Golden Cheetah User Manual

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Table of Contents

1 WELCOME TO GOLDENCHEETAH

GoldenCheetah is an open source program for cyclists.

In fact, it is primarily a program for cyclists with a power meter. It provides functions to download, import, edit, upload and analyse rides containing power data.

It can be used to analyse bike rides that do not contain power, perhaps containing speed, cadence or GPS data. It can be used to analyse other kinds of workouts, perhaps run or swim activities. It can be used purely as a log or journal for any activity.

GoldenCheetah is primarily an open source program for cyclists that own a power meter.

In addition to the post-workout analysis it can also be used as a desktop application to record and monitor workouts on a cycle trainer. It captures telemetry from ANT+ sensors and can also work directly with Bike trainers that provide the right kind of interface.

In this manual we will be explaining how to use and configure the functions within GoldenCheetah. We will be describing it from the perspective of a bike rider. In all cases we will be describing how the functions within GoldenCheetah work, and how to configure them.

This is not a manual on how to train with power. We would urge you to read other books for that kind of information and would recommend 'Racing and Training with a Power Meter' by Dr Andrew Coggan and Hunter Allan.

1.1 About this latest version, V3.0

This manual has been written as a companion to the latest release of GoldenCheetah, v3.0. Released in Spring 2013, it represented an overhaul of the code and was a major update.

If you are new to GoldenCheetah then all the functions it provides will be new to you, but for existing users, version 3.0 had introduced;

500+ bug fixes and minor enhancements

It fixed 46 serious issues and over 400 bugs in over 1,500 different commits. GoldenCheetah is now over 100,000 lines of code. In addition to addressing stability issues it also addressed a number of performance related issues. Whilst the new metric functionality and database means that a modern PC is recommended, the code is still efficient enough to run on a netbook.

Redesigned UI and UX

One of the most immediate changes you will notice with v3.0 are the major changes to the user experience and user interface. From the initial help screens for new users through to the redesigned preferences pane for advanced users, it is slicker and more professional.

There are 4 views available with specific and detailed sidebars for performance tracking (home), short term tracking (diary) as well as the well known analysis and training views from earlier releases.

It now allows you to view charts tabbed and tiled, you can resize and move charts around and customise them using roll-over controls. The activity list is fully configurable and can be configured to show any number of columns.

Support for the latest bike computers

It supports direct download features for the Cyclops Joule and Joule GPS as well as the latest SRM Powercontrol 6 and 7. We also added support for the O-sync Macro and Macro X.

Support for more telemetry

Alongside the support for the latest bike computers it also added the ability to track and plot new data series, including; Headwind, LR Balance, Temperature and Slope.

Export and Batch Export as well as lots of new file formats

It will now export and batch export your data to a wide variety of file formats include TCX, PWX, JSON and XML as well as FITLOG and GPX.

It also supports reading files from SportTracks, GPX, Tacx CAF and the SLF/SMF file formats. We have also added legacy WKO+ file format support (CP 1.0 and 1.1) as well as import of Wattbike TXT exports.

Support for a wide selection of internet services

It can upload and download data from; Withings, Zeo, Strava, TrainingPeaks, Training Stage Buch, RideWithGPS as well as Internet based calendars (calDAV) such as Google Calendar.

Realtime training significantly enhanced

Support has been added for native ANT+ removing the need for quarqd. Video Playback is built in using VLC/QTKit. It now has a media library to organise and reference any video content you may have from Tacx Ergvideos through Sufferfest.

It supports Virtual Power for popular devices from KK, LeMond and many other trainers. We have added support for the amazing new Wahoo Fitness Kickr trainer as well as the old Tacx Fortius.

It also introduces new ways to ride on the trainer including; Streetview, SpinScan (on Computrainer) and an enhanced Workout Plot that plots telemetry against the workout as you ride.

It also includes Computrainer calibration, a workout wizard and download from ErgDB as well as Multi-device Support allowing you to ride with with your ANT+ powermeter on your Computrainer, Kickr or Fortius.

