

# CYSCAN AS

## OPERATOR'S GUIDE



# WÄRTSILÄ



Wärtsilä Guidance Marine Ltd,  
5 Tiber Way, Meridian Business Park, Leicester, LE19 1QP, UK

T: +44 116 229 2600 E: sales@guidance.eu.com

[www.guidance.eu.com](http://www.guidance.eu.com)  
[www.marine.direct](http://www.marine.direct)  
[www.wartsila.com](http://www.wartsila.com)



Serial No:

Sensor Software Version:

Client Software Version:

Date of Shipment from UK:

Wärtsilä Guidance Marine Ltd,  
5 Tiber Way,  
Meridian Business Park,  
Leicester,  
LE19 1QP  
UK

T: +44 116 229 2600

UK Support: +44 116 229 2665  
(365 days a year; 08:00 - 20:00 UTC)

USA Support: +1 504 305-1120

Asia Support: +65 6734 6365

customerservices.wgm@wartsila.com

W: [www.guidance.eu.com/customer-support](http://www.guidance.eu.com/customer-support)

Copyright © Wärtsilä Guidance Marine Limited. All Rights Reserved.

Copyright in the whole and every part of this document belongs to Wärtsilä Guidance Marine Limited (the "Owner") and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person other than in accordance with the terms of the Owner's Agreement or otherwise without the prior written consent of the Owner. "CyScan" is a registered trademark of Wärtsilä Guidance Marine Ltd. All other brand and product names are trademarks of their respective companies or organisations.

Class 1M Laser Product  
Complies with EN 60825-1  
Complies with USA CFR 1040.10  
& 1040.11 except for deviations  
pursuant to Laser Notice No 50  
26 Jul 2001



## Document History

---

Document Number	Changes	Issue Date
94-0560-A	First release of CyScan AS Operator's Guide	25/10/2017
94-0560-B	Corrections and Align Heading had been added	22/02/2018
94-0560-C	GeoLock Section has been added	25/02/2020

# Table of Contents

<b>1. Introduction</b>	<b>5</b>	<b>4.4 Selecting Targets for Multi-Target Tracking</b>	<b>34</b>
1.1 Welcome	6	<i>Selecting Reflections</i>	34
1.2 System Overview	7	<i>Target Selection Order</i>	35
1.3 CyScan Sensor Part Names	8	<i>Target Selection Order and Coordinate Axes Direction</i>	36
<b>2. Getting Started</b>	<b>9</b>	<b>4.5 Aligning Multi-Target Tracking</b>	<b>37</b>
2.1 Start Up and Shut Down	10	<b>4.6 GeoLock Mode</b>	<b>38</b>
2.2 Screen Layout	12	<b>5. Multi-Dashboard (Ethernet) CyScan Systems</b>	<b>39</b>
<i>Main Screen and Bird's Eye View (BEV)</i>	13	5.1 CyScan Ethernet Dashboard - Monitoring Mode	40
<i>Side Bar</i>	15	5.2 CyScan Ethernet Dashboard - In Command Mode	41
<i>Hotkey Buttons</i>	16	<b>6. Support Information</b>	<b>42</b>
<i>Menu Pane</i>	17	6.1 Serial Numbers and Software Versions	43
<i>Coordinates View</i>	18	6.2 DP Feed	44
2.3 Tracking Information Quality	19	<i>To View DP Feed Details</i>	44
2.4 Display Settings	20	6.3 Manual Power Control	45
2.5 Vessel Orientation	21	<i>To Enable Manual Power Control</i>	45
<b>3. Tracking Basics</b>	<b>22</b>	<i>To Use Manual Power Control</i>	45
3.1 Dynamic Blanking Zones	23	<i>To Disable Manual Power Control</i>	45
<i>Setting the Dynamic Blanking Zone</i>	23	6.4 Ethernet Sensor Data Logging	46
3.2 Working with Reflections	24	6.5 Serial Sensor Data Logging	47
<i>Basic Reflections Data</i>	24	<b>7. Troubleshooting</b>	<b>48</b>
<i>Extended Reflection Data</i>	25	7.1 Problems and Possible Remedies	49
3.3 Scanner Tilt Controls	26	7.2 Cleaning the Sensor and Targets	50
<i>Scanner Tilt Modes</i>	26	7.3 CyScan Fuse Information	51
<i>Manually Tilting the Sensor</i>	27	<b>8. Additional Information</b>	<b>52</b>
<i>Spirit Level</i>	27	8.1 Target Types	53
<b>4. Single and Multi-Target Tracking</b>	<b>28</b>	8.2 Targets Installation and Position	54
4.1 Types of Target Symbols	29	8.3 Low Temperature Operation	55
4.2 Introduction to Single and Multi-Target Tracking	30	8.4 Using the On Screen Keyboard	56
<i>To Start Tracking</i>	30	8.5 Working with Alarms	57
<i>To Stop Tracking</i>	30	<i>Filtering Alarms</i>	57
4.3 Positional Display Modes	32	8.6 Using the Current and Historic Alarms	58
<i>Bow and Starboard Axes</i>	33	8.7 Network Communication Settings	59
<i>A and B Axes (A Pos and B Pos)</i>	33	8.8 CyScan System Specifications	60
		8.9 Index	61

---

# 1. Introduction

1.1 Welcome	6
1.2 System Overview	7
1.3 CyScan Sensor Part Name	8

Welcome to the CyScan AS Operator's Guide.

**Getting Started** (see page 9) explains the basics that you'll need to know before using the CyScan system for the first time.

The CyScan system can be installed either as a single-Dashboard serial system or as a multi-Dashboard Ethernet system.

The majority of the sections in this guide apply equally for serial or Ethernet configured systems and explain how to perform the various tasks necessary to operate the system and use it for tracking. These include **Tracking Basics** (see page 22) and **Single and Multi-Target Tracking** (see page 28), **GeoLock** (see page 38), **Support Information** (see page 42) and **Troubleshooting** (see page 48). The section **Multi-Dashboard (Ethernet) CyScan Systems** (see page 39) gives information specific to an Ethernet configured system.

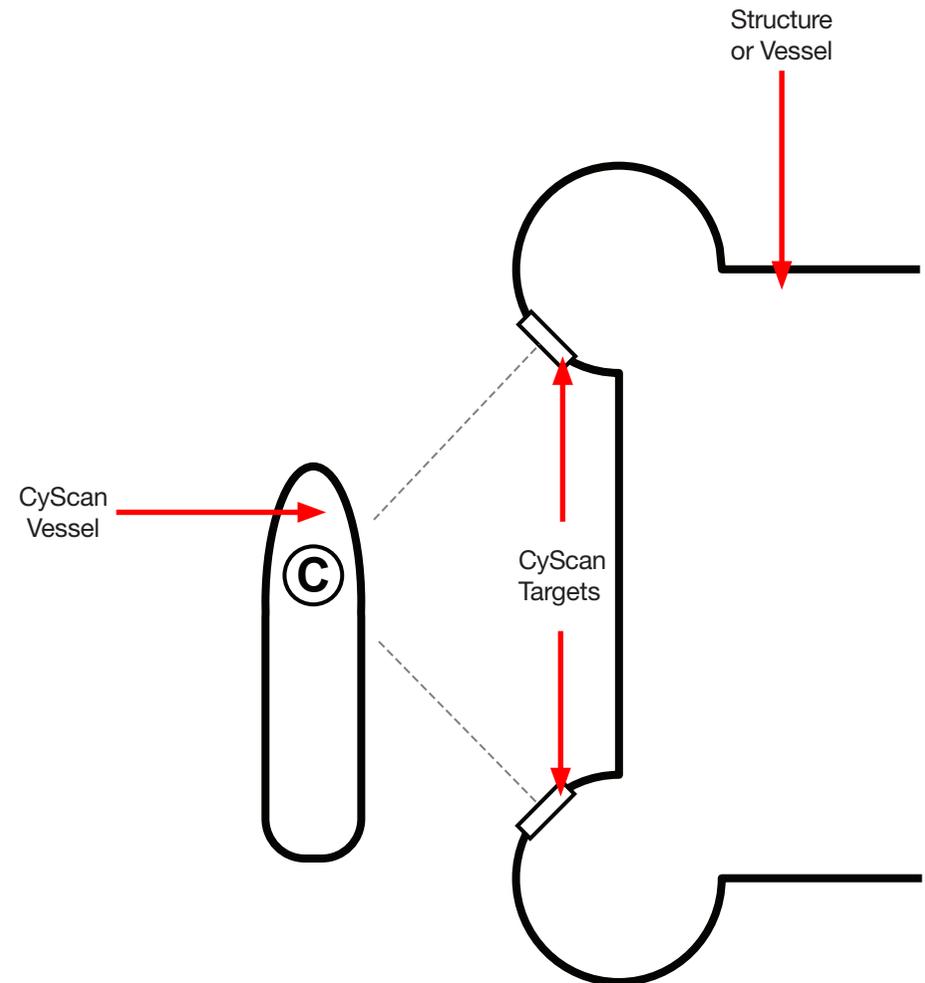
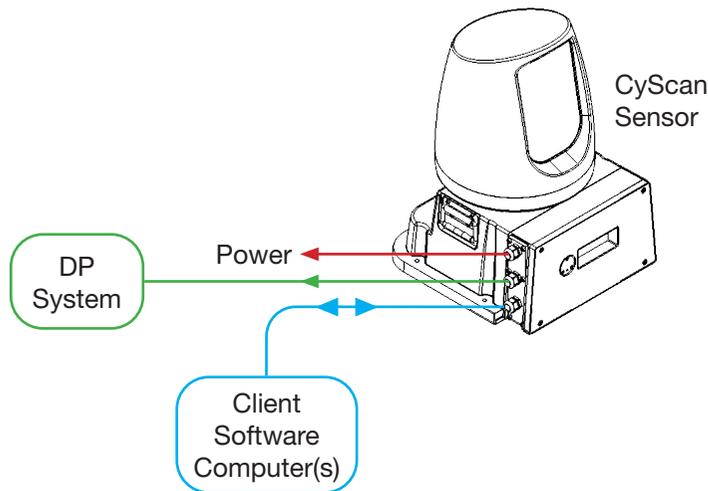
Note that whilst we endeavour to describe the functionality of the Dashboard correctly in this document, we do not guarantee that it exactly represents the version of Dashboard that you are running, particularly after any future upgrades to the software.

The CyScan System is based on a high accuracy laser sensor and provides positional information to allow automated approach and/or station keeping relative to a structure or vessel. It requires one or more reflective targets to be attached to the sides of the structure or vessel.

The CyScan system is designed to be semi-portable and straightforward to operate. Its key elements are:

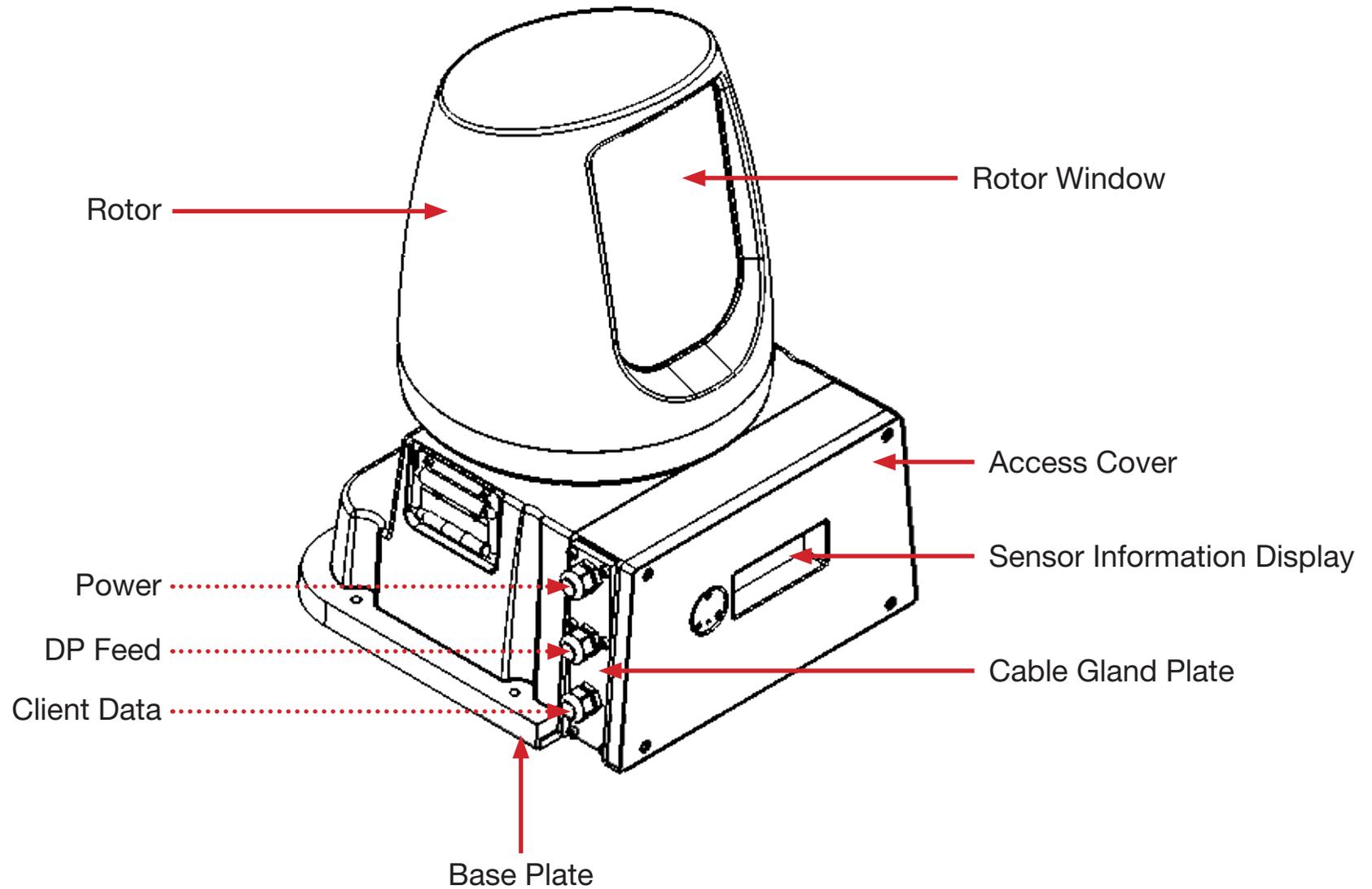
- The **CyScan Sensor**, with integrated Power Supply Unit, which is mounted on the vessel (typically on the wheelhouse) as required.
- The **CyScan Client Software**: The **CyScan Dashboard** is a monitoring and control application running within Microsoft Windows™ on a Type 3 Marine Processor or other computer. This provides the DP operator with status information and control of the system and the data stream being fed to the DP system. The **CyScan Service Interface** is used for system installation and maintenance. This replaces the Service Access function in earlier versions of the CyScan Dashboard and Console.
- The **CyScan Targets**. Retro-reflectors consisting of high performance prism clusters for longer-range capability.

CyScan emits eye-safe infrared light and detects the reflections received back from one or more targets mounted on designated structures or vessels. The range and bearing of the target(s) are accurately measured, displayed on the Dashboard screen and automatically transmitted to the vessel's DP system.



The key elements of the CyScan system

The diagram below illustrates various parts of the sensor unit and gives the terms used for them.



---

## 2. Getting Started

2.1 Start Up and Shut Down .....	10
2.2 Screen Layout .....	12
2.3 Tracking Information Quality .....	19
2.4 Display Settings .....	20
2.5 Vessel Orientation .....	21

You may also find the following sections of the *Additional Information* section useful at this stage:

8.4 Using the On Screen Keyboard .....	56
8.5 Working with Alarms .....	57

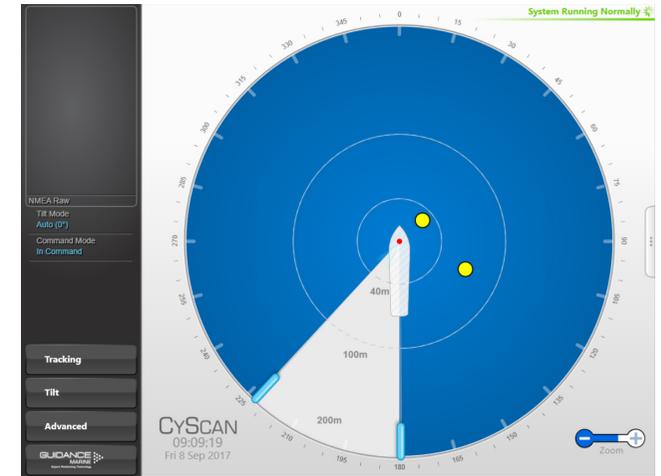
## Start Up

### To Start CyScan Dashboard

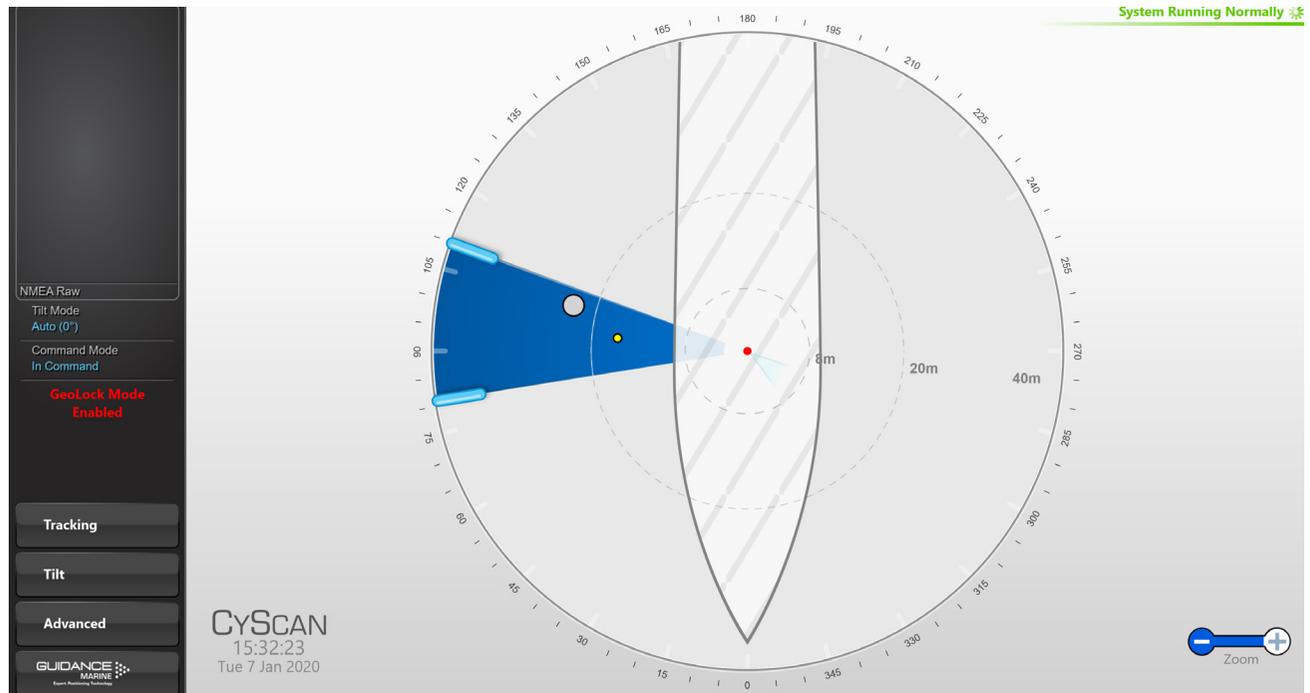
1. Ensure that the CyScan sensor is powered on.
2. Double-click on the CyScan Dashboard icon. (Or run the CyScan Dashboard application from **Start > All Programs > Wärtsilä Guidance Marine Ltd > CyScan > CyScan Dashboard**).
3. The Dashboard display screen will appear. If the sensor is currently suspended, the main part of the screen will be greyed out. Click on the Resume button in the side bar in order for the sensor to begin scanning and for the results to be displayed on the screen. If the sensor was already scanning, any targets in view will be displayed straight away.



