

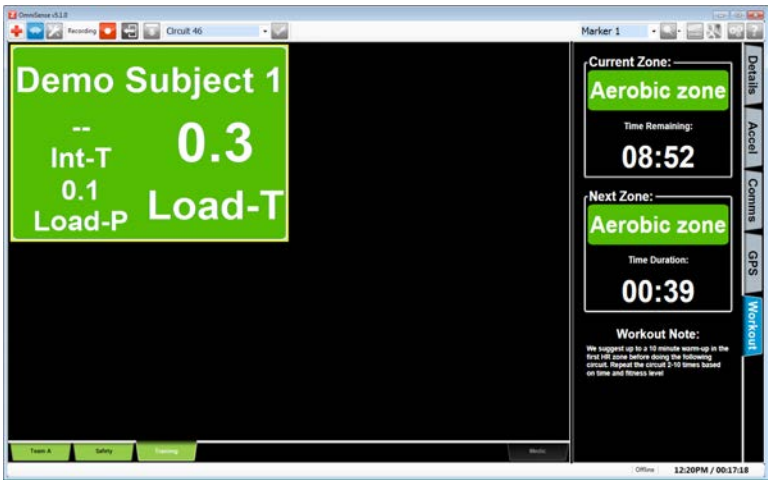
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OMNISENSE™ LIVE OPERATIONS

Preferences (4/5)

Training Thresholds

Training Thresholds are used in conjunction with a Training BioGauge in the context of a Workout.



Threshold targets are set in **Preferences > Training Thresholds**.

Training Thresholds			
Notify Based On: <input checked="" type="radio"/> Individual - CTRL <input type="radio"/> Team Average			
Team	Phy Load	Mech Load	Training Load
Zephyr	0	0	0
Team A	0	0	0
Team B	0	0	0

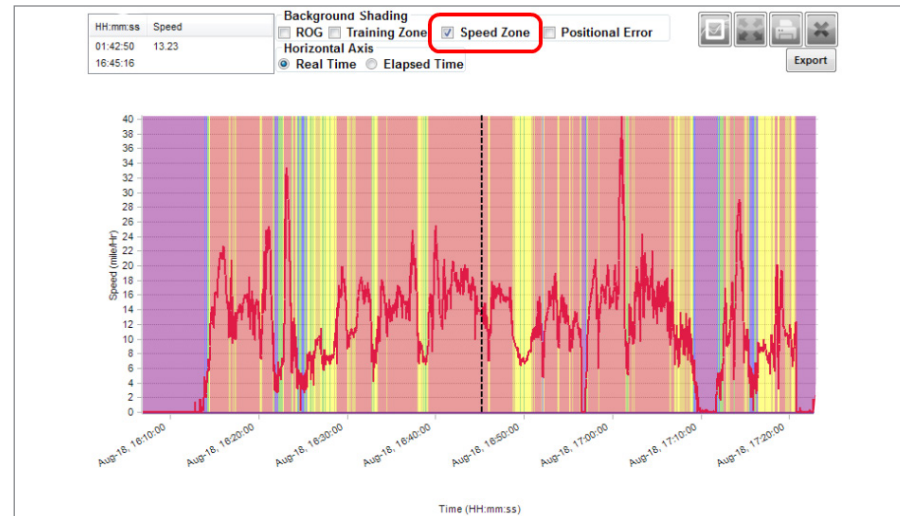
When the prescribed targets are met (individually, or team average), the subject name and target met will flash in a contrasting color on their Training BioGauge, either individually or as a team, dependent on the **Notify Based On** setting.

OMNISENSE™ LIVE OPERATIONS

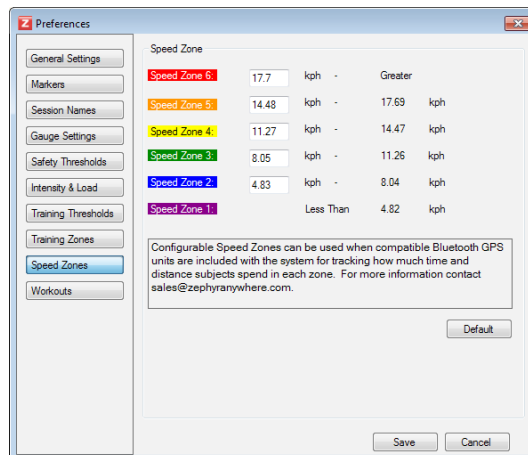
Preferences (5/5)

Speed Zones

Speed zones can be configured for subjects who are using a supported GPS device in conjunction with their BioModule.



- In OmniSense™ Analysis, select the check box above the time graph to show speed zones as background shading. Illustrated is speed over time in miles per hour over a cycle run tracked by GPS.
- As lower limits are adjusted, the upper limit for each zone adjusts automatically.



- Speed Zone data is not viewed in OmniSense™ Live, but in the Analysis module.



Note

When logging GPS data internally in a BioModule, it must be configured to log in **Summary and Waveform** or **Enhanced Summary and Waveform** format, using the Zephyr™ Config Tool.

OMNISENSE™ LIVE OPERATIONS

Connection To Cloud Portal

Connection to Cloud Portal

- An internet connection is required.
- Both OmniSense™ Live & Analysis can connect to the OmniSense™ Cloud Portal.
- When OmniSense™ Live is connected, streaming live data is automatically uploaded to the portal and can be viewed remotely. Data is only uploaded for those subjects who are registered with the portal.
- The registration process is described in the **OmniSense™ Web Portal** section.
- When OmniSense™ Analysis is connected, any log data imported from BioModules assigned to registered portal users is also uploaded.

1. Click on the connect button on the Live (or Analysis) toolbar.



2. Enter your **User Name** and **Password**. The user name will have been assigned to you, and password set by you as part of the registration process.

Click Login.

3. The toolbar button will toggle to show the application is connected to the web portal.



Note

No data is ever downloaded from the portal to a local OmniSense™ Analysis instance. It can only be viewed in the portal itself.

However, subject physiological parameters such as maximum heart rate, fitness level etc - are synchronized between the web portal and a local PC instance every time they are connected, to maintain integrity of these parameters.

OMNISENSE™ LIVE OPERATIONS

Demo Mode (1/2)

Demo Mode

Demonstration mode exists for training and demonstration purposes. It consists of a number of subjects displaying virtual data.

- No LoRa Gateway needs to be connected to operate in Demo mode.
- If a LoRa system is active, then real subject data will display at the same time as the virtual subjects.
- Engage **Demo** mode using the toolbar button.



- 21 virtual subjects will display, on 3 team tabs: **Goalkeeper / Defenders / Offense**.



Team tab (Offense)



Training tab

All tabs and Standard or Training BioGauges will function, except for:

- Accel tab
- GPS tab
- Workouts - the Workout tab can be viewed, but subject data will not attempt to match the Workout targets.

OMNISENSE™ LIVE OPERATIONS

Demo Mode (2/2)

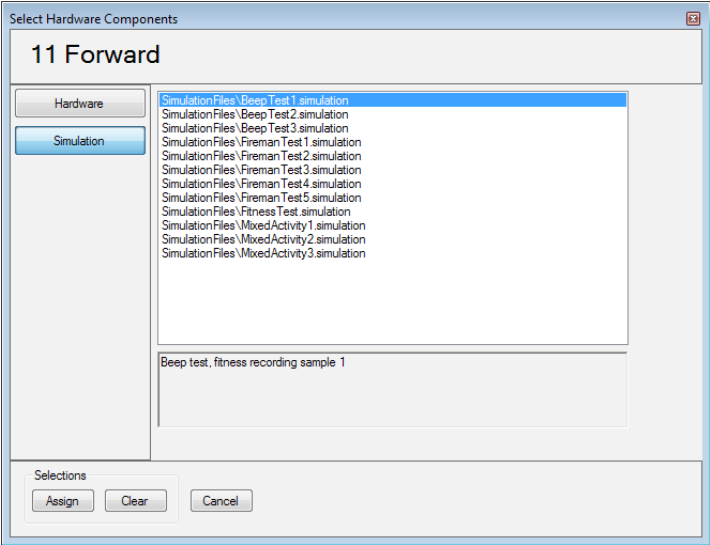
Demo Team Setup

In **Demo** mode, the subjects exist in all the setup tabs. Subject parameters can be edited, and subjects removed from teams or teams un-deployed as real subjects would.

No hardware is assigned to the demo subjects. They are assigned files of virtual data. These files can be selected from a range of options.

Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"MixedActivity2.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"MixedActivity3.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"FitnessTest.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"BeepTest1.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"BeepTest2.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"BeepTest3.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"MixedActivity1.simulation"
Forward	BH3 Side	<input checked="" type="checkbox"/>	Simulation file
Forward	BH3 Side	<input checked="" type="checkbox"/>	"MixedActivity3.simulation"

1. The simulation files can be assigned exactly as devices, by selecting the demo subject, and using the **Assign** button in the **Setup > Hardware** tab.
2. A **Select Hardware Components** dialog will display, with an additional **Simulation** tab.



3. When a file is selected, a note below will describe the nature of the data,
4. Click **Save** to assign the simulation file.

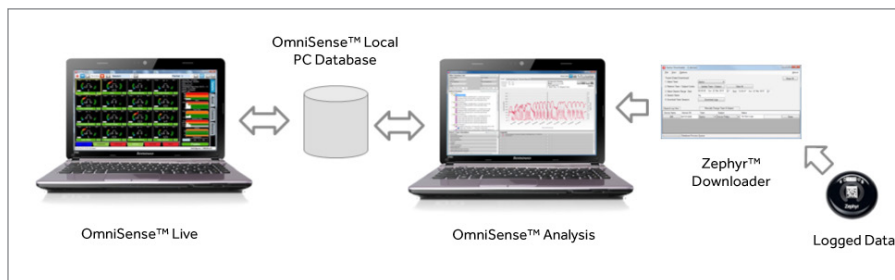
OMNISENSE™ ANALYSIS OPERATIONS

Overview (1/9)

Overview

OmniSense™ Local PC Database

- Both OmniSense™ Live and OmniSense™ Analysis send and receive data from and to the OmniSense™ Local PC database.



The database repository is a single file, **polling.fdb**, located at

C:\Program Files (x86)\Zephyr\OmniSense\Database\DbFile.

At each upgrade install, the existing database is backed up before a new instance is created and populated with any existing data.

The database contains:

- All subject & team data.
- All device data and who devices are assigned to.
- All session data.

The database is populated by:

- Receiving streaming data via LoRa from OmniSense™ Live.
- Importing BioModule Log data via OmniSense™ Analysis.
- Importing external .zsf session files from another instance of OmniSense™ Analysis, or previously archived from the current instance.



Note

The database file is secure and cannot be opened directly - it can only be accessed via OmniSense™ Analysis. However, it can be copied and substituted into the same location in a second PC. All data will be transferred.

OMNISENSE™ ANALYSIS OPERATIONS

Overview (2/9)

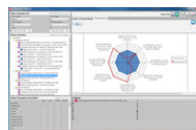
Features



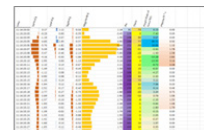
Time graphs



Summary graphs



Reports



Impact Reports

Filter Sessions By

- Team, Subject
- Session Name
- Subsession Name
- Time/Date

Manage Sessions

- Export, rename, move, delete & archive

Time Graphs

- Show 2 parameters of 46 available
- Automatic & Manual Fitness Testing analysis
- Real or elapsed time
- ROG Status, training or speed zone background colors
- Subsessions

Fitness & Training Reports

- Compare individual against normative or team data
- Mean & Std Dev
- Table & radar plot format
- Group Consolidated Summary
- Periodization Report
- Summary GPS
- Summary Physiological
- Workout Compliance

Legend

- Compare up to 16 color-coded sessions simultaneously

Export Graph Data

- Multiple file and image formats

Summary Graphs

- Show 2 parameters of 46 available
- Min/Max/Avg/Total displayed as bar graphs

Impact Reports

- 5 configurable impact zones by g force
- Based on 100 Hz 3-axis data
- Summary impact counts per zone
- Magnitude, duration & direction of impacts
- Automated grouping of impacts by type
 - Walk
 - Run/intense run
 - Bound/Jump
- Detailed analysis showing peak g, rise time, duration, rate of force development & decline and total impulse load

OMNISENSE™ ANALYSIS OPERATIONS

Overview (3/9)

Physiological Parameters

The following parameters are available **in addition** to those displayed in OmniSense™ Live.

