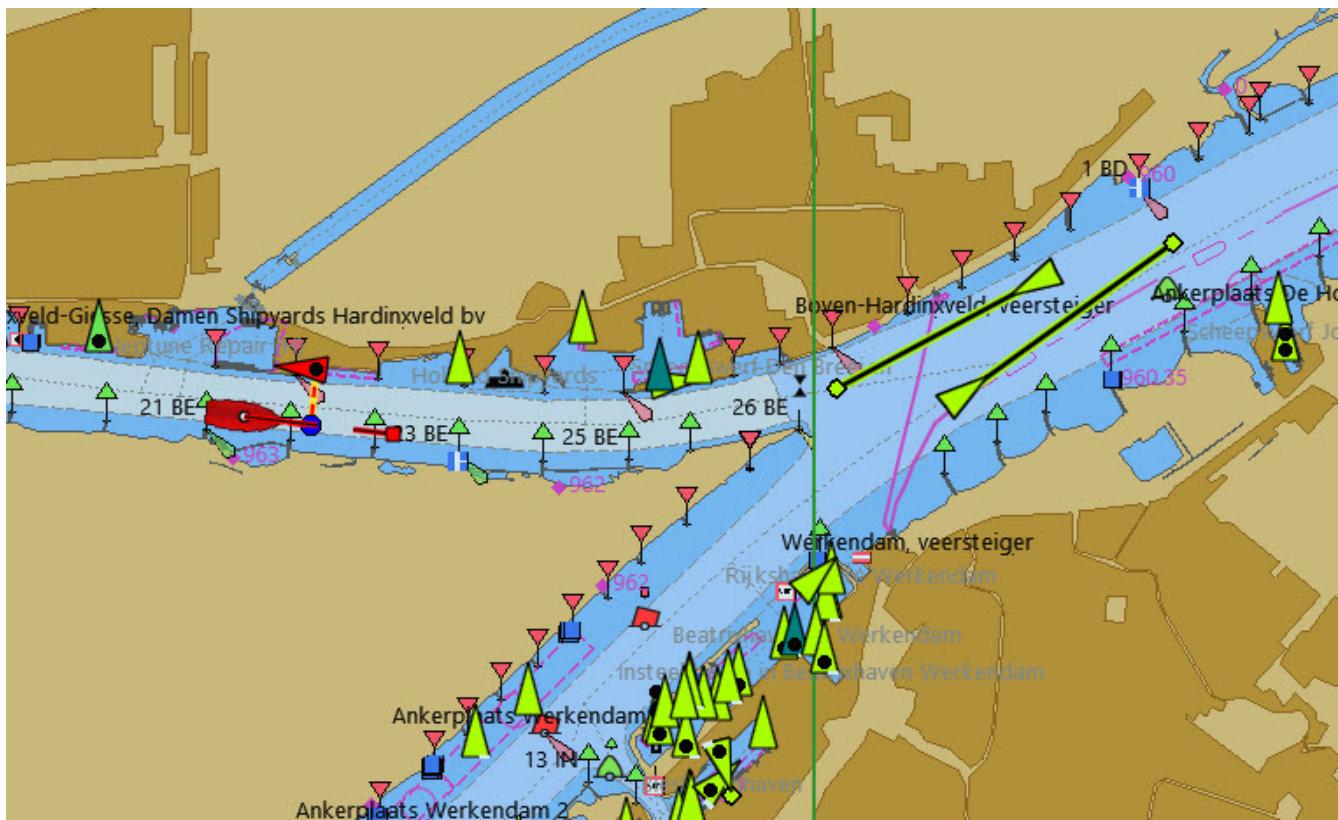
AIS_Icon	Information	AIS_Icon	Information
	An active AIS SART and is a distress call equal to a “Mayday” transmission. More about AIS sart .		The V-shape stern indicates a Class B target. Tugboats and pilot boats very often carry Class B transponders. These are often designed specifically for small commercial boats, fishing boats and pleasure crafts.
	Icon displayed when testing an AIS-SART device.		Targets is complying with the Euro AIS Inland specification.

