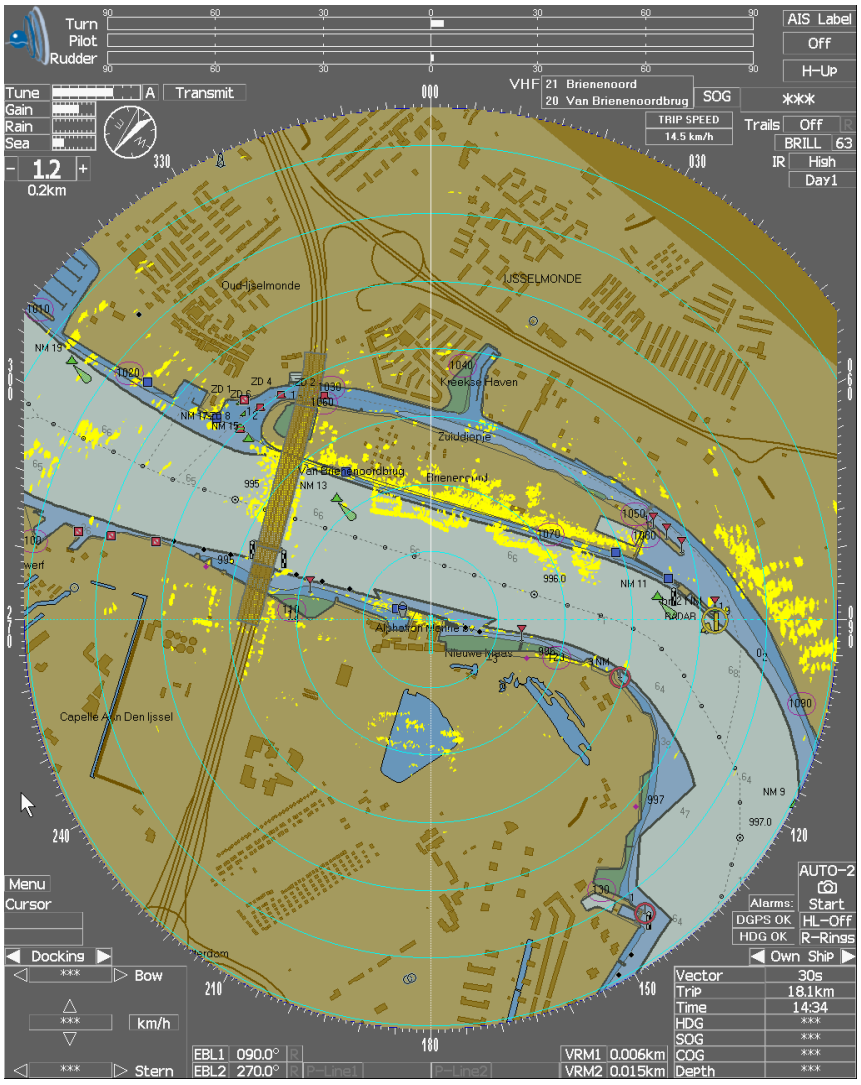
TRESCO RADAR OVERLAY

Operators' manual



Tresco Engineering bvba

Version 2.1

Table of Contents

Revisions

Version	Date	Responsible	Approved	Changes
1.0	2007-11-28	Yves Hacha		First draft
1.1	2008-01-07	Yves Hacha		U/I additions
1.2	2008-01-22	Yves Hacha		New user menu
1.3	2008-02-20	Yves Hacha		Details added and manuals splitted into separate ones for operation and installation
	2008-02-25	Yves Hacha		Added info on AIS-targets
1.4	2008-03-06	Yves Hacha		Details added (menu tree, …)
2.0	2008-05-19	Yves Hacha		User Interface changes. This is the base document for translation.
2.1	2009-09-25	Roel Schroeven		Adapted for JRC JMA 610

Introduction

We would like to thank you for choosing the "Tresco Radar Overlay" system. The Tresco Radar Overlay product enhances a vessel's system radar picture by underlaying Tresco digital charts. This operating mode conforms with "navigation mode" as specified in the Inland ECDIS standard.

Attention !

