

Garmin Paragliding-App „XCTracey“

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Introduction

This app is a simple vario without recording for paragliding or hang gliding, which can be displayed on Garmin sports watches with barometer and the well-known high-quality GPS.

Although the app works self-sufficiently, i.e. without external sensors/additional devices, **it does not replace a real flight instrument due to the relatively high latency and the missing drift compensation**. Together with a minivario (e.g. XCTracer, leGPSBip, Solario, BlueFly), to which it does not need to be paired, it is a full-value solution especially for H&F, where every gram counts - and it is always sufficient for a spontaneous flight after an H&F. Another application is safety training over water, as the supported watches are sufficiently waterproof.

For example, the combination of the solar-powered XCTracer III mini and a Garmin vivoactive HR weighs only 75g - for excellent acoustics, recording and the self-sufficient display which is absolutely sufficient for H&F!

The display frequency is 1hz (optionally 2hz). Flight relevant (altitude) values are determined based on air pressure, calibration is done either by GPS or manually.

The app is basically free of charge! Since development, documentation and maintenance requires a lot of work, a donation - decide for yourself what such a solution for the not so cheap watch is worth to you - via PayPal (see website) is always welcome.

Starting and stopping

The app ranks among the other sports of the watch (running, cycling, rowing...) and is selected like these. It must be explicitly terminated, either by double pressing the ESC key or via **Main Menu > Quit**.

The **Main Menu** is reached by pressing the ENTER key and exited with ESC. With some models (e.g. vivoactive 3) this is done alternatively by swiping or screen buttons.

Display

The display is structured as follows:



Anzeigebeispiel (Garmin vivoactive HR)

1. Local time
2. Airtime

Format: minutes:seconds, from 1 hour in the format hours:minutes
 As long as no flight has been detected, it will read "--:--". The launch can be detected automatically using the set thresholds, or it can be set manually at any time using **Main Menu > Launch!**
3. Battery level

For round displays, a simple circle is drawn instead of the filled in battery symbol. The colours mean

 - green $\geq 66\%$
 - white $\geq 40\%$
 - light gray $\geq 16\%$
 - red $\leq 15\%$

When the permanent backlight (PermLite) is active, so that you can read the clock without touching it even when it is cloudy, the border of the battery symbol turns dark orange instead of yellow to indicate increased battery consumption.
4. Altitude (AMSL, barometric)

As long as the altitude has not been calibrated, the digit remains light grey (insufficient values) or red (no measured values) - after that it turns white. Calibration is performed automatically when a 3D GPS signal is received for 5 seconds. It can also be set manually via **Main Menu > Settings > Altitude**, if you know the starting location.
 The maximum altitude flown is displayed in the upper right corner next to the altitude.

5. Barogram (relative) over the last 10 seconds
With the starter detection a running barogram is displayed. This roughly indicates the quality of the climb, but actually serves as an indicator for the ongoing recording. If the end of the flight is automatically detected or manually set, a country symbol is displayed instead. The colour of the barogram represents the type of calibration: light grey for automatic, green for manual setting (see also under "Menu")
6. Relative altitude to launch (m)
The relative altitude A2 is also displayed with the starter detection. Green values mean a take-off elevation, red values mean that you are flying below the take-off altitude.
7. Climb/descent (m/s, optionally integrated)
Rise is shown in green, sink in red. A limit value can be entered in the settings for both colourings, within which the vario display remains white.
8. Vario bar
In addition to the integrated vario display, the current climbing/descent is also shown as a bar with green or red deflections and as a value. Each half of the vario bar corresponds to 5m/s; values going beyond that are only recognizable by the number. The vario bar is not available on all watch models!
9. Compass rose with wind pointer
The pink arrow indicates where north is. If it is filled in, the direction is determined by the GPS in motion, otherwise by the internal compass (e.g. at the start).
The green arrow points to the starting point as soon as you are at least 50m away from it and fly.
The GPS-based compass rose is only displayed when the pilot is in motion.
When the wind display is activated (see Settings), a grey wind arrow relative to the flight direction, as well as the wind speed. Otherwise the current heading is shown.
10. Ground speed (km/h)
11. Current integrated glide ratio (L/D)
L/D, which uses the same integration period as the vario, is only shown during descend phases. Format is 1:x, while the leading „1“ is left off..

