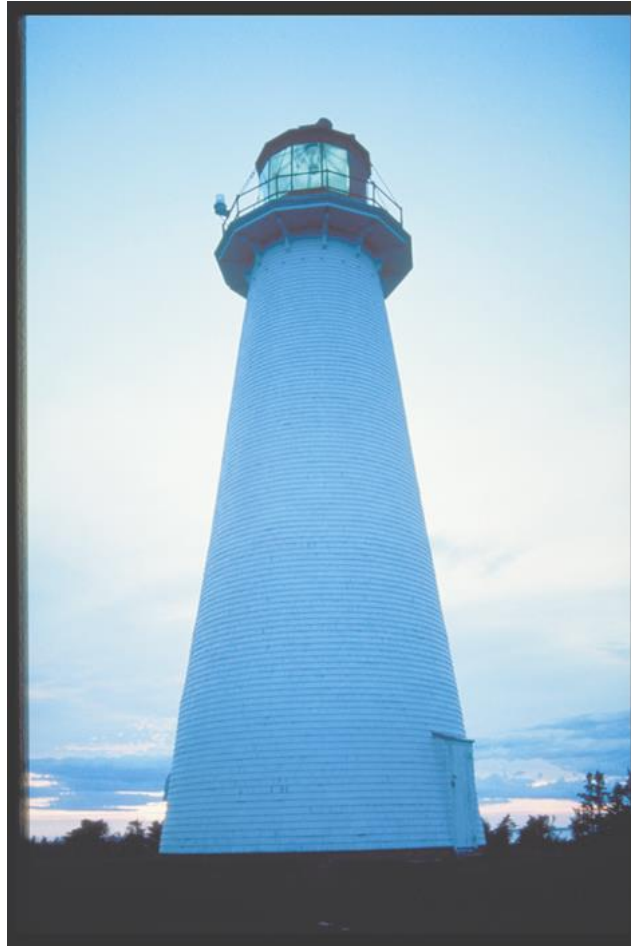


Offshore Pilot

Operator's Manual



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PREFACE

This manual describes the operation and use of the programs in the Offshore Pilot software package

This publication may contain technical inaccuracies or typographical errors.

Corrections will be made in future versions of this manual.

TRELLEBORG will be most happy to receive any comments you may have in relation to this manual.

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1 Introduction

The purpose of the TRELLEBORG Offshore Berthing Aid System is to increase efficiency and operational safety during tanker approach, berthing, loading and departure operations to and from the FPSO/FLNG.

The unique strength of the system is the combination of the high accuracy positioning technology with the relevant and flexible integration and presentation options.

Core features of the system include:

- Position, heading, speed, course, rate of turn of tanker, tugs, and platforms.
- Distances and relative speeds between tanker and FPSO. Emergency signals.
- Drift warning and alarm.
- Data logging etc.

Integrations to external systems include, if available:

- Environmental sensors (wind, current, waves, humidity, etc.)
- ICSS (Product pressure, pump status, etc.)
- Navigational system (AIS)
- Heave, pitch and roll of FLNG/FPSO
- Tug (Power reserve, hawser load, etc.).
- Tanker mooring load monitoring
- Emergency shut down

The system is based on latest available GNSS technology using GPS, GLONASS (L1&L2) receivers and UHF communication links. Using DGPS positioning, accuracies of 2-3 cm are available, together with the very best of heading and speed accuracy.

The PPU is carried by the pilot onto the approaching tanker at the start of the berthing operation. Using an efficient UHF communication all information is available to all tanker, tug, and platform units in real time during the entire operation. This provides a complete overview of the operation for all involved units.

Throughout the loading operation drift warning, monitoring of tanker mooring load and product data as well as ESD functionality are available on the PPU. To avoid information overload, specific displays are available to individual users as required during the different phases of the operation.

The base station unit is a fixed install on the FPSO/FLNG. Monitoring, logging and replay of data are available on the FPSO/FLNG via the base station server.

A TRELLEBORG Offshore solution is extremely flexible and offers client specific adaptations to standard displays as well as unlimited integration options.

This manual describes the project specific behavior of the system.

2 Getting started

2.1 Positioning of the E-Sea Fix CAT III unit

The CAT III must be placed outside with a good view of the sky clear of bulkheads and obstructions. (Minimum distance from the two antennas to small obstructions like VHF antenna 1-2 m, bulkheads 5-10 m).

The CAT III automatically calculates the exact distance between the antennas. However, it is important for the accuracy to get as long distance between the antennas as possible, ideally 4 m (minimum 2 m).

