WingsLevel

User manual: GPS-aided attitude, tapes and HSI with Direct-To, on your phone

Safety notice. WingsLevel is a non-certified situational-awareness aid for VFR flight. It is not approved by EASA, the FAA or any other authority and must not be used for primary navigation or in instrument meteorological conditions. Phone sensors can drift or fail. Always keep visual reference and cross-check with the aircraft's instruments. The pilot in command remains responsible for the safe conduct of the flight.

App address: wingslevel-app.ppoinha.com · Website: wingslevel.ppoinha.com · Edition of September 2026

Contents

How to read this manual

Names of buttons and menu items are written in **bold**, exactly as the app shows them. "Settings → Terrain Manager" means: open Settings (the gear icon), then tap Terrain Manager. The screenshots are taken from the app itself on a phone in portrait unless stated otherwise.

1. What WingsLevel does

WingsLevel turns your phone or tablet into a backup glass cockpit for VFR flying:

- **Attitude indicator** with pitch ladder, bank scale, turn indicator and slip ball.
- **Speed, altitude and vertical-speed tapes** from GPS combined with the phone's accelerometer.
- **HSI** (horizontal situation indicator) with magnetic compass rose, heading bug, bearing pointer and a GPS course-deviation bar.
- **Direct-To** any airport or navaid in the world, with distance, ETA and ETE.
- **Nearest** airports and navaids, and **search** by ICAO code and country, with runways and frequencies.
- **Synthetic vision**: 3D terrain behind the horizon, coloured by height above you, with lakes, sea and runways.
- **Night mode**, **landscape** and **full-screen attitude** layouts, and a **flight recorder**.

Why "GPS-aided"

A phone's accelerometer cannot tell gravity from the aircraft's own acceleration. In a coordinated turn, an ordinary phone app slowly decides the wings are level while you are still banked. WingsLevel runs a GPS-aided Kalman filter, the technique used in real inertial navigation systems: it compares what the sensors measure with how the GPS says the aircraft actually moved, and keeps the horizon where it belongs in turns, on the takeoff roll and when you change power.

Works offline

Once installed, everything runs on the phone: the instruments, the airport and navaid database, and synthetic vision for the terrain areas you downloaded. The GPS works without mobile signal. Your position and sensor data never leave the phone.

> **Limitations.** Speed is GPS ground speed, not airspeed. Altitude is GPS altitude (mean sea level), not pressure altitude: it will differ from your altimeter. Browsers give no access to the phone's barometer. Airport and terrain data are not official AIP data and may be incomplete or out of date.

2. What you need

Phone	Requirements
Android (recommended)	Android 10 or newer, Google Chrome, and a gyroscope (most phones since 2018). Chrome gives the best sensor access.
iPhone / iPad	iOS or iPadOS 16.4 or newer, Safari.
Tablet	Works in portrait and landscape (chosen in Settings). The landscape layout shows attitude and HSI side by side.

- A sturdy mount that holds the phone **upright, facing you**, and does not vibrate.
- A charging cable for long flights: the screen stays on and the GPS is always running.
- A Wi-Fi connection once, to install the app and download the terrain for the areas you fly in.
- Storage: about 12 MB for the app and airport data, plus the terrain you choose (a few MB to a few tens of MB per country; detailed mountain terrain can add a few hundred MB).

> Try the app on the ground first, in your own aircraft and mount, before relying on it in flight.

3. Installing the app

WingsLevel is a web app: you install it from the browser, with no app store. Installed, it has its own icon, opens full screen, keeps the screen on and works with no connection.

Android (Chrome)

1. Open **wingslevel-app.ppoinha.com** in **Chrome**.
2. Tap the ⋮ menu at the top right and choose **Install app**. On some phones the item is called **Add to Home screen**; then tap **Install**. If Chrome shows an install banner at the bottom, you can tap that instead.
3. Open **WingsLevel** from the home screen or the app drawer.
4. When asked for your location, choose **While using the app**. Without location the GPS aiding, the tapes and Direct-To cannot work.

iPhone and iPad (Safari)

1. Open **wingslevel-app.ppoinha.com** in **Safari**.
2. Tap the **Share** button (the square with an arrow pointing up), scroll down and tap **Add to Home Screen**, then **Add**.
3. Open **WingsLevel** from the new icon on the Home Screen. Always start it from this icon: only the installed app runs full screen.
4. On the first start, iOS asks for access to **Motion & Orientation** and to your **location**. Allow both.

Declined a permission by mistake? Android: Chrome → ⋮ → Settings → Site settings → Location (and Motion sensors), allow the app's address. iPhone: Settings → Safari → Motion & Orientation Access and Location, allow; then close WingsLevel fully and open it again.

After installing

Open the app once while still online and leave it open for a minute: it stores itself and the airport and navaid database on the phone. Then download your terrain (chapter 13).

4. Starting the app

The safety notice

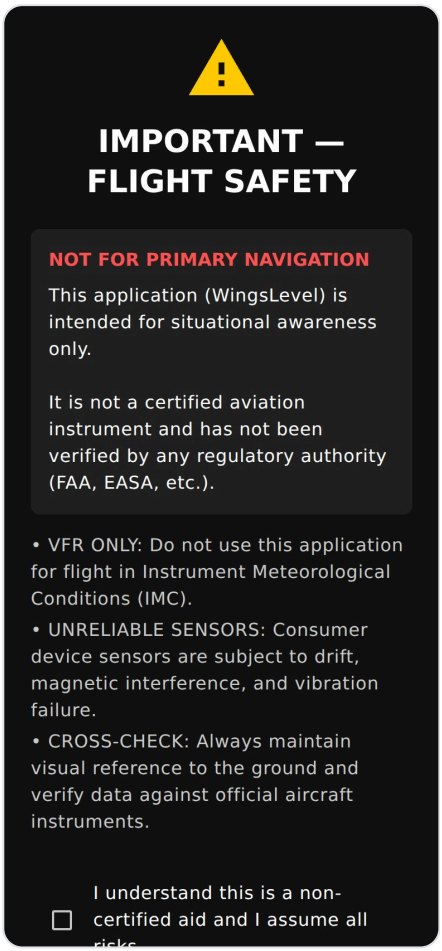
Every time the app starts, it shows the flight-safety notice. Read it, tick **I understand this is a non-certified aid and I assume all risks**, then tap **OPEN WINGSLEVEL**.

On iPhone, this tap is also when iOS asks for motion access: allow it.