Dashboard screen with sensor suspended



Dashboard screen with sensor scanning



Dashboard screen with GeoLock enabled

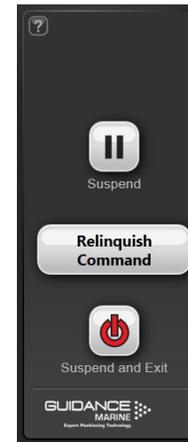
## Shut Down

### To Suspend, Exit Disconnect

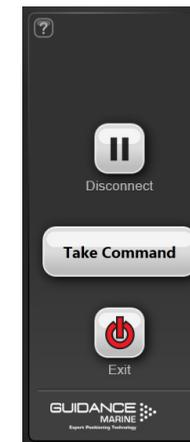
1. Click on the Guidance button in the lower left corner of the screen

This will reveal buttons in the side bar as follows: (see right).

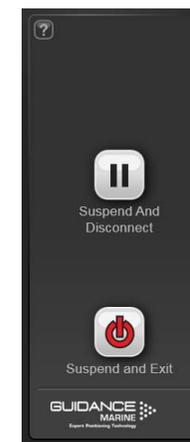
- Suspend - Places the sensor into a 'sleep mode'. The rotor ceases spinning and the scanner tilt returns to a fixed state. However, upon command from the Dashboard application, the unit will return to full operation. This mode is suitable for use when travelling between locations.
- Disconnect - Ceases communications between the Dashboard and sensor and causes the main part of the screen to be greyed out. Does not cause the sensor to stop spinning or tracking targets.
- Suspend And Disconnect – A combination of the above two functions (Serial Dashboard only).
- Suspend And Exit - Places the sensor into the same 'sleep mode' as the suspend command (discussed above) and also closes the CyScan Dashboard program.
- Exit - Closes down the Dashboard without affecting the sensor.



**Dashboard In Command**



**Dashboard Monitoring**

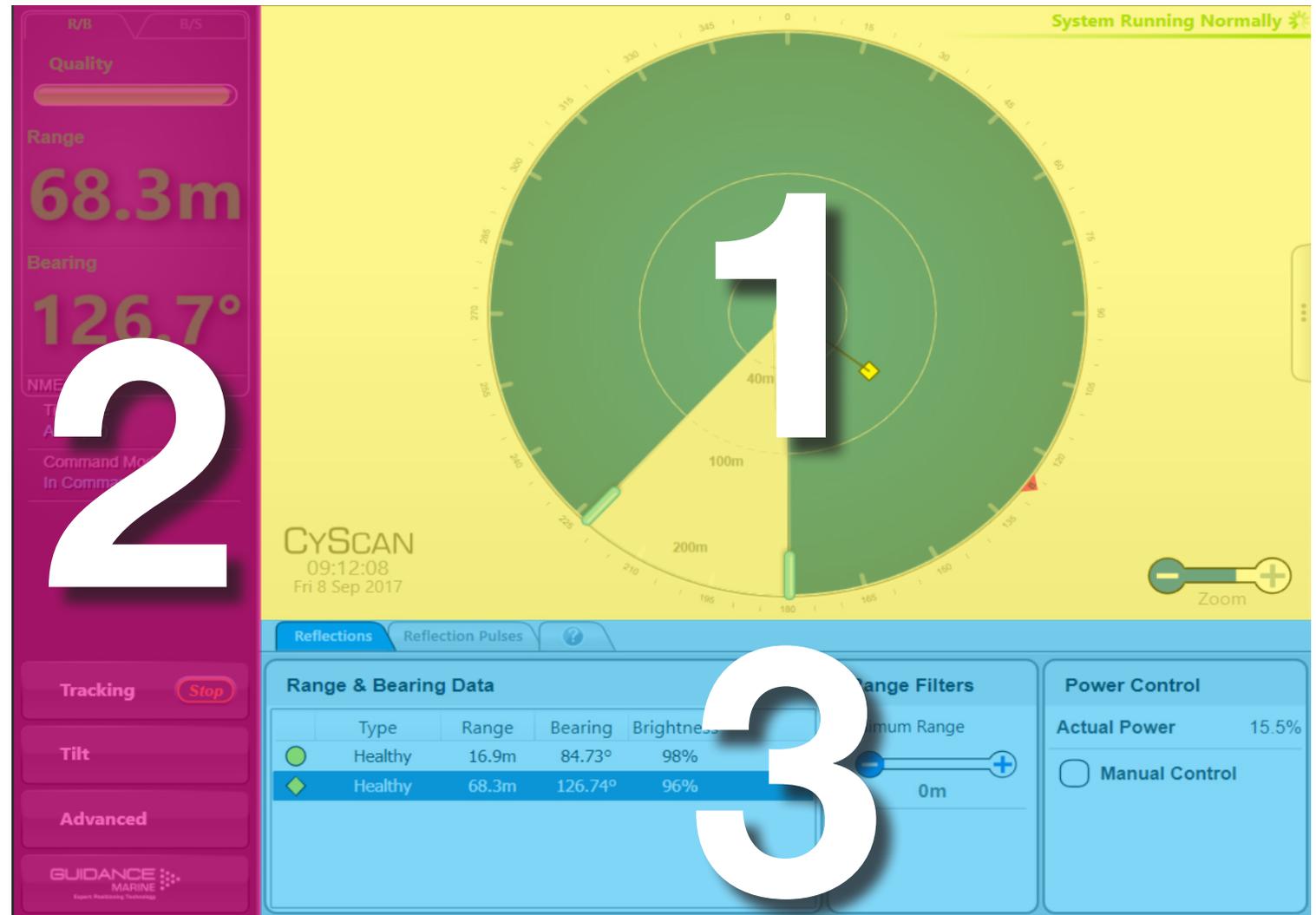


**Serial Dashboard**

See **Multi-Dashboard (Ethernet) CyScan Systems (page 39)** for information on In Command/ Monitoring functionality

The CyScan Dashboard screen is split into three distinct sections, these are:

- 1. **Main Screen and Bird's Eye View (BEV)** (see page 13)
- 2. **Side Bar** (see page 15)
- 3. **Menu Pane** (see page 17)



### Main Screen and Bird's Eye View (BEV)

The centre of the circular BEV represents the CyScan sensor and it shows the relative positions of the CyScan vessel and any detected reflections.

### Vessel Outline

The length and breadth of the vessel and the offsets and orientation of the CyScan sensor within it can be configured using the CyScan Service Interface (see Installer's Guide) so that the vessel image is correctly scaled and positioned on the BEV.

### Dynamic Blanking Zone

The dynamic blanking zone is the sector within each revolution of the sensor rotor where the laser is switched off. This is used by the DP operator to mask out unwanted reflections when needed. The dynamic blanking zone can be adjusted using the Drag Handles, to suit different situations (See **Dynamic Blanking Zones** on page 23).

### Range Circles

The Range Circles act as a visual guide to show the distance between the CyScan vessel and the detected reflections. Distances are shown in metres from the CyScan sensor. Use the Zoom Control to change the scale of the display. (See page 14).

### Radial Markers

These form an angular scale in degrees, clockwise around the circumference of the BEV. Zero is defined by the bow of the vessel, or by a line between the primary and secondary targets, depending upon the selected tracking mode, DP format and display coordinates.



## Reflection Images

Reflections from AS prisms are shown as yellow circles whereas reflections from other reflectors are shown as grey circles. The reflections have a black outline to help in situation where 2 reflections need to be overlaid on the screen. For tracking you must select the reflection(s) that correspond to the physical target(s) to be used. The set of reflections selected for tracking are displayed as diamonds joined by cyan connecting lines (see [Selecting Reflections](#) on [page 34](#)). If the system loses sight of a tracked target then the target indicator changes to a red diamond.

## Bearings and Heading Tags

These are displayed on the Radial Marker when the system is in tracking mode, to indicate the bearing of the primary (or only) target and the vessel's heading. The visibility of these two elements depends on the DP format selected and which coordinate system is being used to display the positional information (see [Positional Display Modes](#) on [page 32](#)).

## Zoom Control

Click on the left-hand side of the control (marked '-') to zoom out of the display and on the right-hand side ('+') to zoom in. The display can also be zoomed by using the mouse wheel when the cursor is positioned over the BEV. For touchscreen displays that supports 2 or more touch points, pinch-to-zoom also works from the BEV.

## Status Display

This consists of two fields:

### Primary

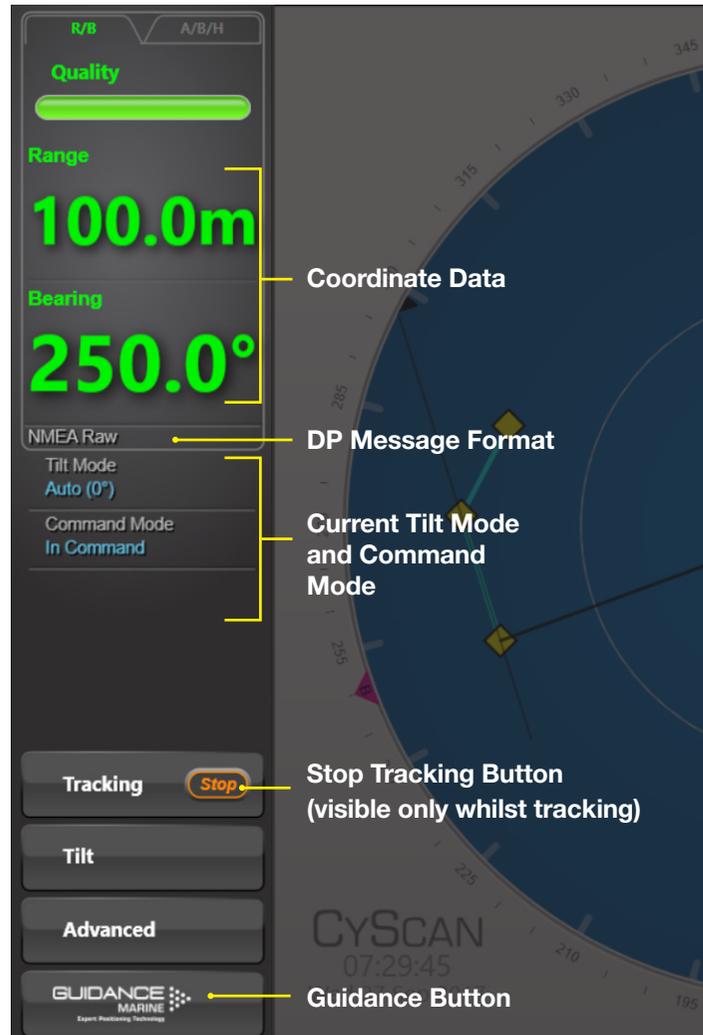
The primary part of the Main Screen. It indicates the current status of the system (e.g. running, suspended, disconnected or error).

### Secondary

The secondary status display is located in the lower right corner of the Main Screen (beneath the zoom control) and is normally hidden. It displays a flashing message for a number of seconds in order to confirm an action taken by the user, e.g. grabbing a screenshot or enabling/disabling the on-screen keyboard. It can also display a persistent, static message if there is a communications problem.

### Side Bar

The Side Bar, the black pane to the left of the BEV, contains control and display components in addition to the coordinates pane.

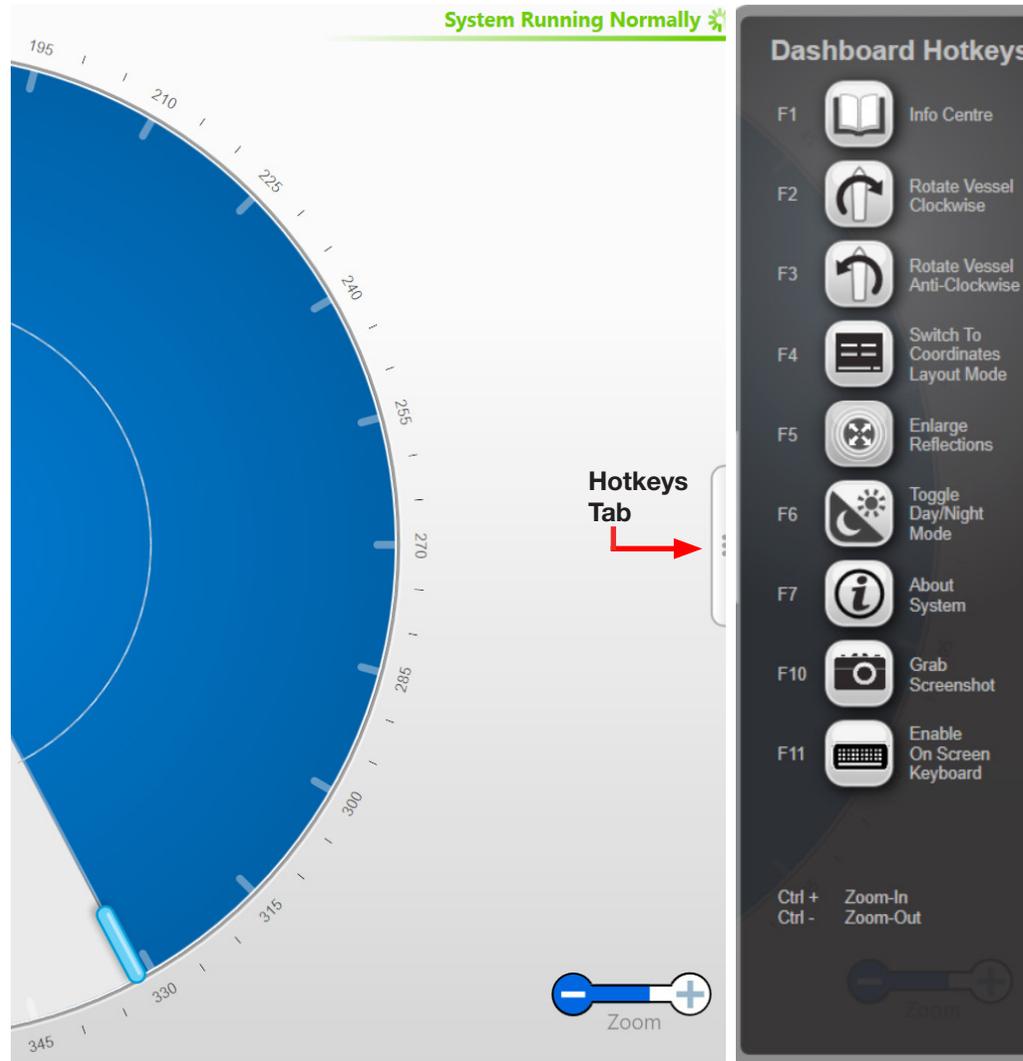


After pressing the Guidance button:



## Hotkey Buttons

Selecting the Hotkeys tab on the right-hand side of the main screen activates the Dashboard Hotkeys menu.



