

PowerFlarm

Tips and Recommendations

Ramy Yanetz

Feb 2021

Where's the danger?



‘... the physical limitations of the human eye are such that even the most careful search does not guarantee that traffic will be sighted.’
Australian Transport Safety Bureau

What is Powerflarm

- The FLARM collision avoidance system was developed for glider pilots, by glider pilots.
- FLARM warns FLARM-equipped pilots of impending collisions plus gives the location of non-threatening nearby FLARM-equipped gliders.
- It only works if both gliders have FLARMS.**
- FLARM knows about the unique flight characteristics of gliders, and stays quiet unless there is a real hazard.
- PowerFlarm also "sees" transponder and ADS-B equipped aircraft but those aircraft do not see PowerFlarm equipped aircraft.
 - Most GA aircrafts have ADS-B

How powerflarm works

- GPS position, pressure altitude
- Each device calculates, transmits and compare predicted flight paths
- Warnings are issued in accordance with the time remaining to a possible collision, not distance, thus eliminating false alarms in thermals
- Multi level of warnings, with an audible collision alarm 6-8 seconds from possible collision
- Distance, bearing and altitude difference are displayed
- In addition powerflarm receives (but not transmit) ADS-B targets and provide similar alerts as flarm targets
- Powerlarm receives Mode C transponder signal, and displays distance and altitude difference (but no bearing)
 - Mode C displayed as a circle

Recent Development

- Powerflarm can now display ADS-R targets (UAT targets relayed from Ground stations)
- Powerflarm can now display TIS-B targets (Mode C/S transponders relayed from ground station)
- Requires ground station coverage and ADS-B Out (or nearby ADS-B Out)
- Requires additional license fee (included in the new Powerflarm Fusion)

Who's using it

- Over 25,000 units installed worldwide
- Virtually all gliders in central Europe are equipped
- **Most gliders in Region 11**
- Virtually all contest pilots
- A growing number of PowerFLARM installations in powered aircraft

Misconceptions

- Midairs are rare
 - After stall/spin, midair collision is roughly tied for second as a source of fatalities from accidents involving gliders.
 - Before powerflarm was introduced, there used to be an average of 1 midair per year in the US with 50% fatality rate.
- Powerflarm is expensive
 - PowerFLARM costs about the same as a parachute and it gets used a lot more often....avoiding a midair collision is clearly preferable to a bailout after the fact.
- I don't need flarm – I have transponder.
- I don't need flarm – I can use See and Avoid effectively.

More Myth and Misconceptions

- The big sky theory
- I don't need PF since I don't fly contest
- **I am willing to take the small collision risk**
- It is complicated to install, configure and maintain
- Powerflarms do not work well, have issues

PF Benefits

- May save yours and others lives
 - Far less midairs worldwide since it was introduced.
 - Already saved lives
- Situational awareness, advance warning
- Find where to tow to
- Find thermals
- Decide where to go next
- Compare climb rates
- Buddy flying
- Flight recorder

Type of Flarm devices

- Classic Flarm
 - Only provide flarm alerts, not ADSB and transponder
 - Does not work in the US
- Powerflarm Core (brick)
 - Permanent installation
- Powerflarm Portable
 - More popular in clubs and as loaners in contests
- Powerflarm Fusion
 - Easier to configure, upgrade, test, can transmit from both antennas, WIFI and Bluetooth, include all licenses

Recommendations

- Get a Fusion or core unless you need a portable device
 - Portable and core are not the same. They have different Displays.
- Get one of the in panel flarm displays if you have space, or the external flarmview
- Clearnav, LXNAV, Oudie are all good alternatives to flarm display
- Stealth mode not recommended
- **Read the manual! It is not “install and forget”**
 - Norcalsoaring.org>Pilot Resources>Documents>Powerflarm Info
- **Firmware must be upgraded yearly**

Performance

- When installed and configured correctly, most pilots report 2-4 miles flarm range on average (occasionally up to 10 miles) in front, and 1-2 miles behind
- Use the FlarmRange online tool with your recorded IGC file to analyze your range
<https://flarm.com/support/tools-software/flarm-range-analyzer/>
- Mode C and ADS-B have much longer range

Core Installation and configuration

- **Read the manual**
- Get help if needed or get professional installation
- Use config tool to configure and put configuration file in USB drive root directory
- Insert USB drive before turning the powerflarm on
- Do not use the same USB drive with another glider as it will overwrite their configuration with yours.
- **Proper configuration is a must**
- Powerflarm displays are installed and configured separately (read the display manual as well)
- Register on FlarmNet.net and download latest flarmnet database into your display (follow display manual instructions and download appropriate file) - This is required so your tail number will be displayed instead of flarm ID
- Register on OGN <https://www.pacificsoaring.org/articles/2020/using-ogn/using-ogn.html> (pacificsoaring.org>Articles and Safety>Safety Information)
- **keep updating your powerflarm (must), display (recommended) and flarmnet (recommended) at least once per year**

