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REAL TIME ENVIRONMENTAL MONITORING SYSTEM

REMS User Manual V5.0.16

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1 Introduction

This manual describes the user interface features of the REMS application.

The REMS web display application provides display and presentation of real-time and historical data. The web display is accessed in the normal way from client web browsers by typing in the URL of the web page in the Location Bar.

The REMS Web display application connects to the REMS relational database and retrieves the latest data at one minute intervals.

A number of different data presentation screens are available, including time history profile plots, operational data displays, tabulations of summary parameters etc. These screens are configured to meet the specific requirements at each REMS installation site.
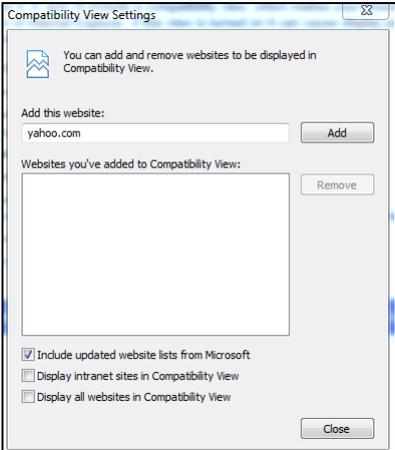
The display uses a list of menu buttons to navigate between the various data display screens.

The menu bar displays the time of arrival of the latest data unless in historical data mode.

The toolbox contains the time selector controls that are used to display historical data. When in historical mode the menu bar and controls colour will change to grey to clearly indicate that the latest data is not presently displayed. The display will automatically enter historical mode when the expected data arrival is delayed beyond a number of record intervals.

1.1 Web Browser Support

- Microsoft Internet Explorer v10.0+
- Google Chrome v60.0+

When using Microsoft Internet Explorer 9.0, Windows Compatibility View should be disabled. From Internet Explorer, press ALT+T to activate the Tools menu. Select the Compatibility View Settings option. Uncheck "Display all websites in Compatibility View" and "Display intranet sites in Compatibility View". Press Close and restart Internet Explorer.

1.2 Desktop Screen Resolution

1920 x 1080 pixels (Full HD - widescreen aspect ratio of 16:9)

1.3 Units & Conventions

- Wind/Wave Directions are relative to True North and evaluated FROM the angle in which the wind is blowing
- Current Directions are relative to True North and evaluated TO the angle in which the current is flowing

- Barometric pressures (QNH, QFE) are corrected to respective calculation height.
- Wind Speeds are corrected to respective calculation height (10m AMSL, 6m above Heli Deck etc) using ISO Profile Wind Scaling.
- The accuracy of measured wave heights is estimated to be in the order of ± 5%.

2   User Interface

The REMS user interface is made up of a number of configurable data display screens (web pages). The web pages are comprised of a number of different display components (controls), the arrangement of these controls differ for each REMS installation depending on the sensors installed. All controls update at one minute intervals when in real-time mode. The following sections describe the different display controls.

2.1   Navigation

REMS web page navigation is performed by activating menu items in the vertical navigation menu bar to the left of the data display area or by clicking horizontal tabs above the main data display area.
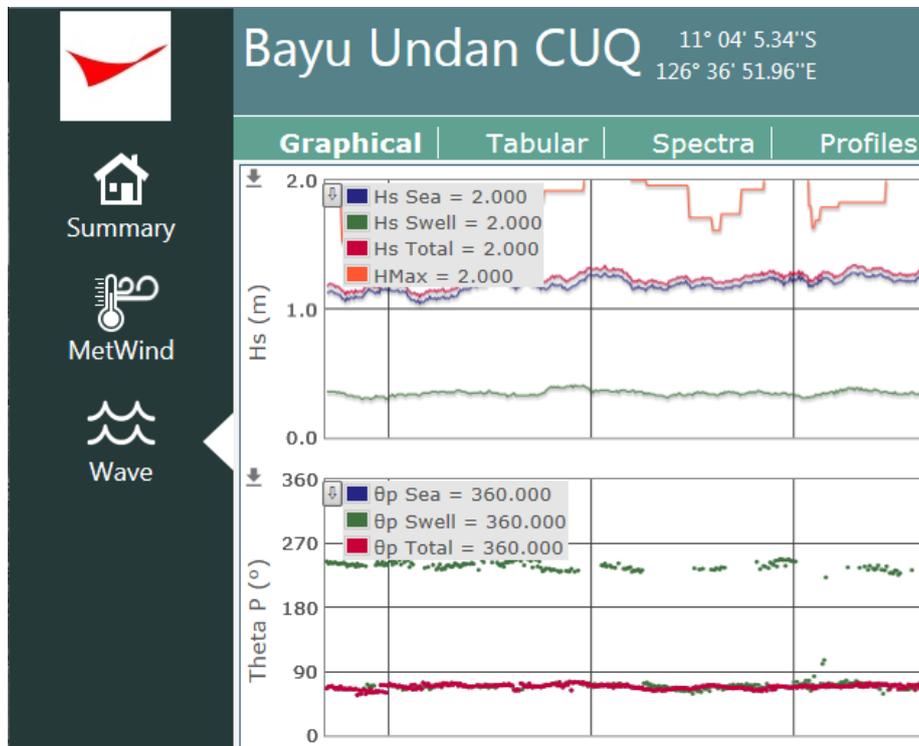
2.2   Toolbox