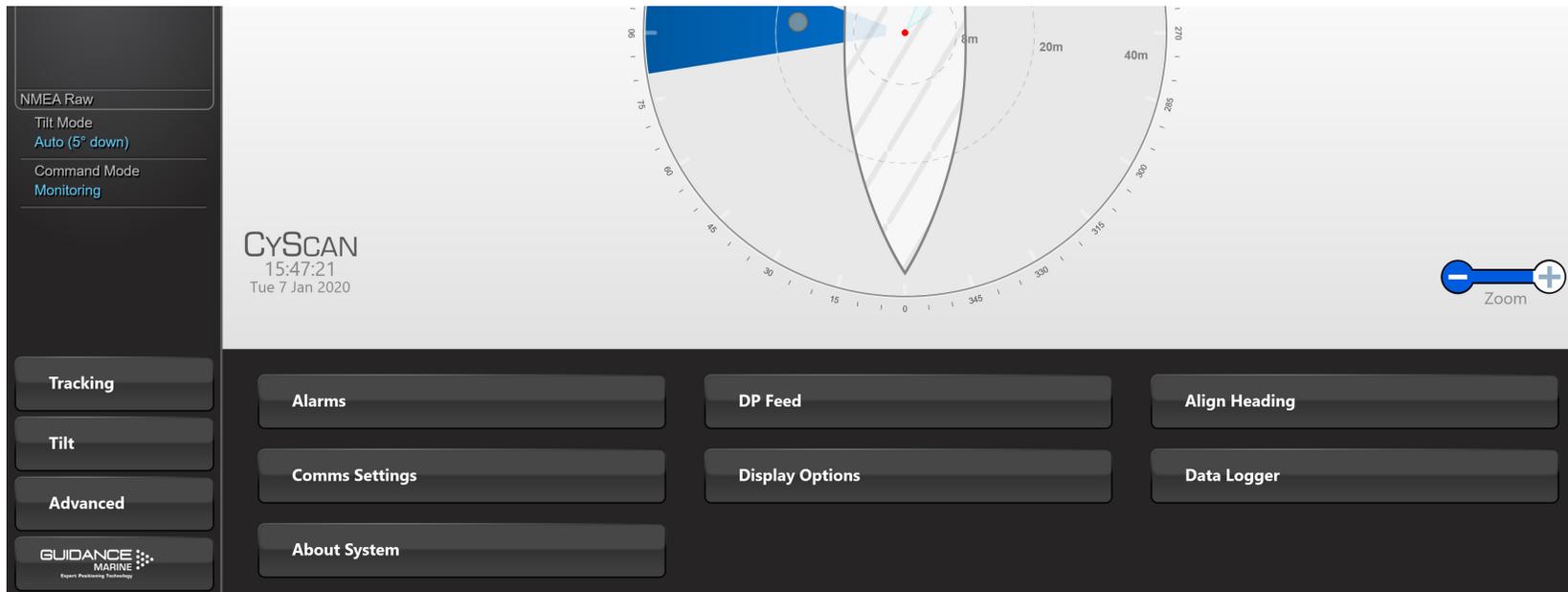
The following keys - and the corresponding buttons on the Dashboard Hotkeys menu - act as shortcuts to application functions.

- F1** Help Menu
- F2** Rotates the vessel clockwise
- F3** Rotates the vessel anti-clockwise
- F4** Toggles between BEV and Coordinates Layout Mode
- F5** Toggles between enlarged and standard-sized reflections
- F6** Toggles between the day view and night view
- F7** Toggles between the **About System** pane and the full main screen display
- F10** Takes a snapshot of the screen and stores the image with the log data
- F11** Toggles the on screen keyboard
- Ctrl +** Zoom-In
- Ctrl -** Zoom-Out
- Esc** When in operation confirmation mode, cancels the current operation request; in all other modes, brings back the full BEV screen
- Return** When in operation confirmation mode, confirm the current operation request

### Menu Pane

The Menu Pane, located across the bottom of the CyScan Dashboard Screen, is not always visible. It appears when one of the Tracking, Tilt or Advanced buttons near the foot of the Side Bar are pressed, which causes the Bird's Eye View (BEV) to contract towards the top of the screen. Clicking the same button for a second time causes the Menu Pane to disappear and the BEV to be restored to full size.

The Menu Pane is used to display a wide variety of information and controls, often accessed by further tabs and buttons that become available once the Menu Pane is in place.



## Coordinates Layout Mode

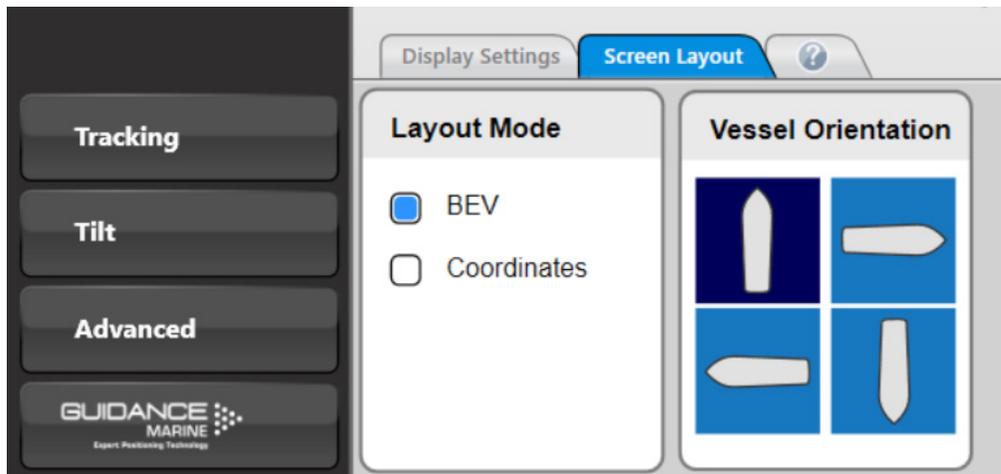
Whilst tracking is in progress, the positional coordinates and the Bird's Eye View can be transposed, so that the coordinates are displayed in extra-large numerals on the main screen, whilst a miniature BEV is shown at the top of the Side Bar.

If tracking ends, the layout automatically reverts to Bird's Eye View. As long as Coordinates View remains selected the main screen will again display coordinates once the next tracking operation commences.

## To Select Coordinates View

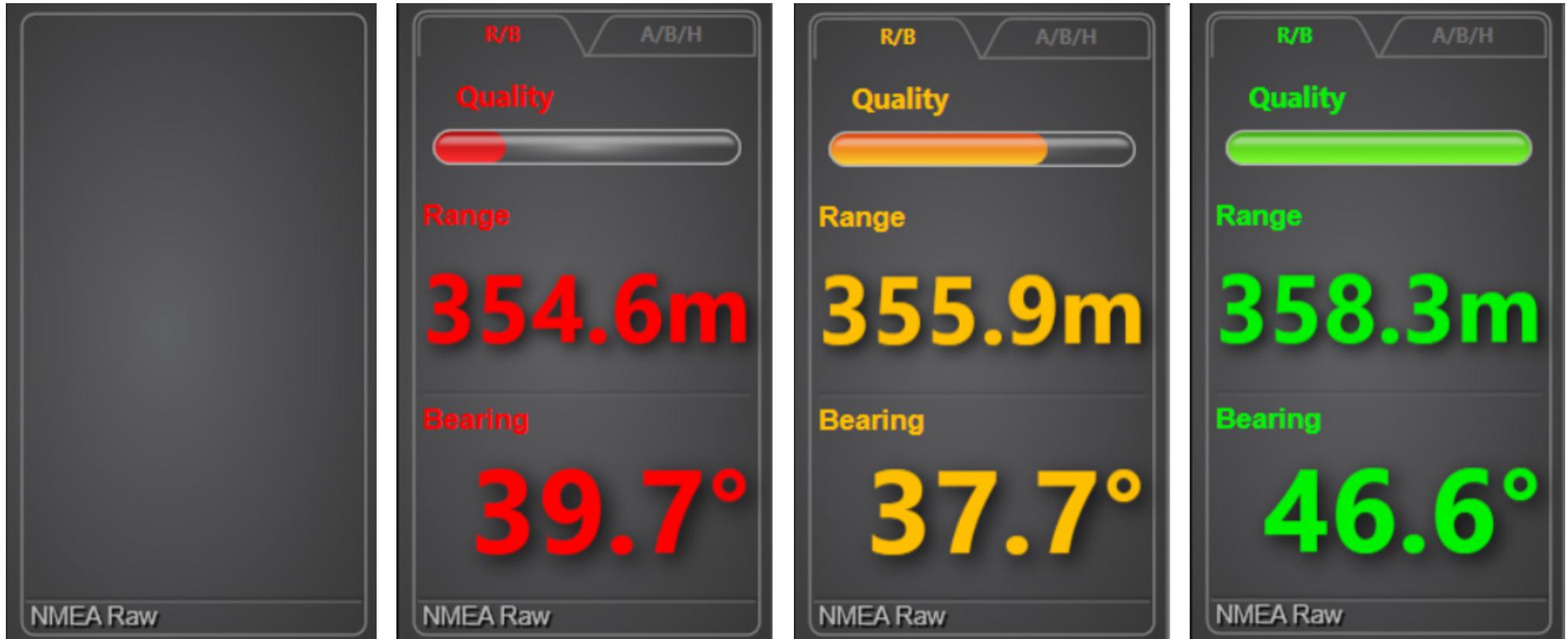
This can be done in a number of ways:

- 1. Navigate to **Advanced > Display Options > Screen Layout**.
- 2. Click on the **Coordinates** radio button.
- 3. Click on the numerical data near the top-left corner of the screen.
- 4. Press **F4**.
- 5. Click on **Switch To Coordinates Layout Mode** in the Dashboard Hotkeys menu.



The CyScan AS Sensor rotates anti-clockwise. On each rotation, the sensor emits two beams of infrared laser light and analyses the position of any reflections that it receives.

After several rotations, the sensor is able to compare the reflections received on the last rotation with those received during previous rotations. This enables CyScan to recognise the reflections from the intended targets and to ignore any unwanted reflections.



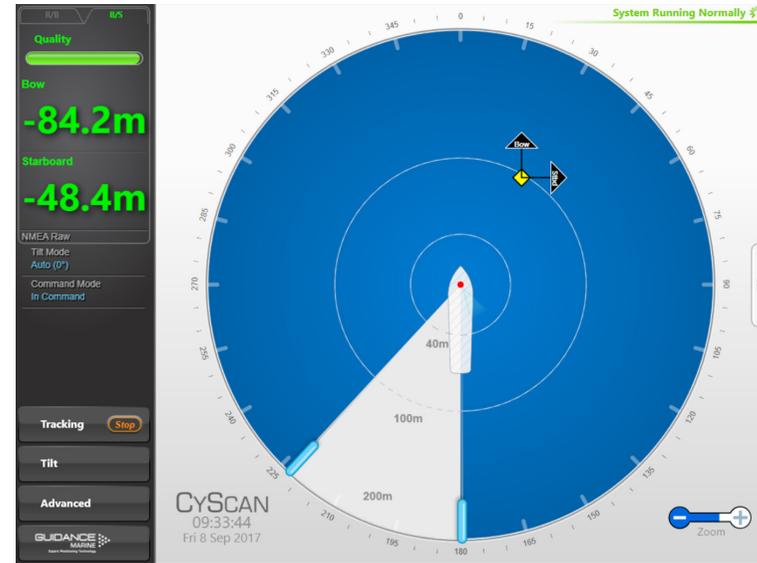
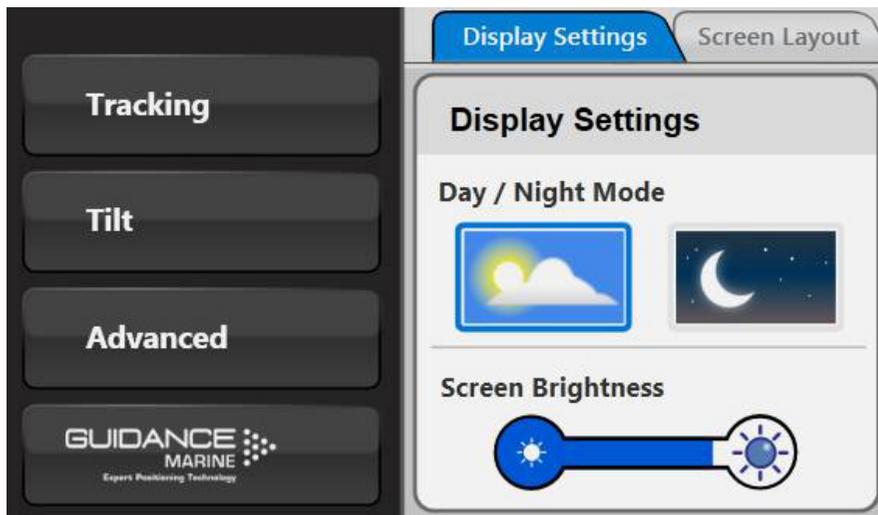
Before tracking has been selected, the Data Quality and Coordinates area in the upper left corner of the screen is empty. Once tracking is started a green quality bar indicates that the system is reliably tracking the selected targets. Amber indicates a drop in performance (the operator's attention may be required when amber) and red indicates that the position information is unacceptable for DP operations. This will lead to the system aborting the current tracking session and the operator will need to restart tracking.

To provide ample visibility during daytime operation and to limit glare during night shifts, CyScan Dashboard offers two display settings: Day Mode and Night Mode. In either mode the brightness can be further adjusted by the Screen Brightness control.

**To change day/night mode and adjust brightness:**

1. Navigate to **Advanced > Display Options > Display Settings**.
2. Click on one of the **Day/Night Mode** symbols.
3. Click on the left side of the **Screen Brightness** control to dim the screen and on the right to make it brighter.

Alternatively, to toggle between day and night mode, use the keyboard shortcut F6 or the Toggle Day/Night Mode button in the Dashboard Hotkeys panel.



Day Mode



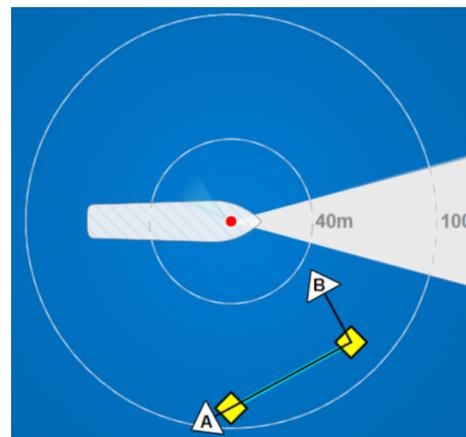
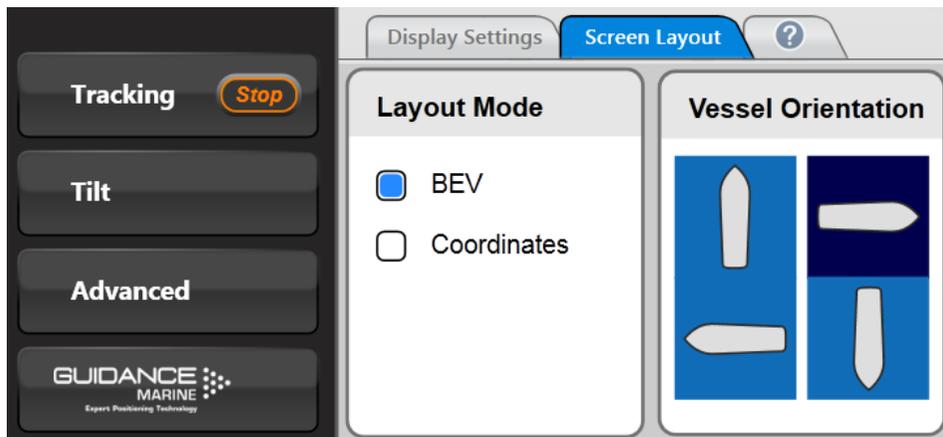
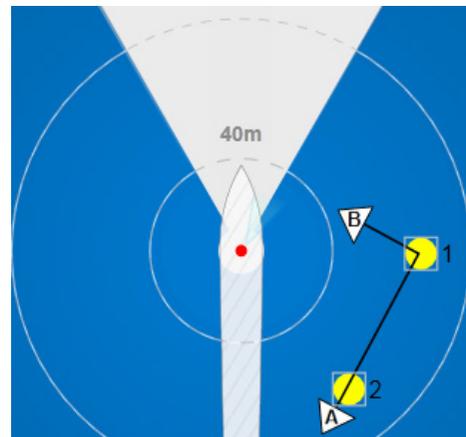
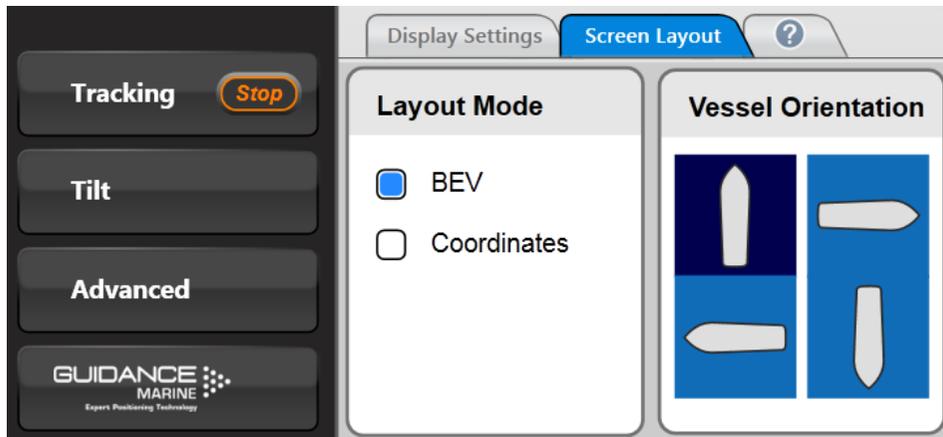
Night Mode

CyScan Dashboard supports four different layouts of the Bird's Eye View so that the operator can choose the one which best represents their surroundings.

For instance, if the operator is facing forward when using the Dashboard, they may want the bow of the vessel in the BEV to point upwards, so that targets located on the starboard side of the vessel are shown on the right-hand side of the BEV.

**To set Vessel Orientation**

1. Navigate to **Advanced > Display Options > Screen Layout**.
2. Click on the vessel outline that points in the required direction.



