

Note:

The USPS Educational Leadership, for the benefit of USPS members, have decided to change the Advanced Grades courses to include marine navigation software that is state-of-the-art and in wide use by commercial as well as recreational boating enthusiasts. This change has been incorporated into the America's Boating Course, 3rd Edition (ABC3), and into the offshore navigation courses.

This Piloting Appendix B Replacement provides the change from the Rose Point Coastal Explorer CD to OpenCPN software for the Piloting and Advanced Piloting courses.

Piloting Appendix B Replacement Overview of *OpenCPN*

- 1 *OpenCPN* is an advanced marine navigation program, available to both the recreational boater and the professional skipper. Through a standard NEMA hookup, *OpenCPN* interfaces with AIS and GPS. Other features include exporting routes for transfer to GPS, and tides and currents displays.
- 2 For this course, we are not able to directly interface with AIS, autopilot, GPS, or other electronic navigation equipment due to the limitations of working in a classroom environment. However, once you learn the basics of how this software works, you should be able to extend your knowledge to take advantage of having your electronics interfaced into *OpenCPN* software on an actual voyage.
- 3 **Getting started using OpenCPN consists of 3 basic steps:**
 1. Installing *OpenCPN*
 2. Installing Charts to be read by *OpenCPN*
 3. *(Optional) *Setting Up GPS* to "talk" to your computer and *OpenCPN*

Completing the first two steps will get you started and allow you to check out the program. Later, after exploring the program, you may want to read through the *Basic Features* and *Advanced Features* sections of the User Manual to really get a good grasp of what the program offers. If you still have questions or would just like to get in touch with other *OpenCPN* users, there is also a fairly large community behind *OpenCPN*. You can find substantial amounts of additional information at the "Cruisers Forum" at www.cruisersforum.com/forums/f134/.

Installing *Open CPN*

- 4 Type <http://opencpn.org/ocpn/download> into your internet browser and hit "enter". When the *Download OpenCPN* page opens, you can select the software to download based on your personal computer's operating system. On the left side of the page, you may also want to identify and open the on-line User Manual. This is the Documentation for the *OpenCPN* 3.2 stable release, including Service Release 3.2.2. There are various tips that may help you with the software installation in this Manual. All serious users need to read through this document to fully understand the scope of the program, as well as all the details. Your browser's "find" option may also be of assistance.
- 5 After successfully downloading and installing *OpenCPN* on your computer, launch the program. At the top of the page, you will see a group of icons. Press  and then the help tab to access this built in version of the User's Manual. Except for the table of contents, links in italic are internal to this document. Other links will need an Internet connection. The installed documentation will open in your default browser. There have been some problems using Internet Explorer to open the User Manual directly from the program. If you do not want to change Browsers, you should make the User Manual a favorite on your computer and access it directly on the internet.
- 6 Note that this software is free to all users; however, the continued development of the software needs financial support. It is your choice to make a contribution to the ongoing project as requested in the documentation.

Installing Charts

- 7 Per the 2002 edition of Bowditch (p 412), the potential danger to the mariner increases with digital charts because by zooming in, he can increase the chart scale beyond what can be supported by the source data. The constant and automatic update of the vessel's position on the chart display can give the navigator a false sense of security, causing him to rely on the accuracy of a chart when the source data from which the chart was compiled cannot support the scale of the chart displayed.
- 8 *OpenCPN* does not come with any pre-installed charts. It is up to the user to find and install charts; however, *OpenCPN* comes with a worldwide background map, displayed if no charts are available for an area. To install charts, *OpenCPN* must be pointed to a directory containing Charts of one of the recognized Chart Formats. Don't point *OpenCPN* to individual charts. You must specify the directory that contains the charts. For this course, you will download free NOAA raster charts and keep them in a folder named Charts or

BSBChart. You may create this folder on your desktop, in My Documents, or on the C drive. That is your decision, but you need to know where the folder exists. To create a chart folder on your desktop, right click on the desktop and select “New” and then “Folder”. By right clicking on the file and selecting “rename” you can type in a name for your file. We suggest that you use the name Charts or BSBChart (since that is the format used by NOAA). *OpenCPN* also works well with vector charts that also can be downloaded free from NOAA. Downloading Vector charts is a very similar process to that described below for Raster charts. See the User Manual for more detailed information about loading and using Vector charts. Both Vector and Raster charts may be used at the same time.

