OTrack

Version 1.11

Reference Manual

Contents

Chapter 1 - Overview

What is OTrack?

OTrack is a package that processes GPS data which has been collected by any GPS device. OTrack analyses this data to provide you with performance information and will tell you where you were at any time on a map of the area.

OTrack Features

- Display your route on the relevant map (or blank sheet).
- Compare your route with the route taken by others.
- Analyse your fitness (time in heart rate zones, time in speed zones).
- Analyse your performance (leg split analysis). Compare your current performance against previous sessions.
- Analyse how route choice affects your results.
- Coaches can download your GPS data while you are warming down and discuss it with you within minutes.
- Use GPS data from any GPS unit. OTrack will direct connect to Garmin, Magellan and SPI 10 devices. OTrack can also load data from files in GPX format.
- Time lapse display of up to 5 runners on the same course. Time lapse display of your performance on a specific circuit for up to 5 occasions.
- Create a time lapse display and mail it to your friends or post it on the web.

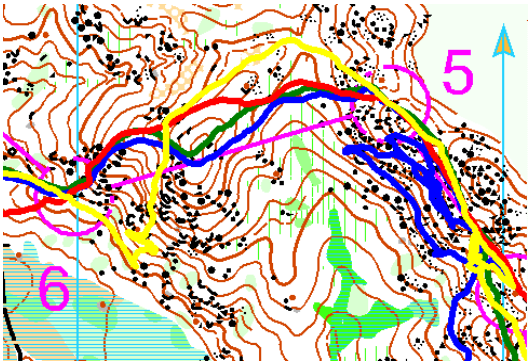
Who is OTrack For?

OTrack was initially designed for orienteering where it is important for the athlete and coach to be able to reflect on where the athlete went in the context of the map. However, OTrack can be used by anyone who wishes to analyse what they did in a training session or event. This includes street runners and walkers, cross country, bike riders, circuit runners, etc.

Gallery

Where did I go?

OTrack takes the data from your GPS unit and displays it on your map. You can also load the data from other runners and compare your route selection with theirs.



What was I doing?

At any point during your session OTrack can tell you how far you have travelled, how fast you are going, how much climb you have done, etc. You can also see what other runners were doing at the same time in their session. OTrack displays the time line information and your corresponding position on the map at that time.

What were my Leg Splits?

OTrack can provide leg split analysis directly from the GPS data. You do not need any other electronic punching data. A leg is the section of your GPS track that you define and could be between two street corners, the top and bottom of a hill, home and the furthest point out, successive loops of a circuit, etc.

Leg Split Analysis

Leg	Time		Distance (km)				Climb (m)		Speed (min/k)	
	Course	Leg	Course		Leg		Course	Leg	Course	Leg
Str	00:00:00	00:00:00	0.00	0%	0.00	0%	0	0	***	***
1	00:01:45	00:01:45	0.26	92%	0.26	92%	11	11	6.6	6.6
2	00:04:12	00:02:27	0.62	92%	0.36	92%	42	31	6.7	6.8
3	00:15:09	00:10:57	1.95	86%	1.33	83%	146	104	7.8	8.2
4	00:24:00	00:08:51	2.75	79%	0.80	64%	207	61	8.7	11.1
5	00:25:54	00:01:54	3.03	81%	0.28	95%	230	23	8.5	6.9
6	00:33:40	00:07:46	3.76	76%	0.73	54%	270	40	9.0	10.7
7	00:38:02	00:04:22	4.46	77%	0.71	85%	293	23	8.5	6.2
8	00:39:12	00:01:10	4.64	77%	0.18	73%	302	9	8.4	6.5
9	00:50:24	00:11:12	6.22	78%	1.57	81%	387	85	8.1	7.1
10	01:01:58	00:11:34	7.56	78%	1.34	75%	462	75	8.2	8.6
11	01:13:51	00:11:53	8.88	77%	1.32	77%	547	85	8.3	9.0
12	01:16:04	00:02:13	9.09	78%	0.21	81%	552	5	8.4	10.4
13	01:21:12	00:05:08	9.76	78%	0.67	88%	599	47	8.3	7.7
14	01:22:31	00:01:19	9.91	78%	0.15	92%	604	5	8.3	8.8
15	01:25:42	00:03:11	10.31	79%	0.40	87%	630	26	8.3	8.0
16	01:26:55	00:01:13	10.46	79%	0.15	94%	639	9	8.3	8.3
17	01:27:55	00:01:00	10.59	79%	0.13	79%	647	8	8.3	7.5
Fin	01:28:37	00:00:42	10.64	79%	0.05	85%	650	3	8.3	14.8

Manual Conventions

The following typographical conventions are used throughout this manual:

text	Indicates a menu or speed button on the screen.
text ▸ **text**	Indicates a menu hierarchy.
text	Reference to another part of this manual.
<*key*>	Indicates a key on the keyboard, e.g. <*Alt*>.
+	Two or more concurrent actions, e.g. <*Ctrl*>+<*End*>+<*Del*>.
<*click*>	Click the designated mouse button.

Chapter 2 - Getting Started

This section is intended to give the first time user some guidance to get going with OTrack.

Minimum Requirements

You will need GPS track data to use OTrack. This data may come directly from a GPS unit or from a data file containing GPS data which has been loaded by somebody else.

It is also desirable (but not essential) to have a map image file. This file should be of the area corresponding to the GPS data.

What To Do

The following steps represent one of the many ways to get going.

a. Start OTrack.

b. Press the  button on the toolbar to create a new and empty file.

c. Create a runner. Refer to New Runner.

d. Load the GPS data.

   If you are loading data from a GPS you should firstly ensure that your GPS unit is connected to the computer, and is operating correctly. Load the data from the GPS unit as described in Load GPS Data, Load From GPS Unit.

   If you are loading data from a file refer to Load GPS Data, Load From File.

e. Review the GPS data to ensure that the data you want is selected. GPS files can contain data from a number of occasions. OTrack will only consider the first 3 hours of the data. If you need to select a portion of the data refer to GPS Data, Select GPS Data for assistance.

f. Load a map. Refer to Map, Load.

g. Enter the map scale. Refer to Map, Scale.

h. Centre the GPS data on the map. Refer to Map, Align GPS Track.

i. Align the GPS data to the map. Refer to Map, Align GPS Track.