At the right hand side of the screen is a button that is used to open the toolbox. The toolbox contains controls that are used to perform actions across all screens for the REMS installation, for example the time selection settings for controlling the time period on the display and export functionality are located here.

2.2.1   Time Selection

The time selection controls are used to both, move between real-time and historical data display mode and to select the time duration of the data displayed.

Time Traversal Control	Explanation
	- The Time Span drop down list allows the selection of different time spans for the data back to a maximum of 28 days. The screens will show data between the selected date and time minus the selected time span. - The left (previous) and right (next) pointing arrows are used to navigate through the data display at the time span duration. Navigating backwards in time will place the system in "Historical Mode". When in historical mode the menu bars and controls will change to the historical mode colour (grey), additionally the words "Historic Mode" will be flashing in read at the top of the screen. In historical mode the screens will remain static and will not refresh with new data for duration of five minutes which it will then revert to real-time mode. - The third button, right pointing arrow with line, is used to switch back to real-time mode. - The final button in the row is the pause button and is used to toggle Operational or Modelling mode. When viewing historical data, Operational mode will revert back to real-time mode after duration of five minutes. This button provides the option to switch to Modelling mode which prevents the displays from reverting to real-time mode automatically. - The text box displays the date and time of the data shown in the display. Date and time selection controls are located to the right of the text box. To view a specific date and time period use the calendar button to bring up the date and time selection controls. Use the calendar to select a month and day and the sliders at the bottom allow the selection of the hour and minute. By default REMS installations retain data for a period of two years.
	Forward Projection When a chart is configured for forward projections the time selection control changes to allow entry of a date-time in the future.

2.3   Data Panels

Data panels display a set of values from a particular instrument or group of instruments. The panels will display the most recent value available in real-time mode. If the latest value available is more than five minutes old (default) then the panels will display "…" indicating that no recent data is available.

When in historical mode the panel will display the most recent value available from the time period selected.

Data panels can be arranged in different layouts including a simple vertical list of values or a grid panel where the values are grouped together such as a panel with wave data.

Data Panel Simple Layout	Data Panel Grid Layout
Meteorological AT RH QNH 27.7°C 63.9% 1013.0 hPa 28/05/19 11:37 28/05/19 11:37 28/05/19 11:37	**Cloud METAR** Height Amount 3rd … 2nd … 1st … SKC

2.3.1   Data Quality Indication

Data quality control (QC) flags are automatically calculated from the sampled data buffer and recorded at the reporting interval. The QC flags are tested against nominated thresholds, if the test should fail then the data is coloured accordingly. The coloured bar on the left indicates the QC status

QC	Status	Explanation
1	Good	Green bars indicate that the data is considered "Good"
2	Suspect	Amber indicates that the data is considered "Suspect"
3	Bad	Red indicates that the data is considered "Bad".

2.3.2   Unit Conversion

Panels may support changing the display unit if there is an appropriate unit conversion available. The unit conversion dialogue is activated by left clicking the item in the panel (e.g. Speed below)