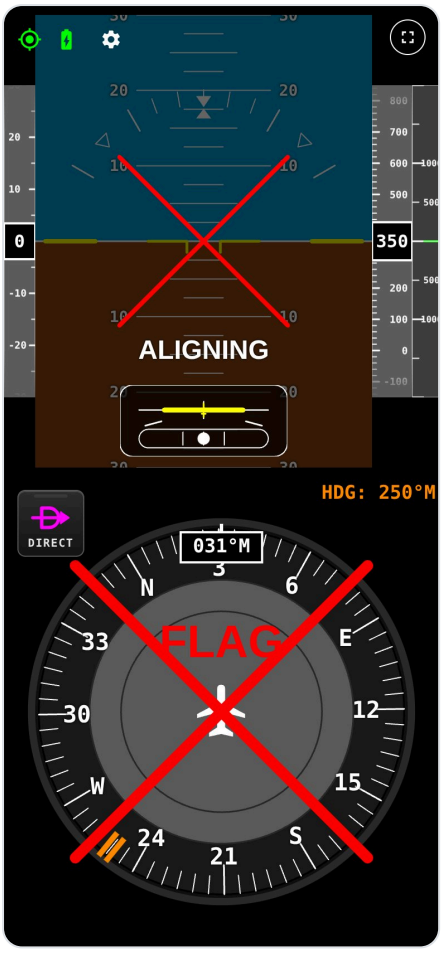
Aligning

For about five seconds after opening, the attitude shows **ALIGNING** with a red cross while the filter settles. Keep the phone still in its mount during this time. The instruments come alive by themselves.

The GPS icon at the top left then turns green once there is a good position (chapter 5).



The safety notice at every start.



ALIGNING: keep the phone still for a few seconds.

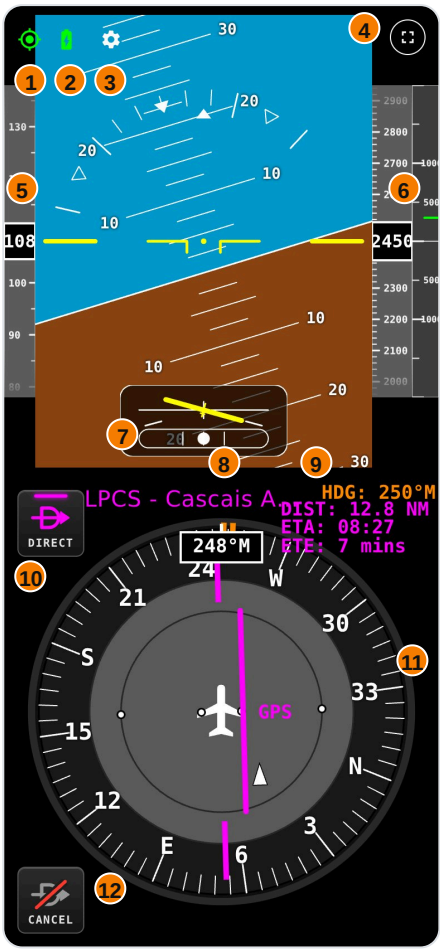
Before engine start

1. Mount the phone upright, facing you.
2. Open WingsLevel and accept the notice.
3. Wait for ALIGNING to clear and the GPS icon to turn green.
4. Level the horizon (chapter 6).
5. Set a Direct-To if you want one (chapter 10).

> Keep WingsLevel in front during the flight. When another app covers it or the screen locks, the sensors pause, and the attitude needs a few seconds to settle again when you come back.

5. The screen at a glance

In portrait the attitude indicator is at the top and the HSI below it.



1. **GPS status**: green = good fix, yellow = weak or old fix, red = no position.
2. **Battery**: charge level, with a lightning bolt while charging.
3. **Settings** (gear icon).
4. **Full screen**: attitude only, with a heading tape.
5. **Speed tape**: GPS ground speed in knots.
6. **Altitude tape** in feet MSL, with the **vertical-speed** scale on its right.
7. **Turn indicator and slip ball**.
8. **Direct-To banner**: destination, distance, ETA, ETE; tap for airport information.
9. **HDG**: the heading bug's value, in degrees magnetic.
10. **DIRECT** key: choose a destination.
11. **HSI**: heading box, compass rose, course and deviation.
12. **CANCEL** key: remove the Direct-To.

Landscape and full-screen layouts are described in chapter 16.

6. Mounting and levelling

Mounting

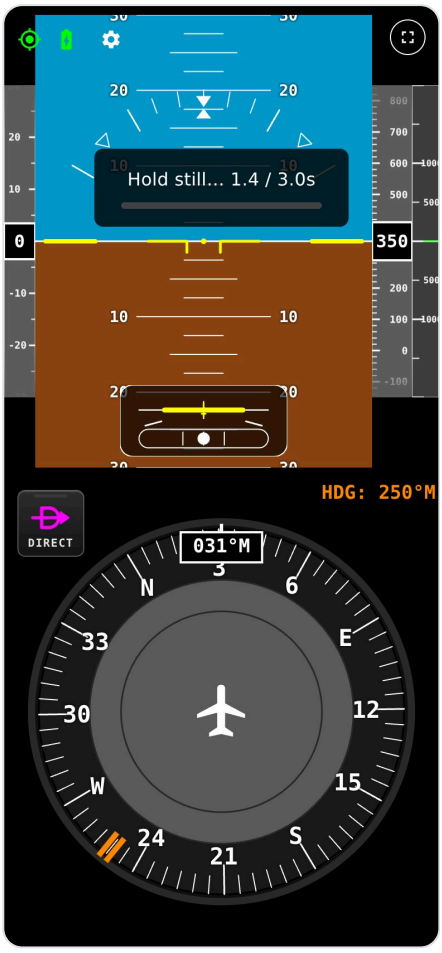
Mount the phone upright (portrait or landscape), screen facing you, as square to the aircraft as you can. A small tilt is fine: **Level** removes it. A mount that shakes adds noise to every instrument. For a sideways mount, first choose **Landscape** in Settings (chapter 16).

Level Horizon

Tell the app how the phone sits in the mount, so the horizon reads level when the aircraft is level.

1. On the ground, on level ground if possible, with the phone in its mount.
2. Open Settings and tap **Level Horizon (Hold Still)**.
3. Keep still. A box shows **Hold still…** with a progress bar.
4. When it shows **LEVEL: captured**, you are done. The setting is kept for next time.

If the box shows **LEVEL: motion detected**, **LEVEL: too much vibration** or **LEVEL: timeout (try again)**, wait for a calmer moment and tap Level again.



Levelling: hold still until "LEVEL: captured".

Levelling in flight

Above 30 kt, Level is only accepted in steady, straight and level flight, so a turn or a climb is never stored as level. If you are turning, the box says **LEVEL: turning (fly straight and level)**; if you are accelerating, **LEVEL: accelerating**. Fly straight and level and try again.