You are now ready to explore your data with the performance analysis, and playback features available in OTrack.

Chapter 3 - View

These options are accessed through **View**

Runner

This item toggles between **Show Runners** and **Hide Runners**.

The effect is to show or hide the runners list at the top left of the screen.

Statistics

This item toggles between **Show Statistics** and **Hide Statistics**.

The effect is to show or hide the statistics panel at the top of the screen.

Sector Statistics

This item toggles between **Show Sector Statistics** and **Hide Sector Statistics**.

The effect is to show or hide the sector statistics panel at the top of the screen.

Map

This item toggles between **Show Map** and **Hide Map**.

If you have loaded a map you can temporarily suppress the display of that map. An equivalent area of blank map will be displayed on the screen.

Control Flags

This item toggles between **Show Control Flags** and **Hide Control Flags**.

The effect is to show or hide the map based control flags on the map area of the screen.

Zoom

This item displays a popup menu enabling you to control the magnification of the map display. This popup menu can also be displayed by right-<*click*>ing over the map display.

Focus

This item toggles between **Enable Focus** and **Disable Focus**.

When a position is selected on the time line display OTrack moves the position markers for each active runner to their corresponding positions on the runner's GPS track on the map display. If the new position of the marker for the first runner is not visible on the map display then, if focus is enabled, the view of the map will be adjusted so that the marker appears as close as possible to the centre of the map display.

Panner

This item displays or hides a set of buttons to move (pan) the map display.

Chapter 4 - Time Lapse Display

Time lapse display is accessed through the  button on the toolbar.

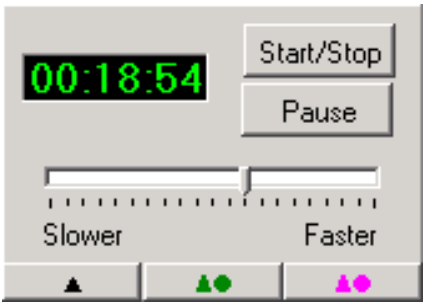
How it Works

When you access the time lapse display a new map image is displayed. The GPS data for each runner is drawn for each runner in segments. The length of each segment is dependant on time lapse speed (the higher the speed the longer the segment). This can result in a dashed effect when two or more runners traverse the same path.

If you select a specific control point to start from, OTrack lines up all of the active runners such that they all start from the one control point at the same time. Using this function you can compare the performance of the runners on a specific leg or legs of their course.

Controlling the Replay

The operation of the time lapse display is controlled through the following control panel.



The position of this panel can be changed by dragging it to a new position. This can even be done when a time lapse display is in progress.

➤ **Clock**

The real world elapsed in HH:MM:SS since the runners left the start point.

➤ **Start**

Press the **Start/Stop** button. The map is refreshed (clearing existing GPS track data) and the GPS track data for the currently active runners is progressively displayed.

➤ **Stop**

Press the **Start/Stop** button. The display must be stopped, before you can exit the time lapse display facility.

➤ **Pause**

Press the **Pause** button.

➤ **Restart**

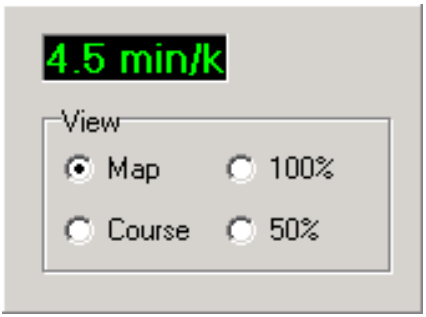
Press the **Pause** button. More GPS data will be displayed from the previous pause point.

➤ **Replay Speed**

The rate at which the data is displayed is controlled by the slider bar on the control panel. The replay speed can be adjusted at any time, even when a time lapse display is in progress.

Map Display

Press the ▲ button to reveal or hide the map display control panel.



The map display options are:

Map The map display is scaled such that the whole map is displayed on the available screen space.

Course OTrack determines the area of the map required to display all of the control points. A border area equal to the **Map Edge** (refer to Options, General) is added. This map segment is then scaled such that it is displayed on the available screen space.

100% The map is displayed full size.

50% The map is displayed half size.

If the map does not fit on the screen, the viewed area may be adjusted using the scroll bars, or by dragging the map with the left mouse button.

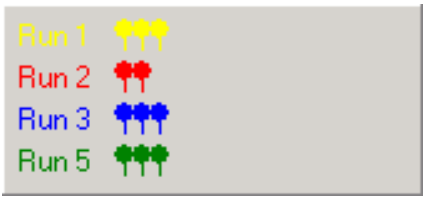
Start Point

Press the  button to reveal or hide the replay start control panel.

Use the arrow buttons to control the start control point for the runners. The number identifies the leg, so “1" means from the start to the first control point. If the **To End** check box is not checked then the replay will stop when all runners have reached the next control point.

Runner Progress

Press the  button to reveal or hide the replay runner progress panel.



The progress of each runner is displayed in terms of the number of control points they have visited up to the replay time. OTrack “beeps” every time a runner

passes a control. This is suppressed if the progress panel is not revealed during the replay.

When the display is in progress, OTrack has the capability of keeping the current position of one of the runners visible on the screen i.e. tracking. If the tracked runner hits the edge of the screen, the screen will be scrolled such that the tracked runner's position is as close to the centre of the screen as possible. The runner being tracked will have a "Ž" to the left of their name on the progress panel. A runner to be tracked can be selected by <*click*>ing the name. <*Click*>ing the name of the tracked runner will discontinue the tracking facility.

Chapter 5 - Publishing

Map

This option is accessed through **File ⏵ Save Map**

The map with your GPS data track(s) marked on it can be saved to a jpeg, gif, bmp file for use elsewhere. The image saved will take on the characteristics of the map image displayed on the screen.

Player

This option is accessed through **File ⏵ Save Player**

The map with your GPS data track(s) displayed in time lapse replay can be saved to "filename".exe file. This file contains the map (in gif format), the GPS track data and a replay engine. This file can be distributed freely.

The player display is based on the settings you have used for the time lapse display.