Parameter	Units	Description
From Fitness Test Analysis		
HR @ AT	Beats/minute	From detection of Anaerobic Threshold
BR @ AT	Breaths/minute	From detection of Anaerobic Threshold
VO ₂ max	ml/kg/min	Based on heart & breathing rates
HRmax	Beats/minute	Maximum heart rate of subject
BRmax	Breaths/minute	Maximum breathing rate of subject
Heart Rate Recovery	Beats per 30 sec	On cessation of test, subject stationary
%VO ₂ max @ AT	%VO ₂ max	Accepted performance indicator
Fitness Level	Scale 1 - 10	10 = elite athlete
From Summary Graphs		
Max, Min, Average	All parameters	
Speed	Box Plot	2nd, 9th, 25th, 50th, 75th, 91st, 98th, 100th percentiles
Elevation	Box Plot	2nd, 9th, 25th, 50th, 75th, 91st, 98th, 100th percentiles
Jump time in air	Seconds	Based on jump detection
Jump height	Feet / meters	Based on jump detection
Exercise Time	Duration	
Time above AT	Duration	
Time in HR Zones	% Total Duration	Banded histogram - % time in each zone
Time in Training Zones	% Total Duration	Banded histogram - % time in each zone
Time in Speed Zones	% Total Duration	Banded histogram - % time in each zone
Distance in Speed Zone	% Total Distance	Banded histogram - % time in each zone

OMNISENSE™ ANALYSIS OPERATIONS

Overview (4/9)

Physiological Parameters

Parameter	Units	Description
From Reports (Group Consolidation Report contains all)		
Average Value		Of all parameters in report
Standard Deviation		Of all parameters in report
Significantly Low Value		Less than 1 STDDEV below average
Significantly High value		More than 1 STDDEV above average
% Time in HR Zones	% Total Time	Time in various zones
% Time > HR@AT	% Total Time	Time operating above Anaerobic Threshold (AT)
% Time < HR@AT	% Total Time	Time operating below AT
Peak HR	Beats/minute	For the session
Average HR	Beats/minute	For the session
Average, Max HRV	ms (STDDEV)	Average, Max in milliseconds
Average, Max HRR	Beats in 30 seconds	Subject stationary for 30 seconds
Average, Max Core Temp	Degrees C / F	For the session
Time in Training Zones	Duration	Blue/Green/Yellow/Orange/Red zones
Time in Speed Zones	Duration	Purple/Blue/Green/Yellow/Orange/Red zones
Distance	Miles/km	Distance in above zones
Average, Max Speed	Miles or km per hour	For session
Elevation Climb, Descent	Feet / meters	Total climb & descent for session

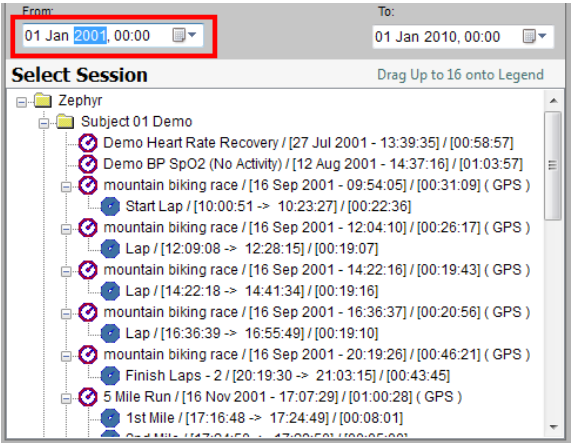
OMNISENSE™ ANALYSIS OPERATIONS

Overview (5/9)

Demonstration Data

A number of demonstration sessions are available in every OmniSense™ installation which can be used to familiarize yourself with how Analysis works. Some sessions include GPS data which can be displayed on Google Maps™* within Analysis.

These sessions are all dated in the year **2001**. They will only become visible if the **From** date field is edited to start from this year.



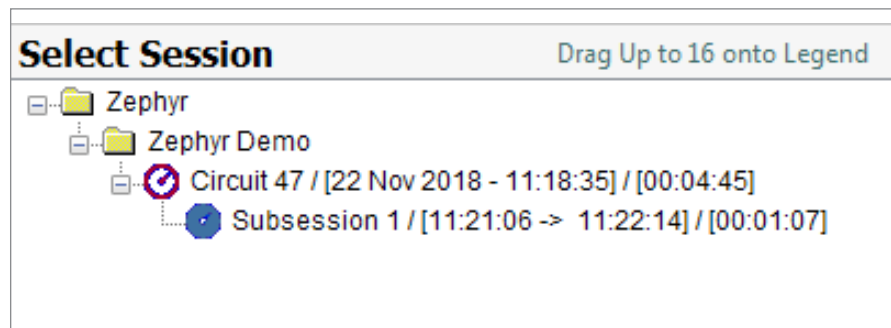
The sessions are:

Subject	Session
Subject 01 Demo	Demo Heart Rate Recovery
	Demo Blood Pressure*/Blood Oxygen*
	Mountain bike race x5 with subsessions (GPS)
	5 mile run with mile subsessions (GPS)
	Readiness Assessment
Subject 02 Demo	Beep Test
	Soccer Practice
	Treadmill Test
	5 mile run with mile subsessions (GPS)
Subject 03 Demo	Beep Test
	Soccer practice
	Treadmill Test
Subject 04 Demo	Beep Test
	Soccer Practice
Subject 05 Demo	Dash Test x 2
	Jump Test x 2
	Soccer Practice

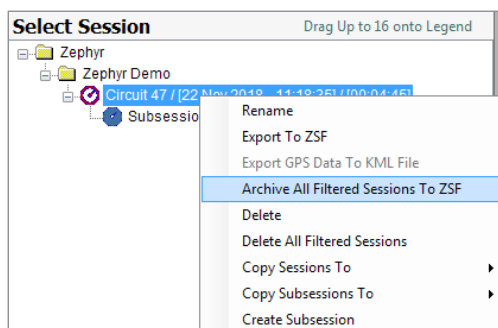
OMNISENSE™ ANALYSIS OPERATIONS

Overview (6/9)

Database Rules



- Subject names must be unique (no duplicates)
- The hierarchy for displaying session data in OmniSense™ Analysis is
 - **Team Name (or No Team Assigned)**
 - **Subject Name**
 - **Session Name**
 - **Subsession Name**
- Subjects are listed under the last team they were assigned to.
- If the subject has never been assigned to a Team (this is possible if log data is imported), they are listed as 'No Team Assigned'.
- Team names can be deleted and recreated as necessary.
- Sessions can be **Archived** – they are saved as an external .zsf file, and are deleted from the database. The external .zsf file can be re-imported at will. Use this function to 'de-clutter' a database and speed up database loading time.



Caution

If a subject is deleted from the database, all of their sessions are deleted and cannot be recovered. If you re-use the name, you will be prompted to 'reactivate' a deleted subject, but their old data will no longer be available.

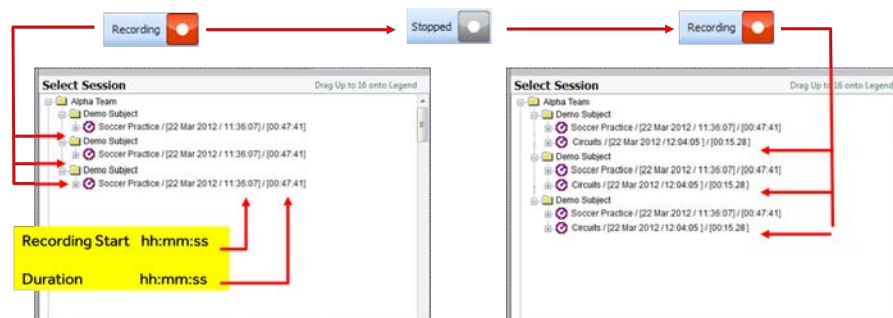
OMNISENSE™ ANALYSIS OPERATIONS

Overview (7/9)

Recording Logic



- Data must be recorded in the Live module (or logged internally in BioModules) for later display in the Analysis module.
- Recording is the default state when Live mode is engaged.
- The default **Session Name** in Analysis will be **Live**, unless the session is renamed in Live, or renamed later in Analysis.
- Analysis and Live modules can run simultaneously, but data must be regularly refreshed manually in the Analysis module using the **Refresh** button.



- Each time the **Record** button is toggled off/on in a continuous session in the Live Module, new individual subject sessions are created in the database for each subject deployed.
- These are displayed as separate subject sessions in Analysis, for each individual subject.

OMNISENSE™ ANALYSIS OPERATIONS

Overview (8/9)

Analysis Toolbar

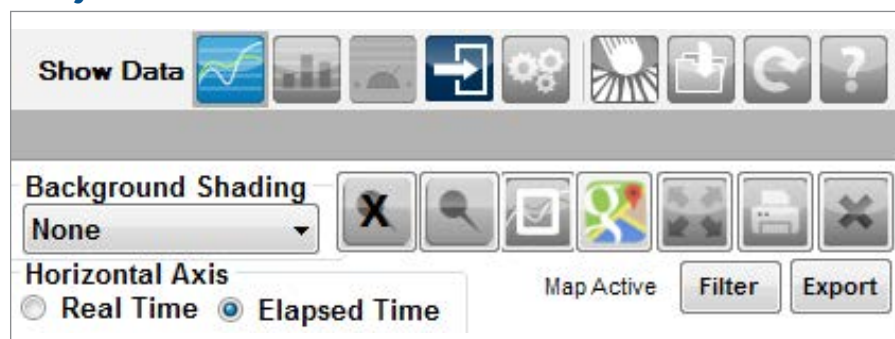


Illustration is for the Time Graphs toolbar - some items will not appear for Summary graphs.

Item	Description
	Show Time graph
	Show Summary graph
	Show Readiness graph
	Offline (left)/Online (right) Web Portal connection
	Preferences
	Start Impact Processor utility
	Import zsf file/BioModule log file
	Refresh database
	Help
	Remove all session markers
	Add a session marker
	Create a subsession
	Open Map pane/window
	Show graph full screen
	Print
	Clear all graph data

OMNISENSE™ ANALYSIS OPERATIONS

Overview (9/9)

Item	Description
Background Shading <div>None ▾</div>	Set background shading of graph to None/ROG Status/Training Zone/Speed Zone/Positional Error
Horizontal Axis <div> <input type="radio"/> Real Time <input checked="" type="radio"/> Elapsed Time </div>	Show horizontal axis as real (absolute) time or elapsed time (starts at 00:00:00)
<div>Filter</div>	Apply conditional filter to data
<div>Export</div>	Export graph contents as csv or various graphical outputs



Note

Markers, when added to a session, are exported when the output format is graphical e.g. pdf, jpeg etc, but **not** when the output is csv file format.

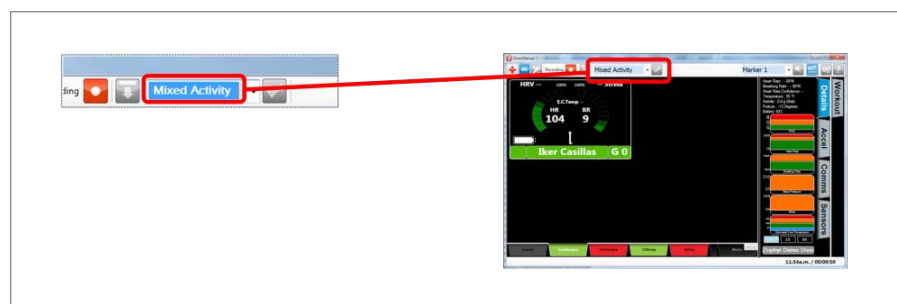
OMNISENSE™ ANALYSIS OPERATIONS

Sessions (1/5)

Session Naming

Custom Session names make for easy filtering of data for display in Analysis.

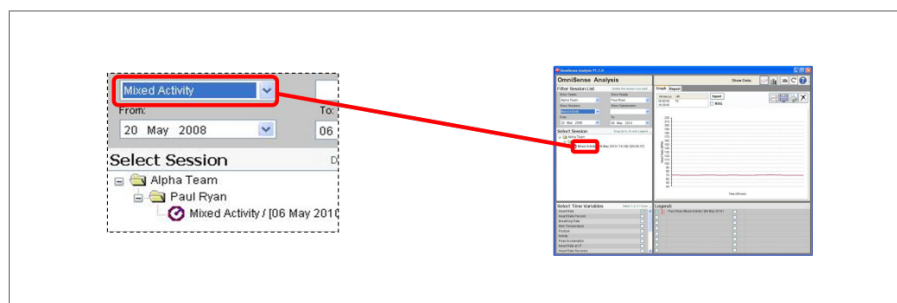
Session Naming in OmniSense™ Live



- Create a **Session Name** in **Live > Preferences** and name using the **Change Session Name** button

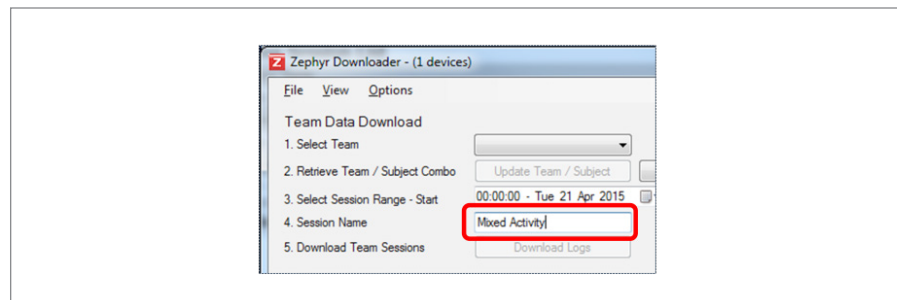


Session Name Filtering in OmniSense™ Analysis



- Use the **Show Sessions** filter to easily locate a named session.

Set Session Name in Zephyr™ Downloader



- Set the **Session Name** when importing log data using the Zephyr™ Downloader.



