

YOUR PARTNER IN NAVIGATION

PROTEUS™

User Guide 1.0.0

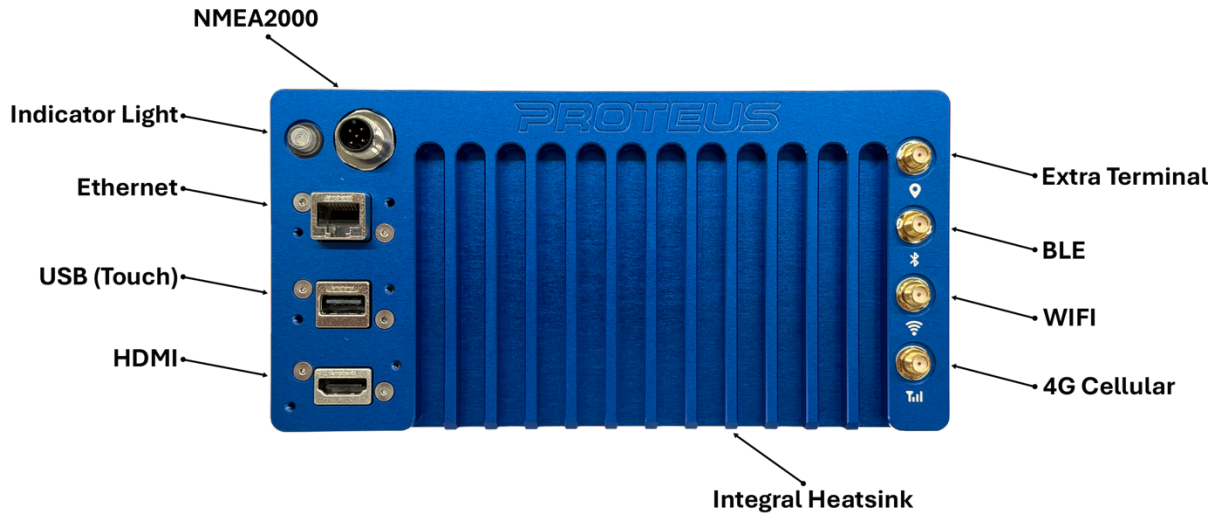
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Quick Reference Guide (Proteus Hub Hardware)

The Proteus Hub connects seamlessly into your existing electronics, using NMEA2000 for data and power and providing an output display over HDMI. Usually, your Proteus Hub will be hidden out of sight with the primary display on your MFD, but if you encounter an issue it can be useful to check the Proteus Hub indicator lights and cables.

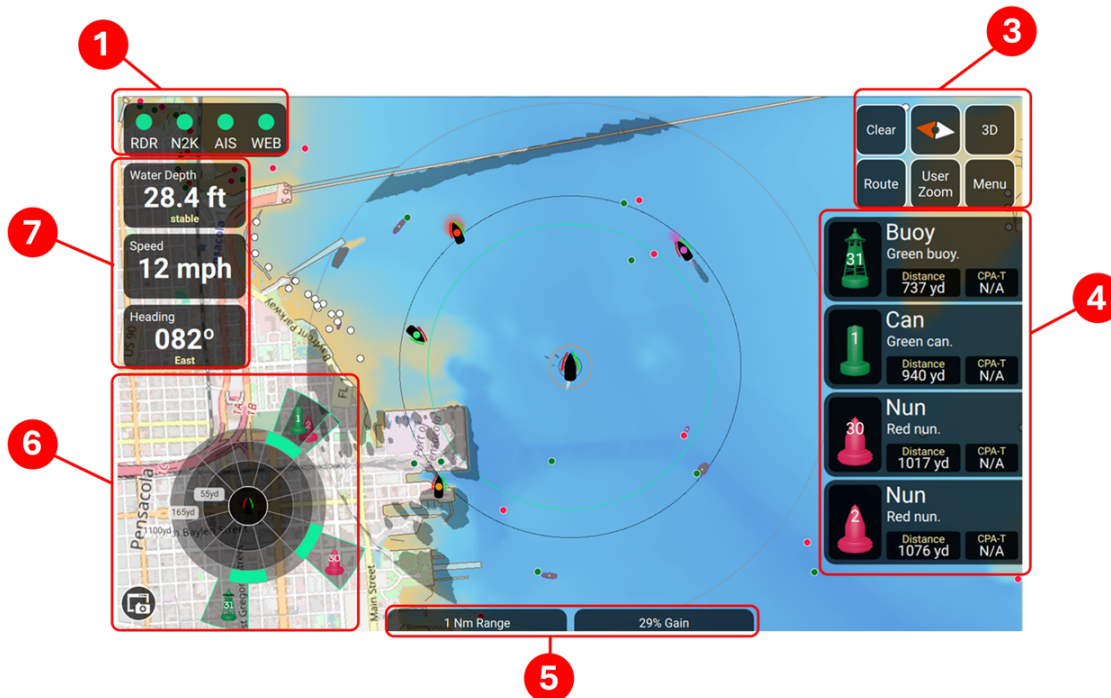
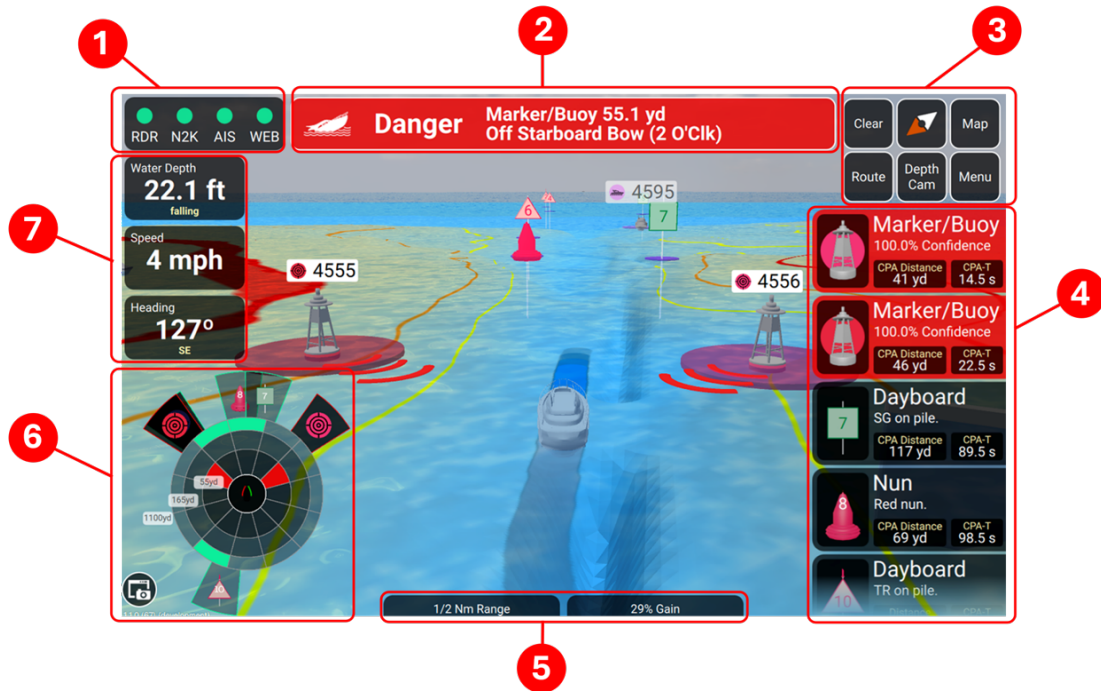


Indicator Light
<input type="checkbox"/> Single Green Light - Normal Operation <input type="checkbox"/> Double Green Blink - Powered, but turned off (Proteus Hub can be turned on or off using the NMEA virtual switch panel) <input type="checkbox"/> Red Light – Error <input type="checkbox"/> Any Blue Light - Bluetooth connected
Connector Cables
<input type="checkbox"/> NMEA 2000 <input type="checkbox"/> Ethernet <input type="checkbox"/> USB for Touchscreen <input type="checkbox"/> HDMI
Antennas
<input type="checkbox"/> Extra Terminal <input type="checkbox"/> BLE (Bluetooth) <input type="checkbox"/> WIFI <input type="checkbox"/> 4G Cellular
Integral Heatsink
<input type="checkbox"/> Helps keep the device operating at a cooler temperature.

Note: Proteus is powered by the NMEA 2000

Quick Reference Guide (Home screen)

The two primary modes of the Proteus display are Map (2D) view, and 3D (simulation) view. To switch between these two home screens, press the "Map" or "3D" button in the top right corner. The following pages describe the features available from the main display.