Nose alignment

The phone may point slightly left or right of the aircraft's nose. The app learns this by itself on each takeoff roll, with no action from you. After moving the mount or the phone, tap Settings → **Reset Nose Alignment (after remounting)** so it learns again on the next takeoff.

Fine pitch trim

Tapping the attitude indicator once shows a technical overlay; while it is shown, dragging up or down on the attitude trims the pitch by small amounts (up to ±20°). Tap again to hide it. Most pilots never need this: use Level instead.

7. Attitude, turn and slip

The attitude indicator shows the aircraft symbol (yellow) against the horizon, with a pitch ladder and a bank scale at the top. The sky pointer at the top shows your bank.

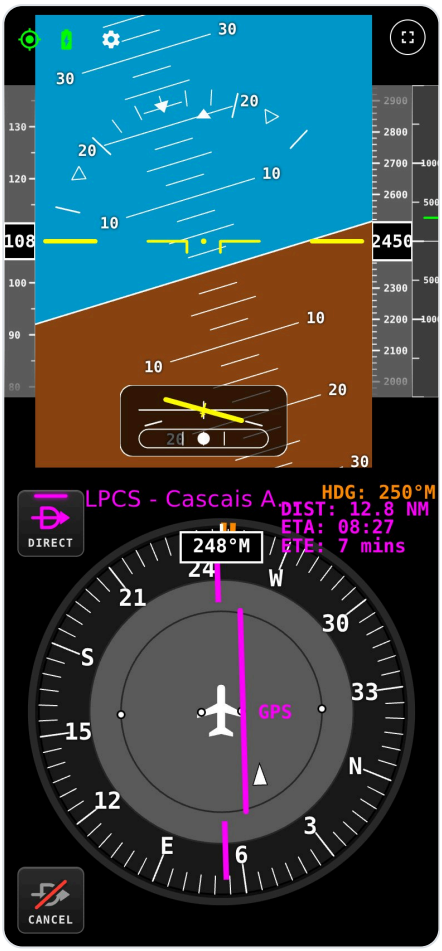
Turn indicator

The small aircraft in the box at the bottom shows the rate of turn. When its wing tip is on the mark, you are in a **standard-rate turn** (3° per second, a full circle in two minutes). A roll with no turn shows no turn.

Slip ball

The ball under the turn indicator works like the real one: centred in coordinated flight, displaced to the side of a slip or skid. "Step on the ball" to centre it. It stays centred in a coordinated turn even if the phone is slightly rolled in its mount.

> If the phone's motion sensors stop, the horizon is replaced at once by a red cross and **ATTITUDE FAIL**. WingsLevel never shows a frozen attitude as if it were live (chapter 20).



A right-hand standard-rate turn: 17° bank, wing tip on the mark, ball centred.

8. Speed, altitude and vertical speed

Speed tape (left)

Ground speed in knots from the GPS, smoothed by the motion sensors between GPS fixes. It is not airspeed: with a headwind it reads less than your airspeed indicator, with a tailwind more.

Altitude tape (right)

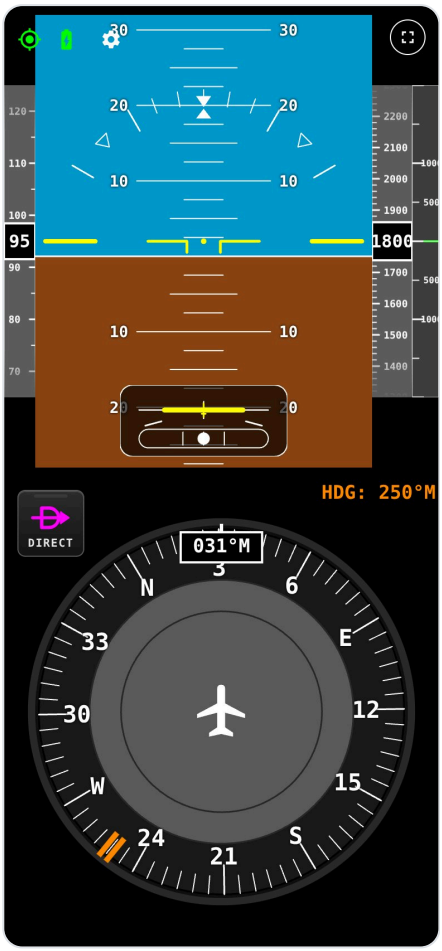
GPS altitude in feet above mean sea level. It differs from your altimeter, which shows pressure altitude corrected by QNH: use the altimeter for altitude and separation.

Vertical speed

The scale to the right of the altitude tape shows the vertical speed in feet per minute (500 and 1000 marks), from GPS altitude combined with the accelerometer. It reacts faster and more smoothly than GPS alone, but is less precise than a barometric VSI.

When the GPS is poor

If the last GPS fix is older than 5 seconds, or the position comes from mobile networks instead of satellites, the speed and altitude tapes show a **red X** instead of an old value.



95 kt ground speed, 1800 ft, level flight.

9. The HSI and heading bug

The HSI shows a compass rose that turns with the aircraft. The box at the top shows your heading in degrees **magnetic** (°M), like your compass, charts and ATC. The magnetic variation comes from the World Magnetic Model for your position, so you never need to set it.

Heading bug

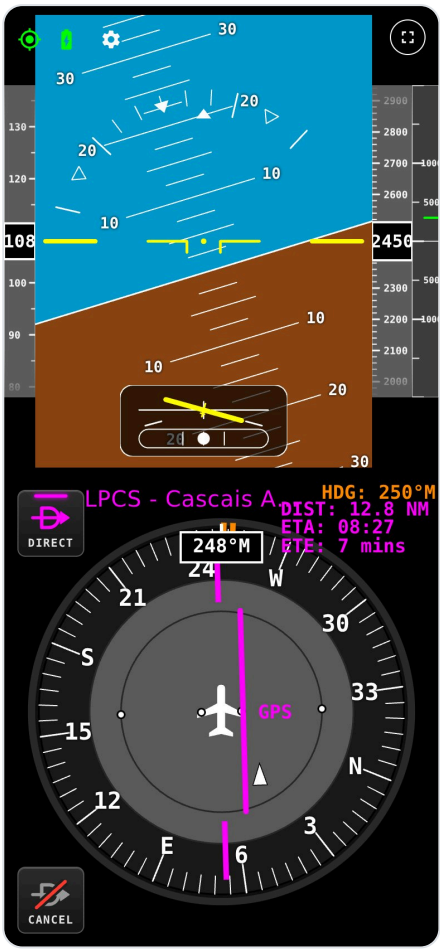
Drag your finger around the **outer ring** of the HSI to move the orange heading bug. The phone vibrates lightly at each degree (Android). The bug's value is shown at the top right as **HDG: 250°M**. Use it to remember a heading you were given or planned.

