

EVOLUTION The Nautical Chart

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1. Introduction

This brief manual presents the functions related to the Chart page of EVOLUTION.

The chapter "The Nautical Chart" introduces digital cartography and then shows how to use it with EVOLUTION.

The "The Chart Page" section is informative and practical. It describes the information on the chart page and guides you through the system's operation. This pragmatic approach ensures you can confidently position the chart in the geographic area of interest and view or work on it,

The "Display Options" section is designed to give you complete control over the chart's presentation. It's not just about customization but tailoring the chart to your needs and preferences.

How to Use This Manual

"Take your time to go through this manual step by step carefully."

It provides a comprehensive view of the system's capabilities and available functions for working with electronic nautical charts.

If you can't find the answer to your problem in this manual, email info@evolution-tactic.com.

We're happy to help!

Suggestions

We would love to hear any suggestions that could help make this manual and EVOLUTION even better!

If you encounter any errors in the system documentation, we would greatly appreciate it if you could email us at info@evolution-tactic.com. Your help in improving our system is appreciated.

2. The Nautical Chart

Nautical charts serve as precise, scaled representations of navigable waters and adjacent land regions. These charts meticulously detail the coastline, ports, hazards to navigation, and the location of aids to navigation. Additionally, they indicate water depths, land heights, seabed composition, and other significant geographic features. Nautical charts are indispensable instruments for safe and effective nautical navigation.

Nautical Charts and the Race Navigator

Whoever fulfills the race navigator role must have plenty of experience understanding and using nautical charts. His focus should always include safety and compliance with the regulations applicable to the waters he sails.

The nautical chart, as a traditional navigation tool, allows you to:

- Plot a route to your destination.
- Avoid risks with proper safety margins.
- Plot your position as you sail.

As a tool for race navigation, it is used to have:

- A geographical representation of the course.
- A way to visualize the yacht on the race course
- A source of tactical data to the next mark.

This manual is not intended to explain how information is represented in nautical charts, how they are interpreted, or how they are used in traditional navigation practices.



We kindly suggest devoting regular practice to traditional navigation and seamanship, focusing on methods that do not depend on advanced electronic devices.

Electronic Nautical Chart

Traditionally, governmental hydrographic offices printed and published navigation charts on paper. Since the mid-90s, information systems have allowed computers to store and present nautical charts on electronic devices.

Electronic Charts for Recreational Navigation

Digital charts were widely embraced in recreational navigation and adapted to various devices, such as chart plotters, manual GPS, personal computers, and, more recently, mobile devices like tablets and smartphones with GPS.

Benefits

Having a device with digital charts onboard is undoubtedly very helpful.

- It helps plan the course. Before setting sail, you can create a route based on specific points and then check that each leg is safe to navigate.
- They are easy to use, and when coupled with a GPS, they allow for tracking the ship's geographical location. This helps to follow a safe course and avoid obstacles and risks.
- They include advanced features. The most sophisticated systems can determine arrival times, course weather, fuel consumption, and other parameters. These are called "value-added systems."
- They can be integrated with AIS receivers and MARPA radars. These ship detection functions significantly improve safety by calculating the possibility of collision and sounding corresponding alarms. AIS was recently incorporated to rescue a man overboard.
- They can detect and mark a man's position overboard, aiding the rescue effort.
- Digital charts are easy to update. With an Internet connection, you can access the most recent versions of the charts. Although this incurs costs, it is always a good option for the prudent navigator.

Limitations

Please keep in mind the following drawbacks of digital charts:

"Digital charts are not considered a substitute for paper charts by insurance companies or regulatory authorities."

Digital charts have long update cycles, as private companies only digitize official charts and are hesitant to use third-party information, resulting in slower update cycles than official channels.

- Digitizing paper charts does not increase their accuracy. Although it is an advanced technology, it is always a copy of the source that may have been created years ago. Some of the most notable cases include:
 - Coastlines and submerged objects may have been surveyed when typical accuracy was hundreds of meters (pre-GPS).

- It is possible that the entire chart was digitized from the wrong datum (zero point).
- The system may allow inappropriate zoom levels for the available chart scale, known as overzooming. This is the same as looking at a world map under a microscope and expecting the accuracy to be that of a high-resolution map.
- Please keep in mind the following information regarding the use of less durable equipment such as tablets, laptops, and notebooks:
 - Personal computers are not suitable for use in humid, salty environments.
 - Many notebooks are not designed to withstand impacts or exposure to liquids.
 - The power supply systems of these devices have limited capacity and are vulnerable.
 - While modern tablet PCs may be more practical and energy-efficient, they are just as susceptible to splashes and moisture as mini-PCs during lousy weather.

