

# Flarm operation

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# Definition

- “The FLARM acoustic alert and visual display is a GPS-based situational awareness system, designed to alert the pilot to a potential collision or near miss with a glider, or aircraft, that he may or may not have seen.”

# Background

- Developed by the Swiss to address the collision risk in Alpine flying.
  - Like flat land thermalling, mountain pilots congregate on certain routes.
  - For mountain flying there is also an obstacle database.
- Initially adopted in Europe but now world-wide, by glider pilots, especially in PowerFlarm format.
- Not only gliders. 50,000+ general aviation, helicopters, UAVs.
- Mandatory, or restrictions without Flarm, at Lasham and other gliding clubs.
  - e.g. at NHL: a non Flarm-fitted glider can only be east of the boundary of North Hill if it is in a circuit to land to the west. (Deconfliction with Dunkeswell airfield)
- Usually mandatory at gliding competitions.
- One of the three types of Electronic Conspicuity that the CAA is pushing hard for aviators to adopt.

# How it works

## Basic components

GPS receiver,  
plus GPS antenna  
Microcontroller unit  
Radio transceiver  
Pressure altimeter  
Flarm display

## Operation

UHF transmission of position, course, speed  
Track up to 50 Flarm contacts  
Display/alarm most dangerous contact

Power (consumption):  
12 Volt, 52mA

## LX Red Box Flarm

GPS "mouse"  
(GPS receiver)

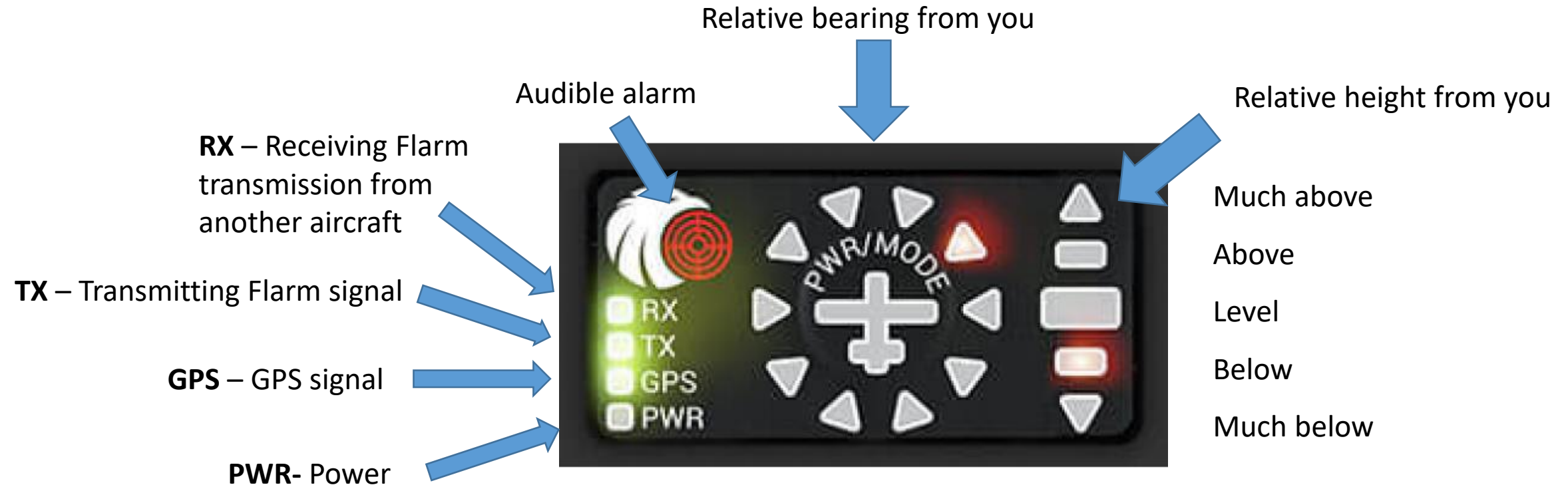
The red box is  
mounted behind an  
instrument panel

UHF Antenna.  
DGS gliders are fitted with  
a slightly different design -  
an omni-directional antenna



Flarm display,  
mounted high on  
each instrument panel

# The display



- This is the simplest Flarm display.
- Other aircraft may be fitted with different displays that provide more features.
- DGS has adopted the KISS principle.

# How to use Flarm at DGS

- Switch on Master power switch.
  - There is no separate switch for Flarm.
- Start up routine (LEDs on left of display).
  - Power – Green.
  - GPS - Red then green when satellites acquired (3D position).
  - TX - Flashes green when Flarm is transmitting.
  - RX- Green when receiving Flarm transmissions from other aircraft.
- Recommend leave Master power switch on throughout the day, except if aircraft is “parked up”.
- No need to touch anything.
- On audible alarm – **Lookout** – if nothing seen then briefly check the display – then **lookout** again.

# Data logging

- Flarm logs each flight – GPS position, GPS altitude, and barometric altitude in .igc format.
- Retains the last 20 flights.
  - Then the oldest flight is over written.
- Flights can be downloaded on to a micro SD card. e.g. for badge claims.
- Fleet Manager holds the micro SD cards, one for each club glider, and can download a specific flight if needed.
- There is no pilot access to the micro SD card port.

# The one Gotcha!

- Flarm transmits the GPS position, altitude, course (track) and speed.
- Displays relative bearing and relative height of the most dangerous contact.
- During most flying this works well

## **BUT:**

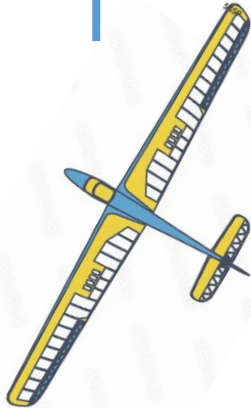
- If you are ridge flying, or flying in strong winds and your heading and track are significantly different then you need to be careful.
- The bearing that Flarm displays will be relative to your track and not where the nose of your glider is pointing.
- So lookout on more than just the relative bearing displayed.



# The one Gotcha (pictorially)

Plan view

Glider's track



Ridge/hill

Wind

Plan view of what Flarm is telling you

Glider's heading

Relative bearing of Flarm contact on the display

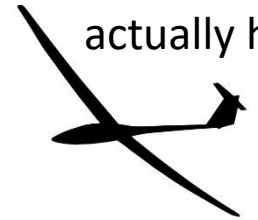
Where is it?

Glider's track

54°

54°

Flarm contact is actually here



Solution: Keep scanning further round until you see the contact

# Summary

- FLARM is an aid to good lookout.
- Effectively it is another set of eyes.
- But it is **NOT** a substitute for a good lookout.
- Don't rely on it.
- Keep your eyes out of the cockpit.
- A good lookout is paramount.

# Final note

- Flarm has been fitted to each club aircraft for your safety.
- It is an expensive piece of equipment and has been individually fused to protect it.
- Do not interfere or fiddle with the display, GPS mouse, omni-directional antenna, the SD card reader, or the Red Box itself.
- Thank you.