Inland ECDIS equipment like this, which is able to work in navigation mode (with radar overlay), may only be installed and configured by authorized companies. The chapter "Installation" in this manual gives only a system overview and an interconnection diagram to know the main parts of the whole system. The complete installation is explained in a separate installation manual.

Any parts of the system (PC, Monitors, DGPS- or GPS-Receivers or –Compasses) may be replaced only by original replacements authorized by Tresco Engineering.

It is important that you read this manual *completely* before you start to install and use your Tresco Overlay.

Glossary

AIS	Automatic Identification System
Authorized Companies	Companies authorized by Tresco Navigation
CCR or CCNR	Central Commission for Navigation on the Rhine
COG	Course Over Ground
DGPS	Differential Global Positioning System
DVI	Digital Visual Interface
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
EGNOS	European Geostationary Navigation Overlay Service (for GPS)
ENC	Electronic Navigational Chart
GPS	Global Positioning System
IALA	International Association of Lighthouse Authorities
IEC	International Electrotechnical Commission
IENC	Inland Electronic Navigational Chart
Information mode	ECS without radar overlay
Inland ECDIS	Inland Electronic Chart Display and Information System
Navigation mode	ECS or Inland ECDIS with radar overlay
NMEA	National Marine Electronics Association
PC	Personal Computer
PCI	Peripheral Component Interconnect (PC bus system)
PSU	Power Supply Unit
RIB	Radar Interface Board
ROT	Rate Of Turn (in degrees per minute)
RTCM	Radio Technical Commission for Maritime Services
RX	Receive or Receiver
SENC	System ENC, or, manufacturer encrypted chart
SHM	"Ship's Heading Marker" or "Bearing Zero" pulse
SOG	Speed Over Ground
TRESCO or Tresco	Tresco Engineering bvba, Antwerp
TX	Transmit or Transmitter
UTC	Universal Time Co-ordinated, or, Greenwich Mean Time (GMT)
VGA	Video Graphics Array
WAAS	Wide Area Augmentation System (for GPS)

Conditions

Tresco Radar Overlay is a navigation aid and works in co-operation with other similar systems like ECDIS and radar. The installation has to be inspected regularly as written in the legal regulations and checked frequently on its operational quality by the user. Remember that navigation and life at sea always requires proper seamanship and that the Tresco Radar Overlay is not a replacement for such qualities.

Tresco Engineering bvba, Antwerp cannot be held liable for any injury or damage caused by, during or because of the installation and using of the Radar Overlay. This product is used at your own risk and it shall be remembered that AIS, GPS, heading and rate-of-turn data depends on the full co-operation of other users and systems.

IT IS IMPORTANT TO KEEP PROPER LOOKOUT AT ALL TIMES AND TO USE ALL AVAILABLE MEANS TO AVOID COLLISIONS AND ACCIDENTS.

GPS (AND THUS THE CHART POSITION) MAY FROM TIME TO TIME INCLUDE ERRORS: THEREFORE, THE POSITION RECEIVED FROM THE GPS SHALL ALWAYS BE VERIFIED WITH OTHER AVAILABLE MEANS.

Support

If you need support, please contact the closest reseller or the location where you acquired the product.

The manufacturer can also give direct support:
Email: support@tresco.be or Fax: +32 3 829 03 71.

Please register your purchase of Tresco Radar Overlay with Tresco Engineering, Antwerp by sending an email to info@tresco.be stating your vessel name, your (company) name, your telephone number and your dealer's/reseller's company name.

Product Specification

Characteristics

Tresco overlay-PC: An *approved PC* delivered by Tresco or an authorized company
Containing the RIB hardware: 1 PCI or PCI-X slot

Power: Uses the host PSU of the PC

Electrical Interfaces: PCI-bus for communication with host PC
DVI or VGA video signal for communication with radar
NMEA-183 for communication with GPS, AIS, rate-of-turn indicator and compass.