They discourage reliance on traditional navigation methods. In an emergency, no one on the boat may be able to navigate using traditional positioning and piloting methods due to a lack of basic knowledge or practice

Some new chart systems include attractive gadgets for marketing but don't add to navigation and decisionmaking capabilities. These distractions may impress a new navigator but don't help them focus on essential tasks. Some examples:

- The ability to view the chart from a bird's eye perspective.
- Viewing the 3D representation of bathymetry and topography.
- Navigation aid symbols blinking, simulating the pattern of their flashing lights.
- Aerial images of marinas and popular tourist sites.
- Satellite photos of the area with limited navigation information.



In Conclusion

As long as you are clear about the origin and quality of the data and the limitations mentioned, digital nautical charts are convenient. They also serve as an excellent complement to traditional navigation methods.

Digital Nautical Charts for EVOLUTION

True to its objective of aiding strategic decision-making in races, EVOLUTION utilizes cartography as a fundamental tool, which is easy to use and understand.

Navigators use the system in different seas worldwide, relying on a cartographic system with global coverage. This means purchasing charts from anywhere and having seamless access to technical support should be possible.



Please note that EVOLUTION does not publish its charts. Additionally, the user license does not include permits for using third-party charts. The customers are responsible for purchasing and updating the charts they intend to use with the system in the areas where they plan to compete.



As previously explained, digital charts and the system do not replace official paper charts or traditional navigation practices and, therefore, do not qualify as navigation systems before the national authorities and insurance companies.

Charts for EVOLUTION

For comprehensive global coverage in sports navigation, EVOLUTION has chosen C-MAP. Renowned for their quality, C-MAP charts are a reliable tool. With the backing of a financially stable firm, these charts are continuously updated, ensuring their accuracy and usefulness.

As a part of the Navico Group, a leading name in instruments and navigation equipment, C-MAP guarantees quality and reliability for the future.

Where do C-MAP Charts come from?

C-MAP's chart digitization process is meticulous. It starts with the most recent version of the chart provided by national hydrographic services, which is then converted into a vector digital format. This ensures that each digitized chart accurately reflects the original. Then it is further updated with the 'Notice to Mariners' from hydrographic services.

C-MAP relies solely on official agency information and does not create or modify data from unauthorized sources to update its charts. The digital charts accurately represent the original charts and their updates. However, it's important to note that C-MAP charts are not considered "official" because they are not verified or approved by any government agency.

Please be aware that the update cycle for incorporating Notices to Mariners may be longer than that for official charts. Additionally, it's important to note that a new "original" letter may take months before it is available in digital format.

How are they Distributed?

C-MAP organizes digitized charts into portfolios, essential collections of charts grouped by geographical area. Each portfolio is given a unique code for identification purposes. For example, M-NA-CC501.32:

- "M" stands for Marine, as C-MAP also creates aeronautical and land charts.
- "NA" represents North America, one of the regions C-MAP uses to divide the oceans/seas.
- "C" corresponds to the format. "C" is for NT+, and "M" is for MAX. EVOLUTION uses either NT+ or MAX. However, starting from "Release" version 42, C-MAP only releases charts in MAX format.
- "501" is the C-MAP chart (portfolio) number and format type.
- This is followed by ".32", indicating the version number.

This portfolio, a C-MAP chart, consists of multiple individual charts. Each chart is labeled with its name, scale, and coverage area, all corresponding to an original chart published by National Hydrographic Services.

NT+/MAX P	C Chart Info						×
Code:	M-NA-C501.32			Disk Num: 2			
Name:	CUBA TO TRIN	NIDAD AND) TOBAGO				Number of
Date:	11-Sep-12	Size:	16752990	Price Class:	CDW+		NT+/MAX PC
Language:	English	Type:	Precision				Charts 614
NT+/MAX	PC Chart Name				[NT+/MAX PC Chart Scale	~
CANAL DE	MARGARITA AN	ND GOLFO	de cariaco			100000	
APPROACH	HES TO PORTS	OF TRINID	AD ISLAND			100000	
MONTSER	RAT					100000	
	UE TO ANEGADA					90000	
Isla Muasim	no ANEUADA Voina to Puerto Or	daz				80000	
Isla Muasim	ioina to Puerto Or	idaz				80000	_
BAHIA DE	MANGLE	552				79145	~
							Close

The C-MAP portfolio, or chart, is a single product containing all the charts included in it. C-MAP distributes its charts on optical disk images that can be mounted on personal computers to complete the purchase. This article provides more information on how to purchase charts from C-MAP:

https://evolution-tactic.com/en/nautical-charts/.

There are five DVDs, each containing the C-MAP charts for different parts of the world. The latest version of the C-MAP DVD can be found at the following link:

https://evolution-tactic.com/en/downloads/

About C-MAP Chart User Licenses

A C-MAP chart can only be used on one computer. To enable this, a protection scheme links the chart exclusively to the computer for which it was purchased. This scheme uses the computer's hardware ID and the chart's identification to generate a License Request Code. This code is necessary when purchasing the chart and obtaining the License Code that activates the chart on that specific computer.

The Chart Page

EVOLUTION has a dedicated chart page accessible through the Chart tab. Here, we can access cartographic, tactical, and forecast information.

