

CanopyFlasher Connect

Anti-collision light for gliders

User Manual

powered by ForeSight Avionics



Revision history

Rev.	Date	Author	Change
1.0	2026-07-15	D. Rudolph	First edition
1.1	2026-08-25	D. Rudolph	Temperature-controlled brightness, extended baud rates (up to 230400), FLARM range analysis
1.2	2026-09-20	D. Rudolph	Setup help, own flight log with take-off and landing time, third flash pattern, web app also in the Nav WiFi

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1. About the CanopyFlasher

This manual applies to the CanopyFlasher Connect. It evaluates FLARM data, flashes automatically in flight and passes the data on to a navigation device wirelessly. For aircraft without FLARM there is the CanopyFlasher Basic, operated solely by the mode switch and the panic button; it has its own manual.

The CanopyFlasher is a configurable anti-collision light for gliders with FLARM integration. It receives NMEA data via serial interfaces and drives a high-power LED unit with optimised flash patterns for maximum conspicuity.

The device is configured entirely through a built-in web app reached via a WiFi hotspot – no USB cable or special software required.

Conspicuity: The detection range depends heavily on weather, background, viewing direction and daylight, and cannot be stated as a single figure.

Flash rate: 40–100 flashes/min – designed to the requirements for anti-collision lights (ICAO Annex 8).

Property	Value
LED output	Green: 10,500 lm · approx. 11,300 cd effective Red: 6,000 lm · approx. 6,500 cd effective
Beam angle	30°
Brightness	5 levels (60–100 %) · temperature-controlled if sensor fitted
Power supply	12 V aircraft supply · USB port provides 5 V to charge a mobile device
Serial interfaces	S1 (FLARM input) · S2 (output or 2nd input)
Wireless	BLE (SeeYou Navigator) or WiFi (XCSoar / LK8000)
WiFi password	myCanopyflash
TCP port	10110 (NMEA)
Operating temperature	–20 °C to +70 °C

2. Scope of delivery & specifications

Scope of delivery

- Canopy flasher unit
- Connect module
- Control unit
- Cable harness
- Alignment decal
- Cockpit label
- Circuit breaker 4 A
- NFC tag (pre-programmed)

3. Getting started

3.1 Normal operation

In normal operation the device starts without WiFi (unless auto-WiFi is enabled). The operating mode is selected with the switch on the control unit.

Switch position	Behaviour
On	LED flashes continuously, independent of FLARM
Auto	LED flashes only above 40 km/h from FLARM (10 s run-on)
Off	Flasher switched off

3.2 Changing settings – opening the CFG WiFi

- 3.2.1. Switch the device off.
- 3.2.2. Hold the button pressed and switch on at the same time.
- 3.2.3. The WiFi network **[SerialNr]_CFG** appears in the WiFi menu.
- 3.2.4. Connect – password: **myCanopyflash**
- 3.2.5. Open a browser: **http://192.168.4.1** or **http://canopyflasher.local**

3.3 WiFi modes at a glance

Mode	SSID	Description
Config	[SerialNr]_CFG	Hold the button while switching on
Nav (auto WiFi)	[SerialNr]_NAV	Starts automatically – stays active

3.4 Setup help

The first time the web app is opened, setup help starts by itself. It guides through the configuration in ten steps: flash pattern, brightness, pauses, panic mode, serial interfaces and wireless.

The familiar interface stays visible throughout. Setup help highlights the card in question, explains it at the bottom of the screen and reminds you to save at the end of each section. For the FLARM step it also shows whether data is arriving.

It can be stopped at any time and restarted from the Setup Help menu entry – for example after changing the FLARM. As it changes settings, it is only available in the configuration WiFi.

4. Flash patterns & LED brightness

The CanopyFlasher offers three flash patterns. The single flash achieves the highest effective intensity and therefore the greatest range. The double flash is more conspicuous with less heat, and the quad flash draws the most attention through its irregular rhythm. Which pattern suits best depends on the use – the single flash is set at the factory.