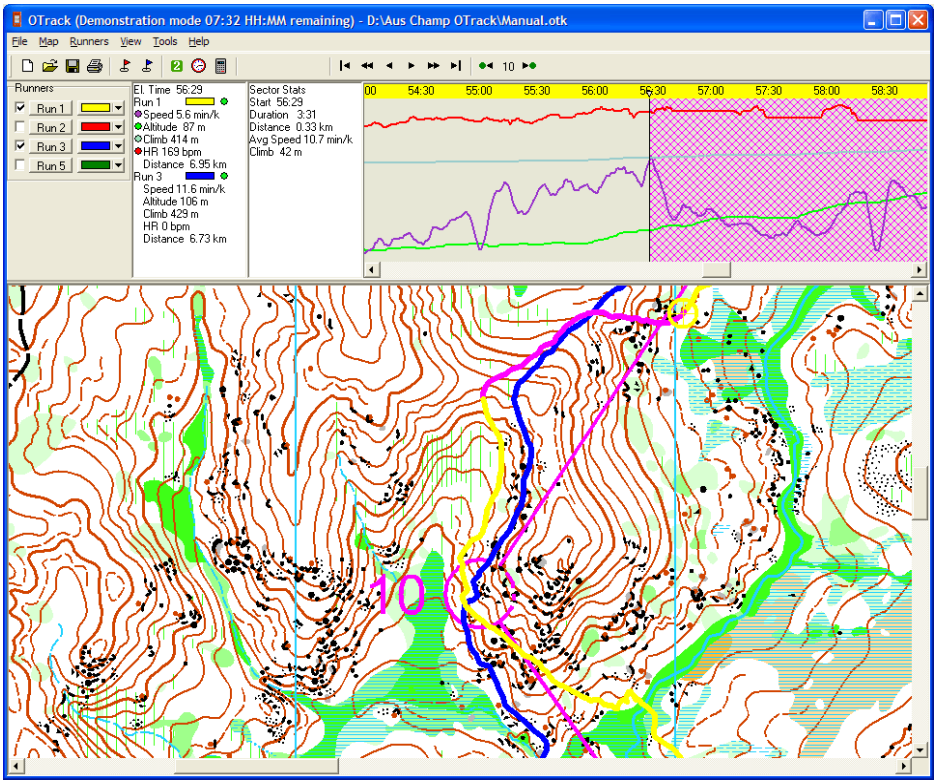
Note The player display may look different on another computer. The size of the screen and colour settings for the display will affect the player display.

View in Google Earth

This option is accessed through **File ⏵ View in Google Earth**

The GPS data track(s) for all runners is bundled up into a kml file and exported to Google Earth. If it is not going, Google Earth is then started. To control the display of the data in Google Earth refer to Options, Google Earth for detailed information.

Chapter 6 - Screen Components



Map Panel

The **Time Line**, **Map** and **Statistics** panels are all synchronised through the Primary Runner. At any time a token will display the Primary Runner's position on the map, a vertical line will display the corresponding position on the time line and the statistics at that time will be displayed in the statistics panel.

The Map

The map display shows the GPS data of runners on a sheet. The sheet can be a blank area or it can contain an image of a map.

Display Order

OTrack displays each GPS track with the track colour you have allocated for a runner.

The OTrack map display is organised on a bottom up basis. The GPS data for the last runner is drawn first and the data for the first runner is drawn last.

Navigation

When the mouse is moved over the map sheet, the cursor will contain a coloured dot. The dot colour will be that of the track colour of the Primary Runner. When the mouse is <*click*>ed over the Primary Runner's GPS track, the time line display will be adjusted such that the time line marker is at the same time as the map position. If the time line marker would not be visible, the time line display is scrolled. The statistics panel will also be updated to show the statistics at this time.

If you want to refer to the second runner you must reorder the runners such that the second runner becomes the Primary Runner.

The viewed area of the map can be adjusted with the scroll bars or by dragging with the left mouse button. To do this, <*click*> on an area of the map which does not contain an active (such as the track of the Primary Runner). Drag the map to the desired position.

To zoom the map display, you may right <*click*> over the map to display a popup menu of zoom options.

Time Line Panel

The **Time Line**, **Map** and **Statistics** panels are all synchronised through the Primary Runner. At any time a token will display the Primary Runner's position on the map, a vertical line will display the corresponding position on the time line and the statistics at that time will be displayed in the statistics panel.

Time line information is only displayed for the Primary Runner. Therefore, the length of the time line will be just sufficient to display the session data for the Primary Runner. The range of information displayed is controlled through **Tools ⏵ Options ⏵Time Line**

Navigation

A navigation bar has been provided to efficiently move around the Time Line. The buttons perform the following functions:


Move the time line marker to the session beginning.


Move the time line marker back 3 minutes.


Move the time line marker back 1 second.


Move the time line marker forward 1 second.


Move the time line marker forward 3 minutes.


Move the time line marker to the session end.


Move the time line marker back to the previous control if one exits, otherwise move the time line marker to the beginning of the session. The current leg number is displayed.


Move the time line marker forward to the next control if one exits, otherwise move the time line marker to the end of the session. The current leg number is displayed.

Runners Panel

The **Time Line**, **Map** and **Statistics** panels are all synchronised through the Primary Runner. At any time a token will display the Primary Runner's position on the map, a vertical line will display the corresponding position on the time line and the statistics at that time will be displayed in the statistics panel.

The **Runners Panel** lists all runners which you have currently defined in this file. This panel can be displayed or hidden using the **View** menu option. The panel enables you to:

Enable/Disable Runners

If a runner is enabled (active) the GPS data for this runner will be displayed on the map. A runner is enabled by checking or disabled by un-checking the check box at the left of the runner's nickname in the **Runners Panel**.

Change Runner's Colour

A colour select button has been provided for each runner to allow you to quickly change the colour used to display the runner's GPS data on the map.

Edit Runner's Data

The **Runners Panel** contains each runner's nickname on a button. Pressing this button will give you quick access to the dialog which allows you to edit their GPS data, profile, etc.

Statistics Panel

The **Time Line**, **Map** and **Statistics** panels are all synchronised through the Primary Runner. At any time a token will display the Primary Runner's position on the map, a vertical line will display the corresponding position on the time line and the statistics at that time will be displayed in the statistics panel.