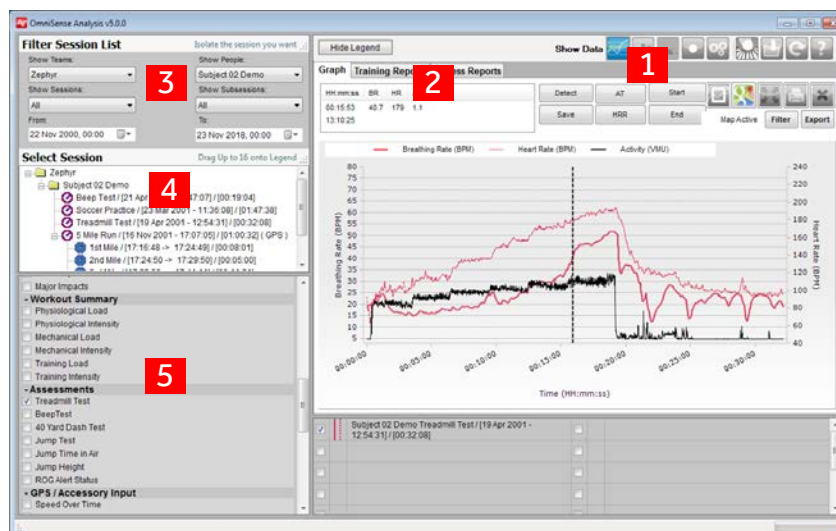
Note

Sessions can be renamed at any stage in OmniSense™ Analysis by right-clicking on the session and selecting **Rename** from the context menu.

OMNISENSE™ ANALYSIS OPERATIONS

Sessions (2/5)

Workflow



1. Select graph type using the appropriate toolbar button

Time (Line graph)



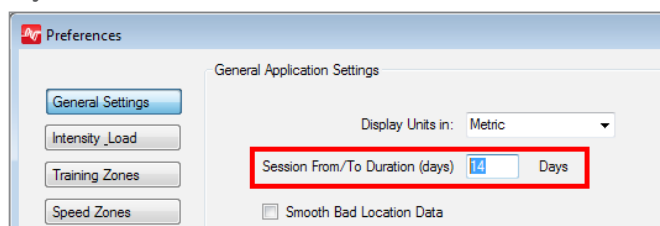
Summary (Bar graph)



2. If a report is needed, rather than a graph, select the appropriate tab. Refer to the **Analysis Reports** topic.

Training Reports **Fitness Reports**

3. Use filter pull downs to populate the **Select Session** tree. The **From** date defaults to 14 days before the current date. This is configurable in **Analysis Preferences**.



4. Drag and drop, or double-click sessions to populate the **Legend**.
5. Select 2 parameters to display on a graph (3 parameters are automatically displayed for **Treadmill** or **Beep** tests).



Note

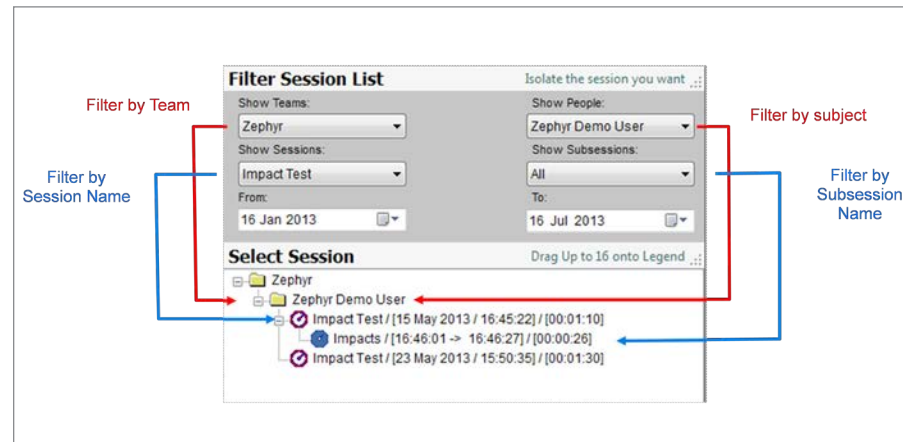
When selecting parameters, the first parameter selected units display on the left-side vertical axis. If either parameter is de-selected, the remaining parameter's units will display on the left side vertical axis.

If a third parameter is selected, the second selected parameter displays on the left side axis, and the third on the right side. The first parameter selected is automatically de-selected.

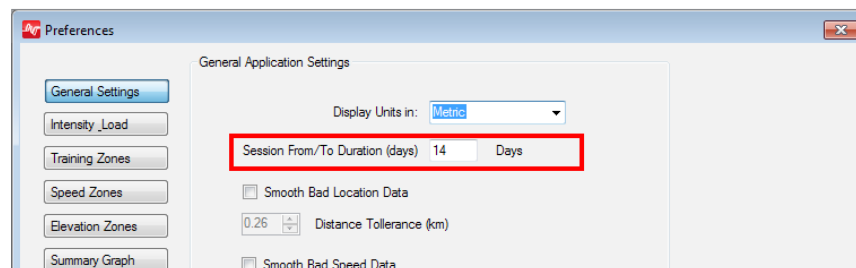
OMNISENSE™ ANALYSIS OPERATIONS

Sessions (3/5)

Filter Sessions



- Effective naming of sessions at the time of recording or download of logged data will make for faster filtering (using **Show Sessions**) when retrieving data.
- The **To** date field defaults to midnight on the current day.
- The **From** field defaults to 14 days prior to the current day. This is configurable in Analysis **Preferences**.



Note

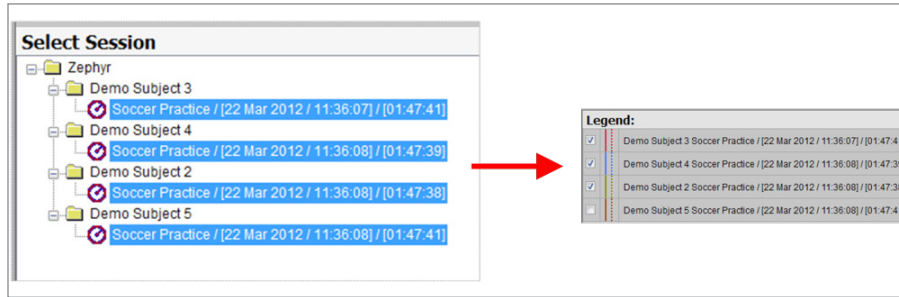
To access Demonstration data, set the **From** field to Jan 2001.

OMNISENSE™ ANALYSIS OPERATIONS

Sessions (4/5)

Select Session

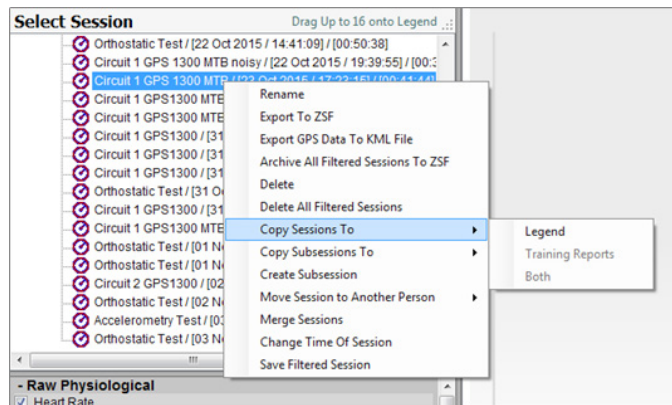
The **Select Session** pane in Analysis displays those sessions which have been filtered by the **Filter Session** pane.



- Click on a session to select it.
- Hold the **Control** key to multiple select.
- Click and drag a sessions or sessions to the **Legend**, or double-click to automatically populate the legend.

Session Options

- Right-click on a Team, subject, session or subsession to display a context menu of options.



Team

Option	Description
Permanently Delete	Permanently delete team, subjects in team, and data for those subjects.



Caution

Permanently deleting a team is a non-reversible action. All subjects in the team are also deleted, and their data. Teams can be recreated, and subjects, but not the deleted data, unless it has been uploaded to the web portal. It will still be available there if the subject is re-activated.

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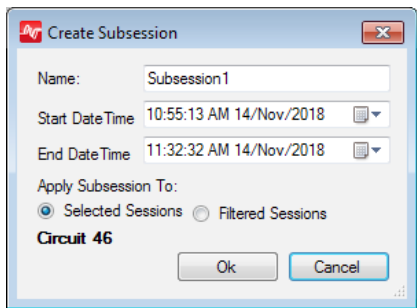
OMNISENSE™ ANALYSIS OPERATIONS

Sessions (5/5)

Subject

Option	Description
Permanently Delete	Permanently delete subject and data (see Caution on previous page)
Change Team To	Transfer subject to another team, selected from list. No data is deleted.

Session & Subsession

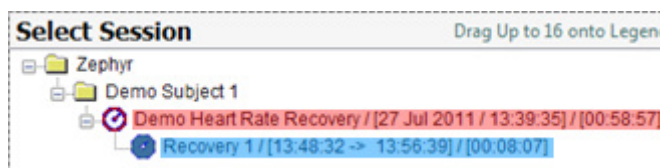
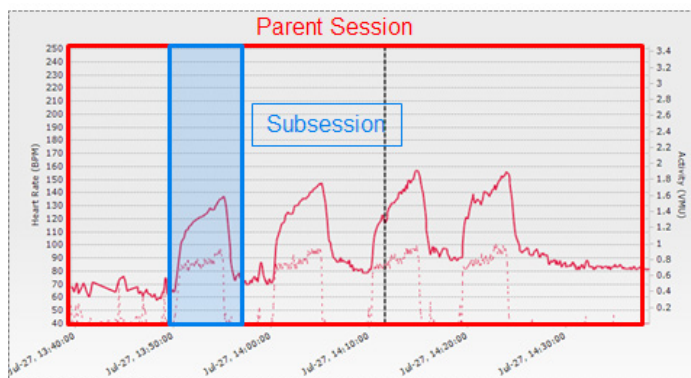
Option	Description
Rename	Rename session
Export to .zsf	Create external ZSF file for import to another instance of OmniSense™ Analysis
Export GPS data to external kml file	Export GPS and basic physiological data to a kml file for import & display in Google Earth™*.
Archive All Filtered Sessions to ZSF	Create an external ZSF of multiple sessions. Original sessions are deleted from database - a dialog will ask to confirm. This can be used as a means of de-cluttering the database of unnecessary data.
Delete	Permanently delete the selected session. Irreversible. Use Archive option to remove from database, but create an external file.
Delete All Filtered Sessions	Permanently delete. Irreversible. Use Archive option to remove from database, but create an external file.
Copy Sessions/ Subsessions to	Legend/Training Report/Fitness Report, depending which is active on the right-side panel.
Create Subsession	Display subsession dialog, Enter details as needed. 
Move Session to Another Person	Select another subject from pull-down list, in the event that data has been wrongly associated.
Merge Session	Select sessions which have an overlap (usually transmitted & log data from the same session). A new session will be created. No merge is created if no timestamps overlap in the sessions to be merged.
Change Time of Session	Change timestamps of session.
Save Filtered Session	Session Filters must be applied. See section on Applying Filters to Sessions.

OMNISENSE™ ANALYSIS OPERATIONS

Subsessions (1/3)

Overview

- A subsession is a user-generated section of a parent session, used to isolate data of interest, or exclude data of no interest so that it does not show on graphs or in reports.
- A parent session can have multiple subsessions, and the subsessions may overlap each other, but you cannot make a subsession from a subsession. Subsessions display as a sub-node to the parent session in the **Select Session** pane.
- The subsession name can be used for easier filtering of data in the **Filter Session** pane. Subsessions can be deleted and re-created at will.



Caution

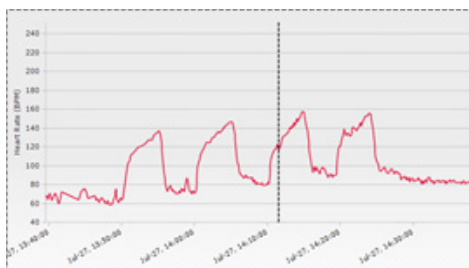
If a parent session is permanently deleted from the database, all subsessions are also deleted.

OMNISENSE™ ANALYSIS OPERATIONS

Subsessions (2/3)

Subsession by Mouse

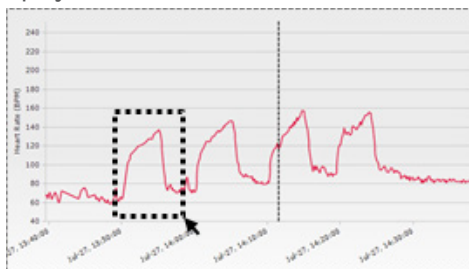
1. Display sessions and parameters as needed.



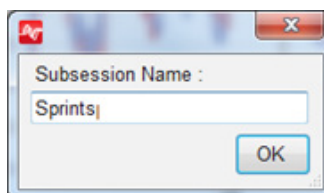
2. Select the **Subsession** button above graph.



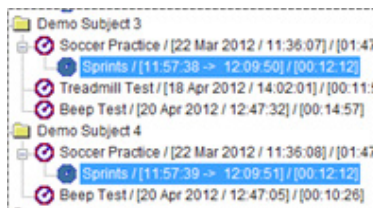
3. Use mouse arrow to click and drag a rectangular frame for the subsession. Both vertical and time axes will truncate automatically when the subsession displays on its own.



4. When the mouse button is released, a **Subsession Name** dialog will display. Select **X** and redraw the subsession if needed, or **OK** to create.



5. The subsessions will be created in the Select Session tree. If more than one session is graphed when a subsession is framed, then a separate subsession is created for each parent session.



