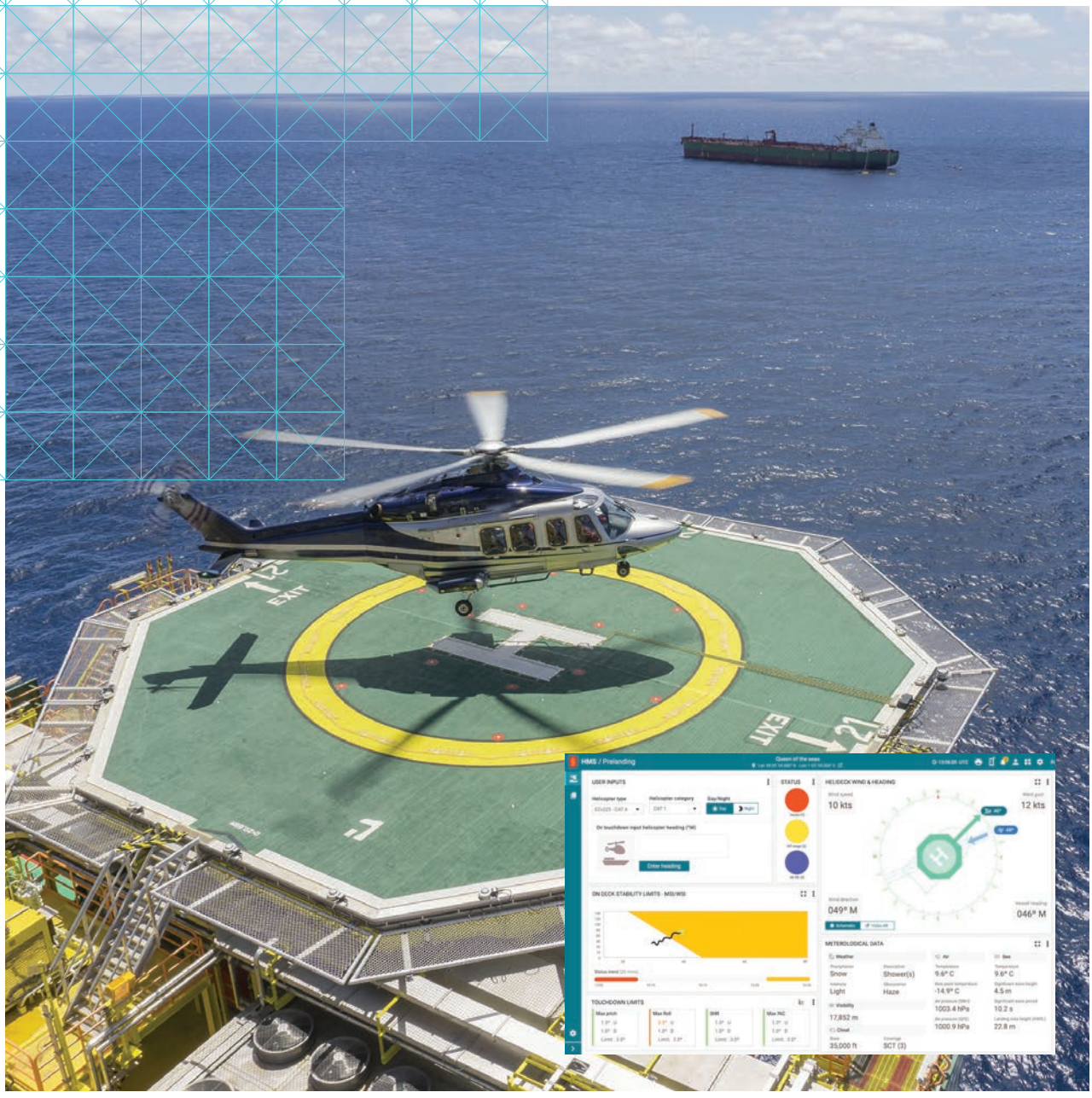
KONGSBERG

OPERATOR MANUAL

HMS 300

Helideck Monitoring System



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M450-71/2.0

Document history

Document number: M450-71 / Revision 2.0		
Rev. 1.0	May 2022	First version.
Rev. 2.0	November 2022	Updated to correspond with version 5.03.01 and the settings for switching the helideck repeater lights on/off. Changed default operator password from **dpos** to **operatoruser**.

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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.
Kongsberg Seatex disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.
e-mail: km.seatex@km.kongsberg.com

Table of contents

Glossary

Abbreviations

CAP 437	Guidance on criteria required by the UK Civil Aviation Authority regarding helicopter offshore landing areas.
HMI	Human machine interface
HMS	Helideck Monitoring System
LED	Light emitting diode
MSL	Mean Sea Level. In the HMS software this means the design water line of the vessel on which the HMS system is installed.
NMEA	National marine electronics association. NMEA 0183 (reference IEC 61162) is a standard for interchange of information between navigation equipment.
QFE	Air pressure at helideck level
QNH	Air pressure at mean sea level
SHR	Significant heave rate. The heave rate calculation for the CAP 437.
WEEE	Waste Electrical and Electronic Equipment

Definitions

Heave	The vertical dynamic motion of a vehicle and defined positive down. Heave position and velocity are dynamic motion variables calculated for a selected average heave period.
Pitch	A rotation about the pitch axis is positive when the bow moves up. Normally, pitch means the dynamic pitch angle motions.
Roll	A rotation about the roll axis is positive when starboard side of the vehicle moves down. Normally, roll means the dynamic roll angle motion.

1 About this manual

Purpose

The purpose of this operator manual is to provide the user with sufficient information to operate and carry out maintenance for this product.

Target audience

This manual is intended for all users of the HMS system.

License information

An export license is required for the export of the Inertial Measurement Units (MGC and MRU).

Registered trademarks

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2 HMS 300

2.1 System description

The HMS 300, Helideck Monitoring System, measures the helideck motion during helicopter pre-landing and on-deck operations. HMS 300 monitors the helidecks acceleration, heave velocity, inclination, roll and pitch in real-time.

The HMS 300 will improve flight and passenger safety in challenging environments by providing real-time monitoring of helideck motion and weather conditions.

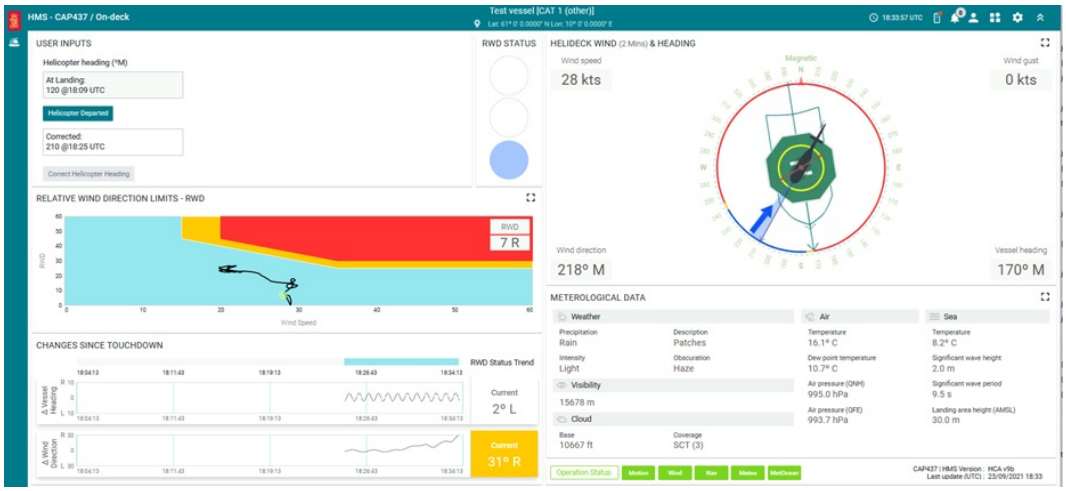
The HMS 300 is fully compliant with the prevailing recommendations and guidelines issued by the Civil Aviation Authorities in the UK, Norway and Brazil. The HMS 300 is compliant with the CAP 437 from September 2018 and accompanying Helideck Certification Agency (HCA) document revision 9b. In addition the HMS 300 is compliant to NOROG ver. 9.2 for the Norwegian sector and NORMAM-27 for the Brazilian sector.

The HMS 300 will monitor and present the Motion Severity Index (MSI) and Wind Severity Index (WSI) data together with significant heave rate (SHR), inclination, roll and pitch of the helideck in real-time. The system uses the Inertial Measurement Units MRU (models E, H, 5 or 5+) or MGC (models R2 or R3) to precisely monitor vessel motion and accelerations in the helideck centre. These data are transferred to the Processing Unit, which processes helideck motion data and MSI and WSI figures to determine whether the helicopter operation is safe or not.