Advanced search and data filtering

It introduces free text search across all activities and a data filter (using the same search box) to filter activities with specific properties. Some examples of using the filter might be finding all rides with a TSS > 300 or perhaps those with an IF >0.9 and a duration of > 1hr.

The search and filter functions can be applied to the charts – which means that you can plot a PMC only where sport is "Bike" or perhaps power distribution but only where the workout code is FTPTEST.

Lots of new charts

It provides a new HR to Power analysis chart as well as a more utilitarian 2d scatter plot. It will also use Bing as map provider for the Map chart.

The histogram and CP curve plots will now plot data for a date range rather than for a specific ride and it will also now plot a mean max curve for HR, Power, Speed, Cadence, xPower, VAM and NP.

New metrics, including TrainingPeaks' TSS and NP

The TrainingPeaks metrics have been added to both the analysis functions as well as the training functions (e.g. track TSS as you ride the trainer).

There are now over 100 different metrics and measures you can work with including things like; Pace, Maximums, Gradient, VAM, wpk, time in HR Zones and many, many more.

1.2 Open Source

GoldenCheetah is an open source program. This means the source code is freely available to download and compile. You can add new features and fix bugs. All we ask is that you then share your work back to the main project.

This is how GoldenCheetah has developed since it was first created in 2006. Over 50 different people have contributed new features and fixes in the 7 years since then.

Mailing list

As you would expect there is an active community of users and developers, you can join the discussion and contribute. The main GoldenCheetah website is `www.goldencheetah.org` and the main mailing list is hosted on Google Groups and is called golden-cheetah-users.

Reporting bugs and requesting new features

The code is hosted in a repository at GitHub. Github is an internet service hosting open source and commercial code repositories for thousands of projects. In addition to hosting projects GitHub also provides an issue tracker.

The issue tracker URL is: `github.com/GoldenCheetah/GoldenCheetah/issues`.

We use the GitHub issue tracker to manage all bug reports and feature requests. If you are looking for a new feature or have experienced a problem using the software then you should consider raising it on the issue tracker.

As a non-developer one of the most valuable contributions you can make to the project is to provide accurate and informative bug reports. This makes it easier for the developers to fix the code and in turn makes the software better for everyone.

1.3 Bit of Past and Present

In early 2006 a Cat 1 racer called Sean Rhea bought a Powertap. Back then power meters were not very common. They certainly weren't very open. The software options were very limited. But Sean was a bit of a geek.

He set about reverse engineering the protocol the Powertap used to communicate with the PC and he developed a couple of command line utilities in the C programming language; 'ptdl' and 'ptunpk'. These utilities downloaded data from a Powertap via its serial interface saving to 'raw' files on disk, and then read that raw file and formatted the output for inputting into GNU plot.

But it soon became clear that using the command line was not at all user friendly. A GUI was going to be required. And so, in late 2006 Sean set about writing a GUI version using the QT framework and moving to the C++ language (because he needed to learn QT for his new job).

This early version had the main charts you see today, indeed a lot of that early code is still present. It could plot the ride, histograms and the CP curve that it is famous for.

From 2007 with Sean leading many new people became involved and new features were introduced; support for SRM using the libsrm project written by Rainer Clasen. Support for Linux, Windows, Metrics, File Formats, Power Zones and a large number of new charts including a Performance Manager written by Eric Murray. Google Map written by Greg Lonnon.

During this time the project moved from a 'hack' project to a fully fledged open source development project and saw Jamie Kimberley, Robert Carlsen and Justin Knotzke assist Sean in managing development with the introduction of a bugs database and more formalised releases for Linux, Mac and Windows.

In Summer 2009 a lot of the current developers joined the project, notably Damien Grauser who added much needed support for interval analysis and Mark Liversedge who contributed WKO+ file support and the 3d plot. Over the next 12 months v2.0 was developed introducing the training View (with Justin Knotzke) as well as the editor and tools, metadata and long term plotting charts.

At the tail end of 2010 Sean handed leadership of the project to Mark. Sean was no longer racing and most develpoment was now being delivered by others anyway. So in January 2011 Mark merged a number of features that were being developed in private into the main repository and thus V3 development began.