- 9 To download charts from NOAA, visit <http://nauticalcharts.noaa.gov/> and select: “Nautical Charts & Publications” (in BLUE strip). Select “Raster Nautical Charts” under “Nautical Charts & Products” and then Click on “Download Free RNCs”. Review usage agreement, scroll to the bottom of the page, and click on “proceed to chart downloader”. Click on “NOAA RNCs” to go on to the downloader page.
- 10 Although you may download individual charts, or selected individual charts, we will download charts by individual States as needed. Let’s start with the State of Florida. In the “RNCs by States” section, click on FL to download all the charts for Florida including certain large scale charts in the Gulf of Mexico.
- 11 Scroll to the bottom of the user agreement and click ‘OK’ to the user agreement. (You may need to maximize the screen to see the ‘OK’ button.) Click “save” if the file download window opens and choose “desktop-Charts” for saving the file. With Windows 7, the file may be in the “downloads” folder in “My Documents”, or in the bottom left corner of the ‘Chart Downloader’ page. If so, you can hold the mouse button down and drag the file to the ‘Charts’ folder on the desktop. Double click the folder on the desktop to open it. Double click on the zip file that you downloaded. It will have the name FL_RNCs; when you double click it you should see “BSB_ROOT”. You must now select ‘Extract all files’ and keep the name of the target folder the same. After extracting you can close the various open files. To confirm that the file is unzipped, double click you Charts folder. Both the zipped and unzipped file should appear; you may delete the zipped file if you would like to keep your folder uncluttered.
- 12 Launch *OpenCPN* and then open the Options Dialog in the Toolbar by clicking  located along the top left side of the screen. (See paragraph 46 for more about the Toolbar). It will open under the first tab, "Display". Select and left click the box "Show Chart Outlines". That will help you visualize the loaded charts. You may also want to click on the box “Chart Quilting” at this time as well so that your charts meld together. See figure 1.

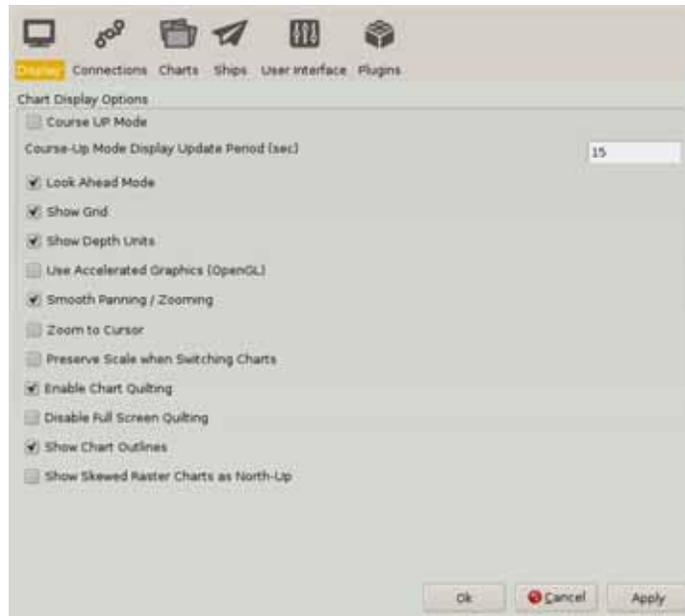


Figure 1.

13 Now click "Charts" and then "loaded Charts" and you will see the screen shown in Figure 2.

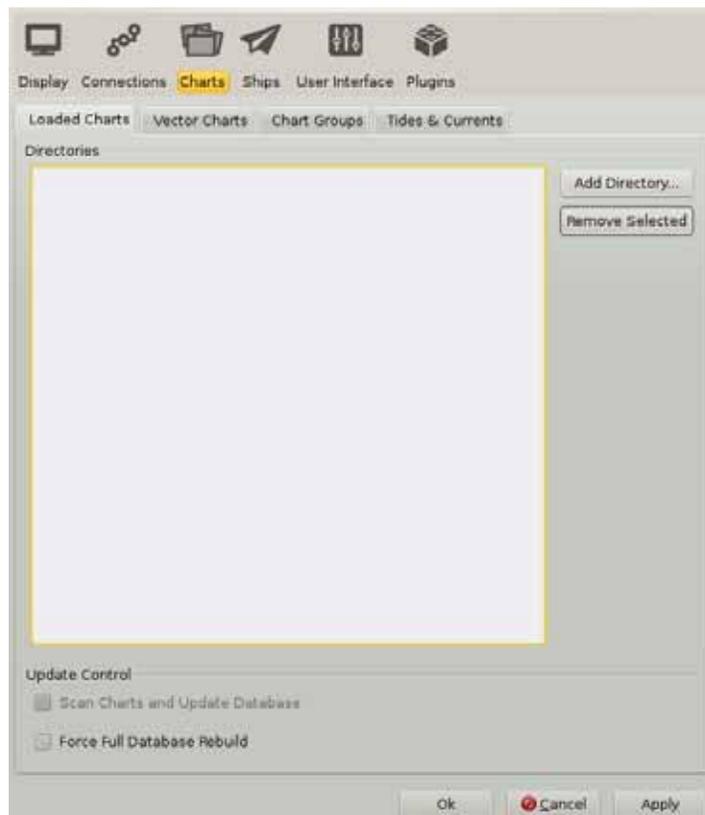


Figure 2.