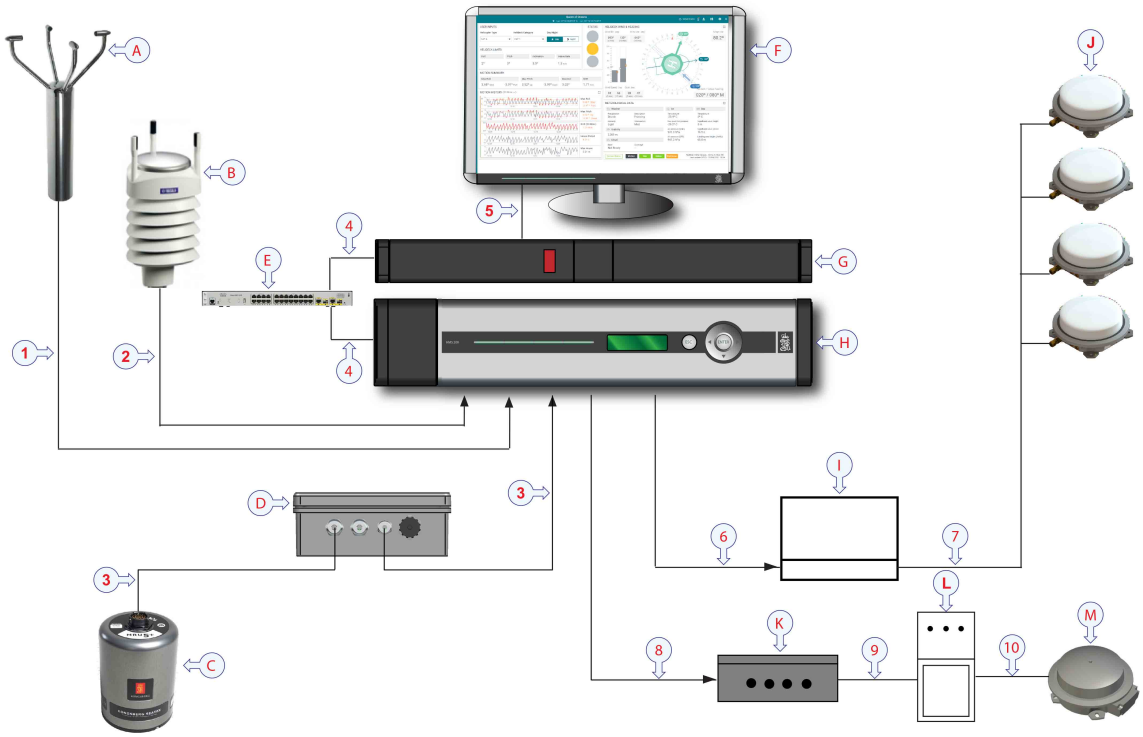
Live vessel data from the system will be available through the Kognifai cloud based digital platform (optional). The Web access will be available to customers through a paid service. This web service will assist helicopter operators in planning the flight prior to take-off from the heliport. Both onboard and onshore personnel can monitor helideck movements and meteorological data in real-time and see the same operational picture in order to increase operational awareness.

The HMS 300 is a two-module solution with a Processing Unit and an EDGE Unit (HMI Unit) connected via Ethernet. The Processing Unit runs critical computations independent of the user interface on the EDGE Unit to ensure continuous and reliable operation. The EDGE Unit presents the helideck motion and the weather conditions in an easy-to-understand format.

The illustration shows a typical view for the operator on the EDGE Unit (HMI Unit).



2.2 System diagram



Units

A Wind sensor
B Meteorological sensor
C Inertial Measurement Unit (IMU)
D Junction box
E GSN router
F Monitor
G EDGE Unit (HMI Unit)
H Processing Unit
I Control Unit for repeater lights
J Repeater lights
K External light relay box
L Status light control panel
M Status light (optional)

Cables

1 Wind data
2 Pressure, temperature and humidity data
3 IMU data
4 Ethernet cable
5 Monitor cable
6 Ethernet cable
7 Power and data cable
8 Alarm signal cable
9 Data cable
10 Power and data cable

Note

The EDGE/HMI Unit (item E) may be supplied with two (2) IOT units inside and will then require two (2) Ethernet cables (item 4) to be installed. See Chapter 14 for detailed drawings.

Note

To apply with CAP 437 of September 2018 the wind data have to be output at 4 Hz. This require a separate wind sensor for CAP 437 installation..

2.3 Product restrictions

2.3.1 Restrictions in export

Export of the Inertial Measurement Unit (MGC or MRU) requires an export license.

Note

Notice to importer: The MRU product specified in this document is shipped from Norway in accordance with The Ministry of Foreign Affairs' Official Notification on Export Control and U.S. Export Administration Regulations (EAR). The MRU may therefore be subject to restrictions from your national export control authorities if exported/re-exported from your country. ***Any valid and approved export license granted to Kongsberg Seatex AS from the Norwegian Ministry of Foreign Affairs is not an authorization for you to export/re-export the MRU.***

Note

Notice to importer: The MGC product specified in this document is shipped from Norway in accordance with The Ministry of Foreign Affairs' Official Notification on Export Control and U.S. Export Administration Regulations (EAR). The MGC product will be subject to restrictions if re-exported from your country, including but not limited to a re-export license from the U.S. Government.

2.3.2 Restrictions in guarantee

Changes or modifications to the product not explicitly approved by Kongsberg Seatex AS will void the guarantee.

The liability of Kongsberg Seatex AS is limited to repair of this system only under the given terms and conditions stated in the sales documents. Consequential damages such as customer's loss of profit or damage to other systems traceable back to this system's malfunctions, are excluded. The warranty does not cover malfunctions of the system resulting from the following conditions:

- Incorrect power connection.

2.3.3 Restrictions in use

The HMS system is designed for use on board marine surface operated vessels with linear acceleration less than ±30 m/s^2 (±3g) and an angular rate range less than ±75 °/s.

Only relative dynamic heave position is calculated and the measurements are limited by the selection of their motion periods available in the range 1 to 25 seconds.

The HMS system is designed as a landing aid only and is not to be used as a landing guide in helicopter operations.

2.4 Network security

Equipment manufactured by Kongsberg Seatex AS is frequently connected to a local area network (LAN). Connecting any computer to a network will always expose the data on that computer to all other computers connected to the same network. Several threats may immediately occur:

- Remote computers can read the data.
- Remote computers can change the data.
- Remote computers can change the behavior of the computer, for example by installing unwanted software.

Usually, two parameters are used to define the threat level:

1 The likelihood that any remote connection will do any of the above.

2 The damage done if a remote connection succeeds doing this.

Because Kongsberg Seatex AS has no information regarding the complete system installation, we can not estimate the threat level and the need for network security. For this reason, we can not accept responsibility for network security. Systems provided by Kongsberg Seatex AS are regarded as stand-alone offline systems, even though they may be connected to a network for sensor interfaces and/or data distribution.

Note

No network safety applications are installed on any Kongsberg Seatex computers. The computers are thus not protected against viruses, malware or unintentional access from external users.

Securing the system itself has no meaning unless there is a policy in place that secures all computers in the network. This policy must include physical access by trained and trusted users. The customer/end user of the system will always be in charge of defining and implementing a security policy, and providing the relevant network security applications.

Note

Kongsberg Seatex AS will not accept any responsibility for errors and/or damages caused by unauthorized use or access to the product.

2.5 Support information

- **Company name**: Kongsberg Seatex AS
- **Address**: Havnegata 9, 7010 Trondheim, Norway
- **Switchboard**: +47 73 54 55 00
- **Duty phone**: +47 33 03 24 07 (24 hours)
- **E-mail address**: km.support.seatex@km.kongsberg.com
- **Website**: http://www.kongsberg.com/maritime

KM-Support App

Support is also available from the KM Support App. This app is available for free in App Store and Google Play.

3 Operation

3.1 Turning on/off and restart procedures

3.1.1 Turning on the HMS system

You must turn on the system in order to start using the system for operational purposes.

Prerequisites

a The IMU is powered.

b The meteorological sensors are powered.

c All cables are connected.

Procedure

1 Turn on the monitor

2 Turn on the Processing Unit by pressing the power on/off switch which is located under the lid to the left of the front panel.

3 Turn on the EDGE/HMI Unit by pressing the power on/off switch located on the front panel. The system may be supplied with two (2) IOT units inside and then both EDGE/HMI Units have to be turn on.

Wait for the operating system to start up. Enter the operator password **operatoruser** (default) and the **Operation window** will then appears automatically on the display.

3.1.2 Turning off the HMS system

There is normally no reason to turn off the HMS system. It should be left running continuously. If the HMS system is not required for a longer period, turn off the entire system.

Context

If you turn off the system all processing, calculation and output from the system to other applications, if any, will stop.

Procedure

1 In the main window, select the **Setup** menu, select →**Processing Unit Control** and then →**PU Shutdown**.

The message `This will shut down the system.  Are you sure?` appears.

2 Select **OK**.

Processing Unit will shut down in a controlled way.

The message `It is now safe to turn off your computer` appears or the display goes black without a message.

3 Turn off the Processing Unit by pressing the power on/off switch which is located under the lid to the left of the front panel.

4 In the main window, select the **Setup** menu, enter →**HMI Unit Control** and then select →**HMI Shutdown**.

The message `This will shut down the system.  Are you sure?` appears.

5 Select **OK**.

Windows is shutting down and the HMI Unit will shut down in a controlled way.

The message `It is now safe to turn off your computer` appears or the display goes black without a message.

6 Turn off the EDGE/HMI Unit by pressing the power on/off switch located on the front panel.

7 Turn off the display.

3.1.3 Restarting the HMS system

Sometimes it may be necessary to restart the system. For example to confirm changes to the configuration or if an unexpected event should occur.

Procedure

1 In the main window, select the **Setup** menu, enter→**Processing Unit Control** and then select →**PU Restart**.

The message `This will restart the system.  Are you sure?` appears.

2 Select **OK**.

The Processing Unit will shut down and restart automatically in a controlled way. You can now resume operation.

3 In the main window, select the **Setup** menu, enter→**HMI Unit Control** and then select →**HMI Restart**.

The message `This will restart the system.  Are you sure?` appears.

4 Select **OK**.

The HMI Unit will shut down and restart automatically in a controlled way. Wait for the operating system to start up. Enter the operator password **operatoruser** (default) and the **Operation window** will then appears automatically on the display.

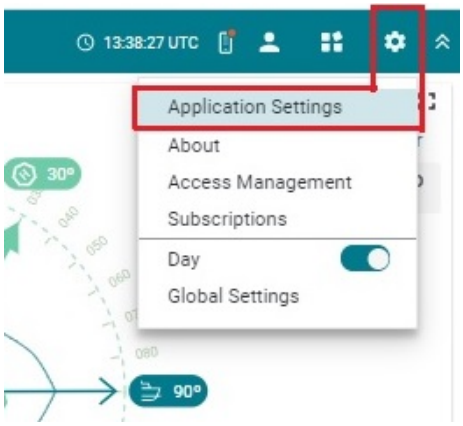
3.2 Operating procedures

3.2.1 Selecting operation standard

You must select which standard you want to use for your helicopter operation.

Context

You can select between three standards: CAP 437, NORMAM-27 and NOROG.