Display Name	Description
1. Communication Status Bar a. RDR – Radar b. N2K – NMEA 2000 c. AIS – AIS Radio d. WEB – WIFI/Cellular	Connection Status of the boat systems to your Proteus system
2. Alert Banner	The most immediate threat is displayed here
3. Control Panel a. Clear b. True North Indicator/Orientation c. 3D/Map d. Route e. User Zoom i. Traditional 2D Map View ii. 3D Map View f. Menu	Buttons to Control your Proteus a. Clears Data, removes all contacts on the screen and rebuilds based on available data. b. Your view of the screen from a True North or 1 st person view c. Switch views between traditional map (top down) view or the Proteus New 3D view d. Plot the route to your destination e. quick zoom option i. Close, Medium, Far ii. Deck Cam, Depth Cam f. Click to go into the Proteus Settings and setup
4. Priority Target Panel	Panel of all relevant targets nearby
5. Radar Status a. NM Range b. Gain	NM Range and Gain a. Manually control zoom levels b. Manually control zoom levels
6. Field of Awareness	Clock based orientation of the targets around your boat that also shows how close they are based on the rings of the circle they populate.
7. Vessel Navigational Data a. Water Depth b. Speed c. Heading	a. The water depth you are currently traveling in b. Your current boat speed c. Your current boat heading

*Use Installation Guide to install Proteus before first powering on

Powering on your Proteus

Your Proteus is tied into your electronics power. To power on, turn on the power to your electronics.

- **Note:** To verify your Proteus is on (if easily accessible) you can check the Status Light

Accessing your Proteus from your Simrad MFD (Multi-Functional Display)

Proteus displays its feed through the video app. From the Home page on your Simrad MFD locate the Video App and press the button. From there you will see Proteus come online.

- **Note:** You can use Simrad's split screen functionality to split Proteus' feed with any other app on Simrad's display.

Initial Setup

Once everything is configured, Proteus will provide nearly hands-free operation. But first, it is important to get the initial setup right so that the Proteus provides accurate information and alerts. This chapter provides step-by-step guidance to get the most out of your system.

Diagnostics

When you start up your new Proteus hardware for the first time it will bring you to the Diagnostic Page.

- **Note:** Any configuration done through Initial Setup can be changed later.

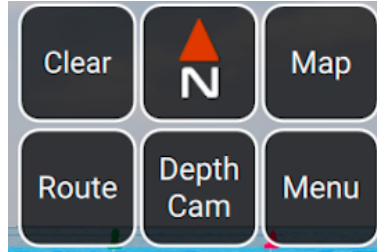


The Diagnostic Page is the first screen you will see as Proteus comes online and/or by clicking on Communication Status Bar. Here you can check serial number, software version, and connection status' (If calling customer support, be on this page for the quickest service.

- Status on the Diagnostic Page and Communication Status Bar
 - **Green:** Actively receiving data
 - **Orange:** Has received data since power on, but is not currently receiving data
 - **Red:** Never received data.
- Click on Close Diagnostics to go to the home screen

Accessing Settings

From the Home Screen, tap the Menu button in the top right Control Panel

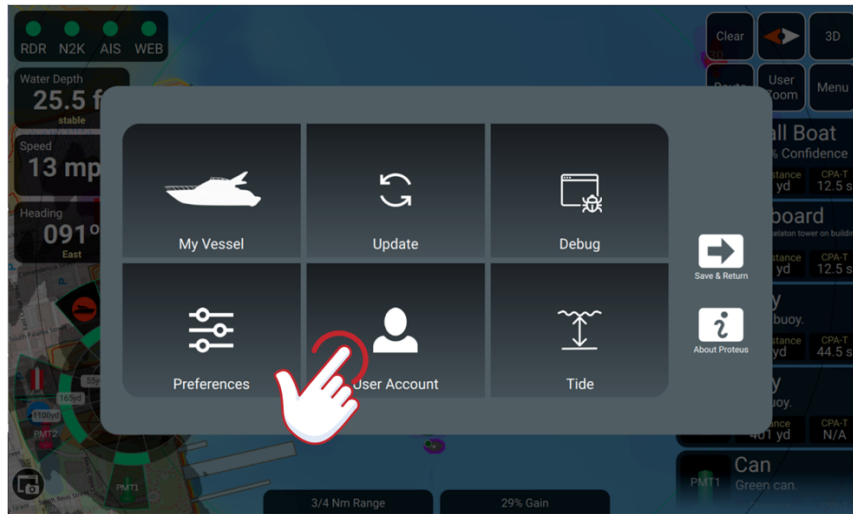


From the menu, you can access six configuration pages. These are explained in detail in the following chapters.

When you are done with settings, choose 'Save and Return' to close the Menu.

Login

From the menu page click on User Account

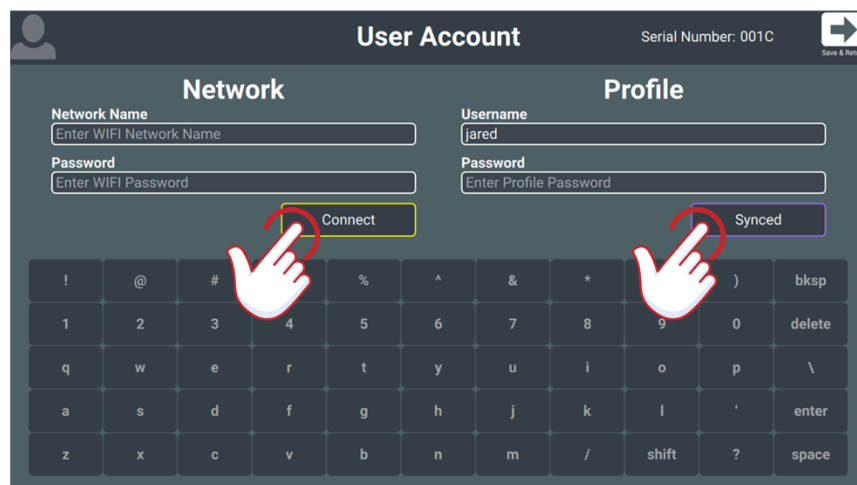


Type in the network name and password, and press "Connect"

- **Note:** Proteus system does not scan for wireless networks, you must know and type in the name of your preferred network and password. If you do not have a wireless network, leave this section blank.

Type in the username and password, and press "Sync"

- **Note:** Your customer profile will be created when you purchase the system and sent to you via email. If you misplaced the username and password, call Tocaro Blue Customer Success. (Call 850-903-1776)

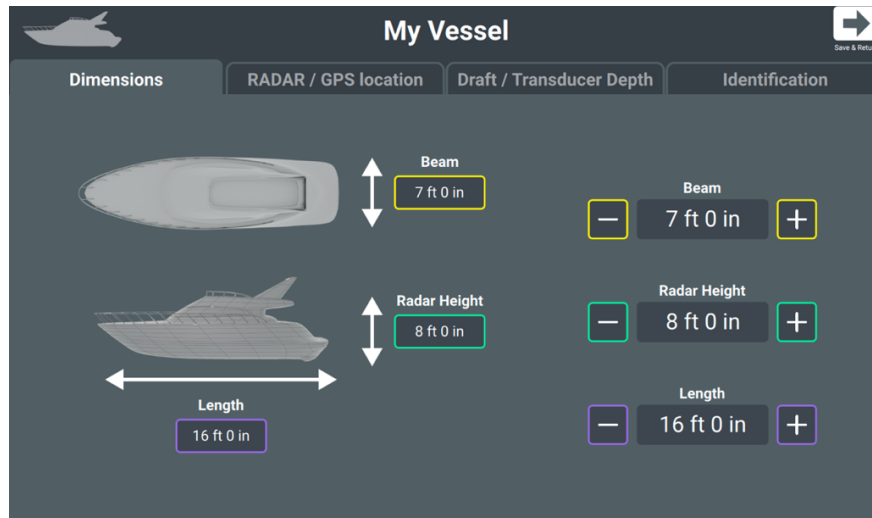


Dimensions

From the Settings menu go to My Vessel

In the Dimensions tab you can customize Proteus with the exact dimensions of your vessel

- **Note:** Press the (+) or (-) button to move in 6-inch increments or hold own to move through the numbers at a faster pace.



In the Identification tab enter in your vessel details to help Proteus better know your boat. This will also help customer success in the event of an issue.

The MMSI is required to separate your ID from other boats that are nearby on the screen through AIS. The vessel's MMSI number is located in your AIS radio and/or in your AIS radio documentation.