2.2 Software setup

Program starts up automatically at power up. If program is stopped it automatically starts again.

2.2.1 Wi-Fi

The CAT III unit creates a wireless network named after its unit number. E.g. the CAT III labeled "CAT-02" creates a wireless network called "ESea_Fix_2". Laptop Pilot2 will automatically connect to the "ESea_Fix_2" network.

2.2.2 Vessel setup

When beginning an operation on a tanker, the pilot may change the setup of the vessel characteristics by double clicking the tanker name in the top of the info bar in the right part of the screen (name is "-" if no tanker has been set up).

A dialog box will appear, letting you enter the information of the tanker.

If the tanker has been used before, you may select its name from the drop down list appearing when clicking the tanker name (or "Select vessel" if none is selected) in the vessel setup dialog.

Enter or change the data for the vessel and CAT III position:

Vessel Setup

TANKER

MMSI 12375645

Vessel size

Length 300.0

Width 50.0

CAT position

Length offset -100.0

Width offset 0.0

Heading offset 100.0

Delete vessel New vessel Reset Apply

Name: The name of the vessel.

MMSI: The MMSI of the vessel. Only necessary in systems where AIS data is available.

Length: The length of the vessel in meters.

Width: The width of the vessel in meters.

CAT width offset: The distance in meters of the CAT III position antenna to the center line of the vessel. A positive value indicates that the CAT III is position on the starboard side of the center line, a negative value indicates port side.

CAT length offset: The distance in meters of the CAT III position antenna from the vessel bow.

CAT heading offset: Indicates how the heading antenna is positioned relative to the position antenna. Think of a compass where the vessel bow represents north and the stern represents south. I.e. if the heading antenna is positioned forward of the position antenna, the heading offset is 0°; if the heading antenna is positioned starboard of the position antenna, the heading offset is 90°; etc.

2.3 Starting a berthing operation

A berthing operation starts when the pilot system is started when the pilot selects and configures the tanker data and the GPS is setup as described above.

3 User Interface

The user interface of the operators PC on the FPSO/FLNG and the laptop for the pilot on the Tanker and Tug are based on the same elements, but are customized to display only the most relevant information in a suitable way.

The main part of the operational screen shows a graphical overview of the operation including the FPSO/FLNG and the tanker.

In the top of the screen is an area showing values from the current vessel, i.e. the operator PC on the FPSO/FLNG shows information from the FPSO/FLNG, the pilot laptop shows information from the tanker.

In the top right corner, the current operation type is shown. For each operation type, different values will be shown in the tabs below.

Then a field is showing if any alarm is currently active. By clicking this field, a new window will open showing all current alarms.

Below are three tabs: Approach, Moored, and Alarms. Each of these will be described below.

To the right is an information box showing information relevant for the current operation.

The following is based on screen shots from the operator PC. The organization of the information in the pilot screen is basically the same. When there are differences in the behavior, this will be described.

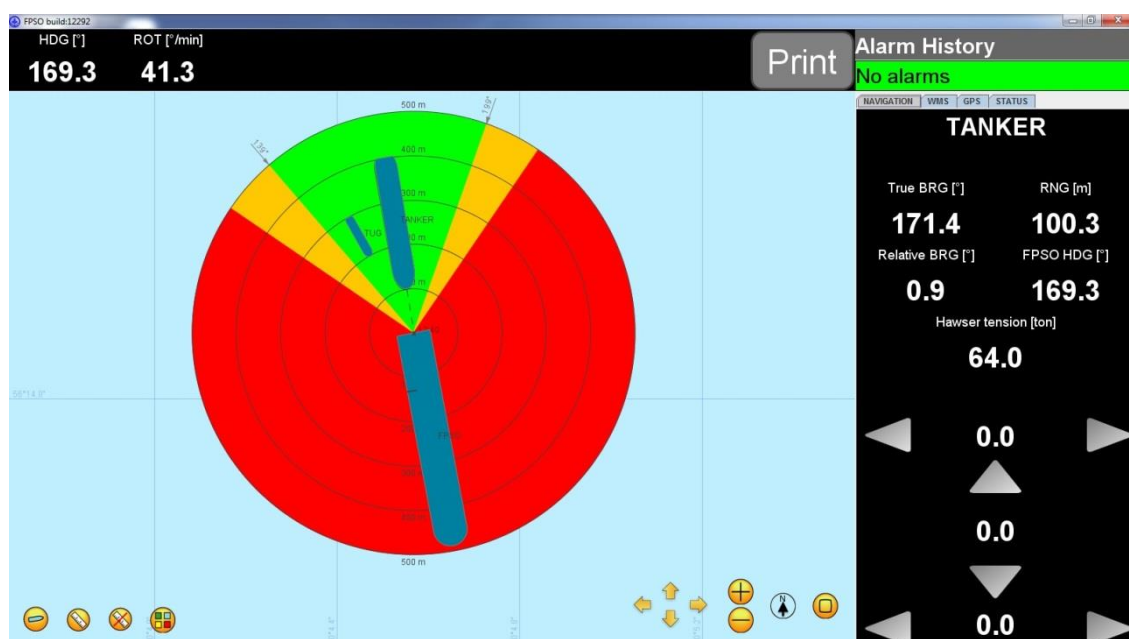
3.1 FPSO Main Screen:

The main screen shows information relevant during the tanker approach. The information box to the right is further organized into tabs in order to only show the information relevant for the current approach operation.

The Navigation and WMS tabs are common for all vessels (FPSO/FLNG, Tanker and Tug).

The GPS tab is specific for the FPSO/FLNG. Displaying the GPS data of the FPSO/FLNG.

HDG (Heading) and ROT (Rate Of Turn) in the top left corner are related to the FPSO/FLNG.

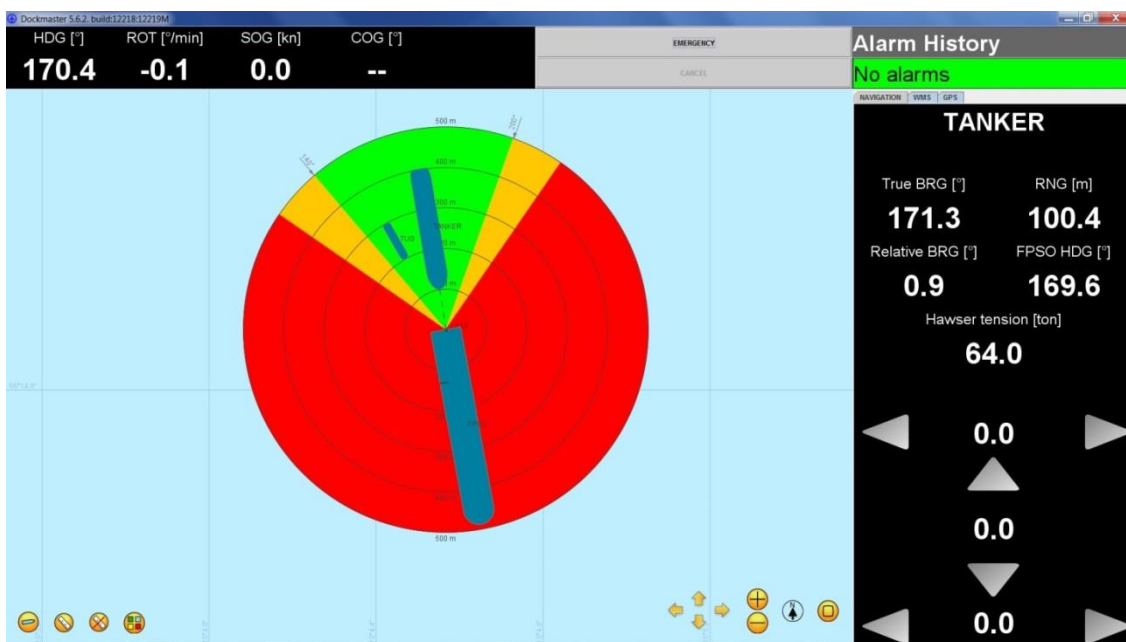


3.2 Tanker Main screen:

The main screen shows information relevant during the tanker approach. The information box to the right is further organized into tabs in order to only show the information relevant for the current approach operation.

The Navigation and WMS tabs are common for all vessels (FPSO/FLNG, Tanker and Tug). The GPS tab is specific for the Tanker. Displaying the GPS data of the CAT III for the Tanker. HDG (Heading), ROT (Rate Of Turn), SOG (Speed Over Ground) and COG (Course Over Ground) in the top left corner are related to the Tanker.

The "EMERGENCY" label is emergency release for the mooring line. To perform the emergency release click on "EMERGENCY" button then enter the confirmation sequence 1,2,3,4 Once the confirmation sequence has been entered the emergency release will activate and the mooring hook will open releasing the mooring line. If nothing is entered then the confirmation label will change back to normal after 15 seconds. No release will be performed. If the emergency release is received on the FPSO/FLNG the "EMERGENCY" label will then grey out and the "CANCEL" button will then be active. To deactivate the emergency release click on "CANCEL" to change back to normal operation then the "EMERGENCY" label will be active again.