Depending on the watch model the layout may change.

Alternative display

On rectangular watches only (vivoactive_HR) there is an alternative display, giving easier access to crucial information i.e. when flying with bad visibility due to weather or light:



Alternative display (vivoactive HR only)

You can change between the displays by swiping to the left.

Status, menus and settings

From the main screen you can display the current settings by swiping to the right (for clocks with touchscreen) or the UP button (leftmost image). The menu button leads to the main and settings menu (images 2-7). Both the status page and the menus are exited with the ESC key.



Status page, menus and settings (example: Garmin vivoactive HR)

The main menu has the following options:

- **Launch!**
Trigger launch immediately
- **Land!**
End logging/display immediately (Duration etc. stay on screen)
- **Settings (cancel with ESC)**
Settings:
 - **VarioInt s**
Integration period (1-30s) for vario and current L/D

- **AutoLaunch km/h**
Speed treshold for launch detection (5-15 km/h)
- **AutoLaunch s**
Time treshold for launch detection (3-15s), combined with speed treshold
- **AutoLand km/h**
Speed treshold for end-of-flight detection (1-20 km/h – everything over 3km/h is for testing purposes only)
- **AutoLand [s]**
Time treshold for end-of-flight detection (0-45s – zero means no auto land)
- **Set Altitude**
Manual calibration based on GPS or current pressure (in case of GPS errors), to be adapted between -100m up to +100m. If set, which is useful close to cliffs etc., all auto calibration is disabled until next launch. The logging indicator (barogram) stays green then.
- **Wind (experimental)**
Wind arrow in compass rose, based on last circle. The speed is shown on a white background if the last circle is not older than 3 minutes, otherwise it gets yellow.
This feature is still experimental and must not be used as the only base for any landing decisions!
- **Toggle PermLite**
Re-enable backlight every second (better in gray skies, but drains battery quickly!)
- **Climb Treshold [m/s]**
Treshold for climbing (makes numbers green, everything below stays white)
- **Sink Treshold [m/s]**
Treshold for descent (makes numbers red, everything above stays white)
- **Frequency [s]**
Toggle between 1 and 2 measures per second (Hz). 2 Hz makes the vario and compass rose react faster, but weaker watches may „stutter“. Garmin standard is 1 Hz.
- **Quit**
Quit app

Tips and tricks

- If you accidentally get into a **cloud** shortly after take-off, the **green arrow** in the compass rose will give you a quick indication of whether and how you are still moving away from the start.
- With sufficient ground clearance, even without a wind arrow, an evenly flown full circle before landing provides information about the wind. The position of the magenta-coloured arrow in the compass rose at maximum and minimum speed is only roughly remembered. If the arrow is then again in the position as observed at minimum speed, you land against the wind, whose speed is then half the sum of both extreme speeds.
Alternatively, you can observe the configurable **wind pointer**, which is still experimental.
- The **automatic landing detection should be switched off** in strong winds, when longer soaring without forward movement is expected. The flight can also be stopped via the main menu, which will be helpful for future versions with recording.

- Depending on the preferred arm position it may be advisable to **turn the watch inwards at the wrist** or even to clamp it diagonally around one of the main carabiners.
- The **integration** of the vario display tries to filter out fluctuations and provide a sensibly damped display. Recommended here are times between 5s (rather Soaren) and 15s (rather free flight). A setting of 0 switches the integration off; then the large and the small vario display correspond to each other. The **glide ratio** is also determined by the integrated sink rate and is only smoothed over this.
- The **permanent backlight** (PermLite) makes it easier to look at the app spontaneously, but it costs a lot of battery! The latter also applies to the turned-up display frequency of 2Hz.
- The ideal complement to the combined sports watch/app is a high-quality GPS minivario, which provides the acoustics and takes over the recording. The XCTracer mini II/III/FLARM models with their solar cells, which are attached to the shoulder or container and together with the watch represent a complete solution under 100g.