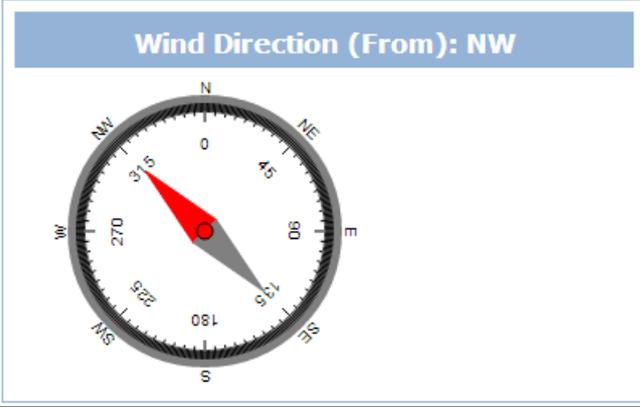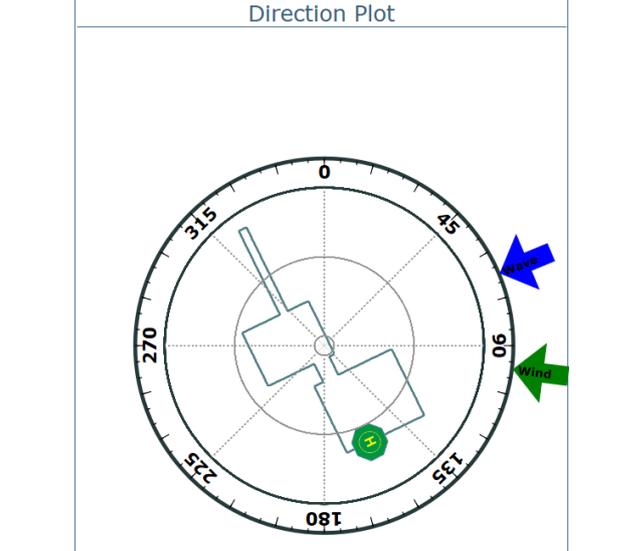The unit conversion dialogue will show the units that are available for the selected value. Clicking the desired unit button will update the display with the converted unit value.

Wind

Direction 600s	Speed 600s @HeliDeck+6m	Gust 60s @SensorHeight
97°	12.5 kn	14.8 kn

Wind Speed 600s Scaled 6m Above HeliDeck

28/05/19 11:41   28/05/19 11:41   28/05/19 11:41

Change Unit

m/s

Cancel

2.4 Graphical Components

2.4.1 Compass

The compass control display directional data (eg. wind direction). The compass will display the most recent value available at the selected date and time when in "HISTORICAL Mode" or the latest value when in "REAL-TIME Mode".

Wind Direction Compass	Description
	The label will indicate if the direction is "From" or "To". The label will also display the abbreviated direction for the currently displayed value. The red side of the arrow will point to the actual value (either To or From).

Helideck Monitoring Direction Compass	Description
	Displays directional information from multiple instruments, for instance Vessel Heading, Wind and Wave data

2.4.2   Charts

The REMS web application has a number of graphical chart configurations which may display multiple plots per chart. Graphical configurations include time series, spectral, profile, and surface charts.
It should be noted that where the number of measurements in the data interval selected for display exceeds the number of screen horizontal pixels, an algorithm is used to plot selected points representative of the data trend.

2.4.2.1   Time Series

The Time Series chart displays data over a range of time corresponding to the selected time and time span. When in real-time mode the chart will update with new data as it becomes available, always displaying the time span that was selected in the Toolbox. The time is represented on the X-axis of the chart. Each chart may display multiple plots.

2.4.2.2   Data Representation

Data on the plot can be represented as a line, individual points, or a line with points. The points can use different markers on the display to differentiate data. These consist of a circle, square, diamond, triangle, and cross. Each sensor parameter displayed on a chart can have its own unique colour and marker style.

2.4.2.3   Chart Legend

Charts have the option to include a legend in the top left of the display. This shows the label and colour of the data being displayed for each plot. When a legend is displayed individual plots can be enabled or disabled by clicking the corresponding coloured box in the legend. Clicking the greyed out box will re-enable the plot display on the chart.
When charts have a legend the hairline (red) will be available. The hairline follows the mouse over the chart and the values in the legend will update to show the values at the position of the hairline.
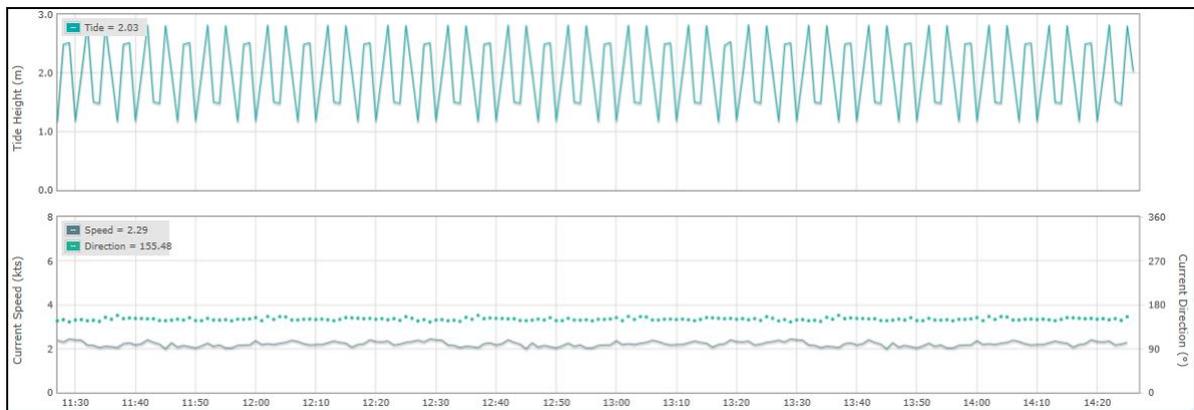
2.4.2.4   Chart Y-Axis Scale