The screenshot shows the 'My Vessel' interface with the 'Identification' tab selected. The form contains the following fields and keyboard:

Manufacturer	Model	MMSI
<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Name	HIN	
<input type="text"/>	<input type="text"/>	

!	@	#	\$	%	^	&	*	()	bksp
1	2	3	4	5	6	7	8	9	0	delete
q	w	e	r	t	y	u	i	o	p	\
a	s	d	f	g	h	j	k	l	'	enter
z	x	c	v	b	n	m	/	shift	?	space

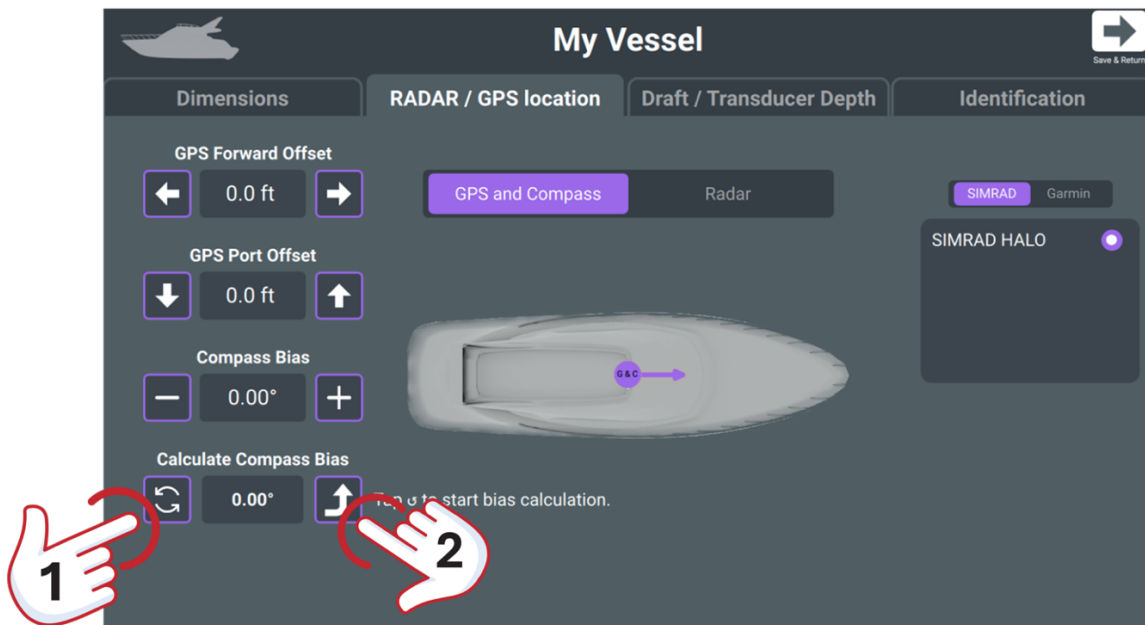
- **Note:** The only time the MMSI will ever change is if the AIS radio is replaced with a new one. In that case you would need to change the MMSI number in Proteus

RADAR and GPS

In the GPS and Compass location tab enter in all your vessel GPS and Compass position data and select the type of Radar you have on your boat.

Compass Bias is when the compass heading does not match the GPS heading. You can enter a bias (offset) to adjust it.

- ❑ Manually adjust your Compass Bias by pressing the (+) and (-) buttons or....
- ❑ Calculate Compass Bias calculates the compass bias by comparing your course-over-ground to your compass heading while you are moving
 - In an area with no current, move at 5 to 10 mph (8 to 16 kph) on a smooth path (turning is OK, but avoid sharp turns).
 - press the rotating arrows (1) to start calculating bias. Hints about your speed and the calculator progress will be shown. This can take a few minutes.
 - Once it is complete, the calculated bias will be shown in the field. Press the up arrow (2) to populate the results in the Compass Bias where it becomes the new applied bias.



- ❑ **Note:** If you are still seeing a bias after you have completed this process, that is ok! See Radar Bias and/or Constellation Lock for more information.

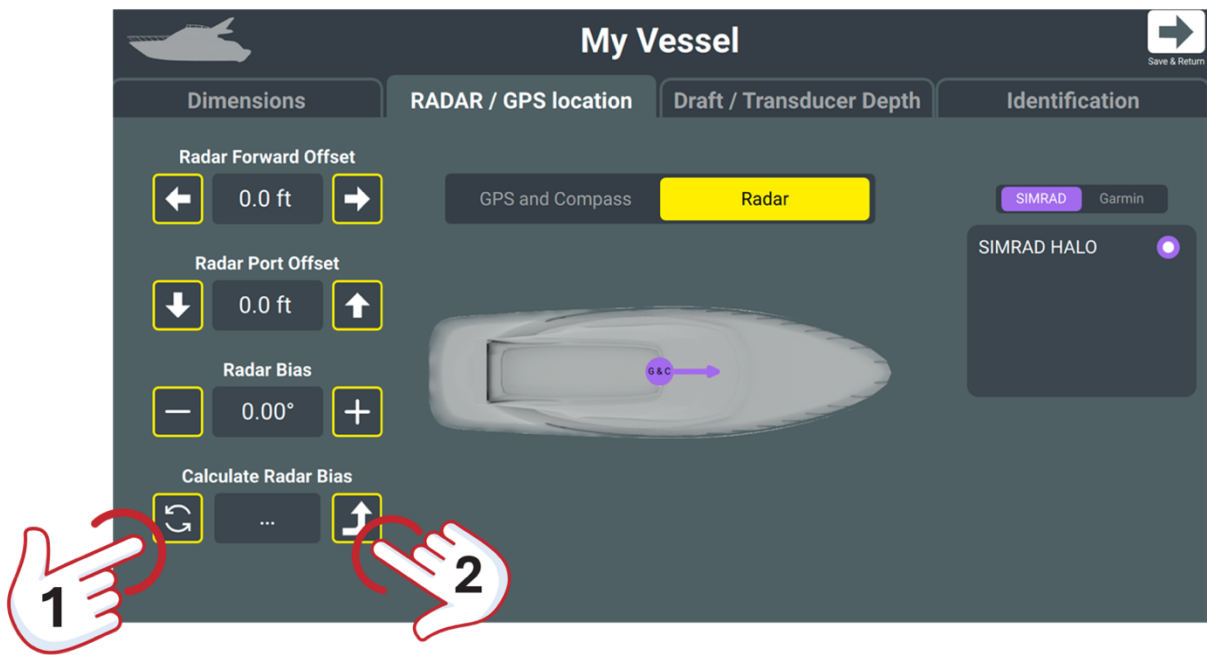
On the same tab switch from GPS and Compass to Radar



In the Radar tab enter in all your vessel Radar position data and select the verify you have selected the correct Radar that is on your boat.

Radar Bias is like the Compass Bias, but in this case the radar hits are offset from the on-screen charts.

- Manually adjust your Radar Bias by pressing the (+) and (-) buttons or....
- Calculate Radar Bias
- Note:** This process is usually NOT recommended. Please use Compass Bias to adjust major offsets and make only small manual adjustments to RADAR bias if fine-tuning is needed.
 - In an area with no tide or current, move at 5 to 10 mph (8 to 16 kph) on a smooth path (turning is OK, but avoid sharp turns). You must be within RADAR scanning range of three or more channel markers which will serve as reference points to automatically align the RADAR. The center of a bay, with RADAR adjusted to barely reach the shoreline, is usually a good location.
 - press the rotating arrows (1) to start calculating Radar bias. Hints about the calculator progress will be shown. This can take a few minutes.
 - Once it is complete, the calculated bias will be shown in the field. Press the up arrow to populate the results in the Radar Bias where it becomes the new applied bias.



- **Note:** If you are still seeing a bias after you have completed this process, that is ok! See Constellation Lock for more information.