---

## 3. Tracking Basics

<b>3.1</b>	<b>Dynamic Blanking Zones</b>	<b>23</b>
<b>3.2</b>	<b>Working with Reflections</b>	<b>24</b>
<b>3.3</b>	<b>Scanner Tilt Controls</b>	<b>26</b>

The Dynamic Blanking Zone is used to mask a segment of the scan rotation. When the scanner passes through the dynamic blanking zone, the laser is switched off to prevent any unwanted reflections from being mistaken as targets.

N.B. Even if the sensor has a clear 360° view, there must be a dynamic blanking zone of at least 23°. The user interface will not allow smaller blanking zones.

Generally, once the dynamic blanking zone has been set, it will not need to be changed. However, there may be occasions when it is necessary to adjust the dynamic blanking zone, for example if the target is on the opposite side of the vessel to normal.

**Note:** Up to four additional static blanking zones can be configured from within the CyScan Service Interface. These are typically used to mask vessel structure. (see [94-0559-C CyScan AS Installers Guide](#)).

### Setting the Dynamic Blanking Zone

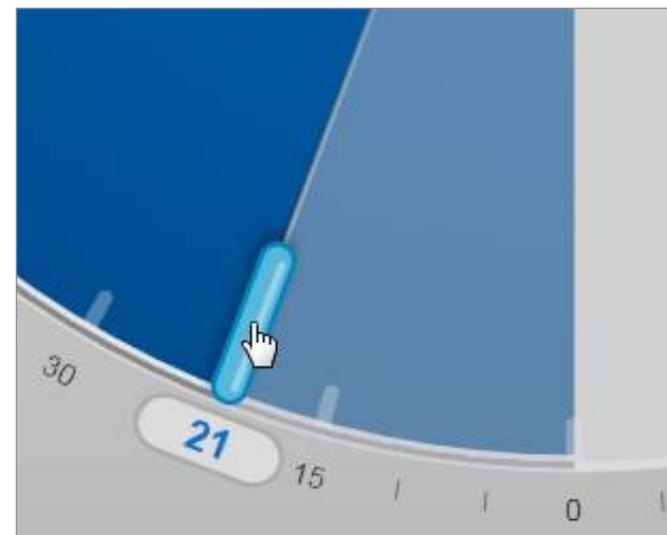
The start and end of the zone can be set to any positions around the circle to the nearest degree, subject to the minimum and maximum sizes of the zone (see red box below).

### To define the Dynamic Blanking Zone

The Dashboard needs to be in command mode to make changes to the dynamic blanking zone.

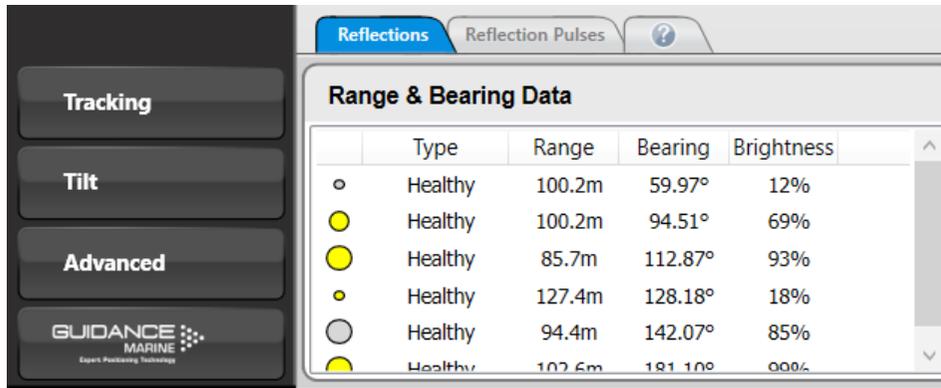
1. Click one of the dynamic blanking zone handles and, holding down the left mouse button, drag to the desired position. Alternatively - on a touchscreen - touch and drag. As the handle is moved, its current position (in degrees clockwise from the vessel bow) is displayed in blue numerals outside the perimeter of the circle.
2. If required, drag the second zone handle in the same way.
3. The Apply-Cancel buttons will have popped up after step 1. Click on the **Apply** button to set the dynamic blanking zone, or on **Cancel** to restore the dynamic blanking zone to its previous state.

The dynamic blanking zone must cover at least 23° but no more than 337°. The user interface will not allow larger blanking zones.



## Basic Reflections Data

Reflections data is displayed on two panes accessed via the Tracking Button. The Reflections pane contains a list of reflections that are visible to the scanner, and the Range, Bearing and Brightness level of each:



Range & Bearing Data				
	Type	Range	Bearing	Brightness
○	Healthy	100.2m	59.97°	12%
●	Healthy	100.2m	94.51°	69%
●	Healthy	85.7m	112.87°	93%
●	Healthy	127.4m	128.18°	18%
○	Healthy	94.4m	142.07°	85%
●	Healthy	102.5m	181.10°	90%

The user is able to filter out unwanted reflections (see following sections).

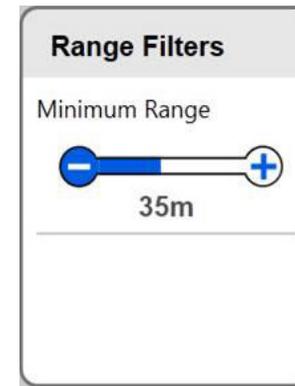
## Range Filters

The Range Filters function on the Reflections pane allows the user to set minimum range. Any reflection at a shorter range than the range threshold is not included in the list of reflections nor displayed on the BEV. This mechanism is useful when unwanted reflections cannot be eliminated by means of the dynamic blanking zone function alone. It can be used at any time, even during tracking.

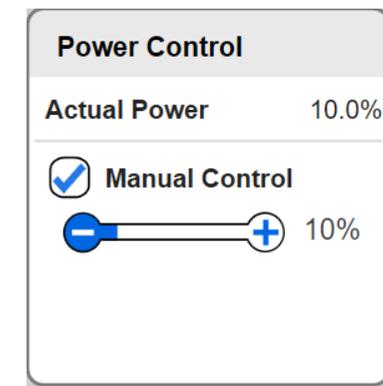
**Note:** The Dashboard needs to be In Command mode to make any changes.

## Filtering by Range

Allows the user to discard reflections that are closer than the threshold range. For example, setting the range threshold to 35m will cause any reflections from less than 35m away to be discarded. The range threshold can be adjusted between 5 and 70 metres by clicking on the end of the filter bar marked '+' or '-' as required. A corresponding grey circle is shown in the centre of the BEV.



Range Filter Bar



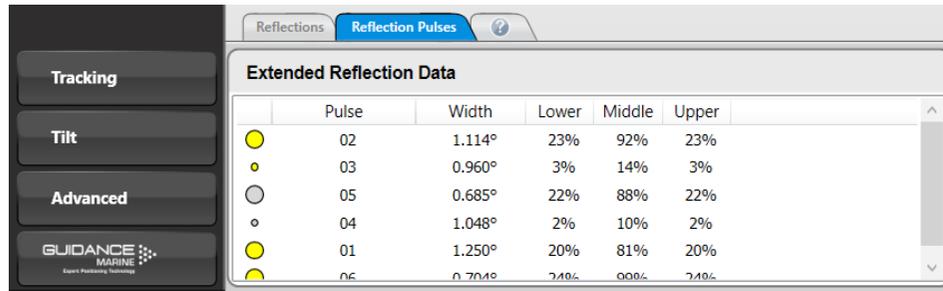
Manual Power Control Bar

## Power Control

Automatic power control should be sufficient for most operations, however there is the option to take manual control (see [Power Control](#) on [page 45](#)).

## Extended Reflections Data

The Reflection Pulses pane contains details about the number of pulses that make up each reflection, and their angle of incidence.



	Pulse	Width	Lower	Middle	Upper
●	02	1.114°	23%	92%	23%
●	03	0.960°	3%	14%	3%
○	05	0.685°	22%	88%	22%
○	04	1.048°	2%	10%	2%
●	01	1.250°	20%	81%	20%
●	06	0.704°	24%	99%	24%

**Pulse** - This column displays the number of laser pulses that have been received back from each target.

In general, the larger the target the more pulses that will be returned. This value will increase as the distance to the target reduces.

**Width** - The Width column shows the horizontal width of each target, measured in degrees.

**Lower, Middle and Upper** - These columns indicate whether the scanner is pointing low or high in relation to the detected reflections. This can occur when the CyScan vessel is working close to a rig and the targets are mounted high above the scanner (see [Manually Tilting the Scanner](#) on [page 27](#)).

**Rev #** - The total number of revolutions made by the scanner rotor since CyScan was last powered up or resumed.

**Pulses** - The total number of laser pulse returns received during the last revolution of the scanner rotor.

**Temperature** - The temperature inside the scanner unit (see [Low Temperature Operation](#) on [page 55](#)).

Rotor Status	
<b>Rev #</b>	2627
<b>Pulses</b>	274
<b>Temperature</b>	31°C

The scanner tilt mechanism automatically compensates for the pitch and roll of the vessel caused by wave motion.

Motion sensors and a tilting optics mechanism ensure that the scanning optics remain at the correct level to see the target.

### Scanner Tilt Modes

The scanner can be operated in either of the following tilt modes:

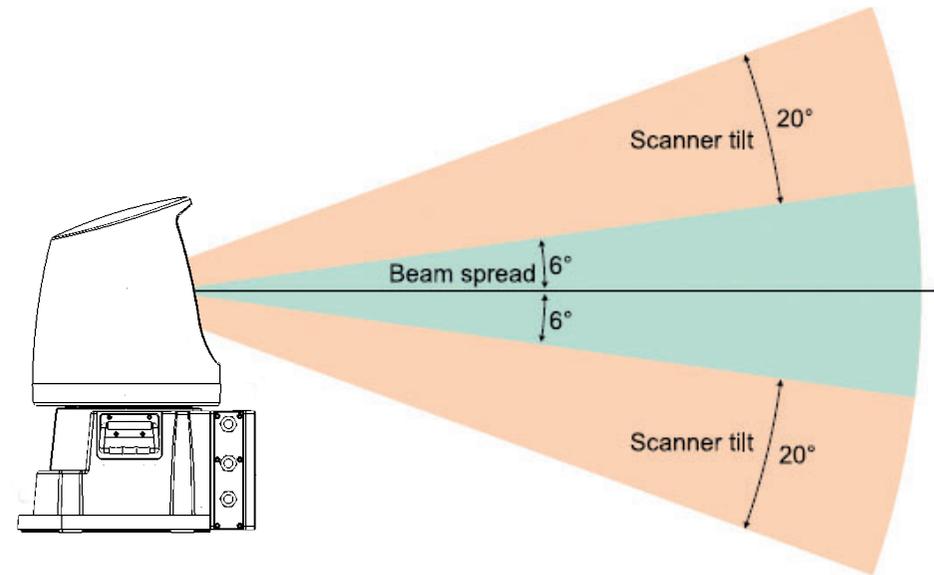
- **Auto** - The scanner tilt automatically adjusts to compensate for draught changes as the vessel loads or unloads, and for gradual tidal movement. Also effective when the elevation angle of targets increases as the vessel approaches a platform.
- **Manual** - This mode is used to manually tilt the optics to reach the target. For example, when station-keeping close to a platform where the targets are mounted high up and the CyScan optics must be tilted up at them (See [Manually Tilting the Scanner](#) on [page 27](#)).

The current tilt mode and leveller angle are displayed in the 'Tilt Mode:' section of the Side Bar.

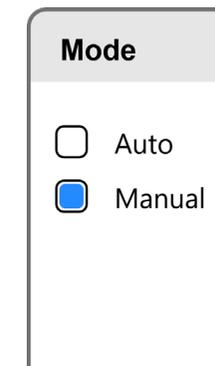
### To change the scanner tilt mode and leveller angle

**Note:** The Dashboard needs to be in command mode to make any changes.

1. Click on the **Tilt** button in the Side Bar.
2. Select the required mode and click on the **Apply** button to confirm.
3. Click on the +/- buttons to adjust the angle. The adjacent list of estimated elevation angles for visible targets helps you to arrive at the best leveller angle.
4. Click on the **Apply** button to confirm your changes.



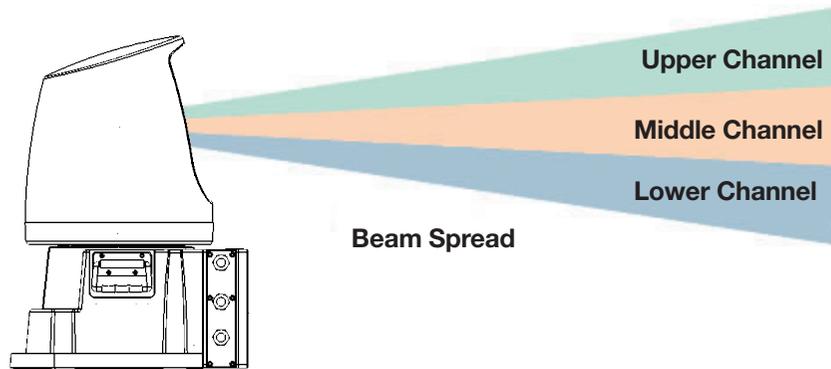
Side Bar Tilt Mode Section



Tilt Mode Selection

### Manually Tilting the Scanner

The Manual mode is used to tilt the scanner optics to a user-defined angle so that the centre of the fanned beam is pointing at the target. This may be necessary when the CyScan vessel is close to a platform and the targets are positioned above the sensor.



The CyScan optical receiver is divided into three vertical channels: Lower, Middle and Upper. The proportion of beam signal being received in each channel is used to determine the correct angle to set the optics.

If one of the reflections in the list is selected, its elevation relative to the horizontal is shown by the position of the yellow target symbol on the right-hand side of the Leveller Graphic. The blue line represents the laser beam, and this moves as the +/- buttons are clicked. When the laser line points to the centre of the target symbol, this indicates that the leveller angle is ideal for the selected target.

### To change the scanner tilt mode and leveller angle

**Note:** The Dashboard needs to be in command mode to make any changes.

1. Click on the +/- buttons to adjust the angle. The adjacent list of estimated elevation angles for visible targets helps you to arrive at the best leveller angle.
2. Click on the **Apply** button to confirm your changes.

#### Leveller Angle

Elevation	Lower	Middle	Upper
5.0°	0%	6%	27%
5.0°	0%	5%	17%
-5.3°	13%	5%	0%
-0.3°	0%	4%	0%
0.0°	0%	41%	0%

+

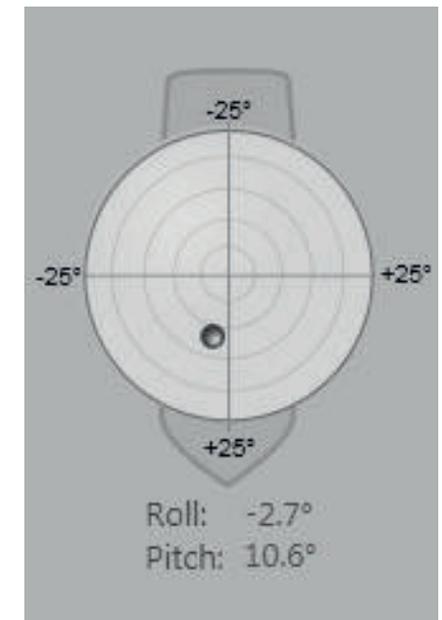
6°

-

Scanner tilted up and pointing at a target mounted higher than the sensor.

### Spirit Level

The Spirit Level indicator, on the left hand side of the Tilt pane, displays the roll and pitch of the vessel as measured by the Vertical Reference Unit within CyScan. The graphical display represents the roll and pitch angles in the same manner as a bullseye spirit level. The current values are displayed in text at the bottom of the control. A ship outline is shown in the background to indicate orientation relative to the vessel.



---

## 4. Single and Multi-Target Tracking

This section explains the different types of target tracking that can be performed using the CyScan Dashboard, and how to configure them. It does not provide advice on how to set up a tracking operation for a specific DP system or application.

The information contained in this section is for general guidance only. This section does not provide an exhaustive explanation of target tracking using CyScan, nor does it form the basis of a contract. Implementation of the material covered in this section will vary according to the type of DP system used in conjunction with the CyScan system. The use of, or reliance on, anything in this section is therefore entirely at the user's own risk and should only be undertaken after assessment of its accuracy, completeness and suitability for the proposed use.

<b>4.1</b>	<b>Types of Target Symbols</b>	<b>29</b>
<b>4.2</b>	<b>Introduction to Single and Multi-Target Tracking</b>	<b>30</b>
<b>4.3</b>	<b>Positional Display Modes</b>	<b>32</b>
<b>4.4</b>	<b>Selecting Targets for Multi-Target Tracking</b>	<b>34</b>
<b>4.5</b>	<b>Aligning Multi-Target Heading</b>	<b>37</b>
<b>4.6</b>	<b>GeoLock Mode</b>	<b>38</b>

The CyScan system displays different symbols and colours for each type of target.

Laser Position Reference Sensors can detect all manner of reflector targets. Prisms, Tube Targets as well as other reflective objects. This can lead to false targets being identified from reflective objects located near the actual reflector. For example, a reflective jacket worn by a worker being selected for tracking.

Wärtsilä Guidance Marine have solved this problem by creating a patent pending Absolute Signature (AS) technology. When a CyScan AS sensor is used in conjunction with an AS prism, the system can uniquely identify the AS prism target from all the clutter of other reflective objects in the scene. No other laser sensor can do this. AS prisms appear as regular reflective objects to other types of sensor. For more information on how this works, please see the CyScan AS Installers Guide.

Here are the symbols shown for each type of target:

Target Type	Tracked	Untracked	Missing
AS Targets			
Non-AS Targets			

Untracked targets size is affected by the strength of the reflection. A weaker reflection will appear smaller in the Dashboard. Conversely a tracked target will appear as a full size symbol.