3.3 Tug Main Screen:

The main screen shows information relevant during the tanker approach. The information box to the right is further organized into tabs in order to only show the information relevant for the current approach operation. The Navigation and WMS tabs are common for all vessels (FPSO/FLNG, Tanker and Tug).

The GPS tab is specific for the Tug. Displaying the GPS data of the CAT III for the Tug. HDG (Heading), ROT (Rate Of Turn), SOG (Speed Over Ground) and COG (Course Over Ground) in the top left corner are related to the Tug.



3.4 Navigation:

This tab shows information relevant when the pilot has boarded the tanker, and is navigating towards the FPSO/FLNG at far distance. This includes true bearing and range from the tanker to the FPSO/FLNG along with the tanker heading. Furthermore, when the tanker is moored in tandem, this tab also shows the tension of the tandem mooring hawser. In the top of the navigation tab is the name of the selected tanker (“–” if no tanker has been specified).

To Enter the vessel setup. See description under “Vessel Setup” described” above.

For the Tanker only the pilot on the Tanker can enter the name and other settings of the Tanker.

For the Tug only the pilot on the Tug can enter the name and other settings of the Tug.

For the FPSO/FLNG there is no vessel setup tool as this only needs to be configured once and done by the TRELLEBORG technician when installing the system.

Vessel Setup

TANKER

MMSI 12375645

Vessel size

Length 300.0

Width 50.0

CAT position

Length offset -100.0

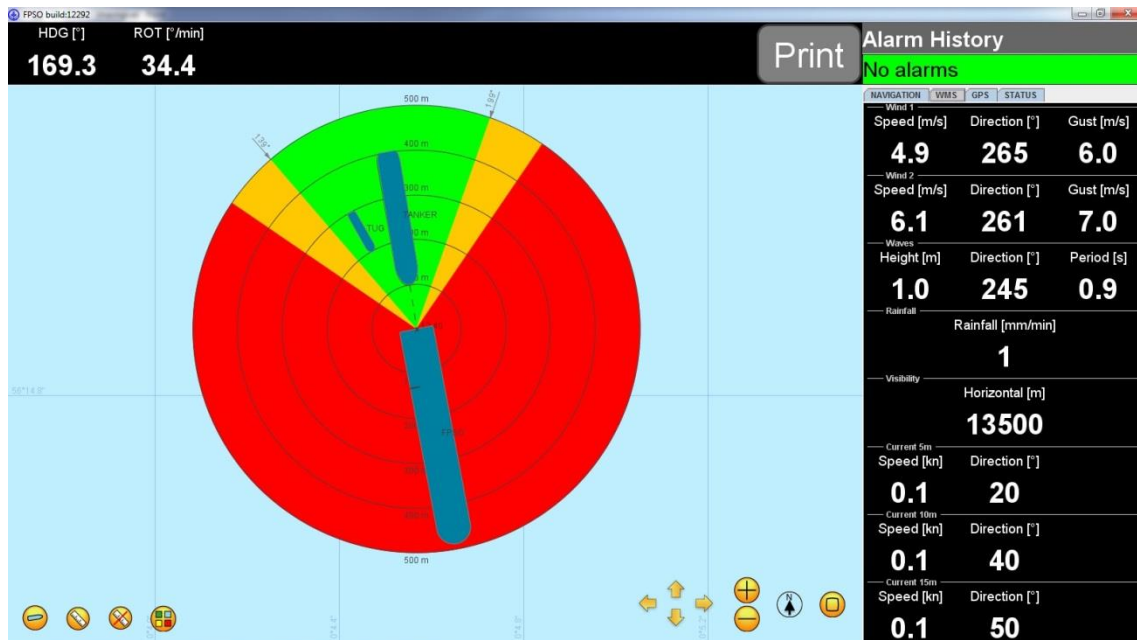
Width offset 0.0

Heading offset 100.0

Delete vessel New vessel Reset Apply

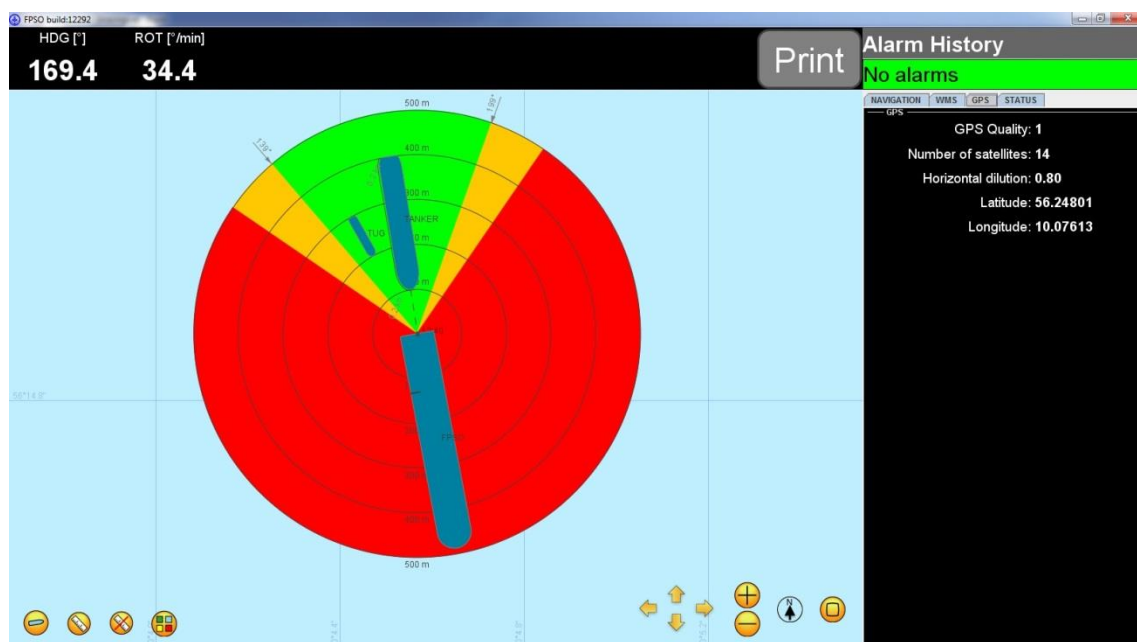
3.5 WMS:

This tab shows weather information from the Weather Monitoring System. Fields showing “-” means that the system is not getting any value for that field right now.



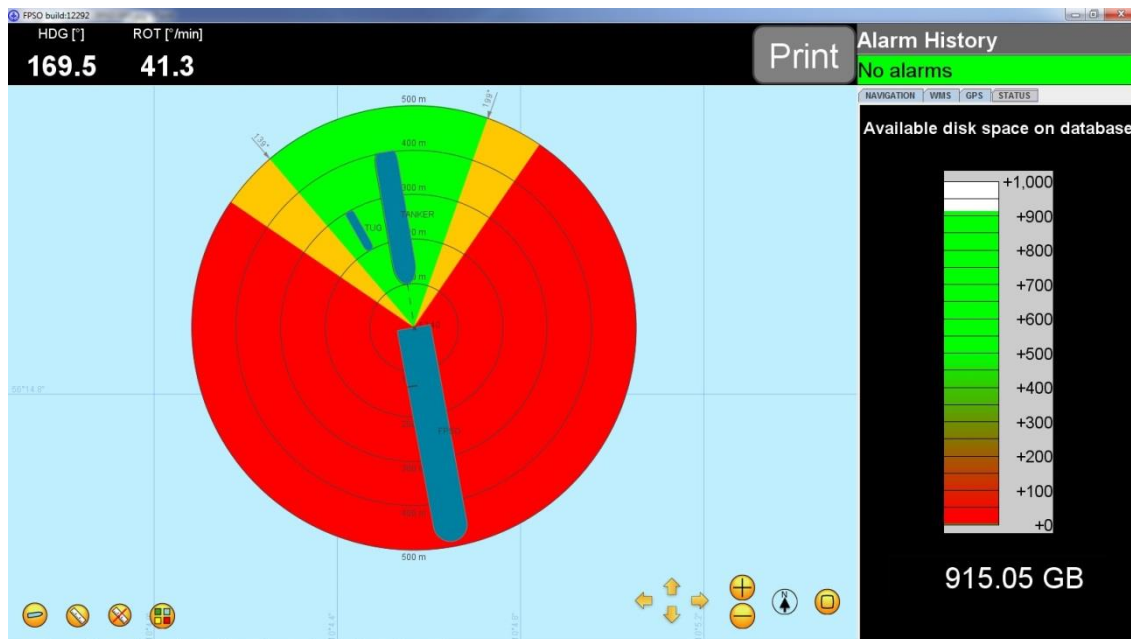
3.6 GPS:

The GPS tab shows performance data for the communication from the GPS on the FLNG and in the CAT III unit respectively.