In Spring 2013, after 3 years of development version 3 was released, along with this user guide.

Version 3 is a landmark release and provides a platform for future development - the modular views and configurable layouts means it will be very easy to introduce new functionality and concepts without needing to adjust the underlying code. In short, v3 provides a future platform.

1.4 Future Plans

Version 3.1 is already being planned and the high priority features include;

- Planning functions centred around the concept of an interactive performance manager chart where you set target events and physical adaptations or performance targets with a progression of daily stress and long term stress.

- Interval Analysis and Comparison across separate rides, to compare efforts and track and rank performance in intervals or 'segments' of rides and routes.

- Season by Season progression to compare and rank performance development in cycles and seasons across the long term charts, but also the critical power and distribution charts.

- Separation of the training view into a separate program 'OpenTrainer' to enable more advanced graphical displays including video with overlay and animations.

Version 3.1, hopefully, will not take so long to come to fruition and is currently targetted for Spring 2014.

2 QUICK START GUIDE

For those of you that are new to GoldenCheetah this section gets you up and running with the software and using its basic features. For those of you with experience of GoldenCheetah from previous releases, you might like to skip this chapter.

2.1 Downloading and Installing

There are four ways to get GoldenCheetah onto your PC and available for use:

- **Download a Stable release build** - We maintain a stable release binary for download and installation on the GoldenCheetah website, at `www.goldencheetah.org/download`.
- **Download a Development build** - We also provide regular build updated of the very latest code on the GoldenCheetah development build website, at `www.stand2surf.net`.
- **Build from Source** - Since we provide the source code for the program you can get the source from GitHub and build your own. But unless you plan on contributing to the project this is probably a pointless exercise. You could just use the pre-built binaries described above.
- **Apt-get install** - If you are running a Linux distro you can get the GoldenCheetah binary and dependencies installed via apt-get. It is worth noting that at the time of writing the V3 build has not yet been packaged.

Once you have the binary installed you can go ahead and run it, it doesn't need any configuration before you start.

2.2 Running for the first time

When you run GoldenCheetah for the very first time it will prompt you with the Athlete selection dialog box. In GoldenCheetah we allow you to create as many athletes as you like. This may sound like it is only useful for coaches, but in fact you may want to set up a scratch athlete to play and learn.

Either way in this first run you will not have an athlete created, and will see a blank dialog, asking you to select or create an athlete to work with:
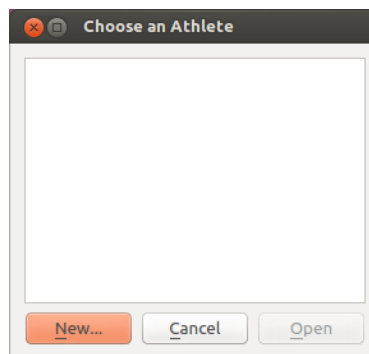

Figure 1: Initial Dialog

At this point you should go ahead and click 'New...'. This will open another dialog window to create a new athlete and set some basic data.
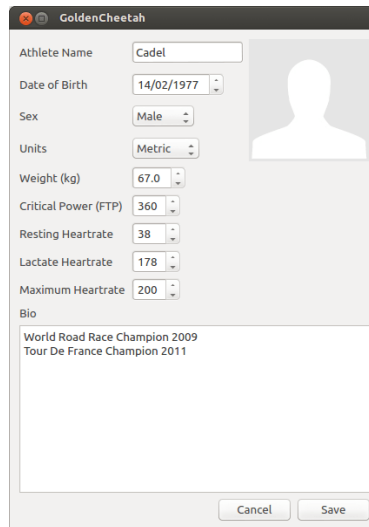
Figure 2: New Athlete Dialog

Whilst it is possible to configure these values in preferences or within an individual activity you should go ahead and set up as much of the data as accurately as possible. These values are used as defaults in many metric calculations.

If you click on the blank athlete icon on the right it is possible to set an image for the athlete too. This isn't used anywhere at present, but that may change in the future.