Chart



The following sections outline the components on the "Chart" page and their respective functions. You may sometimes come across references to other EVOLUTION manuals, which provide more detailed information on the chart's display and manipulation, such as the race course and marks, tactical data, forecasts, etc.

The Chart Area

The chart is a graphic representation of a part of the Earth's surface. It is always oriented with true north up and typically includes a latitude-longitude grid referenced to the Datum (WGS84).

The system presents a wide range of information and data on the chart. You can manage their appearance using the "Chart Options" form, which will be detailed later in the Display Options section.

To organize the data presented on the chart, the system uses the concept of "layers." Related data will appear together in the same layer. The "Chart" page contains three layers: forecasts, tactical data, and actual cartography.



wind, currents, AIS traffic, man overboard position, etc.

The cartographic layer will always be present. This layer displays the typical data of a nautical chart, including the user's "waypoints" (Please refer to the "Waypoints" section in the "Routes, Marks and Waypoints" manual).

Evolution displays tactical data on top of a map. The system uses information from sensors such as GPS, log, wind direction and speed, compass, etc. It also considers the boat's performance (polar curves), the race course, and the tactical target.

Finally, a forecast layer presents weather, waves, and current forecasts with various display options.

Using the Cursor on the Chart

The system allows you to perform various functions in the chart area using the mouse or another cursorcontrolling device. The possible actions are as follows:



The Buttons

The upper section of the Chart page contains a set of buttons with various functions:



Activates the marking of the fall point of a "man overboard". The "Security" manual -part of the software documentation- deals with this topic in detail.

The following five buttons control the "Race Course" and the "Tactic Mark" placement. Please refer to the "Routes, Marks and Waypoints" manual for a detailed explanation. These buttons perform the following actions.



It lets you open the Race Course editing form while the arrow on the right opens a menu with the course marks. The Tactic Mark will assume the position of the selected mark.



If the Tactic Mark is positioned at a race course mark, the system moves it to the next mark on the course.



If the Tactic Mark is on a race course mark, the system moves it to the previous mark on the course.



Manually place the Tactic Mark in a position that does NOT correspond to a course mark. 1 This button remains "active" (pressed as shown on the right) until you set the Tactic Mark in its new position by making a "Long Click" on it or until you press it again. While this function is active, the cursor will take on this appearance on the chart.".



Use the cursor to create, delete, or change the course marks' position ("Drag") on the chart. This button will stay "active" (pressed) until you press it again to exit the course editing mode. While the system is in this state, the cursor on the chart will change to a symbol shown on the right, indicating that you can manually adjust the race course.





The following two buttons are used to change the method of centering the chart from "Manual" mode, where the user uses the mouse, to centering and following the "Boat" mode or centering on the Tactical Mark.



The chart is centered on the boat's position. If the boat moves, the system constantly repositions the chart to keep the boat in view.

Center the chart on the Tactic Mark position and adjust the scale to make the boat visible. If the <mark>@</mark>@] mark is moved to a new position, the system will re-center the chart on the Tactic Mark.

The next button allows you to access the chart display options.

This button opens the "Chart Options" form, which will be described in detail later in the Display Options section. The arrow on the right displays a menu with the names of the different "Option Sets" defined by the user and allows the user to select one.

The next button activates the BRL tool to measure the bearing and distance between two points on the chart.



When you press this button, the system switches to a mode where you can put two markers on the chart and move them as needed to create a "course and distance line." The "Actions on the Chart" section provides detailed instructions for this procedure.

The last two buttons serve simple purposes.

It performs a "Zoom Out," equivalent to a "Right Click," on the chart area. When using EVOLUTION on a tablet, performing a right-click with a pen or finger can be challenging. This feature enables you to do it directly. The only function in the system that requires the right mouse button is Chart Zoom Out.

It prevents the possibility of resizing the chart, zooming in, zooming out, or panning while operating the system on a touch-enabled tablet. This feature is designed to prevent accidental touches from moving the chart away from the area of interest. When this mode is active, the button will appear as shown in the figure on the right."

Informative Data Boxes

The "Chart" page's upper right corner contains two boxes with information pertinent to the cursor position.

The box on the right typically shows the latitude and longitude of the cursor's location on the chart. When the cursor moves outside the chart area, the box displays information about the chart projection (e.g., "Mercator" or "Gnomonic") and the status of the chart's centering mode, such as "Manual", "Boat", or "BoatMark".



The left box shows different information based on the system's state, for example:

In normal mode, EVOLUTION will display the distance and bearing from the boat to the cursor's position. If the system is not receiving the boat's coordinates from the instruments, the message will be "NO FIX." The box will inform

FIX 311º M 0.85 nm MVAR 010.95° W

Depths in METERS North is MAGNETIC

about the bathymetry units if the cursor is outside the chart area. Also, it will display whether bearings and headings are about the magnetic or true north.