- 14 There are no charts loaded initially with the exception of the World Chart. To add charts we have to add a directory that contains charts of a recognized format. To get started press "Add Directories" and navigate to your chart-directory that you created on your desktop, named "Charts" or "BSBChart" and click it. It should open and show you the FL_RNCs folder. All that remains is to select it, click OK, and then click the "Apply" button at the bottom of the "Options" page. *OpenCPN* will then process your selection and you can start using your charts. When you are finished with your settings click "OK" and the Options Dialog closes.

Start using your charts

- 15 To navigate around, you can click and drag the chart with your mouse. The cursor changes to a triangular green arrow near the edges of the *OpenCPN window*; left clicking in this situation, pans the chart in the direction of the arrow. The scroll wheel zooms the chart in and out. Left clicking anywhere centers the view on that position. Right clicking brings up a menu with useful actions. Exactly what the menu contains depends on the circumstances. Read the User Manual for a full explanation.
- 16 If you are running *OpenCPN* for the first time you may see the background chart instead of the charts you installed. That simply means *OpenCPN* is pointed at a location that is not on any of the charts you installed. Click and drag, or use the arrow keys, to move the view-point to the location of one of your installed charts as described under "**a few hints**" in the User Manual. Look for the rectangular outlines of the installed charts. An alternative is to right-click, and then click "Jump to position". Enter a location that is within the perimeters of your entered charts. The first time you start *OpenCPN* the view will be centered on Georgetown in South Carolina. **Single Chart Mode** is the default display mode. In this mode only one chart at a time will be displayed. All the information printed outside the chart proper can be read. To change to another chart, select and click in the Chart Selection Bar. Read more in *Status Bar*. The other display mode is *Chart Quilting*.
- 17 *OpenCPN* is a fully functional navigation program with a lot of capabilities. The best way for you to learn this software package is to work through the practice examples included in this chapter. The following section will help you get started learning this software package and provides information on most of the features you need for this course.

Moving Around the Charts

18 **Panning and Centering.** It is easy to reposition and scroll the chart. Left click anywhere on the chart and the chart will center itself on the screen at the location you clicked. By holding down the left mouse button while moving the cursor, you can also reposition the chart.

19 **Zooming In and Out.** There are several ways to zoom in and out. Use the Zoom   buttons along the top left side of the screen. Each time you click, the chart is zoomed in or out. You can also right-click at the point on the chart that you want to zoom. Select scale in or scale out from the drop down menu.

You can also move the cursor to the point on the chart that you want to zoom and press **F7** or the + (plus) key to zoom in and press **F8** or the – (minus) key to zoom out. On your mouse, you can use the scroll wheel to zoom in or out.

For zooming in smaller steps try:

Ctrl + for fine scale zooming in.

Ctrl - for fine scale zooming out.

Ctrl + scroll wheel, zooming in/out in small steps.

If you zoom in too much there will appear a warning "**OverZoom**" in the upper left part of the chart area. This means that you have zoomed in way too far, and the program is using the chart at a scale that was never intended, and that is not supported by the original survey. No new information will be seen, and the situation is potentially dangerous as it could give the impression of increased distance between dangers.

20 **Switch to Larger or Smaller Scale Chart.** To switch scales, use the second set of buttons from the left in the top row, or use the F7 and F8 keys. You can also click on the blue buttons at the bottom of the page.

21 As you move the cursor around the chart, note that the actual latitude and longitude of the cursor's position is displayed at the bottom of the chart. This is especially useful when you are attempting to locate a specific position for a Mark.

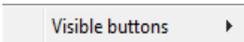
Charting Preferences

- 22 You have the option to change the settings of your charts. To adjust these settings, from the menu bar click  **Options**, then select **Display**. One feature that is helpful is **Enable Chart Quilting**. Chart quilting is a way to display parts of several charts together on the screen, redrawn to the same scale. Once quilting is on in the **Options/Display** menu, F9 becomes a toggle switch to temporarily get into single mode display. Zooming in, automatically brings up larger scale charts, if available. Panning reveals a continuous quilt of the available charts. For this class, it is recommended that you enable chart quilting.
- 23 The "quilt reference chart" is the left-most, largest scale chart, highlighted in the chart bar shown in figure 3. This is the left button of the two pale blue chart buttons above. Click the next chart blue button "one-to-the-right" of the of the current reference chart. The reference scale of the quilt will be decreased, but the viewpoint will not change. The same logic applies if clicking a chart-to-the-left of the present reference chart, except that the scale of the quilt will increase. Zooming in/out will also move the reference chart to the left/right.