Connectors: PCI-slot
DB-15 VGA connector or DVI connector
DB-9 or DB-25 serial connector for NMEA

Resolution: 1024 by 1280 pixels

Graphical layers: four:
- chart - under radar
- radar echoes
- chart - over radar
- radar top

Positional Accuracy: equal to the accuracy of the positioning device (e.g. GPS)

Radial accuracy: equal to the accuracy of the heading device plus or minus 0.1°

Standards, prescriptions and Type Approval

This product complies with the Inland ECDIS standard adopted by the CCNR, the Danube Commission and the United Nations Economic Commission for Europe (UN-ECE). The standard can be downloaded on the site of the CCNR. The title is "Inland ECDIS Standard Edition 2.0". Use the following links:

- English version: http://www.ccr-zkr.org/Files/ris/eri12_e.pdf
- German version: http://www.ccr-zkr.org/Files/ris/eri12_d.pdf
- French version: http://www.ccr-zkr.org/Files/ris/eri12_f.pdf

All River Information Services (RIS) documents can be found at:
http://www.ccr-zkr.org/commun/ris.htm

The prescriptions about the minimum requirements and approval conditions for navigation mode equipment used on the Rhine:

- German version: http://www.ccr-zkr.org/Files/rp21a_012004.pdf
- French version: http://www.ccr-zkr.org/Files/rp21f_012004.pdf

The prescriptions concerning installation and the functional test for radar equipment and turn indicators for navigation on the Rhine:

- German version: http://www.ccr-zkr.org/Files/rp23a_012004.pdf
- French version: http://www.ccr-zkr.org/Files/rp23f_012004.pdf

For the list of approved equipment, see section B in:

- German version: http://www.ccr-zkr.org/Files/rp24a_012004.pdf
- French version: http://www.ccr-zkr.org/Files/rp24f_082007.pdf

Tresco charts comply with the IHO S-57 / S-52 standards.

NMEA-183 serial communication complies with the IEC 61162 standard.

Type Approval

This Tresco radar-overlay product has been type approved by the Traffic Technology Centre of the federal waterways administration. The certificate was issued on 15 april 2008 and has the number R-4-102 .

FEDERAL WATERWAYS ADMINISTRATION

Traffic Technologies Centre
Weinbergstrasse 11-13
D-56070 Koblenz

Admission Certificate

No. R-4-102

According to the

Regulations concerning the Minimum Requirements and Test Conditions for Navigational Radars in the Rhine River Shipping

concluded by the Central Commission for the Navigation on the River Rhine at 18.05.1989

the Inland ECDIS Equipment

Tresco Radar Overlay

manufactured by

Tresco Engineering bvba
Kribbestraat 24, B-2000 Antwerp, Belgium

consisting of

Origin Display of JRC JMA 609 (T.A. No.: R-4-011)
Shuttle XPC, Barebone SG31GS Black or similar
GPS Compass JRC, Type JLR-20 or any other as THD certified Compass
Video switch 2 x 1 (1280 x 1024)

will be admitted as daughter display for the type approved navigational radar JRC JMA 609, T.A.No.: R-4-011 for the use on inland waterways.

This Admission will be granted to

Tresco Engineering bvba
Kribbestraat 24, B-2000 Antwerp, Belgium

Essential features of the Inland ECDIS equipment are described in the conformity test report FVT_IETP_01/2008 dated with 15-04-2008 and in the accompanied letter which are part of this Admission. The owner of this Admission has to announce any modification of the equipment to the signer.

Federal Waterways Administration
Traffic Technologies Centre

Koblenz, 15-04-2008

by Order

Haberkamp

(Haberkamp)

Admission certificates without official stamp and sign are invalid. They may be distributed unmodified only.

Installation

The installation on board should only be performed by a Tresco authorized company. An extra Tresco installation instruction manual is made available for this purpose.

Only a general installation overview is given here.

The following items belong to your product:

- a Tresco overlay-PC
- a Tresco CD "Tresco Radar Overlay"
- a PCI Radar-Interface Board (RIB)
- (optionally) a 2-input video switch
- Cables, etc…

1. PC Installation

An approved PC with the required specifications should be installed:
- Installation of extra hardware,
- Installation of software
- Connection to external devices.

2. Radar connection

Connect the screen video signal from the radar to:
- the second input of the video-switch, and,
- the radar-overlay PC.