The box displays relevant information when using the function to measure distances. This will be visible in the next section, "Actions on the Chart",

While EVOLUTION is in forecast display mode, the left box shows information specific to the data the system is displaying. For instance, the right

Wind: 011º T - 7.5 kt Max Gust: 11.7 kt 56 % example shows average wind and gusts. The display of forecast data is detailed in the EVOLUTION manual, "Forecasts"

Actions on the Chart

This section covers various actions that can be performed on the chart, including adjusting the center and scale to focus on specific areas and measuring distances between two points.

Change the Center and Scale.

Three functions define the area of interest in the chart: 1) Pan, 2) Zoom In, and 3) Zoom Out.

1. Pan – Move without changing the Scale.

To reposition the chart, click on the chart location that will take the center of the chart area. If you need to move the chart to the point not currently visible, click successively toward that position.

If you click to recenter the chart while the system is in a specific mode, it may perform a different action instead of centering. This can also happen if the cursor points to an object where the click has a particular function. For example, in "Change Course on Chart" mode, the system will add a new mark on the race course if the cursor points to a course leg.

2. Zoom-In – Closeup.



You can create a window to zoom in on a specific chart area. To do this, move the cursor to one of the corners of the chart, click and hold the left mouse button, and drag the cursor to the opposite corner.

The system will immediately recenter the chart and adjust its scale so that the chart area perfectly fits the window.



When you zoom in, it's crucial to consider the chart's scale. If the original chart has a large scale (low detail), zooming in too much will lead to a lack of details and accuracy, causing potential errors. This situation, called "Over-Zoom," can be a navigational hazard when used to plot a track.

In C-MAP cartography, the maximum zoom level is determined by the level of detail in the chart at the center of the area. If the chart has low detail, the maximum zoom-in is limited; if it has high detail, it is possible to have greater zoom-in.

You can move objects such as marks when using the "Drag" action. Thus, if the system is not in normal mode, you should create the window without selecting one of these objects. This situation can occur when modifying a racing course on the chart and using the function to measure bearings and distances.

3. Zoom-Out

To enlarge the visible area and zoom out from the chart, right-click using the mouse's right button. This action will double the chart scale, expanding the coverage of the visible area.

Right-clicking on a touch screen like a wireless deck tablet can be challenging. In these cases, use the following button to zoom out, achieving the same result as a right-click.

Distance and Bearing Measurement.

Using a simple function, you can easily calculate the bearing and distance between two points on the chart. This function lets you specify the starting point and the destination. Once these points are set, the system will display a line connecting them, along with the distance and bearing from the starting point to the destination, following a great circle course. Here are the steps for using this function:

1. Create a Bearing and Range Line (BRL).



The system switches to measurement mode or "Bearing Range" (BR) using this button. The cursor on the chart will change to the appearance shown on the right.

The information box's top line will display "BR?" indicating that neither the origin nor the destination positions have been set yet. If desired, users can exit this mode by using the button again.

Position the cursor on the chart at the starting point and perform a "Long Click" with the left button to create the first mark, defining the origin.



Now, in the upper line of the information box, "BR+" will appear. "BR+" indicates that the origin point was created. It is followed by the bearing and distance to the position where the cursor points.

BR+ 073° M 4.43 nm MVAR 010.81° W

Place the cursor in the desired position to mark the destination and make a "Long Click". Similar to the first, a second mark will appear on the chart, indicating the destination point. The chart will also display a purple line connecting both positions. It's important to note that this line follows an orthodromic path.



When you hover your cursor over the starting or ending points, you will see labels that say "BRL Start Point" or "BRL End Point." Furthermore, when you hover over the line, the system will display the label "BRL Segment," along with the bearing and distance between the two positions.



The bearing and distance from the origin will be displayed on the first line of the information box.

BRL 088° M 10.6 nm MVAR 011.05° W



Pressing the button again exits the measurement mode. After that, the cursor and information box return to normal appearance, while the marks and the line remain visible.

2. Change the Origin and Destination Positions of a BRL

In BRL mode, you can change the origin and destination points when creating a bearing and distance line by re-entering the function with the corresponding button.

While in BRL mode, move the cursor to the mark you want to change. Then, perform a "Drag" by pressing the left button while moving the cursor. As the mark is being moved, the system will display a box with the latitude and longitude of the new location and the course and distance from the origin to the destination.



Delete the entire BRL or the Destination. 3.

No matter what mode you are in - BRL or Normal - it is possible to remove the bearing-distance line with



the following procedure:

You can use the drop-down menu from the BRL button to select "Clear All" to delete both marks (the entire line) or "Clear End" to delete the destination mark. If the system is in BRL mode, you can create both marks again or only the destination

It is important to remember to exit BRL mode once the line has been created or modified.

Create a Course, and Position the Tactic Mark

Managing the race course is a crucial task that the race navigator must execute flawlessly. The EVOLUTION manual "Routes, Marks, and Waypoints" thoroughly covers this topic. It is highly recommended that you read it and, especially, practice it.

You don't need to prepare the race course on the same computer that's used onboard. You can create it beforehand on any computer with EVOLUTION installed. After that, transferring the race course file to the yacht's computer is simple.