Statistics are only displayed for active runners. The statistics which are displayed is controlled through **Tools** ⏵ **Options** ⏵**Statistics**

The statistics displayed for each runner commences with a header line containing the runner's nickname. Beside the nickname is a rectangle which shows the colour that is used to display the runner's GPS track on the map. Adjacent to this box will be a red or green coloured dot. A green dot signifies that the runner's GPS track passes through all of the marked control flag sites; a red dot signifies that one or more of the control flag sites has not been visited. This will have an impact on statistics such as leg splits, etc.

Sector Statistics Panel

A sector is a segment of the GPS track selected by the user. It is displayed in a different colour. Statistics for that particular portion of the GPS track are also generated.

The **Time Line**, **Map** and **Sector Statistics** panels are all synchronised through the Primary Runner. Sectors can only be created for the primary runner and the sector statistics only apply to the primary runner.

Create Sector

A sector is created by:

a. Adjust the **Time Line** so that it displays the desired start time for the sector. With the <*Shift*> button down left <*click*> on the start time. A sector of duration 10 seconds will be created. Or,

b. On the **Map** left <*click*> on the primary runner's track while holding down the <*Shift*> button. A sector of duration 10 seconds will be created.

Adjust Sector

The sector start and end points can be adjusted using the method outlined above. Extending the sector is achieved by selecting a point outside of the current sector. Shortening the sector is achieved by selecting a point within the current sector. When shortening the sector, OTrack shifts the start to the new point if it is closer than the end otherwise the end is shifted to the new point.

Clear Sector

A sector is cleared by right <*click*>ing in the **Time Line** panel with <*Shift*> button down.

Chapter 7 - Runners

OTrack is structured around the Runner and more specifically the Primary Runner. The runner is the owner of any package of GPS data and any performance profile. The OTrack map display is organised on a bottom up basis. The **Primary Runner** is the runner at the top of the list of runners.

Runners can be different people running the same course at an event, the same person running the same course at different times, or a person running continuous loops around a training course. Each runner will be a unique combination of a person and a package of GPS data. OTrack gives you the capability of showing the performance of one of the these runners, or comparing the performance of up to 5 runners simultaneously.

New Runner

This option is accessed through **Runners** ⏵ **New Runner**

A new runner will be created and control will be transferred to the Runner Profile entry form to allow you to enter the characteristics of the runner and to load the GPS data for the runner's session. The new runner will be added to the bottom of the list of runners. To change this position refer to Reorder Runners.

Once the new runner process is started, the new runner can only be removed by the Delete Runner process.

If the menu item **Runners** ⏵ **New Runner** is dimmed, you have reached the maximum number of runners of five.

Delete Runner

This option is accessed through **Runner** ⏵ **Delete Runner**

A dialog box containing a list of runners will be displayed. Select the runners you wish to delete one at a time and press **Delete**. The deletion of runners will only occur when you press the **Okay** button to exit the dialog box. The order of the runners is maintained. The first runner in the remaining list will become the Primary Runner.

Reorder Runners

This option is accessed through **Runner** ⏵ **Reorder Runners**

A dialog box containing a list of runners will be displayed. Select the runners you wish to move up or down in the list and press the **Move Up** or **Move Down** button. The Reordering of runners will only occur when you press the **Okay** button to exit the dialog box. The first runner in the reordered list will become the Primary Runner.

Runner Profile

These options are accessed through **Runners** ⏵ **"Nickname" Profile**

The runner's profile is a set of information (as detailed below) which is used to identify a runner, their GPS data, and the performance characteristics to be used to analyse their GPS data. A runner's typical profile can be saved and recalled using the **Select Profile...** and **Save Profile** buttons. The profile is stored with the particular GPS data and can therefore differ from the saved profile.

Runner profiles can be deleted through **Tools** ⏵ **Delete Profile**

- **Name**

  A fifty character name used by OTrack to identify a runner and their profile. This name should be unique.

- **Nickname**

  A five character name used by OTrack to identify a runner. This is used by OTrack to save space on the display.

- **Heart Rate Zones**

  Five heart rate zones have been provided. The first zone starts at zero and the last zone goes to "infinity". To set the zones, enter the span for each zone in the box provided. OTrack will calculate the range of each zone from these spans.

  Note Heart rate zones must be entered in beats per minute.

➤ **Speed Rate Zones**

Five speed zones have been provided. The first zone starts at zero and the last zone goes to "infinity". To set the zones, enter the span for each zone in the box provided. OTrack will calculate the range of each zone from these spans.

Note Speed zones must be entered in kilometres per hour.

➤ **Speed Limit**

Sometimes, a GPS unit will generate a spurious result when it is having difficulty e.g. in a tunnel. This may be a location a long way away from where you actually were. The speed that you must run to get to that location will typically be very high.

OTrack will filter out this data by comparing this speed with the speed limit you have set. The speed limit should be left at 0 (no filtering) unless it is absolutely necessary to filter some GPS readings.

If you set a low speed limit, OTrack may become unstable because it will attempt to filter out every GPS reading.

Chapter 8 - GPS Data

GPS data records consist of:

- Timestamp
- Latitude
- Longitude
- Altitude
- Heart Rate (not recorded by all GPS units)

These records are collected by some GPS units at a regular time interval (such as 1 per second, 1 every 5 seconds, etc) or when the GPS unit has detected a shift of some distance (such as every 10 metres, etc). The GPS unit will sometimes miss one or more of its observations. This is usually caused when the GPS units lose sight because the tree canopy overhead is dense, you are close to a cliff face, you are in a deep gully, etc.

OTrack assumes that it will have one observation per second. In situations where the GPS unit has not recorded an observation(s) OTrack fills in the gaps with synthetic observations based on constant speed and a straight line between available GPS observations. OTrack displays actual GPS observations in blue and synthetic observations in red. As the number of red observations increases, the value and accuracy of the information presented by OTrack decreases.

When operating the GPS unit, it is very unlikely that you will be able to start and stop the GPS unit at the beginning of your session or orienteering course. Extra records can be eliminated by OTrack.