Each chart has a default range (stored in the REMS database) on the Y-axis that is set according to the data being displayed. Changes to the y-axis range are stored for the local user session, default y-axis ranges are loaded for each new session.

Left mouse clicking on the label on the Y-axis activates the Change Y-axis dialog box. The scale can be changed between the default range, auto scale or entering a custom range. Auto scale sets the range to suit the minimum and maximum of the data being displayed

2.4.2.5   Multiple Y-Axes

For charts with two or more plot data items that have differing units the chart can display a second axis. Each Y-axis can also change scale independently of each other. Charts are limited to displaying data with two different units.
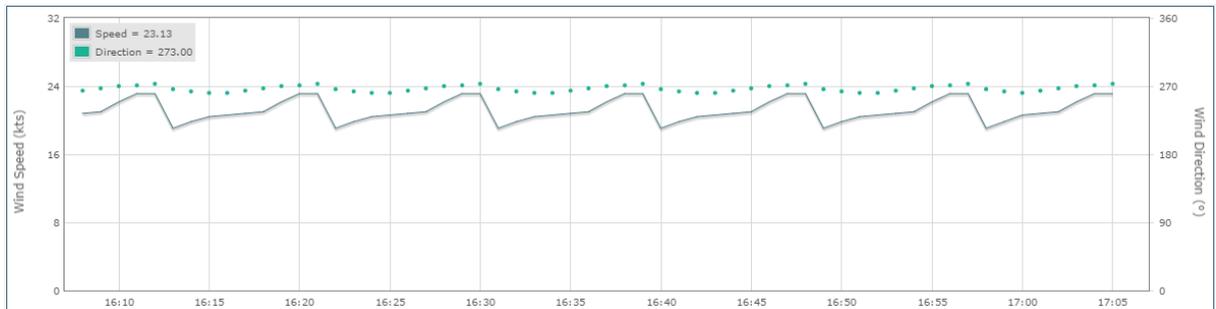
2.4.2.6   Forward Projection

Charts can be configured to plot forward projections when predictions or modelled data are available. The ToolBox time selection control changes to allow entry of a date-time in the future. The chart on the rhs will display future data for the selected Time Span.
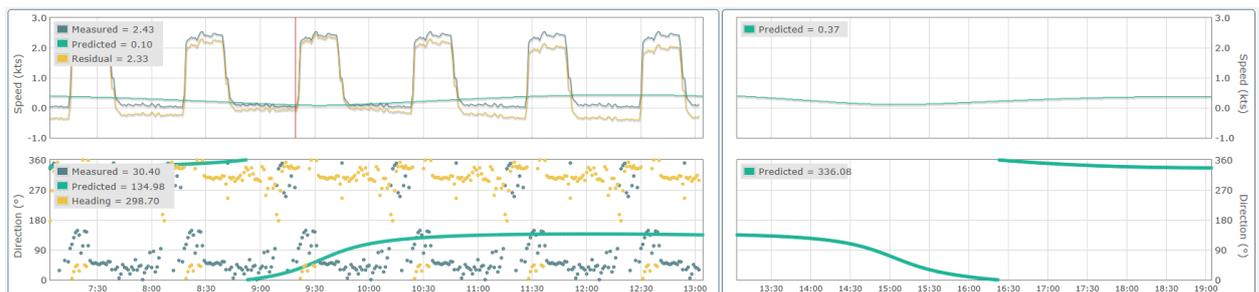
2.4.2.7   Printing Charts

A .PDF image of individual charts can be generated by clicking on the download ⬇ button on the top left of the chart.
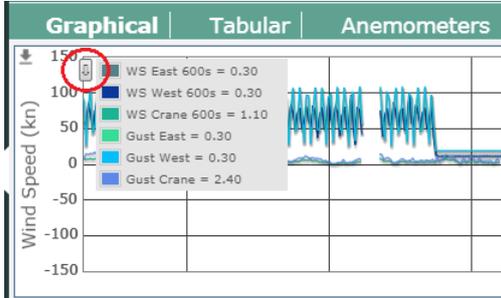
2.5   Tables

Data can be displayed in a tabular format using the table controls. Tabular displays show the data in descending chronological order from the most recent data for the selected date and time span. Columns can be grouped up to 3 levels to categorise the data that is being displayed.