Procedure

1 Select **Settings →Application Settings**.

2 Select the wanted standard: CAP 437, NORMAM-27 or NOROG

3 Select **Change Standard**.

Related topics

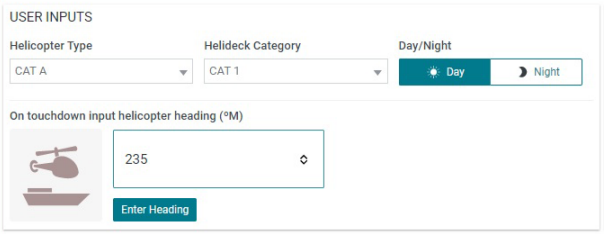
- *Top bar* on page 25
- *Settings* on page 41

3.2.2 Selecting helicopter type and day/night limitations

You must select which type of helicopter is going to land on the helideck and which type of vessel on which the helideck is located.

Context

The **Helideck Category** parameter is set during configuration and is not selected during operation.



Procedure

1 Under **User inputs**, select **Helicopter Type**: CAT A or CAT B.

2 Select limitations for **Day** or **Night** conditions.

Related topics

- *User input view* on page 28

3.2.3 Changing from Prelanding to On-deck mode

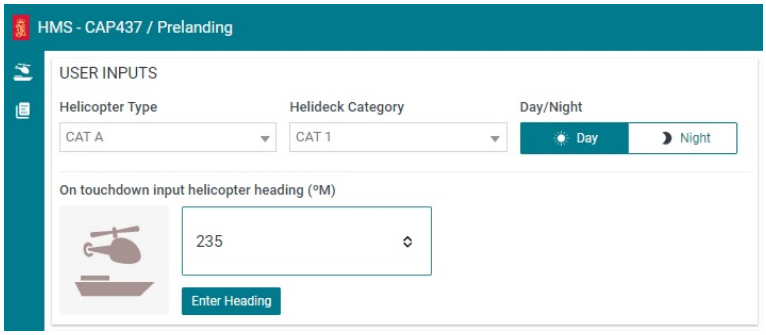
The CAP 437 standard has two modes: *Prelanding* and *On-deck* mode.

Prerequisite

The helicopter pilot has reported the helicopter heading.

Context

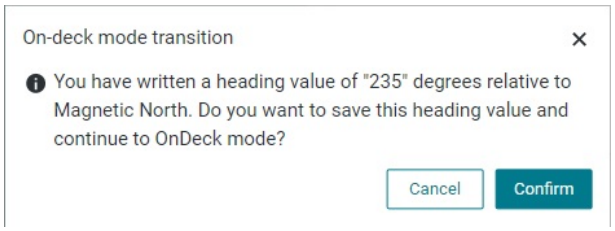
After the helicopter has landed on the helideck you must change from *Prelanding* to *On-deck* mode.



Procedure

1 Under **User inputs**, type the helicopter heading (three digits) in the **On touchdown input helicopter heading (°M)** box.

2 Select **Enter Heading**.



3 Select **Confirm** to switch to *On-deck* mode.

Related topics

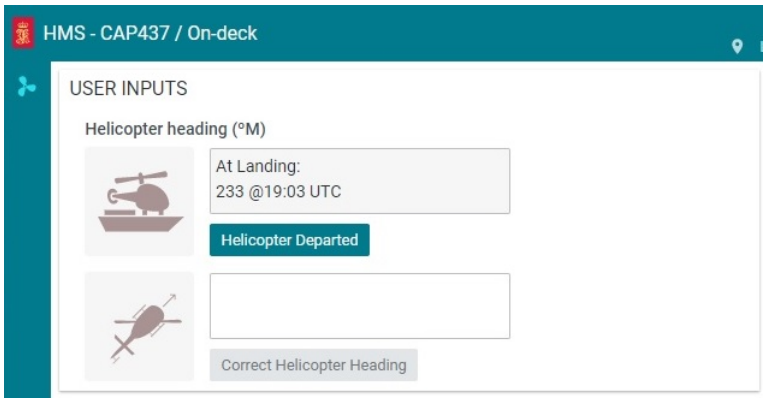
- *User input view* on page 28

3.2.4 Changing from On-deck to Prelanding mode

The CAP 437 standard has two modes: *Prelanding* and *On-deck* mode.

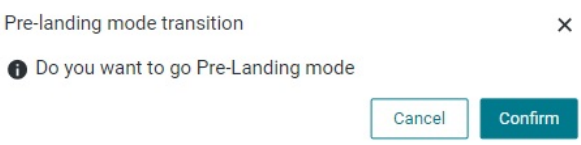
Context

When a helicopter has left the helideck, you must return to *Prelanding* mode.



Procedure

1 Under **User inputs**, select **Helicopter Departed**.



2 Select **Confirm** to switch to *Prelanding* mode.

Related topics

- *User input view* on page 28

3.2.5 Generating a weather/helideck report

Before a helideck operation you must generate a helideck report.

Context

Generating a report is done in three steps; Compose e-mail, Create report & screenshot, Prieview and send.

The report for the CAP 437 and NORMAM-27 standards contain more information than the report for the NOROG standard. The report for CAP 437/NORMAM-27 is a Weather Report. The report for NOROG is a Helideck Report.

All boxes with a red asterisk are required. You will not be able to submit the form without filling those boxes.

Procedure

1. Select **HMS/Report** on the **Side** bar to open the report form.
2. **Compose e-mail**
   a. Compose the e-mail which is to be sent together with the report. Type the recipient's email address and other required information.
   b. Select **Create report and Screenshot**.
3. **Create report & Screenshot**
   a. **Weather report**

      Enter the required **General details** data, **Weather observation** data, **Helideck movement** data, **Atmospheric conditions**, **Flight conditions** and **Summary** remarks.
   b. **Helideck report**

      Enter the required **General details** data, **Weather observation** data, **Helideck movement** data.
4. Select **Generate report**.

   A pdf-file with the Helideck report is generated. A screenshot of the current main screen is generated.
5. Select **Preview and send**.
6. Select the attachments to check if they are OK before sending them.
7. Select **Send Email**.

Related topics

- *Side bar* on page 26

3.2.6 Switch helideck repeater lights off/on

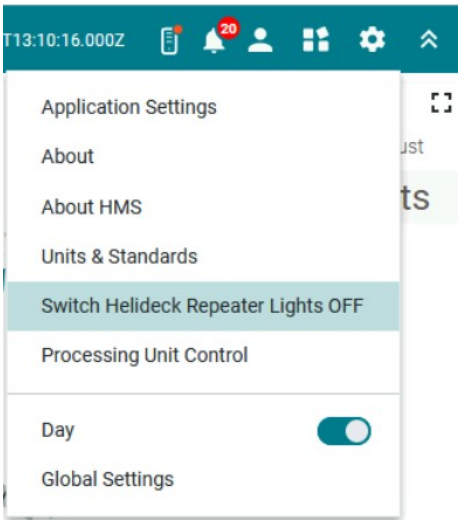
You can switch the helideck repeater lights OFF and ON from *Settings* in the *Meny system*.

Context

Include a procedure for how to switch the helideck repeater lights OFF and ON again.

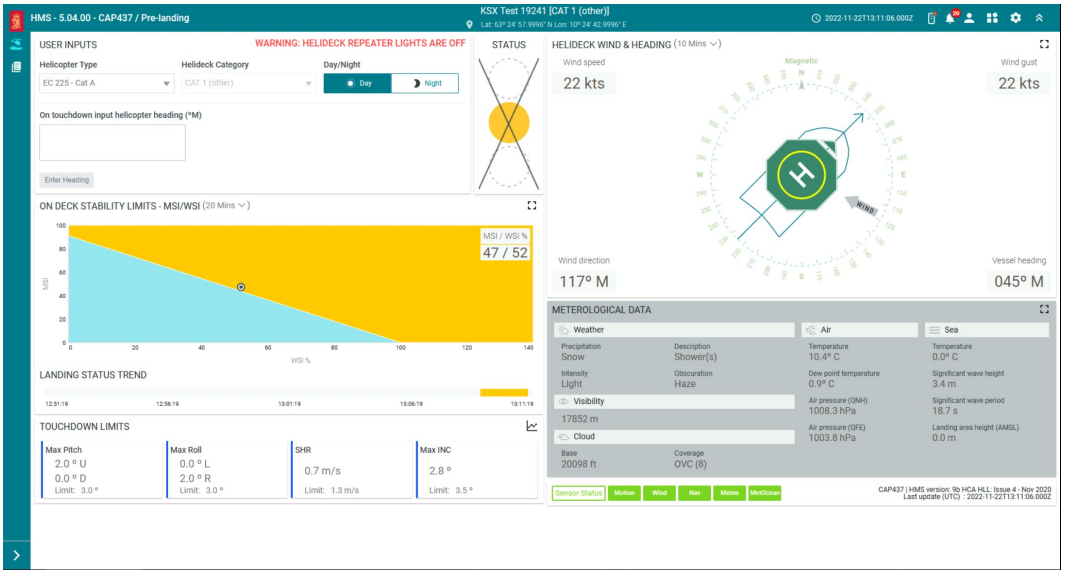
Procedure

1 Under **Settings**, select **Switch Helideck Repeater Lights OFF**.



2 Select **Confirm** to switch the repeater lights OFF.

3 In the *USER INPUTS* view the message *WARNING: HELIDECK REPEATER LIGHTS ARE OFF* appears in red text and the *STATUS* view is crossed.



4 To switch the helideck repeater lights ON again, repeat this procedure from Step 1.

Related topics

- *Settings* on page 41

3.3 User preference procedures

3.3.1 Selecting colour palette for display

You can adjust the brightness and the colours of the display to suit your current light conditions.

Context

- **Day**: this is the recommended colour palette for daylight use.
- **Dusk**: this a colour palette for night operations which will not weaken the night sight of the operator.