3. Video switch installation (optionally)

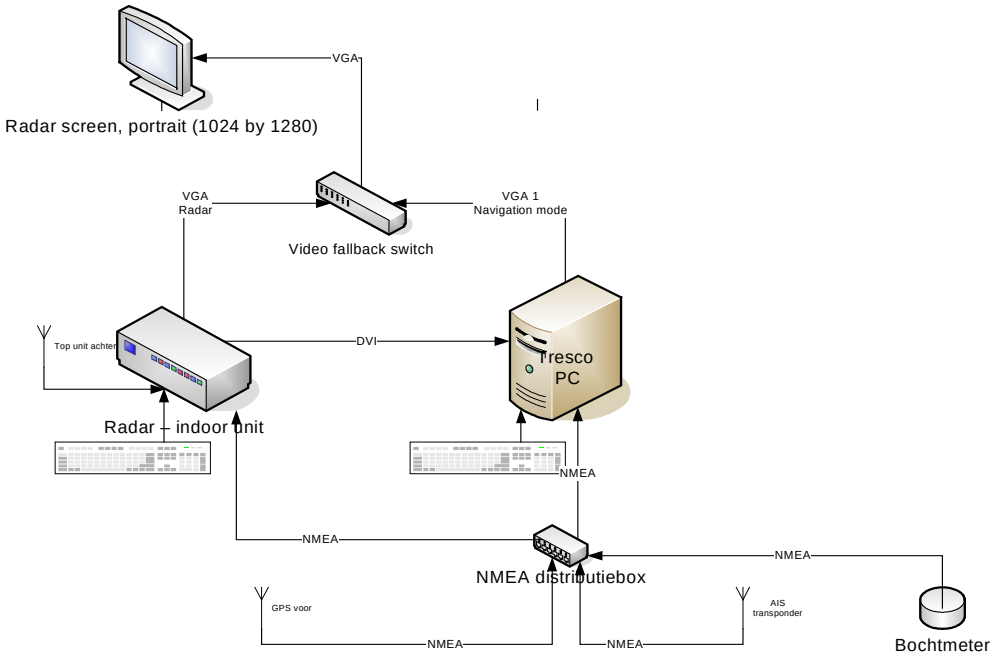
This switch should be easily accessible to the user. It allows the operator to switch between radar image and radar with underlaid chart.

The radar-overlay can be installed in two different ways:
- radar and PC have separate monitors, or,
- radar and PC *share* one and the same monitor.

The following pictures clarify this by using schematic diagrams:

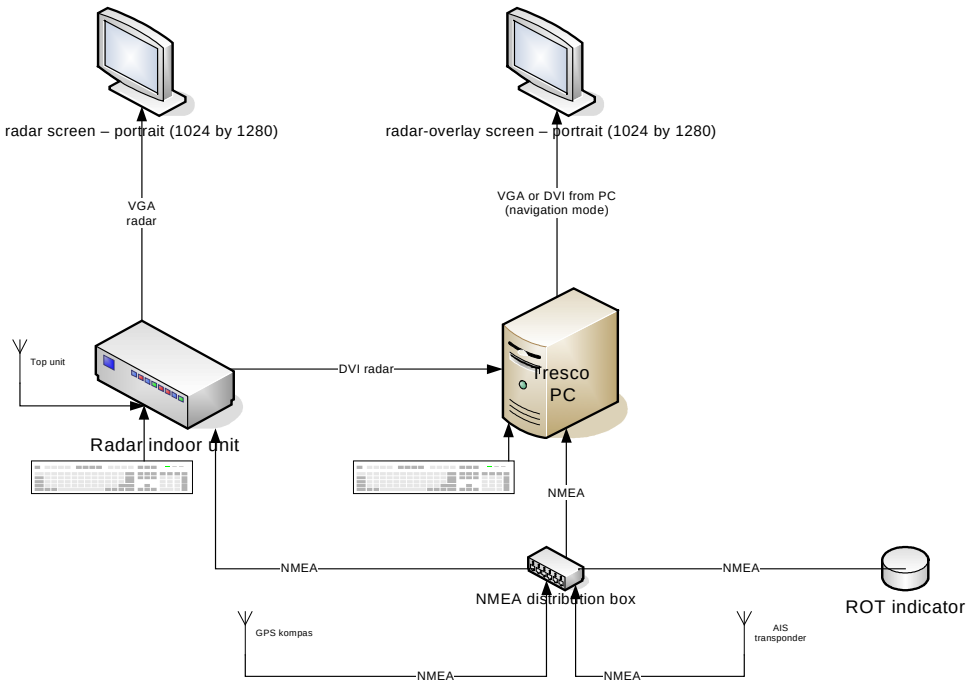
Installation with 1 shared monitor for radar and Radar Overlay:

TRESCO RADAR OVERLAY – Config 1



Installation diagram with separate monitors:

TRESCO RADAR OVERLAY – Config 2



Using your Tresco Radar Overlay

Whit the radar turned on and the PC off, the user should see his normal radar picture.

At that moment please switch your radar as usually to the required distance RANGE and adjust TUNE and GAIN to the optimal value. Please set STC and FTC to zero, unless there is any clutter generated by waves or rain, than adjust carefully to the minimum required value.

After turning on the Tresco PC, one should see the radar picture with underlaid chart. A PC mouse pointer becomes visible on the screen. The chart will appear only if position and heading data are available and of a good quality.

All operations regarding radar can be done continuously in the usual way by using the radars operating panel (radar keyboard and trackball).

To operate the additional chart functions, please move the mouse pointer to the bottom of the radar-overlay screen, and, the Tresco chart menu will pop-up:

user menu in navigation mode

The following diagram shows all selectable user menu possibilities in navigation mode.
It is depicted here in a menu tree:

Mode	Item	User choices		Short comment
NAV MODE				
	AIS			
		OFF		No targets visible
		ON		Targets visible on position
		LABELS		Targets visible with labels during 10 seconds
	CHART			
		OFF		No chart underlay on screen
		MIN		Chart gets underlaid with minimal info
		USER		Chart gets underlaid with user selected info
		ALL		Chart gets underlaid with maximal chart details
	BRILL RADAR			
		analog slider		Controls the radar intensity
	BRILL CHART			
		analog slider		Controls the chart color and intensity
	SWITCH TO			
		INFO MODE		
			YES	Go directly to Tresco Info mode
			NO	Stay in navigation mode
	EXIT			
		YES		Exit navigation mode
		NO		Stay in navigation mode
	TRIP	distance		Tripmeter in distance mode
		time		Tripmeter in time mode
		avg speed		Tripmeter in avg spd mode
		PAUSE		Pause the tripmeter
		RESET		Reset the tripmeter

Besides the above-listed commands which are accessible through the popup menu, the next table shows the functionality which can be initiated by the pointing device (mouse or trackball):

Mode	**User action**	**Short comment**
POINTING DEVICE ACTION		
	general left click in the chart/radar area	Initiate a pick report procedure
	left click in the chart/radar area near an AIS target	Initiate a target report procedure
	Mouse or trackball movement to the bottom of the screen	Show popup menu

When the user exits the radar overlay application, the main start up menu appears:

The following selections are possible:

Mode	Item	User choice	Short comment
START-UP			
	NAVIGATION MODE		Launch radar-overlay application
	INFORMATION MODE		Launch information mode application (no radar)
	SERVICE: Enter user password	OK	Go to service mode if correct password
		Cancel	Stay in Start-Up screen
	ON-SCREEN KEYBOARD		Displays a virtual keyboard
	RESTART	YES	Reboot the overlay-PC
		NO	Stay in Start-Up screen
	SHUTDOWN	YES	Turn the overlay-PC off
		NO	Stay in Start-Up screen

User Instructions

For the general instructions, commands, features and options that can be used or selected in *information mode*, please consult the "Tresco Navigis River Installation and Operation" manual.

Additionally, in the pop-up menu, the following user commands can be selected:

AIS OFF, AIS ON or AIS LABELS

Switch to select if other vessels which are equipped with an AIS-transponder, are made visible on the chart. How exactly the AIS-targets are shown, is selected in the system setup configuration option in information mode. An octogon symbol indicates a vessel with no transmitted heading information. When heading information is received over AIS, the octagon switches to a triangle symbol. The direction of the triangle indicates the vessels' heading or bearing of the target and the fine, dashed line which originates from the triangle, indicates the course-over-ground. Note that the course and the heading may differ significantly depending on actual sailing conditions (current, wind, actual rate-of-turn, …).
If the current display range allows an AIS vessel to be drawn on scale, you will see the vessel outline when this data is received over AIS.