AIS_Icon	Information	AIS_Icon	Information
	Aircraft participating in Search and Rescue.		This vessel has the “Inland Blue Flag” set, it’s a part of the European, Inland AIS standard. The “Blue Flag” signal, commonly seen on inland waters, indicates that the vessel requests a “stbd-stbd” passage or crossing. This Blue Signal is manually switched on/off, by the target.
	Potential Danger.		Aton, Aid to Navigation, for example a Lighthouse or a Buoy with an AIS transmitter.
	No Danger. Not Identified (Voyage data not received)		Aton, Aid to Navigation, that is off its supposed position. For example a buoy equipped with AIS that has come adrift.
	No Danger. Not Identified (Name from cached data)		Virtual Aton, Virtual Aid to Navigation, not a real marker. Can be useful for a range of situations. A new wreck, is one example. Further explanations.
	No Danger. Identified		Virtual Aton, off position. Actually seen in the wild, but may be a user config error. (Old style display.)
	Lost Target		AIS Base Station

AIS_Icon	Information	AIS_Icon	Information
	Ship which has lost fix - position unavailable. Displayed at the last known position.		The following targets only displays if DSC messages, GpsGate messages, Radar or APRS messages are mixed in to the incoming AIS stream, by using, for example a multiplexer. More on the following pages.
	Vessel not under command.		DSC Station. Only the DSC message received. The position contains only degrees and minutes of Latitude and Longitude.
	Vessel restricted in ability to manoeuvre.		DSC Station. DSC and DSE messages received. The DSE message contains the missing decimals of minutes of Latitude and Longitude. The result is a much more accurate position.
	Vessel constrained by draft.		DSC Station transmitting a distress signal. Treat this as a "Mayday" call.
	Vessel aground.		GpsGate Buddy target.
	Vessel engaged in fishing.		ARPA Target
	High Speed- and Wing In Ground- crafts. This includes Hydrofoils, Hovercrafts and low flying crafts utilising the ground effect.		APRS Target

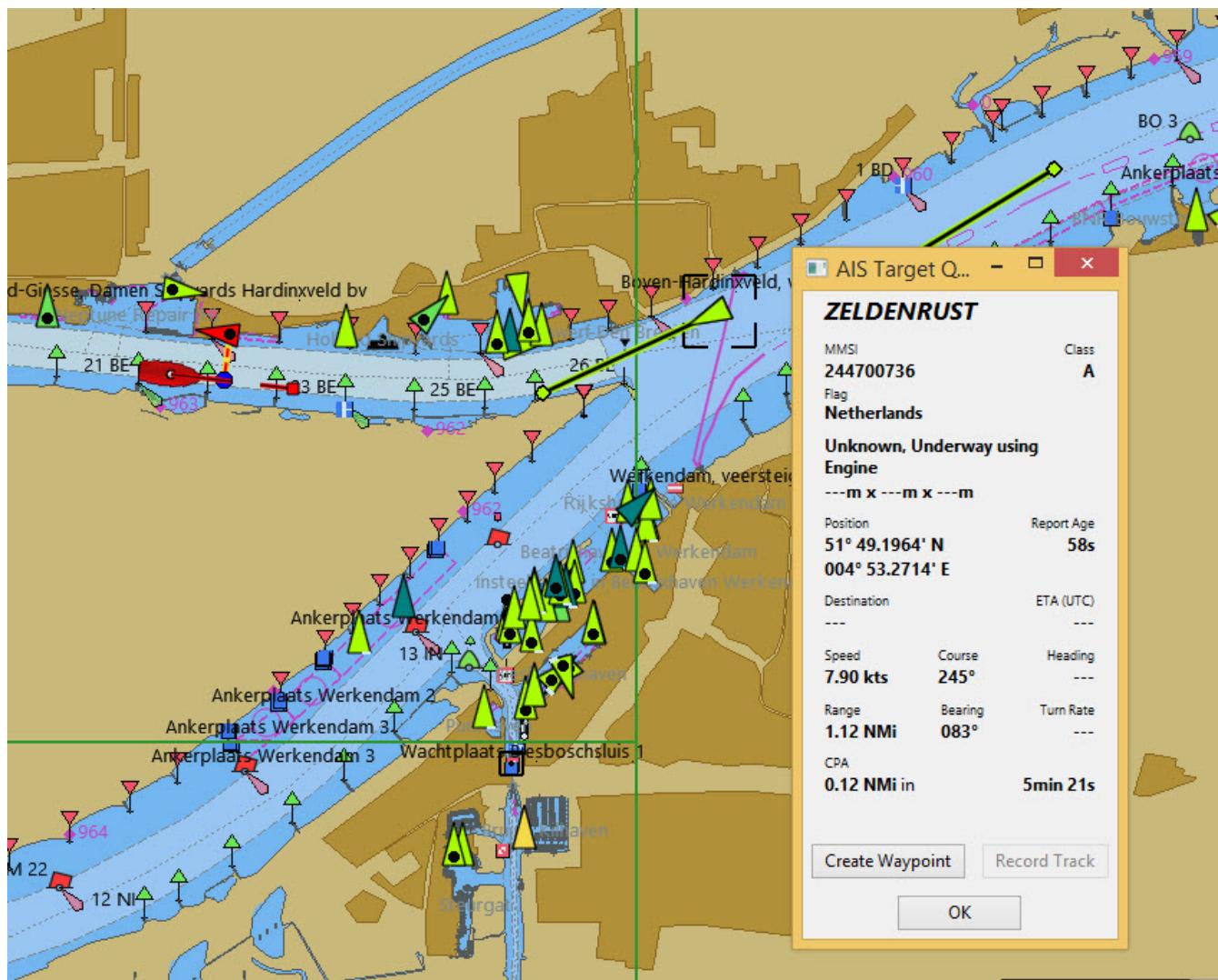
AIS_Icon	Information	AIS_Icon	Information
	Anchored or moored. Displayed when the transmitted “Navigation status” is “at anchor” or “Moored”. There is no guarantee that this status is correct, as it is set manually on the transmitting ship...		...illustrated by this ship. Note the black line on the yellow circle. This indicates that the vessel is turning to port (left), also illustrated by the lag in the display update. ROT - Rate Of Turn is available in the “Ais Target Query” dialog, through the right click menu.