View Forecasts

The EVOLUTION manual "Forecasts" provides instructions for accessing and displaying forecasts. For more details on data display format options, refer to "Forecast Information Display Options" in this manual's "Display Options" section.

Objects on the Chart

EVOLUTION provides navigation, tactical, and forecast information on the nautical chart. The "Display Options" section below details the variety of available options and demonstrates how to customize these settings according to the user's needs and preferences.

Display Options

This section provides information about the different options for displaying the chart and its objects. These options include selecting the color scheme, determining which cartographic elements to display or hide, specifying the period and track data, and choosing the symbology for presenting meteorological information.

These options only apply to the page associated with the "Chart" tab. They remain active regardless of which "Yacht" boat is currently selected. In other words, selecting another boat does not change these options.

When the system is closed, it saves the current options configuration, and when it is opened again, it restores the previously saved configuration.

The "Chart Options" Form

The Chart Options form allows you to access and change the chart display options. The following button on the Chart page toolbar opens this form.

The form consists of two parts. The upper part allows you to manage sets of options or "Options Set," while the lower part contains tabs for the pages that contain the "Options" themselves.

Options Sets

There are numerous options that each user can combine in various ways at their discretion. The goal is to emphasize important information for specific situations, such as races, cruises, low light, weather, etc.

The user can save the current set of options under a name and activate it later by selecting that name. This feature reduces the task of reconfiguring the various options in each situation.

Selection list of Option Sets of already saved presented by their names.				
Set of currently selected				
Chart Options				
Options Set Navigation View	v 🖸 🎽 🎇			
Televille	Data Track			
Generate a new set of options based on the current ones in use.				
Delete the currently s	elected Options Set.			

When you change an option, the system will save it under the selected Options Set.

Using Options Sets is not mandatory, but they offer a simple way to display the chart differently without reconfiguring options each time.

Create a New Options Set

The process for creating a new set of options is as follows:



Clicking this button opens a form to enter the name of the new set of options.

You can enter a name, such as "Night Navigation," and then save it by clicking the SAVE button. The system will generate a new set of options under the specified name.

New Ch	art Options Set 🛛 🛛 🔀	
Name Navegacion Nocturna		
	Save Cancel	

This new Options Set will be automatically selected and have the same options as the original set, creating a clone under a new name.

The next step is to adjust the chart's display options to the desired settings, and the system will save them with this new name.

Select an Options Set

You have two different ways to choose from when selecting an existing set of options:

On the Chart page, click the arrow next to the button used to open the "Chart Options" form, then choose an option from the drop-down list.

You can select an "Options Set" from the selection list if the "Chart Options" form is open.

	Chart Options	5	
Forecast View	Options Set	Navegación Nocturna	*
Navigation View		Forecast View	1
 Navegación Nocturna 		Navigation View	~
Regata View		Navegación Nocturna Regata View	

Delete an Options Set

If you wish to delete a current set of options, follow these steps:



On the "Chart Options" form, select the Options Set you want to delete. Then click this button. The system will ask you to confirm. If so, the system immediately deletes it and starts using the first set in the list.

Note that if this is the only Options Set remaining on the list, the system will notify you that it cannot be deleted.

Options

To better organize the wide variety of options available, the system groups them into a series of pages, which can be accessed through the tabs on the Chart Options form.



It is important to remember that changing an option has an immediate effect. The options are saved on the hard disk only after closing the Chart Options form or shutting down the system.

Display – General Options

The Display tab includes three options:

- 1. A selection list to choose the color scheme (palette) for presenting the chart.
- 2. A dial to control the brightness.
- 3. An option to restore or not the center, scale, and focus that were last used with this set of options.

Display					
Chart Color Palette Gray					
Dim Background					
Restore View (Center, Scale and Focus) When switching to this Options Set:					
 Restore last view used with this Options Set. Keep current view. 					

1. Color Scheme

The "Chart Color Palette" list lets you select the color combination for the chart's appearance. The palettes are predefined and cannot be altered. The color palette primarily affects cartography. However, the tactical data black items change to yellow in palettes with a dark background.



2. Chart Brightness

The "Dim Background" dial controls the background cartography's brightness and forecast information's display. This option does not affect the presentation of tactical data or the track.



3. Restore Center, Scale, and Focus

When choosing a new Option Set, you can restore the center, scale, and focus to their last-used state in that set or leave them unchanged at their current value.



The Restore View state determines the system's behavior when the set of options is selected again.

- If the selected option is "Restore the last view used with this Option Set," the center, scale, and focus change. They reset to the state they were in the last time this option set was used.
- If the selected option is "Keep current view," the center, the scale, and the focus remain unchanged.

Cartography – Cartographic Information Options

The Cartography page contains all the controls that affect the display of the cartography layer. This is the background against which the tactical and performance data, the boat's track, and the forecast information are displayed.

1. Cartographic Database

The cartographic system's database contains the set of objects that the system can display.