Aligning the compass card

If the HSI heading differs from your aircraft's compass or heading indicator, drag your finger in a circle **inside the rose** (between the aircraft symbol and the numbers) to turn the card until they match. The correction is kept.

Course and deviation

With a Direct-To active, the HSI shows the magenta course to the destination, the course-deviation bar (how far left or right of the course you are) and a TO/FROM arrow. **GPS** next to the bar reminds you the course is from GPS. Fly towards the bar to get back on course.



Heading 248°M, bug at 250°M, Direct-To Cascais with the aircraft slightly right of course.

10. Direct-To navigation

Setting a Direct-To

1. Tap the **DIRECT** key at the left of the HSI.
2. Choose **Nearest Airports**, **Airports** (search), **Nearest Navaids** or **Navaids** (search).
3. Tap the airport or navaid in the list.

The HSI returns with the magenta course from where you were to the destination.

The Direct-To banner

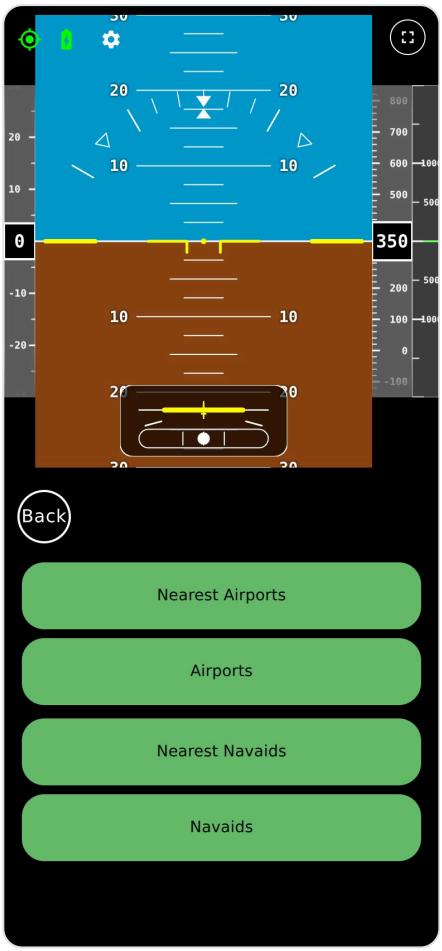
At the top of the HSI the banner shows the destination, and in magenta:

- **DIST**: distance in nautical miles,
- **ETA**: estimated time of arrival (phone's local time),
- **ETE**: time en route, at the current ground speed.

Tap the banner for the destination's information (chapter 11).

Cancelling

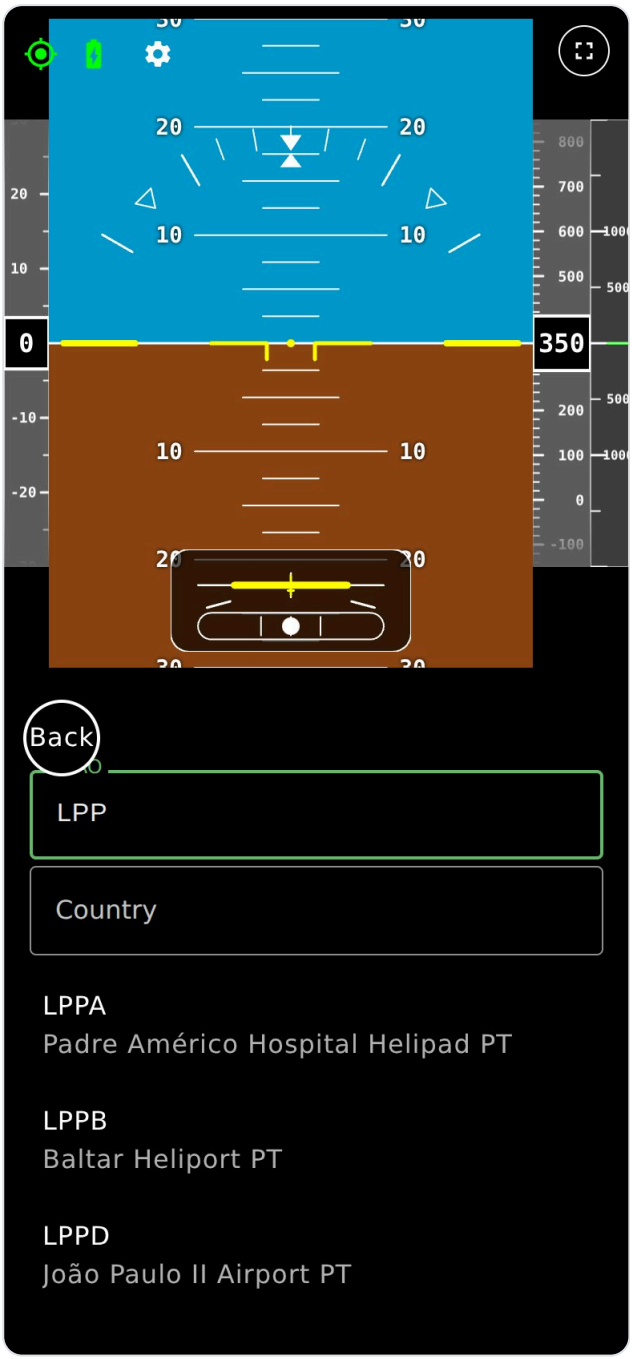
Tap **CANCEL** at the bottom left of the HSI. To go somewhere else, just set a new Direct-To.



The Direct-To menu. Back returns to the HSI.

11. Nearest, search and airport information

Nearest Airports, by true distance from your position.



Airports search: "LPP" lists every code starting with LPP.

Nearest

Nearest Airports and **Nearest Navaids** list the closest ones to your GPS position anywhere in the world, with the distance in nautical miles. The list includes airfields, heliports and seaplane bases. Without a GPS position the list shows **No GPS position yet**.

Search

In **Airports** or **Navaids**, type the start of the ICAO code or identifier in the first field (for example `LPP` or `LPPT`). The second field, **Country**, narrows the list by country code (for example `PT`). Results appear as you type.