If records are missing from the beginning or the end of a session, synthetic records can be added. This can make the session time correct but cannot make distances covered correct. As OTrack has no way of knowing where you came from or where you are going or how fast you are going, it assumes that you are standing still. On the other hand, some GPS units record multiple sessions for multiple days in a single file. These usually have to be separated into individual sessions for OTrack to process them.

The following sections of this help file will explain how you can refine the raw GPS data and separate it into its component parts to maximise the information provided by OTrack.

Load GPS Data

These options are accessed through **Runners** ⏵ **"runners nickname" GPS Data**

GPS data may be loaded into OTrack from one of the following sources:

Load From OTrack Log

The OTrack Log file is a special file automatically created by OTrack when data is read from a GPS unit.

The process of loading data from a GPS unit is typically very slow. Furthermore, some GPS units will allow you to select the specific data you wish to load while other GPS units require that you load all of the data in the unit and then select the piece that you want.

The format of the OTrack Log is the same as any *.GPX file. You can therefore save the OTrack Log as a "filename.GPX" file using Windows facilities. The saved file can be used at a later date with OTrack or any other software which can process GPX files.

To load the data from the OTrack Log:

a. Select **OTrack Log** from the **Data Source** drop down list.

b. Press the **Load Data** button.

c. If more than one track segment is found in the GPS data, dialog box will be displayed asking you to select one of the segments.

Load From File

OTrack supports GPX format files and a number of other vendor specific formats such as GXP.

a. Select the desired file type from the **Data Source** drop down list.

b. Press the **Load Data** button.

c. If more than one track segment is found in the GPS data, a dialog box will be displayed asking you to select one of the segments.

Note Care should be taken when importing data from files in vendor specific

files. For example, FRWD files record the date in the language of the computer being used to export the data. This can be fixed by using the Select Data facility.

CSV Wizard

A CSV Wizard has been provided to handle the different data layouts available in CSV (Comma Separated Variable) files. To enter the CSV Wizard simply select “CSV files” as the data source, then experiment with the following parameters so that the CSV file is decoded correctly.

Record Processing

Field Delimiter - The character used to enclose the data fields and is often either “ or not used. If a field delimiter is not used, ensure this is set to a character which does not occur in the data.

Decimal Point - The character used as the decimal point in floating point numbers.

Field Numbers

Select the number of the field in your data that contains each of the fields date and time, latitude, longitude, altitude and heart rate. As altitude and heart rate are not essential to OTrack they may be set to non existent field numbers.

Date Processing

Mask Processing. To enable translation of the date and time field, mask processing of this field has been provided if the default (or no mask) processing does not achieve the desired result. The mask will decode the date and time field according to the following:

?	ignore this character
a	One character specifying the time of day (a for am, p for pm)
dd	Two characters specifying the day as a number with a leading zero or space (01-31)
ddd	Three characters specifying the day as an abbreviation (Sun-Sat)
ddddd	Variable number of characters specifying the day as a full name (Sunday-Saturday)
mm	Two characters specifying the month as a number with a leading zero or space (01-12)
mmm	Three characters specifying the month as an abbreviation (Jan-Dec)
mmmm	Variable number of characters specifying the month as a full name (January-December)

yy	Two characters specifying the year as a two-digit number (00-99)
yyyy	Four characters specifying the year as a four-digit number (0000-9999)
hh	Two characters specifying the hour with a leading zero or space (00-23)
nn	Two characters specifying the minute with a leading zero or space (00-59).
ss	Two characters specifying the second with a leading zero or space (00-59)
z	One character specifying the millisecond with a leading zero (0-9)
zz	Two characters specifying the millisecond with a leading zero (00-99)
zzz	Three characters specifying the millisecond with a leading zero (000-999)

A typical mask would be “dd?mm?yyyy?hh?nn?ss”.

Base Date. This option allows you to set the date and time of the first accepted record. The records following are then time stamped relative to this date.

Sample Output

The first 100 records of the data file in accordance with the decoding parameters you have chosen.

Load From GPS Unit

Before you can load data from a GPS unit you must first establish a connection path between OTrack and the GPS unit. The dialog box to do this is accessed through **File** ⏵ **GPS Setup**. Refer to Setup, GPS for detailed information.

You are now ready to download data from your GPS unit.

a. If necessary return to the Load From GPS facility via **Runners** ⏵ **"runners nickname"** ⏵ **GPS Data**

b. Ensure your GPS unit is correctly connected to your computer, is turned on and in the correct mode to talk to your computer. Consult your GPS Owners Manual for assistance.

c. Select the desired GPS unit, COM port combination (identified in the process above) from the **Data Source** drop down list.

d. Press the **Load Data** button.

e. If more than one track segment is found in the GPS data, a dialog box will be

displayed asking you to select one of the segments.

Adjust Timestamp

This option is accessed through **Runners** ⏵ **"runners nickname"** ⏵ **GPS Data**

Coordinated Universal Time (UTC) is the international time standard. It is the current term for what was commonly referred to as Greenwich Meridian Time (GMT). Zero (0) hours UTC is midnight in Greenwich England, which lies on the zero longitudinal meridian.

GPS records are tagged with a UTC timestamp. Some GPS units will adjust this timestamp to reflect daylight saving and some will not. Furthermore, if GPS data is recorded somewhere else in the world, the timestamp will probably reflect that local time.

If the times shown in your GPS data do not reflect the correct time you can adjust them. Use the **UTC Adj** edit box to add a correction time. This adjustment may have a "+" or a "-" in the first character position to move the timestamps backwards or forwards. The adjustment set here is applied only to GPS data loaded for this runner in this OTrack file.

Select GPS Data

These options are accessed through **Runners** ⏵ **"runners nickname"** ⏵ **GPS Data**

Select Data

The Select Data option allows you to clip unwanted data from the front and/or the end of the GPS data file you have loaded. When you have loaded a file containing GPS data, OTrack stores a copy of that data in its own file. The data which is clipped is removed from the OTrack data only. The source GPS file is not touched. If you clip too much data you must reload the original GPS file into OTrack to recover.

To select the required GPS data press the **Select Data** button. A window will appear displaying the raw GPS data.

To set a new first record, locate the desired record in the list of records and double <*click*> the **First** column of that record. "****" will then appear to indicate the new first record and the "clipped records" will turn to grey.