The CyScan system can track either a single target or multiple targets:

### Single-Target Tracking

During Single-Target Tracking, only one target is used.

Single-Target Tracking is quick and easy to use, but has the following limitations:

- Tracking stability is affected if the target reflection is temporarily lost, as there is no redundancy.
- If the true target reflection is obscured by vessel operations, there is a possibility that the sensor track could jump to another reflection.
- Relative vessel heading cannot be calculated.

### Multi-Target Tracking

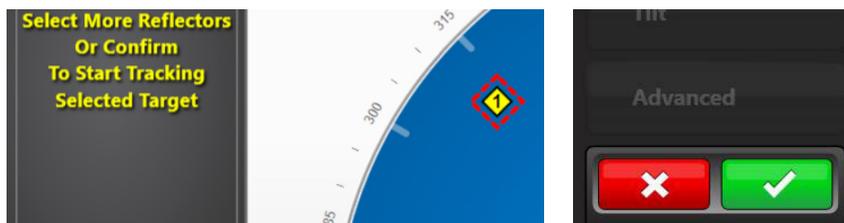
In Multi-Target Mode, CyScan uses two or more targets. Wärtsilä Guidance Marine recommends using a minimum of three targets. Multi-target tracking has the following advantages compared to single-target tracking:

- Improved tracking stability.
- Increased immunity to false reflections.
- Redundancy allows tracking to continue even if a target is temporarily lost. Redundancy is only provided when 3 or more targets are selected.
- The vessel's heading in relation to the Multi-Target Group can be calculated.

**Note:** Multi-Target tracking assumes that all the reflectors are attached to the same rigid body (e.g. rig). If the selected targets are not all mounted on the same structure it will violate the rigid body assumption and tracking will be lost.

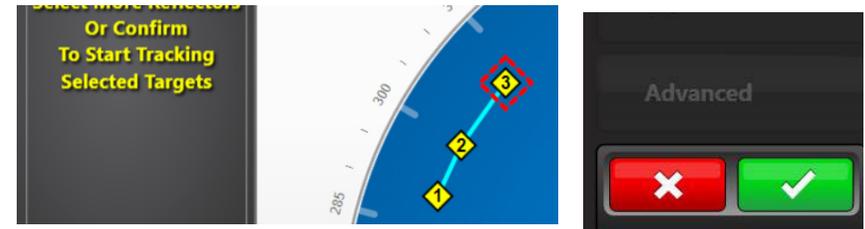
### To Start Tracking For Single-Target Mode

1. Ensure that the dashboard is **In Command** mode.
2. Locate a reflection on the BEV, or in the Reflections tab located in the **Tracking Menu**.
3. Click on the required target reflection symbol. It changes to the selected state (diamond shape with red dash around the outside and number "1" superimposed).
4. Click on the **Apply** button to confirm and begin tracking.



### For Multi-Target Mode

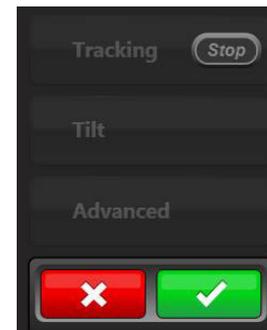
1. Ensure that the dashboard is **In Command**.
2. Locate a reflection on the BEV, or in the Reflections tab located in the **Tracking Menu**.
3. Select a minimum of two target reflection symbols (see [Selecting Targets for Multi-Target Tracking](#) on page 34). An ordinal number will be superimposed on each as they are clicked. Reflections can be deselected by clicking on them again.
4. Click on the **Apply** button to confirm and begin tracking.



### To Stop Tracking

Whilst tracking is in progress, a Stop button is embedded in the Tracking button on the Side Bar.

1. Click on the **Stop** button.
2. Click on the **Apply** button to confirm.



## Edit Tracking

Tracking can be altered without first stopping existing tracking. This is done to add additional reflectors to the current multi-target mode.

To Track Additional Targets:

1. Ensure that the dashboard is **In Command**, and that the Quality of the existing track is at least 90%.
2. Locate a reflection on the BEV, or in the Reflections tab located in the **Tracking Menu**.
3. Select the additional target reflection symbols (see Selecting Targets for Multi-Target Tracking on page 33). A number will be superimposed on each as they are clicked. These additional reflections can be deselected by clicking on them again. Reflections already used for tracking cannot be deselected.
4. Click on the **Apply** button to confirm and begin tracking.

## Notes on Edit Tracking

- Single Target Tracking cannot be edited.
- During the Edit process, the existing tracking will continue to work. Any Edits made by the user can be cancelled by pressing Cancel.
- We only allow additional targets to be tracked if the Quality of the existing track is  $\geq 90\%$ . Targets cannot be removed from the existing track. These limitations are to prevent jumps in the signal being sent to the DP feed. If the users wishes to alter the set of tracked targets in this manner, they must first Stop Tracking.

## Lost Tracking

The CyScan sensor is capable of tracking targets even when they are momentarily obscured from view, or drift slightly in position. Missing targets will appear as red symbols. DP Feeds that issue a separate DP telegram for each target will not emit a valid telegram for missing targets.

If all tracked targets are lost for a period of time, then the CyScan sensor will be unable to continue tracking. The dashboard will report this with a warning:

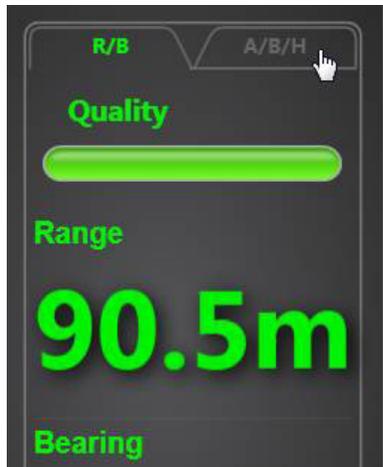


Once this state is reached, tracking will have ceased, and no DP feeds will be updated. The operator will need to Stop Tracking, and select a new set of targets.

The relative positions of the CyScan vessel and single or multiple targets can be expressed either as Range and Bearing values, or as 'x' and 'y' positions on a rectangular coordinate frame.

During Single-Target Tracking the position of the tracked target can be displayed as either Range/Bearing or Bow/Starboard. For Multi-Target Tracking the position of the tracked targets can be displayed as Range/Bearing or A/B/Heading (see definition of **A/B axes** on [page 33](#)).

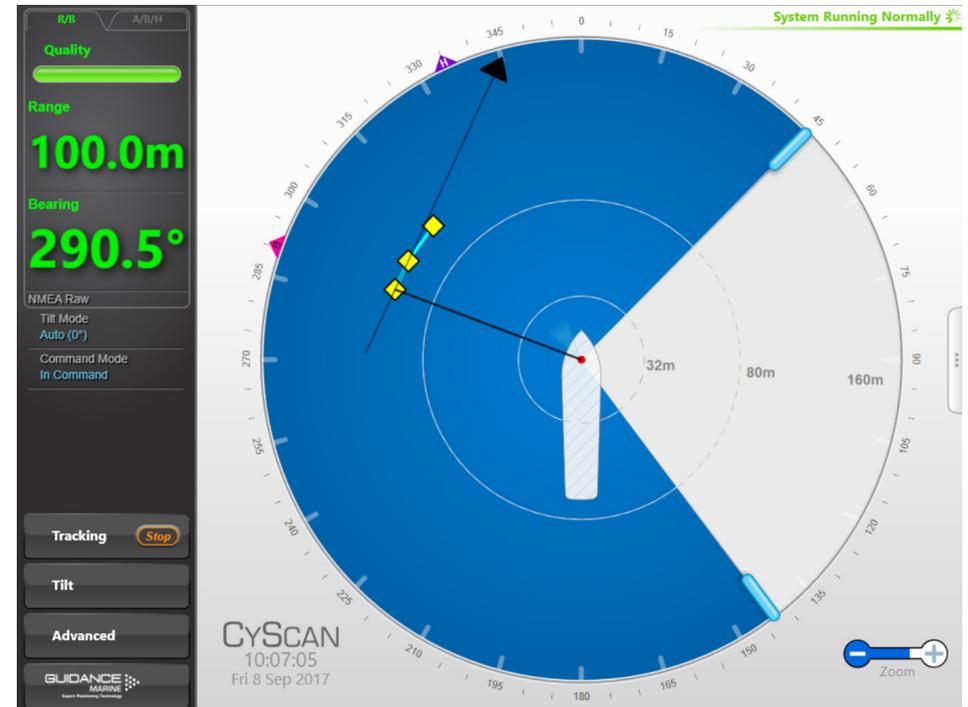
Users can select the required mode by clicking the appropriate tab above the Data Quality area:



### Range & Bearing

Range and Bearing mode displays the distance and the bearing of the primary (or only) target from the sensor. The radial markers around the outside of the BEV are zeroed in line with the vessel bow and a magenta tag marks the bearing, which is the angle of the target clockwise from the bow.

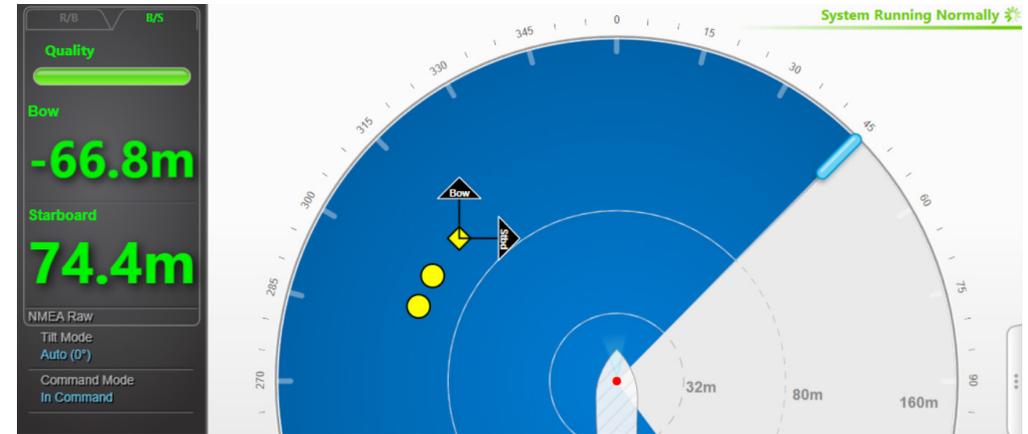
In the case of multi-target tracking, there is also a heading axis. This always passes through the primary target and it points through the secondary target. A purple tag represents the heading, which is the angle of the vessel bow clockwise from the heading axis.



### Bow and Starboard Axes

This mode is available for single-target tracking.

In this mode, the position of the sensor vessel is expressed in metres from the target along Bow (B) and Starboard (S) axes which have their origin at the target. The B and S coordinate axes are always parallel with the vessel's own axes.



Bow and Starboard Axes

### A and B Axes (A Pos and B Pos)

This mode is available for multi-target tracking.

In this mode, the position of the sensor vessel is expressed in metres from the target along A and B axes which have their origin at the primary target.

The axes are initially aligned with the multi-target group, with the A axis passing through the secondary target. The vessel's relative heading is measured clockwise from the A axis.

The radial markers around the outside of the BEV are zeroed in the same direction as the A axis, which acts as the heading axis. The purple heading tag is aligned with the vessel bow, at the point on the scale that shows the angle of the bow clockwise from the A axis.



A and B Axes

### Selecting Reflections

When you select a reflection as a target, make sure that it corresponds to the actual target that you wish to track against. You can select up to 9 reflections to form a multi-target group.

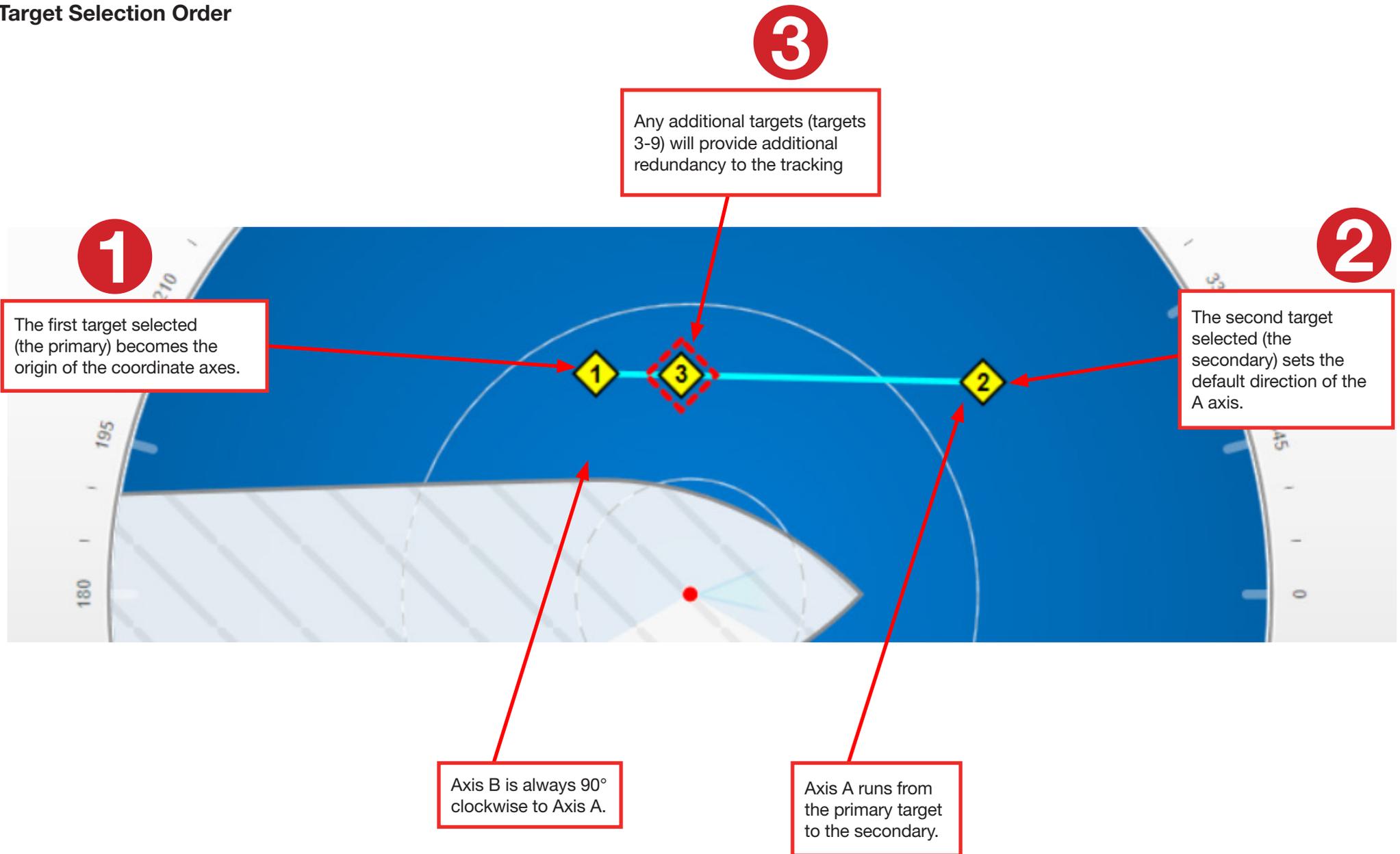
The first reflection that you select (target 1) becomes the primary target, which forms the origin of the A and B coordinate axes.

The second reflection that you select (target 2) sets the default orientation of the A and B coordinate axes.

A further 7 reflections can be added to give redundancy to the group if targets 1 or 2 are temporarily lost or obscured.

If more targets are mounted on the rig, then the superfluous ones should be physically removed and not just omitted from the multi-target group.

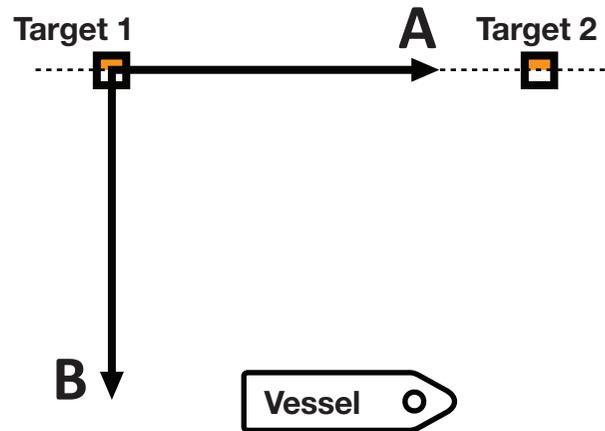
Target Selection Order



### Target Selection Order and Coordinate Axes Direction

The A and B coordinate axes point in different directions according to the order in which targets 1 and 2 are selected.

By default, axis A runs from target 1 to target 2, and axis B is always drawn 90° clockwise from axis A.



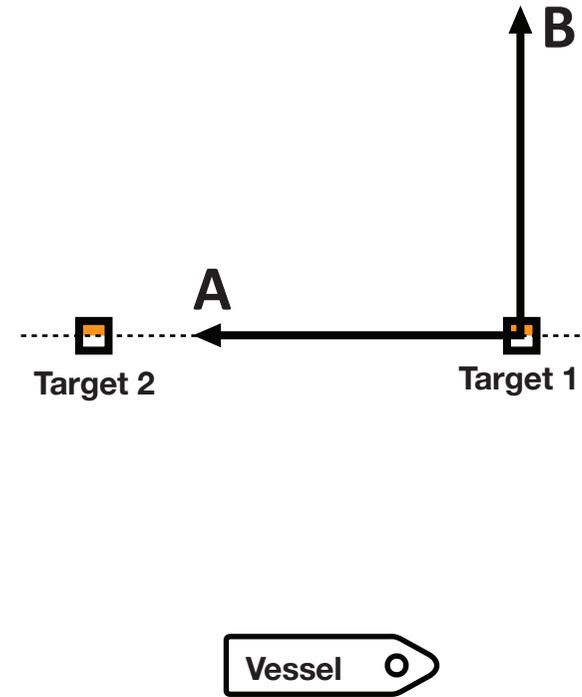
#### Target 1 on Left

- Axis A runs from left to right.
- Axis B points towards the CyScan vessel.