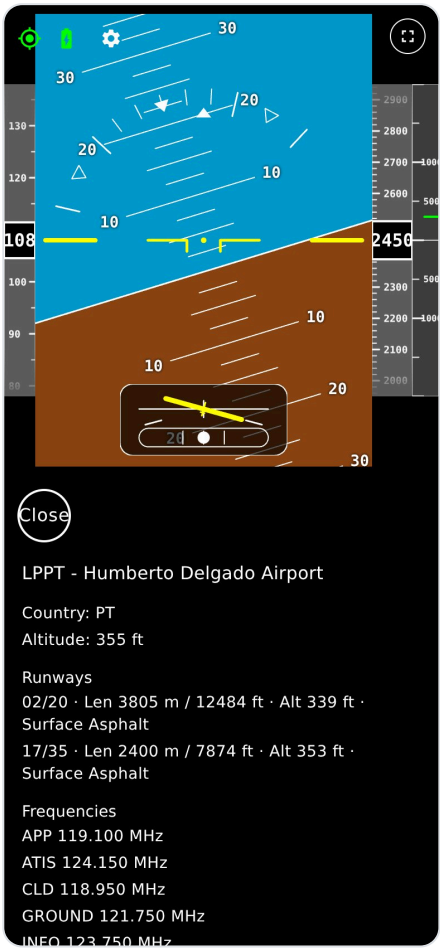
Airport and navaid information

Tap the Direct-To banner to see the destination's details:

- country and elevation,
- **Runways**: designators, length in metres and feet, elevation and surface,
- **Frequencies**: approach, ATIS, tower, ground and others,
- for a navaid: its type, frequency and position.

Tap **Close** to return to the HSI.

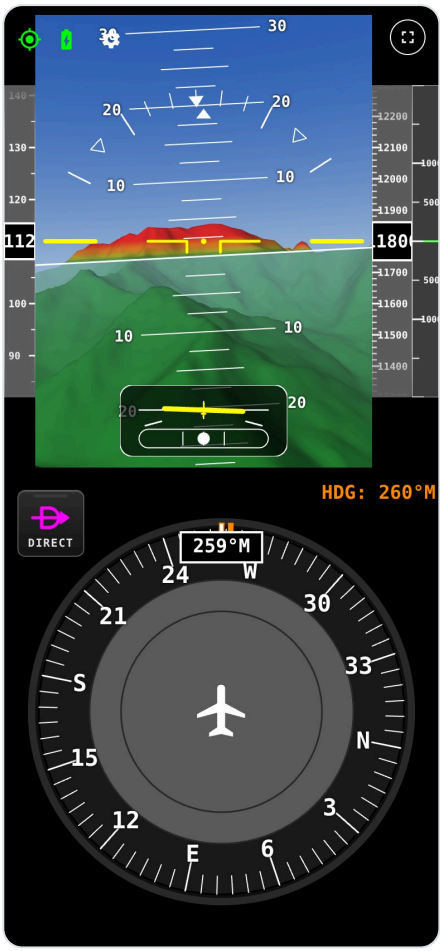
> Check frequencies and runway data against the official AIP and charts before use.



Information for Lisbon (LPPT).

12. Synthetic vision

Synthetic vision draws the terrain around you in 3D behind the attitude indicator, so you see high ground even in haze. It covers the whole world.



Near Monte Rosa at 11,800 ft: the high ground ahead is shown in yellow and red.

Turning it on

Settings → **Enable Synth Vision**. The same button then reads **Disable Synth Vision**. (If it reads **Synth Vision (Pro)**, synthetic vision is not included in your version of the app.)

What you see

- Terrain coloured by height **relative to you**: green and brown well below, **yellow** near your altitude, **red** at or above it.
- Sea and lakes in blue, a sky gradient with haze on the horizon; high ground is never hidden by the haze.
- Runways with their markings.
- In mountain areas, detailed 90 m terrain out to 12 km around you.

Offline

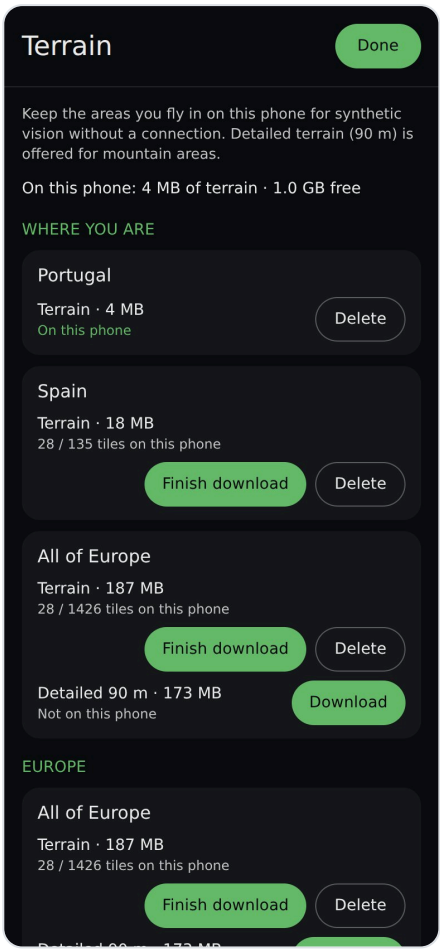
Terrain is loaded from the terrain you downloaded in the Terrain Manager (chapter 13). Online, missing terrain is downloaded as you fly and kept. Where no terrain is available, the view shows **No tile**.

In night mode the terrain switches to a dim red palette.

> Synthetic vision is for awareness only. Never use it to navigate around terrain or cloud.

13. Terrain Manager: offline terrain

The Terrain Manager keeps the terrain of the areas you fly in on the phone, so synthetic vision works without a connection. Do this at home, on Wi-Fi.



Portugal is on the phone; Spain is partly downloaded.

Opening it

Settings → **Terrain Manager (offline areas)**. Tap **Done** to close it.

The list

- At the top: how much terrain is on the phone and the free space.
- **Where you are**: the areas around your position, smallest first.
- Then all areas by region (Europe, North America, …), countries and larger regions such as **All of Europe**.

Each area shows its **Terrain** size and, in mountain areas, a **Detailed 90 m** layer with its own size.

Downloading

1. Tap **Download** next to the area (and next to Detailed 90 m if you fly in the mountains).
2. A progress bar shows the download. You can keep using the app.
3. Tap the button again to stop; **Finish download** continues later where it stopped.
4. When done, the area shows **On this phone**.

Shared terrain

Areas overlap: an area may already show some tiles as saved because a neighbouring area you downloaded uses them (for example "28 / 135 tiles on this phone"). Tap **Finish download** to get the rest.

Deleting

Tap **Delete** and confirm. The app keeps any terrain that another downloaded area still needs.

Sizes

Most countries take a few MB to a few tens of MB. Detailed 90 m terrain for a mountain range such as the Alps adds up to a few hundred MB. Downloaded terrain is kept when the app updates.

> Before a trip to a new area, open the Terrain Manager on Wi-Fi and download it. Without a download, only the terrain synthetic vision has already displayed is kept on the phone.

14. Aviation data updates

The airport, runway, frequency and navaid database is stored on the phone, so Direct-To, Nearest and search work offline.

Automatic updates

A few seconds after the app starts with a connection, it checks for new aviation data. It downloads only the parts that changed (airports, runways, frequencies or navaids), checks them, and keeps them offline. Nothing needs to be done.