Configuration tips

- Use flarm config tool at <https://flarm.com/support/tools-software/flarm-configuration-tool/>
- Flarm horizontal and vertical range set to max
- ADS-B range 5NM/2000 feet (reduce to 3NM/1000 feet if you find it too distracting)
- ADS-B collision warning ON
- PCAS/Mode C range 3NM/1000 ft
- Mode C Target: On
- Mode C filtering: Aggressive
- Beep on Mode C: On
- Disable Stealth and No Track modes
- More tips available at <https://www.cumulus-soaring.com/flarm/PowerFLARM-Tips.pdf>

Firmware Upgrade

- **MUST be done at least once per year**
- Download from <https://flarm.com/support/firmware-updates/download-firmware/> and save in USB drive root directory
- Insert USB drive before powering up and wait at least 2 min for upgrade to complete.
- Verify the firmware number after upgrade
- **Best to do it part of the annual**
- Make an entry in the glider logbook and indicate the date and firmware
- See more information at <https://flarm.com/ica>
- **Firmware will expire and the powerflarm will be completely inop few month after 1 year, sometime without warning**

Powerflarm in NCSA club Gliders

- KP – currently has portable, getting replaced with a core
- 81C – Powerflarm Core coming soon
- SS – Powerflarm Portable
- FB – Powerflarm portable coming soon

- Club units are already configured, registered and have latest firmware. Do not change configuration!

Portable installation

- Can be velcroed on glare shield
- Powerflarm portable need to be connected to external power or 6 internal AA batteries
- Do not connect to external power with batteries inside, unless rechargeable!
- To use in another glider which has no external power connector, all you need is to bring velcro and 6 AA batteries

Portable Operation

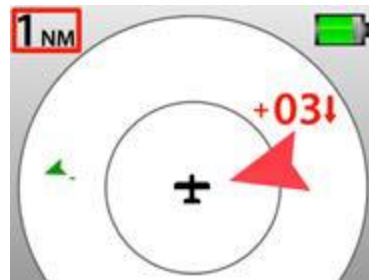
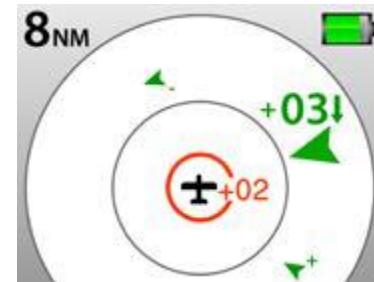
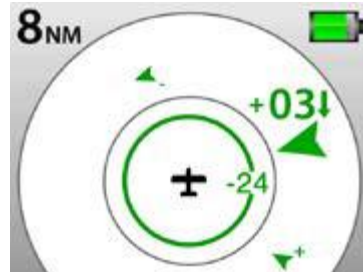
- **Press button for at least 3 seconds**
- **Wait for the disclaimer and press OK within 5 seconds**
- Radar like display will show up
- Turn the knob to change zoom level – recommending 1-2 mile range
- Long press to turn off
- If you don't know how to use it, or don't trust/care about it, just turn it on so other Powerflarms will see you.
- Questions/issues? Contact your powerflarm crew chief.

Portable Operation in KP/81C (temporary)

Must be done in the following order:

1. Press any button to turn on the S8 Vario then press middle button to confirm elevation
2. Turn on the powerflarm and confirm
3. Press the lower button in the S8 to switch to the page with vario and STF data
4. you may hear beep alerts whenever traffic is detected and the S8 may switch from vario to flarm display and show traffic, or you can press the middle button to toggle between vario and flarm display manually.
5. Use S8 top knob to change volume

Powerflarm portable display



Cockpit Procedures

- Maintain a good visual scan for other traffic. Power Flarm is an aid, not a solution. We must not rely solely on Power Flarm to “see and avoid” other gliders
- ADS-B target looks similar to flarm target in older displays and portable
- If you only see a green/orange/red circle it is a non directional mode C alert
- **Include powerflarm in your instrument scan for situational awareness**
- Zoom in as needed when hearing traffic alert to locate traffic (1-2 mile recommended)
- **If you find it too distracting it is better to lower volume and ignore it than turning it off**

Cockpit Procedures (continues)

- On FLARM/ADS-B Collision alarm (directed target, with bearing):
 - collision may be imminent
 - Brief glance at the display to determine bearing to target
 - Make visual contact
 - Take evasive action.
 - If no visual contact - push or pull, it is faster than rolling
 - May get occasional false alarm during themaling and on tow