3.7 Status:

The status bar shows the amount of disk space remaining on the hard drive of the server PC. This tab is only visible on the FPSO/FLNG.



3.8 Alarms:

This label will alert you of the current warnings and alarms. Click on the label and a window will open so you can see which alarms are present here you can also acknowledge the alarm to disable the alarm sound.

dd-MMM-yyyy HH:mm:ss	!Alarm_name	Acknowledged
07-Oct-2014 12:04:12	No data from module 'TUG'	<input type="checkbox"/>
07-Oct-2014 12:04:13	Hawser Tension Too Low	<input type="checkbox"/>
07-Oct-2014 12:04:13	NO WMS DATA	<input type="checkbox"/>
07-Oct-2014 12:04:13	NO MRU DATA	<input type="checkbox"/>

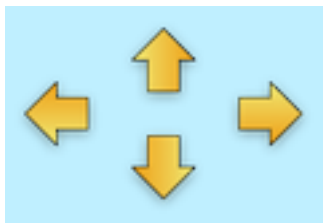
3.9 Alarm History:

Clicking on the Alarm History label will open a new window. Here you will be able to see the history of alarms for the specific approach or view historical data from a different approach. To view historical data click the history window and choose from and to which date you wish to see the historical data. Then click on load history to load the data to the screen.

Panel of Wed Jan 09 11:34:34 CET 2013				
<input type="checkbox"/> History Oct 2, 2014 <input type="checkbox"/> Oct 2, 2014 <input type="button" value="Load history"/>				
Alarm Name	Status	Started	Acknowledged	Stopped
Tanker has entered da...	Warning	02-Oct-2014 10:02:45	Never	02-Oct-2014 10:02:52
Tanker has entered da...	Alarm	02-Oct-2014 10:02:06	Never	02-Oct-2014 10:02:32
No data from module '...	Alarm	02-Oct-2014 10:01:41	Never	02-Oct-2014 10:02:06
Tanker has entered da...	Alarm	02-Oct-2014 10:00:01	Never	02-Oct-2014 10:01:29
Hawser Tension Too L...	Alarm	01-Oct-2014 17:53:07	Never	02-Oct-2014 10:03:01
No data from module '...	Alarm	01-Oct-2014 17:51:43	Never	02-Oct-2014 10:00:01
Tanker has entered da...	Alarm	01-Oct-2014 17:50:39	Never	01-Oct-2014 17:51:43
Tanker has entered da...	Warning	01-Oct-2014 17:50:27	Never	01-Oct-2014 17:50:39
Tanker approach spee...	Alarm	01-Oct-2014 17:50:19	Never	01-Oct-2014 17:51:43
NO WMS DATA	Alarm	01-Oct-2014 17:23:13	Never	01-Oct-2014 17:38:12
NO GYRO DATA	Alarm	01-Oct-2014 17:20:24	Never	01-Oct-2014 17:38:02
NO MRU DATA	Alarm	01-Oct-2014 17:20:19	Never	01-Oct-2014 17:38:20
NO GYRO DATA	Warning	01-Oct-2014 17:20:09	Never	01-Oct-2014 17:20:24
NO MRU DATA	Warning	01-Oct-2014 17:20:09	Never	01-Oct-2014 17:20:19
No data from module '...	Alarm	01-Oct-2014 17:19:43	Never	01-Oct-2014 17:36:07
No data from module '...	Alarm	01-Oct-2014 16:52:31	Never	01-Oct-2014 16:54:08
NO GYRO DATA	Alarm	01-Oct-2014 16:52:19	Never	01-Oct-2014 16:52:44
NO MRU DATA	Alarm	01-Oct-2014 16:52:19	Never	01-Oct-2014 16:53:05
No data from module '...	Alarm	01-Oct-2014 12:53:10	Never	Never
No data from module '...	Alarm	01-Oct-2014 12:53:10	Never	01-Oct-2014 16:39:27
NO MRU DATA	Alarm	01-Oct-2014 12:52:59	Never	01-Oct-2014 16:39:52
NO GYRO DATA	Alarm	01-Oct-2014 12:52:59	Never	01-Oct-2014 16:39:39
Hawser Tension Too L...	Alarm	01-Oct-2014 12:52:59	Never	01-Oct-2014 16:41:48
NO WMS DATA	Alarm	01-Oct-2014 11:57:15	Never	01-Oct-2014 16:42:11
Print				

4 Pan & zoom

It is possible to navigate the view of the graphical overview in the screens of both the pilot unit and the operator terminal by using the icon buttons in the lower part of the screen.