The screenshot shows the 'Settings Flasher' interface of the CanopyFlasher web application. On the left is a sidebar menu with options: Start, Settings Flasher (highlighted), Panic Mode, Serial Interface, Bluetooth & WiFi, FLARM Config, Flight Log, Range Analysis, and Firmware Update. The main content area is titled 'Settings Flasher' and contains three sections:

- FLASH INTERVAL**: A section with a lightning bolt icon. It states 'Three patterns to choose from. Flash rate and heat are rated below.' and presents three buttons: 'Single flash' (One strong flash – classic ACL, maximum range), 'Double flash' (Two short flashes – more conspicuous, less heat), and 'Quad flash' (Four flashes in an irregular rhythm – highest conspicuity). The 'Quad flash' button is currently selected.
- LED BRIGHTNESS**: A section with a plus icon. It states 'Set the LED brightness in 5 steps. Higher brightness increases visibility but also heat and power consumption.' Below this, a row of five buttons shows the brightness levels: 60%, 70%, 80%, 90%, and 100% (DEFAULT). The 100% button is selected.
- FLASH CYCLE**: A section with a plus icon. It states 'Configure the breaks between flashes. Four flashes per cycle, repeating infinitely. Perceptibility is strongest when flash frequency increases towards the end of the cycle.' Below this is a yellow warning box: '⚠ Test every new setting for overheating before taking off!'. The settings for the flash cycle are as follows:
 - Flash duration: Set to 30 ms (with an 'automatic' label).
 - Pause nach Blitz 1: Set to 170 ms (range 100–400 ms).
 - Pause nach Blitz 2: Set to 100 ms (range 100–400 ms).
 - Pause nach Blitz 3: Set to 170 ms (range 100–400 ms).

	Single flash	Double flash	Quad flash
Flash duration	22–60 ms · follows the pause	2 × 30 ms (fixed)	4 × 30 ms (fixed)
Gap between flashes	–	120 ms	170 / 100 / 170 ms
Pause (cycle)	1440 ms	1200 ms	1850 ms
Cycle time	1500 ms	1380 ms	2410 ms
Flash rate	40 flashes/min	87 flashes/min	100 flashes/min
Duty cycle	4.0 %	4.4 %	5.0 %
Effective intensity	100 % (reference)	68 %	78 %
Range (relative)	100 %	83 %	88 %
Typical use	Greatest range	More conspicuous, less heat	Highest conspicuity, more heat

Background: For anti-collision lights it is not peak brightness that counts but the effective intensity according to Blondel-Rey: $I_e = \text{light time} / (0.2 \text{ s} + \text{flash duration})$. Longer flashes therefore produce a considerably higher effective intensity. The single flash thus achieves a higher effective intensity than the double flash and is seen further away at the same LED power (range $\sim \sqrt{I_e}$).

4.1 Adjusting the pause

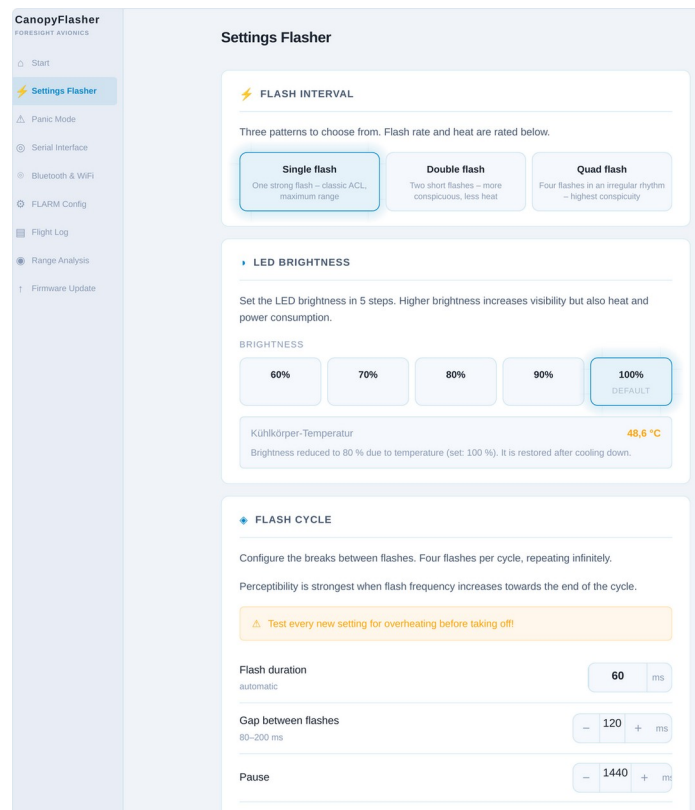
The pause is adjusted in the web app under Flasher settings and determines the flash rate. For the single flash the flash duration follows the pause so that the heat stays constant: 60 ms at a pause of 1440 ms, 22 ms at 540 ms. For the double and quad flash the duration is fixed at 30 ms, so a shorter pause raises the thermal load there. For the quad flash, the three gaps between flashes can be set individually.