If the duration of data selected for display is too great to present on a single table then the data is split in to multiple pages which can be selected using the page numbers at the bottom of the table.

| Record Time Local Time | Directional Wave Rider | | | | | | | | | | |
	Sea			Swell			Total			Time Domain	
	Hs m	Tp s	Op °	Hs m	Tp s	Op °	Hs m	Tp s	Op °	HMax m	ThMax s
05/11/2013 15:03:00	0.6	6.1	259	0.5	14.3	213	0.8	14.3	213	1.0	5.5
05/11/2013 14:56:00	0.6	8.7	257	0.5	14.3	158	0.8	14.3	158	1.1	10.5
05/11/2013 14:55:00	0.6	8.7	257	0.5	14.3	159	0.8	14.3	159	1.1	10.5
05/11/2013 14:54:00	0.6	8.7	257	0.5	14.3	159	0.8	14.3	159	1.1	10.5
05/11/2013 14:53:00	0.6	8.7	258	0.5	14.3	161	0.8	14.3	161	1.1	10.5
05/11/2013 14:52:00	0.6	8.7	258	0.5	14.3	161	0.8	14.3	161	1.1	10.5
05/11/2013 14:51:00	0.6	8.7	258	0.5	14.3	162	0.8	14.3	162	1.1	10.5
05/11/2013 14:50:00	0.6	8.7	258	0.5	14.3	160	0.8	14.3	160	1.1	10.5
05/11/2013 14:49:00	0.6	8.7	258	0.5	14.3	160	0.8	14.3	160	1.1	10.5
05/11/2013 14:48:00	0.6	8.7	257	0.5	14.3	161	0.8	14.3	161	1.1	10.5
05/11/2013 14:47:00	0.6	8.7	257	0.5	14.3	161	0.8	14.3	161	1.1	10.5
05/11/2013 14:46:00	0.6	8.7	255	0.5	14.3	165	0.8	14.3	165	1.1	10.5
05/11/2013 14:45:00	0.6	8.7	254	0.5	14.3	167	0.8	14.3	167	1.1	7.4
05/11/2013 14:44:00	0.6	8.7	254	0.5	14.3	167	0.8	14.3	167	1.1	7.4
05/11/2013 14:43:00	0.6	8.7	252	0.5	14.3	169	0.8	14.3	169	1.1	7.4
05/11/2013 14:42:00	0.6	8.7	252	0.5	14.3	169	0.8	14.3	169	1.1	7.4
05/11/2013 14:41:00	0.7	6.1	259	0.5	14.3	169	0.8	14.3	169	1.1	7.4
05/11/2013 14:40:00	0.6	6.1	259	0.5	14.3	167	0.8	14.3	167	1.1	7.4
05/11/2013 14:39:00	0.6	6.1	259	0.5	14.3	167	0.8	14.3	167	1.1	7.4
05/11/2013 14:38:00	0.6	6.1	258	0.4	14.3	163	0.8	14.3	163	1.0	5.5
05/11/2013 14:37:00	0.6	6.1	258	0.4	14.3	163	0.8	14.3	163	1.0	5.5
05/11/2013 14:36:00	0.6	6.1	259	0.5	14.3	219	0.8	6.1	259	1.0	5.5
05/11/2013 14:35:00	0.6	6.1	259	0.5	14.3	213	0.8	14.3	213	1.0	5.5
05/11/2013 14:34:00	0.6	6.1	259	0.5	14.3	213	0.8	14.3	213	1.0	5.5
05/11/2013 14:24:00	0.7	6.3	264	0.5	14.3	145	0.8	14.3	145	1.2	7.0
05/11/2013 14:23:00	0.7	6.3	260	0.5	14.3	145	0.8	14.3	145	1.2	7.0
05/11/2013 14:22:00	0.7	6.5	263	0.5	14.3	145	0.8	14.3	145	1.2	7.0
05/11/2013 14:21:00	0.7	9.0	256	0.5	14.3	144	0.8	14.3	144	1.2	7.0
05/11/2013 14:20:00	0.7	6.3	261	0.5	14.3	142	0.8	14.3	142	1.2	7.0
05/11/2013 14:19:00	0.7	9.0	260	0.5	14.3	146	0.8	14.3	146	1.2	7.0

1 2

3   Operational Displays

The Operational web pages display the latest MetOcean data updated at the configured reporting interval (typically one minute). Parameters displayed are useful for operational purposes, for instance Helicopter flight operations or mooring of vessels. Wind Speeds are scaled to helicopter hover height (6 metres) above the helideck.