Figure 3.

Toolbar Buttons

- 24 The Toolbar is floating and can be placed anywhere on the screen, vertical or horizontal. Note the "grabber" symbol at the far right side of the toolbar. (It is hard to see; move the cursor along the Toolbar and look for vertical white dots at the extreme right end in the whitish gray area). Use this handle to drag the toolbar wherever you want it. The default position is horizontal and docked top left. It "snaps" to the edges. Right click on the grabber, and the toolbar shifts to vertical format. On Windows (at least), unless in OpenGL (Graphics Library) display mode, the toolbar dims down transparently until you roll over it.
- 25 There are a lot of buttons available in the standard Toolbar (and more counting the many plugins). To control exactly which buttons to display, hold the cursor over any button and right-click. First you see this pop up, . When you move your cursor over the box to the right, the dialog box shown in figure 4 appears.

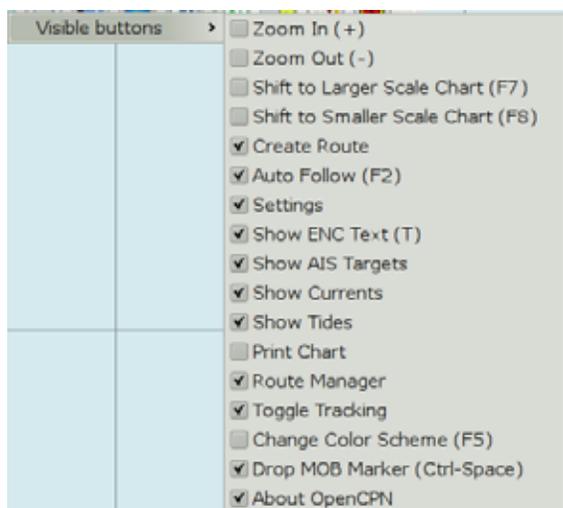


Figure 4

26 Only the buttons with a ticked box in this dialog will be displayed. The available shortcuts are also shown in parenthesis to the right of the button description. When a toggle button is pressed, it changes and becomes darker, Traditional style also adds a stronger outer frame. A brief explanation of the use of each button is available by just hovering with the cursor over a button. See the User Manual for a more detailed explanation of the function of each button.

27  A separate **GPS status and Chart Orientation Status** is normally in the upper right corner of the display, unless the floating ToolBar covers this position. Then the "Status-bar" will be moved to the lower left corner, were it will stay, unless the main ToolBar is moved to cover this position, in which case the "Status Bar" goes back to the default position. 
 Course Up/North Up and  GPS status are shown in the display.

Basic Features

28 *OpenCPN* uses some basic settings as follows:

- Courses are always shown and labeled as true, not magnetic through version 3.2.2. Newer versions may have a magnetic option.
- Distances are measured in Nautical Miles (meters for very short distances).
- All distances and routes are calculated using Mercator Sailing. Great Circle Sailing is an option in route creating.
- Knots are used for speed. (meters per second (m/s) is an option in displaying GRIB files)

Right Click Menu

29 The right click menu is always available as long as the cursor is somewhere in the chart area (see figure 5). The content of this menu is very context sensitive. The reason for the "Focused Context Menus" is to keep the number of options down to a reasonable level, and still be able to deal with all situations. There are basic right-click menus when clicking at a random point, and very focused menus when clicking on a waypoint, a route, a track or an AIS target. If you have just created or deleted a waypoint, or if chart groups are defined, there are further entries added to the basic menu. Below, the basic entries are explained. The more context specific entries are dealt with as the concerned feature is explained.

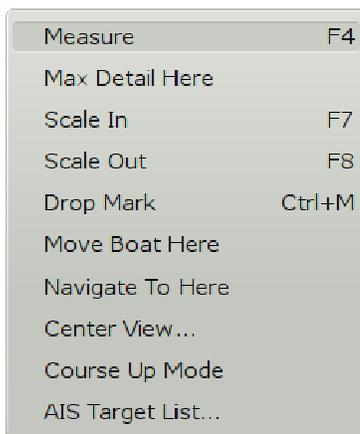


Figure 5.