Parameter	Single flash	Double flash	Quad flash
Pause (cycle)	540–1440 ms	900–1400 ms	1200–2500 ms
Gap	– (not used)	80–200 ms	100–400 ms each

4.2 LED brightness

Brightness is set in the web app in five levels: 60 %, 70 %, 80 %, 90 % and 100 %. Higher brightness increases range but also the heat generated. If a temperature sensor is fitted, the

selected level acts as an upper limit: the device starts reducing brightness at about 45 °C and reaches the lower limit at 55 °C. Brightness is only restored once the module has cooled down considerably. The current temperature is then shown below the level selection.



4.3 Thermal load

The web app shows three bars rating the current setting:

- Thermal load (duty cycle × brightness) – green: optimal · yellow: acceptable · orange: borderline
- Flash rate (flashes/min) – green within 40–100/min · Effective intensity (Blondel-Rey) with resulting range in %

Operation on the ground: Without airflow the device gets considerably hotter than in flight. Do not run the flasher longer than necessary when stationary and in direct sunlight. In Auto mode the device only flashes above 40 km/h and is therefore protected on the ground.

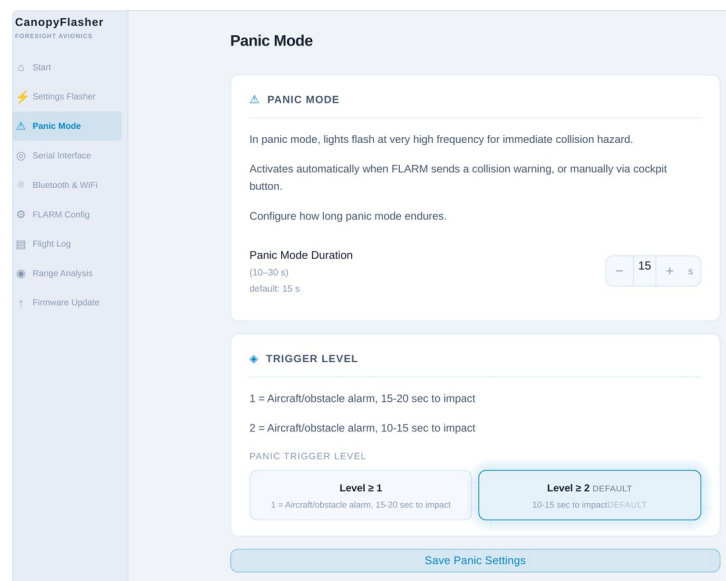
4.4 Temperature sensor and history

The device detects by itself whether a temperature sensor is fitted – no setting is required. If the sensor becomes unreachable, for example with the canopy open or due to a broken cable, the device runs at reduced brightness until the next reading. The display states the reason.

On the start page the device records the temperature over the last four hours. After the flight this shows the peak temperature and how long the control was active. The record survives a restart.

5. Panic mode

Panic mode switches to a much faster flash pattern to attract maximum attention in an emergency. It has two stages: level 2 flashes evenly and fast (approx. 5 Hz), level 3 switches to an irregular strobe burst in case of acute collision risk, clearly distinct from the normal pattern.



	Level 2 – warning	Level 3 – acute danger
Flash pattern	4 evenly spaced flashes	Strobe burst
Flash frequency	~5 Hz	4 × 40 ms + 300 ms pause
Trigger	Button or FLARM alarm level 2	FLARM alarm level 3

5.1 Triggers

- Press the panic button
- FLARM collision warning (\$PFLAU alarm level) at or above the configured level
- Level 3 is triggered exclusively by an acute FLARM warning (alarm level 3)

5.2 Configuration

Setting	Description
Panic mode duration	Default 15 seconds · adjustable from 10 to 20 seconds
Panic trigger level	FLARM warning level that triggers panic mode

Panic mode ends automatically after the set duration. The button always triggers level 2.