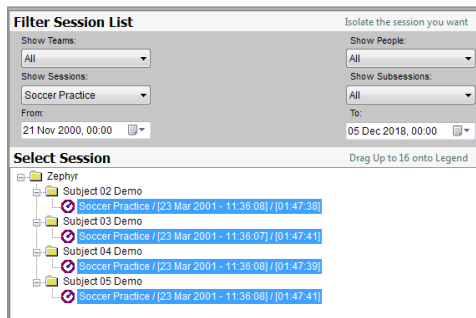
OMNISENSE™ ANALYSIS OPERATIONS

Subsessions (3/3)

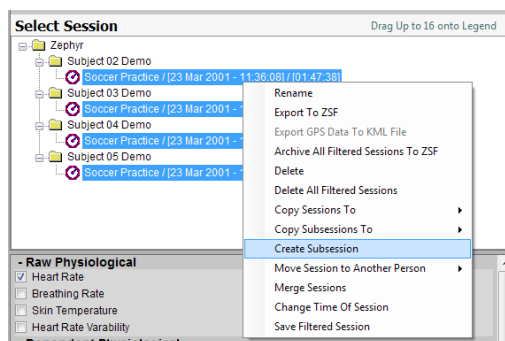
Subsession by Wizard

The subsession wizard is best used where **Start** and **End** times are known.

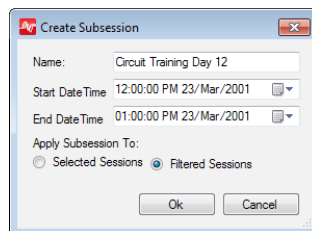
- (Recommended) Use the **Show Sessions** filter and others if necessary to display only those sessions you want to use.



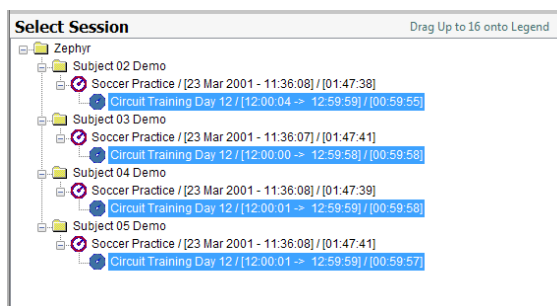
- Right-click on a session to display the context menu, and select **Create Subsession**.



- Edit the **Create Subsession** dialog as needed. Give the subsessions a meaningful name which can be used for filtering at a later date. Check **Filtered Sessions** if all the sessions displayed in the **Select Session** tree are to have subsessions created.



- New subsessions will be created for each parent session.



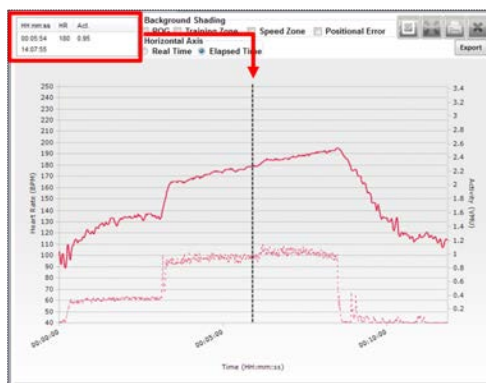
OMNISENSE™ ANALYSIS OPERATIONS

Graph Types (1/3)

Select Graph Type

Time Graph

Toolbar button:



- Line graph, two parameters allowed per subject
- Drag vertical cursor to show exact values
- Compare up to 16 subjects
- Left axis = 1st parameter selected
- Right axis = 2nd parameter selected

Summary Graph

Toolbar button:



- Average, maximum, minimum or total values, dependent on parameter.
- Show historical trends over multiple sessions
- Compare up to 16 subjects.

OMNISENSE™ ANALYSIS OPERATIONS

Graph Types (2/3)

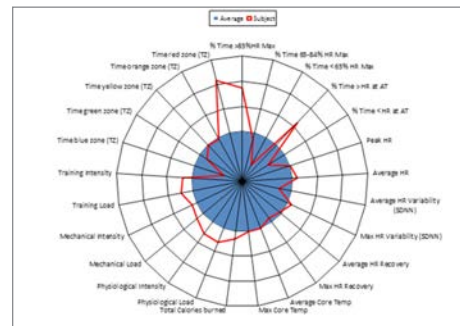
Reports

Training Reports



Training Reports display a selection of parameters in table format, color coded to relate each individual's statistics against the mean and standard deviation for the group. The activity or training session for which the report covers is decided by the user.

A radar plot compares individual subject statistics against the group's.



There are five Training report variations:

- Group Consolidated Summary (super-set of all parameters)
- Physiological Summary (heart rate related parameters)
- Periodization Report (Intensity & Load Parameters)
- Workout Compliance Report (Training Zone parameters)
- Summary GPS Report (GPS related parameters - Speed etc)

Fitness Reports

A fitness report compares a subject or team's fitness parameters against a selected normative (elite athletes or user-generated) in table, chart and radar plot format.

The fitness parameters used are:

- | | | |
|-----------------------------|-----------------------|------------------|
| ▪ VO ₂ max | ▪ HR @ AT as % HR max | ▪ HR min Resting |
| ▪ %VO ₂ max @ AT | ▪ BR @ AT | ▪ BR min Resting |
| ▪ HR max | ▪ HR Recovery 30 sec | ▪ HRV @ Rest |
| ▪ HR @ AT | ▪ HR min Standing | ▪ Fitness Level |

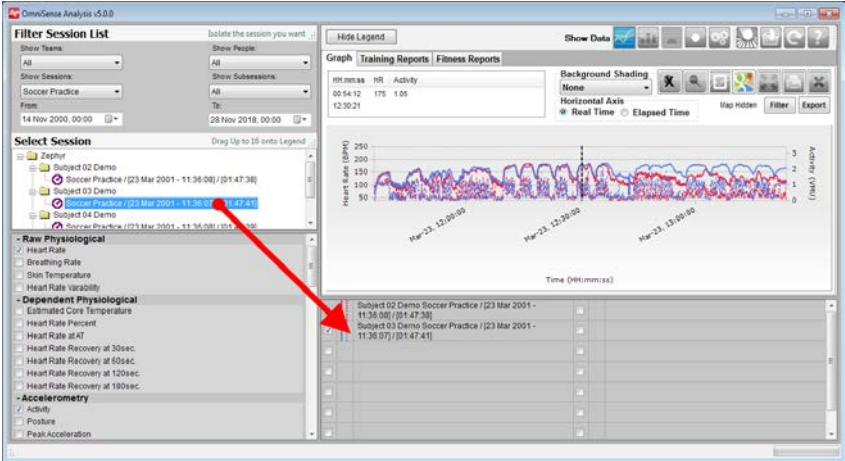
The data used are the subject fitness parameters which have been saved as a result of fitness test analyses.

Refer to the Analysis Reports section for details.

OMNISENSE™ ANALYSIS OPERATIONS

Graph Types (3/3)

Legend



- Click and drag a session to the **Legend** or
- Double-click the session
- Ctrl+ click to multiple-select

<input checked="" type="checkbox"/>	Subject 02 Demo Soccer Practice / [23 Mar 2001 - 11:36:08] / [01:47:38]
<input checked="" type="checkbox"/>	Subject 03 Demo Soccer Practice / [23 Mar 2001 - 11:36:07] / [01:47:41]

Item	Description
<input checked="" type="checkbox"/>	Check/uncheck to show/hide the session
<div></div>	First parameter selected (left side axis)
<div></div>	Second parameter selected (right side axis)

Legend:		
<input checked="" type="checkbox"/>	Demo Subject 3 Soccer Practice / [22 Mar 2012 / 11:36:08] / [01:47:41]	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Demo Subject 4 Soccer Practice / [22 Mar 2012 / 11:36:08] / [01:47:39]	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Demo Subject 2 Soccer Practice / [22 Mar 2012 / 11:36:08] / [01:47:38]	<input type="checkbox"/>
<input type="checkbox"/>	Demo Subject 5 Soccer Practice / [22 Mar 2012 / 11:36:08] / [01:47:41]	<input type="checkbox"/>

- Click on a session to select
- Right-click selected session for **Remove** options
- Use the **Clear Graph** button to empty the legend and graph of all sessions



OMNISENSE™ ANALYSIS OPERATIONS

Time Graphs

Select Time Variables

Select time variables to populate the graph.

- Raw Physiological

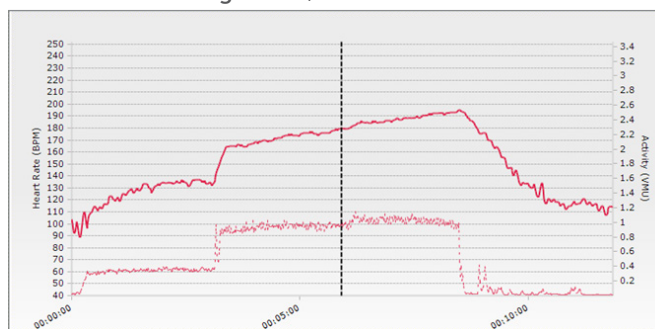
☒ Heart Rate
☐ Breathing Rate
☐ Skin Temperature
☐ Heart Rate Variability

- Dependent Physiological

☐ Estimated Core Temperature
☐ Heart Rate Percent
☐ Heart Rate at AT
☐ Heart Rate Recovery at 30sec

Select two variables.

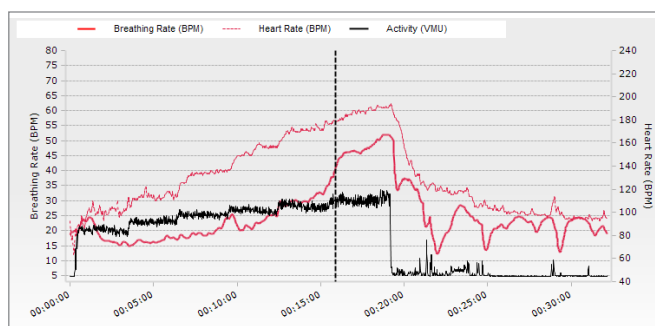
- 1st variable selected = left axis, solid trace.
- 2nd variable selected = right axis, dashed trace.



- If **Treadmill Test**, **Beep Test** or **ROG Status** is selected, heart rate, breathing rate & activity level will automatically display, with a legend identifying them. No other variables can be selected.

- Assessments

☒ Treadmill Test
☐ BeepTest
☐ 40 Yard Dash Test
☐ Jump Test
☐ Jump Time in Air
☐ Jump Height
☐ ROG Alert Status



Note

If a variable is de-selected, any remaining variable will display against the **left** axis.

OMNISENSE™ ANALYSIS OPERATIONS

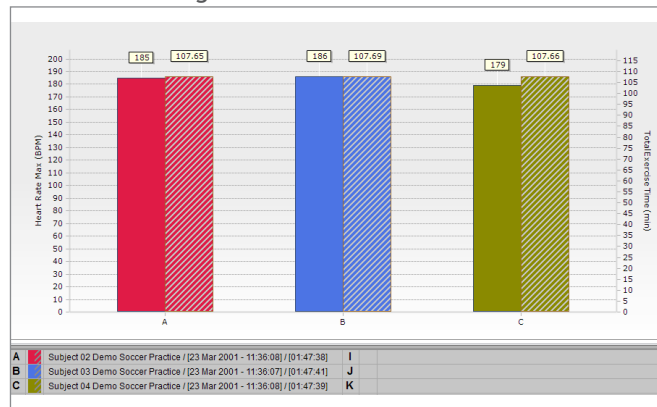
Summary Graphs (1/8)

Select Summary Variables

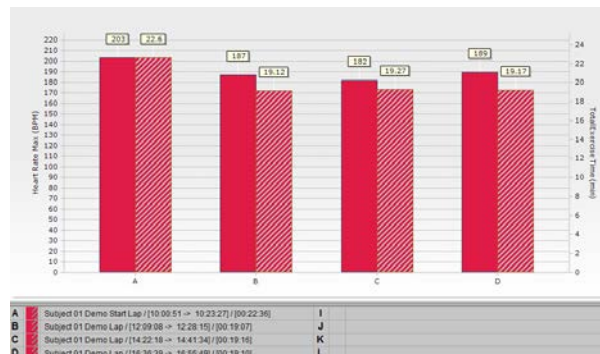
Select summary variables to populate the graph.

- Raw Physiological	Max	Min	Avg	Tot	Sum
Heart Rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Breathing Rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Skin Temp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Heart Rate Variability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
- Dependent	Max	Min	Avg	Tot	Sum
Estimated Core	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HR at AT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HR Recovery 30s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HR Recovery 60s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HR Recovery 120s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HR Recovery 180s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
- Accelerometry	Max	Min	Avg	Tot	Sum

- Select two variables. **Maximum, Minimum, Average, Total** and **Summary** are available according to context.



- The columns are labelled **A - P** to correspond the Legend entries. As for line graphs, separate subjects will be colored differently.
- 1st variable selected = left axis, solid fill
- 2nd Variable selected = right axis, dashed fill
- As there is no vertical cursor, the value of each bar is shown as a call out above the bar **203**.
- If all sessions are from the same subject, then they will be colored identically.



Note

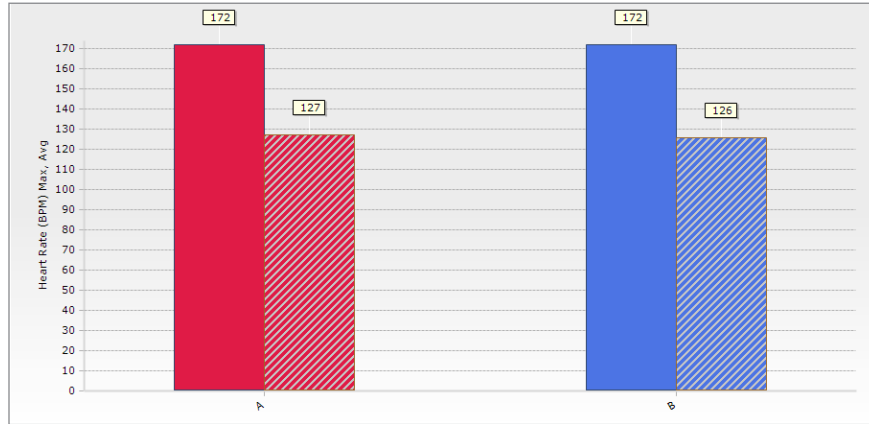
If a variable is deselected, any remaining variables will display against the **left** axis.

OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (2/8)

Max/Min/Avg

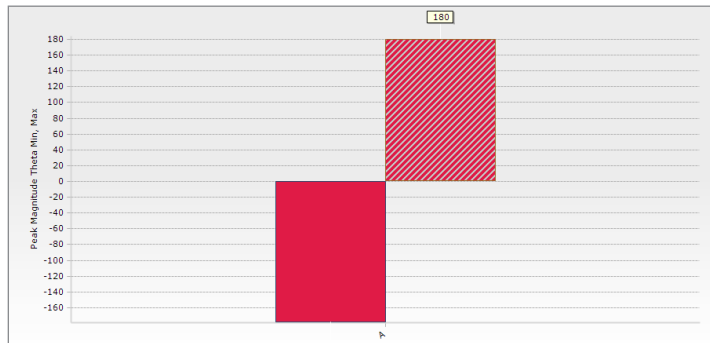
Maximum, minimum and average values for a given parameter and session are calculated each time the parameter is selected.



- Max/Min/Avg values are available for parameters which are recorded periodically during a session (such as heart rate, activity level). If the parameter is cumulative, such as the number of calories burned, or the total number of steps detected, then max/min/avg values have no meaning, and they are not available.
- If the two parameters selected have the same units (e.g. Max & Avg **Heart Rate**), as above, then they both display against the left axis. The axis title will indicate which summary variables are displayed.

Negative Values

Two parameters - **Posture** and **Peak Magnitude Theta** impact angle, may report negative values. If paired with a positive value on the chart, then the results may look initially confusing.



Peak Magnitude Theta Min & Max.

- Minimum is a negative value, maximum is positive.

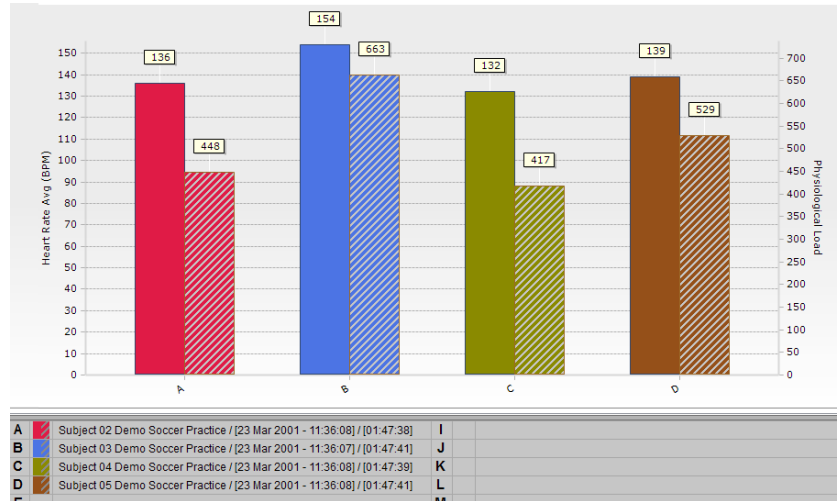
OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (3/8)

Total

Total values display exactly as max/min/avg, but are only relevant for some parameters; various impact counts, workout loads and distance travelled.

- Total values can be graphed simultaneously with max/min/avg values.

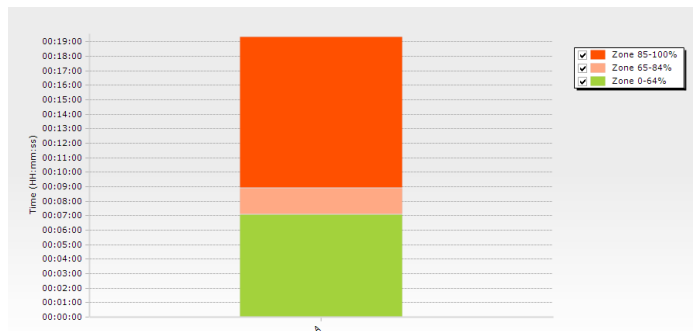


Average Heart Rate compared to Total Physiological Load.

Stacked Total Charts

In the **Workout Summary** parameter category, four parameters display as a stacked bar chart. These charts cannot be displayed against a second parameter.

Time in HR Zones

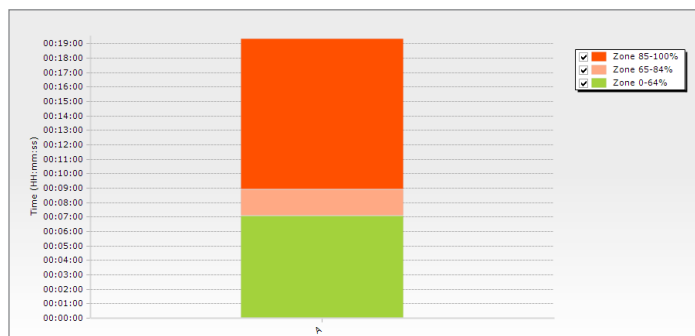


- Individual zones in the legend can be checked or unchecked to include or exclude them from the graph.
- The zone thresholds are fixed at 0-64/65-84/85-100 Subject HR max, and **not** related to **Safety Thresholds** or **Training Zones**

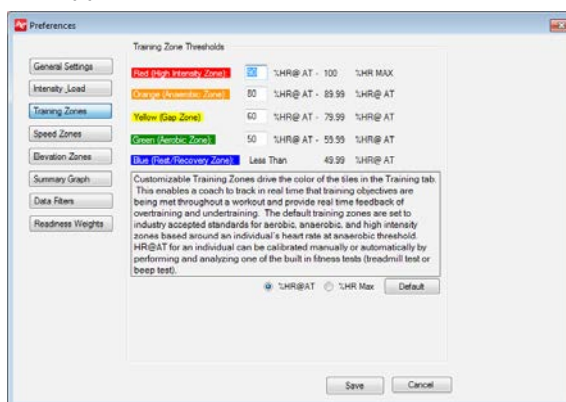
OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (4/8)

Time in Training Zone



- Individual zones in the graph legend can be checked or unchecked to include or exclude them from the graph.
- Training Zone** thresholds are common to both OmniSense™ Live and OmniSense™ Analysis. They can be configured from **Preferences > Training Zones** in either application.

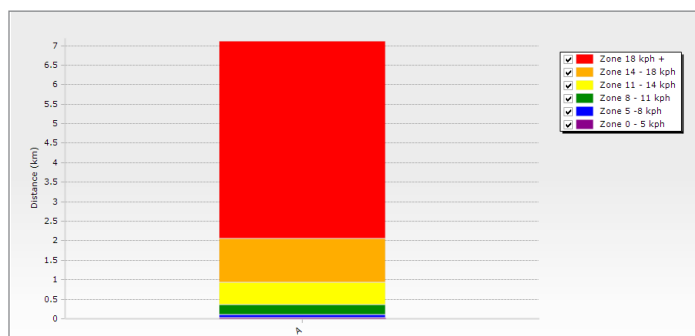


- Threshold percentage values are global across all subjects, but local to the subject's own maximum heart rate, or heart rate at Anaerobic threshold, depending on which is selected
- ☒ %HR@AT ☐ %HR Max
- Lower thresholds for each zone can be edited. The upper threshold of the adjacent zone will be updated automatically.

OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (5/8)

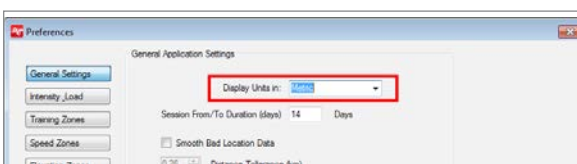
Distance in Speed Zone



- Speed zone data is available in any session with GPS data.
- Individual zones in the graph legend can be checked or unchecked to include or exclude them from the graph.
- **Speed Zone** thresholds are common to both OmniSense™ Live and OmniSense™ Analysis. They can be configured from **Preferences > Speed Zones** in either application.



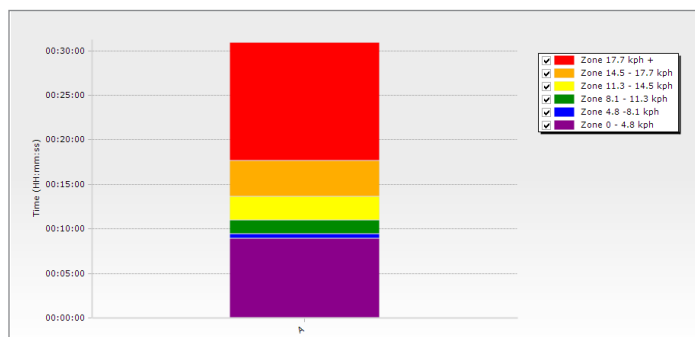
- Lower thresholds for each zone can be edited. The upper threshold of the adjacent zone will be updated automatically.
- Speed units can be metric or imperial; they are set from **Preferences > General Settings** in Live or Analysis (shown).



OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (6/8)

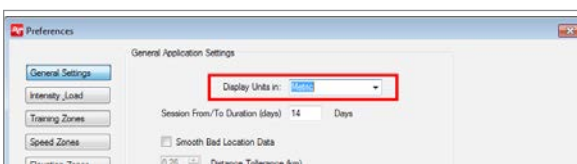
Time in Speed Zone



- Speed zone data is available in any session with GPS data.
- Individual zones in the graph legend can be checked or unchecked to include or exclude them from the graph.
- **Speed Zone** thresholds are common to both OmniSense™ Live and OmniSense™ Analysis. They can be configured from **Preferences > Speed Zones** in either application.



- Lower thresholds for each zone can be edited. The upper threshold of the adjacent zone will be updated automatically.
- Speed units can be metric or imperial; they are set from **Preferences > General Settings** in Live or Analysis (shown).



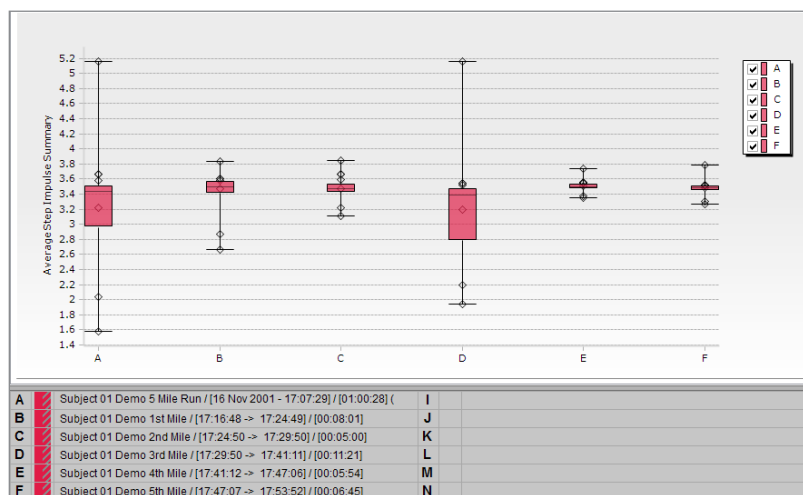
OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (7/8)

Summary

Summary charts are available for some impulse-related parameters, and speed and elevation GPS data.

The format of the chart is a 'box and whisker' chart. This style of chart indicates the range of values (minimum to maximum) and gives a graphic representation of the distribution of values within that range.

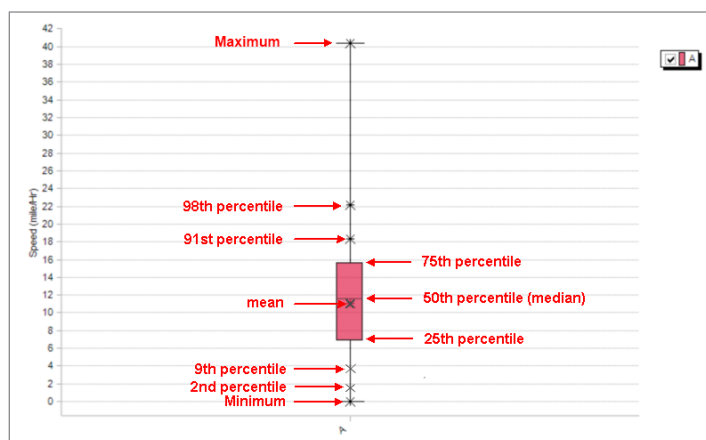


Average Step Impulse Summary data

- Individual sessions in the graph legend can be checked or unchecked to include or exclude them from the graph.

Box and Whisker Chart Format

This diagram shows how this chart type represents the distribution of data within a data set.



- The filled 'box' represents the spread of the middle 50% of the data in the set, centered on the median, the most common value. The taller the box, the more broadly the data is distributed between the maximum and minimum values. If the box is shorter (as above), then the data set is relatively more concentrated around the median value.
- An explanation of box plots, including the unusual upper and lower percentiles, can be found at <http://en.wikipedia/wiki/BoxPlot>

OMNISENSE™ ANALYSIS OPERATIONS

Summary Graphs (8/8)

Summary Graph Preferences

The scaling of the vertical axis in some of the bar charts can be customized in **Preferences > Summary Graph**.