The LTHR value is the HR at which the onset of blood lactate accumulates, whilst the CP value is the maximum theoretical watts you can hold for an hour. It is very similar to your FTP (if that is a term you understand).

Once you're happy with the settings click save and you will then be able to select your new athlete in that initial dialog (except of course there is now an athlete listed). Go ahead and open that athlete and you wil be greeted with GoldenCheetah, but a splash page.

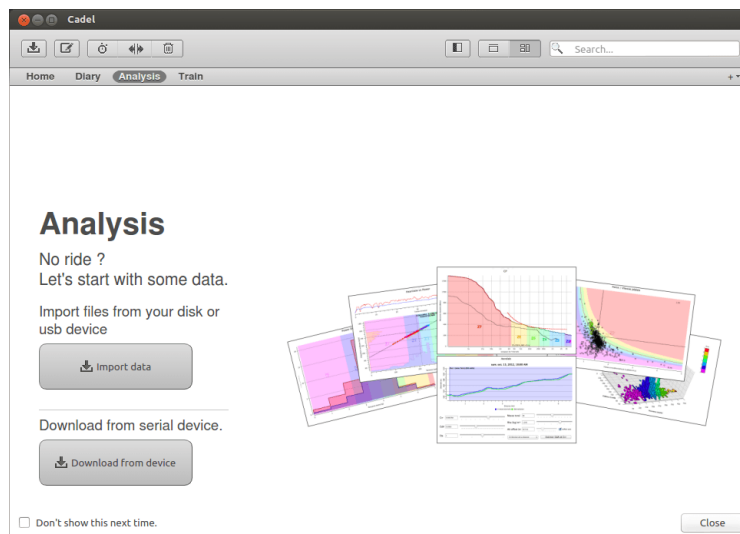

Figure 3: Analysis view splash screen

This page is shown because there is no data associated with this athlete. We need to go ahead and download some data from your bike computer or import some data from disk or USB.

2.3 Downloading a ride from device

If you use a Powertap, SRM, Joule, Joule GPS or Macro-X device you will be able to download from it directly. Please make sure the device is conected and plugged in correctly. For example, if you are downloading from a Powertap please make sure the computer is firmly connected and displays 'HOST' on its screen.
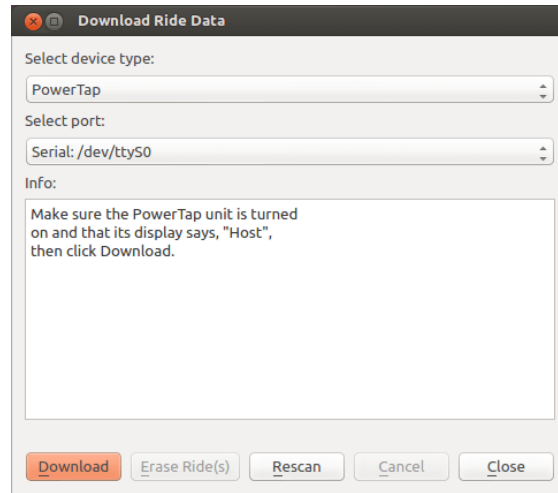
Figure 4: Download Dialog

To start the download go ahead and click the download from device button. This will open up the download dialog. Select the right kind of device and serial port before clicking on the 'Download' button. If no serial port is listed, or the port is not correct you can click on the 'Rescan' button to look again for your device. This is sometimes required if you click on 'Download' before the device is connected.

Any ride files will then be downloaded and imported into GoldenCheetah and the splash screen will disappear to reveal the Analysis view of GoldenCheetah. Congratulations - you can now start using GoldenCheetah to analyse and track your performance.