Draft and Transducer

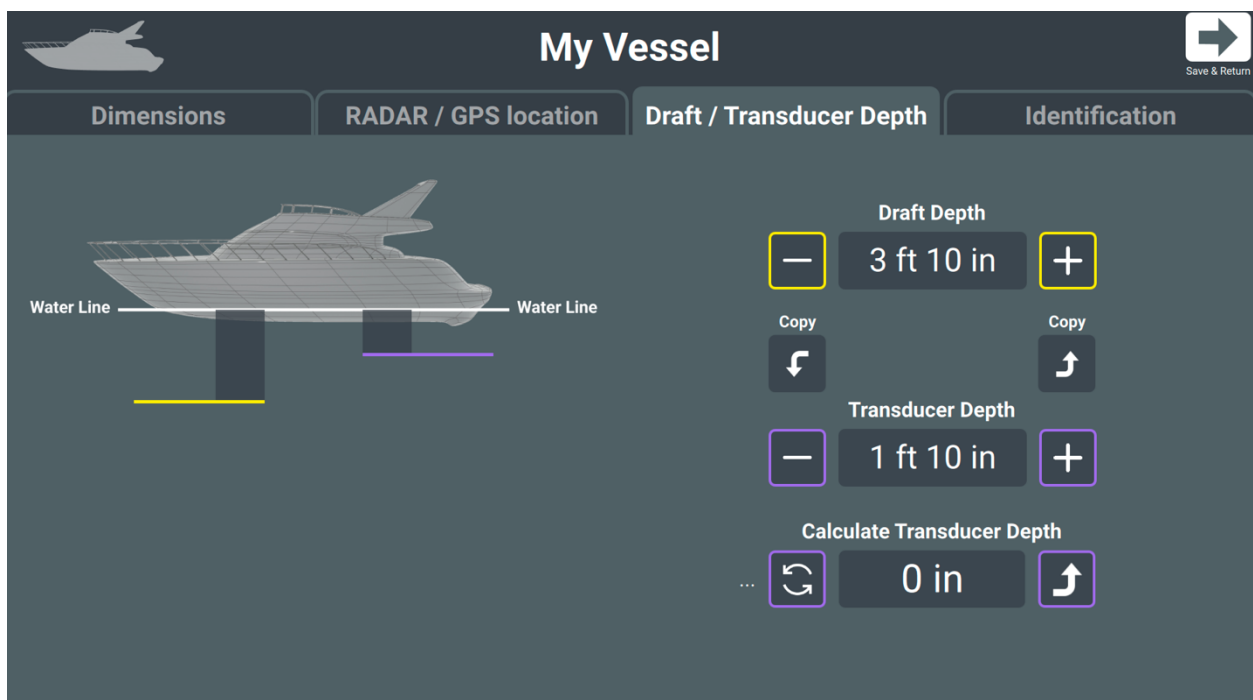
In the Draft / Transducer Depth Tab enter in all your vessel draft and transducer depth data. Proteus will display depth tiles as reported from the last official sounding (or the last time you traversed the area), but the system will always monitor the transducer and report if the seafloor is getting shallow based on the changes in depths being reported by the transducer. The Proteus system will always provide 2 forms of depth reporting; historical and changes being reported by the transducer – these alerts are adjusted for local tides.

If your Draft Depth and Transducer depth are the same, then press the copy button.

- **Note:** If you do not set your transducer depth, you will not have ability to do depth remapping.

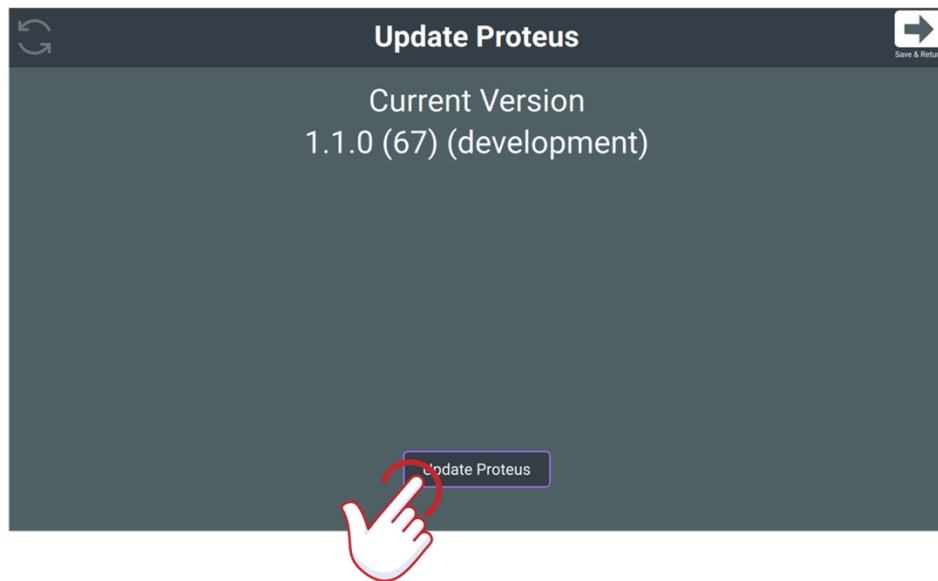
Calculate Transducer Depth compares your depth readings to the map data to estimate your transducer offset. You must be moving more than 5 mph and in a mapped area for this to be accurate.

- **Note:** We always recommend the offset published by your boat manufacturer. If possible, use manufacturer data vice this calculator. The more accurate the depth data the better protected you are from running aground.



Software Update

From the Settings Menu go to Update



Find the current version of software running on Proteus. Press Update Proteus to find out if a new update is available, and it will automatically begin updating.

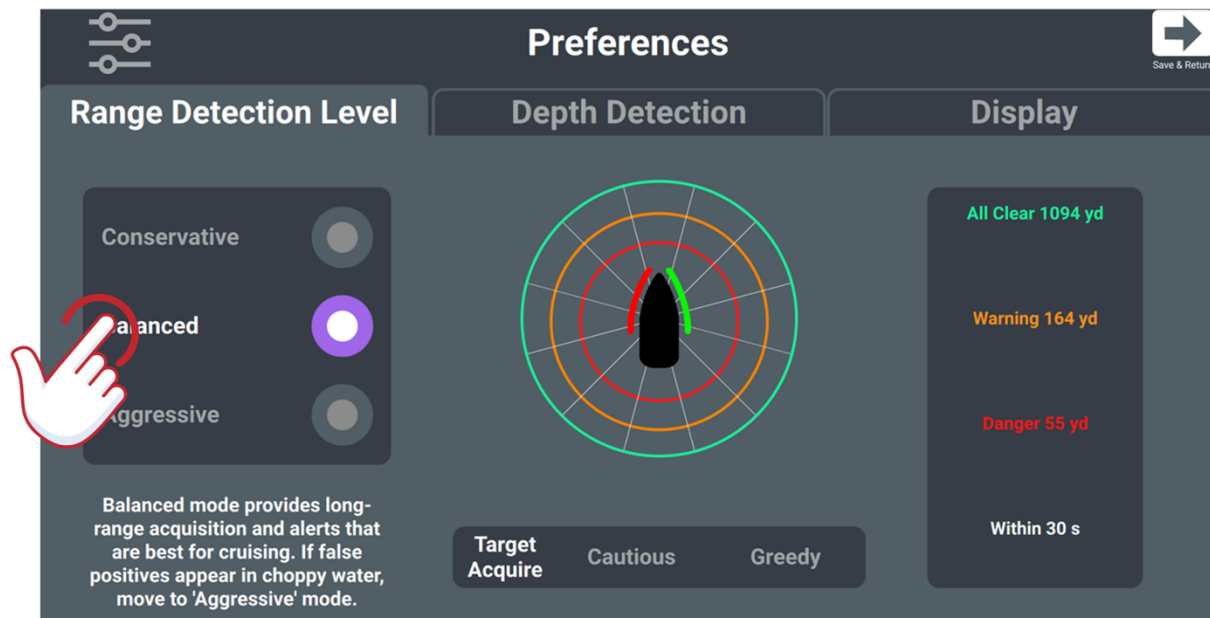
- **Note:** It is best to do an update while at dock with a strong WIFI/cellular connection.

Display and Alert Preferences

Setup your threat preference for alerting, breadcrumbs, night mode along with other options

Range Detection Level are the threats/objects on the surface of the water, and the frequency at which you the user wants to see those objects/threats based on distance/time.

- Conservative: Most sensitive, at a risk of shoeing many more false positives. Expect to be alerted sooner but need to tap “Clear” more often.
- Balanced: (Best Option) Provides long-range acquisition and alerts that are best for cruising. If false positives appear in choppy water, move to “Aggressive” mode.
- Aggressive: The least sensitive only showing warnings for highly likely events. Best to minimize alerts, and in choppy seas.