Switch to 'AIS LABELS' to select whether the other vessels should be labeled by its AIS-transmitted name. Optionally the name can be accompanied by a vessel number, a course and a speed indication.
Remark: the more information is put in a label, the larger the label is projected on the screen. In a place (e.g. harbour) where a lot of vessels are transmitting there AIS-info, screen-cluttering may occur. For this reason the AIS-labels are automatically switched off after ten seconds. AIS-targets are still visible by their octagon or triangular symbol.

Note: AIS-targets can only be shown if you have connected an AIS-receiver or AIS-transponder to the PC used for navigation purposes. (The connection is made by a serial NMEA 183 data-cable between the AIS hardware and the Tresco PC.)

CHART OFF, CHART MIN, CHART USER or CHART ALL

Select whether you want to see an electronic vector chart(S57 standard) or not.
If the quality of the position sensors and the heading sensors are OK, the chart will be drawn if the user has selected 'CHART MIN', 'CHART USER' or 'CHART ALL'.
When you select CHART OFF, the chart image will disappear. (If 'AIS ON' or 'AIS LABELS' is selected, targets will still be shown.) In this case the screen will be very similar to the image as it is shown on the normal master radar-screen.
The density of displayed information of the Inland ECDIS chart is chosen by selecting one of the following interface buttons:
"CHART MIN" : minimum required navigational info
"CHART USER" : user selectable info between minimum and maximum density, and,
"CHART ALL" : show all chart data available in the S57 SENC.

In Information Mode, the user can select which layers will be shown on the chart when the "CHART USER" density is selected.

CHART BRIGHTNESS

Select the opacity of the chart by means of the slider.
When the slider is more to the left, the impact of the chart image will be minimum.
When the slider is moved to the right, the chart becomes more apparent

RADAR BRIGHTNESS

Selects the color intensity of the radar echoes by means of the slider.
When the slider is more to the left, radar-echoes become darker (more contrast against the electronic chart). When the slider is moved to the right, the echoes become brighter.

Remark: experiment with different settings of chart brightness and echo visibility. Choose a contrast that satisfies with the current lighting conditions (day, dusk or night).

TRIP

On the top row, the tripmeter displays (from left to right): distance, time and average speed of the tripmeter. The bottom rows shows (also from left to right): PAUSE, RESET, actual speed.
Click PAUSE to pause/unpause the tripmeter, or RESET to reset the tripmeter.
Click one of the values (distance, time, average speed, actual speed) to display the corresponding value in the tripmeter in the radar screen itself.

WATERWAY

This box shows the waterway name and the km-position on that waterway corresponding to the current position.

TO INFORMATION MODE

This option allows the user to switch to Information mode or configuration mode. In information mode, no radar echoes are shown. A different range or region (planning mode) can be shown North- or Course-up. To return to Navigation Mode, select "Navigation Mode" at the top-left position in Tresco's Information mode screen.
This selection has to be confirmed with "YES" or "NO". So, two user actions are necessary to exit navigation mode.

EXIT

This option shuts down the Tresco Radar Overlay application and returns to the start-up screen. This selection has to be confirmed with "YES" or "NO". So, two user actions are necessary to exit navigation mode.

On the start-up screen, the user can turn off the navigation PC, or relaunch the application.

To re-launch your Radar-Overlay product after PC shut-down, start the PC using the ON-button on its front cover.

PICK REPORT

When the user (left-)clicks on the chart, the selected position, chart symbols and AIS-targets (if available) are listed in an extra exhaustive information box at the bottom-left. In the left pane of the box all chart features in the neighborhood of the selection are listed. When the user clicks on a chart feature (e.g. a buoy), all attributes of that selected feature are listed. If the user selects a listed AIS target, all AIS data of that target is shown in the right pane.

Select "CLOSE" to dismiss the pick report information box.