6. Serial interfaces S1 & S2

Interface S1 (FLARM input)

Setting	Options	Default
Pins	Normal / swapped	Normal (RX: 18, TX: 17)
Signal	Inverted / normal (TTL)	Inverted (for FLARM)
Baud rate	4800 / 9600 / 19200 / 28800 / 38400 / 57600 / 115200 / 230400	Auto detection

Pins swapped: Use if no data is received – swaps RX and TX.
Inverted (default): For FLARM and most serial avionics devices (IGC standard).

Interface S2

S2 can be configured as an output (forwarding NMEA to a display) or as a second input (second avionics device).

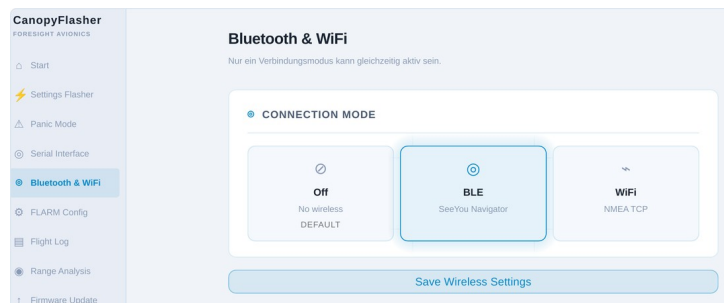
Mode	Description
Output (default)	NMEA data from S1 is forwarded to S2 – for example to a display
Input 2	Connect a second device to S2 – its NMEA data is processed as well

NMEA monitor

The web app includes a built-in NMEA monitor showing the most recent sentences received on S1 and S2 in real time. Useful for troubleshooting.

7. Bluetooth & WiFi

Only one connection mode can be active at a time. The mode is saved in the web app under Bluetooth & WiFi.



⚠ BLE and WiFi cannot run at the same time. Enabling one mode automatically disables the other.

7.1 BLE – Bluetooth Low Energy (SeeYou Navigator)

BLE is preferred by modern apps on iOS and Android. The CanopyFlasher uses the Nordic UART Service (NUS) to transmit NMEA data.

Parameter	Value
BLE name	CanopyFlasher
Protocol	Nordic UART Service (NUS)
Data	NMEA sentences from S1
Compatible apps	SeeYou Navigator (iOS & Android)

Setting up SeeYou Navigator

- 7.1.1. In the web app: **Bluetooth & WiFi** → **BLE** → **Save**.
- 7.1.2. Open SeeYou Navigator.
- 7.1.3. **Devices** → **Add device** → **Bluetooth LE**.

7.1.4. CanopyFlasher – select from the list.

7.1.5. Set the protocol to **NMEA** and enable the device.

✓ Compatible with: SeeYou Navigator (iOS & Android).

7.2 WiFi – NMEA TCP (XCSoar, LK8000)

In WiFi mode the CanopyFlasher opens its own network and provides the NMEA data over TCP.

⚠ While connected to the CanopyFlasher network there is no internet access.

Parameter	Value
SSID	[SerialNo]_NAV (individual serial number)
Password	myCanopyflash
IP address	192.168.4.1 or canopyflasher.local
Port	10110 (NMEA TCP)
Protocol	TCP NMEA
Timeout	stays active (until restart)

Setting up XCSoar

7.2.1. Connect to the WiFi network **[SerialNr]_NAV** – password: **myCanopyflash**

7.2.2. XCSoar: **Config** → **Devices** → **TCP client** → **IP: 192.168.4.1** → **Port: 10110** → **NMEA**

Setting up LK8000

7.2.1. Connect to the WiFi network.

7.2.2. LK8000: **Settings** → **Devices** → **TCP client** → **IP: 192.168.4.1** → **Port: 10110**

✓ Compatible with: XCSoar (iOS/Android/PC), LK8000 and any app supporting TCP NMEA.

8. FLARM configuration

The CanopyFlasher allows the connected FLARM device to be configured directly from the web app. While configuration mode is active, NMEA forwarding is paused.