- Note:** In the Conservative setting you will possibly receive more false positives, whereas in aggressive you will potentially miss some targets

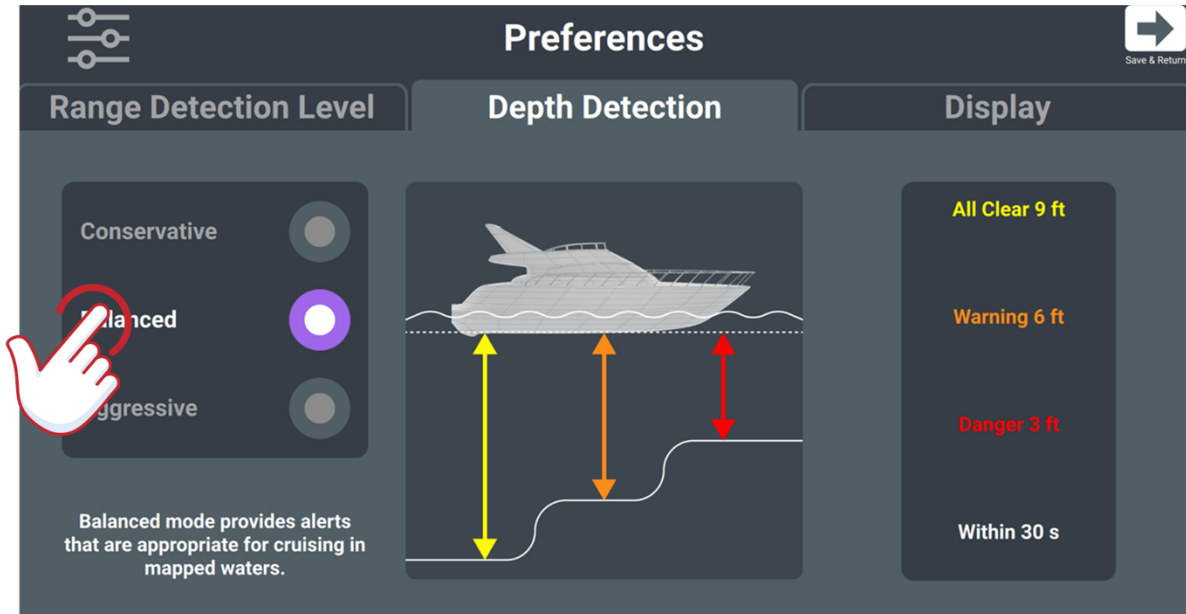
Conservative
All Clear 1531 yd
Warning 219 yd
Danger 109 yd
(Within 45 seconds)

Balanced
All Clear 1094 yd
Warning 164 yd
Danger 55 yd
(Within 30 seconds)

Aggressive
All Clear 875 yd
Warning 109 yd
Danger 22 yd
(Within 15 seconds)

Depth Detection uses your depth transducer and baseline cartography to determine the threat of shallow areas and mapped underwater objects

- Conservative: Most sensitive. It is the safest in poorly mapped areas but may show false alerts near steep drops.
- Balanced: (Best Option) Provides alerts that are appropriate for cruising in mapped waters.
- Aggressive: Least sensitive, at a risk when tides are uncertain, or areas are not well-mapped waters.



- **Note:** In the Conservative setting you will possibly receive more false positives, whereas in aggressive you will be more at risk especially in not well-mapped waters.

Conservative
 All Clear 12 ft
 Warning 9 ft
 Danger 5 ft
 (Within 45 seconds)

Balanced
 All Clear 9 ft
 Warning 6 ft
 Danger 3 ft
 (Within 30 seconds)

Aggressive
 All Clear 5 ft
 Warning 3 ft
 Danger 1 ft
 (Within 15 seconds)

- **Note:** Depth alerting is based on your current course

Display gives you option to turn on/off certain features in Proteus

Enable Constellation Lock allows you to adjust the compass based on nearby channel markers.

- **Note:** If your compass bias is complete and everything is still offset, you can Enable Constellation Lock, and the system will automatically take the nearest markers and line up the radar hits to those markers, creating a more accurate compass and radar interaction.

Show Night Mode allows you to turn on/off Proteus display features in a nighttime setting

Predict Curved Paths allows you to toggle between predictive curved paths of vessels around you based on the known movement of that vessel and non-predictive straight path that assumes the vessel's course is straight.

Show RADAR Colormap allows you to turn on/off traditional radar returns.

- **Note:** Proteus wants to give you the option of seeing less obtrusive objects on your screen. Radar hits like that are predominately false data are greyed out in Proteus. If you would still like to see the traditional colors of a radar hit, turn on Radar Colormap.

Remap Seafloor allows you to enable/disable seafloor remapping.

- **Note:** The system default to enabled and should be disabled if you prefer baseline chart data vice the depths recorded by your vessel. This system will also default to disabled until transducer depth is entered into the system (for accuracy reasons).

Show Breadcrumbs allows you to toggle on/off to get a historic record of your vessel's movements.

Metric/Standard allows you to switch between Metric/Standard (For all settings)



Preferences



Range Detection Level

Depth Detection

Display

Show Depth Map



Enable Constellation Lock



Show Night Mode



Predict Curved Paths



Show RADAR Colormap



Warp Seafloor



Show Breadcrumbs
(coming soon)



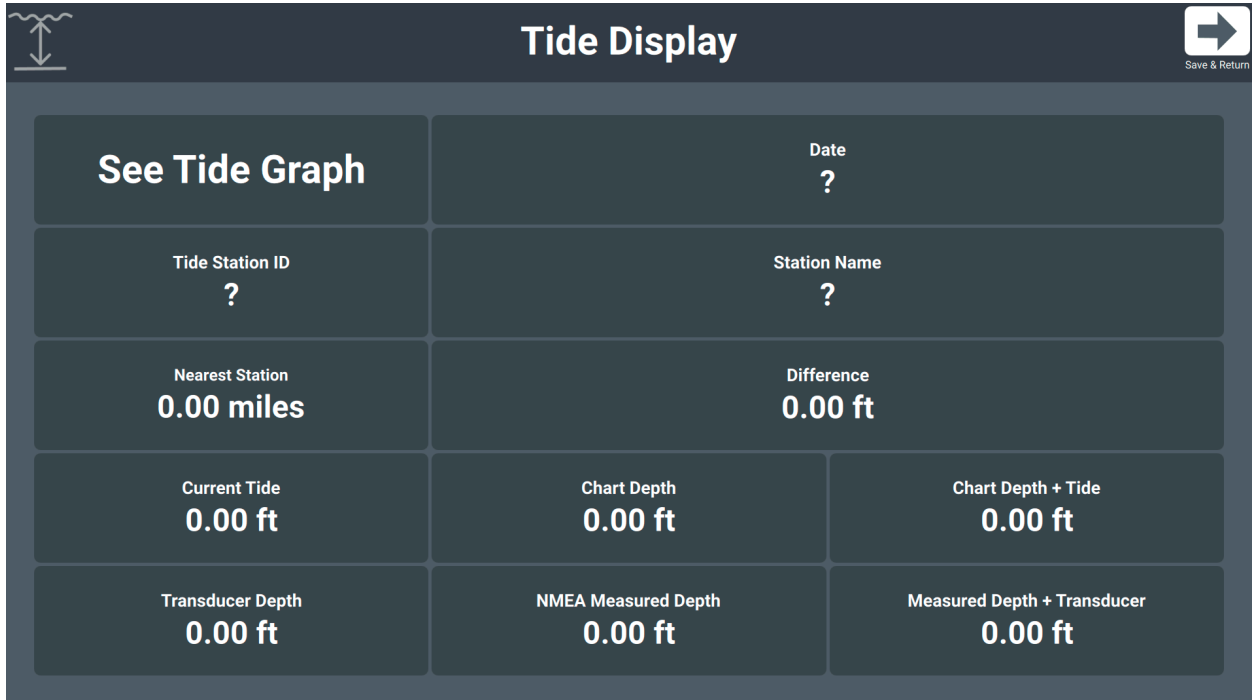
Metric

English

Tide

Tide Display shows the nearest tide station/ID and current depth datum. Proteus automatically takes into account tidal data and includes it in your depth mapping.

Non interactive



Debug is for onsite tech support when installing, setup, and troubleshooting systems.

Get the Most out of Proteus

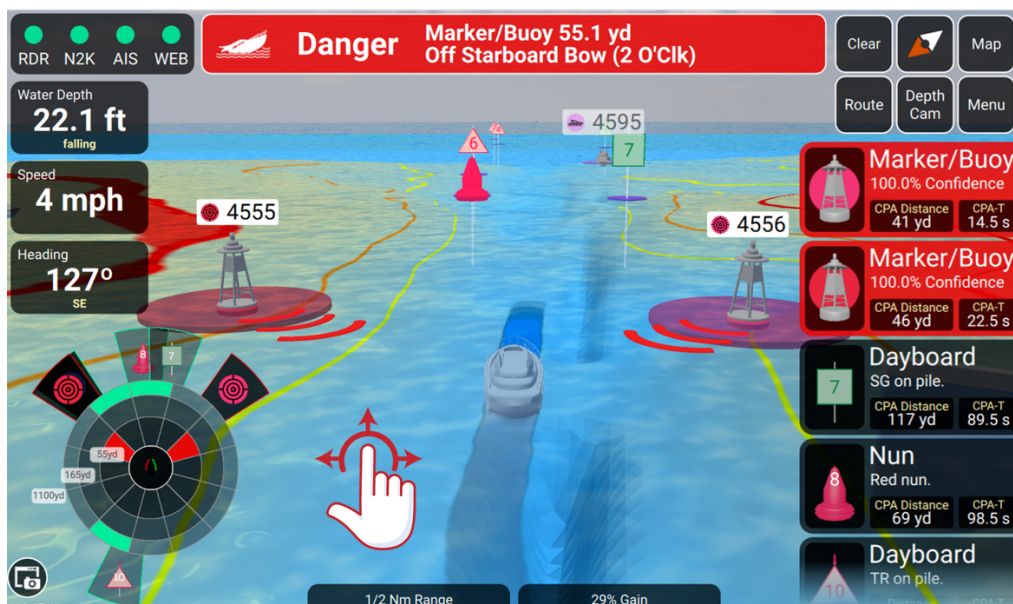
Now that setup is complete and your preferences are applied, you can start to enjoy the benefits of Proteus. The display is user-friendly and intuitive once you're used to it. This guide points out the powerful ways that Proteus has re-imagined the navigation experience.