3.1   Heli Ops Display

The Heli Ops display is designed to support helicopter operations between the FSO, CUQ and Dili airfield, by summarising weather conditions at all three sites simultaneously.

3.2 Marine Pilot Display

The Marine Pilot display is primarily for support for the vessel's pilot, but also provides data relevant to helicopter pilots.

3.2.1 Parameter List

Parameter	Description
Wind	
Direction 600s	10 minute average wind direction updated at 60 second intervals
Speed 600s @Helideck+6m	10 minute average wind speed updated at 60 second intervals and scaled to 6.0 metres above the Helideck using ISO Wind Profile Scaling algorithm. When the 600s wind speed is less than 1 knot, 600s Wind Speed is reported as "CALM"
Gust 60s @Sensor Height	10 minute maximum wind Gust updated at 60 second intervals. Gust is not scaled, i.e. as measured at anemometer elevation. "No Gust" is reported if the 600s Wind Gust in the past 10 minutes has not exceeded the 600s Wind Speed by 10 knots or more.
Meteorological	
AT	60 second average Air Temperature updated at 60 second intervals
RH	60 second average Relative Humidity updated at 60 second intervals
QNH	60 second average QNH value updated at 60 second intervals. (Barometric Pressure reduced to MSL). Rounded down to nearest hPa.
FSO Heading	
Heading	60 second average vessel heading reported by the gyro.
Wave	
Hs	Significant Wave Height (Total)
Tp	Period of peak spectral ordinate (Total)
HMax	The highest wave measured in the averaging period.
Visibility	
Vis60s	1 minute average visibility in metres
Vis600s	10 minute average visibility in metres
Cloud	
METAR	Current sky status displayed in METAR format
1st, 2nd, 3rd	The ordinal cloud level.
Height	Height, in feet, of the detected cloud level. If no cloud detected then "…"
Amount	METAR value at the given height as per BOM Equipment Specification A2669. i.e.: ***NNN HHH*** Where:

|	

	NNN is the processed cloud amount for the corresponding cloud layer, reported as follows:
	        SCT For a Scattered cloud layer (1-3 oktas)
	        BKN For a Broken cloud layer (4-6 oktas)
	        OVC For an Overcast cloud layer (7-8 oktas)
	
	HHH is the processed cloud height for the corresponding cloud layer. It is reported in hundreds of feet. e.g. 15,000 feet height shall be reported as 150.
	
	If the ceiling/sky condition is unavailable, this group is to be reported as "***//////***"
	If no cloud is detected below 12,500ft, this group is to be reported as "**CLR BLW 125**"

Currents	
Speed	10 minute average ocean current speed in knots
Direction	10 minute average ocean current direction

3.2.2   Wave Data Displays

The REMS web pages support a number of different data presentations of wave data including the following

- Time History Charts, Time History Tabulations, Wave Spectral Displays, Wave Profile Displays