Summary Graph	Custom Maximum
HRV (Min, Max, Avg)	automatic <input checked="" type="checkbox"/>
Speed	automatic <input checked="" type="checkbox"/> km per hour
Exercise Time	automatic <input checked="" type="checkbox"/>
Calories	automatic <input checked="" type="checkbox"/>
Physiological Load	automatic <input checked="" type="checkbox"/>
Mechanical Load	automatic <input checked="" type="checkbox"/>
Training Load	automatic <input checked="" type="checkbox"/>
Total Distance Traveled	automatic <input checked="" type="checkbox"/> km
Physiological Intensity	automatic <input checked="" type="checkbox"/>
Mechanical Intensity	automatic <input checked="" type="checkbox"/>
Training Intensity	automatic <input checked="" type="checkbox"/>
Time in HR Zones (hh:mm:ss)	automatic <input checked="" type="checkbox"/>
Time in Training Zones (hh:mm:ss)	automatic <input checked="" type="checkbox"/>
Time in Speed Zones (hh:mm:ss)	automatic <input checked="" type="checkbox"/>
Distance in Speed Zones	automatic <input checked="" type="checkbox"/> km per hour

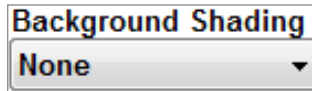
- The default setting is **Automatic**. This scales the vertical axis to show the maximum value of all sessions at the full height of the axis. If a large outlier value in one session reduces the relative height of all other bars, then Automatic can be set manually to a lower value.

OMNISENSE™ ANALYSIS OPERATIONS

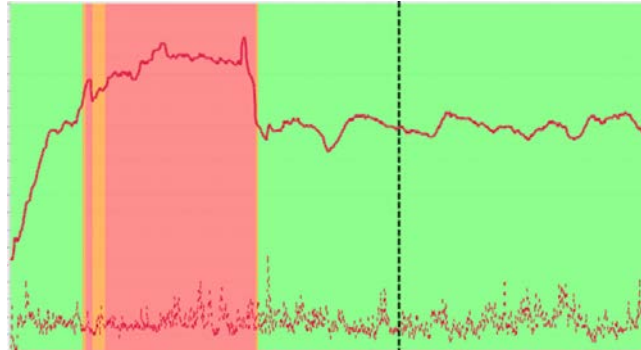
Graph Functions (1/7)

Background Shading

When any time graph is displayed - excluding fitness tests - background color can be set using the pull down list above the Time graph. Background color options do not apply to Time graphs showing fitness test analyses, or Summary graphs.

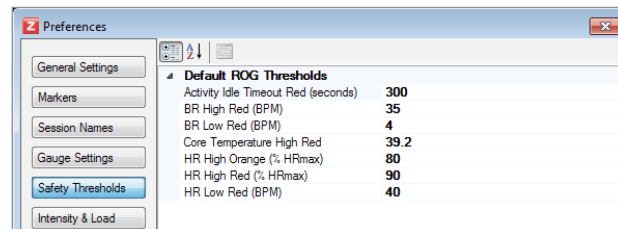


ROG Subject Status



Safety Alarm Thresholds					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HR High Red	HR High Orange	HR Low Red	BR High Red	BR Low Red	Core Temp Red

- Subject **ROG Status** is determined by the **Safety Thresholds** set in **Live Setup > Subject** screen. Defaults are set in **Live > Preferences > Safety Thresholds**.



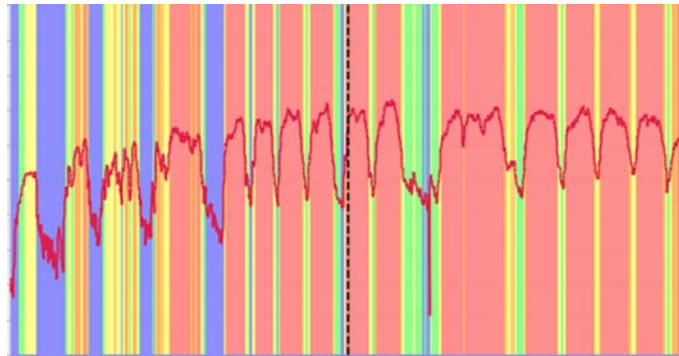
- ROG Status shows on the subject BioGauge, as the subject name panel background color.



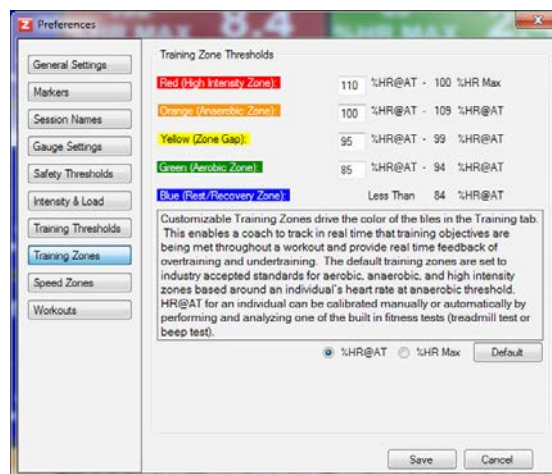
OMNISENSE™ ANALYSIS OPERATIONS

Graph Functions (2/7)

Training Zone



- Training Zones are related to subject **HRmax** or **HR @ AT**. They will correlate closely to HR data, as seen above.
- They can be configured in **Live > Preferences > Training Zones**



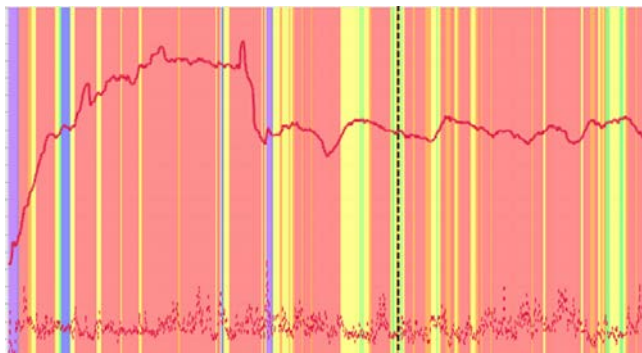
OMNISENSE™ ANALYSIS OPERATIONS

Graph Functions (3/7)

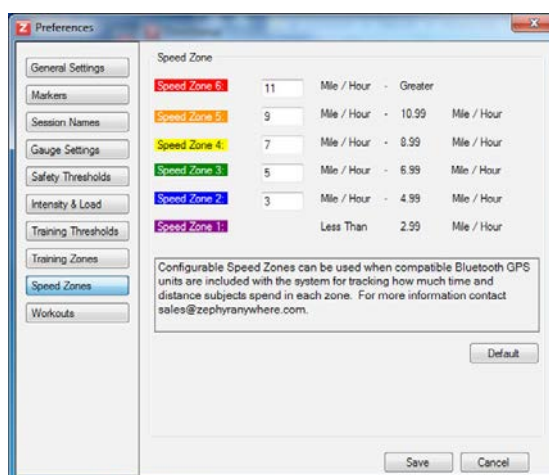
Speed Zone

Speed Zone background data will only display for sessions which incorporate GPS.

- Sessions which contain no GPS data will display a non-colored background if this option is chosen.



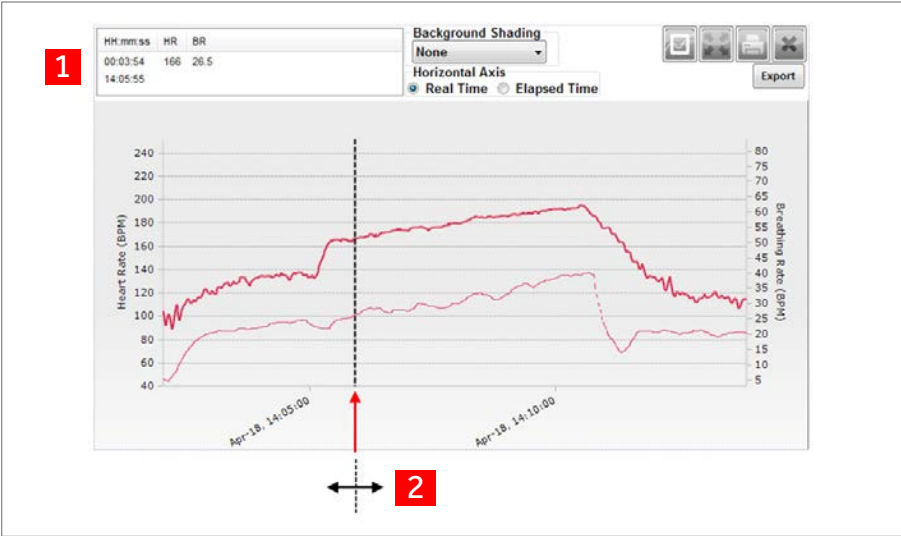
- Speed Zone thresholds can be configured in **Live > Preferences > Speed Zones**



OMNISENSE™ ANALYSIS OPERATIONS

Graph Functions (4/7)

Cursor Values



#	Description
1	Parameter Values at the location of the vertical cursor.
	[HR] [BR] Selected parameters, first parameter on left-side vertical axis.
	hh:mm:ss Timestamp of vertical cursor location.
	[00:03:54] Upper value elapsed time from start of session.
	[14:05:55] Lower value absolute (real) time.
2	Click and drag the vertical cursor left or right to desired location.



Note

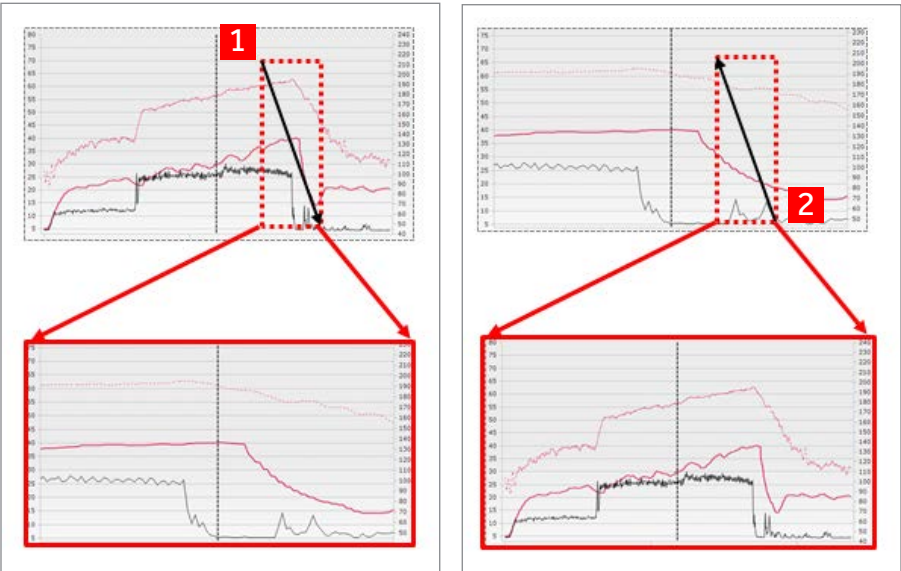
The default location of the cursor is in the center of the graph.

OMNISENSE™ ANALYSIS OPERATIONS

Graph Functions (5/7)

Zoom and Pan

Zoom

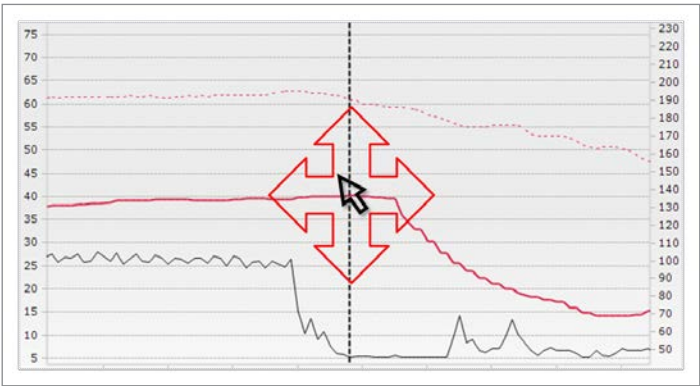


Zoom In

Zoom Out

#	Description
1	Click and drag a box from top left to bottom right around the area to be zoomed in. Multiple zoom-ins can be done successively.
2	Click and drag the cursor from bottom right to top left - anywhere on the graph - to zoom out. The zoom-out is always back to the graph's original state, regardless of how many zoom-ins have occurred.

Pan



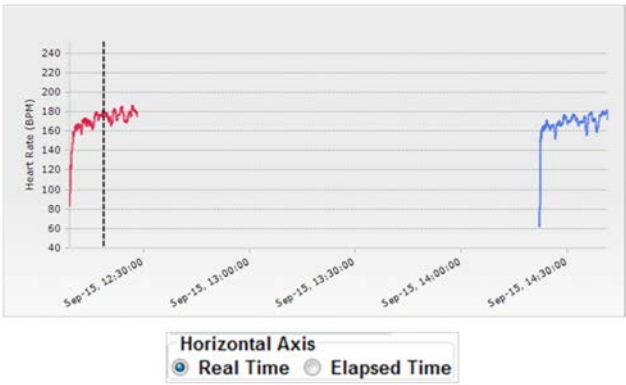
- **Right-click** and drag the graph in any direction. The vertical and horizontal axis values will adjust automatically.