30 **Measure** activates a "pencil". Move the pencil with the cursor. Put the tip of the pencil on a position that you want to measure from. Left-click, a dot Position with a circle around is created. Move the pencil with the mouse and see the distance and bearing from the point to the pencil-tip in "real time". Left-clicking again creates a temporary waypoint. When moving the "pencil" again, distance and bearing, once again are shown from the temporary waypoint. The total distance from the original measure point, via the temporary waypoint(s) are also shown as "Route Distance". Right click and mark "Measure Off" to stop measuring. For longer distances, especially on east-west courses on higher latitudes, the measure tool seamlessly switches to display and measure great circles instead of Mercator rhumb-lines. Read more about *Great-circle Sailing* in the User Manual. You also get measurement information when using the route function.

- 31 **Drop Mark Here** drops a mark (waypoint) at the position of the cursor.
- 32 **Move Boat Here** moves your boat's position to the position indicated by the cursor click. This item is only visible in the right click-menu if the GPS isn't connected. This function is necessary to create Alarm Zones.
- 33 Using raster charts and the quilting option adds one item to the bottom of the menu. **Hide this chart** excludes the currently visible chart from the quilt. To show the chart again, find it in the chart bar, now marked with a red "X", right click and press "Show this Chart".
- 34 **Setting up GPS** is not included in this course; we are not able to directly interface with GPS due to the limitations of the classroom environment. However, after you learn the basics of how this software works, you may extend your knowledge by having your electronics interfaced with *OpenCPN* on an actual voyage. Be sure to read *OpenCPN's* disclaimer in advance.

Status Bar

- 35 At the bottom of the display, is the Status Bar. It is activated from "Options—User Interface" and selecting "Show Status Bar" It shows the position of the cursor, direction and distance to the next waypoint, and the scale of the chart being used. Just above the Status Bar is the "Chart Selection Bar". (*CTRL +B toggles this bar on/off.*) It shows the available chart for the present view represented by one segment for each chart. The order between the segments on the "Chart Select Bar" represents the scale of the charts, with the largest scale to the left and the smallest to the right. Figure 6 shows both of these bars.

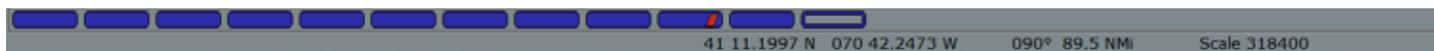


Figure 6.

- 36 The segmented color bars in the Status Bar provide information about the chart:
- Blue for Raster
 - Green For ENC's (vector charts)
 - Brown/Yellow for CM93 charts (vector charts)
 - The current chart displays as a lighter shade of its color, or if quilting is active, the charts currently making up the quilt are displayed in lighter shade.

Tides and Currents

37 As a precaution, remember the following about tides and current displays:

1. Tide and Current predictions are not available for all areas.
2. *OpenCPN* comes with a built in tidal data file, but can use any legacy IDX or binary tcd files. Multiple tidal files can be used at the same time.
3. As with all predictions, the displayed values are calculated using mathematical models and actual tides and currents will vary.

38 To enable the Tides or Currents display, click the toolbar button  to see **tide** stations, or select  to see **current** stations. **Important:** tides and currents will not be displayed unless these toolbar buttons are selected.

39 Available tide stations will show on the chart as green graphs with a "T" logo; The "T" becomes a yellow and blue vertical bar when the scale is greater than 1:500,000. The vertical bars contain a lot of information at a glance. In figure 7a, the tidal rise is 2.5m above the chart datum. The blue part is "water". The "V" inside the bar indicates that the tide is decreasing towards Low Water. In figure 7b, the tide is rising towards High Water. Figure 7c shows Low Water and figure 7d shows High Water.



Figure 7a



Figure 7b

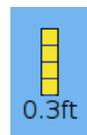


Figure 7c



Figure 7d

40 Right click the middle of either icon to see the tidal graph shown in figure 8. As you move the cursor along the graph curve, the time and actual height of the tide will be displayed. A heavy red line displays the current time and the time zone appears above the date. If a waypoint, route or a track is, or passes, on top of a tidal icon, a right click will show a context menu for those features. To see the tidal graph, press "Show Tide Information" at the bottom of the menu.

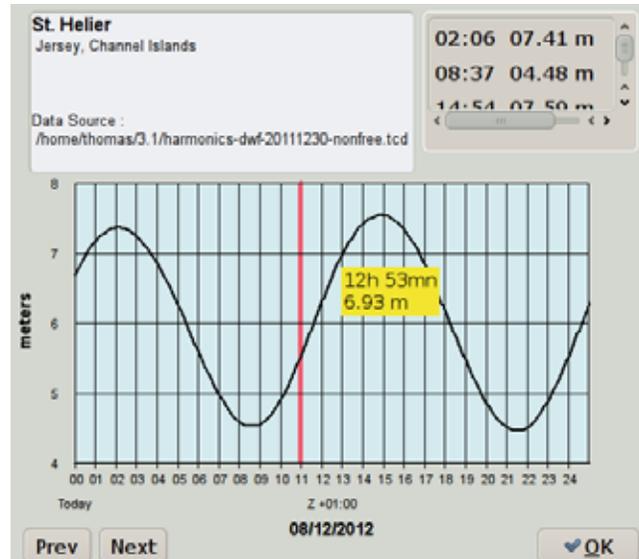


Figure 8.