The left-most reflection is selected as target 1 and the right-most reflection as target 2.

Axis A runs from left to right on the display.

Axis B is drawn 90° clockwise from axis A, and points towards the CyScan vessel on the display.



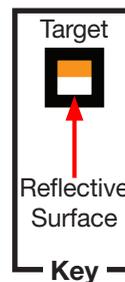
#### Target 1 on Right

- Axis A runs from right to left.
- Axis B points away from the CyScan vessel.

The right-most reflection is selected as target 1 and the left-most reflection as target 2.

Axis A runs from right to left on the display.

Axis B is drawn 90° clockwise from axis A, and points away from the CyScan vessel on the display.

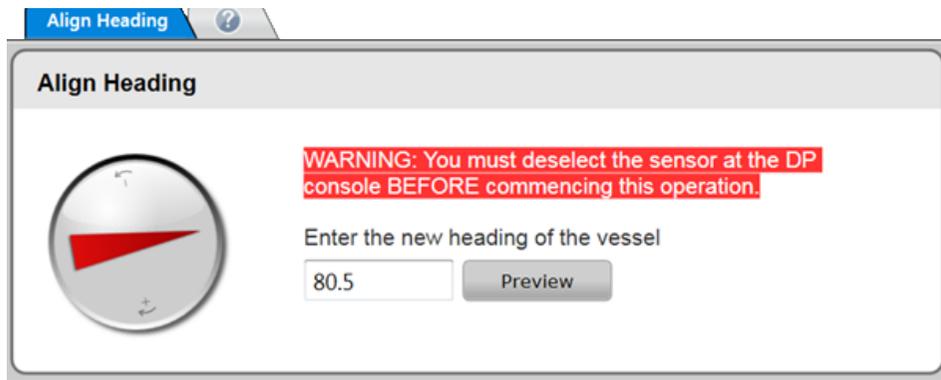


This functionality is for use if you require the CyScan AS system to produce a new heading based on a known reference heading rather than on the orientation of the primary and secondary targets.

**WARNING:** You must deselect the CyScan AS sensor at the DP console BEFORE commencing this operation.

**Note:** This operation is only available when multi-target tracking using DP formats NMEA Raw or NMEA Primary. The Dashboard should also have A/B/H selected in order that you can see the effect of your changes.

- Navigate to Advanced > Align Heading
- Key the required heading value into the numerical entry box and click Preview.
- Alternatively, move the red compass needle to the required position, either by clicking and dragging it or by repeatedly clicking the small +/- buttons.
- Press Apply (on the Apply-Cancel pop-up) to confirm.



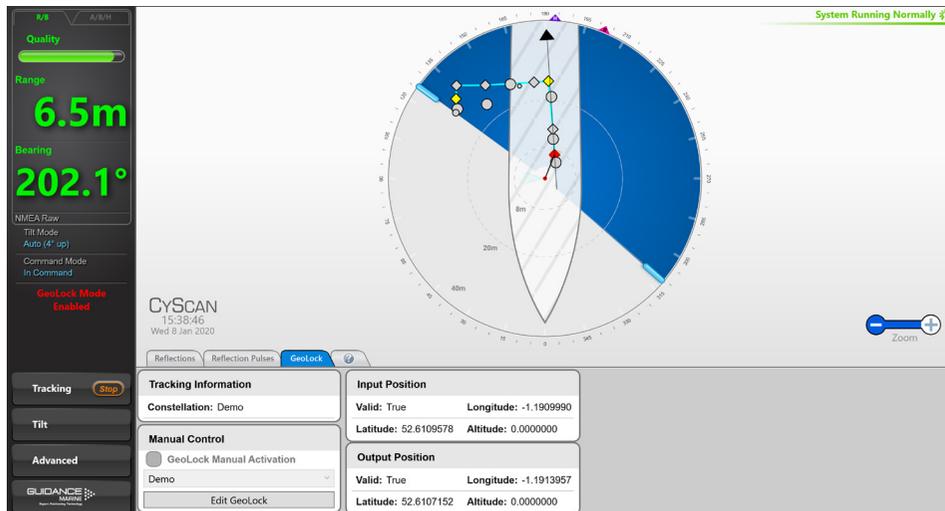
When you align the multi-target heading, the A and B axes orientation and position coordinates are recalculated so that they correspond with the new heading value.

The heading and position coordinate data sent to the DP system will change suddenly when you confirm the new alignment.

GeoLock mode is configured and enabled in the CyScan Service Interface (see [94-0559-C CyScan AS Installers Guide](#)).

GeoLock mode uses a Global Navigation Satellite System (GNSS) input which is monitored by the CyScan software. Once the CyScan is within a predetermined distance of the coordinates given in the configuration it automatically attempts to start navigation off the targets (called a constellation) described in the same configuration, even if the sensor is currently suspended.

The GeoLock data is accessed via the **Tracking button**. The GeoLock pane contains three pieces of information and the Manual Control.



**Input Position** - As reported by the GNSS.

**Output Position** - Calculated by the CyScan from the configuration data and its position relative to the targets.

**Tracking Information** - Shows the name of the constellation being used as given when the configuration data was created in the CyScan Service Interface.

**Manual Control** - This is used to manually activate GeoLock. This is useful if there is a problem with the GNSS input.

### Using Manual Control

1. Click on the **Resume** button if the sensor is suspended.
2. Click on the **Take Command** button if the CyScan Dashboard is not already in **In Command** mode.
3. Click on **Edit GeoLock**.
4. Select the correct constellation from the drop-down menu.
5. Tick **GeoLock Manual Activation**.
6. Click on the **Apply** button to confirm.

**Input Position**

<b>Valid:</b> True	<b>Longitude:</b> -1.1909990
<b>Latitude:</b> 52.6109578	<b>Altitude:</b> 0.0000000

### Input Position

**Output Position**

<b>Valid:</b> True	<b>Longitude:</b> -1.1913957
<b>Latitude:</b> 52.6107152	<b>Altitude:</b> 0.0000000

### Output Position

**Tracking Information**

**Constellation:** Demo

### Tracking Information

**Manual Control**

**GeoLock Manual Activation**

Demo

Edit GeoLock

### Manual Control

---

## 5. Multi-Dashboard (Ethernet) CyScan Systems

5.1 CyScan Ethernet Dashboard - Monitoring Mode .....	40
5.2 CyScan Ethernet Dashboard - In Command Mode .....	41

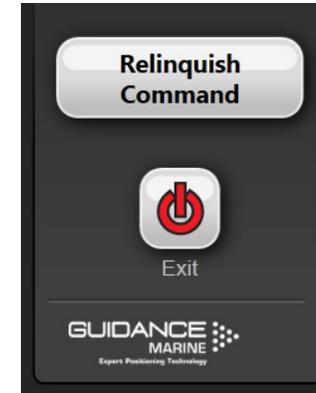
**Note:** A CyScan system running with Serial communications supports only a single Dashboard, and whenever this is running and connected to the sensor, it is effectively in command mode.

CyScan, when configured to run with Ethernet communications, supports multiple Dashboards running simultaneously on the same system. No more than one of these can be In Command mode at any given time; the others are in Monitoring mode.

When the Dashboard is running in Monitoring mode, the controls relating to the Dashboard itself will be active, but those relating to the CyScan sensor will be disabled. A Monitoring Dashboard displays the same reflections and positional data as the In Command Dashboard. It cannot initiate or stop tracking operations, alter the power control, reflection filtering or tilt settings.

**To switch a Dashboard from In Command mode to Monitoring Mode**

1. Click on the **Guidance** button.
2. Click on the **Relinquish Command** button.



Examples of inactive controls in Monitoring Mode

The screenshot shows the dashboard interface with several sections:

- Tracking:** A 'Stop' button is shown as inactive.
- Range & Bearing Data:** A table with columns for Type, Range, Bearing, and Brightness.
- Range Filters:** A 'Minimum Range' slider is shown at 8m.
- Power Control:** Shows 'Actual Power' at 12.3% and an inactive 'Manual Control' button.

Type	Range	Bearing	Brightness
● Healthy	92.0m	117.63°	92%
● Healthy	86.0m	125.50°	97%
● Healthy	86.0m	206.15°	96%
◆ Healthy	101.8m	294.42°	97%
◆ Healthy	114.0m	298.97°	94%
▲ Healthy	02.2m	274.10°	100%

When the CyScan Dashboard is running in Command mode all control functions are available. Any changes made to the tracking or sensor-related settings at the In Command Dashboard will be visible on the screens of the Monitoring Dashboards. On the other hand, display options such as Screen Brightness or Zoom level can be set differently on each individual Dashboard, whether it is Monitoring or In Command.

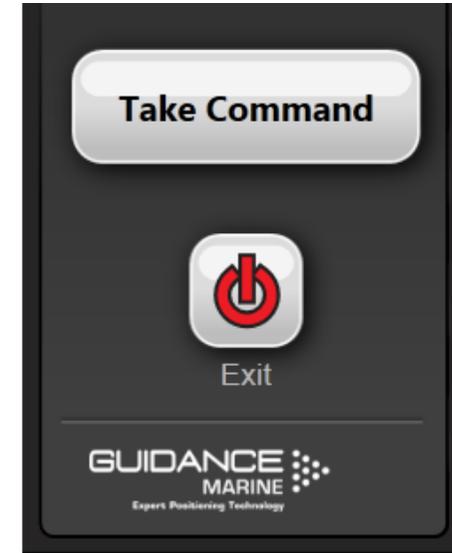
When the In Command Dashboard is used to suspend the CyScan sensor, a message will appear on the screens of the Monitoring Dashboards indicating that the system is suspended. The same message is displayed if a Dashboard is opened whilst the sensor is suspended (See *Start Up and Shut Down* on page 10).

In this state, clicking the Resume button on any Dashboard will automatically put that Dashboard In Command. Clicking Exit will close that individual Dashboard only.

Whenever the system is running, a Monitoring Dashboard can be promoted to In Command as shown on the right.

### To switch a Dashboard from Monitoring mode to In Command Mode

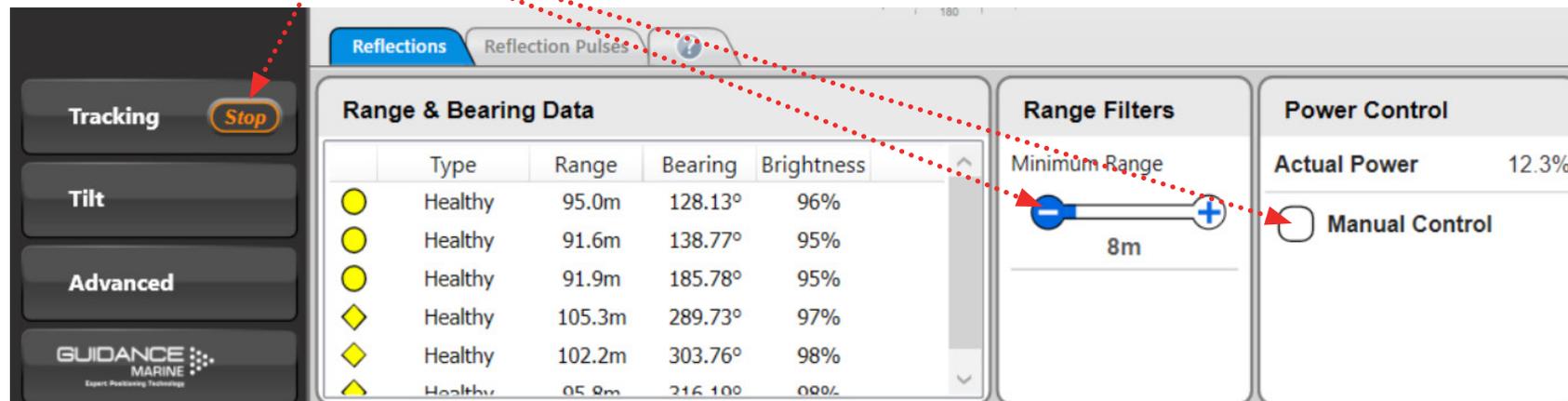
1. Click on the **Guidance** button.
2. Click on the **Take Command** button.



The dashboard will start in Monitoring mode if there is already an In command client connected to the system.

Command of the system can be taken by pressing the Take Command button.

### Examples of controls available only in In Command Mode



---

## 6. Support Information

<b>6.1</b>	<b>Serial Numbers and Software Versions</b>	<b>43</b>
<b>6.2</b>	<b>DP Feed</b>	<b>44</b>
<b>6.3</b>	<b>Manual Power Control</b>	<b>45</b>
<b>6.4</b>	<b>Ethernet Sensor Data Logging</b>	<b>46</b>
<b>6.5</b>	<b>Serial Sensor Data Logging</b>	<b>47</b>

These numbers identify the hardware configuration and product revision and will be requested by Wäertsilä Guidance Marine in the event of an application service or support call to the company.

### Product Label

The Part Number and Serial Number can be found on the product label affixed to each unit.

### Software Version Information

The About System pane provides version information about the Dashboard and the software components within the CyScan sensor. It also contains the serial number of the sensor.

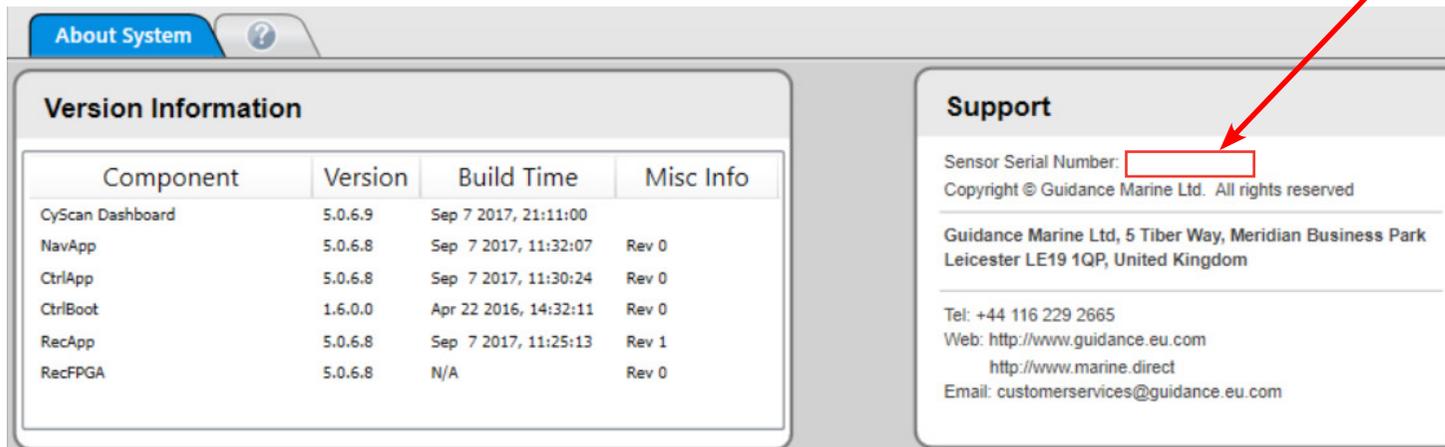
### To Display the About System Pane

1. Click on the **Advanced** button.
2. Click on the **About System** button.



CyScan sensor part number

CyScan sensor serial number

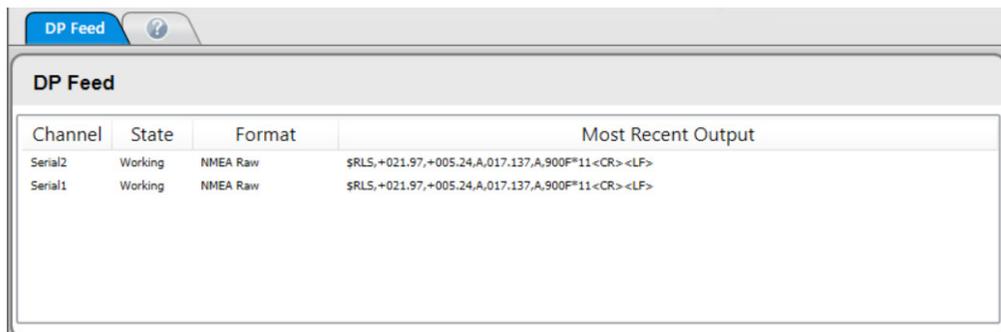


The DP Feed is the data that CyScan transmits to the vessel's Dynamic Positioning system. CyScan supports several different data message formats and it is important that CyScan and the DP system are both configured to use matching formats. However, this cannot be done from the Dashboard; in order to change the CyScan DP settings, use the CyScan Service Interface (see document [94-0559-C CyScan AS Installer's Guide](#), which also contains descriptions of the available DP message formats).

The state of the sensor's DP output channel, the message format used and the most recent data output can be viewed on the Dashboard.

### To View DP Feed Details:

1. Click on the **Advanced** button on the side bar.
2. Click on the **DP Feed button** on the menu pane.



Channel	State	Format	Most Recent Output
Serial2	Working	NMEA Raw	\$RLS,+021.97,+005.24,A,017.137,A,900F*11<CR><LF>
Serial1	Working	NMEA Raw	\$RLS,+021.97,+005.24,A,017.137,A,900F*11<CR><LF>

**Note:** The Dashboard needs to be In command mode to make any changes.

Manual Power Control can be used to switch off the normal automatic power control for the rotor on the CyScan Sensor and to apply and adjust a fixed constant power instead.