Displays

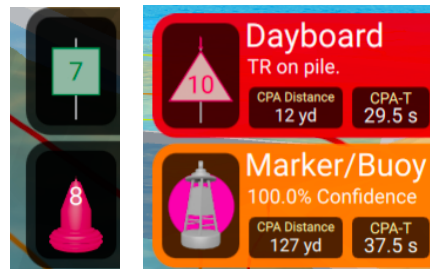
Re-imagine the experience at your helm with the intuitive Proteus 3D Display!

Track and see all of your targets in new 3D renderings

Screen Swivel by simply holding your finger to the screen and dragging you can move the perspective in 360 degrees.



In the Priority Target Display you can touch the icons and they shrink to a small icon or leave them expanded to show all relevant information.



- **Note:** If the icons are small or large the most immediate threat will always populate to the top in the large icon format

Experience multiple ways of viewing Proteus in 3D.

- Depth Cam
- Deck Cam

Proteus' Classic 2D Map Display is so much more than classic!

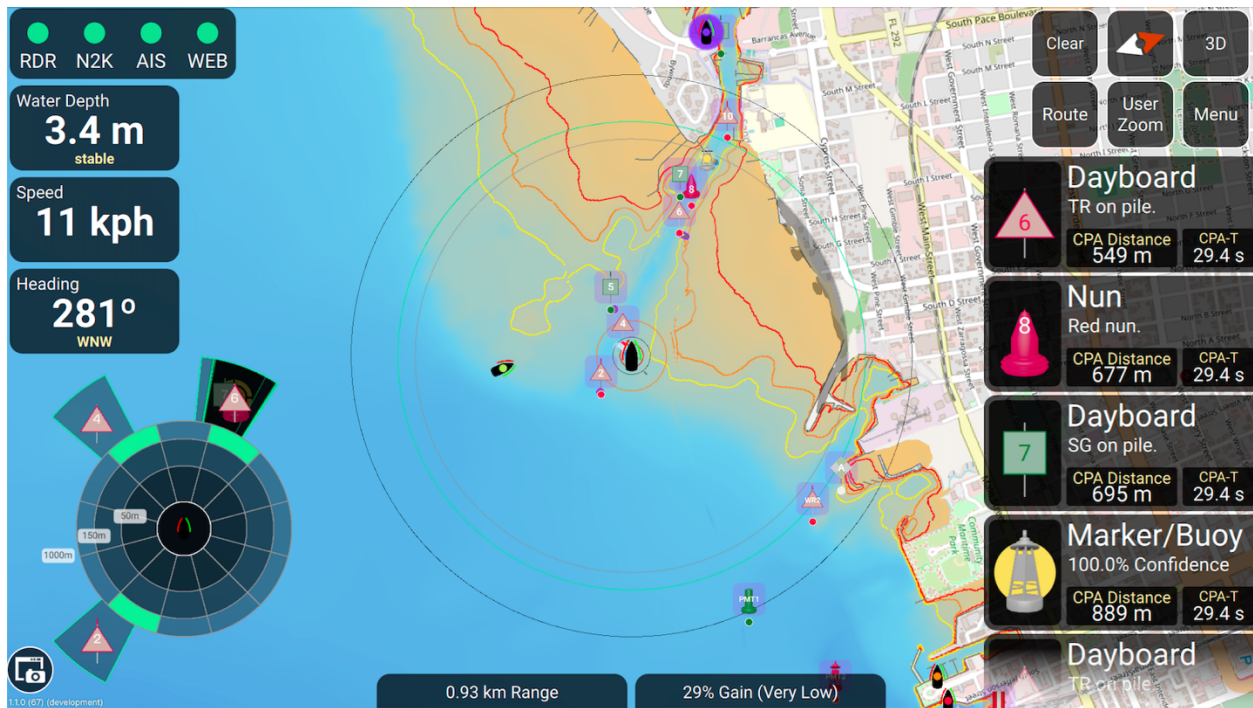
Uses RADAR Vision to display other boats Predicted Path

Markers and buoys are easier to see and understand than on a traditional chart plotters.

Using Proteus' RADAR Colormap option you can power off the intrusive radar blobs that take up large portions of you display

Visualize your depth thresholds with yellow, orange, and red lines that show you where you might have a risk of running aground.

- Yellow line: Mild threat/Shallow Water
- Orange line: Medium threat/Shallower Water
- Red line: Critical threat/Very Shallow Water



- Note:** The Darker the sand the shallower the water. The darker the blue the deeper the water.

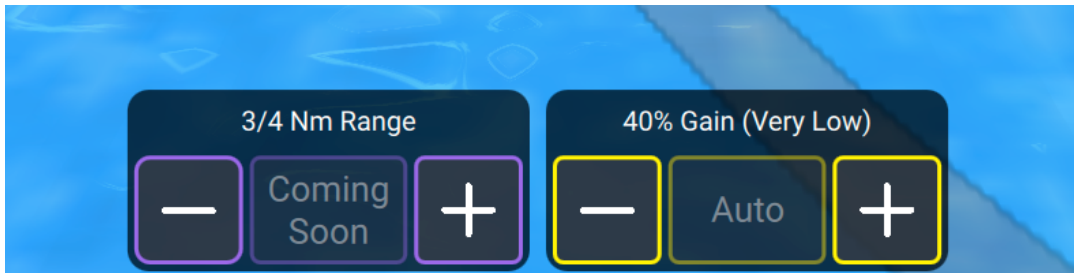
Your threat levels can be customized to your boat (see Depth Detection in Chapter 1)
Experience multiple ways of viewing Proteus in traditional 2D with our preprogrammed zoom levels.

- Near Zoom
- Mid Zoom
- Far Zoom

Other Features on the Home Screen

Radar Display (Auto Gain/NM Range)

- Adjust Gain up (+) or down (-) to meet desired needs on the water.
- On compatible RADAR hardware, select Auto to have Proteus Auto-Focus manage your RADAR gain.
- Manually adjust Nautical Mile range up (+) or down (-) or use preset zoom levels in the control panel.



- **Note:** Adjustments made in this section will affect your OEM display, and vice versa.

Field of Awareness a graphical representation of items nearby and their threat level to your vessel. This display is created by combining state-of-art radar object detection and tracking with USCG Light List and AIS data to provide situational awareness without manual user intervention. Threat level considers not only the current location of this vessel and other objects but predicts the time and location of the closest approach.

- Green/Outer Circle: This is a notification that there is a boat or object within your set Range Detection Level.
- Orange/Middle Circle: This is a warning that there is a boat or object within your set Range Detection Level.
- Red/Inner Circle: This is a threat to your boat by another boat or object within your set Range Detection Level.



- **Note:** To configure your Range Detection Level, see Preferences on Page 16

Communication Status Bar (RDR, N2K, AIS, WEB) is a quick view of the connection statuses to your Proteus device.

RDR – Radar Connection to your Proteus device

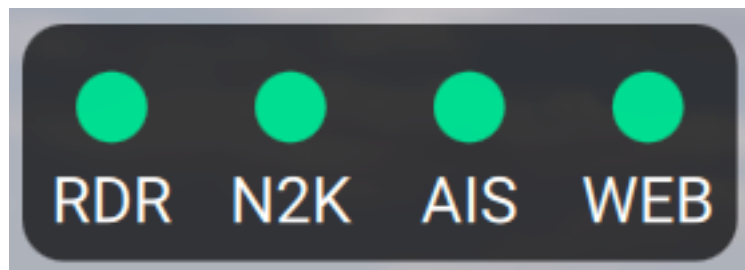
N2K – NMEA2000 Connection to your Proteus device

AIS – AIS VHF Connection to your Proteus device

Web – WIFI Connection to your Proteus Device

Connectivity Status Color Chart

- **Green:** Actively receiving data
- **Orange:** Has received data since system started, but not currently receiving data
- **Red:** Never received data



- **Note:** The AIS Radio must be powered on for AIS icon to be Green. It is not required for Proteus to work, but you will lose the ability to identify boats by their AIS signal including 3D renderings, speed, and direction. If you do not have an AIS radio this icon will stay Red.

