



UAV Mate

User Manual

Version 2.0 · July 2026 · English · uav-mate.com · © 2026 UAV Mate Inc.



Docs & support

About this manual

This manual is task-oriented: start with **Quick Start** for the workflow you need, then use the **Reference** chapters for details on every screen.

Conventions used in this manual

Note — Useful background or context.

Tip — A faster or better way to do something.

Warning — Read before continuing; ignoring this may cause data loss or inaccurate results.

Figures. Console screenshots are taken directly from the device consoles.

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1. Overview

UAV Mate has two operating roles. You choose the role in the console; the device performs one role at a time.

ROLE	WHAT IT DOES	TYPICAL USE
PPP Base Station	Acquires its own absolute position from the PPP correction service, then broadcasts RTK corrections to nearby rovers/drones over a private Wi-Fi NTRIP caster.	Drone (UAV) mapping flights that need RTK/PPK, set up anywhere with no local infrastructure.
Rover	Receives corrections (PPP, NTRIP, or radio) and outputs a precise position; can measure and log ground control points .	Surveying GCPs to check or georeference a drone survey.

Note — Because UAV Mate gets its base coordinate from PPP, you do not need to set up over a known mark or connect to a CORS network. The base coordinate is delivered in **ITRF2020, current epoch**.

2. What's in the box

Contents may vary with the kit you ordered. A typical kit includes:

- UAV Mate GNSS receiver
- Type-C to USB cable (charging and data)
- 410–470 MHz UHF whip antenna and extension pole — for the internal radio
- Carrying case
- Quick Start Guide
- (*Optional*) 5/8" × 11 mounting connector (for tripod/pole)

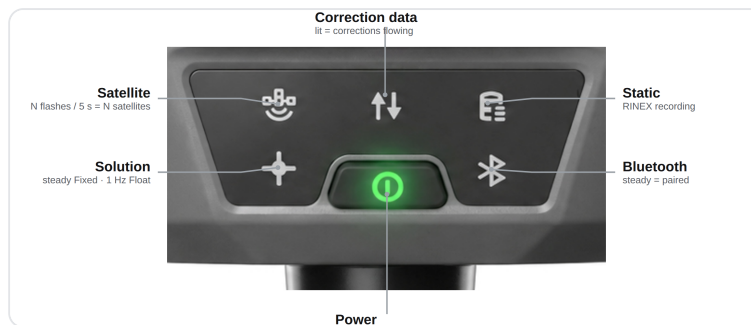
Note — Contents vary with the kit ordered; check your kit against its packing list.

3. Hardware overview



UAV Mate has a white faceted GNSS dome on top of a charcoal body. The front control panel carries the status icons and the power button; the bottom connector mounts the unit to a pole, tripod, or drone mount.

Control-panel indicators (LEDs)



UAV Mate has **five green status LEDs** on the front panel — Satellite, Correction Data, Static Survey, Solution, Bluetooth — plus the power button. The smart battery has its own power display on the bottom. The receiver also supports **voice prompts**.

LED	INDICATION
Satellite	Flashes once every 5 s while searching. Once satellites are tracked, it flashes N times every 5 s , where N is the number of satellites tracked.
Correction data	Indicates correction data is being received.
Static Survey	On while the receiver is in static-survey (logging) mode.
Solution status	Steady = Fixed solution · flashing at 1 Hz = Float solution · off = other solutions.
Bluetooth	Steady = Bluetooth paired · off = no device paired.

Smart battery / power display (bottom). Press the battery button to show the remaining charge — each lit segment $\approx$ **25 %**. While charging, the display flashes to show the current level; at **20–10 %** it flashes slowly and **below 10 %** it flashes fast (charge soon). The unit also has a built-in **electronic bubble** for levelling.

STATE	LED BEHAVIOUR
Power on	Hold the power button ~2 s — all LEDs light, go off, then each LED resumes live status.
Power off	Hold the power button ~5 s — all LEDs turn off.
Low battery	The bottom power display flashes slowly (20–10 %), then fast (< 10 %).
Firmware upgrade	All six LEDs light briefly, then cycle while upgrading; the unit restarts when finished. Do not power off during an upgrade.

Power button

- **On:** press and hold ~**2 seconds**.
- **Off:** press and hold ~**5 seconds** (release when all LEDs turn off).

Ports and mounting (bottom)

PORT	USE
Serial port & external power	Device/computer/USB-drive connection, external power, communication, external radio.
SIM slot	Nano-SIM card (for the cellular module).
TNC port	410–470 MHz UHF radio antenna.
5/8" × 11 screw hole	Standard surveying connector for tripod, pole, or mount.

Mount the unit on a stable tripod/pole (base or rover) or the appropriate drone/vehicle mount via the 5/8" connector.

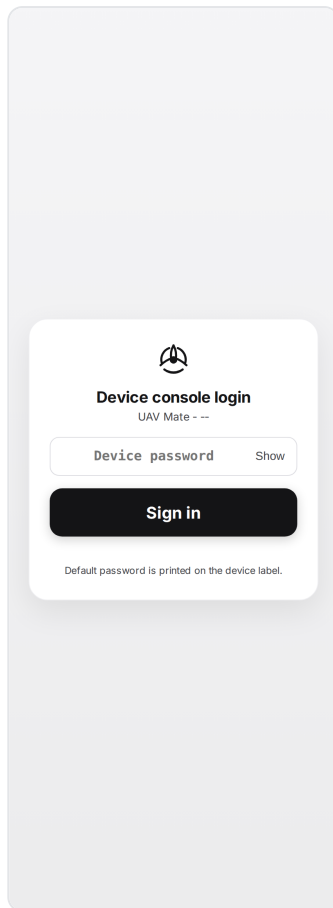
Power, charging & battery

- Built-in **7000 mAh / 7.4 V** lithium battery — up to **10 hours** of field work (varies with radio/cellular use, temperature, and battery age).
- **Fast charging** up to **15 W (5 V / 3 A)** over USB-C; about **3 hours** from 20 % to 90 %.
- **External power:** USB **5–20 V**.
- Charge between **+10 °C and +45 °C**.
- **IP68** dust- and water-proof.

4. Connecting to the Device Console

The Device Console is hosted **on the receiver itself**. No internet connection is required in the field.

1. Power on UAV Mate and wait for the green power LED.
2. On your phone, tablet, or laptop, open Wi-Fi settings and connect to the receiver's hotspot **UAV MATE-<SN>** — where **<SN>** is your unit's serial number (a numeric string printed on the device label). The hotspot is **open** — **no Wi-Fi password**.
3. Open a web browser and go to the receiver's console address **http://192.168.2.1:8080**.
4. Sign in at the **Device console login** screen with the default password **uavmate**. You can sign out later under **Device > Sign out** (Simple console) or via the Professional console header.