To set a new last record, locate the desired record in the list of records and double <*click*> the **Last** column of that record. "****" will then appear to indicate the new last record and the "clipped records" will turn to grey.

You may also set the time and date of your GPS records. When GPS data is imported from other sources, OTrack will attempt to determine the time and date when this data was collected. If the time and/or date is incorrect, new values may be entered here.

Set Session

The Set Session option also allows you to mask out unwanted data. Set Session does not remove any data, it moves the session window along the available data. This is useful if you want to set your session start time using trial and error.

It also allows you to have a start time earlier than the first available GPS record and a finish time after the latest available GPS record. It is also useful when you are attempting to break GPS data which covers continuous loops of a training course into individual sessions for comparison.

Two helper buttons have been provided to help you find the start  and find the finish  of a session. You must first have established a map based control site for the start and for the finish and have aligned your GPS track to the map. OTrack searches along your GPS track data to establish the times at which your track is closest to the start and to the finish. You may have to fine tune these points manually.

To reset the session parameters to cover the available GPS records, press the **Reset** button.

Note The session duration has a maximum value of 3 hours.

Export GPS Data

This option is accessed through **Runners** ▸ **"runners nickname"** ▸ **GPS Data**

After you have loaded GPS data, you will have the option of exporting the data in one of the supported file formats.

To export the data, press the **Export Data** button.

If you have loaded a large file from a GPS unit you can use this facility to make a copy of data for reprocessing.

Chapter 9 - Map

Load

This option is accessed through **Map** ⏵ **Load Map**

The load map option provides a dialog to enable you to load a map file.

Scan

These options are accessed through **Map** ⏵ **Scan Map**

Select Source

If you have more than one scanning device attached to your computer you must select which device OTrack is to use to acquire your map image. If you only have one scanning device OTrack will automatically select that device.

Scan

Press the **Scan** button to activate the Scan Dialog facility provided with your scanner.

Save and Close

Press the **Save and Close** to create a permanent copy of your map file. OTrack then loads this file as the map.

Rotate Image

Use the buttons  to rotate the map image by 90, 180 or 270 degrees. OTrack will adjust the vertical and horizontal dimensions of the image during the rotation process.

Straighten Image

If the map image is askew (e.g. the northing lines are not quite vertical) you can:

Vertical straighten

a. Press the  button. The rotate buttons will be deactivated while this button is down.

b. <*Click*> on one end of a vertical reference on your map.

c. Drag the mouse to the other end of the vertical reference and release. The map image will then be rotated so that the reference line is vertical.

d. Press the  button to reactivate the rotate buttons.

Horizontal straighten

a. Press the  button. The rotate buttons will be deactivated while this button is down.

b. <*Click*> on one end of a horizontal reference on your map.

c. Drag the mouse to the other end of the horizontal reference and release. The map image will then be rotated so that the reference line is horizontal.

d. Press the  button to reactivate the rotate buttons.

Scale

This option is accessed through **Map ⏵ Scale Map**

Use this option to set the scale of the map. OTrack uses this scale to convert between distances on the map sheet and distances in the real world.

Centre GPS Track

This option is accessed through **Map ⏵ Centre GPS Track**

OTrack displays the loaded GPS data on a map. OTrack also provides the ability to move, stretch and rotate the GPS track.

There will be situations where the track becomes distorted beyond recognition or disappears. If this occurs, the GPS track can be recovered by centring the

GPS track on the map.

Align GPS Track

Once you have a map loaded and a GPS track (GPS data) loaded you will want to align the GPS track to the map. To achieve this undertake any or all of the following steps that you need to do to achieve the desired result. Each step may be undertaken a number of times.

Note If you experience problems when aligning the GPS track it may be necessary to centre the GPS track again using **Map ⏵ Centre GPS Track** and starting the alignment process afresh.

Anchor Points

OTrack uses two anchor points represented by  These anchor points are used to identify a point on the GPS track and match it to a location on the map.

Adjust the Red Anchor

a. Press the  button on the toolbar. Any existing anchor points will now be displayed on the map.

b. Move the mouse over the GPS track to a point on the GPS track which you can identify on the map e.g. the start, finish or a control flag site.

c. With the <*Shift*> button down, press the left mouse button and drag the mouse to the desired point on the map and release the mouse button.

If a blue anchor existed then the GPS track will be stretched and rotated without affecting the blue anchor. If there is no blue anchor then the GPS track will only be shifted.

Adjust the Blue Anchor

a. Press the  button on the toolbar. Any existing anchor points will now be displayed on the map.

b. Move the mouse over the GPS track to a point on the GPS track which you can identify on the map e.g. the start, finish or a control flag site.

c. With the <*Shift*> button down, press the left mouse button and drag the mouse to the desired point on the map and release the mouse button.

If a red anchor existed then the GPS track will be stretched and rotated without affecting the red anchor. If there is no red anchor then the GPS track will only be shifted.

Finally

Ensure that both buttons  on the toolbar are up. The anchor points displayed on the map will now disappear.

Chapter 10 - Options

General

These options are accessed through **Tools** ⏵ **Options** ⏵ **General**

Open last file

When OTrack starts it will load the last file you were accessing. Un-ticking this box will prevent the last file from being loaded.

Extended search

When you load a map file OTrack saves the complete file name of the map. This is used to open the map file the next time.

This occurs even if it is in the same directory as the *.otk file. If you email the *.otk file to somebody else the map may not be able to be found unless you set this option. Extended search option causes OTrack to look for the map under its full name. If it cannot be found there, OTrack will then search the directory containing the *.otk file.

Map Edge

There are situations where it is desirable to reduce the map size. For example, when a GPS track occupies only a small segment of the map, the amount of map which is printed to print the GPS track can be reduced to the GPS track size plus the **Map Edge** amount all around the GPS track.

Default UTC Adjustment

Coordinated Universal Time (UTC) is the international time standard. It is the current term for what was commonly referred to as Greenwich Meridian Time (GMT). Zero (0) hours UTC is midnight in Greenwich England, which lies on the zero longitudinal meridian.

GPS records are tagged with a UTC timestamp. Some GPS units will adjust this timestamp to reflect daylight saving and some will not. Furthermore, if GPS data is recorded somewhere else in the world, the timestamp will probably reflect that local time.