2.4 Importing data from file

To import files into GoldenCheetah you have a couple of options. You can drag and drop them from a file explorer or from the desktop into the main GoldenCheetah window, or you can select them via the import files button on the splash screen. Once you have done either the import activity wizard will appear to process the selected files.
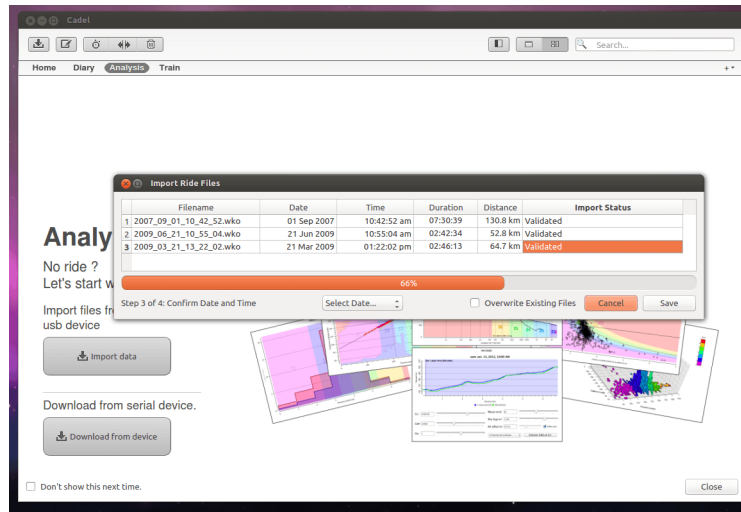
Figure 5: Import Activity Wizard

You will notice that the files are opened first to ensure you have the required permissions to read them before being validated. Once validated the dialog will prompt you to edit any of the dates (some file formats do not include date information). Once you have set the dates (if needed) you can click on save to complete the import and save the files to disk.

The splash screen will now disapper and reveal the main GoldenCheetah analysis view and you can now start analysing and tracking your performance.

3 GETTING AROUND GOLDENCHEETAH
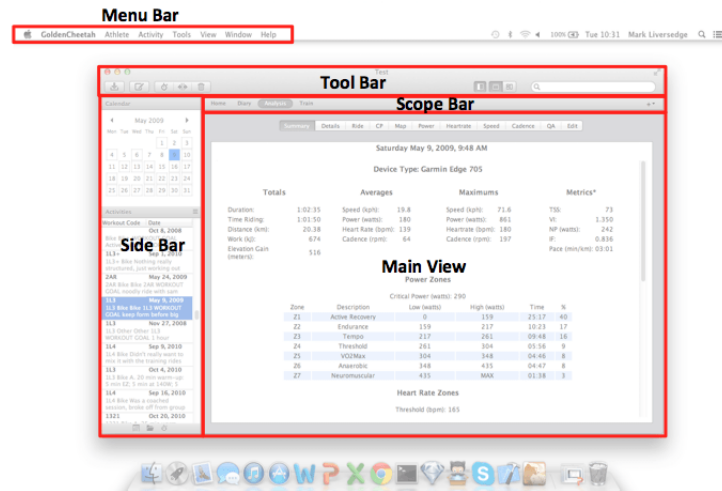
Figure 6: Main window elements

Regardless of whether you are training with your bike trainer, reviewing recent activities in the diary or tracking long term performance in the home view, the GoldenCheetah layout is always the same.

Looking at the figure above you will see the following components;

- **Menu Bar** - this contains all the menu options for GoldenCheetah. The screenshot shown is from the Mac OSX version, but the menu bar is similar in modern Linux distributions. On Windows the menu bar will be seen within the main window rather than at the top of the screen.

- **Tool Bar** - the toolbar contains buttons to get quick access to functions that also available within the menu bar. We place them in the toolbar because they are used very commonly, and it is handy to be able to get at them quickly and easily.

  In V3 the toolbar is biased towards functions used during analysis, but this may change as we get more feedback from users about what they use most commonly in the other views.

- **Scope Bar** - the scope bar is used to select the view. Each view offers different functionality as their names suggest. Additionally there is a '+' menu to the right of the scope bar for adding charts to the view selected.

- **Side Bar** - the side bar contains selections and lists that are most appropriate for what the user is currently doing. It changes as different views are selected in the scope bar.

- **Main View** - selected via the scope bar the main view shows the charts and windows relevant to the view in question. Analysis View contains analysis functions and so on. Note that the view can be shown in a tabbed style or a scrolling set of tiles.