#### To Enable Manual Power Control:

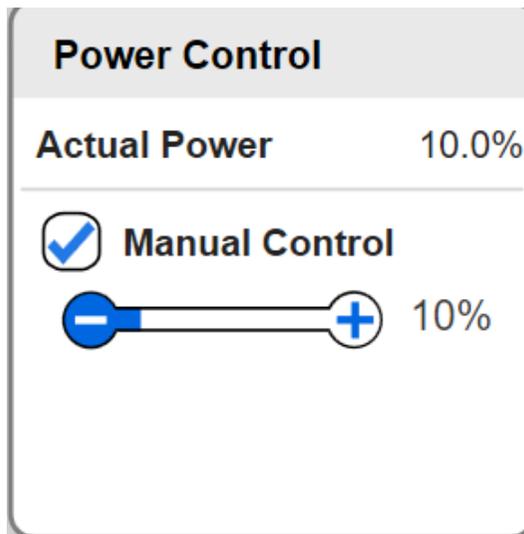
1. Click on the **Tracking** button on the side bar.
2. Click on the **Reflections** tab, if not already in focus.
3. Click on the **Manual Control** tick box, in the **Power Control** panel.

#### To Use Manual Power Control:

1. Adjust the power level by clicking on the left or right hand side of the control until the required value is displayed.
2. Click on the **Apply** button to confirm the changes.

#### To Disable Manual Power Control:

1. Click on the **Manual Control** tick box and on the **Apply** button to confirm.
2. The tick box will clear and the Power Level control will be removed.



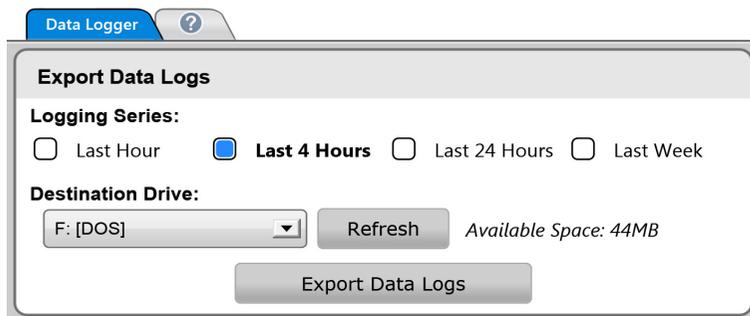
This is for **Ethernet** connected sensor Data Logging only.

The system automatically generates a set of operation logs that can be analysed by a service engineer to diagnose any system faults. It generates these at all times.

Logs can be e-mailed to Wärtsilä Guidance Marine Limited ([customerservices@guidance.eu.com](mailto:customerservices@guidance.eu.com)) or to your DP Supplier in the event of a problem.

## Exporting Data Logs

The most recent data logs can be exported to a removable drive on the Dashboard computer.



## To Export Data Logs

1. Insert a USB or other removable drive into the Dashboard computer.
2. Navigate to **Advanced > Data Logger**.
3. Select the period for which you wish to export logs (**Last Hour**, **Last 4 Hours**, etc).
4. Select destination drive from the drop-down list, if not already displayed (click on the **Refresh** button to refresh the list of available USB drives).
5. Click on **Export Data Logs**.

Either before or during the export operation, the **Refresh** button can be used to update the Available Space field.

## Taking Screenshots

The Screenshot option records every detail of the current screen and stores it as a bitmap image. Screenshots can be analysed by a service engineer or e-mailed to Wärtsilä Guidance Marine Limited in the same way as log files.

Screenshots are stored with the data logs and are included when data logs are exported.

## To Take a Screenshot

There are two alternative ways:

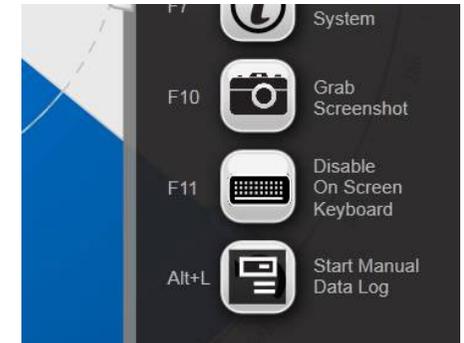
- Click on the **Hotkeys** tab. Click on **Grab Screenshot**.
- Press the **F10** key.

## Extended Data Logging

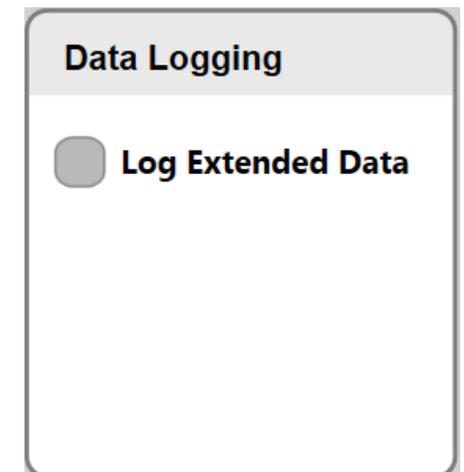
When the Log Extended Data box is ticked, extra information will be included in all data logs that are recorded. This may be useful as a short-term measure for diagnosing a particular problem, but in general the box should be left unticked in order to conserve disk space.

To Enable **Extended Data Logging**:

1. Navigate to **Advanced > Data Logger**.
2. Tick the Log Extended Data box.



The Grab Screenshot Button



This is for **Serial** connected sensor Data Logging only.

The system automatically generates a set of operation logs that can be analysed by a service engineer to diagnose any system faults. It generates these at all times.

Logs can be e-mailed to Wärtsilä Guidance Marine Limited ([customerservices@guidance.eu.com](mailto:customerservices@guidance.eu.com)) or to your DP Supplier in the event of a problem.

## Exporting Data Logs

The most recent data logs can be exported to a removable drive on the Dashboard computer.

### To Export Data Logs

1. Insert a USB or other removable drive into the Dashboard computer.
2. Navigate to **Advanced > Data Logger**.
3. Select the period for which you wish to export logs (**Last Hour**, **Last 4 Hours**, etc).
4. Select destination drive from the drop-down list, if not already displayed (click on the **Refresh** button to refresh the list of available USB drives).
5. Click on Export Data Logs.

Either before or during the export operation, the **Refresh** button can be used to update the Available Space field.

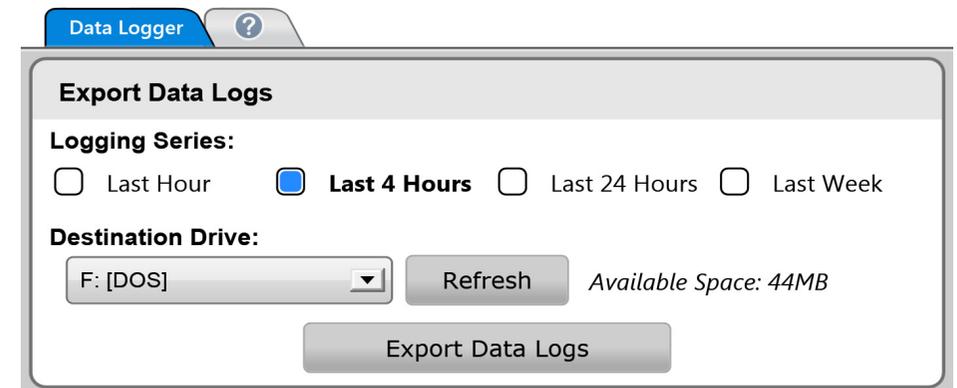
### Alternative Export Methods

Exporting data logs from a Serial sensor can take a long time, depending on the selected time period and the size of the data logs. After clicking the **Export Data Logs** button, the dashboard will display (within a minute) an estimated time of how long the process will take.

If the estimated time is too long for you to wait, then we advise changing the sensor configuration from **Serial** to an **Ethernet** connection and then restart the steps again. This will decrease the exporting time significantly.

**Note:** the debug logs, event log, service history, and the **active unzipped** log files, are not exported on a **Serial** sensor.

Please see **94-0559-C CyScan AS Installers Guide** on how to reconfigure the sensor to an Ethernet sensor configuration.



The screenshot shows a web interface for the 'Data Logger' section. A dialog box titled 'Export Data Logs' is open. It has a 'Logging Series' section with four radio button options: 'Last Hour', 'Last 4 Hours' (which is selected), 'Last 24 Hours', and 'Last Week'. Below this is a 'Destination Drive' section with a dropdown menu showing 'F: [DOS]' and a 'Refresh' button. To the right of the dropdown, it says 'Available Space: 44MB'. At the bottom of the dialog is a large 'Export Data Logs' button.

---

## 7. Troubleshooting

If you experience problems when installing or using the CyScan system, please check through this Troubleshooting section for a possible solution. It contains the following pages:

<b>7.1 Problems and Possible Remedies</b> .....	<b>49</b>
<b>7.2 Cleaning the Sensor and Targets</b> .....	<b>50</b>
<b>7.3 CyScan Fuse Information</b> .....	<b>51</b>

If your problem is not listed or you cannot resolve the issue, please contact the system installer or equipment provider who are trained to assist with installation and operational problems.

If the problem cannot be resolved by the system installer or equipment provider, please contact Wärtsilä Guidance Marine Limited:

### **Contact Details**

UK Support: +44 116 229 2665  
(365 days a year, 08:00 - 20:00 hours UTC)  
customerservices.uk@guidance.eu.com

USA Support: +1 504 305-1120  
customerservices.us@guidance.eu.com

Asia Support: +65 6734 6365  
customerservices.sg@guidance.eu.com

Web: [www.guidance.eu.com/customer-support](http://www.guidance.eu.com/customer-support)

### No communication between CyScan Dashboard and the Sensor

- The Dashboard screen turns grey, the Primary Status Display reads “Communications ERROR” and the Secondary reads “Unable to communicate with the sensor”. Click the **Disconnect** button then the **Connect** button.
- Check the power and client connections to the sensor.
- Check that the unit is displaying the current time on the sensor information display. If it is showing any errors then power cycle the sensor.
- Check that the data feed converter is powered (yellow LED on) and that the outer transmit/receive lights are flashing once every couple of seconds (i.e. the Dashboard is trying to establish communications with the sensor unit). Under normal conditions the outer LEDs should flash first followed by the inner two LEDs flashing in response (the sensor unit answering with data).

### Rotor does not rotate

- Check the temperature of the unit is above -15°C degrees. Below this the rotor is prevented from spinning to protect the sensor mechanics.
- Check that the Dashboard is not showing a ‘Motor Stall’ alarm, if so suspend and then resume the unit to restart the motor.
- The sensor rotor might be prevented from rotating due to mechanical blockage. Investigate and remove blockage.
- Check the sensor information display on the system unit. Ensure that there are no errors displayed. Otherwise power cycle the unit and observe the messages on the display.
- Check for ice build up under the rotor. Remove any ice which may be present.

### System appears to be operational but no reflections are displayed within CyScan Dashboard

- Check that the dynamic and static blanking zones are configured correctly.
- Clean the CyScan sensor window. (See [Cleaning the Sensor and Targets on page 50](#)).
- Check whether there are any reflections listed on the Reflections menu and that the Zoom control on the main screen is set appropriately.
- Check that the Tilt controls are set appropriately.
- Check that the Power controls on the Reflections menu are set appropriately.
- Check that the Range Filters on the Reflections menu are set appropriately.

### System is operational but is not tracking

- Check that the sensor has a clear view of the targets.
- Check that the blanking zones are not blocking targets from view.
- In the case of Multi-Target tracking, check that a suitable set of targets has been selected (see [Selecting Targets for Multi-Target Tracking on page 34](#)).

### System tracking but no data is received at the DP system

- Check the DP Feed connection from the sensor.
- Check that the DP Message Format matches the configuration of the vessel’s DP system.

### System operates correctly but in cold weather loses targets

- Check for condensation or ice on targets. Clean if necessary.
- Check for condensation or ice on the window of the sensor. Clean if necessary.

To maintain the CyScan Sensor in good working order it is important that its optical elements are kept free of contamination.

### **To clean the optical window**

Use a lint-free cloth with IPA spray to carefully wipe the optical window. If the material on the window is difficult to remove, warm soapy water with a non-abrasive cloth may be used to clear the window.

### **To clean the targets**

In dirty environments the reflective faces of the targets should be cleaned regularly for best viewing.

Under icy or frosty conditions, the targets should be cleared of any condensation or ice.

The CyScan system contains two replaceable fuses, one for the Live and the other for the Neutral. These are located on the connector board as shown below.

**Connector Board Fuse**

Please refer to the Installer’s Guide for details on how to access the connector board.

To remove a fuse from its housing, fit a flat-head screwdriver into the slot in the insert - then push it in and turn it anti-clockwise until the insert releases and can be pulled out.

Reverse the above procedure to replace the fuse.

Both fuses have the same specification.

Ensure the replacement fuse has the same specification as the original fuse.

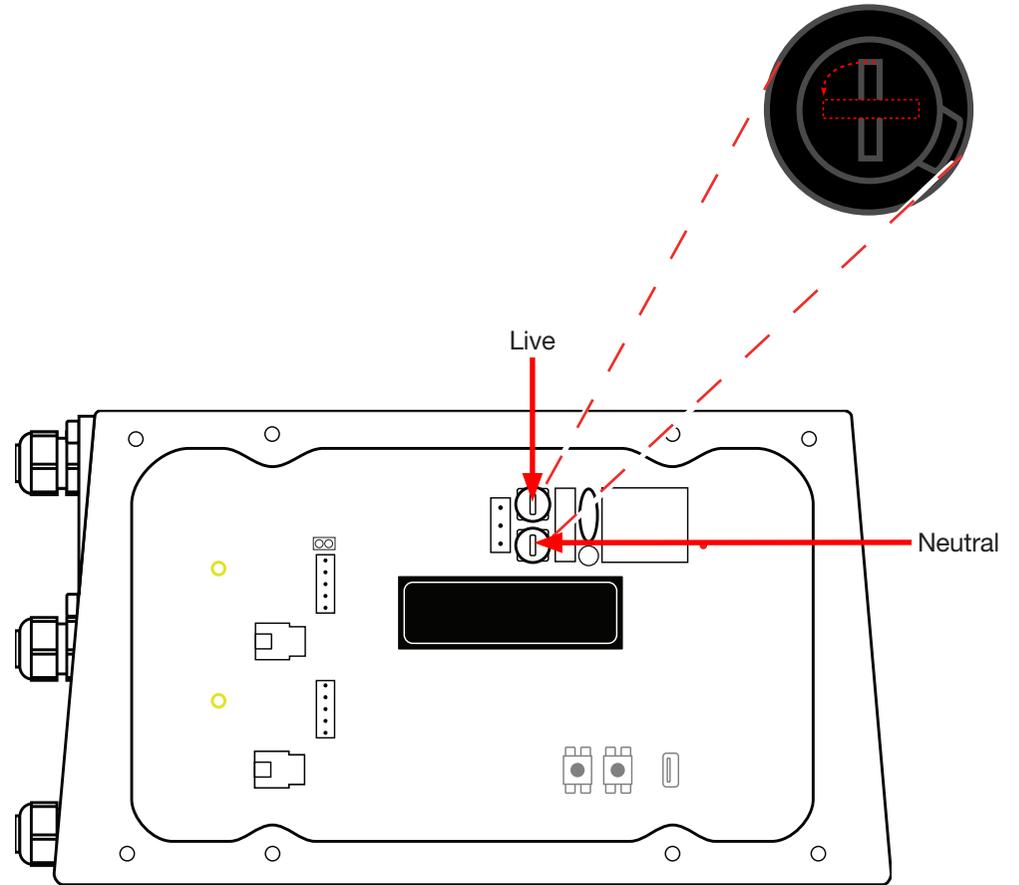
The fuses should be 5 x 20mm anti-surge glass fuses rated for 250V. The current rating should be determined by the table below.

Voltage Supply	230V	110V
Normal Operation	630mA	630mA
Low Temperature Operation	1A	2A

Normal operation is where the sensor is operated at -10°C or above.

Operating at below this temperature we have additional internal heaters which warm the unit at start-up

**CAUTION: DOUBLE POLE/NEUTRAL FUSING**

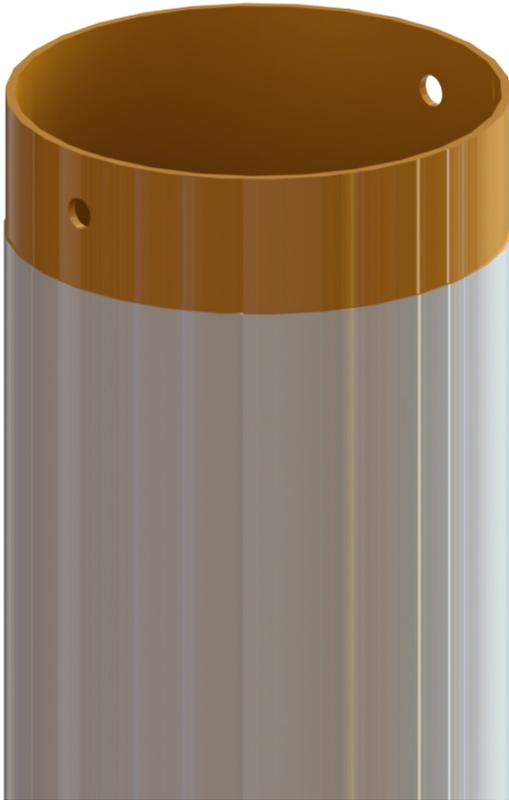


---

## 8. Additional Information

8.1 Target Types .....	53
8.2 Targets Installation and Position .....	54
8.3 Low Temperature Operation .....	55
8.4 Using the On Screen Keyboard .....	56
8.5 Working with Alarms .....	57
8.6 Using the Current and Hisotric Alarms .....	58
8.7 Network Communication Settings .....	59
8.8 CyScan System Specifications .....	60
8.9 Index .....	61

CyScan can operate successfully with flat, cylindrical or prism targets. Targets can be bought online from [www.marine.direct](http://www.marine.direct).