Use the default setting to suit your local time and your GPS. A different

adjustment can be used specifically for a set of GPS data when it is loaded.

Data Smoothing

The GPS data may cause zigzag patterns when it is rendered on the map, or displayed as a speed curve. You may apply data smoothing to the X,Y coordinates or to the speed data to reduce the zigzag effect. Non smooth data is normal for orienteering as the GPS unit may have difficulty operating in heavily treed areas or where running requires you to avoid objects or climb over them.

Using trial and error, select a level of smoothing which provides the best result. 0 is no smoothing while 4 is the maximum.

Map

These options are accessed through **Tools** ⏵ **Options** ⏵ **Map**

Blank Map

When GPS data is loaded into OTrack it is displayed on a map. If a map does not exist then OTrack creates a blank sheet as the map, with this colour. The sheet is just big enough to display the GPS data.

Course

When OTrack displays the Course on the map it uses the following parameters to render the artwork.

- **Flag Font** - The colour and text of the font to be used when drawing the text on the flags which identify control sites.
- **Flag Colour** - OTrack uses this colour for the infill of a box with rounded corners to identify the location of map based control flags which you have defined.
- **Dot Size** - The size in millimetres of the dot drawn on the course to mark control sites. Values range from 0 - 10.
- **Line Width** - The width in millimetres of the line used for displaying course leg lines. Values range from 0 - 10.

Runner

These options are accessed through **Tools** ⏵ **Options** ⏵ **Runner**

Track Thickness

The track thickness is the diameter of the pen which OTrack uses to draw the track on the map.

Track Display

When OTrack draws the runner's track on the map it will use either the colour you have selected for the runner or a colour which represents the speed zone of the runner at that particular point.

Runner Token

Two different token types are provided to display the runner's current position on the map. The token colour will be the same as the colour you have selected for the runner. The position of the tokens is synchronised with the elapsed time which is displayed in the **Time Line** display.

Sector

You may select a segment of the GPS track for analysis. The colour selected here is used to display the sector on the map and also to identify the area on the time line display.

Statistics

These options are accessed through **Tools** ⏵ **Options** ⏵ **Statistics**

OTrack can display a set of statistics about the active runners at their current position as indicated by the map display and time line display. This panel is made visible through **View** ⏵ **Show Statistics**

The statistics available are:

- Altitude
- Climb

- Distance
- Elapsed Time
- Heart Rate
- Lead
- Speed

Time Line

These options are accessed through **Tools** ⏵ **Options** ⏵ **Time Line**

OTrack displays a time based graphic representation of some of the statistics for runners. The length of the display is based on the duration of the GPS track of the primary runner.

You can choose the **Single Runner** option to display the data for the primary runner, or the **Compare Runners** option to compare data between the active runners.

Single Runner

Any of the data items from the following list can be plotted on the time line display for the Primary Runner:

- Altitude
- Climb
- Heart Rate
- Speed

The line colour for each of the data items on the graph can be selected via the colour button adjacent to each item.

Compare Runners

One data item out of the following list can be plotted on the time line display for each of the active runners:

- Altitude
- Climb
- Distance
- Heart Rate
- Lead
- Speed

The line colour for the data items on the graph is that which you have selected to represent each runner.

Units

These options are accessed through **Tools** ⏵ **Options** ⏵ **Units**

Units for the display of speed, distance and altitude can be selected as follows.

Measurement	Unit
Speed	m/s (metres per second) kph (kilometres per hour) mph (miles per hour) k/min (kilometres per minute) min/k (minutes per kilometre) *
Distance	m (metres) km (kilometres) ft (feet) miles (miles)
Altitude	m (metres) ft (feet)

* If the unit for speed is chosen to be min/k then an additional **Max** option will be displayed. Enter a number from 1 to 100 which represents the maximum minutes per kilometre value to be used by OTrack when generating charts.

Note When you are stationary your minutes per kilometre is infinite.

Zones

These options are accessed through **Tools** ⏵ **Options** ⏵ **Colours**

Zones

When OTrack displays the runner's GPS track on the map, it uses these colours to represent the various speed zones of the runner.

Google Earth

These options are accessed through Tools ⏵ Options ⏵ Google Earth

The options set here are transferred to Google Earth to use when displaying data being transferred from OTrack. For a detailed description of these parameters refer to Google Earth's documentation.

Course

When Google Earth displays the Course layout it uses the following parameters to render the artwork.

- **Colour** - The colour of the course lines and control site icons.
- **Opacity** -The opacity of the course artwork, with 0 being invisible and 100 being opaque.
- **Icon Scale** -The scaling factor for displaying control site icons. Values range from 0.5 - 10.
- **Line Width** -The width of the line used for displaying course leg lines. Values range from 0.5 - 10.

Runner

When Google Earth displays the path for each runner it uses the colour you have already identified in OTrack for each runner along with the following:

- **Line Width** -The width of the line used for displaying the runner's path. Values range from 0.5 - 10.

Chapter 11 - Control Flags

OTrack uses control flags to identify the start and end of a course and the location of any control points (sites) along a course.

OTrack assumes that the session start location and the Str flag are at the same location on the map. It also assumes that the session end and the Fin flag are at the same location.

Map Based Flag Sites

These are flag sites which are at some position on the map e.g a boulder, gully, watercourse, street corner, hotel, etc.

The accuracy of the position of these map based flag sites will depend on the accuracy of the map being used and the accuracy of the placement of the corresponding control point "on the ground". For example, mappers will sometimes stretch parts of the map to improve the readability of the map. Such maps will look okay but the absolute position of objects will not be precise in terms of GPS coordinates. This will result in GPS data not quite matching the map or not quite visiting some control sites.

OTrack processes a runner's GPS data and determines when the runner is closest to the map based flag site. The runner is considered to be at the control point. In some situations, this may not be a valid assumption. For example, the map may be wrong or the athlete (e.g. orienteer) has run past a control point without seeing it and coming back later to punch the control.

Time Based Flag Sites

These are flag sites which are defined to be at some elapsed time after the runner has started their course.