Procedure

1 Select **Settings**.

2 Select **Day** or **Dusk**.

Related topics

- *Settings* on page 41

4 User interface

4.1 Operational principles

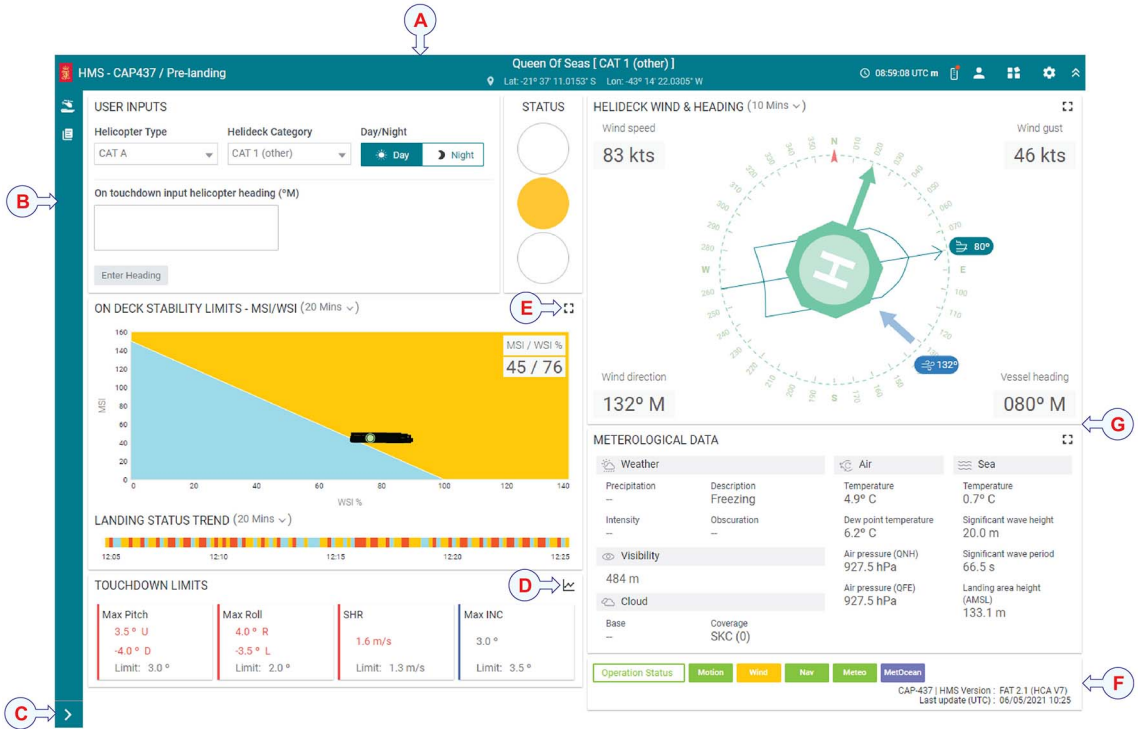
The system is operated using a mouse and a keyboard from the HMI Unit.

Note

The mouse cursor will disappear after some time of mouse inactivity. Simply move the mouse to make the cursor reappear.

The Processing Unit includes an integrated LCD display and keypad for accessing the internal menu system in the Processing Unit. Use the menus and screens to review system status for diagnostics purposes.

4.2 Display organisation



A Top bar

B Side bar

C Expand/collapse Side bar

D Graph presentation icon

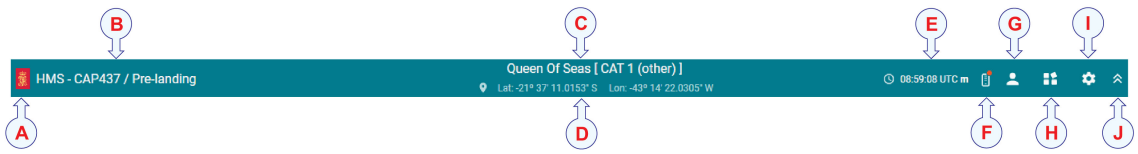
E Expand view icon

F System status

G Various display views, depending on choice of standard

4.3 Top bar

The **Top bar** includes the following information:



A Restore **Top bar**

Select this icon to restore the top and side bar if you have hidden them.

B Current standard and mode

It shows the selected standard. You can select between CAP 437, NORMAM-27 or NOROG.

C Vessel name

This is the name of vessel.

D Position

This is the vessel's current position in Latitude/Longitude.

E Current time (UTC)

This is the current time shown in Coordinated Universal Time.

F Quality of service indicator

It shows the web server connection.

G My profile

Here you can edit your user profile and change password. You can send an email to get support and log out of the service.

H Applications

This is a collection of applications or tools which are available in the system.

I Settings

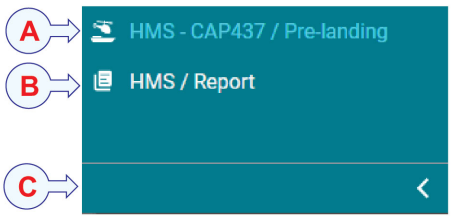
Here you can select which standard to use, CAP 437, NORMAM-27 or NOROG. You can select which palette to use for the display presentation, Day or Night. You can select email address for the helideck report in the user administration dialog.

J Hide **Top bar** and **Side bar**

Select the **Kongsberg** icon to restore the Top and Side navigation.

4.4 Side bar

The side bar includes the following information:



A Change application mode (CAP 437 only)

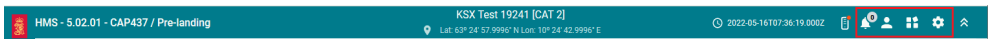
B Generate helideck report

C Expand/collapse Side bar

4.5 Menu system

The four buttons located to the right of the **Top bar** make up the HMS menu system.

- Alarms
- My profile
- Application menu
- Settings



Related topics

- *Menu system* on page 38

4.6 Operation standards

You can select to operate the HMS system according to one of the following three standards:

- CAP–437 in *Prelanding* or *On-deck* mode
- NOROG
- NORMAM-27

4.7 Display views

4.7.1 About display views

The display views in the HMS system differs depending on which standard you have selected for your operation. CAP 437, NOROG or NORMAM-27.

These views are always present and apply to all standards:

- User inputs
- Status
- Helideck and wind heading
- Meteorological data
- Operation status

These views apply to the NOROG and NORMAM-27 standards:

- Helideck limits
- Motion summary
- Motion history

The CAP 437 has two modes, *Prelanding* and *On-deck*. Which views appear on the display depends on which mode you are in.

These views apply to the CAP 437 standard:

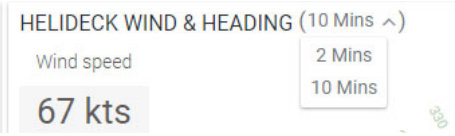
- Relative wind directions limits - RWD (*On-deck* mode)
- Change since touchdown (*On-deck* mode)
- On-deck stability limits - MSI/WSI with Landing status trend (*Prelanding* mode)
- Touchdown limits (*Prelanding* mode)

These buttons allow you to zoom in or out of a view and to get a trend graph presentation of the information in the view.

Select these buttons to zoom in and out of a specific view.

Select this button to get a trend graph presentation of the information in the view.

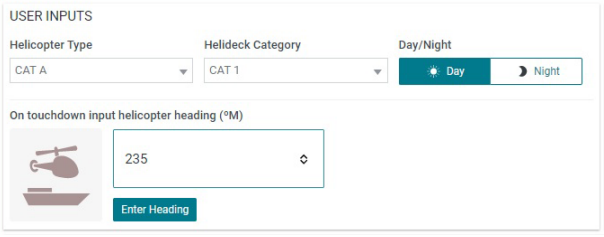
Some views allow you to select a time frame for the output. For example a 2-minute period or a 10-minute period.



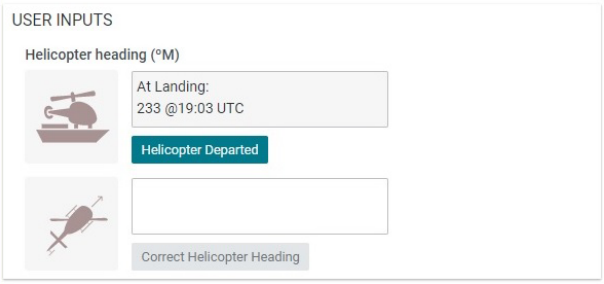
4.7.2 User input view

Here you can select helicopter type, helideck category and Day or Night landing limits.

In *Prelanding* mode you can type the helicopter heading at touchdown. Select **Enter Heading** and you switch to *On-deck* mode.



When you are in *On-deck* mode, select **Helicopter departure** in order to return to *Prelanding* mode.



Helicopter Type

Helicopters are classified as either Category A or Category B based on an assessment of their handling characteristics in relation to the landing, touchdown.

Helicopter Category

Helidecks are divided into three categories depending on which vessel type the helideck is on and if the operation is during night or day conditions.

Day/Night

Select if the operation is carried out during night or day conditions.

On touchdown input helicopter heading (°M)

The magnetic heading of the helicopter at touchdown (communicated by the pilot to the Radio Operator).

Helicopter Heading button

Changes mode from *Prelanding* to *On-deck* mode. The transition in mode is confirmed by pressing the **Confirm** button.

Helicopter Departed button

Changes mode from *On-deck* to *Prelanding* mode. The transition in mode is confirmed by pressing the **Confirm** button.

Correct Helicopter Heading

Enter new and corrected helicopter heading at helideck since touchdown.

4.7.3 Status view

For the NOROG and NORMAM standards the status lights are either red or green from top to bottom . The repeater lights on the helideck will show red colour for red status and blue for green status.

For the CAP 437 standard the status lights on the screen are either red, amber or blue, from top to bottom. The repeater lights on the helideck will have the same colour as the status lights shown on the screen.

In *On-deck* mode the lights show the availability on the helideck based on relative (RWD) only.

- Red light (steady burning): The helideck stability is outside the landing limits.
- Red light (fast flash): Relative wind limit exceeded after touchdown. Take appropriate mitigating action. Apply only for CAP 437 in *On-deck* mode.