- 41 The Tidal Dialog gives the name of the station as well as the name of the Data Source file. This is important when you have multiple sources covering the same area. Time and height for HW and LW is displayed in the upper right part. The Yellow box, with the tidal rise and time, follows the cursor when hovering over the dialog. The time axis at the bottom displays the time, in figure 8 the time zone is "Z +01:00", which is the same as one hour ahead (east) of UTC (GMT).

Displaying Currents

- 42 Available current stations will show on the chart as orange diamonds; when zooming in arrows will appear pointing in the direction of the set. Note that "current" here is short for "Tidal Current", and is the same as the UK term "Tidal Stream". Master current stations are shown like this  in all scales. No direction is associated with these stations but they can be queried, by a right click, for the magnitude of the current.



Figure 9.

- 43 An arrow indicates current **direction** and **strength** - the bigger the arrow, the more current as shown in figure 9. Right click the orange box  to see the current graph seen in figure 10.

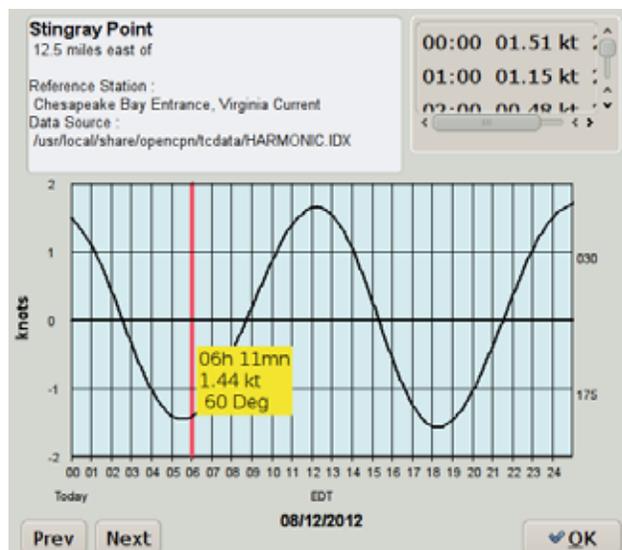


Figure 10.

- 44 If a waypoint, route or a track is, or passes, on top of a current icon, a right click will show a context menu for those features. To see the current graph, press "Show Current Information" at the bottom of the menu. The Yellow box, (time, speed and direction), follows the cursor when hovering over the dialog. Note that *OpenCPN* can only display "Reversing Currents" found in restricted waterways, such as rivers and straits. The general case with "Rotary Tidal Currents", cannot be displayed with this interface, but are available for some areas as GRIB files. We will learn more about GRIB Weather Plugin later in the chapter.

Marks and Routes

45 **Marks** are the basic points that are used for many things, such as creating routes, marking fishing spots, good anchorages or anything of interest. Once a mark is created a focused right-click dialog becomes available, when clicking on the mark, shown in figure 11.

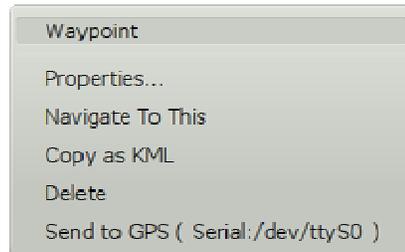


Figure 11

46 There are a few ways to directly create marks. Pressing "Enter" or "Space" creates a mark at the boats position and "Ctrl + M" creates a mark at the cursor position. Right-clicking and pressing "Drop Mark" creates a mark at the position the cursor was when clicked. Marks are created at the start of each leg in a route, as well as at the end of the route. Marks created these ways will have a triangular icon, except for routes that uses a diamond, but no name. You can **move** the mark by left-clicking and dragging it around.

47 You can **delete** a mark by right-clicking its icon, and selecting "Delete". There is a built in **undo/redo** buffer for creating, deleting or moving marks or waypoints. If you have just created, deleted or moved a mark the right-click dialog will have relevant entries. The undo/redo, for moving or creating marks, follows a straight time-line and is not tied to an individual mark

48 All marks have properties that can be seen by right-clicking and selecting "Properties", or just double click the mark. Marks can be manipulated through the Route Managers Waypoints tab as well. Careful, deleting a mark that is part of a route will change the route. Marks that are a part of a "layer" cannot be changed at all. Marks can also be imported into *OpenCPN* in a number of ways. See **The Route Manager and Gpx Data** in the User Manual.