AIS Examples

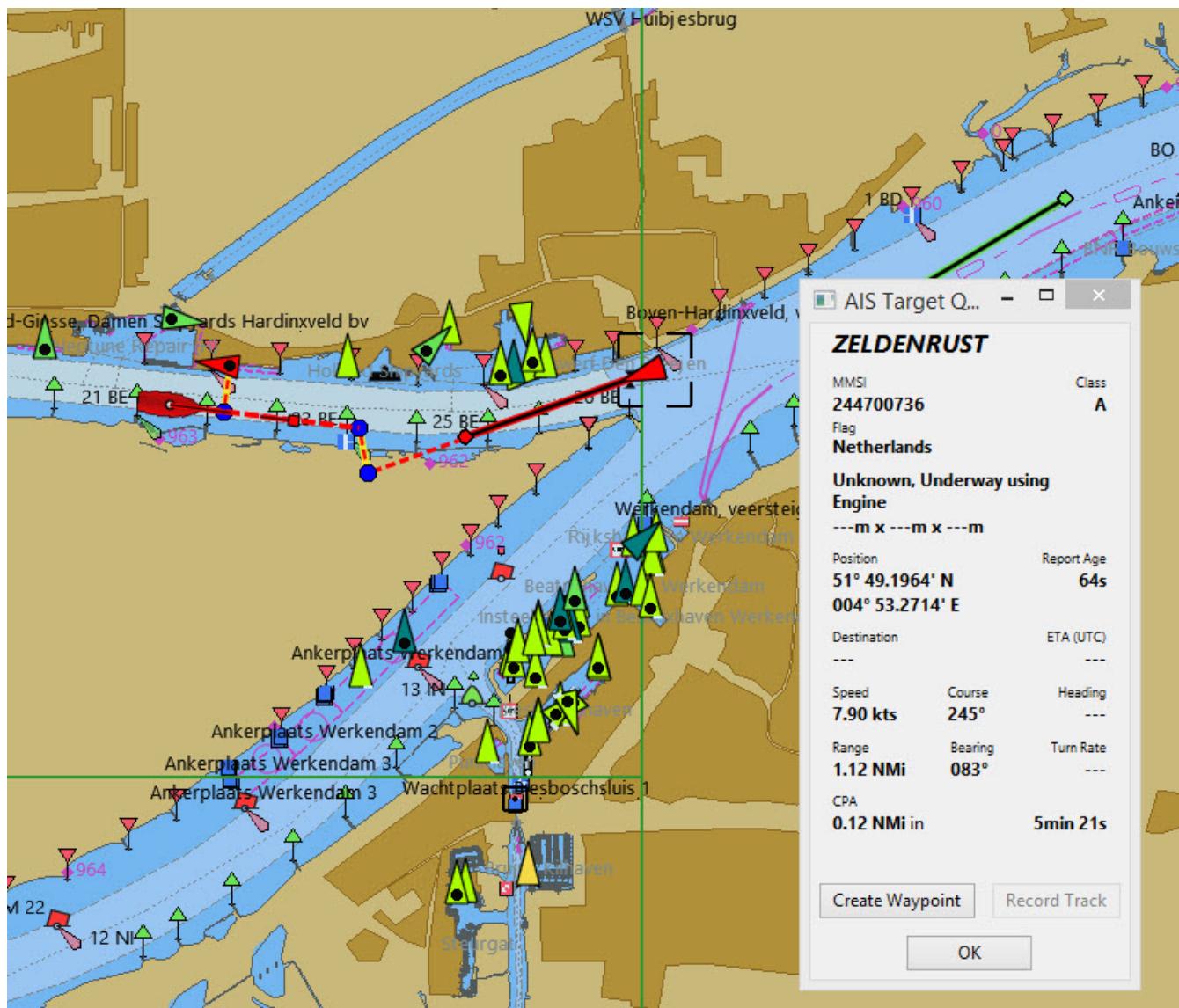


A vessel at the junction appears to be altering course to enter 'our' canal.

right-click