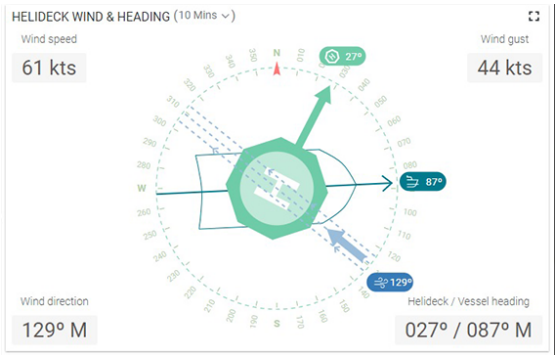
- Green light (steady burning): The helicopter can land and take-off. Apply only for the NOROG and NORMAM standards.
- Amber light (steady burning): MSI/WSI limit only exceeded (consider using modified operating procedures). Apply only for CAP 437 in *Prelanding* mode.
- Amber light (fast flash): Impending relative wind limit exceeding (investigate cause and identify appropriate mitigating action required). Apply only for CAP 437 in *On-deck* mode.
- Blue light (steady burning): Safe to land. Apply only for CAP 437 in *Prelanding* mode.
- Blue light (slow flash): Relative wind direction within limits (safe to stay on deck). Apply only for CAP 437 in *On-deck* mode.

4.7.4 Helideck wind and heading view

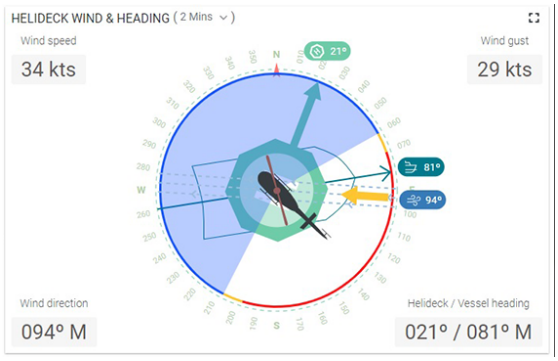
This view shows a wind meter with indication of wind direction and speed. It also shows the vessel magnetic heading and position.

The appearance of this view changes depending on the operation standard you have selected.

Prelanding mode



On-deck mode



You can select between a 2-minute or a 10-minute average wind presentation of wind direction, wind speed and wind gust. The values for Wind Direction, Wind Speed and Wind Gust will change according to the selected time frame.

Compass rose

The compass rose shows the vessel with a helideck. The orientation of the helideck towards the vessel bow direction is shown. Arrows indicate values for wind direction, vessel heading and helideck direction.

Vessel heading

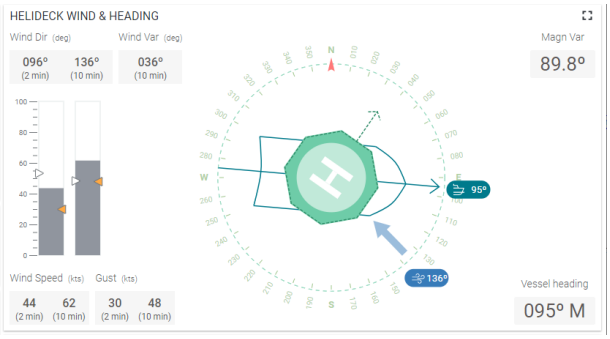
This is the heading direction of the helideck and the vessel heading in degrees, relative to the magnetic North.

Wind direction

This is the wind direction in degrees, relative to the magnetic North.

Wind speed

This is the wind speed in knots. The appearance of this view changes depending on the standard you have selected for operation. The NOROG/NORMAM-27 standards show bars for wind speed and gust. The height of the bars shows the average wind speed for 2 or 10 minutes wind statistics. The white triangle indicates the maximum wind speed. The amber triangle indicates the wind gust.

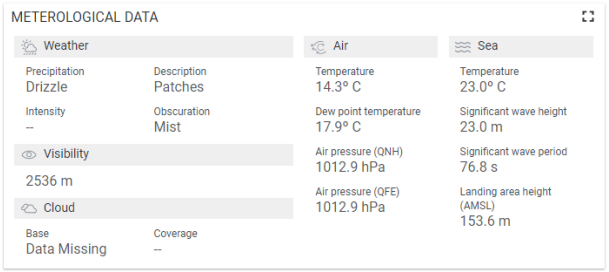


Wind gust

This is the wind speed and the wind gust speed in knots. The system will only calculate a value for Gust Wind Speed if a 2-minute or 10-minute mean wind time frame is selected.

4.7.5 Meteorological data view

This view shows the meteorological data for the current operation.



Weather

This is the weather information which is input directly from the present weather sensor (Auto) or which is input from the latest generated helideck report (Manual).

Visibility

This is the visibility value which is input directly from the visibility sensor (Auto) or which is input from the latest generated helideck report (Manual).

Cloud

This is the cloud information which is input directly from the ceilometers (Auto) or which is input from the latest generated helideck report (Manual).

Air temperature

This is the most recent air temperature value in centigrades received from the temperature sensor.

Dew point temperature

This is the most recent calculated dew point temperature value in centigrades. It is based on the received air temperature and humidity measurements.

Air pressure

This is the most recent air pressure value in [hPa] received from the pressure sensor. The pressure values are shown both as QNH and QFE.

Sea temperature (optional)

This is the most recent sea temperature value in centigrades received from the temperature sensor. This value is only available if a sea temperature sensor is connected.

Significant wave height (optional)

This is the measured significant wave height from the wave measurement sensor. This value is only available if a sea wave sensor is connected.

Significant wave period (optional)

This is the measured significant wave period from the wave measurement sensor. This value is only available if a sea wave sensor is connected.

Landing area height (optional)

This is the measure height from the helideck to the sea surface. This value is only available if a sea wave sensor is connected.

4.7.6 Operation status view

The operation status indicates which sensors the HMS system is set up to receive sensor data from, and the status of these sensor signals.

A green light in the **Operator Status** box indicates that the sensors are operating and sending valid data.

The status indications are explained in the table.

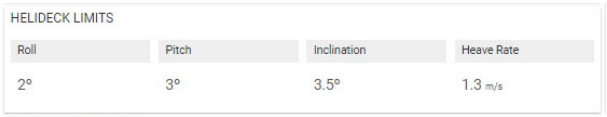
Operator Status	Range	Description
Motion	Off/On	RED background when MRU, MGC or Seapath data are invalid or missing. YELLOW background when the MRU data are unreliable. BLUE if simulated input data is used. GREEN background when data are stable & present. Remains grey when MRU input disabled.
Wind	Off/On	RED background when wind data are invalid or missing. YELLOW background when the wind data are unreliable. BLUE if simulated input data is used. GREEN background when data are stable & present. Remains grey when wind input disabled.

Operator Status	Range	Description
Nav	Off/On	RED background when the position and heading sensor data are not present. BLUE if simulated input data is used. GREEN background when data are present. Remains grey when position input is disabled.
Meteo	Off/On	RED background when the meteological sensor data are not present. BLUE if simulated input data is used. GREEN background when data are present. Remains grey when temperature input is disabled.
MetOcean	Off/On	RED background when the sea temperature sensor and/or wave sensor data are not present. BLUE if simulated input data is used. GREEN background when data are present. Remains grey when temperature input is disabled.

The **Operator Status** view also holds information on the current version of the HMS system and the latest update.

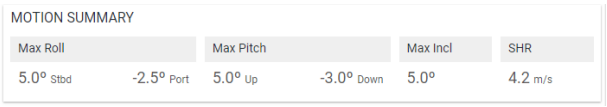
4.7.7 Helideck limits view

Shows the corresponding limits for inclination, roll, pitch and heave rate for the selected Day/Night limitations, helicopter type, vessel category and standard. Apply only for the NOROG and NORMAM standards.



4.7.8 Motion summary view

This view shows the calculated maximum motion statistical values on the helideck. This view is only available for the NOROG and NORMAM standards.



Max Roll

Maximum roll amplitude calculated for the last 20 minutes.

Max Pitch

Maximum pitch amplitude calculated for the last 20 minutes

Max Incl

Maximum inclination amplitude calculated for the last 20 minutes

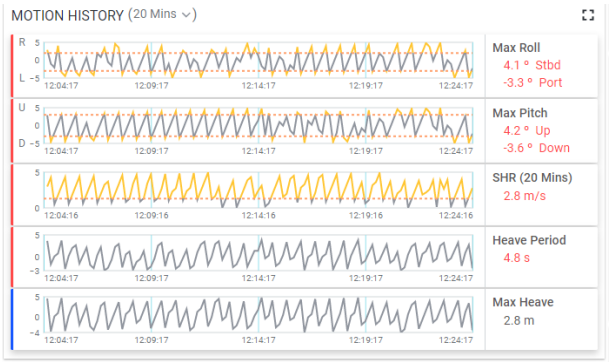
SHR

Maximum Significant Heave Rate (SHR) value calculated for the last 20 minutes

4.7.9 Motion history view

This view shows real-time data for the roll, pitch and heave motion. You can select to display the data for various time frames. 2 minutes, 10 minutes, 20 minutes or 3 hours. The red straight line in the graphs indicates the maximum allowed value for the vessel where it is still within the limitations for the chosen vessel category.

This view is only available for the NOROG and NORMAM standards.



Max Roll

Shows real-time roll data for the selected time frame.

Max Pitch

Shows real-time pitch data for the selected time frame.

SHR

Shows real-time Significant Heave Rate (SHR) calculated data for the selected time frame.

Heave Period

Shows real-time heave period values for the selected time frame.

Max Heave

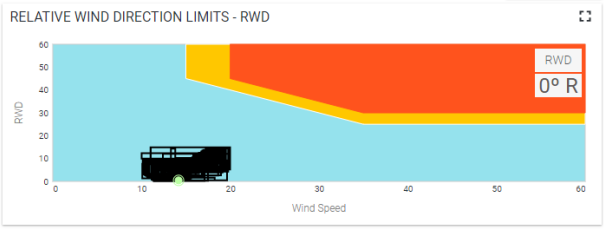
Shows the calculated maximum heave amplitude for the selected time frame

4.7.10 Relative wind direction limits - RWD

The graph in this view shows the limit of the relative wind direction (RWD) versus the wind speed.

The RWD/Wind Speed limits graph shows the limit lines, the extent of the corresponding (flashing) amber and red zones and the trace of the RWD/wind speed data points since touchdown.

This view is only available for the CAP 437 standard, *On deck* mode.