OMNISENSE™ ANALYSIS OPERATIONS

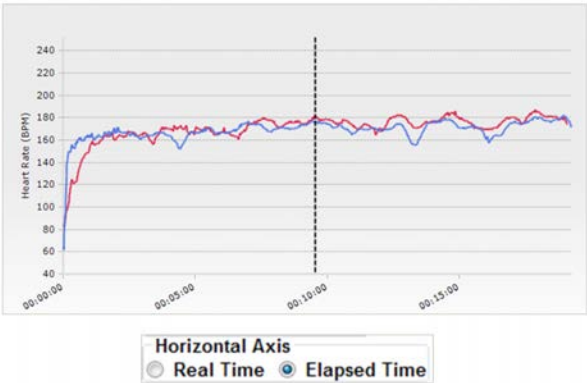
Graph Functions (6/7)

Real and Elapsed Time

Elapsed time is made available so that sessions which didn't happen simultaneously in real time can be compared.



- The example shows two non-consecutive laps of the same circuit. In real time they don't overlap, so can't be compared directly.

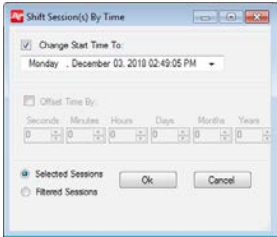


- In elapsed time, both session Start Times are shifted to 00:00:00.
- If Elapsed Time data is exported from Analysis, the original timestamp data is replaced with new timestamps starting at 00:00:00 for all sessions exported.



Note

Two sessions could also be compared by adding an offset to the timestamp of one - right click on the session in the **Select Session** pane and select **Change Time of Session** from the context menu, but this will make the session time change permanent.

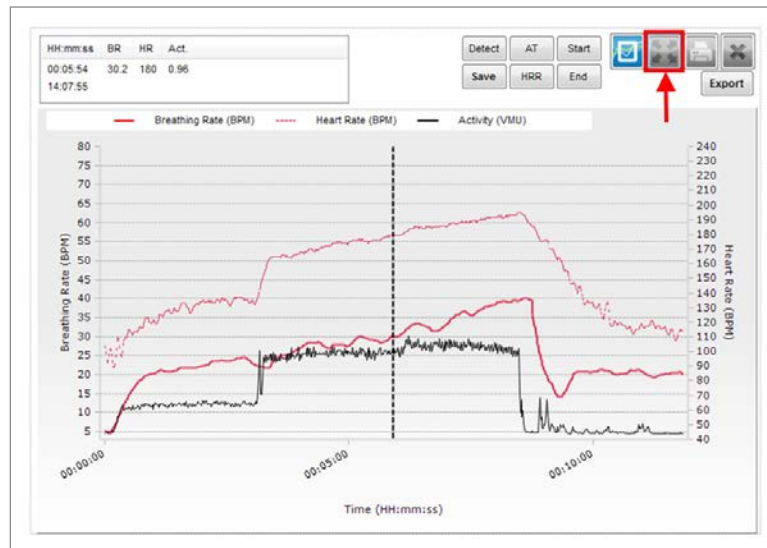


OMNISENSE™ ANALYSIS OPERATIONS

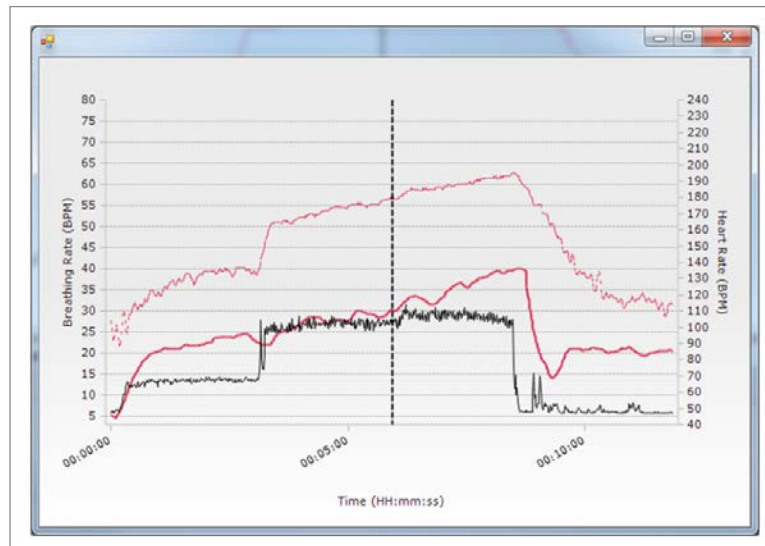
Graph Functions (7/7)

Full Screen

- The full-screen button will display the graph contents in a separate, re-sizable window.



- **Zoom** and **Pan** are still active in this window.

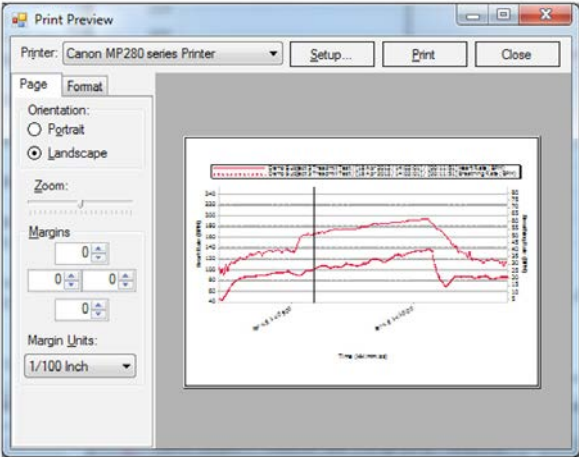
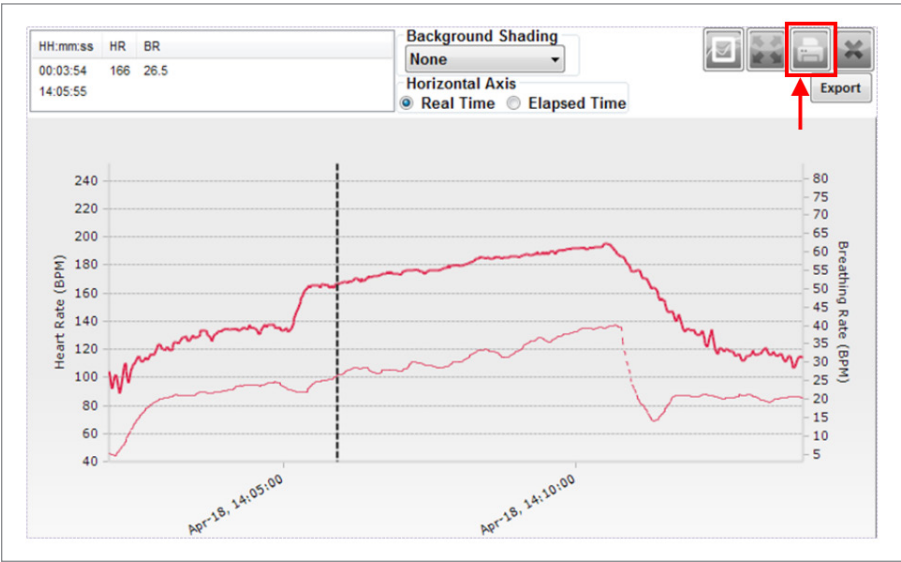


OMNISENSE™ ANALYSIS OPERATIONS

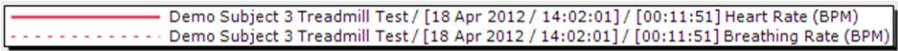
Print/Export(1/4)

Print Graph

- The Time or Summary graph will print exactly as displayed i.e. if zoomed-in or panned.



- A legend will be printed to identify sessions and parameters.

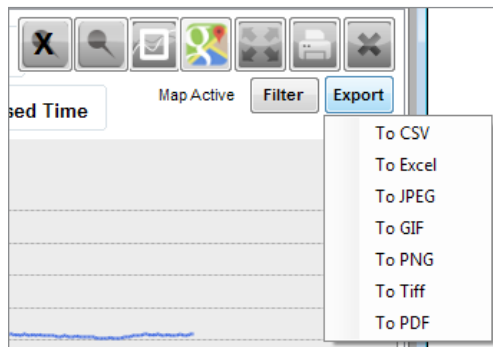


OMNISENSE™ ANALYSIS OPERATIONS

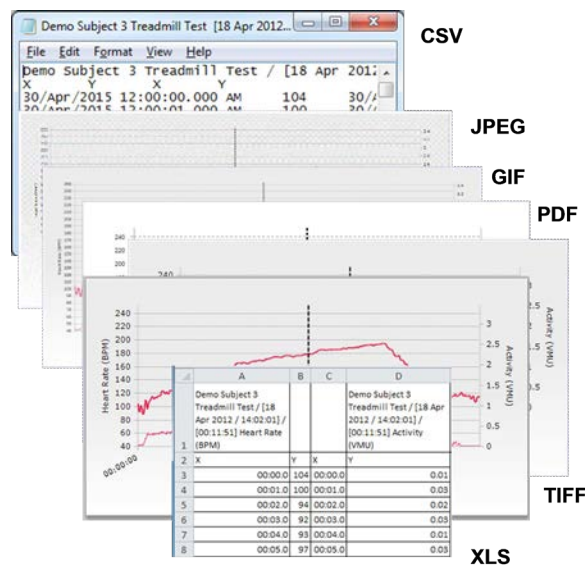
Print/Export(2/4)

Export Graph Data

The contents of the graph can be exported in a number of formats.



- Select the preferred output format.



Note

Image files (jpeg, etc) show **Session Markers** on the graphs; .csv and .xlsx files do not.

OMNISENSE™ ANALYSIS OPERATIONS

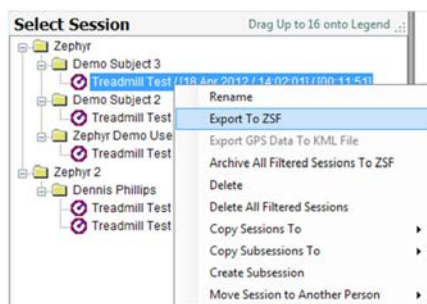
Print/Export(3/4)

Export / Archive Session Data

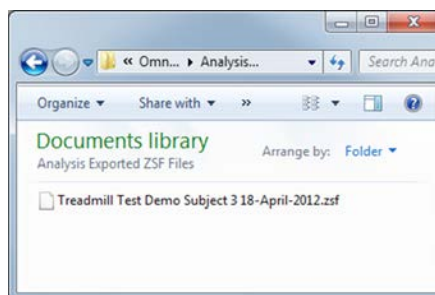
Export to .ZSF File

ZSF (Zephyr™ Serial Format) files are used to migrate data from one OmniSense™ instance to another, or to archive large amounts of data outside the database to speed up response time. The database will take longer to respond as it grows bigger.

- Right click a session for a context menu.
- Select **Export to ZSF**.
- Browse, name the .zsf file and save in your preferred location.



- The .zsf file will contain all parameters for that subject and that session only.

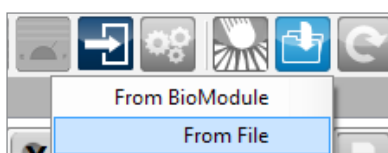


Note

An exported session is **not** removed from the database.

Archive to .ZSF File

- Use the **Filter Session** panel to populate the **Select Session** panel with only those sessions to be archived, and then select the **Archive All Filtered Sessions To ZSF** option.
- A single .zsf file will be created which contains **all** the archived data. Name it appropriately when saving.
- Archived sessions **are removed** from the database.
- Archived sessions can be re-imported to the database at any time using the **Import > From File** toolbar button.



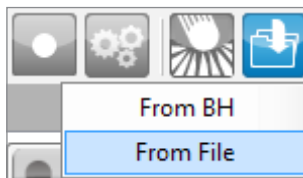
OMNISENSE™ ANALYSIS OPERATIONS

Print/Export(4/4)

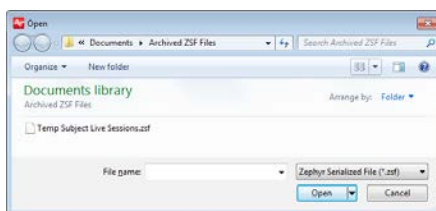
Import Session Data

Data can be imported into OmniSense™ as an external .zsf file. This file format is the **only** means of importing external data, other than directly from a BioModule.

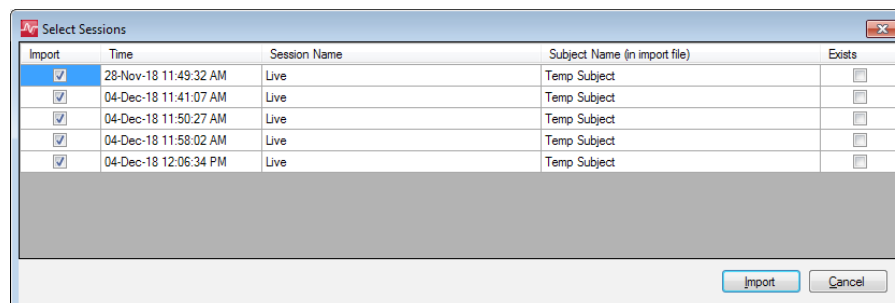
1. To Import external data click on the **Import** button and select the **From File** option from the list.



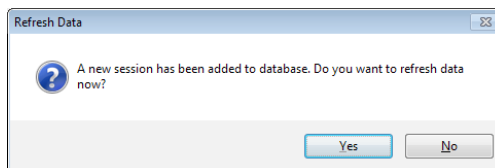
2. Browse to the .zsf file location and select it.



3. A **Select Sessions** dialog will display. If importing an archived .zsf file containing multiple sessions, then they will display as shown below.