EVOLUTION implements two independent vector cartographic databases:

- The most relevant database is C-MAP NT+/MAX PC. A commercial product from the firm C-MAP. This database includes a lot of information presented in the style of paper charts.
- The other database contains only the coastline for the entire planet (World Shoreline), including rivers and lakes. The average accuracy is approximately 0.5 nautical miles. In this case, the presentation is rather basic. Still, it is convenient for displaying tactical or meteorological data without interfering with the details available in the more comprehensive C-MAP database.

The first option on the Cartography page allows you to select the database to view.

Use the database selection list to select the desired database, C-MAP cartography or the World Shoreline to view your needed background data.



The rest of the options on the cartography page vary depending on each database's characteristics, and each can present its information differently.

Options Specific to C-MAP Cartography

This cartography tool enables you to customize various display settings. For instance, you can choose depth units and show or hide different categories of objects. Additionally, hovering the cursor over specific items provides access to more information through Info Tags, such as navigation aids and tide gauge stations. You can manage all these features using the options available on the following page:

Car	tography		
Database Projection	CMap 💙 Mercator 💙	Info Tags Waypoints Batimetric Lines Batimetric Shades	
Enable C Sound	Chart Level Mixing 🔽	Spot Soundings Tide Currents Bottom Type	
Navigation Interna	Aids Symbols tional () American	 Buoys Beacons Signals Light Sectors Caution Areas 	~

1. Projection

C-MAP cartography can only be displayed in the traditional Mercator projection, the default option in the projection selection list.

2. Level Mixing

If you enable "Enable Chart Level Mixing," the system will display higher-detail (lower scale) charts overlaid on lower-detail (higher scale) charts. The lower-detail charts show dotted information, indicating the change in accuracy (see figure on the right).

If you turn off this option, the system will not display the less detailed information (as shown by the gray area in the figure on the left).



3. Depth Units



The depth of spot soundings and bathymetric lines can be displayed in meters, feet, or fathoms. The "Soundings in" selection list allows you to change this option.

4. Aids to Navigation Symbols

Navigation aid objects (such as buoys and beacons) can adhere to one of two standards - the American standard, which uses symbols found in United States cartography (depicted in the left figure), or the international standard, which uses symbols found in the rest of the world (depicted in the figure at the right). In the Navigation Aids Symbols options, you can choose between the two standards.



5. Show or Hide Groups of Objects

The chart contains different items organized into groups. On the right side of the chart, there is a list that allows you to show or hide these groups by checking or unchecking the corresponding list item.

The following diagram illustrates the relationship between each group and the objects on the chart.



Options Specific to the World Shoreline Cartography

The World Shoreline database only contains the coastline with low precision, but it allows for a Gnomonic projection in addition to the traditional Mercator. This cartography also includes layers for waypoints, rivers, and lakes.

It can display information in large areas where details are not essential, such as when showing data on forecasts, courses, ocean routes, etc.



This cartography should not be used for coastal navigation as it lacks the accuracy and features necessary for safe and prudent piloting. It is only included for the convenience of wide-area data presentation.

To access the limited options available in this mapping database, please use the following page:

Car	tography		
Database Projection	World Shoreline V Mercator	 Info Tags Waypoints Batimetric Lines Batimetric Shades Spot Soundings Tide Currents Bottom Type Buoys Beacons Signals Light Sectors Caution Areas 	< III >

1. Projection

Coastline cartography can be displayed on either a Mercator or a Gnomonic projection, both commonly used in the nautical world. To choose the desired projection, use the Projection list.

Mercator	~
Mercator	
Gnomonic	

Mercator Projection

The Mercator projection is the most well-known and commonly used projection in paper charts. The straight lines represent rhumb lines of the same heading.

The Mercator projection has limitations. The great circle paths EVOLUTION uses may appear as curves on long-distance routes. Distances are distorted in charts with vast latitude differences. Near the poles, realistic distances are not shown accurately, which is essential for evaluating the progress of weather systems or the distance from other competitors. The figure illustrates a journey from New Zealand to Cape Horn on a Mercator projection.





Gnomonic Projection

The Gnomonic Azimuthal projection projects objects from the earth's center onto a tangential plane to the world at the location of the chart area center. This projection is independent of where you center the chart, allowing you to view any point on the globe. On Gnomonic projections, all great circle paths appear as straight lines.



The projection becomes more distorted as you move further away from the center of the chart. To address this, EVOLUTION restricts the zoom to a diagonal of 7000 nautical miles, which is equivalent to a radius of 30° from the center.

Using a Gnomonic projection, the following figure displays the same route from New Zealand to Cape Horn.



2. Show or Hide Objects Groups

In coastline cartography, you can only show or hide the following: text of extra information (Info Tags), Waypoints, and Rivers and Lakes.

Displaying Waypoints

Waypoints are not included in the cartographic databases. However, EVOLUTION considers them part of the cartography, regardless of the one selected. When Info Tags are active, the system will display the waypoint data when the cursor is placed over it.