Tip — The console is responsive and works on a phone. On small screens the left menu becomes a hamburger drawer at the top-left.

Note — You can confirm or change the Wi-Fi name, IP, and MAC address later under **System** (see §14).

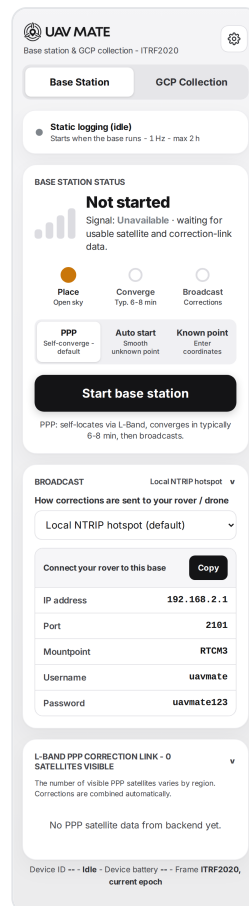
5. Two consoles: Simple and Professional

UAV Mate ships with **two consoles on the same device**. Both control the same receiver — pick whichever suits the task and switch at any time.

	SIMPLE CONSOLE (DEFAULT)	PROFESSIONAL CONSOLE
For	Everyday base + GCP work, phone-first	Full control, diagnostics, integrations
Screens	Base Station · GCP Collection · Device	Dashboard, Device Config, PPP Status, Static Survey, GCP Manager, Advanced I/O, System
Switch	Device › Open Professional Console	Open Simple Console card (bottom of Dashboard)

Signing in with the password on the device label opens the **Simple console**. Your sign-in is shared between both consoles.

5.1 Simple console — Base Station tab

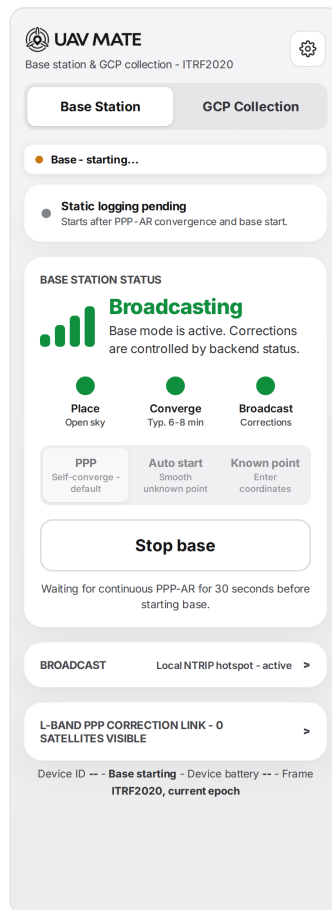


Everything needed to run a PPP base on one screen:

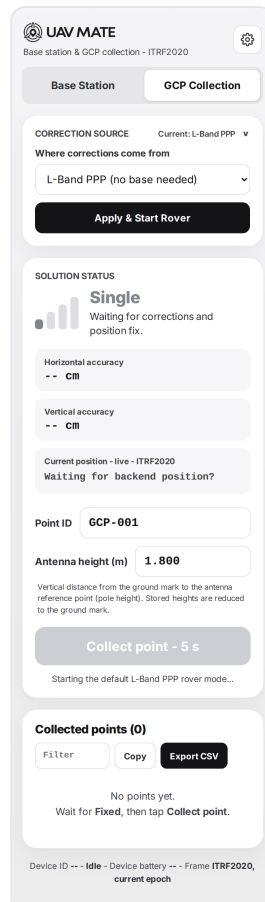
- **Static logging strip** — RINEX 3.x raw logging (1 Hz, max 2 h) starts automatically with the base (see §12).
- **Base station status card** — signal bars, a large state label, and the three stages **Place** → **Converge (typ. 6–8 min)** → **Broadcast**.
- **Start mode** — **PPP** (self-converge, default), **Auto start** (smooth an unknown point), or **Known point** (enter latitude / longitude / ellipsoidal height).
- **Broadcast card** — how corrections reach your rover / drone: **Local NTRIP hotspot** (default; credentials shown with a Copy button), **Internal radio (UHF)** (channel, TX power, protocol, air baud), or **External NTRIP server (4G)** (requires a SIM and a cellular setup — see §14). Broadcast settings are locked while the base runs.

- **Base position card** — once fixed: latitude / longitude / ellipsoidal height in **ITRF2020, current epoch** with **Accuracy H 1.5 cm / V 3.0 cm** and a **Copy** button. Record this position for your flight-planning software.

One unit, one role — starting the base stops GCP collection, and vice-versa. The console tells you before it switches.



5.2 Simple console — GCP Collection tab



- **Correction source** — **L-Band PPP** (no base needed), **CORS** (your NTRIP account over 4G), or **Radio** (corrections from an external base — match the transmitter's channel, protocol and air baud). Apply with **Apply & Start Rover**.
- **Solution status card** — live state with horizontal / vertical accuracy and the live position (ITRF2020).
- **Collect point** — enter a **Point ID** and the **antenna height** (vertical distance from the ground mark to the antenna reference point; stored heights are reduced to the ground mark), wait for **Fixed**, then hold the pole steady for the **5-second** occupation.
- **Collected points** — review, **Copy**, or **Export CSV** (see §19 for the CSV format).

UAV MATE

Base station & GCP collection - ITRF2020

Base Station

GCP Collection

GCP rover - Fixed - 0 points

CORRECTION SOURCE

Current: L-Band PPP

Where corrections come from

L-Band PPP (no base needed)

Active source: L-Band PPP. Rover start command sent.

Stop rover

SOLUTION STATUS

Fixed

Centimetre accuracy via L-Band PPP. Hold steady and tap Collect.

Horizontal accuracy

-- CM

Vertical accuracy

-- CM

Current position - live - ITRF2020

Waiting for backend position?

Point ID

GCP-001

Antenna height (m)

1.800

Vertical distance from the ground mark to the antenna reference point (pole height). Stored heights are reduced to the ground mark.

Collect point - 5 s

Receiver solution is fixed, but rover mode is not active.

Collected points (0)

Filter

Copy

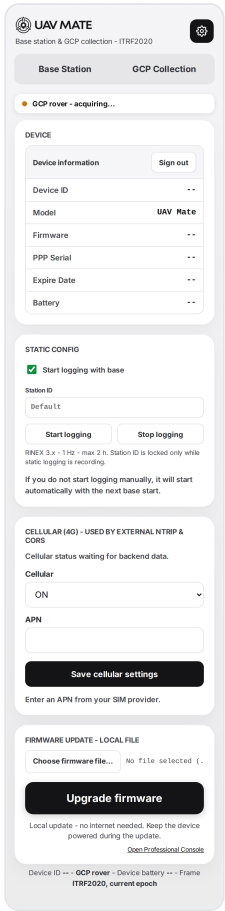
Export CSV

No points yet.