Remark:
The pick report window masks a large part of the radar picture. Close the window to continuing navigation. If there is no user action that closes this info window, the windows is closed automatically after 10 seconds.

Indications and alarms

If the main interface signals are not correctly detected, the product shows the following appropriate indication or alarm:

No radar input,
No or bad position input,
No or bad heading input,

In these cases, the chart image will be suppressed as it will not align properly with the radar image. Verify your navigation sensors (GPS, DGPS, GPS-compass or electronic compass) and make sure you can pinpoint the failing component.

During normal operation, the user sees at the bottom-right of his screen:

DGPS OK or GPS OK
NO
ALARMS

The normal white font color indicates normal operation.

In case of signal errors, the following indications or alarms will be displayed:

- When the main GPS-receiver is able to receive a "D" beacon-signal(RTCM), the quality of the position improves. This condition is indicated by displaying "DGPS" in stead of "GPS" in the normal white font. If the position is not received during 10 seconds, the GPS alarm is indicated in a bright red font color.
- When the heading fails, because there is no true-heading received by the main antenna during 10 seconds, the heading is displayed in a bright red font color.

Consult your installation company in case of these indications or alarms.

Local VHF channel indication

At the top, you'll see an extra window showing current, local VHF channels that can be used to listen and call out. The indication of the correct channels automatically changes during your journey.

Interface Descriptions

Interface from Radar to PC

The radar is the main navigation instrument that controls the quality of the radar picture. The PC follows these settings and uses the radar video in slave mode. So, when the range or the off-center position on the radar is changed, the Radar Overlay changes accordingly.

Radar echo video signal interface

The radar echo video signal is captured at the end of the processing stages from the main radar. This has the unique advantage that the Tresco Radar Overlay has the same high-quality echo image as the main radar. The communication to the RIB in the Tresco-PC is done by a VGA- or DVI-cable.

Radar parameters interface

The radar parameters such as Sea, rain, gain, tune, range, off-center and color-scheme are directly interpreted from the video signal. So, no extra physical interface is required to obtain this data.

Ship's heading marker(SHM) or "Bearing Zero" interface

This signal indicates when the radar antenna is updating bow echoes at 0 degrees head-up. This electrical pulse is fed to the Data-Set-Ready contact of a RS-232 port on the PC. If necessary, a serial port already used for NMEA data, can be shared to also input this signal.
Although not absolutely necessary, this interface allows the Tresco chart drawing engine to synchronize with the scanner.

Interface from PC to Radar

The standalone radar is not controlled by this product in anyway. It is the PC that works in slave mode and adapts to the settings controlled by the radar console.

NMEA Interface between GPS(-compass), Rate-Of-Turn indicator, radar, AIS transponder and the PC

All this equipment transmits its data to the Tresco PC by means of the serial NMEA-183 protocol, using the IEC 61162 standard.

Accepted GPS sentences:

GLL, GGA, RMC and VTG

Accepted GPS-compass sentences:

See: 'Accepted GPS sentences' plus:
HDT and ROT

Accepted Rate-Of-Turn indicator sentences:

ROT

Accepted AIS sentences:

VDM and VDO

Accepted Radar sentences:

TTM, OSD and RSA

Maintenance

WARNING:

Unauthorized servicing of the Tresco Radar Overlay will invalidate the warranty.

NOTE:

This product contains no user serviceable parts. Contact your Service Agent for repair.

Troubleshooting

No Chart underlay

Check that you connected a positioning device(GPS) and heading device(compass), and that both these external units are working correctly. Under normal conditions, no red alarm indications should be visible on the right hand side of the screen.
Also, check that charts/cells and chart/cell permits are correctly installed. When you haven't the correct licenses, no chart will come up.

There are no radar echoes visible

Check that the video signal from the radar is connected to the Tresco PC. Also, check that the direct radar image gives a good picture (Gain OK ?).
Check that when you move the radar mouse, you see the cursor of the radar moving over the PC screen.
Check that the echo visibility slider is in the right up-most position.

The R/O menu pane is not visible

Make sure that your looking at the PC-generated screen. Move the PC pointing device (mouse or trackball) to the bottom of the screen. Your menu should come up automatically.
As long as you stay with your pointing-device inside the menu area, the menu will stay.

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