The screenshot shows the CanopyFlasher web application interface. On the left is a sidebar menu with the following items: Start, Flasher Settings, Panic Mode, Serial Interface, Bluetooth & WiFi, **FLARM Config** (highlighted), Range Analysis, and Firmware Update. The main content area is titled 'FLARM configuration' and includes a sub-header: 'In configuration mode NMEA forwarding is paused and the FLARM is addressed directly.' Below this, there is a 'Configuration mode' section with a green 'ACTIVE' status indicator and two buttons: 'Disable' (red) and 'Read all' (blue). Underneath is the 'Configuration parameters' section, which contains six input fields arranged in a 3x2 grid. Each field has a 'Save' button and a green checkmark indicating the value has been saved. The parameters are: PILOT NAME (Dennis M.), REGISTRATION (D-1234), COMPETITION ID (7C), COMPETITION CLASS (Standard), FLARM ID (HEX) (DDA5BA), and LOG INTERVAL (S) (4).

In configuration mode NMEA forwarding is paused. Parameters are read directly from the FLARM and can be saved individually. Disable the mode when finished so that the flasher processes FLARM data again.

Flight log: The flights stored in the FLARM can be listed and downloaded individually as IGC files – without removing the device.

8.1 Opening configuration mode

- 8.1.1. Open the web app: **http://192.168.4.1** or **http://canopyflasher.local**
- 8.1.2. **FLARM Config** → **Enable**.
- 8.1.3. The parameters are displayed. **Read all** loads the current values from the device.
- 8.1.4. Adjust the values and save them individually.
- 8.1.5. **Disable** – NMEA forwarding resumes.

8.2 Configurable parameters

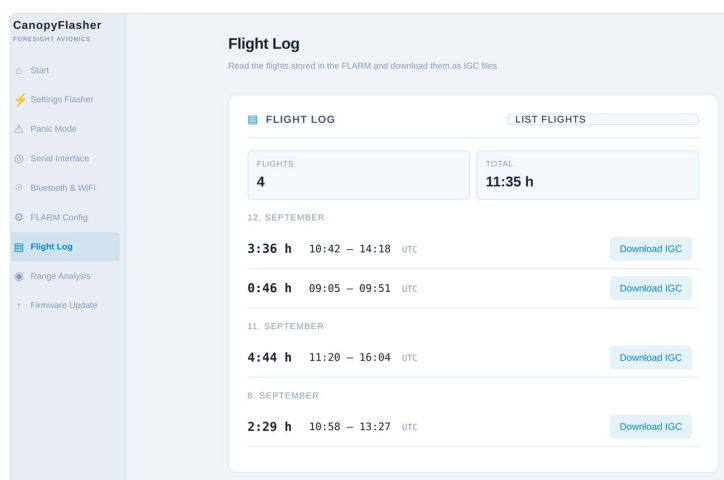
Parameter	Description
Pilot name	Name of the pilot (PILOT)
Co-pilot	Name of the co-pilot (COPILOT)
Registration	Aircraft registration (GLIDERID)
Competition ID	Competition sign (COMPID)
Competition class	e.g. Club, 15m, 18m (COMPCLASS)
FLARM ID (hex)	Unique FLARM address (ADDRESS)
ID type	1=ICAO, 2=FLARM, 3=OGN (ADDRTYPE)
Log interval	Recording interval in seconds (LOGINT)
No-track	Disable tracking: 0 = on, 1 = off (NOTRACK)

9. Flight log

The CanopyFlasher keeps its own flight log. Take-off and landing are recorded automatically, regardless of the connected FLARM.

- For every flight the date, take-off time, landing time and duration are recorded – in hours and minutes.
- Times are UTC. The display indicates this.
- The last 40 flights are retained, including across a power loss.

After landing, open the web app while stationary and select Flight Log.



Tap Download IGC on the flight you want.

While the flight log is open, no FLARM data is forwarded to the navigation device. This is irrelevant when stationary.

The flight log is also available in the Nav WiFi, so no restart with the button held is required. The aircraft must be stationary.

9.1 IGC files from the FLARM

If the connected FLARM supports the readout, the flights stored there can additionally be downloaded as IGC files. For this the page briefly switches the FLARM into configuration mode and ends the mode again as soon as you leave the page.