To ensure waypoints appear on the chart, the zoom level must match the "Starting at Scale" level assigned to each waypoint. These waypoint scale levels are Nearby, Local, Region, and World. Additionally, the "Waypoints" group must be active, or the waypoint must have its "Show Always" (Always) option checked.

For more information on this topic, please refer to the "Routes, Marks, and Waypoints" manual, specifically the "Data Associated with a Waypoint" section.

Tactic Data - Tactical Information Options

Tactic Data refers to the tactical information generated by EVOLUTION and displayed on the chart. It mainly includes details about the race course, the boat's position on the chart, actual sailing performance, and target data to reach the "Tactic Mark".

Two other main elements of this group are "Wind" and "Current," represented by direction and speed indicators over water.

Another feature in this section is the display of ships or other safety data obtained via the Automatic Identification System (AIS).

The Tactic Data page organizes the display options for tactical information, as shown below.

Tactic Data		
	✓ Info Tags	~
Tactic Lines Width	✓ Track	
Grid Type Lat Lon 💌	Course Over Ground	
	Best Course To Mark	≡
	Course On Max Vmc	
Tactic Text	Headings	
	🗹 Optimum Beat Run	
Background Opacity 0%	✓ Laylines	
Lise Bold Font	✓ Layline Info	
	Race Course	~

1. Width of Tactical Lines

Much of the tactical information is presented in lines like the course (including starting line, boat laylines, etc.). The Tactic Line Width numerical control allows adjusting the thickness of these lines.

For example, the thickness of the lines in the left image is 2px, while on the image at the right, they have a thickness of 4px. Note that the maximum line width is 6px.



The reference grids provide information about the geographical position of the objects on the chart. You can change the grid type by using the Grid Type selection list. The options include "None", "Latitude-Longitude" (Lat Lon), and "Distance-Bearing" from the center of the chart (Range).

As shown in the figure group below, the selected projection also influences the appearance of the grids, with the Gnomonic above and the Mercator below.

The gnomonic projection exhibits symmetrical distortion at long ranges, which is noticeably less than the distortions of a Mercator projection at high latitudes.

A

Lat Lon	~
None	
Lat Lon	
Range	

The figures below depict an orthodromic path across the North Atlantic in both projections, with different grids.



3. Tactical Text

In EVOLUTION, numerical values with tactical information are displayed on the chart. These values can help with decision-making without going to the Tactic tab. They include information such as wind and current direction, time and distance to laylines, speed through water and over ground, performance percentage, and more. The data appears near the boat or at the intersection of the laylines. To prevent overloading the chart, the data is displayed in a small font on a transparent background, sometimes making it difficult to read.

Two tactical text options can enhance the presentation of these parameters. The first option is to adjust the background opacity of the text (Background Opacity). The second option is to use a bold font (Use Bold Font). The following figures demonstrate the impact of utilizing these options to display tactical information on the chart.



4. Show or Hide Object Groups

You can display or conceal tactical data on the chart according to the specific needs of each type of navigation. Here are some examples:



Race Course

Four tactical objects that can be shown or hidden belong to the race course and deserve a more detailed explanation.



A race course is defined by the marks that make it up and an optional starting line (Starting Line). When the Tactic Mark is placed on a course mark, it defines the Active Leg and the Next Leg.

In this example of a "windward-leeward" course, the tactic mark coincides with the windward mark, making the upwind leg the Active Leg and the downwind leg the Next Leg.

Please take note of the following rules regarding this set of objects:

- You cannot hide the marks as they will always be visible.
- The Race Course object includes the Starting Line, the Active Leg, and the Next Leg objects. You must also hide the Race Course object to hide any of these three objects.

AIS Targets

Other objects that can be displayed or hidden include AIS targets (Tracked Targets) and ships transmitting their data and position through the automatic identification system (AIS).

Even if you have chosen to conceal this group of objects, EVOLUTION may reverse this situation if EVOLUTION's target tracking functions trigger a collision, proximity, or manoverboard alarm.

When the system identifies a risky situation, it will sound an alarm. EVOLUTION will then show a form with a list of targets sorted by their level of risk. While this form is open, AIS targets will be visible on the chart, even if you have chosen to hide them.

These alarms are based on guard ranges and time/distance at closest proximity. To open the form that controls them, select the "Tools \rightarrow Tracked Targets" option on the main menu and then the button on the right.

Track Data

The boat's track is another tactical object you can display or hide. This object shows the path already sailed and also provides additional information. A specific page groups track display options (see Track – Track Information Options).

Tactical Info Tags

Tactical objects on the chart have additional information called Info Tags. The associated text will appear when you hover the cursor over particular tactical objects. These objects can include marks and legs of the race course, the tactic mark, AIS targets, track data, and so on. We can show or hide these tactical Info Tags on the Tactic Data page.

Info Tags are helpful when modifying the race course on the chart. The displayed tags show that the cursor has selected a mark or leg, and you can take action on them. When the system is in "Editing the Course on the Chart" mode, the Info Tags will always be visible, even if they are set to be hidden.