Wait for Fixed, then tap Collect point.

Device ID -- - GCP rover - Device battery -- - Frame

ITRF2020, current epoch



Open with the gear icon: device information (ID, model, firmware, PPP serial and expiry, battery), **static logging** configuration, **Cellular (4G)** setup (APN and authentication — used by External NTRIP and CORS), **Files** (on-device RINEX & log storage; oldest files are removed first when full), **local firmware update** (a `.bin` file — no internet needed), **Sign out**, and **Open Professional Console**.

5.4 Professional console at a glance

The Professional console is the full-depth interface. The left-hand menu is the main navigation:

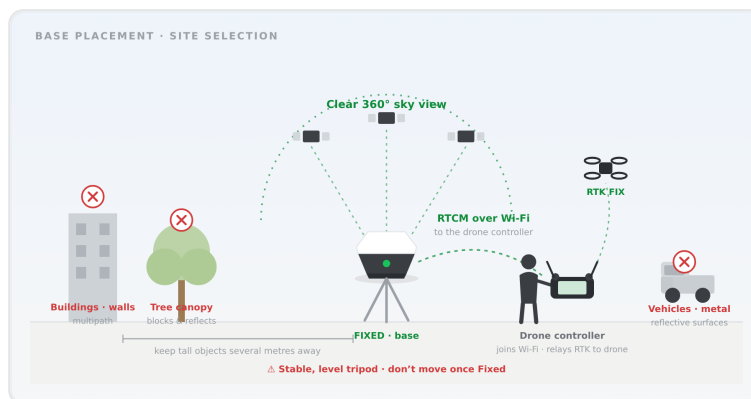
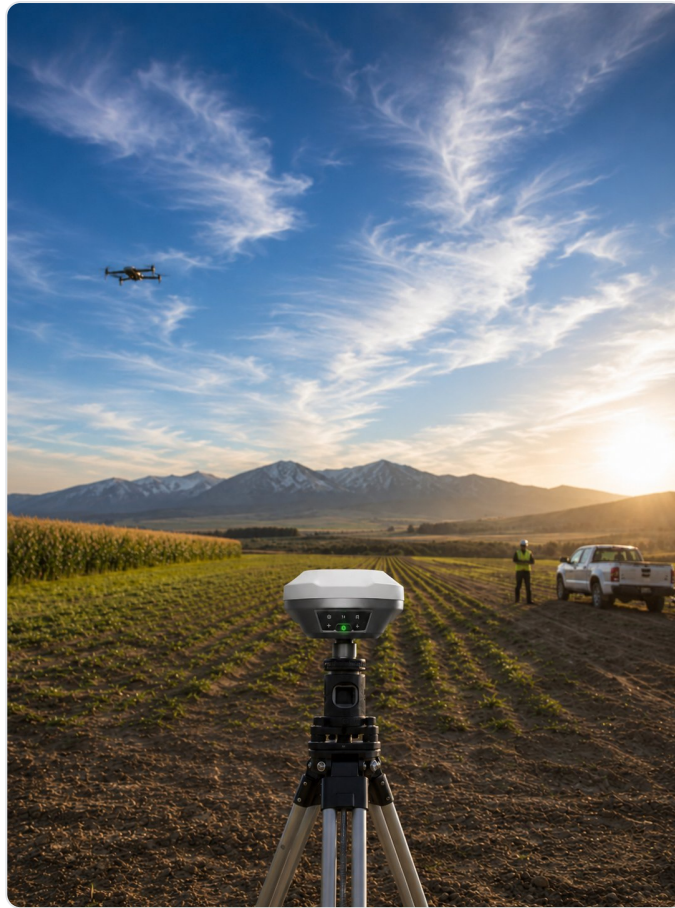
MENU ITEM	PURPOSE
Dashboard	Live status: connection, current mode, solution status, satellites, battery, serial, broadcast; skyplot; signal strength; quick actions; and Guided setup (the two wizards).
Device Configuration	Choose and configure the operating role — Base Mode , Rover , Tilt Compensation .
PPP Configuration	PPP correction service settings and the live PPP status display.
I/O Configuration	Output method & ports, NMEA messages, the Local NTRIP Caster, and radio settings.
Static Survey	Record a static raw-data session (RINEX) for post-processing.
GCP Manager	Measure, review, and export Ground Control Points.
Modules	Optional hardware modules (e.g. cellular).
System	Wi-Fi, cellular, power/battery, firmware update, config backup/restore, reboot/reset.

Guided setup (Professional)

The Dashboard's **Guided setup** card exposes two step-by-step wizards — the **PPP Base Wizard** and the **Rover & GCP Wizard**. Each is a 3-step guide with a live PPP status display (see §10 and §15); you can close it at any time and configure manually.

6. Placement and site selection

Where you put UAV Mate matters as much as how you configure it: placement drives how fast it reaches a fix and how accurate the result is. Choose the spot before you power through the setup.



Sky view and obstructions

- Set up in the **open**, with a clear view of the sky in every direction — the fewer obstructions, the faster and more reliable the fix.
- Keep well clear of **buildings, walls, dense tree canopy, vehicles, and large metal or glass surfaces**. Signals reflecting off these (*multipath*) reduce accuracy and can stop the receiver from fixing.
- Avoid setting up directly beneath power lines or next to transmitting antennas.

Tip — Rule of thumb: if you can see open sky all around and nothing tall is within a few metres, it's a good spot.

Mounting the base

- Mount UAV Mate on a **stable tripod** or fixed pillar so it cannot move, sink, or be knocked.
- **Level** it with the tribrach bubble and tighten every connection so the unit is rigid.

Warning — After the base has fixed and started broadcasting, **do not move or re-level it**. Moving the antenna invalidates the base coordinate and every drone/rover position derived from it.

Antenna height

Accurate heights depend on entering the correct **antenna height** — the vertical distance from the ground mark to the receiver's antenna reference point (ARP).

- Measure with a tape or the tripod's graduated rod, and record it consistently (always to the same reference).
- Enter the value where the workflow asks for it: **Static Survey**, **GCP Manager** → **Antenna height**, or your drone software's base-height field.
- Measure to the **ARP** (the receiver's mounting base). The ARP-to-phase-centre offset is **applied automatically by the receiver** — there is nothing to configure in the console, and stored heights are reduced to the ground mark.