49 A general locking of all marks is available. "Go to Options -User Interface", and tick the box. This feature is handy, to prevent accidentally moving a mark. Activate this feature when underway, deactivate it when planning.

- 50 The **Man Over Board** mark can be activated through the icon  in the toolbar, or through hitting Ctrl + Space-bar. The mark looks like the button and is dropped on own boats present GPS position. This mark cannot be moved or deleted with the cursor or keyboard (by mistake), but can still be deleted from the Route/Waypoint manager dialog.
- 51 *OpenCPN* comes with a handful of different icons that can be assigned to a mark. Right click or use the Route Manager and activate the properties dialog. The Mark Icon window in the dialog shows the available icons.
- 52 Press the -button and start the creation of a **Route**. Hotkey "CTRL R" is an alternative way to start a route and "Esc" ends the route. The cursor changes to a () pencil. Left click along the desired route you want to make. This will leave sequential numbered waypoints as you click along, the numbers will not be visible, but are available in the Route Properties Dialog, accessible through the right click menu or the Route Manager. The running total distance of the whole route will be shown along the "pencil" together with the course and distance from the last marked waypoint. When creating routes, *OpenCPN* will ask if it should use a nearby mark, when a route point is added that is close to an already existing mark. If answering "yes", the existing mark is copied to the route.
- 53 For longer distances, especially on east-west courses on higher latitudes, the Create Route tool seamlessly switches to offer a great circles alternative, instead of Mercator rhumb-line route legs.
- 54 Holding the cursor over the route brings up specific information. The name of the route (if it is set in the properties dialog), the total length of the route, the course and distance for the leg under the cursor and distance run so far along the route, to the first waypoint in the current leg. Looking at the four legged route in figure 12, the total distance is 8.8 nm. The third leg is 1.89 nm, true direction 160° and the accumulated distance in the first two legs is 4.76 nm.



Figure 12.

55 If your desired route extends off the currently displayed chart, move the route cursor in the desired direction and the display will automatically pan to show the area. You can zoom in and out with the mouse scroll wheel or keyboard +/- keys during route creating. You can also right click and select 'MAX DETAIL HERE' or 'Scale Out' during route creation. When finished right click and choose end route from the context menu, alternatively just press the "Esc" key. You should now have an inactive (Blue) route. Active routes are Red, inactivated routes are Blue. Right-clicking on a route brings up a focused menu as shown in figure 13.

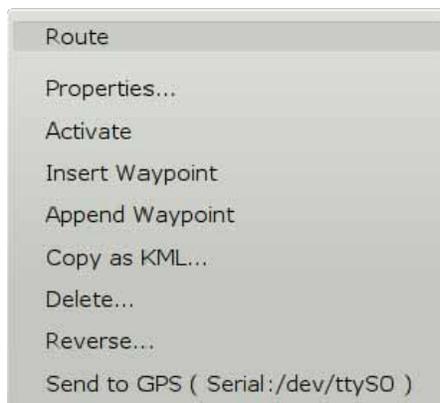


Figure 13.

56. You may add waypoints between other waypoints using ‘Insert Waypoint’ or use the ‘Append Waypoint’ to add to the ends of the route. *OpenCPN* will want to add a waypoint to the last waypoint in the route; to append the route from the initial start point of the route, you must first use the “Reverse” option shown in figure 8-14. Upon completion, select “End Route” and, if desired, reverse the route again. Use the ‘Properties’ option to name the Route and to edit the waypoints. Highlight a waypoint and right click in the Properties menu; then select ‘Waypoint Properties’. You can change the physical location of the waypoint by typing in a correction to the latitude and/or longitude. You can also simply right click on a specific waypoint, select Properties, and then edit the waypoint.
57. Clicking "Activate Route" or performing the same action through the Route Manager, changes the route color to red and new, route information window appears on the right side of the display. Once a route is activated, you are presented with the choice of "Deactivate Route" in the different menus. Right clicking on a waypoint in a route brings up a few options, otherwise not available. See the User Manual for more detailed information on following a route while underway.

Planning an Offshore Voyage

Let’s plan an offshore crossing, from Tampa, Florida to Carrabelle, Florida.