There are a number of sources which can provide times for this purpose:

- Split times from Sportident.
- Times from watches which have leg time capability.
- Examining the time line speed curve to determine when you may have stopped e.g. an orienteer stops to punch a control.

- Examining the shape of the GPS track e.g. sharp changes in direction.

Time based flag sites will overcome the problems associated with running past a control or slowing to search for a control.

It may be necessary to use time based flag sites if OTrack considers that you have not visited a control because your GPS track did not pass sufficiently close enough to a map based flag site which you have defined.

Establishing Control Flags

There are three different techniques for establishing control flag sites:

(a) From Corpse (an orienteering software package)
(b) User Entry
(c) From Time Splits

Control Flags - Corpse

Control flag sites established this way are positions on the map - map based.

If Corpse 6.2 or later has been used to plan the orienteering course, the information required to position control flags on the map for OTrack is attached to the EPS files created by Corpse.

To access this information you must have loaded the relevant course EPS file as the map for OTrack. If this has been done, **Map ➧ Load Flag Sites** will be enabled. Selecting this option will download the flag site locations as map based control flag sites.

Control Flags - User Entry

Control flag sites established this way are positions on the map - map based.

To enter the flag sites manually:

a. Press the  button on the toolbar. Many OTrack functions will be disabled while this button is down.

b. Select a flag (if there are any flags) by <*click*>ing over the flag number in the Flag List or by <*click*>ing over the flag site on the map. Any new flag site created will be positioned in the list after the selected site.

c. Add a new flag site using one of the following methods.

1. Using the Flag List

   Add a new flag by pressing the  button. This will add a new flag to the list and position the flag at the centre of the map. It may then be dragged to the correct place on the map by using the mouse to drag it.

2. Using the Time Line

   Move the mouse over the time line to the exact time that the primary runner is thought to be at the flag site and double <*click*>. This will add a new site to the list on the primary runner's path and will place it in the list in the correct chronological sequence. If the site is not in the correct place on the map then it may be moved by using the mouse to drag it to the correct place on the map.

3. Using the Map

   Move the mouse over the map to the desired site and double <*click*>. This will add a new site to the list. If the site is not in the correct place then it may be moved by using the mouse to drag it to the correct place.

d. Repeat steps "b." and “c.” until all flag sites have been added.

e. Press the  button on the toolbar to leave the control flag edit mode.

Control Flags - From Time Splits

Control flag sites established this way are at elapsed times from the beginning of the session or course - time based. These flag sites will apply to the particular GPS data for the session.

To enter these flag sites:

a. Select the Runner from the drop down list of runners from **Runners** on the main menu bar.

b. Select the **Leg Times** tab.

c. If map based flag sites exist, the time splits associated with these can be

transferred to the leg times list by <*click*>ing the **Load Map Sites** button.

d. Select the leg time you wish to enter and press <*Enter*>. Enter the time and press <*Enter*>. The **Leg Times** sheet will be automatically updated as you go. Legs can be added by entering a time at the bottom of the list.

e. A leg time can be removed from the list by selecting the leg time and pressing <*Del*>.

Shifting the position of a flag site along the GPS data is the same as increasing or decreasing time for one leg while decreasing or increasing the following leg time. Buttons have been provided to make this combined adjustment by 1 minute or 1 second at a time. The time of either leg cannot be reduced to less than one second with these buttons. If you wish to have OTrack use these time based flag sites, tick the check box provided.

Control Flags - Edit Map Based Flag Sites

To edit the map based flag sites:

a. Press the  button on the toolbar to reveal the Flag List. Many OTrack functions will be disabled while this button is down.

b. Buttons adjacent to the flag list enable you to add and remove flags or to change a flag's sequence number for a course.

c. To alter the position of a flag on the map, select it by <*click*>ing over the flag number in the Flag List or by <*click*>ing over the flag site on the map. It may then be moved by using the mouse to drag it to the correct place on the map.

Note A control can be brought into view on the map using the map's scroll bars or by double <*click*>ing the flag number in the flag list.

d. Press the  button on the toolbar to leave the control flag edit mode.

Chapter 12 - Setup

GPS

These options are accessed through **File** ⏵ **GPS Setup**

Basic Settings

a. Ensure your GPS unit is correctly connected to your computer, is turned on and in the correct mode to talk to your computer. Consult your GPS Owners Manual for assistance.

b. Select the type of GPS unit you have from the **GPS Unit** drop down list.

c. Select the GPS data transfer speed to be used from the **Data transfer speed** drop down list. Consult your GPS Owners Manual for assistance in choosing an appropriate value. It is likely that the OTrack defaults will be appropriate.

d. Press the **Test** button. OTrack will search all COM ports on your computer for the GPS unit. If found, OTrack will display name of the GPS unit and the name of the COM port to which it is found. If it is not found then you may have selected the wrong unit or the wrong speed. You may have to reboot your computer as Windows may not have recognised the existence of your GPS unit on one of the computer's COMs ports.

e. You will need to use this GPS unit and COM port combination whenever you are going to load data directly from your GPS unit.

Advanced Settings

These settings should only be adjusted as a last resort. Before making any changes, record the current settings and store them in a safe place.

The parameters which can be adjusted are:

- **Read wait time (milliseconds)** - The additional time OTrack will wait for a read operation to complete after the GPS unit has been requested to send data. The internal processing speed of a GPS unit can be quite slow resulting in a delay between a request for data and the actual transmission of the first piece of data.

- **Write wait time (milliseconds)** - The time OTrack will wait for a write operation to the GPS unit to complete. OTrack write operations will normally be very short as they are limited to sending acknowledgements of a successful read operation from the GPS unit.

- **Retries** - The number of additional times a read/write operation will be attempted if the original read/write operation failed.

Adjusting these parameters will affect the successful reading of data from your GPS unit. Adjustments may improve read times or on the other hand prevent successful reading of data.

Glossary

Term	Meaning
Altitude	Height above sea level as recorded by the GPS unit.
Climb	The sum of all of the positive altitude changes (increases in height) since the beginning of the GPS data.
Distance	The distance travelled since the beginning of the GPS data.
Elapsed Time	The time that has elapsed since the beginning of the GPS data.
Heart Rate	Heart rate in beats per minute as recorded by the GPS unit.
Speed	The current speed of the runner.