Base-to-controller range

- The **drone's remote controller** joins UAV Mate's Wi-Fi and pulls the RTCM corrections, then relays them up to the drone over its own control link — the drone itself never connects to UAV Mate's Wi-Fi directly.
- Keep the **controller** within reliable Wi-Fi range of the base; the drone can then fly wherever its own control link reaches.

Rover placement (GCP collection)

- Hold the pole **vertical** with the bubble centred while measuring — **or** enable **Tilt Compensation** (Device Configuration → Tilt) and let the unit correct for pole tilt.
- Rest the pole tip precisely on the mark and hold it steady for the full sample count.
- Stay in the open; step away from walls, vehicles, and canopy that can block or reflect signals.

7. Quick Start A — Set up a PPP base station

Use this workflow to put UAV Mate on a tripod and broadcast RTK to your drone. It uses the **Simple console — Base Station** tab (see §5.1).

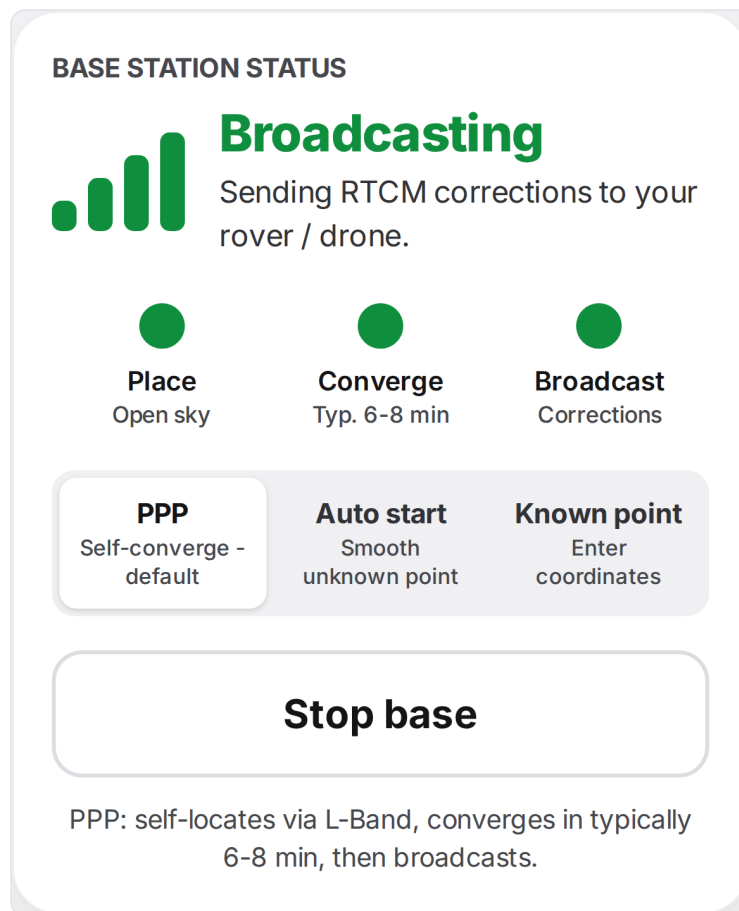
Step 1 — Place and start

1. Mount the receiver on a stable tripod with a clear, open view of the sky (§6). Once started, don't move it.
2. On the **Base Station** tab, keep **PPP** (self-converge) selected. To use a surveyed mark instead, choose **Known point** and enter its latitude, longitude and ellipsoidal height — the console sanity-checks your entry against the observed position.
3. Tap **Start base station**.

Step 2 — Converge

The status card shows **Converging...** with live progress — typically **6–8 minutes** under open sky. It's a good window to set up your drone. Broadcasting starts automatically once converged; static RINEX logging runs alongside (§12).

Step 3 — Broadcast & connect the drone



When the card reads **Broadcasting**, the base position (ITRF2020, current epoch; typ. **H 1.5 cm / V 3.0 cm**) appears with a **Copy** button — record it for your flight-planning software.

Connect the drone in two steps:

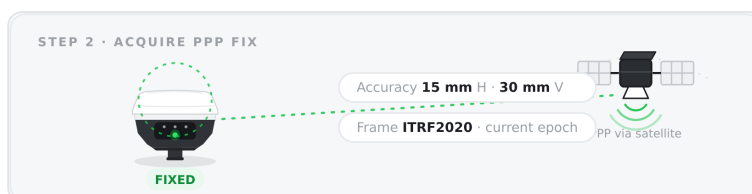
1. On the **drone remote controller**, open Wi-Fi settings and join UAV Mate's hotspot **UAV MATE-<SN>** (open — no password). The controller needs this link to reach the base's NTRIP caster.
2. In the flight-control app, choose **custom network RTK / NTRIP** and enter:

SETTING	VALUE
UAV Mate — User Manual	v2.0
IP address	192.168.2.1
Port	2101
Mountpoint	RTCM3
Username / Password	uavmate / uavmate123

No Wi-Fi on the controller? In the **Broadcast** card choose **Internal radio (UHF)** — set the rover radio to the same channel, protocol and air baud — or **External NTRIP server (4G)** with a SIM installed (\$14).

Confirm the drone shows **RTK Fix** — then you're ready to fly.

Professional alternative — the **PPP Base Wizard** (Dashboard > Guided setup) walks the same flow in the Professional console, with the live PPP status display and skyplot.



8. Quick Start B — Collect GCPs in rover mode

Use this workflow to walk a pole and measure ground control points, on the **Simple console — GCP Collection** tab (see §5.2). UAV Mate can correct itself via **L-Band PPP** (no base needed), a **CORS** NTRIP account over 4G, or an external base over **radio**.

Step 1 — Choose the correction source

Open **GCP Collection**. One unit plays one role at a time — if the base is broadcasting, tap **Stop base** first. Pick the source, fill in its details (CORS: caster address, port, mountpoint, account; Radio: channel, protocol, air baud matching the transmitter), then tap **Apply & Start Rover**.

Step 2 — Reach a Fixed solution

The solution card walks through **Acquiring...** → **Float** → **Fixed** with live horizontal / vertical accuracy. With PPP, expect the usual convergence time; with CORS or radio, Fixed typically arrives within seconds. Collection is blocked until the solution is **Fixed**.