Checking by hand

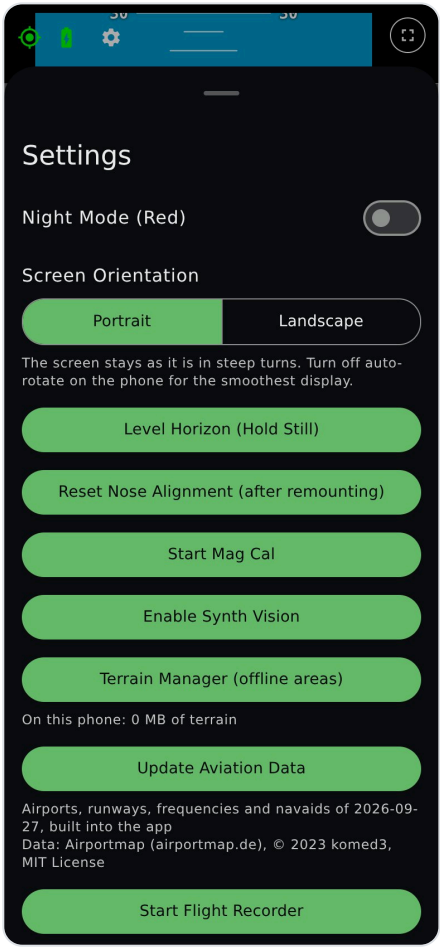
1. Open Settings and tap **Update Aviation Data**. While it works, the button reads **Checking for Aviation Data…**.
2. The line under the button then says **Up to date**, or **Updated:** followed by the parts that changed.

The line also shows the date of the data on the phone and where it came from ("from this server", or "built into the app" before the first update).

> Before a flight, open the app once while online so it can fetch the latest data. The data comes from the open Airportmap database and is updated regularly, but it is not official AIP data.

Storage

The database takes about 12 MB. The phone may remove it if storage runs very low; opening the app online restores it.



Settings, with Update Aviation Data and its status line.

15. App updates

New versions of WingsLevel are never installed without asking. Whenever the app is opened with a connection, it checks for a new version and downloads it in the background, but it keeps running the version you have until you choose to update.

The update message

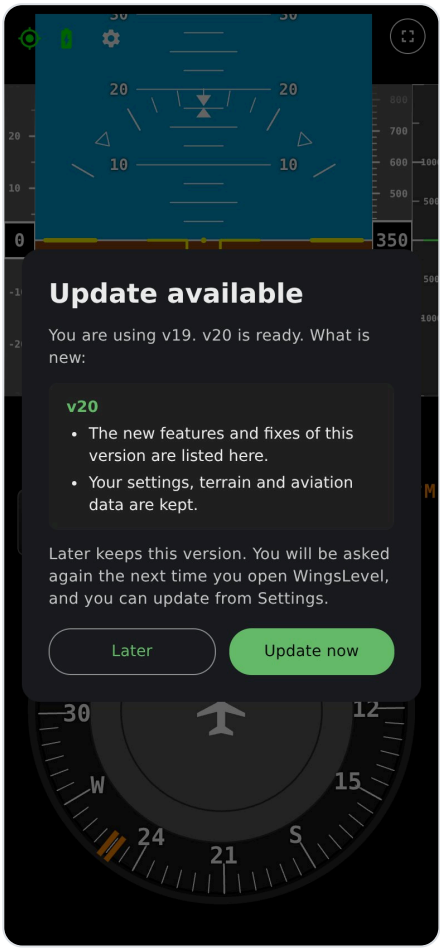
When a new version is ready, a message shows the version you use, the new version and what is new in it. It has two buttons:

- **Update now** switches to the new version. The app restarts; this takes a few seconds.
- **Later** closes the message and keeps the version you have. You can keep flying with it as long as you like.

After Later, the message comes back every time you open the app, until you update. While an update is waiting, Settings also shows an **Update Available** button with the new version number; tap it to see the message again.

Offline, no message is shown and the app starts as usual. If the new version cannot be downloaded when you tap Update now, the message says so and the app stays on your version; try again with a connection.

> Do not update just before or during a flight. Update on the ground, then check that everything works (Level, GPS, your terrain) before you take off.



The update message (example).

- Your settings (level, nose alignment, heading correction, night mode, screen orientation), your downloaded terrain and your aviation data are kept when you update.
- The version is shown at the bottom of Settings (for example **WingsLevel v19**), followed by the app's address.
- To fly with the latest version: open the app on Wi-Fi the day before and tap **Update now** if the message appears.

Reinstalling

If the app ever misbehaves after an update, close it fully (swipe it away from the recent apps) and open it again. As a last resort, remove it from the home screen and install it again (chapter 3); you will need to download your terrain again and redo Level.

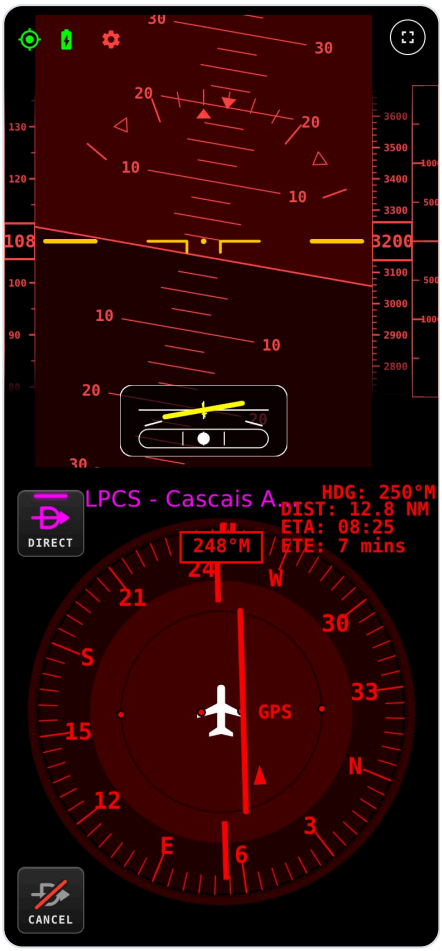
16. Night mode, portrait or landscape, full screen

Night mode

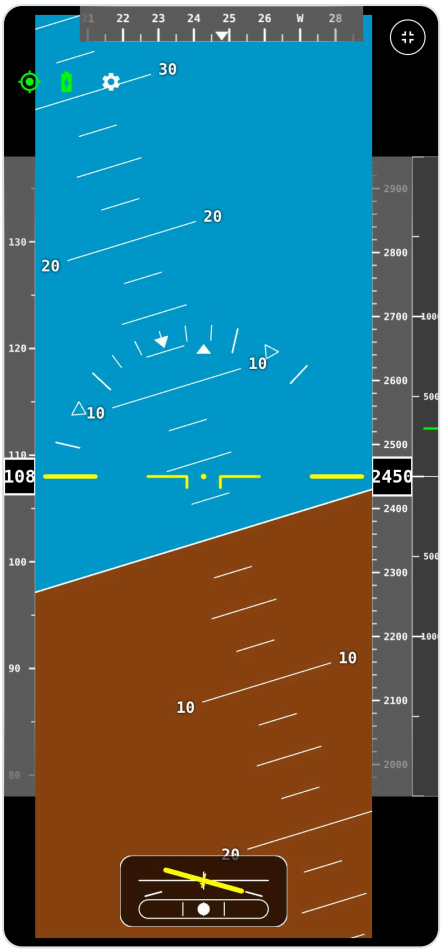
Settings → switch **Night Mode (Red)** on. Every instrument turns red on black to protect your night vision, and synthetic vision uses dim red terrain. Switch it off the same way. Lower the phone's brightness as well.

