The Gliding Federation of Australia Inc.

Operations

Operations Advice Notice
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Flarm Health Check

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Background

The Australian gliding fleet has FLARM installed in significant proportions now and this is assisting us with see and avoid by alerting us to the ones we don't see. FLARM technology gives us what is called "air-to-air alerting" and the benefits of this are now apparent. This of course is only true if the FLARM is working properly.

Unfortunately there is no simple test you can do to verify the FLARM is working properly before take-off. The status indicator lights only give some of the status and do not perform an end to end check. This advice notice outlines a number of checks that should be performed before, during and after the flight to verify the FLARM Operation.

Checks before the flight

External GPS Antenna

The external GPS antenna is usually a small square block and its top surface must have a clear view of the sky. If the GPS antenna is buried behind the instruments or has fallen down on its side the position and course will not be accurate and may be intermittent. Its mounting position must be rectified before the next flight. Also if using the external GPS antenna on some models set the internal DIP switches as described in the manual for an external GPS antenna.

Internal GPS Antenna

If using the GPS antenna within the FLARM then the whole top of the unit must have a clear view of the sky. A fibre glass cover must also protect the FLARM from the sun. The best position for the GPS antenna, or the FLARM unit if you are using the internal GPS antenna, is on top on the instrument panel.

Check the Data Antenna

FLARM uses a very low powered data link radio to communicate to other FLARMs so the corresponding data antenna is very important to be set up correctly. The data antenna is usually a small pole antenna. Orientation of this antenna is important as all antennae are directional to some degree. The pole type antenna must be vertical to communicate in the directions of

interest. If it has fallen over or bent forward then there will be blind spots in your coverage and reduced range. There should also be no metal or carbon obstructions blocking the "view" of the data antenna to other gliders. This usually means the best position for the data antenna is again on top of the instrument panel.
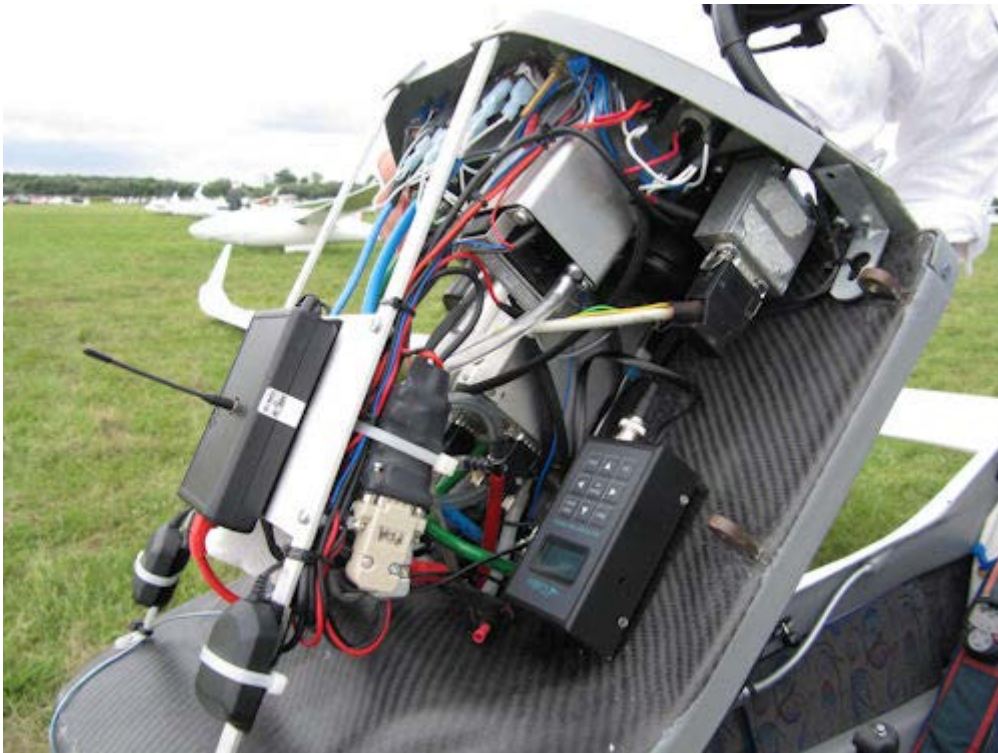

Check the data antenna for damage

Look closely at the data antenna and replace it if it is damaged in any way. They usually break just up from the connector inside the rubber cover. The rubber cover is usually loose when this happens. Also replace the data antenna if you are not receiving anybody or others claim they cannot receive you. The half wave antennas (longer) are better than the short stubby ones.