Step 3 — Measure & export

The screenshot shows the UAV MATE application interface for GCP Collection. At the top, there are tabs for 'Base Station' and 'GCP Collection'. Below the tabs, a status bar indicates 'GCP rover - Fixed - 0 points'. The 'CORRECTION SOURCE' section shows 'Current: L-Band PPP' and a dropdown menu set to 'L-Band PPP (no base needed)'. Below this, it says 'Active source: L-Band PPP. Rover start command sent.' and a 'Stop rover' button. The 'SOLUTION STATUS' section shows a green bar chart and the word 'Fixed' in green, with the text 'Centimetre accuracy via L-Band PPP. Hold steady and tap Collect.' Below this, it shows 'Horizontal accuracy -- CM' and 'Vertical accuracy -- CM'. The 'Current position - live - ITRF2020' section says 'Waiting for backend position?'. The 'Point ID' field is set to 'GCP-001'. The 'Antenna height (m)' field is set to '1.800'. Below this, it says 'Vertical distance from the ground mark to the antenna reference point (pole height). Stored heights are reduced to the ground mark.' and a 'Collect point - 5 s' button. Below the button, it says 'Receiver solution is fixed, but rover mode is not active.' The 'Collected points (0)' section has buttons for 'Filter', 'Copy', and 'Export CSV'. Below this, it says 'No points yet. Wait for Fixed, then tap Collect point.' At the bottom, there is a footer with the text 'Device ID -- GCP rover - Device battery -- Frame ITRF2020, current epoch'.

1. Enter a **Point ID** (auto-incremented if left blank) and the **antenna height** — pole height from the ground mark to the antenna reference point. Stored heights are reduced to the ground mark.
2. Put the pole tip on the mark, hold it steady, and tap **Collect point — 5 s**. Keep still for the 5-second occupation.
3. Repeat for each point. Review the **Collected points** list, then **Copy** or **Export CSV** (§19).

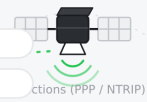
Professional alternative — the **Rover & GCP Wizard** and **GCP Manager** offer the same flow plus tilt compensation (§9.3), CSV import, and per-point solution records.

STEP 2 · REACH RTK FIX



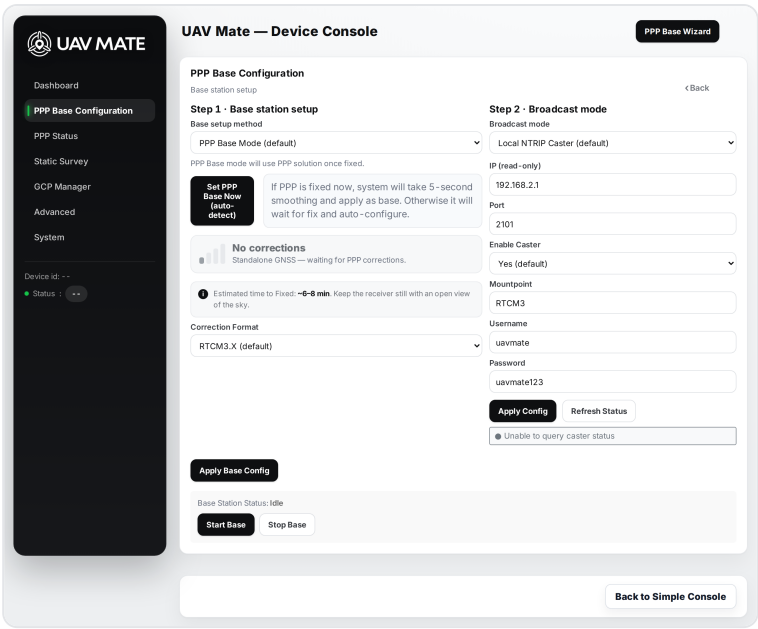
Solution **Narrow Fixed**

Hold until **Fixed** to measure



9. Reference — Device Configuration

Device Configuration has three tabs: **Base Mode**, **Rover**, and **Tilt Compensation**.



8.1 Base Mode Config

FIELD	OPTIONS / NOTES
Base setup method	PPP Base Mode · Enter known coordinates · Average for N seconds (10 / 30 / 60 s)
Correction Format	RTCM3.X · RTCM3.0 · RTCM2.3 · CMR · CMR+
(known coordinates)	Latitude, Longitude, Ellipsoid Height (m) — used only with <i>Enter known coordinates</i>
Broadcast mode	Local NTRIP Caster · NTRIP Caster · Internal Radio
Buttons	Set PPP Base Now (auto-detect), Apply Base Config, Save as Preset, Start Base, Stop Base

Base Station Status shows the live base state.

8.2 Rover

FIELD	OPTIONS / NOTES
Rover input	NTRIP Client · TCP · Internal Radio · PPP (satellite corrections, no base)
(NTRIP/TCP fields)	IP, Port, Mountpoint, Username, Password, Connection timeout (s) — shown for the relevant input
Buttons	Apply Rover Config, Start Rover, Stop Rover

Tip — With **PPP** rover input the device corrects itself anywhere; you do not need to deploy a separate base for GCP work.

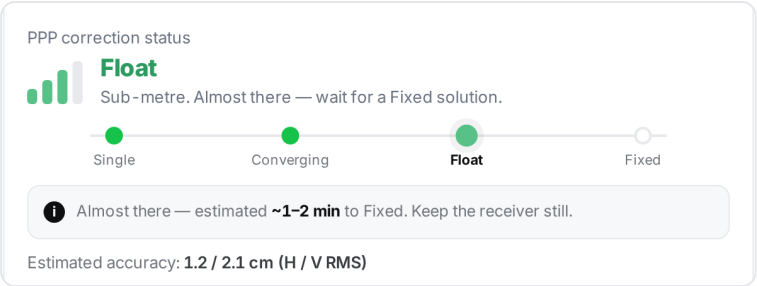
FIELD	NOTES
Tilt Sensor	Enable / disable the tilt (IMU) hardware.
Tilt Compensation	Enable so pole tilt is corrected in measurements using pole height.
Pole height (m)	Enter the pole height, then Save Pole Height .
Tilt data	Live tilt status / attitude.

Calibration-free tilt. UAV Mate's tilt compensation needs no magnetic calibration and is immune to magnetic disturbances, with accuracy of **≤ 2 cm within 60°** of tilt. To initialise, enable Tilt Compensation and then move/rock the pole gently as prompted until the console reports a valid attitude.

Warning — When tilt compensation is enabled, GCP measurement requires tilt initialisation to be complete (a valid attitude). Move/rotate the pole to initialise if prompted.

10. Reference — PPP Configuration

The PPP Configuration page controls the satellite PPP correction service the base (or rover) uses.