The vessel is identified.



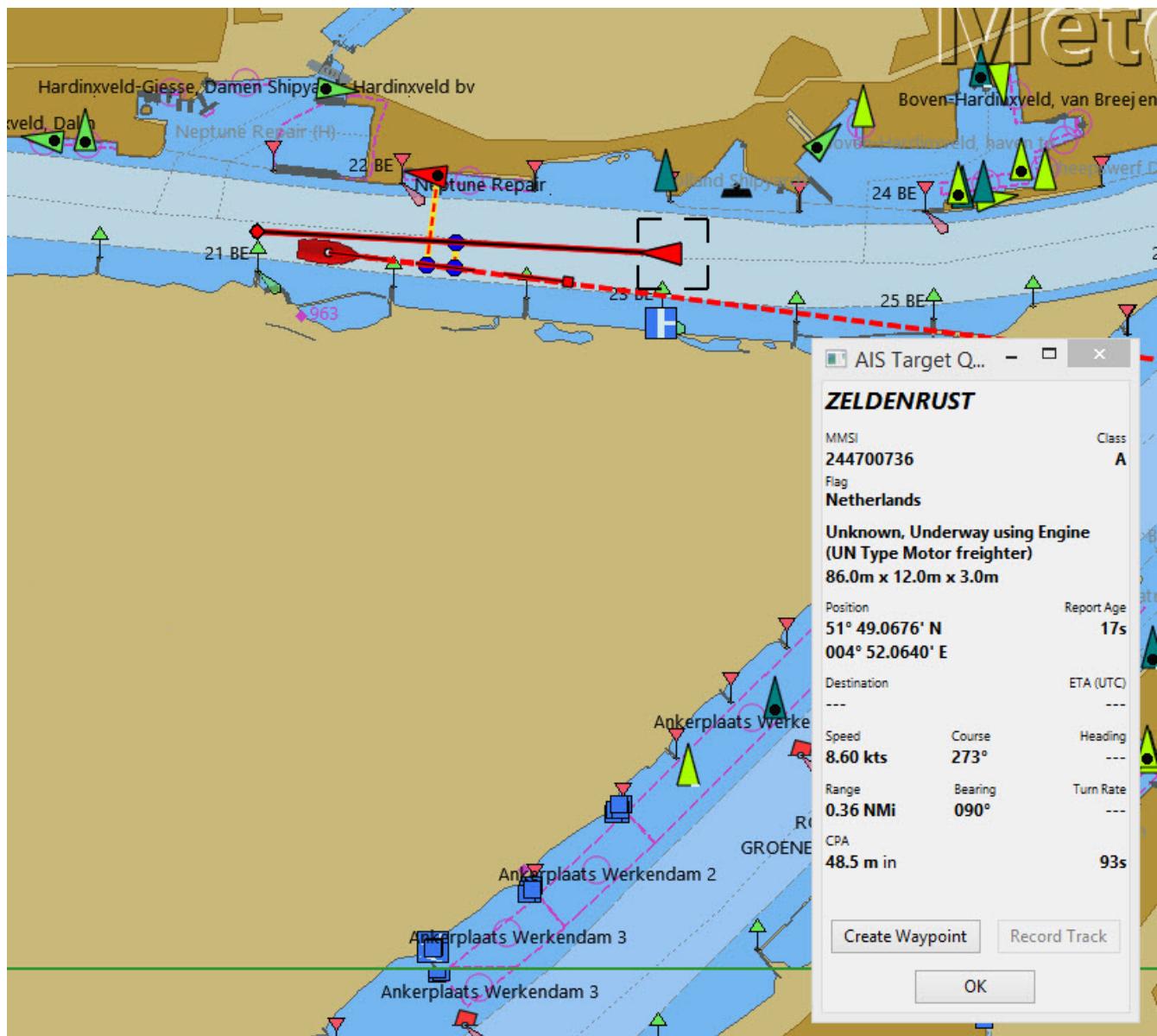
'Zeldenrust' is a potential danger and has triggered a warning based on the settings entered in OpenCPN.