Check the software is up to date

FLARM requires a software update every few years otherwise they will be incompatible with other FLARMS and will stop working. The last update was Feb 2011 and the next will be Mar 2015. The updates are free and are easy to do if the FLARM has an SD card. Otherwise use the update software on a PC and a connection via the power /data port. See the FLARM web page http://www.flarm.com/support/updates/index_en.html.

Check the frequency

The data link frequency for Australia is different to Europe/US/NZ and if set to the wrong frequency FLARM will not receive or transmit anything useful. Latest FLARM versions result in automatic channel setting via the received GPS location. However visiting pilots with FLARMS (or Power FLARMS) that have been used overseas should check the frequency as it may have been locked. The FLARM tool software can be used to check and change all the settings including the frequency. This is software, available from the FLARM web site, runs on your PC and plugs into the power/data port.
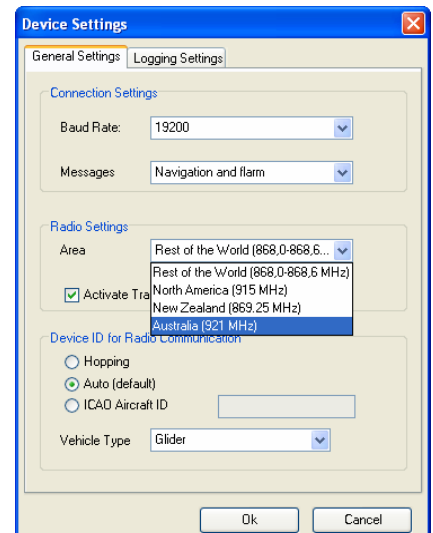
Check the status LEDs before take-off

FLARMS and some displays have status indicators which should be checked prior to take-off. Some of these status LEDs are combined on some units.
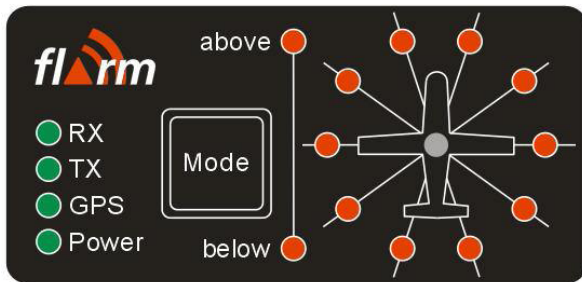
Tx: **Green** indicates the FLARM has a valid GPS signal and is transmitting.

Rx: **Green** indicates another FLARM is being received. Usually flashes.

GPS: **Green** indicates valid GPS signals are received and the position is calculated.

Power: **Green** indicates the battery voltage is good.

Check the repeater/displays:

FLARM repeaters or small displays should be placed in a convenient place in the pilot's scan. These devices are not really repeaters so the lights may not indicate exactly the same as the main unit. These units separately calculate what to display and timing differences and setup parameters will have them display differently. Unfortunately the reset to factory settings on some of these units (holding down the mode button for 20secs) renders them unable to communicate with the FLARM as the baud rate is wrong if connected to the Power/Data port. Sequentially flashing status lights means the repeater cannot communicate with the FLARM. To set them up again read the instructions for the repeater/display.

Check integrated FLARM to flight computers and PDA's

If the FLARM is integrated to a flight computer or PDA check the unit is connected to the correct data port on the FLARM. The serial interfaces on the back of the FLARM have different information on them so ensure the correct port is utilised for the device and it is set up for what you want. If connecting more than one device to a serial port make sure only the receive wire of the device is connected so the remote devices only listens to the FLARM messages. The installer or club geek can advise.

When using north facing maps on the PDA check indications with the FLARM as the FLARM messages are designed for indications relative to the direction of the glider.

Checks During the flight

Look outside!

Never rely on FLARM. A vigilant effective lookout is required at all times!

Turn off the mobile phone

As the data signals are very weak from the FLARM it is easy for interference to affect the performance. Mobile phones will degrade the sensitivity of the FLARM. Mobile phones should be turned off when in the air.

Check for received aircraft

Nearest mode is the default mode on power up and in flight it should indicate other FLARMS on a collision course up to 3Km. Check you get indications from seen gliders that you know have FLARMS. If there is never an indication then you (or them) probably have an issue. If there are multiple gliders you should get an indication from at least one of them. Especially if you are circling. Leave the FLARM in nearest mode at least until you verify it is working. Try and spot other gliders before the FLARM.