### Cylindrical Targets

Cylindrical targets can be used up to approximately 300 metres. They can be hung over the side of the structure/vessel and secured at either end.

**Part number: 20-0078-0-B**

1.9m cylindrical reflector)



### Prism Targets

Prism clusters with multiple 6cm elements for extended range operations. Variable configurations allow for optimisation of the visible reflection, visible reflection level or reflected power. A fixed layout rugged version includes a robust housing, brightly-coloured for easy identification.

**Part number: 20-0197-2**



### Absolute Signature Prism

AS Prism with multiple 6cm elements for extended range operations. A fixed layout AS Prism includes a robust housing, brightly-coloured for easy identification. The AS prism has a black tinted lens filter which gives it a unique signature that the CyScan AS sensor can exclusively identify as the AS prism target.

**Part number: 20-0232-3**

### Target Installation

Key to the operation of the CyScan system is the correct installation of targets. Please follow the guidelines given below when installing targets on the structure/vessel.

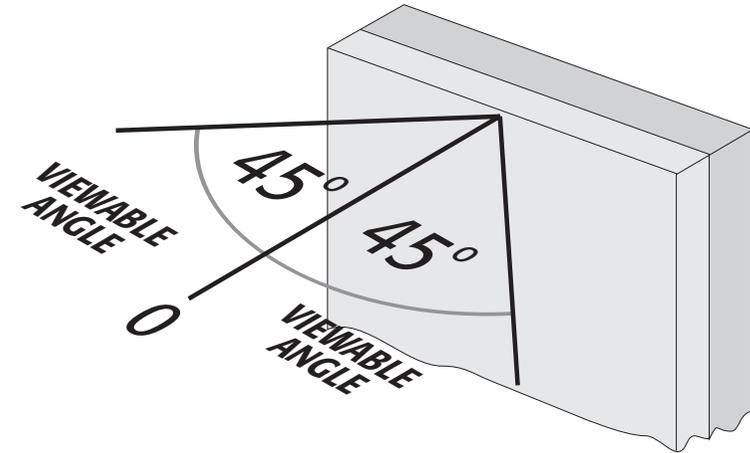
Once the targets are installed, their relative positions can be automatically surveyed by the system.

### Installation Tips

- Targets should be placed in positions where the sensor can see them while the vessel is within the expected working area. Consider vertical position as well as horizontal. The targets should ideally be mounted at the same height as the sensor.
- Cylindrical targets can be viewed from any angle equally well.

### Optimum Spacing for Multiple Targets

- Targets should be positioned with unequal spacing between them – this helps the system to distinguish between specific targets. For example, with a typical mooring distance of 40-80m using three targets, suitable spacing between the targets would be 10m and 20m – giving a total spread of 30m.
- Targets should be placed no closer than 5m together. Ideally they should be placed 10m or more apart.



## Introduction

The CyScan sensor is a precision electromechanical device with hardware components that, of necessity, are mounted in an external position on a vessel's superstructure. It is recognised that industrial marine operations may subject these components to harsh environments, including low temperature.

The CyScan hardware complies with the requirements of IEC 60068-2-1 and is able to operate for prolonged periods at temperatures down to  $-25^{\circ}\text{C}$  provided that certain operating conditions are maintained.

If there is a requirement for CyScan to operate at temperatures below  $-25^{\circ}\text{C}$ , contact Wärtsilä Guidance Marine.

## Operating Conditions

The following recommendations are made for low temperature use:

- If it is necessary for the system to be switched on after a prolonged period at temperatures below  $5^{\circ}\text{C}$  (and down to  $-25^{\circ}\text{C}$ ) the sensor will warm itself, but will require some time to reach optimum operating condition.
- If the unit is switched on after a period at temperatures between  $-15$  to  $-25^{\circ}\text{C}$  it will not communicate with the Dashboard, the VFD will remain blank and the rotor will not rotate until the internal temperature of the base unit rises above  $-15^{\circ}\text{C}$ .
- When the system is not in use (i.e. un-powered or suspended) the sensor should be protected by means of a suitable insulating and protective cover to prevent the external build-up of ice.

For operation below  $-25^{\circ}\text{C}$  additional forced air heating must be provided. Do not use exhaust emissions as these contain particulates which will degrade the optics.

## Technical Considerations

- The CyScan sensor uses a sophisticated rotating infrared laser range-finder to accurately measure the distance and bearing to retro-reflective targets that are placed at specific locations in the working area. Movement sensors allow mechanically driven optics to compensate for vessel motion due to wave action. The internal mechanism may become disabled if it is allowed to cool in a low temperature environment.
- A safety interlock prevents activation of the range-finder laser if the scanner rotor head stops or is prevented from rotating by ice build-up.
- View of the retro-reflective targets will be obscured by a build-up of ice on either the optical window of the scanner or the surface of the targets (N.B. ice has poor reflective properties at the infra-red frequency used by CyScan).

In order to accommodate systems without keyboards, CyScan Dashboard provides an onscreen Keyboard (OSK) option. This enables text to be input using only a mouse pointer or touch screen.

### To enable the on-screen keyboard

If, during installation, you indicated that the Dashboard would be used with a touch screen, the OSK will already be enabled.

Otherwise, click **F11** or the **Enable On Screen Keyboard** button in the Dashboard Hotkeys menu.

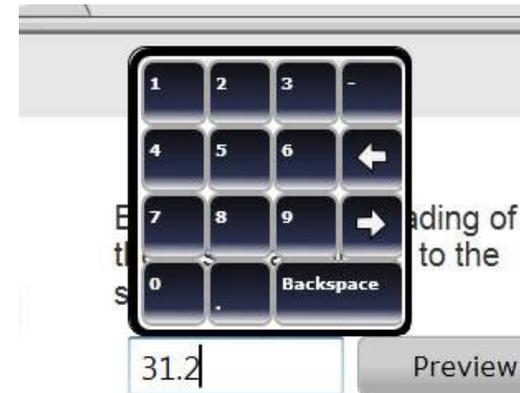
### To use the on-screen keyboard

Simply click on any text entry field and the OSK will pop-up ready for use:



Click on the necessary keys on the on-screen keyboard using your mouse or by tapping the touch screen.

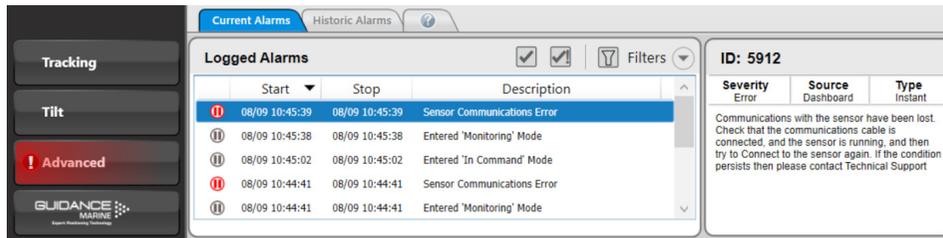
In the case of a numerical field, the OSK is restricted to the appropriate keys:



When you have finished using the OSK, proceed to the next relevant action (e.g. clicking on the **Apply** button), or else click on a different part of the screen, and the OSK will disappear.

During operation, the CyScan system produces an audit trail of event messages. These range in increasing order of severity from: Information, Warning, and Error to Fatal. As these alarms are raised, the Dashboard lists them within the Alarms pane.

Click on any alarm to display details about it in the right-hand section of the Alarm pane:



The severity and current state of an alarm are reflected in its colour and shape:

- Information—grey symbols
- Warning—orange symbols
- Error—red symbols
- Fatal—red symbols

The arrowhead Symbol indicates that an alarm condition is persisting aka **Active** alarms; an alarm in this state will show a Start time but not a Stop time.

The square Symbol means that the alarm condition no longer exists aka **Stopped** alarms, therefore the alarm will show both Start and Stop times.

The pause Symbol indicates an instantaneous alarm. In this case, the Start and Stop times are identical.

When an Error or Fatal alarm is raised, the Alarms pane is opened automatically and the Advanced button in the side bar is shaded red as in the example above. If the pane is closed, the Advanced button returns to its normal grey shading.

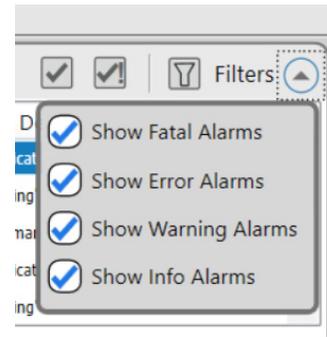
Additionally, after a Fatal alarm has been raised, close the Dashboard, power down the sensor and restart the system especially error and fatal alarms, to click on the alarm and act on the details where necessary, e.g. reconnect/reboot, contact support, etc.

### Filtering Alarms

A filter is available to suppress the display of particular alarm by severity. By default, the filter is activated and causes information messages to be hidden.

Click on the Alarm Filter button to toggle between activated and de-activated

Click on the Filter Selection button to choose which types of alarm are to be filtered out:



Alarm types that are ticked are always displayed in the alarms list, un-ticked types are hidden when the filter is activated.

## Using the Historic Alarm List

The Alarms tab has two alarms lists:

- The **Current Alarms List** displays new alarms (since the last start of the Dashboard software).
- The **Historic Alarms List** is used to store alarms that have been cleared from the current list.

Current alarms are automatically transferred to the Historic alarms list when the Dashboard is closed.

Items in the Current List cannot be deleted, they may only be moved to the Historic List.

Only items in the Historic List can be permanently deleted.

### To accept alarms in the current list

1. Navigate to **Advanced > Alarms** and ensure that the **Current Alarms** tab is in focus.
2. Select the alarms that you wish to move into the Historic list:

**To accept one alarm**—Click on the required entry and click on the ✓ button.

**To accept all alarms**—Click on the ✓! button and click **Apply** to confirm.

**Note: This will not apply to alarms that have been hidden by the filter mechanism.**

### To accept alarms in the current list

1. Navigate to **Advanced > Alarms** and ensure that the **Historic Alarms** tab is in focus.
2. Select the alarms to delete:

**To delete one alarm** – click on the alarm entry and then on the ✕ button.

**To delete all alarms** – click on the ✕! button and click **Apply** to confirm.

**Note: This will not apply to alarms that have been hidden by the filter mechanism.**

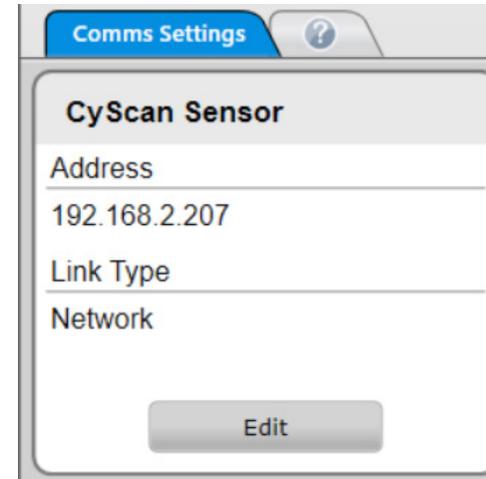
The Comms Settings menu pane displays the configuration of communications between the Dashboard and sensor. This menu only changes the local dashboard record of the sensor IP address. Changing the sensor's IP address (stored in the connect.ini file) is NOT possible from the dashboard but IS possible from the CSI Network Config tab 'Sensor on-board network configuration' section. (see document [94-0363-4 CyScan Installer's Guide](#)).

#### To View the Network Comms Settings:

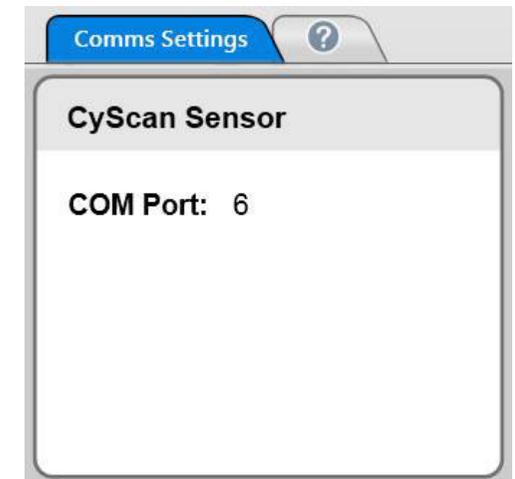
1. Click on the **Advanced** button on the sidebar.
2. Click on the **Comms Settings** button on the menu pane.

#### To Modify the Dashboard's Record of the Sensor's IP Address:

1. Navigate to **Advanced > Comms Settings**.
2. Click on the **Edit** button.
3. Modify the **IP Address** field as required.
4. Click on **Apply** to confirm.



Ethernet Communications



Serial Communications

Sensor	
Laser Source	Pulsed laser diodes
Laser Classification	Class 1M
Operating Range (nominal)	10 - 2500m (dependant on target size and atmospheric conditions)
Range Resolution	0.01m (DP feed dependant)
Range Noise	50mm*
Bearing Noise	0.2 mrad
Beam Shape	12° vertical, 0.13° horizontal
Total Vertical Coverage	52°
Wave Motion Compensation	Single axis gimbal, +/- 20° absolute range
Maximum Detectable Targets	30
Maximum Trackable Targets	9

Levelling Optics	
Active Axis	Single axis with automatic dynamic stepper control
Tilt Compensation	-20° to +20° roll and pitch (combined)
Sensors	3 axis solid state gyros and accelerometers, 2 axis inclinometer
Total Vertical	52° (mechanical + optical)
Wave Motion Compensation (typical)	+5° for 5 second wave period

Environmental	
Operating Temperature Range	Min: -25oC Max: 55oC
Ingress Protection Rating	IP66 rated
Standards Compliance	EN60945, IEC60825
EMC Certificate	CE Certified, FCC Part 15(a)

Vessel Interface	
Sensor Power	85 - 264 VAC, max 130W
Sensor Control Electrical Interface	Ethernet100Base-T or Serial RS422
Sensor Control Software	Up to 10 simultaneous consoles (Ethernet). Single control console for serial connected sensors
Sensor DP Feed	2 x RS422 (Ethernet controlled sensors) or 1 x RS422 (Serial connected sensor)
Supported DP Telegram Formats	NMEA0183R NMEA0183P, ASCII17, MDL standard, MDL Multi-Target, Nautronix Standard, Kongsberg
Custom DP Telegrams	Kongsberg BCD, Artemis Mk IV, Marine Technologies, Rolls Royce

Sensor Weight & Dimensions	
Width	405mm
Depth	407mm
Height	565mm
Weight	28kg

Flight Case	
System Dimensions	680 x 570 x 910mm
System Weight	ca. 78kg (typical accessories)

Targets	
See page 51	

\*Measured at 200m on a cylinder target

- A**
- A and B Axes 32, 33, 34, 35
  - Absolute Signature 28
  - Absolute Signature Prism 50
  - Absolute Signature Target 28
  - Access Plate 8
  - Alarms 57
  - A Pos 32, 33, 34, 35
  - Axis Orientation 34
    - Examples 36
- B**
- Base Plate 8
  - Bird's Eye View (BEV) 13
  - Dynamic blanking zone 13, 22, 49
  - Bow and Starboard Axes 33
  - B Pos 32, 33, 34, 35
- C**
- Cleaning 50
  - Contact Details 48
    - Wärtsilä Guidance Marine 48
  - Command Mode 10, 23, 29, 41
  - Coordinate Axes Direction 36
  - Cylindrical Targets 53
  - CyScan Sensor Part Names 8
- D**
- Dashboard 7, 11
  - Data Logs 46
  - Day Night Mode 20
  - Display Settings 20
  - Data Logging
    - Ethernet 46
- Serial* 47
- DP Feed 8, 31, 44
- E**
- E-mail 46
- F**
- Fuse Information 51
- G**
- GeoLock 6, 10, 38
- H**
- Hotkeys 16
- L**
- Labels 43
  - Low Temperature Operation 55
- M**
- Manually Tilting the Scanner 27
  - Manual Power Control 45
  - Monitoring Mode 40
  - Multiple Target Spacing 54
  - Multi-Target Tracking 30, 31, 34, 35, 36
- N**
- Non-AS Target 29
  - Network Communication Settings 59
- O**
- On Screen Keyboard 56

- Operating
    - Conditions 55
  - Optical Window 8
- P**
- Part Number
    - CyScan Sensor 43
  - Part Numbers
    - Cylindrical Target 53
    - Prisms 53
    - AS Prisms 53
  - Phone 48
  - Positional
    - Information Quality 19
  - Positional Display Modes 30
  - Power 8, 24, 49
  - Prism
    - Targets 53
  - Problems and Possible Remedies 49
  - Product Labels 43
- R**
- Range & Bearing 32
  - Reflection 14, 24
  - Resume 41
  - Rotor 8, 10, 12, 25, 45
- S**
- Scanner Tilt
    - Controls 26
  - Screen Layout 12, 13
  - Selecting Reflections 14, 34
  - Selecting Targets 13, 34
  - Sensor Part Names 8

Serial Number

*CyScan Sensor* 43

Sidebar 15

Single-target navigation 30

Software Versions 43

Spacing Multiple Targets 54

Starboard Axes 32

Sub-zero Temperatures 55

Suspended 10, 40

System Logging 43

System Specifications 60

## **T**

Target

*AS Prism* 53

*AS Target* 29

*Cylindrical* 53

*Installation* 54, 55

*Installation Tips* 54

*Non-AS Target* 29

*Position* 54

*Prism* 53

*Spacing* 54

*Symbols* 29

*Types* 57

Temperature 55

Tilt

*Controls* 26

*Mode* 26

Tracking

*Multi-target* 30

*Overview* 28

*Quality* 19

*Single-target* 28

## **U**

Using the Historic Alarm List 58

## **V**

Vessel Heading 30, 36

Vessel Orientation 21



**WÄRTSILÄ**