COG predictor arrow length is set at three minutes.

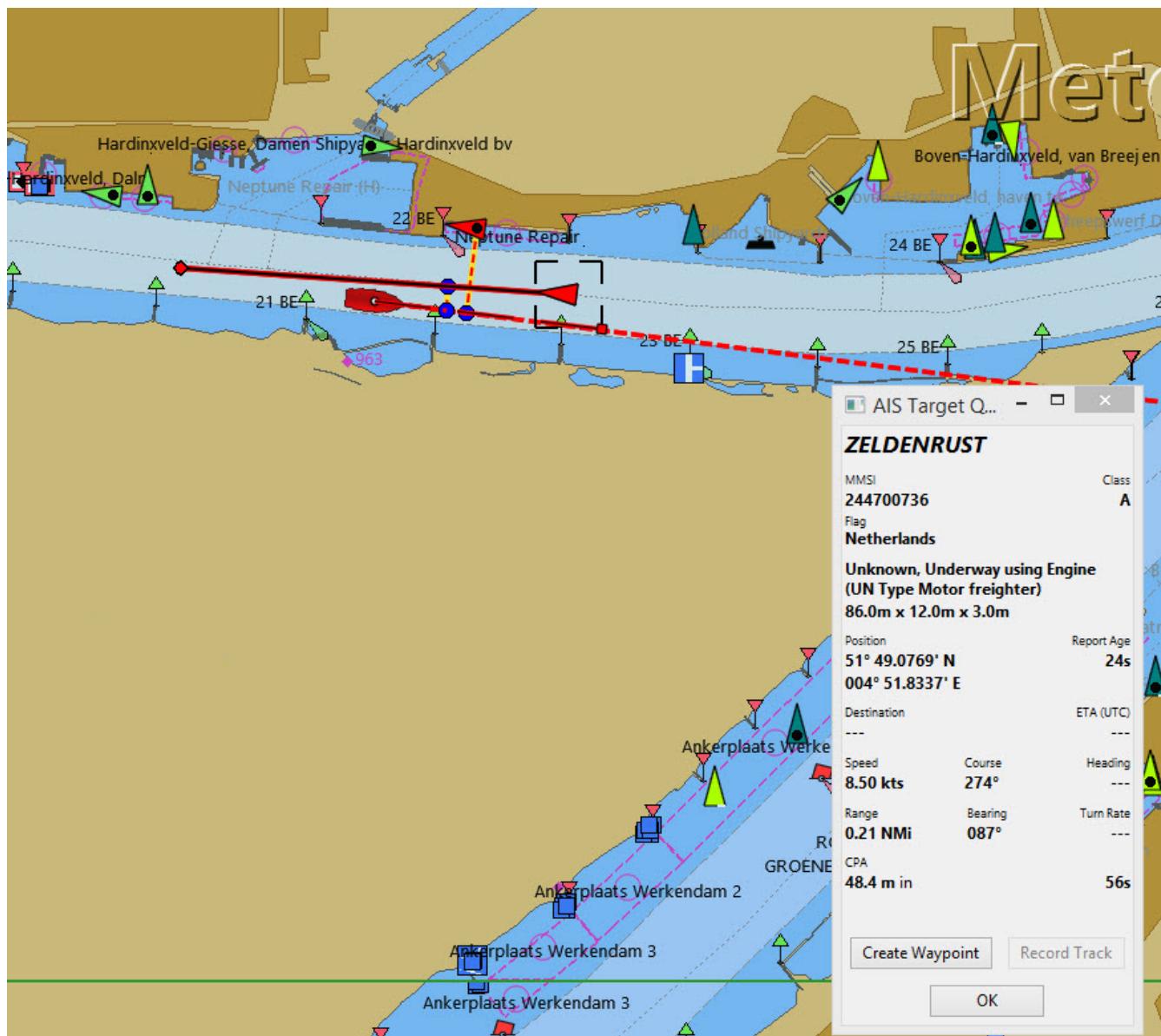
There is a red dashed extension line of the COG predictor which helps provide an estimate of time to CPA, if *target query* has not been used.