Checks after the flight

Check your coverage

There is a FLARM web page (http://www.flarm.com/support/analyze/index_en.html) where you can upload your FLARM IGC data file and get a print out of the received range information for a flight. It's only conclusive if there is lots of FLARM traffic. It's worth doing this with more than one file over the season to keep an eye on what your receive range is. During a comp do it each night to make sure the FLARM is in top condition. (The one below is the coverage for a broken data antenna).
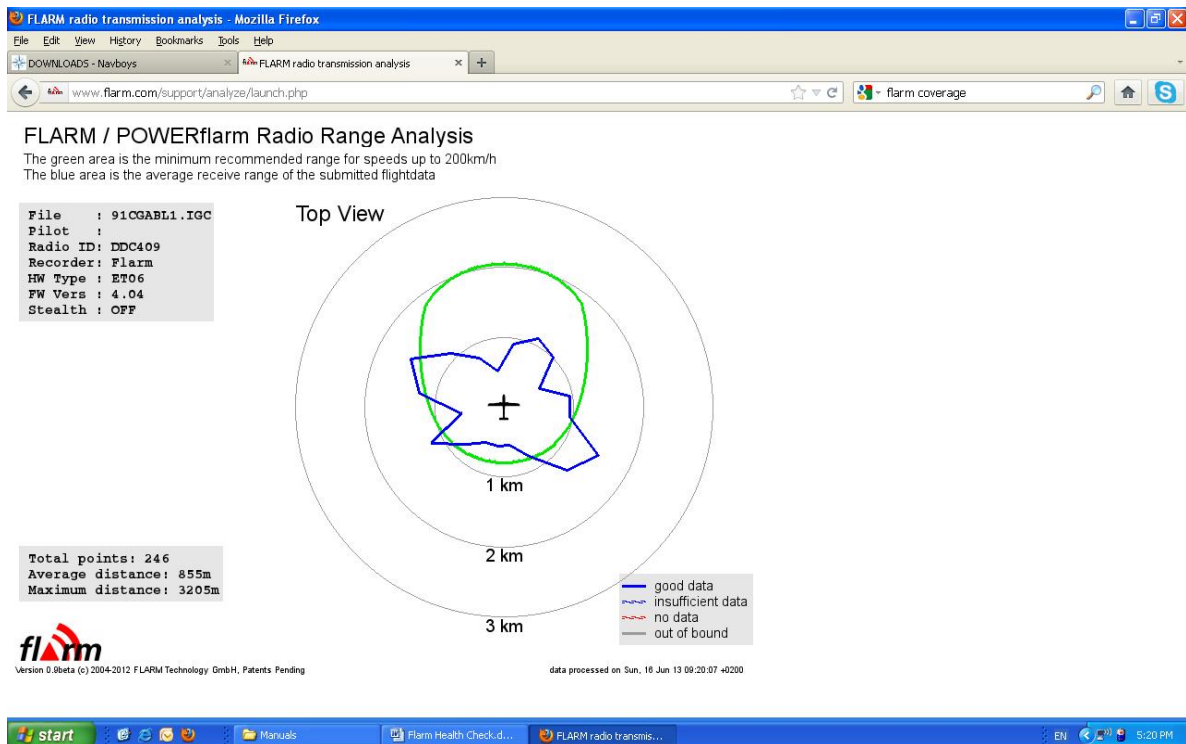
Checklist

Before the flight

- Check the GPS antenna is facing the sky and clear of everything.

- Check the data antenna is vertical and clear of everything.

- Check the data antenna is not damaged in any way.

- Check the software is up to date.

- Check the frequency is set up for Australia if the FLARM has come from overseas.

- Check your repeater is set up correctly. (Sequentially flashing status lights means it is not getting messages from the FLARM and is probably the baud rate)

- Check the flight computer or PDA is set up correctly.

During the flight

- Check the GPS status light goes green before take-off.

- Check the receive light occasionally goes green when another FLARM is nearby.

- Check you are receiving other FLARMS by staying in nearest mode for a while.

- Turn off your mobile phone to avoid interference with the FLARM.

After the flight

- Flights to be analysed must have at least a duration of 30 minutes and contact with 5+ other aircraft while flying. Upload the FLARM IGC file to the FLARM web site (http://www.flarm.com/support/analyze/index_en.html) to see what the range is. Do this each night if you are in a comp and a couple of times during the season if club flying.

How can I improve the transmission range?

Check the Installation Manual to see if all rules and recommendations have been followed
Relocate the RF antenna to another position, as far away as possible from any metal / carbon
Try a different type of RF antenna.

Should I try to improve the "Maximum distance"?

Distances beyond 12km are normally a sign that the performance is not evenly distributed in all directions. Therefore a big "Maximum distance" could be bad for overall performance.

Christopher Thorpe
Chairman, Operations Panel

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