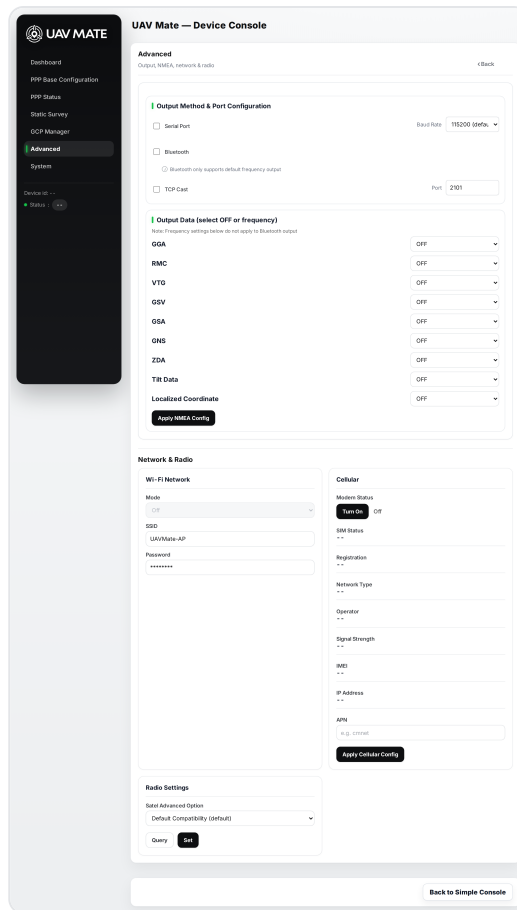


FIELD	NOTES
PPP / L-Band source	The satellite correction channel (e.g. L-Band (PPP)).
PPP correction status	A live indicator: signal bars plus a colour-coded four-stage progression Single → Converging → Float → Fixed , an estimated time to Fixed that narrows as the solution converges, and the estimated accuracy (H / V RMS) once a solution is available. See §15 for the underlying status groups.
Subscription	Service serial/subscription details, where applicable.

Note — On UAV Mate the correction service is labelled **PPP** throughout the console.

11. Reference — I/O Configuration

The I/O Configuration page sets how position data leaves the device and how the local caster behaves.



10.1 Output Method & Port Configuration

OUTPUT	SETTING
Serial Port	Enable + Baud Rate (9600 ... 921600)
Bluetooth	Enable (default-frequency output only)
TCP Cast	Enable + Port

Note — Bluetooth output uses the default message frequency; the per-message rates below do not apply to Bluetooth.

10.2 Output Data (NMEA)

Set each message to **OFF** or a frequency (**10s**, **5s**, **1Hz**, **2Hz**, **5Hz**, **10Hz**):

GGA · RMC · VTG · GSV · GSA · GNS · ZDA

Click **Apply NMEA Config** to save.

10.3 Local NTRIP Caster

This is the on-device caster that broadcasts base corrections over Wi-Fi.

FIELD	NOTES
UAV Mate — User Manual	v2.0
Enable Caster	Yes / No (default Yes)
Host / IP	<code>192.168.2.1</code> — the receiver's private Wi-Fi gateway (clients connect here)
Port	Default <code>2101</code>
Mountpoint	Mountpoint name
Username	Default <code>uavmate</code>
Password	Default <code>uavmate123</code>
Buttons	Apply Config, Refresh Status

10.4 Radio Settings

The internal UHF radio can broadcast corrections (base) or receive them (rover). Configure under **I/O Configuration** → **Radio Settings** (Professional) or in the **Broadcast / Correction source** cards (Simple).

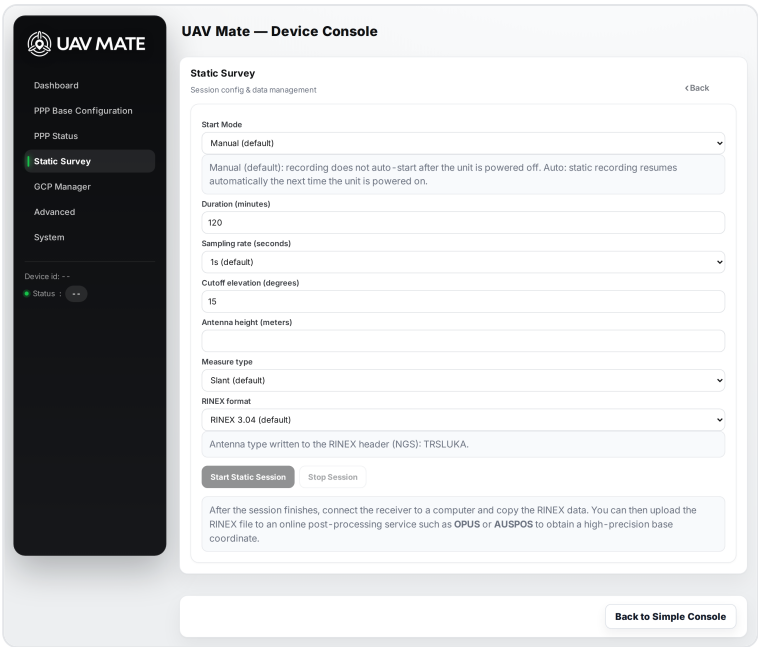
SETTING	OPTIONS
Channel / Frequency	CH1 457.550 · CH2 458.050 · CH3 458.550 · CH4 459.050 · CH5 459.550 · CH6 460.550 · CH7 461.550 · CH8 462.550 · CH9 463.550 · CH10 464.550 MHz
TX power	High — 1 W · Low — 0.5 W
Protocol	Transparent · TrimTalk450 · TrimMark3 · Satel · South
Air baud rate	4800 · 9600 · 19200 bps (available rates follow the protocol)

Pairing rule — transmitter and receiver must use the **same channel, protocol and air baud rate**. The radio stays idle until the base is ready, then transmits automatically.

Regulatory — UHF transmit frequencies and power are subject to local licensing. Confirm what you may legally use in your region before enabling the radio.

12. Reference — Static Survey

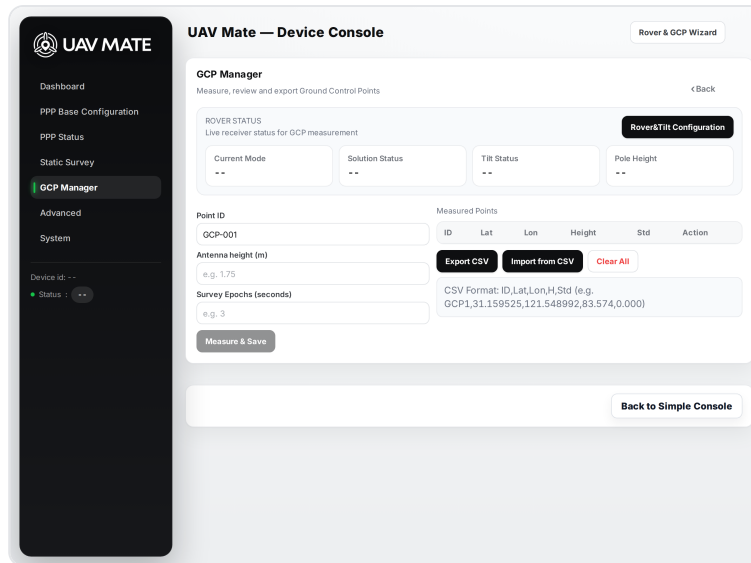
Record a raw-data session on the device for later post-processing (PPK).