RWD

Is the angle difference calculated from the vessel heading, the helicopter heading after touchdown and the 2–minute mean apparent wind direction relative to magnetic North (free steam wind direction relative to the longitudinal axis of a helicopter landed on the helideck). RWD is always display as a positive number and the sign represented by **Right/R** (positiv) or **Left/L** (negative).

Wind Speed

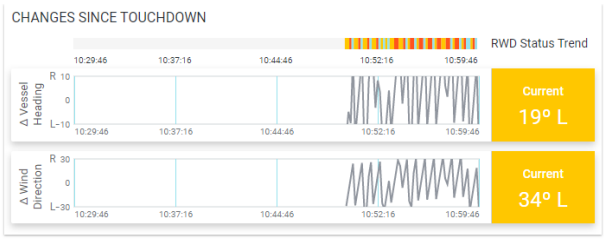
The wind speed in knots for the 2-minute mean wind speed with gusts.

4.7.11 Changes since touchdown view

This view shows the changes in the status lights over time since touchdown. The data in the graph covers the most recent 30 minutes since touchdown.

Changes in vessel heading and wind direction are shown in a trend graph. The trend data are colour coded in accordance with the RWD status: red, amber, blue.

This view is only available for the CAP 437 standard, *On deck* mode.



RWD Status Trend

The trend data are colour coded in accordance with the RWD status: red, amber, blue

Vessel Heading

Changes in vessel heading over time is shown in a trend graph. Current vessel heading is shown in degrees **Right/R** (positiv) or **Left/L** (negative).

Wind Direction

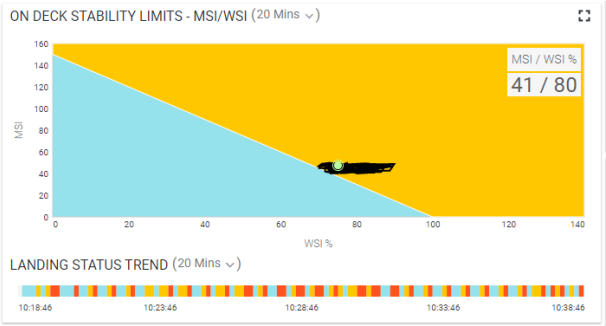
Changes in wind direction over time is shown in a trend graph. Current wind direction is shown in degrees **Right/R** (positiv) or **Left/L** (negative).

4.7.12 On-deck stability limits - MSI/WSI

This view shows the on-deck stability limits for and whether it is safe to land or not. The graph shows the limit lines and the extent of the amber zones. The graph traces the MSI/WSI data points for the selected time frame. Default time frame is 20 minutes.

A **Landing status trend** for the selected time frame is shown. It is colour coded in accordance with the traffic light status: red, amber, blue.

This view is only available for the CAP 437 standard in *Prelanding* mode.



MSI%

The Motion Severity Index value in %.

WSI%

The Wind Severity Index value in %.

Landing status trend

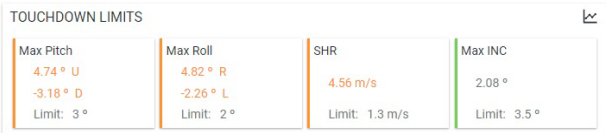
Status trend of the MSI/WSI data is shown for the selected time frame and colour coded in accordance with the traffic light status (red, amber, blue).

4.7.13 Touchdown limits view

This view shows the maximum values for the roll, pitch, SHR (Significant Heave Rate) and inclination measurements. It also shows the limit values for these parameters for the selected time frame. Default time frame is 20 minutes.

This information can also be shown as a trend graph if you select the **Trend graph** icon.

This view is only available for the CAP 437 standard in *Prelanding* mode.



Max Pitch

Shows the maximum values for the pitch (up/U and down/D) and the limit value for the selected time frame (default 20 minutes). The values are colour coded in accordance with the traffic light status (red, amber, blue).

Max Roll

Shows the maximum values for the roll (right/R and left/L) and the limit value for the selected time frame (default 20 minutes). The values are colour coded in accordance with the traffic light status (red, amber, blue).

SHR

Shows the maximum values for the Significant Heave Rate and the limit value for the selected time frame (default 20 minutes). The values are colour coded in accordance with the traffic light status (red, amber, blue).

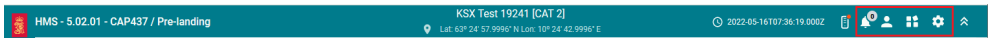
Max INC

Shows the maximum values for the inclication and the limit value for the selected time frame (default 20 minutes). The values are colour coded in accordance with the traffic light status (red, amber, blue).

5 Menu system

5.1 About the menu system

The four buttons located to the right of the **Top bar** make up the HMS menu system.



Alarms

Here the alarms generated in the system will be listed.

My profile

Here you can edit your user profile and log out of the system.

Application menu

This menu holds various user applications.

Settings

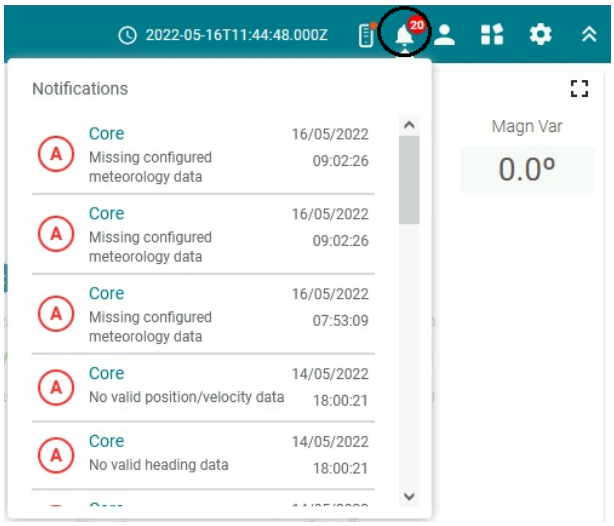
This menu holds possibility to change the settings of the system.

5.2 Alarms

Here you can get an overview of the alarm notifications in the system.

How to open

Alarms is located on the **Top bar**.



Notifications

Here the alarm notifications in the system is listed. The 20 last events are listed.

5.3 My profile

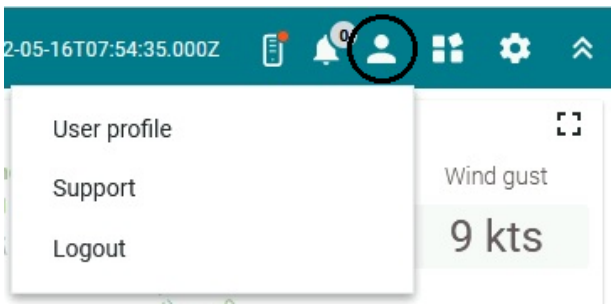
Here you can edit your user profile and log out of the system. There following three possible user types are available:

- Operator. This is the default user profile of the HMS 300 system. Default user name and password is **Operator**.
- Support engineer. Used by the service engineer for more advanced configuration and setup of the system.
- Observer. A user with read-only possibilities.

How to open

My profile is located on the **Top bar**.

To exit the menu, select **Hms-300** application in the **Application menu**.



User profile

Here you can enter personal details such as operator name and e-mail address. You can set and change the password. You can set security parameters for your user account.

Support

This one is not in use.

Logout

Here you can log out of the system.

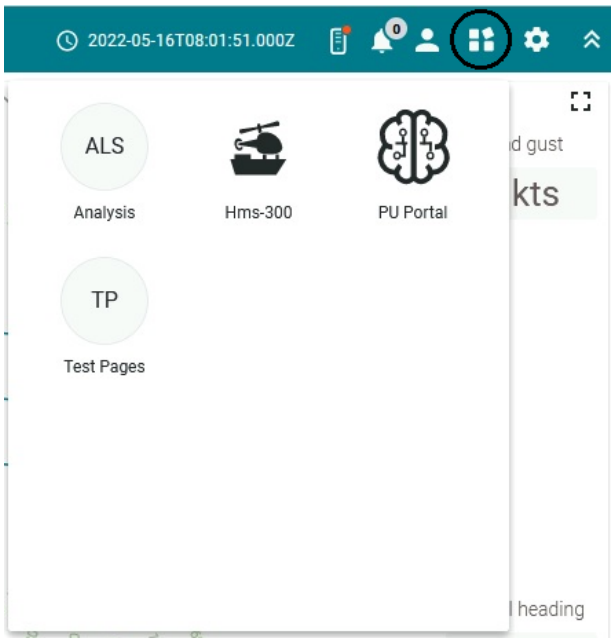
5.4 Application menu

This menu includes applications for analysis, Hms-300, PU Portal and Test Pages.

How to open

The **Application menu** is located on the **Top bar**.

To exit the menu, select **Hms-300** application in the **Application menu**.



Analysis

Plots historical data for input measurements and operations for a user defined period. This application is only available with **Support engineer** user profile.

HMS 300

Starts the HMS 300 application and used to exit the other menus.

PU Portal

This application is only available with **Support engineer** user profile.

Test Pages

This application is only available with **Support engineer** user profile.

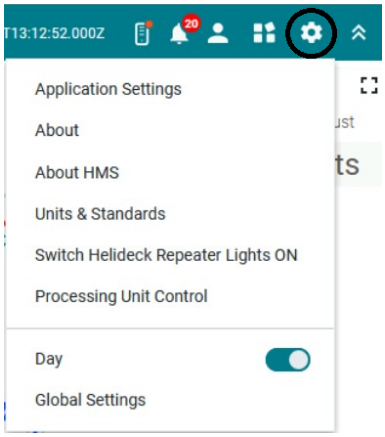
5.5 Settings

Here you can edit different settings.

How to open

Settings is located on the **Top bar**.

To exit the menu, select **Hms-300** application in the **Application menu**.



Application Settings

Here you can select which standard for offshore helicopter landing you want to use for your operation. CAP 437, NORMAM-27 or NOROG.

About

This setting is not in use.

About HMS

About holds details about the current system version.

Units & Standards

Here you can select between metric and Canadian units.