Use the arrows to pan the map north, south, east, and west.



Use the plus and minus to zoom in and out. Zoom in or out may also be done by scrolling up or down with the mouse wheel — or the right most side of the mouse pad in the laptops.



Use this button to manage the orientation of the sea chart. Toggle between heading up (own vessel), indicated by "H", or north up, indicated by "N".



This button restores the view to the default zoom and centering of the map.



Clear the past track of the tanker.



This button toggles on/off a line drawing tool. When on, you may click twice on the map to mark the beginning and end of a line. Holding the mouse over a line shows range and bearing of the line.

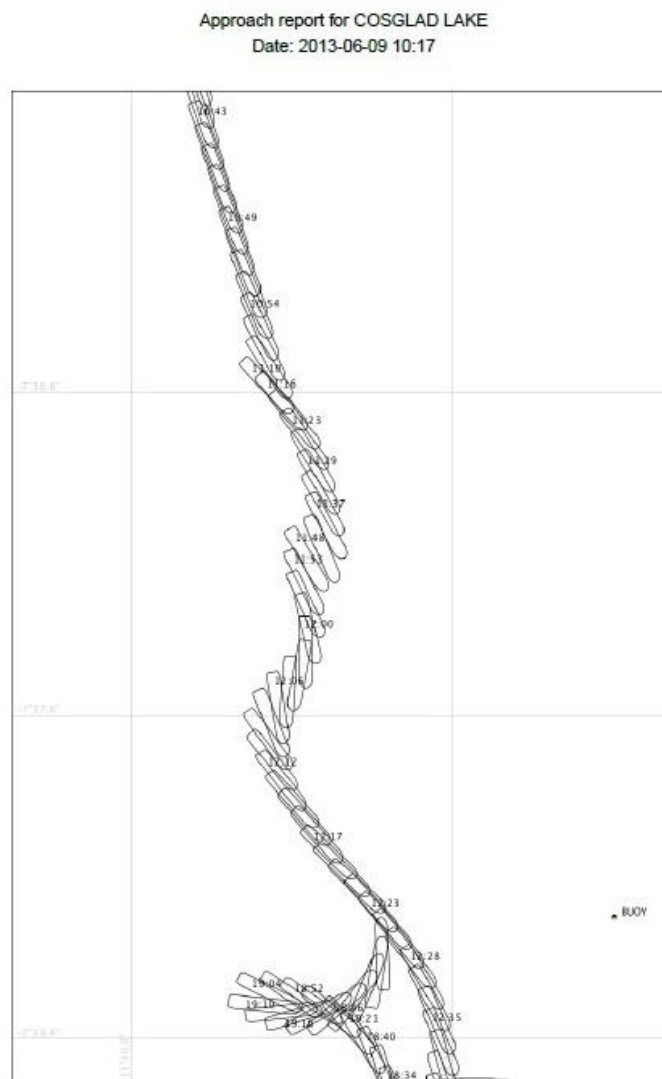


Clears all lines created with the line drawing tool described above.