4. Check or uncheck the box in the **Import** column as desired. Each entry contains the **Time**, **Session Name** and **Subject Name** of the original session. If the subject already exists in the database, the **Exists** column will be checked. If unchecked, a placeholder subject will be created in the database. Select **Import**.
5. When the sessions have been imported, you will be prompted to refresh the database.



Note

Importing data does not automatically change the **From** and **To** entries in the **Filter Session List** in order to display the imported sessions. If they contain older data, you will have to manually change the **From** entry.

OMNISENSE™ ANALYSIS OPERATIONS

Data Filters (1/2)

Filter Data

Data can be filtered for any graphed session, modifying what is displayed according to multiple parameter values. Filters can be applied to 8 parameters only, selected from the **Filter Variable** pull down list. 21 **Threshold Variables** are available.

Examples

- Use **Heart Rate Confidence** to filter heart rate to remove excessively high heart rate values caused by ECG noise, and interpolate - this will give more realistic values for calories burned, intensity and load calculations.

	Filter Variable	Threshold Variable	When	Value	Action	On/Off
	HR	Heart Rate Confidence	Less Than	25	Interpolate	<input checked="" type="checkbox"/>

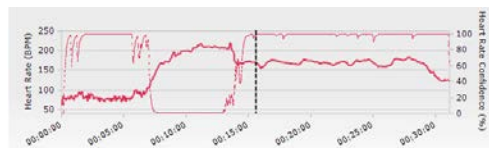
- Set realistic upper limits for **Speed** from GPS data and set to null any values greater than these, which may be outliers caused by poor GPS satellite reception.

	Filter Variable	Threshold Variable	When	Value	Action	On/Off
	Speed (mph)	Speed (mph)	Greater Than	18	Null	<input checked="" type="checkbox"/>

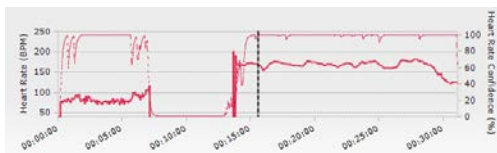
Action - Interpolate or Null?

Interpolate draws a straight line between points on either side of the interpolated segment. **Null** sets no value; the graph trace will show a vertical line either side of the null segment.

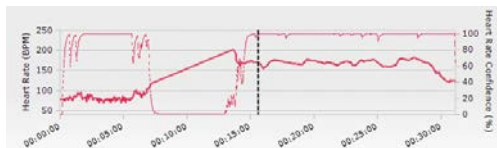
Choice of null or interpolate will depend on the scenario. The example below shows the **Subject 01 Demo Mountain Bike** race available in Analysis (date stamp **16 Sep 2001**).



- Unfiltered data, showing **HR** (solid trace) vs. **HR Confidence**. HR Confidence drops to zero soon after HR climbs above 200 beats per minute, most likely caused by too-dry sensor pads. This rectifies itself eventually, as the subject perspires.



- The same data with action **Interpolate**, when HR Confidence < 25%



- The same data with action **Null** when HR Confidence < 25%
- In the above scenario it would not be appropriate to set null HR values. The user must decide whether unfiltered or interpolated data best represents the subject's actual HR. Interpolate is not ideal, but a better compromise than null, or the original artificially high values.

OMNISENSE™ ANALYSIS OPERATIONS

Data Filters (2/2)

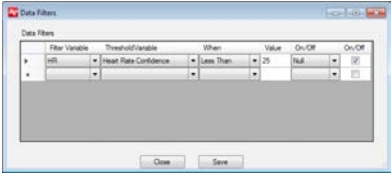
Create a Data Filter

Data filters are saved within OmniSense™ Analysis and are applied to **all** sessions unless disabled.


1. [Optional] Set up a session or sessions in Analysis, together with the parameters to be displayed.
2. Click on the **Filter** button above the graph. The text on the button is black when no filters are active/**On**.



3. The **Data Filters** window will display.



Item	Description
First column	<ul style="list-style-type: none">▶ Saved filter▪ New filter for editing (always available)... Edited but not saved filter
Filter Variable	The variable to be filtered: <ul style="list-style-type: none">▪ HR Confidence▪ HR▪ BR▪ Posture▪ Activity▪ Peak Acceleration▪ HRV▪ Speed
Threshold Variable	The variable which will determine filtering - 21 available, not listed here.
When	<ul style="list-style-type: none">▪ Less than▪ Greater than▪ Equal▪ Not Equal
Value	The threshold value the condition applies to
Action	Filter by interpolating or nullifying the filtered variable
On/Off	Enable or Disable the filter

4. Edit an existing filter or create new, and turn on or off as desired. **Save** the changes.
5. When any filter is checked **On**, the button text is red  and the filter will apply to **any** graph displaying the **Filter Variable**, until it is set to **Off**.



Note

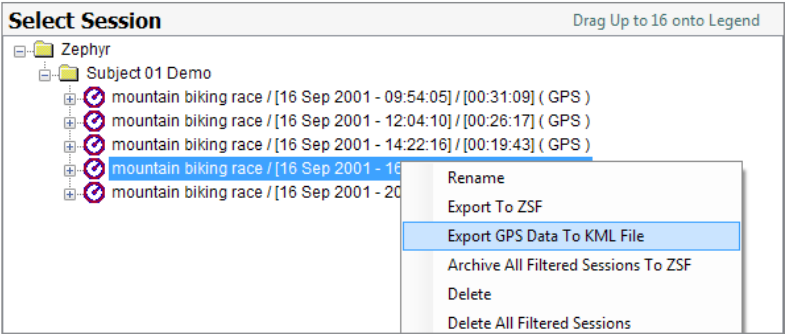
To save a filtered session permanently, right click on the session in the **Select Session** tree, and select **Save Filtered Session** from the context menu.

OMNISENSE™ ANALYSIS OPERATIONS

GPS Data (1/2)

Export GPS Data

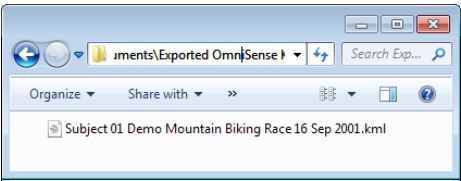
Data which has been received or downloaded from a BioModule using a supported GPS will show a suffix of **(GPS)** in the **Select Session** tree, and **Export GPS Data to KML File** will populate as a right-click context menu option.



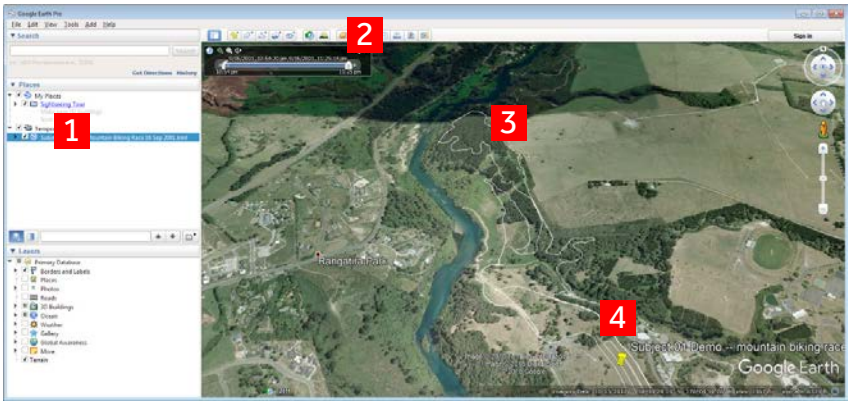
A **KML** (Keyhole Markup Language) file will open in Google Earth™* if installed. OmniSense™-generated .kml files also contain basic physiological data which can be viewed in the context of satellite or map view.

Export and Open Location Data

1. Save the kml file to a preferred location, and click to open.



2. Google Earth™* (if installed) will open. All built-in viewing functionality is available, and the .kml file will display in the **Temporary Places** node.



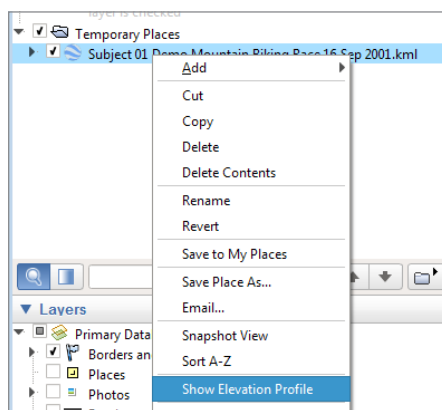
#	Description
1	KML file in Temporary Places node.
2	Slider control to move place mark around trace
3	Path contained in kml file
4	Place mark showing current location according to slider control.

OMNISENSE™ ANALYSIS OPERATIONS

GPS Data (2/2)

View Physiological Data from KML File

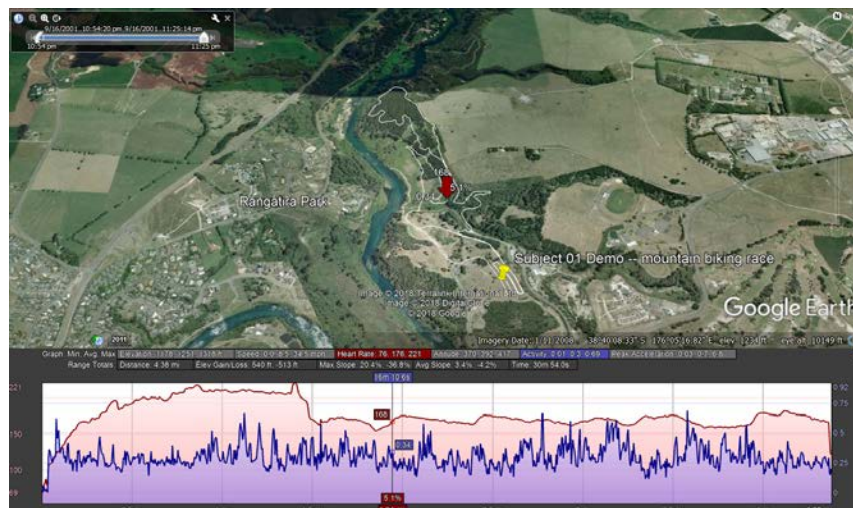
1. In Google Earth™*, right click on the imported .kml file, and select **Show Elevation Profile** from the context menu.



2. A chart will be inserted under the main satellite display. Above the chart are selectable fields of GPS and BioModule data; **Heart Rate, Activity and Peak Acceleration**. Two of these may be selected for display on the chart.

Graph: Min, Avg, Max | Elevation: 1178-1251 | 1318 ft | Speed: 0.0-8.5 | 34.5 mph | Heart Rate: 76-176-221 | Altitude: 370-392-417 | Activity: 0.01-0.3-0.69 | Peak Acceleration: 0.03-0.1-6.8
 Range Totals: Distance: 4.38 mi | Elev Gain/Loss: 540 ft -513 ft | Max Slope: 20.4% -36.8% | Avg Slope: 3.4% -4.2% | Time: 30m 54.0s

3. As the mouse cursor is floated along the chart, a red arrow marker will appear on the trace, with the selected parameters displaying beside it. The same values will also display as call outs on the chart below.



OMNISENSE™ ANALYSIS OPERATIONS

Readiness

Overview

A subject's Readiness rating is a score on a scale of 1 - 10. The score is relative for that subject, and is calculated algorithmically on two sets of factors.

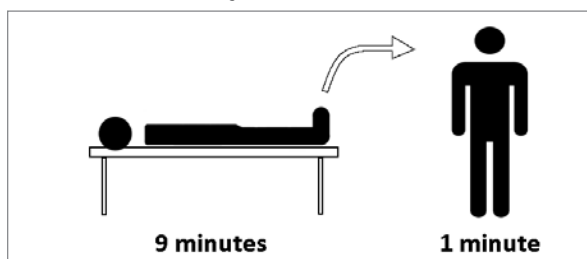
Objective Factor - Orthostatic Hypotension Readiness Test

Subjects perform an orthostatic hypotension readiness test while wearing a BioModule. The data can be transmitted Live to OmniSense™, via the OmniSense™ mobile device application, or logged on the BioModule and imported later.

Orthostatic Hypotension Readiness Test

The purpose of the test is to establish personal metrics which will contribute to a measure of Readiness.

- Resting Heart Rate
- Standing Heart Rate
- Resting Heart Rate Variability (HRV)



1. Subject should lie down in a comfortable quiet location for 9 minutes. They may be prompted earlier if using the mobile device application. This establishes resting HR and HRV.
2. Subject stands and remains stationary for 1 minute. This will establish standing HR.



Note

If conducting an orthostatic hypotension readiness test using OmniSense™ Live, it is good practice to create a session name appropriate to this test, and to name the session using it, for easier retrieval of sessions in OmniSense™ Analysis

Subjective Factor - Readiness Survey

The subject must rate themselves on a 1-10 scale for eight points. Each rating should be entered into a dialog window in OmniSense™ Analysis at the time of analyzing the orthostatic test data, or directly in to the mobile application.

The factors are:

- | | |
|----------------------|-------------------|
| ▪ Training Load | ▪ Current Stress |
| ▪ Training Intensity | ▪ Eating habits |
| ▪ Sleep Quality | ▪ Hydration level |
| ▪ Overall Stress | ▪ Injury |

When the survey is saved into OmniSense™, both the objective and subjective factors are given weighted values in an algorithm, and a **Readiness Score** is calculated. Weightings of each factor are configurable in Analysis **Preferences**.

Analysis of the test and survey results are described in the **Baseline Fitness Testing** section.