FIELD	NOTES
Measure type	Session type
Antenna height (metres)	Measured antenna height
Sampling rate (seconds)	Logging interval
Duration (minutes)	Planned session length
Cutoff elevation (degrees)	Satellite elevation mask
Start Mode	Session start behaviour
Format	RINEX format / TRS format
Buttons	Start Static Session, Stop Session, Download

13. Reference — GCP Manager

Measure, review, and export Ground Control Points. UAV Mate must be in **Rover** mode and report an **RTK Fixed** solution before a point can be saved.



Measuring a point

FIELD	NOTES
Point ID	Name/identifier for the point
Antenna height (m)	Pole/antenna height at the mark
Samples	Number of epochs to average (e.g. 3)
Measure & Save	Averages the samples and stores the point. Allowed only on an RTK Fixed solution.

Warning — If the solution is not Fixed (e.g. Single, Float, or PPP Converging), **Measure & Save** is blocked and the console tells you the current solution. Wait for **L1 / Wide / Narrow Fixed** or **PPP Fixed** before measuring.

Measured Points table

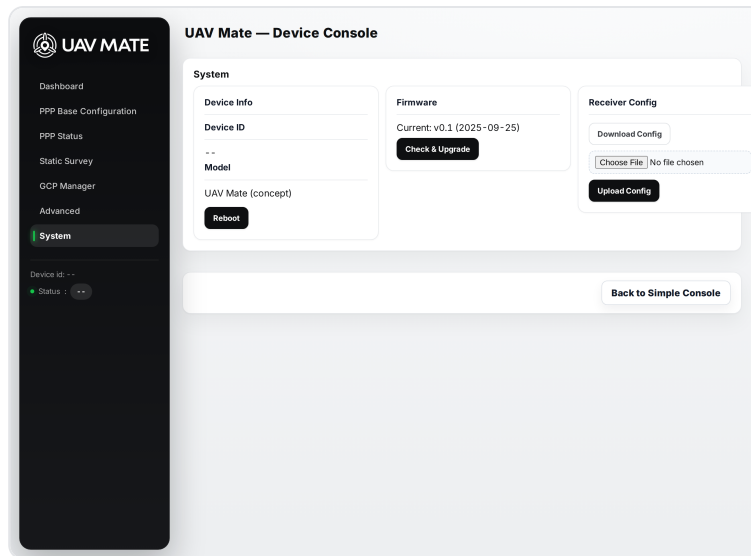
Columns: **ID · Lat · Lon · Height · Std · Solution**. The **Solution** column records the solution status at the moment of capture, so you can audit point quality later.

Managing points

CONTROL	ACTION
Export CSV	Export all points (Point ID, Latitude/Longitude, Ellipsoid Height, RMS H/V, Solution) for photogrammetry/GIS.
Import from CSV	Load points from a CSV file.
Clear All	Remove all measured points. <i>(Cannot be undone.)</i>

Tip — A separate **GCP Manager — Quick View** appears on the Dashboard showing the most recent points measured in the current project.

14. Reference — System & Modules



System

AREA	ITEMS
Wi-Fi	SSID, IP Address, MAC Address
Cellular	APN, Network Type, Operator, Registration, SIM Status, IMEI, Signal Strength, Modem Status — Apply Cellular Config
Power	Battery level, Power state
Firmware	Check & Upgrade
Configuration	Download Config / Upload Config (backup & restore)
Maintenance	Reboot, Factory Reset

Warning — Factory Reset erases your settings and presets. Export your configuration first with **Download Config**.

Cellular (4G)

Used by **External NTRIP server** broadcasting and **CORS** rover corrections. Install a SIM, then configure under **Device** › **Cellular** (Simple) or **System** (Professional): APN, optional APN username/password, and authentication (**None / PAP / CHAP / PAP+CHAP**). Enter the APN exactly as issued by your SIM provider.

Files — RINEX & logs

Raw observation files and logs are stored on the device (about 8 GB). Files are kept until deleted or storage is full — **oldest files are removed first**. Download what you need before long projects.

Updating firmware

Firmware updates are applied **from a local file — no internet needed**:

1. Get the `.bin` firmware file from UAV Mate or your dealer and save it on your phone/laptop.
2. Open **Device** › **Firmware update** (Simple) or **System** (Professional), choose the file, and tap **Upgrade firmware**.
3. Keep the receiver **powered throughout the update**. The console reports the detected firmware date and skips the update if you are already current.

The Modules page manages optional hardware (e.g. the cellular modem). Use **Turn On / Apply Cellular Config** to enable and configure a module.

15. Understanding Solution Status

The Dashboard shows the current **Solution Status**. Higher-quality fixes mean more accurate positions. The table groups the statuses you will see.

GROUP	STATUS (AS SHOWN)	MEANING / USE
RTK Fixed — survey-grade	L1 Fixed, Wide Fixed, Narrow Fixed, PPP Fixed	Centimetre-level, integer-fixed. Required for GCP measurement.
Converging / float	PPP Converging, PPP, L1 Float, Iono-Free Float, Narrow Float, Float Conv, Wide Lane, Narrow Lane	Solution is still improving; not yet survey-grade. Wait for Fixed.
Standalone / differential	Single, DGNSS, SBAS, Doppler, Propagated	Sub-metre to several-metre; navigation only.
Base fixed-position	Fixed Position, Fixed Height	The unit is acting as a base with a held coordinate.
Other	Unknown	No valid status reported.

Note — For GCP work, only **L1 Fixed / Wide Fixed / Narrow Fixed / PPP Fixed** are accepted by **Measure & Save**. **Narrow Fixed** is the best.

On-screen display — On the **PPP Status** page (and in the wizards / Base Mode Config when using PPP), these statuses are summarised as a four-stage indicator — **Single** → **Converging** → **Float** → **Fixed** — with signal bars, an estimated time to Fixed, and the estimated accuracy (H / V RMS).

16. Specifications

Figures from the *UAV Mate Datasheet* (V1.0, 2026-02). Real-world PPP performance depends on sky view and atmospheric conditions.