Full-screen attitude

Tap the **full-screen** button at the top right of the attitude indicator. The attitude fills the screen, with a heading tape at the top. Tap the button again to bring the HSI back.



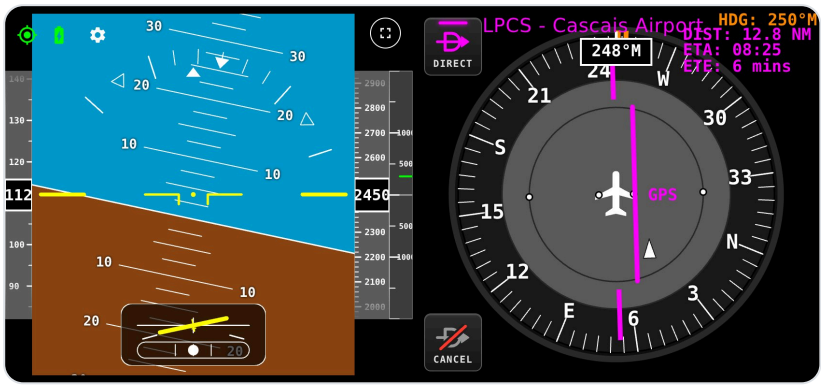
Night mode.



Full-screen attitude with heading tape.

Portrait or landscape

The app does not follow the phone's auto-rotate: in a steep turn the screen stays as it is. Choose the orientation under Settings → **Screen Orientation**: **Portrait** (the default on phones) or **Landscape**, where attitude and HSI appear side by side. Landscape suits tablets and yoke mounts.

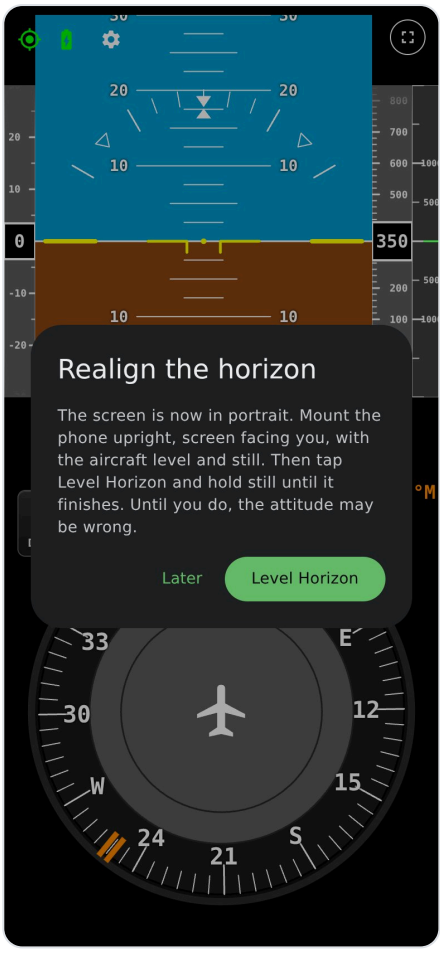


Landscape layout.

Realign after a change

After switching, the app asks you to **Realign the horizon**: turn the phone in its mount, keep the aircraft level and still, and tap **Level Horizon**. Until you do, the attitude may be wrong. **Later** closes the message; you can level any time from Settings (chapter 6).

On Android, with WingsLevel installed, the system holds the orientation. In a browser tab and on iPhone the system cannot be told to hold it, so WingsLevel turns its own picture back if the phone rotates. For the smoothest display there, also switch off the phone's auto-rotate (screen rotation lock).

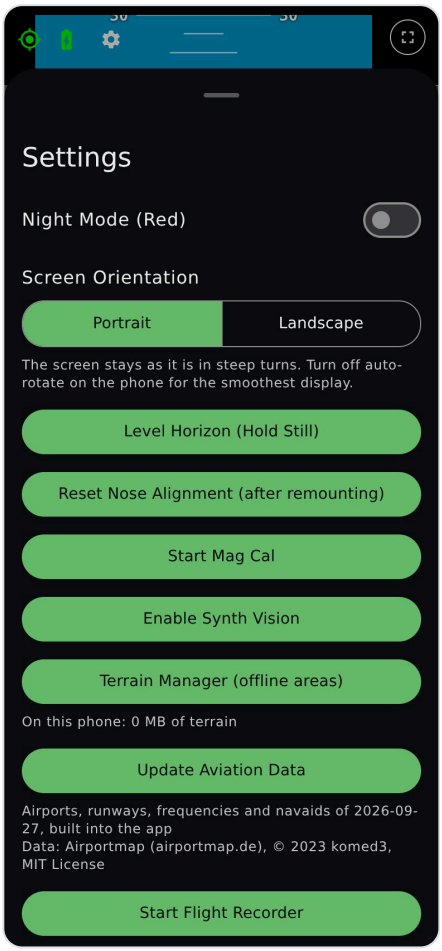


After changing the orientation: realign the horizon.

17. Settings reference

Tap the gear icon to open Settings. Drag the handle at the top down, or tap outside, to close it.

Item	What it does
Night Mode (Red)	Red-on-black instruments (chapter 16).
Screen Orientation	Portrait or Landscape, held in steep turns. Asks you to level again after a change (chapter 16).
Level Horizon (Hold Still)	Stores the mount's tilt so the horizon reads level (chapter 6).
Reset Nose Alignment (after remounting)	Forgets the learned nose offset; it is learned again on the next takeoff roll.
Start Mag Cal	Magnetometer calibration where the phone allows it (chapter 19).
Enable Synth Vision	3D terrain behind the attitude (chapter 12).
Terrain Manager (offline areas)	Download and delete terrain areas (chapter 13). The line below shows the terrain on the phone.
Update Aviation Data	Checks for new airport and navaid data (chapter 14).
Start Flight Recorder / **Save Flight Log**	Records sensor and GPS data (chapter 18).
Update Available: v…	Only when a new app version is waiting: shows what is new, with Update now and Later (chapter 15).
Version line	App name, version and address (chapter 15).