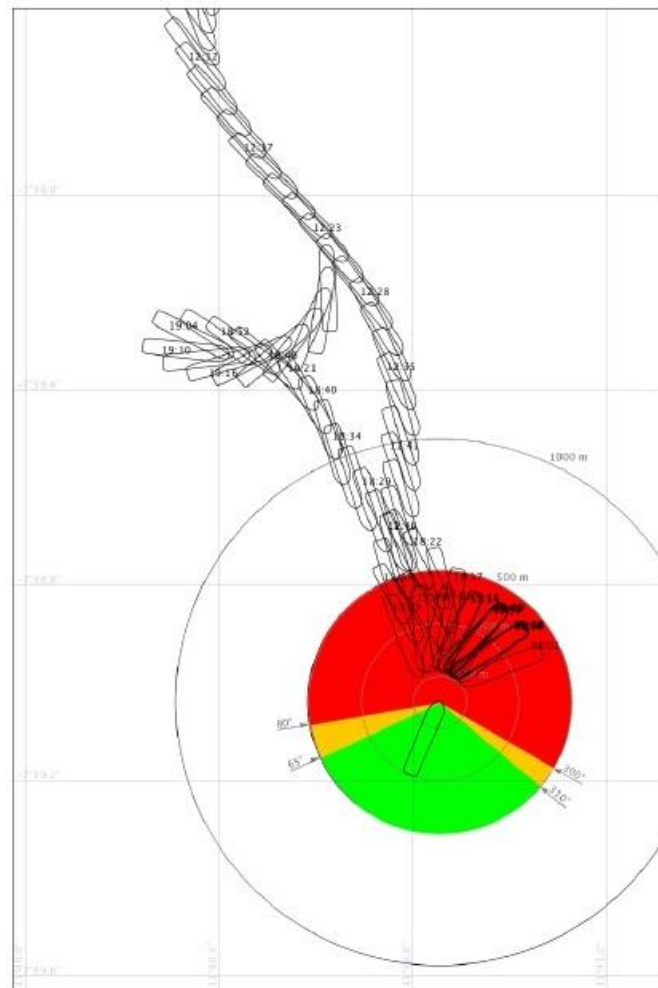


This button brings up a popup window, that allows the user to select a new background color for the chart.

When the recording ends, a report is generated and stored as a PDF document in the directory TRELLEBORG\reports on the operators PC. In this case the FPSO/FLNG PC. The report consists of two pages, the first showing a picture of the full operation, the second showing a close up of the operation, covering the FLNG and an area of approximately 2 kilometres around it.



Approach report for COSGLAD LAKE
Date: 2013-06-09 10:17

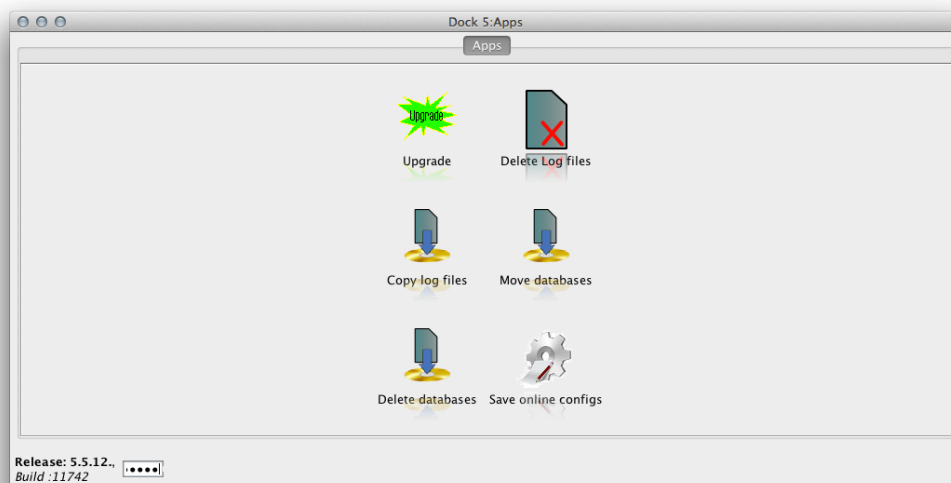


6 Maintenance

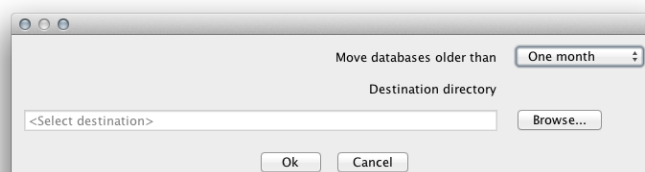
6.1 Removing logged sessions

The session recording mentioned in the previous section, stores all its data in database files on the server disk. In order to always have sufficient disk space, it is necessary to remove some of these database files regularly. They may either just be deleted, or they may be moved to an external storage. If they are to be moved, attach the external storage device to a USB port on the main server in the cabinet. Using the terminal installed in the cabinet, make sure the disk is mounted in the file system before proceeding.

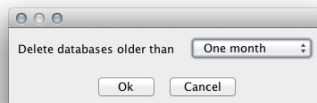
Now, open the maintenance tools: From the desktop double click the icon called dock5.sh. This will bring up a window titled "Dock 5:Apps". In the password field in the lower left corner type maintain followed by enter. A number of icons for starting maintenance tools will appear.



Now, double click either the Move databases icon or the Delete databases icon. If you choose to move the files, this window will appear:



From here you may choose the amount of databases to keep in the system. In the example above, operations from the last month will be kept in the system. All older databases will be moved. Click Browse to select the external storage device as destination. Clicking OK will



move the databases, thereby creating more available disk space in the server disk. If you choose to delete the databases, you will only be asked to specify the amount of databases to keep. Same as above. Clicking OK will delete the older databases, and make the disk space available to the server. The interval for doing this removal of database files will of course depend on the length and frequency of operations. It is recommended to do this at least once every year.