The only time the main window looks different to that shown above is when running for the first time or when no data is available. In this case a 'splash' screen is shown to assist new users in importing data or setting up devices etc.

3.1 The Menu Bar

The GoldenCheetah menu bar is no different to any other application. The only slight confusion is the location of the preferences pane across platform. On Windows and Linux the preferences pane can be found as Tools->Options whilst on a Mac it is found as GoldenCheetah->Preferences.

NOTE: Each menu is now explained in the section below, but depending upon the options installed when the program was built you may not see all the menu options listed. If you installed a stable build from the GoldenCheetah website it will have all available options compiled in *this is not the case for Development builds*.

The *Athlete* menu

The Athlete menu is largely about opening and closing new windows. Since in GoldenCheetah we open a new window to work with a specific athlete (you cannot switch athlete in the main window, you need to open another window). As a result this menu is rather trivial:

- **New...** - Opens the new athlete dialog we saw in the quick start guide and then proceeds to open a
- **Open...** - Opens the choose athlete dialog in order that you select an athlete to open in a new window.
- **Close** - Closes the current athlete window.

NOTE: When you restart GoldenCheetah it will always open the athlete you last opened, so if you open up an athlete and close to go back to a previous window the last Athlete that was opened will be displayed, rather than the last one you closed. You can specify which athlete to open on the command line e.g. `$ ./GoldenCheetah "Mark Liversedge"`.

The *Activity* menu

In GoldenCheetah we refer to a ride file or any file that contains data related to an exercise you have completed as an 'Activity' this is because simply referring to it as a 'ride' wouldn't be valid if, for example, it was a run!

Additionally, a prescribed activity plan (e.g. 2x20 mins at L4) we refer to as a 'workout'. This may be confusing to users that come to us from TrainingPeaks WKO+ where a workout refers to a past activity. We refer to future activities as planned activities and past activities as just activities.

So, this menu contains functions for working with activities – past exercises that have been recorded and imported into GoldenCheetah.

- **Download from device...** - Also available from the tool bar this function opens the dialog to download data directly from a device. We support SRM Powercontrol, Powertap LYC, Joule and Macro-X devices.
- **Import from file...** - This option will open a file selecton box to select one *or more* files to import. Once selected the files will be processed by the import wizard. You can also import files by just dragging and dropping them on the analysis view.

    NOTE: If you try and drag and drop on the training view we will try and import videos and workouts (not activities).

- **Manual activity entry...** - This will open up a dialog box to create a manual entry. There is also a button on the toolbar that does this. A manual activity gives you the opportunity to estimate time, distance, stress and other metrics for an activity that wasn't record (for example on a gym bike). See Section 4.1 [Importing Exporting Downloading and Creating Data], page 16.

- **Export...** - Will open a dialog box to export the currently selected activity. You can select the directory to export to and the file format to write the export as. This is particularly useful if you want to send your data to a coach who requires data in a format his software understands.

  For example; PWX files can be read by WKO+ and Garmin TCX files can be read by almost all sports software.

  NOTE: Whilst we offer FITLOG format for SportsTracks we would not recommend it, since the fidelity of the file format is very suspect.

- **Batch export...** - This opens the batch export dialog, it provides the ability to select the output directory and format to export to as well as select the activities you wish to export. Since this functions is typically used to export data for import into another program there is a select all option too.

- **Export Metrics as CSV...** - Although the metric database is a sqlite file it can be useful to export all the metrics as a comma separated variable format to work with in a spreadsheet. This function will export all columns and rows to a CSV file of your choice.

- **Upload to TrainingPeaks** - This will upload the currently selected ride to TrainingPeaks.com. There are no options since the account and password need to be defined in the preferences pane before you start.

- **Download from TrainingPeaks...** - This will open the download dialog for TrainingPeaks.com. It allows you to select the specific activities you want to download and will match the available activities to any existing activities by examining their date and time.

- **Upload to Strava...** - This opens the upload to strava dialog to allow you to select which data series you want included.