The Settings sheet.

18. Flight recorder

The flight recorder logs the raw motion-sensor and GPS data of a flight, to review it afterwards or to share it with us when reporting a problem.

Recording

1. Settings → **Start Flight Recorder**. A red ● **REC** timer appears on the attitude indicator while it runs, and the button shows the elapsed time.
2. Fly as usual. The log is saved on the phone every few seconds, so if the app closes you lose at most a few seconds.
3. After landing: Settings → **Stop Flight Recorder**.

Saving the log

Tap **Save Flight Log**. The phone's share sheet opens (or the file downloads), with a compressed `.csv.gz` file: save it to your files, or send it by email or a messaging app. The status line shows the file name and size. Save still works after the app was closed and reopened.

A recording takes about 15 MB per hour before compression. The log stays on the phone only; nothing is sent anywhere unless you share it.

19. Magnetic calibration

The attitude and heading mostly come from the gyroscope and the GPS track. The phone's magnetometer is only a soft heading reference. Where the browser gives the app direct access to the magnetometer (some Android phones), you can calibrate it:

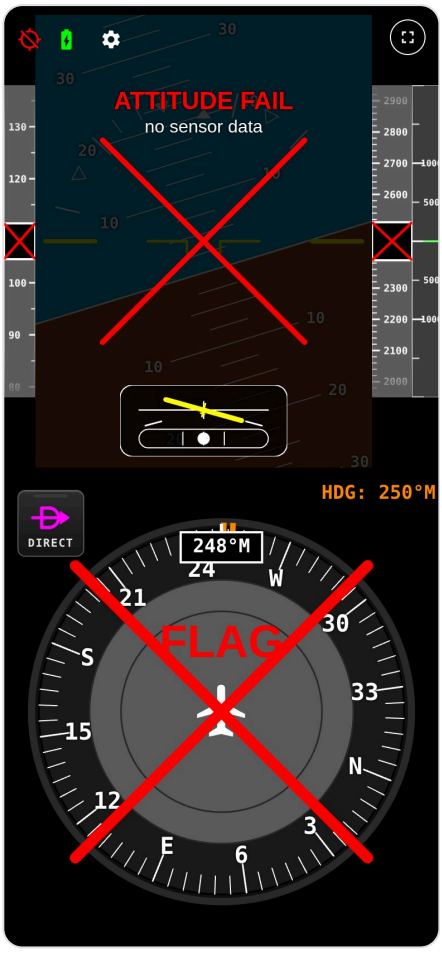
1. Away from metal and electronics, tap Settings → **Start Mag Cal**.
2. Slowly turn the phone in all directions (a figure-of-eight in the air) for about half a minute.
3. Tap **Stop Mag Cal**.

On most phones the browser does not give this access; the app then shows **MAG CAL: raw magnetometer not exposed by this browser** and uses the phone's own compass instead. This is normal and needs no action. If the HSI heading does not match your compass, align the compass card instead (chapter 9).

20. Warnings and failure indications

WingsLevel shows at once when it cannot be trusted, instead of showing old values.

What you see	Meaning and action
ALIGNING and red cross	Starting up. Keep the phone still for a few seconds.
Red cross, **ATTITUDE FAIL**, "no sensor data"	The motion sensors stopped. Do not use the attitude. Bring the app to the front, or close and reopen it.
Red cross and **FLAG** on the HSI	Heading not valid (same cause). Use the aircraft's compass.
Red X on the speed or altitude tape	No recent, accurate GPS position. Check the GPS icon.
GPS icon **yellow**	Weak or older fix: values may lag.
GPS icon **red**	No position: check that location is allowed and the phone can see the sky.
LEVEL: … messages	Level was refused; see chapter 6.
No rotation sensor available	This phone has no suitable motion sensor; the attitude cannot work on it.
No tile in synthetic vision	No terrain for this area on the phone: download it (chapter 13).



Sensors and GPS lost: attitude, HSI and tapes all flagged.

> If a flag appears in flight, stop using WingsLevel for that information and fly by your aircraft's instruments and outside references.

21. Troubleshooting

The horizon is not level on the ground

Tap Settings → **Level Horizon (Hold Still)** with the phone in its mount (chapter 6).

The horizon is slightly off after moving the mount

Level again and tap **Reset Nose Alignment**; the nose offset is learned again on the next takeoff roll.

The GPS icon stays red

Check that location is allowed for the app (chapter 3), that the phone's location is on and set to high accuracy (Android), and that the phone can see the sky: metal roofs and heated windscreens can block the GPS.

The attitude is not moving (iPhone)

Motion access was not allowed. Settings → Safari → Motion & Orientation Access: on. Then close WingsLevel fully and open it again from the Home Screen icon.

The HSI heading differs from the compass

Drag in a circle inside the compass rose to align the card (chapter 9). Phones near metal, speakers or chargers can disturb the heading.

Synthetic vision shows "No tile" or no terrain

Download the area in the Terrain Manager on Wi-Fi (chapter 13), and check that **Enable Synth Vision** is on.

Airports are missing or old

Open the app online and tap **Update Aviation Data** (chapter 14).

The screen turns off or the app stops in the background

Keep WingsLevel in front. Some phones drop "keep the screen on" when the battery is low or in battery-saver mode: keep the phone charging.

The app doesn't open full screen (iPhone)

Open it from the Home Screen icon, not from a Safari tab.

Something else

Record a flight with the flight recorder (chapter 18) and send the log with a short description to support.

22. Data sources and credits

- Airport, runway, frequency and navaid data: Airportmap (airportmap.de, github.com/komed3/airportmap-database), © 2023 komed3, used under the MIT License. Not for navigation: the data may be incomplete or out of date.
- Terrain (synthetic vision): produced using Copernicus WorldDEM-90 © DLR e.V. 2010-2014 and © Airbus Defence and Space GmbH 2014-2018 provided under COPERNICUS by the European Union and ESA; all rights reserved.
- World Magnetic Model WMM2025: NOAA NCEI / British Geological Survey (public domain).
- EGM96 geoid model: NGA (public domain); grid prepared with egm96-universal by Nicolas Vanhoren (MIT License).
- Material Icons: Google, Apache License 2.0.

Safety notice. WingsLevel is a non-certified situational-awareness aid. It is not approved by EASA, the FAA or any other authority, must not be used for primary navigation or IFR flight, and consumer phone sensors can drift or fail. Always maintain visual reference and cross-check with the aircraft's instruments. The pilot in command remains responsible for the safe conduct of the flight.