9.2 Direct link and NFC tag

Every page of the web app can be opened directly through its address. For the flight log it is:

`http://192.168.4.1/#flightlog`

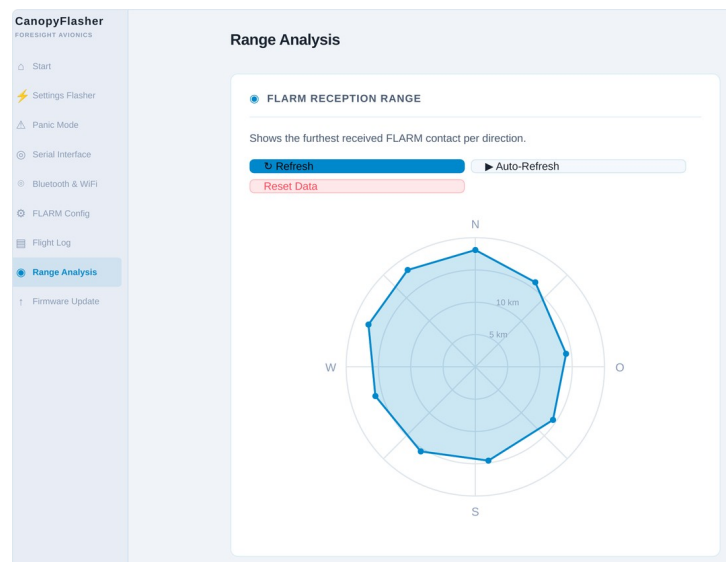
The supplied NFC tag is already programmed with this address. Fit it in the cockpit – after landing, a single tap with the mobile device opens the flight log without navigating through the menu. The address also works as a browser bookmark.

An existing WiFi connection to the CanopyFlasher is required. With auto-WiFi enabled this is usually already the case after landing.

10. FLARM range analysis

The CanopyFlasher continuously evaluates the FLARM contacts received and derives the reception range in every direction. This shows whether the FLARM antenna is well installed or whether there are directions with poor reception.

The evaluation runs automatically in the background. No setting is required – the longer you fly, the more complete the picture becomes.



The horizon is divided into 72 sectors of 5° each. For every sector the most distant contact received is stored. An evenly round shape indicates good all-round reception; pronounced indentations point to shadowing, for example by the fuselage, instruments or a poorly routed antenna.

Reset clears the collected data – useful after modifying the antenna in order to check the effect.

11. Firmware update

The CanopyFlasher supports over-the-air (OTA) updates directly from the web app – no USB cable or special software needed.

File	Description
CM-[Version].ino.bin	Firmware update – core functions, new features, bug fixes
CM-[Version].littlefs.bin	Web app update – new interface, new pages, design updates

Firmware and web app can be updated separately or together – simply select both files at once.

Your settings are fully preserved during an update.

Performing an update

- 9.1. Open the CFG WiFi (hold the button while switching on).
- 9.2. Open the web app: **http://192.168.4.1** or **http://canopyflasher.local**
- 9.3. **Firmware Update** → select the update file(s) – both files can be selected at once.
- 9.4. **Upload** – the files are transferred one after another, then the device restarts automatically.

- ⚠ Use only official update files from ForeSight Avionics.
- ⚠ Do not disconnect or switch off the device during the update.

12. Troubleshooting

Problem	Solution
LED does not flash	In Auto mode the light only flashes above 40 km/h (FLARM ground speed). For continuous flashing set the switch to On.
WiFi not visible	Hold the button while switching on to enter config mode
No FLARM data	Check the baud rate – use auto detection. Try the signal inversion setting.
Web app shows an old version	Press Ctrl+Shift+R in the browser (clear cache)
FLARM Config does not respond	The S1 baud rate must match the FLARM. Use auto detection.
BLE connection drops	Restart the device. Do not enable BLE and WiFi at the same time.
WiFi timeout	Both WiFi modes stay active until the device is restarted

13. Safety notes

- ⚠ The CanopyFlasher is an auxiliary device to improve conspicuity and is not a certified anti-collision light. Its flash rate follows the requirements for anti-collision lights (40–100 flashes/min, ICAO Annex 8).
- ⚠ Always test all settings and connections on the ground before flight.
- ⚠ The device does not replace any required safety equipment.
- ⚠ Do not operate the signal inputs above 3.3 V.
- ⚠ Do not open or modify the device.
- ⚠ Use only official firmware from ForeSight Avionics.
- ⚠ In case of malfunction disconnect the device and contact the manufacturer.