For more information on editing race courses, please refer to the Routes, Marks, and Waypoints manual.







Track - Track Display Options

The track, the path already traveled by the boat, is a tactical object that can be displayed or hidden. (Refer to the Track Data in the Tactical Data section above). The system has specific options to determine the duration for displaying the track and the data type to present.

		Show
rt Time 🗹 -5 min.		Vind Vind
2 hours	~	Current
l-Jan-2011 19:49	Now	Sow
	rt Time 🔽 -5 min. 2 hours [1- Jan -2011 19:49]	rt Time 🗹 -5 min. 2 hours 💌 1- Jan -2011 19:49 🗘 💽 Now

1. Track Length

EVOLUTION stores all the navigation history of the boat. Therefore, you should choose a specific period to view the track. Otherwise, the chart will display tracks from multiple navigation sessions, potentially causing clutter. You can control the track span using the three alternatives in the Track Span box.

The Race Start Time

The first alternative is (Race Start Time). It sets the beginning of the track at the last start sequence based on the race timer (Race Timer). For more detailed information on how to operate the race timer, please consult the Race Start manual.

⊙ Race Start Time 🔽 -5 min.

Setting the "-5 min." option indicates that the track will include the previous five minutes before the start gun, as shown in the figure on the right.

A Time Span

The second option enables you to select a specific duration for displaying track data. This duration can range from as little as one minute to as long as one week.

This is the best option in standard navigation. The track length can be fitted within the expected duration of our voyage. Each time the chart area is redrawn, the beginning of the track is reset, displaying the given duration.



💿 Last	12 hours	~
	12 hours 1 day 2 days 3 days	~
	4 days 5 days 6 days	
	7 days	~

Wind

sow

Current

From a Given Date and Time

The final option is to specify a particular moment (since), date, and time. This feature lets us pinpoint the exact time to begin displaying the track.

Since 01-Jan-2011 19:49 Now

When we click the "Now" button, the "Since" option adopts the current time. Alternatively, the "Since" option adopts the player's time if the system is in Replay mode.

With this button, you can capture the time of a point on the track by performing a long click on the chart. During this operation, the cursor changes, as shown below.



2. Data Displayed over the Track

The track represents the boat's sailed path. You can select additional information to display along the track on the Track page Show box. The options available are Wind, Current, and boat speed Performance relative to the polar target speed.

From a graphics perspective, the track consists of small segments, each at least ten screen pixels long. When applying maximum zoom, the segment length is determined by two consecutive GPS positions, typically recorded every second.

Due to a broader zoom level, a segment may contain several seconds of navigation. In these cases, the system averages the data displayed with the segment.

Wind and Current Lines

The wind and the current appear as vectors (or barbs) along the track. They point toward the center of the track, and their length is proportional to their speed. The wind is black (left figure), and the current is red (figure on the right).



Viewing this data is invaluable, especially for checking instrument calibrations and corrections. Wind and current must remain stable in direction and speed, even after significant maneuver and course changes.

Polar Performance

The boat's polar performance can also be displayed on the track. This data item is defined as the ratio of the current boat speed to the polar target speed, shown as a percentage. The polar target speed is determined from the polar curves for the specific True Wind Angle (TWA) and True Wind Speed (TWS) the boat is sailing with.

The system shows this performance percentage, from 70% to 120%, as a range of colors (see chromatic scale below). Outside this range, the performance is shown in black.



This information will help you evaluate whether the polar curves accurately represent the boat's capacity in different navigation conditions. A quick look at the track's colors can also give you hints for countless analyses and adjustments.



You can place the cursor anywhere on the track to view specific numerical information, True Wind Direction-Speed (WOW), Current (CURR), and Speed through Water Performance (Polar STW %). Remember that the displayed values are averages for the track segment's duration.

Also, remember that the wind and the waves are specified by the direction from which they come. However, for the current, its heading is presented.

Forecast - Forecasts Display Options

EVOLUTION offers a notable feature by providing detailed information on various forecasts, including weather conditions, wave patterns, tide predictions, and current data.

This section describes the display options in the Forecast tab, which affect how Forecasts are presented when overlaid on the chart.

			Forecast		
Wind Symbol	Black Barbs	~			
Waves Symbol	Arrow 3	~			
Current Symbol	Arrow 1	~			
Show Isobars on Pressure Map 🔽					

1. Symbols for Wind Data

The chart offers four options for representing wind over the chart. The Wind Symbol selection list controls these options.



2. Symbols for Wave Data

In the same way, the waves have their own pair of symbols that you can choose from the Wave Symbols selection list.



3. Symbols for the Current Data

There are also options when displaying forecasted currents. The symbols used are similar to the arrows for the wind. The Current Symbols selection list includes these options, as shown in the figure below.



4. Show or Hide Isobars

This option allows you to display or hide the isobar lines when viewing pressure maps while showing meteorological forecasts over the chart.