Switch Helideck Repeater Lights ON

Here you can select between switching the helideck repeater lights ON or OFF.

Processing Unit Control

Here you can select between reboot, restart, shutdown, start or stop of the Processing Unit.

Day/Dusk

Here you can select which colour palette you want to use for the display presentation.

Global Settings

Here you specify the default startup settings for the HMS 300 system when power on or restarted. The standard default setting is **Hms-300**.

6 Maintenance

The HMS system consists of both software and hardware. The software part can be reinstalled or upgraded to the latest version in the field. Service of the HMS hardware in the field can consist of:

- Exchange of damaged cables.
- Exchange of failed Monitor.
- Exchange of failed Processing Unit.
- Exchange of failed EDGE Unit (HMI Unit).
- Exchange of failed IMU (MRU or MGC).
- Exchange of failed meteorological sensors.
- Exchange of failed wave and water level system.
- Checking fuse within the power connector on the Processing Unit.

The Processing Unit, EDGE Unit and the IMU are not designed for service in the field and opening the housing will result in damage or degradation of the units and void the warranty. A failed IMU unit has to be shipped back to Kongsberg Seatex AS in the original transportation box for service.

6.1 Troubleshooting

6.1.1 System status

The error conditions in the system are usually observed by looking at the system status field at the bottom right of the display or the LED indicators located on the front panel of the Processing Unit.

For a description of the LED indicators on the Processing Unit, see the *Installation Manual*.

Related topics

- *Operation status view* on page 32

6.1.2 No power

If the LED indicators are not lit when powering the unit, it may indicate that the unit does not receive power.

Procedure

1. Check the power connection to the unit(s).
2. Turn the power switch behind the lid on the front panel off and on two or three times in case of poor connection.
3. Check the fuse within the power connector.

6.1.3 No cursor

The cursor may hide important information. For maximum visibility, the cursor is hidden after about one minute with no user activity. Simply move the mouse again to re-display the cursor.

6.1.4 No wind information

The HMS system automatically detect whether the NMEA MWV message include true or relative wind measurements. If both true and relative wind information is available in the MWV message, the HMS system will by default only use the true wind information. If the wind sensor of some reason stops sending out true wind information, the HMS system will not automatically switch to use the relative wind information. The HMS system will only switch to use the relative wind information after a restart of the system.

6.1.5 Problems with the Inertial Measurement Unit (IMU)

The tool available for troubleshooting the IMU is the **Data Viewer** and the **Port Monitor**. If the motion indication show invalid "Red", then the Processing Unit most likely does not receive any data from the IMU (MRU or MGC).

What to do if the Processing Unit does not receive any data from the IMU

1. Check that data are coming in to the MRU connector on the Processing Unit by selecting the **Tools** menu →**Port Monitor** and selecting **MRU**.
2. Check that the cable from the IMU is properly connected to the MRU port on the rear panel of the Processing Unit.
3. Check that the IMU cable is properly terminated in the junction box.
4. Check that the fuse in the junction box is not blown. Replace it if it is.

If the motion indication show reduced "Yellow", then the data from the IMU are most likely unstable.

What to do if data from the IMU are unstable

1. Check that the shield around each pair in the cable between the IMU and the Processing Unit is individually isolated in the MRU terminal. The outer shield is connected to pin 3 (screen) in the MRU terminal, which is an open end (not

connected to earth). In the MRU junction box (part no. MRU-E-JB3) both the shield around each pair and the outer shield are terminated in pin 40 (chassis) on the P3 side.

2 If it is still not working after checking all of the above items, then the IMU has most likely failed and the IMU has to be shipped to Kongsberg Seatex AS for repair.

6.2 Software upgrades

Software upgrades are performed through a specific portal with remote support from Kongsberg Seatex AS.

6.3 Periodic maintenance

6.3.1 Cleaning of Processing Unit air inlet

The air inlet at the rear of the Processing Unit needs to be cleaned regularly to avoid overheating of the unit.

Context

The period between each cleaning is dependent on the air quality at the location. We recommend that the filter is cleaned at least every six months.

Procedure

1 Remove the plastic cover with a screw driver or similar.

2 Remove the filter and clean it by washing it with a mild detergent or use a vacuum cleaner.

If the filter is very dirty, replace it with a new one.

3 Put plastic cover with clean filter back in place.

6.3.2 Recalibrating the meteorology sensors

The WXT520/530 Multi-Weather sensor inputs wind speed and direction, air pressure, temperature and humidity measurements to the HMS system. For the performance of the HMS system it is important that these Multi-Weather sensor measurements are within the specifications.

The PTU module within the WXT520/530 sensor is the source for the air pressure, temperature and humidity measurements. The PTU module is influenced by the amount of chemicals in the air around the sensor and especially the humidity measurements are influenced. Therefore, at an **interval of three years** the PTU module is recommended replaced with a new one. The old PTU module cannot be re-calibrated. The new PTU module is issued with a new calibration sheet.

The wind speed and direction measurements are stable over years due to no moving parts. Therefore, no recalibration or replacement of parts is required for accurate wind measurements over the years.

For other meteorological sensors interfaced to the HMS system, check the individual documentation for each sensor to find recommendations on recalibration procedures and intervals.

6.3.3 Recalibrating the IMU

After years in operation a recalibration of the IMU (MRU or MGC) used in the HMS system is recommended. A recalibration is recommended due to changes in the characteristics of the internal sensors over time and is therefore necessary in order to achieve the specified performance. Kongsberg Seatex AS recommend the following recalibration intervals for MRU and MGC units used in HMS application:

	Interval
MRU 3	2 years
MRU H, E & 5 and MGC R2	5 years
MRU 5+ and MGC R3	10 years

No MGC recalibration is necessary if the MGC is configured to integrated navigation mode. If the MGC has been configured to operate in integrated navigation mode, the MGC will calculate the drift in the accelerometers over time and correct for its influence.

The IMU has to be returned to Kongsberg Seatex AS for recalibration.

Note

When returning the IMU for recalibration, do not remove the mounting bracket from the site, only the cylindric sensor is to be removed and returned.

6.4 Repairs and parts replacement

6.4.1 Returning equipment to the manufacturer

Malfunctioning equipment should be returned to the manufacturer for repair.

Context

When you contact the customer support department, you will receive an RMA number (Return Material Authorisation) which will identify your service request. Use this number for all correspondence regarding your service request.

Procedure

1 Contact the manufacturer's customer support department
   - by phone: +47 33 03 24 07 (24 hours)
   - by e-mail: km.support.seatex@km.kongsberg.com

2 Provide information about the equipment to the customer support department:
   - what equipment you want to return
   - the serial number of this equipment
   - why you want to return the equipment
   - your company name and address

3 In return you will be given an RMA number (Return Material Authorization).

4 Include this number as a reference with the equipment when shipping it back to the manufacturer.

6.4.2 Installing a spare Processing Unit

If a spare unit is rented while your unit is in for repair, it is delivered with the latest version of the product software.

Procedure

1 If possible, backup the configuration:
   a Insert a USB flash drive into the USB port in the front of the HMI Unit.
   b Select **Tools→Copy configuration**
   c Verify that correct vessel name is entered.
   d Select **Start** to copy system configuration to the inserted USB flash drive.
   e Select **System→Shutdown→System** and switch off the power when told to do so.

2 Disconnect the Processing Unit to be repaired from its cables and the rack, and replace it with the spare unit.

3 Connect all cables as they were on the original unit.

4 Power up the unit.

5 Insert the USB flash drive with the configuration copy into the spare unit

6 Select **System→Change system mode→Configuration** to enable configuration restore.

7 Select **Tools→Restore configuration.**

8 Make sure all check boxes are selected.

9 If necessary, select **Select** to select the wanted configuration archive.

10 Select **Start** to restore the configuration from the original unit.

If the hard disk on the Processing Unit has failed, it is not possible to access its setup file. The spare unit has to be configured as described in the *Installation Manual*.

Related topics

- *Turning off the HMS system* on page 14
- *Installation Manual*

6.4.3 Repairing the Inertial Measurement Unit (IMU)

All repairs and modifications of the IMU of type MRU or MGC, except for installation of new software versions and user configuration, have to be carried out by Kongsberg Seatex AS.

Caution

Opening the IMU housing will result in permanent damage and the user should under no circumstances make any attempt to do so.

6.4.4 Repairing the meteorological sensors

For repairing or exchanging the failed meteorological sensor, see the actual manual for this sensor for how this should be done.

6.4.5 Repairing the wave and water level system

For repairing or exchanging the wave and water level system, see the Wave Finder manual for description of how this should be done.

7 References

Reference documents

1 *HMS 300 Installation manual*, Kongsberg Seatex AS

2 Vaisala Weather Transmitter WXT530, User's Guide

3 Vaisala BAROCAP Digital Barometer PTB330, User's Guide

4 Vaisala Ceilometer CL31, User's Guide

5 Present Weather Detector PWD22, User's Guide

6 SM-140 Range Finder, User Manual

7 Wave Finder, User Manual

8 General Conditions for the Supply of Products, Orgalime S 2000 with one exception sheet

9 Standard Measuring Equipment for Helideck Monitoring System (HMS) and Weather Data

10 CAP 437, Offshore Helicopter Landing Area - Guidance on Standards, CAA, London

11 Check and verification procedure, HMS 300 installations in UK, Norwegian and Brazilian waters

Appendix A
Conformity declaration

KONGSBERG

EU DECLARATION OF CONFORMITY

Manufacturer's name:	**Kongsberg Seatex AS**
Manufacturer's address:	**Havnegata 9, N-7010 Trondheim, Norway**

declares that the product:

Product name:	**HMS (Helideck Monitoring System)**
Model number:	**HMS 300, basic package without sensors**

is in conformity with the EMC directive 2014/30/EU, Low Voltage Directive 2014/35/EU and RoHS directive 2011/65/EU, using relevant sections of the following product standards:

Essential requirements	**Standards**
EMC:	**EN 60945/IEC 60945, ed. 4**
Electrical safety:	**EN 61010-1:2006/IEC 61010-1:2010**
RoHS	**EN 50581**

Test reference

- Test report: HWP 2010, NavEngine/GUI, report no. 130954/4, issued by Nemko AS.
- HMI_EMC_report_v01.pdf, report no 142356, issued by Nemko AS.
- File: HWP_2010_Safety_TCF, issued by Kongsberg Seatex AS.
- File: HWP_1U_2010_Safety_TCF.pdf, issued by Kongsberg Seatex AS.
- Report (RoHS): KSX-2017-RoHS2, issued by Kongsberg Seatex AS.