3.2.2.1   Time History Charts
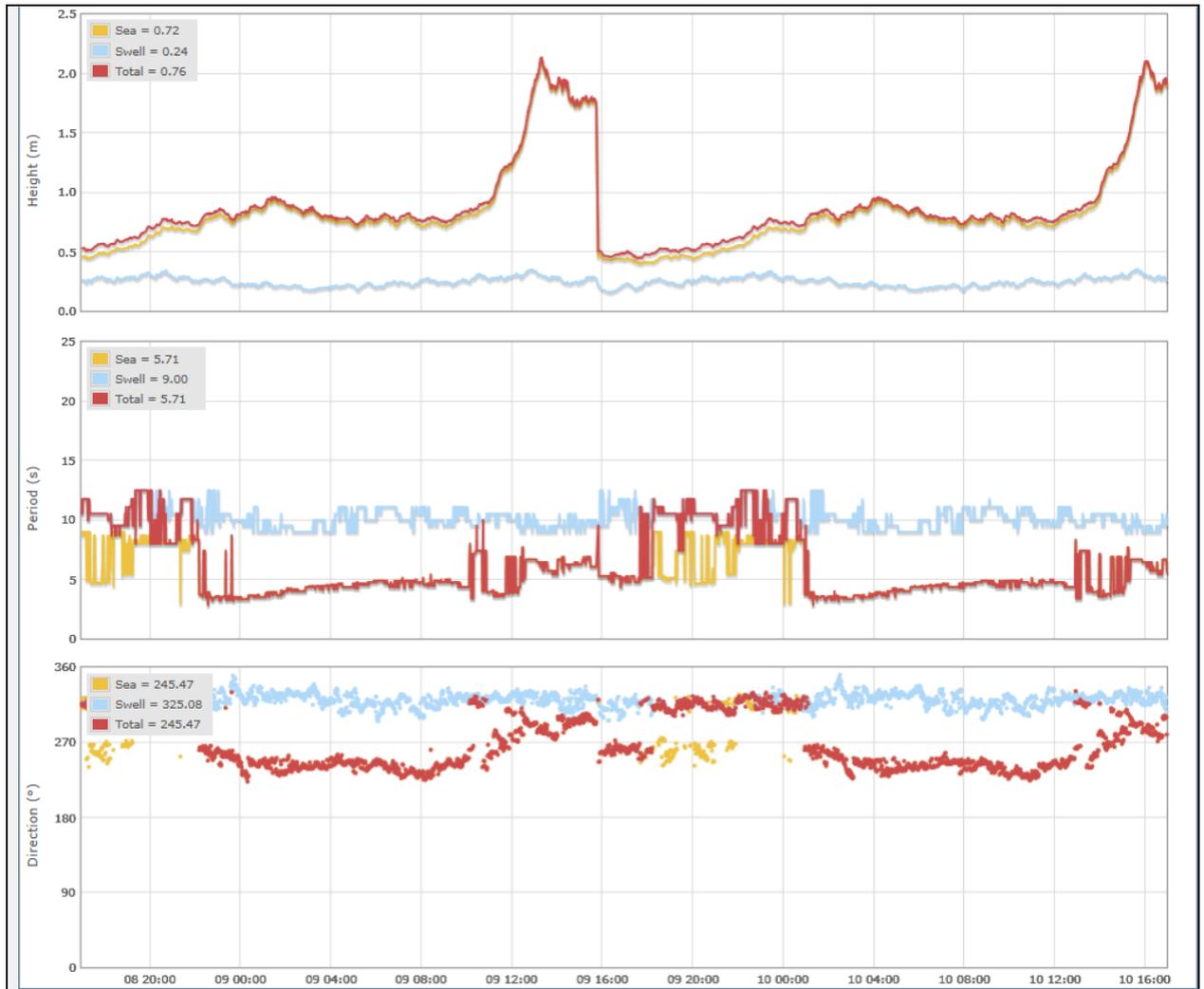
3.2.2.2 Wave Spectral Data Display

Spectra charts are a specialised chart for displaying wave spectra (Energy, Spread, and Direction). The Energy Spectrum graph shows wave energy plotted against frequency in the unit m2/Hz. This plots the energy of the sea state against the wave period (frequency). The wave energy spectrum usually appears as a continuous curve, the shape of which varies according to sea conditions. Irregular seas give rise to broad spectra. These may show several peaks clearly separated or merged into a broad curve having several humps on its back. Smooth sea, where there is little local wind, will show most of the wave energy in the long period (swell) section of the graph.

Spectra charts support a single Y-axis and provide the same scale functionality as the Time Series charts.
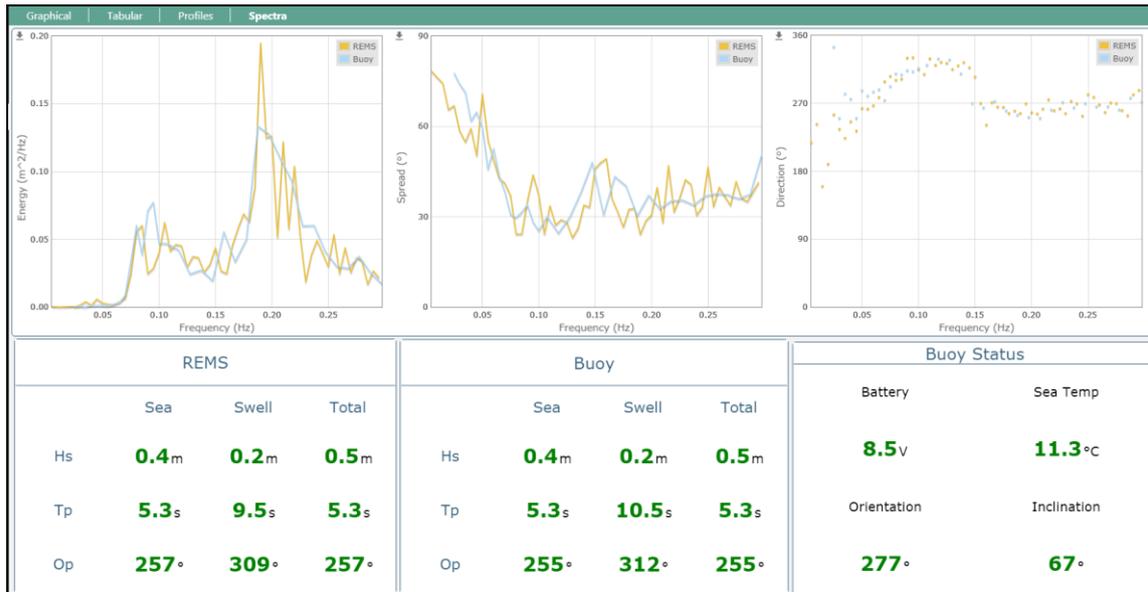