- **Download from Strava...** - Download from Strava requires a Strava activity ID. Once you provide this the activity will be downloaded and imported into your activity library. Note that there is no option to select activities from a list since Strava do not support this (data lock-in).

- **Upload to RideWithGPS...** - This will upload the currently selected ride to RideWithGPS.com. There are no options required.

- **Upload to Trainingstagebuch...** - This will upload the currently selected ride to TrainingStage-Buch.com. The user id and password need to be configured in the preferences pane in order for this to work.

- **Save activity** - We do not automatically save changes to activities, if you want to update the activity you must save it. The metrics for the activity will only be updated when it is saved.

- **Delete activity...** - Permanently deletes the ride from the ride library. There is no undo so use with caution. It will prompt to confirm you really mean it.

- **Split activity...** - Will open the split activity wizard, this wizard will allow you to find breaks in an activity and split it into separate activities. This is of particular use when you forget to stop recording and end up with multiple activites downloaded as a single activity.

The *Tools* menu

The Tools menu contains a selection of 'handy' utilities, its a bit of a catch all for functions that are either related to manipulating activities or don't really fit in anywhere else.

- **Options...** - Only on Linux and Windows this opens the preferences pane. Note that the preferences pane is an application in its own right and will remain open even when you have closed the main windows. You can also have multiple preferences panes open at once **we recommend you do not do this**.

- **Critical Power Estimator...** - Opens a dialog to estimate your CP based upon a short and long power best or result from a specific test. We recommend using 3 minutes and 20 minutes since that aligns with the algorithm used (Monod/Scherer).

- **Air Density (Rho) Estimator...** - Opens a tool for estimating Air Density based upon temperature and air pressure. This is useful when working with Aerolab.

- **Get Withings Data...** - Downloads all measures for you Withings weight scale, but the user id and public key need to be configured in the passwords section of the preferences pane.

- **Get Zeo Data...** - Downloads sleep data for your Zeo sleep monitor. You will need to have configured the user id and pasword in the preferences pane.

- **Create a new workout...** - Opens the workout wizard for creating a training view workout. This will create a '.erg' or '.crs' workout.

- **Download workouts from ErgDB...** - Opens a dialog to select and download training view workouts from the internet ErgDB website.

- **Import workouts or videos...** - Opens a file dialog to select and import a workout or video into the training view library.

- **Scan disk for videos and workouts...** - Opens a dialog to scan directoris for workouts and videos and import into the training view library.

- **Upload Activity to Calendar** - Will create a calendar entry to any CalDAV based calendar service. You will need to configure the URL, user and password in the preferences pane before using this.

- **Refresh Calendar** - Will read any entries from your CalDAV internet calendar to display on the calendar view.

- **Find intervals...** - Opens a dialog to find intervals in the current activity. This menu option is here since it has always been on the tools menu. It should really be moved to the *Activity* menu.

- **Adjust Torque Values...** - An editor tool for adjusting the torque data series. This is useful when using a Powertap without calibrating.

- **Fix GPS Errors...** - An editor tool for extrapolating and adjusting GPS values, this is useful when your GPS device lost its satellite connection or after importing from other software and the data contains invalide values.

- **Fix Gaps In Recording...** - GoldenCheetah expects all data series samples to have timestamps separated by a consistent recording interval (e.g. every 1 second). This tool dialog allows you to extrapolate values where there are gaps in recording. In future releases we may remove the need for the data series to have regular timestamps.

- **Fix HR Spikes...** - Find and smooth out spikes in HR, usually caused by loss of conection or iterference from overhead power lines.

- **Fix Power Spikes...** - Find and smooth out spikes in Power, usually caused by reed switch being double triggered or recording interference.

The *View* menu

The View menu provides a menu access to the view configuration, showing and hiding UI elements as well as switching fullscreen and adding charts to the layout.