Supplementary information
The equipment tested was the HWP 2010 Engine, which is Kongsberg Seatex's Generic Industrial Computer and Sensor box, and the HWP 2010 1U HMI, which is Kongsberg Seatex's Human Machine Interface Unit. The HMS 300 basic package is housed in the HWP 2010 Engine. A VGA display was connected to monitor the performance. A special test program was used for performance monitoring of the serial and LAN ports. Relevant documentation is held by Kongsberg Seatex AS.

Date and signature
2021-02-17

Erlend Vågsholm, Vice President R&D

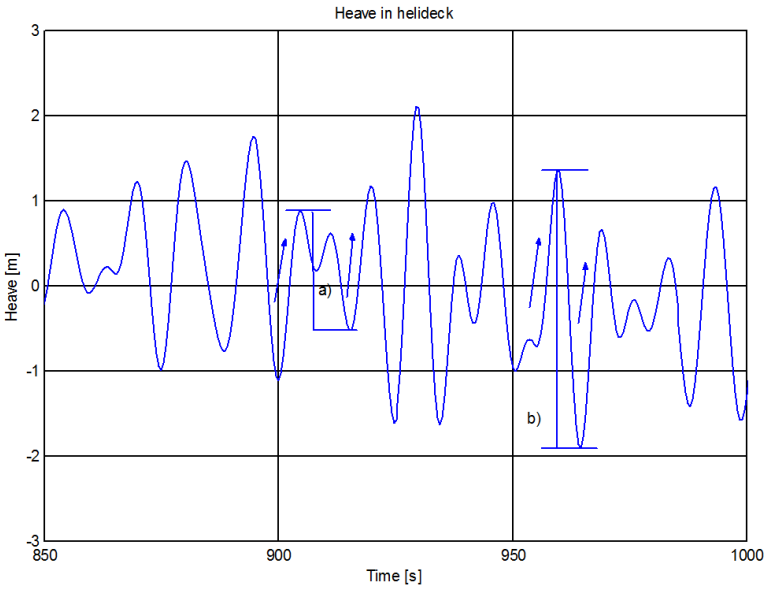
Appendix B Calculating the helideck report

The roll, pitch, heave and heave velocity in the helideck reports are calculated according to the following definition:

- Helideck pitch and roll values are given in degrees from level attitude. Maximum positive and negative angles are presented during a twenty-minute recording period.
- Helideck pitch and roll values are given in degrees from level attitude. Maximum positive and negative angles are presented during a twenty-minute recording period.

The graph shows the maximum peak-to-peak value in one cycle where the wave period **b)** indicates what is meant by a peak-to-peak value in one cycle for heave. The wave **a)** gets a long heave period since the first wave slope did not cross zero.

The HMS software searches through the twenty-minute recording period to find the largest peak-to-peak value in one cycle.



B.1 Helideck Monitoring System (HMS) and weather data

The Standard Measurement Equipment for Helideck Monitoring System (HMS) and Weather Data is described in *Standard Measuring Equipment for Helideck Monitoring System (HMS) and Weather Data*, see *References* on page 49. The HMS software is according to the latest revision of this standard that apply to all moving helidecks operating on the UK and Norwegian Continental Shelves.

Output variables to be reported for the past 20 minutes are:

- Maximum heave (metres)
- Heave period (seconds)
- Maximum Average Heave Rate (metres/seconds). Only for NORMAM-27.
- Significant Heave Rate (metres/seconds). Only for CAP 437 and Norwegian CS.
- Maximum Pitch (degrees)
- Maximum Roll (degrees)
- Maximum Helideck Inclination (degrees)

The different output variables are defined as follows:

Maximum Roll

The helideck movement athwartship in degrees starboard(+) and port(-) with zero being the horizontal level. Maximum positive and negative angles are presented.

Maximum Pitch

The helideck movement alongship in degrees up(+) and down(-) with zero being the horizontal level. Maximum positive and negative angles are presented.

Maximum Helideck Inclination

The largest helideck inclination is defined as the angle between the absolute horizon and the plane of the helideck.

Maximum Heave (Hmax)

The largest vertical helideck movement in metres is measured from top to bottom on the movement curve over the past 20 minutes.

Maximum Heave Period (Tmax)

Is the time between where the wave curve starts and ends in the zero up crossing point. This period corresponds to the wave generating the largest vertical helideck movement, Maximum Heave.

Maximum Average Heave Rate (MAHR)

Is the maximum mean vertical rate for a movement range from top to bottom within one cycle over the past 20 minutes.

Significant Heave Rate (SHR)

The significant heave rate is the average of the highest one-third of heave rate amplitudes recorded in the previous 20 minutes. The significant heave rate sis updated continuously, using a moving 20-minute window. The Significant Heave

Rate value is calculated directly from the heave rate in accordance with the following formula defined in *ATKINS Technical Note no. 5077366–000–TN-1*.

Maximum average heave rate

Calculation of maximum average heave rate is calculated based on one of the following two methods:

- Norwegian method 1: The calculation of maximum average heave rate is implemented according to *Sintef Report 22D114.00, 1999-11-09 "FPSO Helideck Motion Criteria"*. In this method Maximum Average Heave Rate (Vavg) is defined as Vavg= Hmax / (Tmax/2), where Hmax is the maximum total heave (of the helideck) in metres measured from top to bottom on the movement curve and Tmax the associated heave period over the past 20 minutes.
- Norwegian method 4: The calculation of maximum average heave rate is implemented according to *ATKINS Technical Note no. 6 with title "Heave rate limiting parameter definition"*.In this method Maximum Average Heave Rate is defined as the slope between each heave peak to trough (as well as trough to peak) is calculated using the actual time between them (which is effectively half the period). This is considered to be the interpretation most closely aligned with the spirit of the definition of average heave rate in the*Standard Measuring Equipment for Helideck Monitoring System (HMS) and Weather Data*. In this method there is no need for a 'period' to be calculated, since the time difference between successive peaks/troughs are used.

Norwegian method 4 is the most conservative, and therefore safer, of the interpretations. In the HMS it is configurable which method to be used and method 4 is used as the default method.

Inclination

The Maximum Helideck Inclination in degrees is calculated in the following way:

- MaxInclination [º] = arccos (cos (MaxRoll) * cos(MaxPitch))

Wind gust

In the Norwegian Sector standard it is required that wind gust is calculated for either a 2-minute or a 10-minute period. The calculation for wind gust is implemented in the HMS 100 in the following way:

Wind observation over 2-minute period

The maximum value in the observation period which is 10 knots above the 2-minute mean value, is output as the wind gust value.

Wind observation over 10-minute period

The maximum value in the observation period which is 10 knots above the 10-minute mean value AND which has a duration of 3 seconds or more, is output as the wind gust value.

Appendix C
Converting log files

The program **IBReader** is used to convert the recorded binary files (IB) in HMS system to CSV (Comma Separated Value) formatted files. The CSV files can be imported into for example Excel for analysis. The CSV file includes the following information:

- Motion data
- Meteo data
- MetOcean data
- Operation changes
- Navigation data
- One file per configured measurement (OV = observation variable)

The log files and the **IBReader** program are stored on the Processing Unit. Use the Data Export selection under the **Tools** menu to copy the log files to a USB memory stick.

Note

*Always use the **IBReader** program exported together with the log files when converting the files.*

Below is an example on how to export data from the HMI Unit, unzip log files and how to perform the conversion on a local PC.

Example 1 Exporting data files

1. Insert a USB memory stick in the USB port behind the little door on the left hand side of the HMI Unit.
2. On the HMI main display, select **Data Export** from the **Tools** menu.

   This brings up the data export dialog.
3. Select a starting date and time using the graphic panes on top, and select the duration for which you want to copy data.

   The log files have been set to 10 minutes, so exporting one hour's worth of logs should give you six IB files.
4. The **Data Export** tool will tell you when the export has finished. Exit the dialog and remove the USB memory stick

Example 2 Unzip and convert log files

Before converting the file, unzip the log file(s). The log files are stored as zipped IB files.

Example 3 Usage

The syntax is: ibreader <ib-file>. Example:

- ibreader 1310211048.ib

Generates the following files in a sub-folder with name <ib file>_result. Example:

- For ib file 1310211048.ib the result will be in 1310211048.ib_result

The following files are generated for e.g. 1310211048.ib which have Motion sensors, meteo sensors, navigation sensors and 5 OVs:

- VMS_20131021_104855.ActiveOperation.csv
- VMS_20131021_104855.CAP437_AC-A_Day_Vessel1.01.csv
- VMS_20131021_104855.CAP437_AC-A_Night_Vessel1.01.csv
- VMS_20131021_104855.CAP437_AC-B_Day_Vessel1.01.csv
- VMS_20131021_104855.CAP437_AC-B_Night_Vessel1.01.csv
- VMS_20131021_104855.HCA_AC-Heavy_Day_Vessel1.01.csv
- VMS_20131021_104855.HCA_AC-Heavy_Night_Vessel1.01.csv
- VMS_20131021_104855.HCA_AC-Medium_Day_Vessel1.01.csv
- VMS_20131021_104855.HCA_AC-Medium_Night_Vessel1.01.csv
- VMS_20131021_104855.NORMAM27_AC-A_Day_Vessel1.01.csv
- VMS_20131021_104855.NORMAM27_AC-A_Night_Vessel1.01.csv
- VMS_20131021_104855.NORMAM27_AC-B_Day_Vessel1.01.csv
- VMS_20131021_104855.NORMAM27_AC-B_Night_Vessel1.01.csv
- VMS_20131021_104855.MeteoData.csv
- VMS_20131021_104855.MetOceanData.csv
- VMS_20131021_104855.NavData.csv