The significant wave height parameters are calculated in the spectral domain. A spectral analysis is performed when the reporting interval elapses. The HsTotal generally corresponds to the classical time domain analysis.

Label	Units	Parameter	Description
Hs	metres	Sig Wave Height (Total)	average height of the highest one third of waves in the last ten minute sample for sea, swell and total
Tp	seconds	Period at Spectral Peak	wave period around which the most wave energy is concentrated in the last ten minute sample for sea, swell and total
ϕp	degrees	Direction at Peak (from)	average direction of waves referred to by Tp.
SSS	seconds	Sea/Swell Split	cut-off period for sea and swell waves

4   Data Export

The Export Data button located in the ToolBox pane activates the data export dialog box. The data export dialog allows users to select parameters for a nominated period and download to file in CSV format.
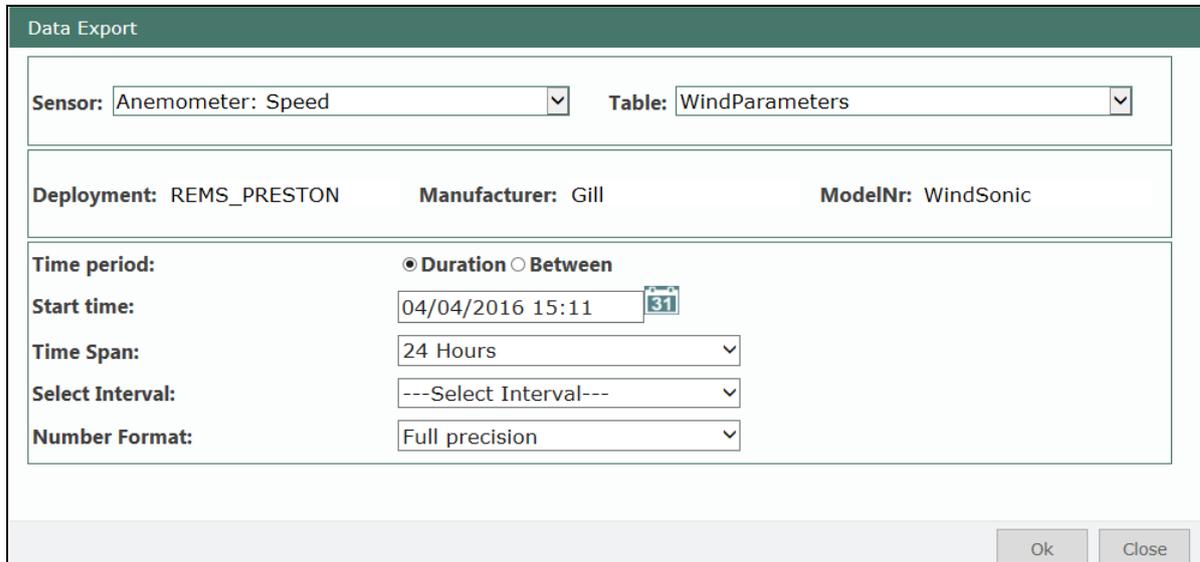
The Sensor dropdown allows for the choice of instrument (e.g. Anemometer, DWR). Selecting a Sensor filters the available database Table list for that sensor and the manufacturer and model of the sensor will be displayed.

Data can be exported for a specified Duration, or Between Start and Until time periods by selecting the desired option from the radio options in the dialog. In either mode a start time for the export must be chosen using the calendar button. Data/Time selections are in local-time. Selecting the

- "Between" option activates the "Until" date/time populated via the calendar button.
- "Duration" option requires entry of Time Span value for the period of data export.

The resolution of data exported is configured using the "Interval" option eg. 1 minute, 1 hour.
Data is output in local-time of the machine hosting the Web Browser (eg. WST == [UTC+8.0]).
Direction conventions of data output are: WIND and WAVE "from"; CURRENT "to".

5   Help

The REMS User Manual document is accessible in .PDF format by activating the **ToolBox** Help   ⓘ
menu