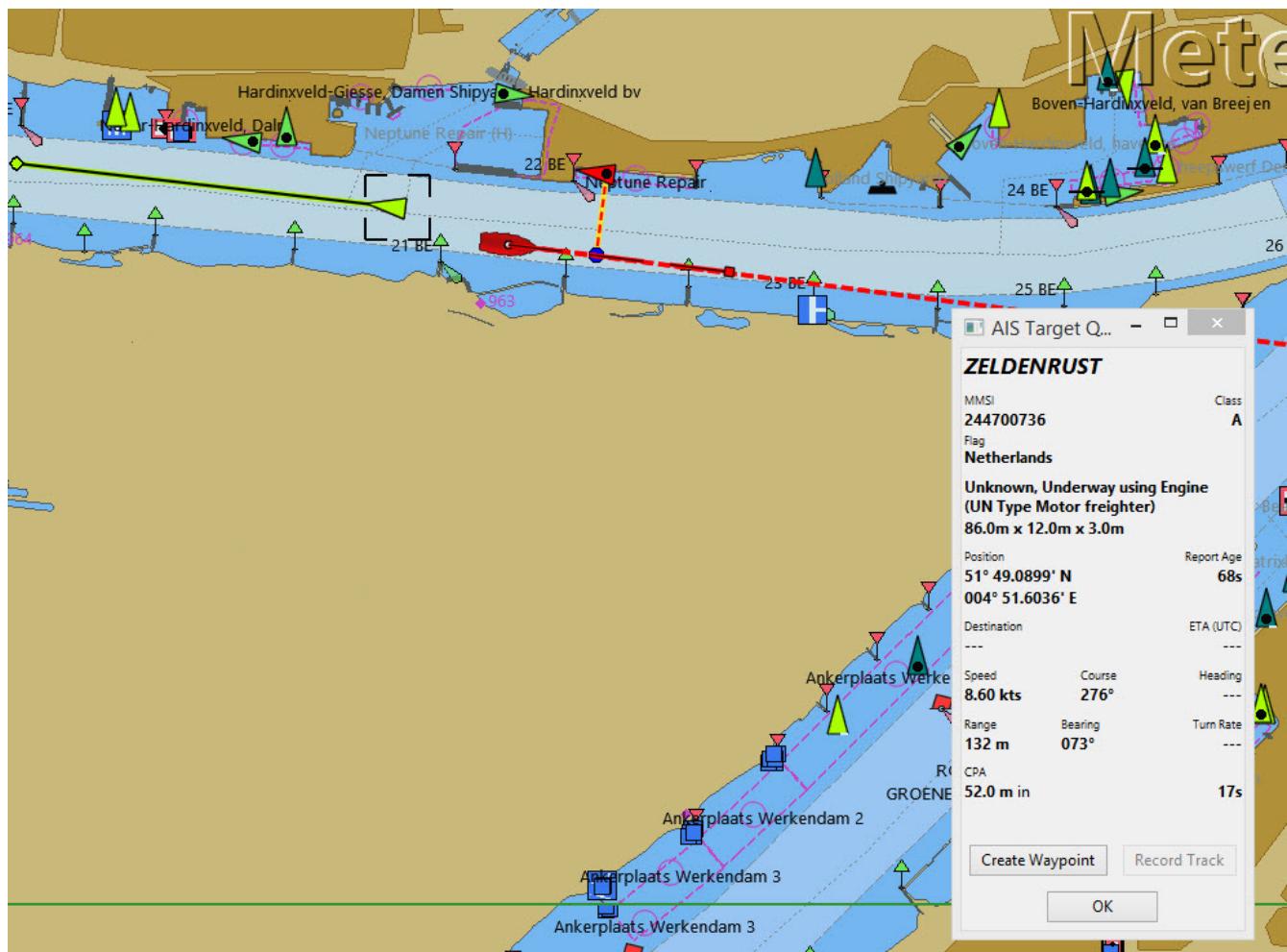
Estimated positions of the vessels at CPA are shown by the blue dots.

The yellow highlighted line indicates the distance off at CPA.



'Zeldenrust' has turned further and will now pass down our port side. CPA 48.5m.





'Zeldenrust' is past and clear.

The vessel at 'Neptune Repair' is a potential danger but she is moored.