Control Panel is the primary controls for adjusting items, targets, and views on your home screen.

Clear should be used if you see tracked boats on the Proteus display that do not correspond to real vessels (also called "False Positives").

- ❑ A single tap on the Clear button will delete tracked targets that are near your vessel. This is used when false targets appear near our own vessel, typically due to RADAR returns from our own vessel wake causing an alert.
- ❑ A double tap on the Clear button will delete all tracked targets. Proteus will immediately begin to re-acquire targets if possible.

Compass Heading: Switch the orientation between the screen pointing north up or course up

Map/3D – Switch between Map (Classical 2D) and 3D Views

View Orientation:

- ❑ In Classical 2D switch between preprogrammed zoom levels Near, Mid, and Far.
- ❑ In 3D switch between Deck cam and Depth cam

Route: Plot a route to a desired location and Proteus will choose the quickest route for you to travel to your destination based on depth (See Course Plotting in Advanced Features)



Priority Target Panel is one of three locations on the home screen to see the targets near your vessel.

As targets become threats, they will auto populate to the top of the list based on the immediacy of the threat (Pictured Above)

Objects that appear on the display may not be classified right away. This is a percentage depiction of the system's confidence level classifying the radar hit. As Proteus becomes smarter the system will classify the targets quicker.

Proteus will also give you a confidence rating of targets on the water. The more you are on the water the smarter Proteus gets.

List of objects on the water

Boats

Markers

Buoys

Unidentified Objects

CPA Distance – Closest Point of Approach Distance

CPA – T – Closest Point of Approach Time

In the Priority Target Display you can touch them and they shrink to a small icon or leave them large to show all relevant information.



- **Note:** If the icons are small or large the most immediate threat will always populate to the top in the large icon format

The Alert Banner appears when there are immediate threats above and below water

Severity of Alert:

- Red (Immediate threat)
- Orange (Medium threat)
- Purple (Shallow water threat)

Note: The banner will disappear when there is no threat

Identification of target "Small Vessel"

Distance 221.1 yd: Total distance to your threat

Direction "Off the Port Bow (10 O'Clk)": Clock direction off the bow of where your threat is located

Close Approach 7.2 yd in 18.0 s: Distance and Time from your threat

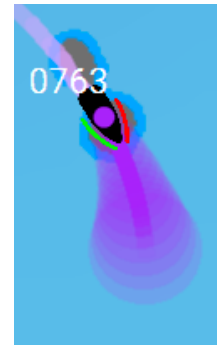


Projected Path (2D View Only) Proteus can predict another boat's position 20 seconds into the future based on its current path and speed. The potential future location of a boat or object is displayed on the 2D view.

Path Traveled is the line behind the boat is the path that the boat has traveled from.



Slow Boat



Fast Boat

- **Note:** the shorter and wider the path is an indicator that the boat is traveling slower and has more maneuverability. The longer and narrow the projected path indicates that the boat is traveling at a high speed and has less maneuverability.

Projected Path (3D View/Your Vessel) Projected path is always on whether in traditional 2D or 3D views. It will change direction with you as you steer on the water.



Advanced Features

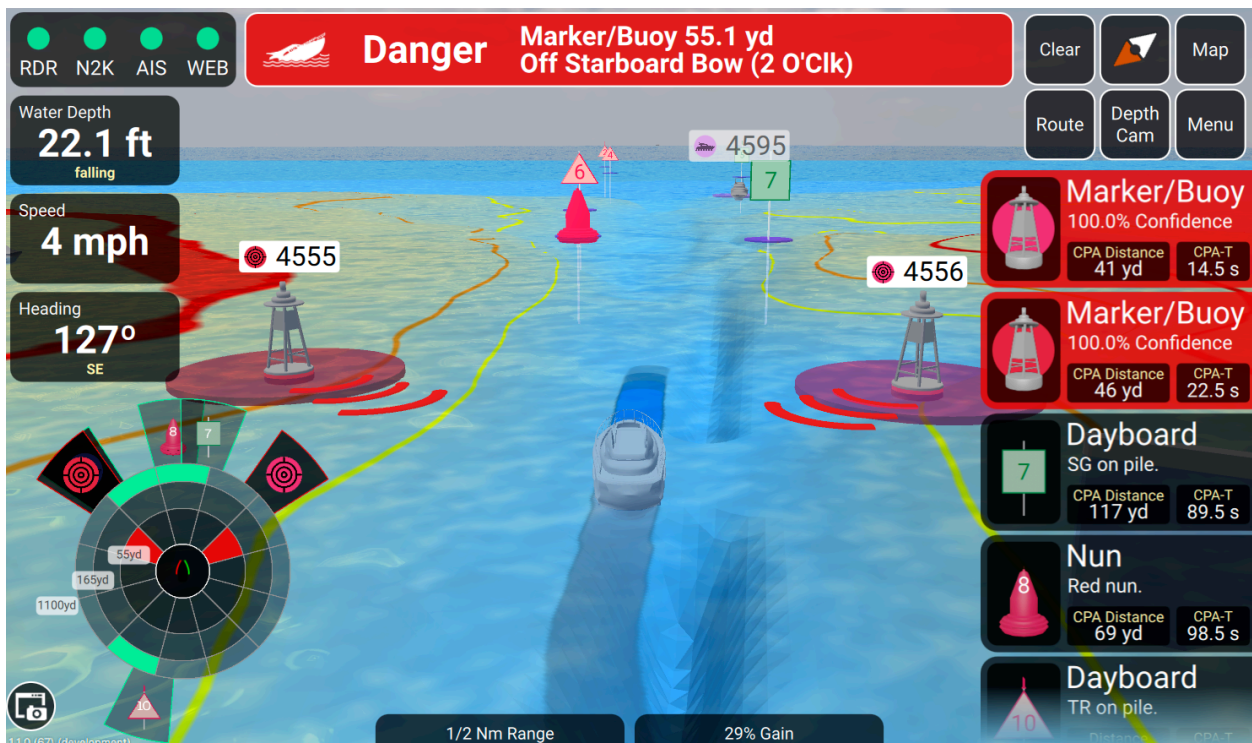
Going beyond the basic features and displays, Proteus helps you navigate in new ways by remapping the seafloor as you travel, and computing safe routes that are corrected for time and tide.

Active Remapping allows you map familiar and foreign waters. Proteus will actively take the existing chart data and the new depth readings from your transducer to give you the most up to date map datum available.

Active Remapping data will be shared with all Proteus users with an internet connection. Proteus sends and receives weekly consolidated and validated updates from Tocaro servers.

Requirements for Active Mapping

- The vessel must be underway (moving)
- The vessel must be equipped with a NMEA depth transducer
- We must have baseline maps for your location (baseline depths)



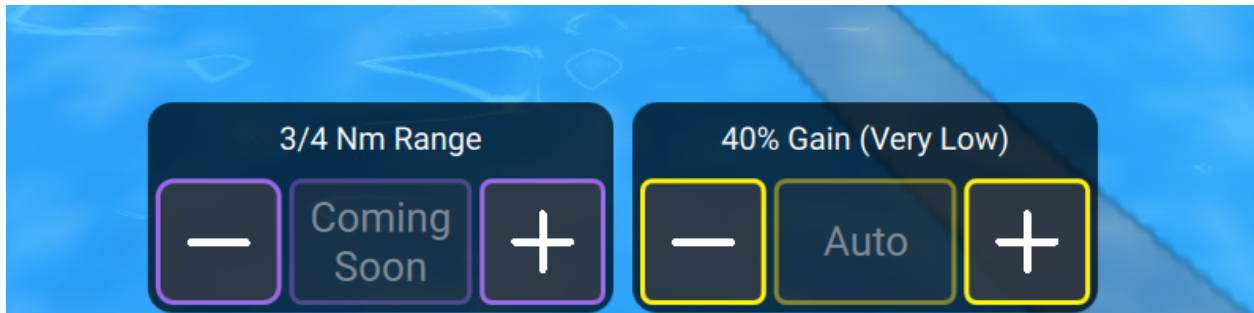
Note: Channel Marker, buoy, and Dayboard numbers/designators will be auto populated in 2D/3D.

Course Plotting allows you to plot a route to a desired location and Proteus will choose the quickest route for you to travel to your destination based on safe depth passage for your boat

- ❑ Press the Route button in the control panel (top right)
- ❑ Press a desired location and Proteus will map a path for you to take based on the safe water depths set for your boat.
- ❑ Press the End Plan button to stop your route (Same button as the Route button)



Auto Gain allows you to adjust the gain on the home screen. This feature is primarily used for Magnetron radars. Solid State Radars can be enhanced by Auto Gain but do require it to function properly



- **Note:** Many of the radar companies develop one or both styles (Magnetron or Solid State) of radars. Be sure to specify what type of technology your radar employs to get the full experience out of Proteus.