Positioning accuracy (RMS)

MODE	HORIZONTAL	VERTICAL
Single point	1.5 m	2.5 m
DGPS	0.25 m	0.5 m
High-precision static	2.5 mm + 0.1 ppm	3.5 mm + 0.4 ppm
Static & fast static	2.5 mm + 0.5 ppm	5 mm + 0.5 ppm
PPK	2.5 mm + 1 ppm	5 mm + 1 ppm
RTK	8 mm + 1 ppm	15 mm + 1 ppm
Network RTK	8 mm + 0.5 ppm	15 mm + 0.5 ppm
PPP base (absolute, satellite corrections)	~15 mm	~30 mm

Performance

ITEM	VALUE
TTFF	Cold start < 30 s · warm start < 5 s · reacquisition < 1 s
RTK initialisation	~4 s typical, reliability > 99.9 %
PPP convergence	typ. 6–8 min (open sky)
Tilt compensation	Calibration-free, ≤ 2 cm within 60°
Data output rate	up to 20 Hz

System & data

ITEM	VALUE
Correction formats	CMR, RTCM 2.3, RTCM 3.x
Data output	RINEX, NMEA-0183, Binary
Storage	8 GB built-in

Communication

ITEM UAV Mate — User Manual	VALUE	v2.0
Wi-Fi	802.11 b/g/n (hosts the console and the NTRIP caster)	
Bluetooth	4.1	
Cellular	4G LTE / WCDMA / GSM/EDGE (Nano-SIM)	
Network protocols	NTRIP Client, NTRIP Server/Caster, TCP	
Internal UHF radio	410–470 MHz · 0.5 / 1.0 W · half-duplex · 12.5/25 kHz · GMSK/4FSK · 4800/9600/19200 bps · protocols incl. TrimTalk450, TrimMark3, Satel, Transparent	
USB	Type-C (OTG)	

Electrical, physical & environmental

ITEM	VALUE
Battery	7000 mAh / 7.4 V — up to 10 h (environment-dependent)
Charging	USB-C fast charge 15 W (5 V / 3 A), ~3 h (20–90 %); external power 5–20 V; charge +10 to +45 °C
Dimensions	Ø 132 × 68 mm
Weight	≈ 827 g
Mount	5/8" × 11 UNC-2B
Operating temperature	–40 °C to +70 °C (storage –55 to +85 °C)
Ingress protection	IP68 (dust & water proof)
Relative humidity	100 %, non-condensing
Pole drop	2 m onto concrete
Vibration	MIL-STD-810G, FIG 514.6C-1
Warranty	One year

17. Troubleshooting

SYMPTOM	TRY THIS
Console won't load	Confirm you are connected to the receiver's Wi-Fi hotspot and using the correct IP. Reload the page. The console needs no internet.
Base won't reach a fix	Ensure a clear sky view (no canopy/buildings). PPP needs time to converge — keep the unit stationary. Check PPP Configuration status.
Drone shows Float, not Fix	Confirm the base has Started and the caster is enabled (I/O Configuration → Local NTRIP Caster → Refresh Status). Confirm the drone joined UAV Mate's Wi-Fi and uses the correct caster Host/Port/Username/Password (defaults <code>192.168.2.1</code> / <code>2101</code> / <code>uavmate</code> / <code>uavmate123</code> ; see §7, Step 3).
Measure & Save is blocked	The solution is not RTK Fixed. Wait for Narrow/Wide/L1 Fixed or PPP Fixed (Dashboard → Solution Status).
Tilt measurement won't complete	Tilt initialisation isn't finished or the attitude isn't valid. Level/rotate the pole as prompted, or disable Tilt Compensation.
No serial/Bluetooth output	Check the output is enabled and the message frequency is not OFF (I/O Configuration). Bluetooth uses default frequency only.
Lost settings after reset	Restore with System → Upload Config if you exported a backup.

Tip — Use **System** → **Download Config** to keep a backup before firmware upgrades or experiments.

18. Glossary

TERM	MEANING
PPP	Precise Point Positioning — absolute cm-level positioning from satellite corrections, no local base or CORS needed.
RTK	Real-Time Kinematic — cm-level positioning relative to a base via correction messages.
RTCM	Standard format for GNSS correction messages.
NTRIP	Protocol for streaming RTCM over IP; a <i>caster</i> serves corrections to <i>clients</i> .
GCP	Ground Control Point — a surveyed mark used to georeference/verify a drone survey.
ITRF2020 (current epoch)	The global reference frame and epoch in which PPP coordinates are delivered.
NMEA	Standard sentences (GGA, RMC, ...) carrying position/time/satellite data.
Fixed solution	An integer-resolved RTK solution; the highest-accuracy state.
Tilt compensation	Correcting the measured point for pole tilt using the IMU and pole height.

19. Appendix — GCP CSV format

Exported points (**Export CSV**) include, per point:

- **Point ID**
- **Latitude, Longitude**
- **Ellipsoid Height (m)**
- **RMS (H / V)**
- **Solution** (status at capture)

Note — Confirm the exact column order/headers against your photogrammetry software's import template. *[Insert sample CSV header here once confirmed.]*

20. Safety and regulatory information

Important — Read and understand these requirements before using UAV Mate.

General safety

- Operating or storing the receiver outside its specified temperature range can damage it.
- Do **not** use the receiver during a **thunderstorm** — there is an increased risk of a lightning strike.
- When using the internal radio, **install the radio antenna before transmitting**. Transmitting without an antenna can overheat and damage the radio module.
- Do not operate near electrical blasting caps or in an explosive atmosphere. Keep equipment properly grounded and have it serviced only by a qualified technician.
- Changes or modifications not expressly approved by UAV Mate Inc. may void your authority to operate the equipment and can damage the receiver.

RF exposure

To limit exposure to radio-frequency energy, do not operate the transmitter when anyone is within these distances of the antenna:

- **Bluetooth / Wi-Fi / cellular:** less than **20 cm**
- **410–470 MHz UHF radio:** less than **47 cm**

Do not operate unless all RF connectors are secured or properly terminated.

CE marking

UAV Mate Inc. declares that the UAV Mate GNSS receiver complies with the essential requirements (radio performance, electromagnetic compatibility, and electrical safety) and other relevant provisions of the **Radio Equipment Directive 2014/53/EU**, the **EMC Directive 2014/30/EU**, and the **Low Voltage Directive 2014/35/EU**.
[Confirm the certifications that apply to your market — e.g. FCC, RCM.]

Disposal (WEEE)

Do not dispose of this product with household waste. Dispose of it in accordance with the regulations in force in your country, and prevent access by unauthorised personnel.

Warranty & support

UAV Mate is covered by a **one-year warranty** from the date of purchase (see the UAV Mate Datasheet). For support, contact your dealer or UAV Mate Inc.:

- **Web** — uav-mate.com
- **Email** — sales@uav-mate.com