58. Along with the detail the functions of the *OpenCPN* software just described, we’ll go through several examples using the software, with an explanation along the way on what we are doing and why. Be sure to work through these examples on the computer using the *OpenCPN* software as you read the explanations.
59. During this early stage of voyage planning, our first task is to set up the basic route with only the starting and destination waypoints.
60. **Example 1 – Set Up Route**
 - a. Launch *OpenCPN*. Scroll and or move the display until you can see Florida. Move the cursor just outside the approximate location of Tampa and start scrolling in until you can see Tampa Bay. Center the display just outside Tampa Bay by left clicking at that location and then scroll in until you find the entrance channel. You may have to click to re-center the display a few times as you expand the view. Locate RW "T" Mo A just west of the end of the channel.

- b. On the tool bar, select "Create Route" (or Ctrl R); your cursor will become a pencil. Find a location about a half mile west of the RW "T" Mo A turning buoy ($27^{\circ}35.3'N$, $083^{\circ}03.5'W$ is a good place). Note that the location of the cursor shows up at the bottom of the page near the center of the screen. Left click the cursor to establish your first waypoint. Now move your pencil on a heading of 326° for 154 nm. If you keep your pencil near an edge of the screen, it will automatically scroll in the direction that you point it. The yellow box gives you the distance and heading information and you can watch the change it L and Lo at the bottom of the screen. You may also be able to scroll the chart with your mouse wheel, if your mouse is so equipped, as you move the cursor (but do not click).
- c. You are looking for the entrance channel into the Carrabelle River through East Pass. R2 is the outer marker and located at $29^{\circ}44.5'N$ and $084^{\circ}39.2'W$. When you are in the vicinity of this marker, move slightly to the west and left click your mouse to create another waypoint. A good location is $29^{\circ}44.5'N$, $084^{\circ}39.3'W$ (this is a red marker (R2 Fl R 4s) that you will want to keep to starboard when entering the channel--never put a waypoint exactly on a marker or other object since visibility could be obscured and you do not want to hit anything). You may have to adjust your screen size with the mouse wheel to easily find this location. Do not worry if you happen to click, but miss the exact location that you want; when you finish your route, it will be easy to edit the route by moving the waypoints either manually or by changing the Lat/Long in "Route Manager".
- d. Now move the pencil towards the green marker, C3. (If you cannot find C3, download chart 11404 and "Update Database") Select a location just to the east of this marker (green must be left on your port side as you enter a channel) and again left click your mouse. Continue this procedure whenever the channel changes directions. Note that you need to make a turn to the east as you pass Dog Island. Note that at the mouth to the Carrabelle River the marker numbers restart again with G1. For this exercise, when you arrive in the river at R6, after establishing your waypoint, right click and then highlight "End Route" with your mouse and left click it, or alternatively--hit Esc.
- e. Now go back and review your waypoints. If one or more is not located exactly where you want it, select the waypoint with a right click of the mouse--but hold down the mouse button and move the mouse to move the waypoint. When you release the mouse button, your waypoint has been relocated. You can also remove an unwanted waypoint; just right click it and select "remove from route". Note that the waypoint still exists, it is just not included in the route--left click on the waypoint and you have a choice to delete it totally. If you notice that you missed a waypoint in the route, simply left click on the route line near the location that needs the waypoint and select "Insert Waypoint". Then edit the position as described above. Selecting "Append Waypoint" allows you to add a waypoint to the end of the route and/or continue the original route.

f. Now go into "Route Manager"; highlight your route by left clicking it and then select "Properties" and left click it. You now can give your route a name, perhaps *Tampa-Carr*. Note that you can edit an intended speed for your boat. Change the speed to 8 knots and note that the first leg between the two outer markers takes approximately 19.3 hours. If you highlight any leg, right click and select "waypoint properties" you can edit the exact latitude and longitude, change the icon configuration, or add a description. Some people like to name their waypoints rather than using numbers, to make their locations recognizable. As an example, the #2 waypoint at R2 could be named CAROM (for Carrabelle Outer Marker). Your screen should now look something like figure 14, showing the entrance to Carrabelle.



Figure 14

63 Figure 15 shows an expanded view of the R"2" marker. The yellow box appears with the route data when you hover the cursor over any desired waypoint.

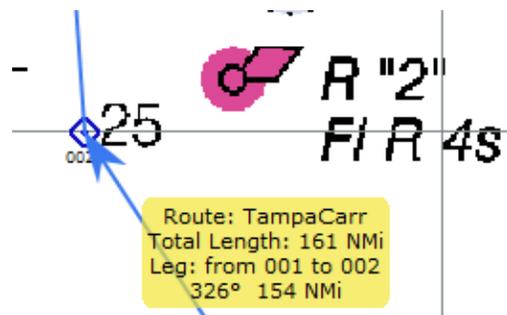


Figure 15