Targets are colored coordinated between the object on the water, Field of Awareness, and Priority Target panel.



3D Generated Targets are generated by Proteus to give you the user an idea of what to look for on the water. These targets are generated by AIS, non-AIS targets, and RADAR vision.

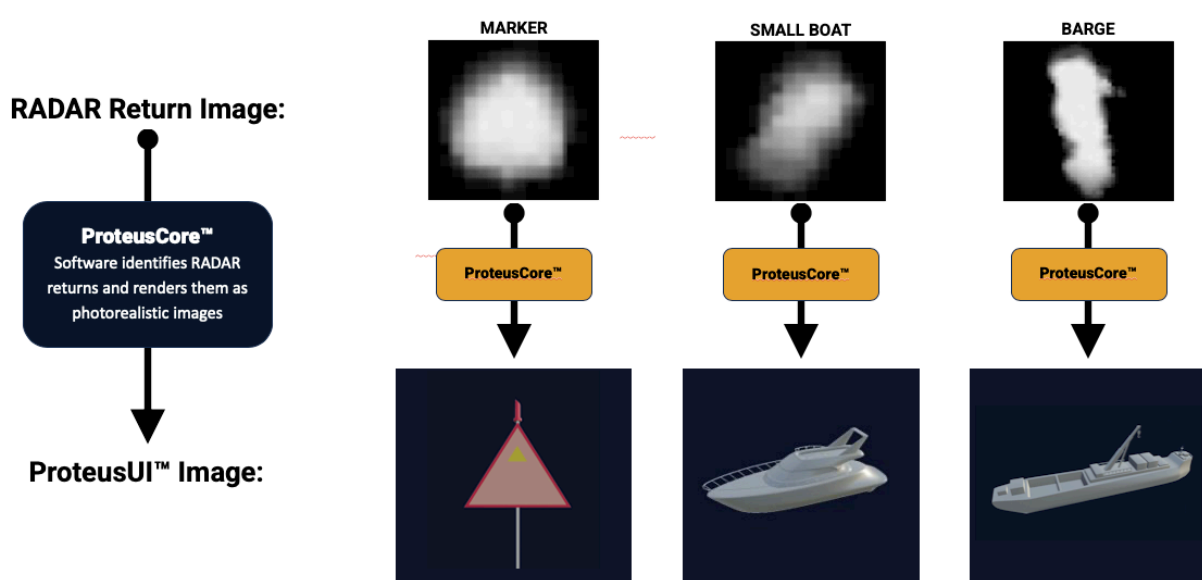


ProteusCore™ uses machine learning to classify RADAR returns.

Proteus filters out 90% of RADAR returns to show you what really matters.

All objects in the RADAR's view - boats, markers, debris - are tracked by Proteus.

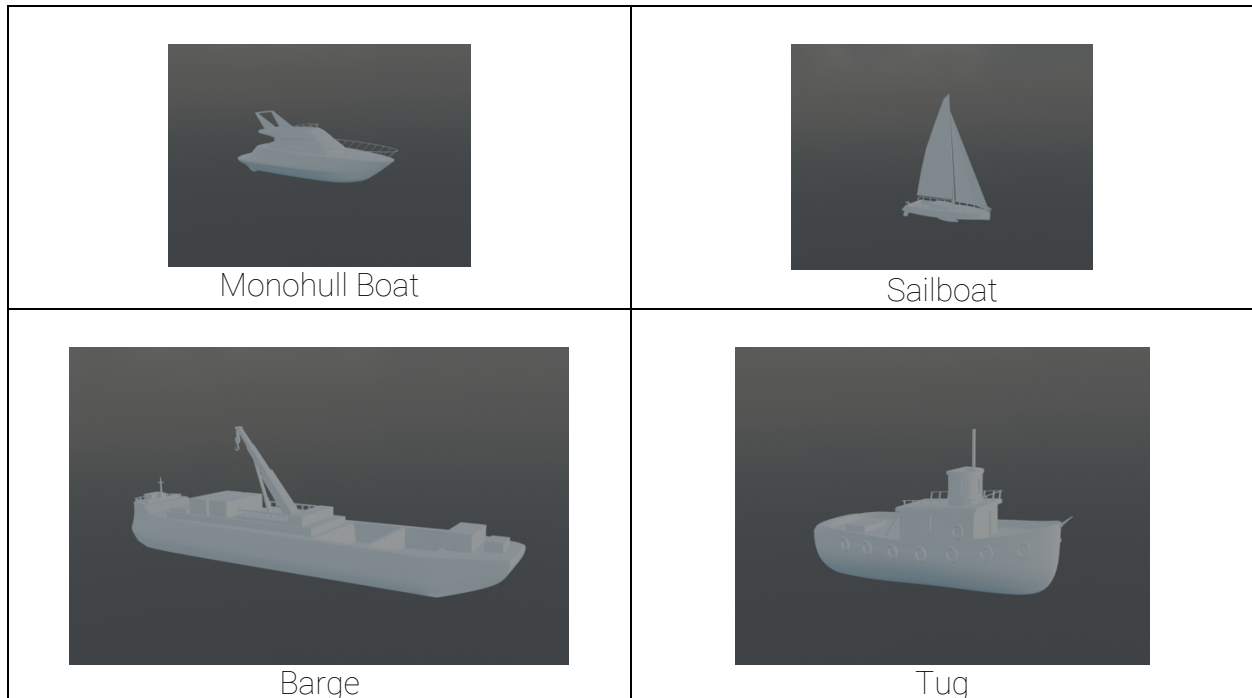
Proteus predicts an object's location 20 seconds into the future.



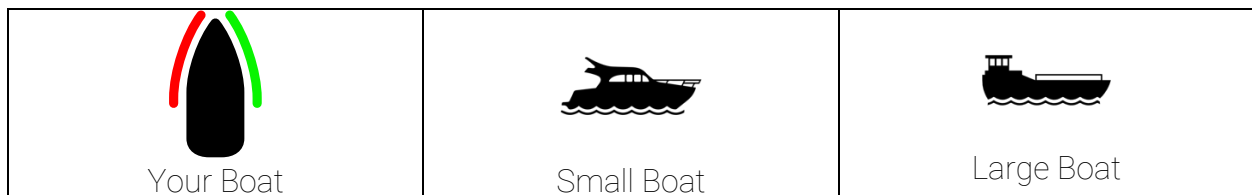
Visuals / Navigation Aids

Proteus is full of new icons and models that are easy to see and use in your navigation. For more thorough understanding of exactly what the display is presenting, this is a guide of the essential icons and images used in the Map, 3D world, and Field-of-Awareness.



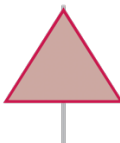
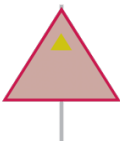












Boats (3D)



Boats (2D)

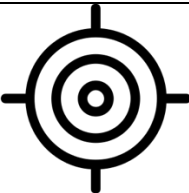
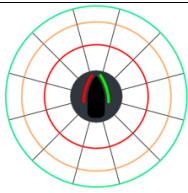
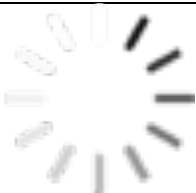





Buoys





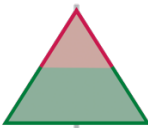



 <p>Starboard Side / Red Buoy</p>	 <p>Starboard Side / Red Buoy</p>	 <p>Starboard Side / Red Dayboard</p>	 <p>Starboard Side Red Dayboard Intercoastal</p>
 <p>Port Side / Green buoy</p>	 <p>Port Side / Green Buoy</p>	 <p>Port Side / Green Dayboard</p>	 <p>Port Side Green Dayboard Intercoastal</p>
 <p>Safe Water</p>	 <p>Safe Water</p>	 <p>Preferred Channel</p>	 <p>Preferred Channel</p>
 <p>Special Marks</p>	 <p>Special Marks</p>	 <p>Special Marks</p>	 <p>Isolated Danger</p>

- **Note:** Channel Marker, buoy, and Dayboard numbers/designators will be auto populated in 2D/3D.

In-App Icons

 <p>Unknown Target</p>	 <p>Field of Awareness</p>	 <p>Loading Icon</p>
 <p>Compass North</p>	 <p>Compass</p>	 <p>Buoy</p>

Other Navigation Aids

 <p>Diamond Dayboard</p>	 <p>Diamond Dayboard</p>	 <p>Diamond Dayboard</p>	 <p>Preferred Channel</p>
 <p>Preferred Channel</p>	 <p>Regulatory Marker</p>	 <p>Unknown Buoy</p>	 <p>Range Dayboard</p>

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