- **Toggle Full Screen** - As the name suggests toggles between normal and full screen. On Linux and Mac this is also available from the F11 key (and you can use the ESC key to leave full screen mode too). On Mac Lion we use the standard toolbar button for switching between normal and full screen mode.
- **Show Left Sidebar** - Toggles the display of the sidebar.The button on the toolbar also does the same. You can also drag and close the sidebar by hand.
- **Show Toolbar** - Toggles showing or hiding the tool bar.
- **Tabbed View** - Toggles tabbed or tiled mode for the current view.
- **Analysis** - Switch to the Analysis view.
- **Home** - Switch to the Home view.
- **Train** - Switch to the Training view.
- **Diary** - Switch to the Diary view.
- **Add Chart** - Opens a submenu to select a chart to add. When selected an add chart dialog will be open showing the chart and allowing you to adjust the chart settings before it is added to the current view.
- **Reset Layout** - Will reset the current view layout to the application default. This is useful if you spoil your setup, or want to fall back to the current application default. Note that the application default will change and improve over time.

The *Window* menu

Simply lists the current windows you have open and allows you to select the window to raise and make the current window focus.

3.2 The Toolbar and Scope bar

what the buttons do

3.3 Views & Sidebar

scopebar, sidebar, tab/tiled, add chart menu

3.4 Searching and Filtering

free text search and basics of data filtering

3.5 Adding and adjusting charts

the dialog, title, settings, finding them again

3.6 Going fullscreen

key sequences, hiding and showing the toolbar screensaver?

3.7 The Metric database

why, what, where, refreshing, exporting

4 IMPORTING EXPORTING DOWNLOADING AND CREATING DATA

4.1 Download from device

download dialog, basics for each device (plugging in etc)

4.2 Import from file

selecting a file, the import wizard

4.3 Manual activity

the manual activity dialog and refer to details screen for more "indepth" (need a better word) stuff

4.4 Exporting data

i A single ride ii Multiple rides

4.5 Uploading and Downloading from the Cloud

i TrainingPeaks ii Strava iii TrainingStage Buch iv RideWithGPS

5 THE ANALYSIS VIEW

5.1 About Activities and Intervals

5.2 Sidebar actions and context menus

o activities o intervals

5.3 Editing and adjusting data

o using the editor i basics ii anomalies iii find o advanced editor functions i the 'fix' tools ii copying, cutting and pasting

6 Analysis View Charts

i Activity Summary ii Details iii Summary and Details iv Editor v Performance vi Critical Mean
Maximals vii Histogram viii Pedal Force vs Velocity ix Heartrate vs Power x Google Map xi Bing
Map xii 2d Plot xiii 3d Plot xiv Aerolab Chung Analysis

7 THE HOME VIEW

7.1 About Date Ranges, Seasons and Events

8 Performance Tracking Charts

i Long Term Metrics - indepth howto incl. setting up a PMC++ ii Performance Manager iii Collection TreeMap iv Critical Mean Maximal v Distribution

9 THE DIARY VIEW

9.1 Purpose

9.2 Summarising for Day / Week / Month

9.3 Longer term purpose (planning)

10 THE TRAIN VIEW

10.1 About Devices, Workouts and Video

10.2 Sidebar actions and context menus

o devices o workouts o media

10.3 Working with the Workout Library

- Creating a new Workout - Getting Workouts from ErgDB

10.4 Setting up and starting a workout

- Using CT handlebar controller - controlling workout from mouse + keyboard

11 Training View Charts

i Telemetry ii Workout iii Realtime iv Pedal Stroke v Map vi StreetView vii Video Player

12 CONFIGURING

Intro and explain opening the Preferences Pane

12.1 General

12.2 Athlete

i About ii Power Zones iii HR Zones

12.3 Passwords

i General ii Withings iii Zeo iv Google Calendar (calDAV)

12.4 Appearance

12.5 Data Fields

i Fields ii Notes Keywords iii Processing

12.6 Metrics

12.7 Train Devices

i Using Multiple Devices ii Adding a device

Appendix A Supported Devices, Formats & Services

B Metrics Reference

B Data Filtering Reference

C Glossary & Resources

D OS Specifics (Directories, Drivers and Permissions)

Index

(Index is nonexistent)