IGC GNSS Flight Recorder Approval Committee (GFAC)

UPDATE for IGC PLENARY

Ref: GFAC report in Plenary Agenda

Another busy year

by Ian Strachan, GFAC Chairman

IGC GNSS Flight Recorder Approval Committee (GFAC)

GFAC members - in order of Family Name

- Dr (PhD) Angel Casado (Spain)
- Marc Ramsey (USA)
- Tim Shirley (Australia)
- Ian Strachan (UK, Chairman)
- Dr (PhD) Hans Trautenberg (Germany)

Technical advisors

- Dickie Feakes (Bicester Aviation)
- Tim Newport-Peace (Specialist Systems)
- Pete Purdie (ADT Aviation Services)

+ co-opted experts as required

**New people required – Volunteers please

Common sense, rather than Technical Expertise

IGC Flight Recorders – March 2014

45 types of FR are IGC-approved

from

17 different manufacturers

Flight Recorder IGC-approvals 2013 -14

Initial approvals:

1	Flarm:	powerFlarm-IGC
2 & 3	LXNAV:	FlarmMouse & LX9070
4	LX Navigation	Mini Box Flarm battery version
5	Triadis:	Recorder Unit 3 (RU3)

Updates:

1	Flarm-IGC	security update
2	Ediatec ECW 100F	security update
3 & 4	LX Navigation	Mini Box & Red Box Flarm security update
5 & 6	LXNAV	external MOP box for LX8000 & 9000

(MOP box for low-ENL such as electric & jet MGs)

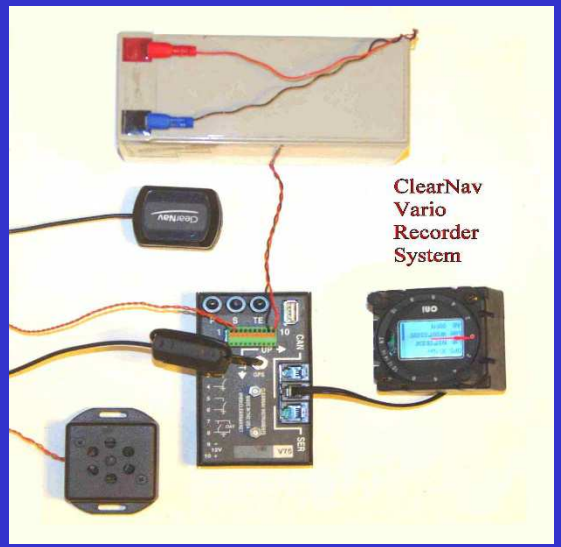
Flight Recorder Testing 2014

1 Naviter

Oudie-IGC

2 ClearNav

CNv Vario



High Altitude Flight Recorders (HAFR)

High Altitude Flight Recorders (HAFR)

For IGC Records above 15,000m (~50,000ft)

(Perlan Project with pressurised glider)

GPS Altitude used instead of Pressure Altitude

(GPS Altitude data must be high quality)

High Altitude Flight Recorders (HAFR)

Rules

SC3 - para 4.5.3

FR Specification - para 2.2.4.1

Annex B – addition needed to reflect the above - will be done after this Plenary

(SC3 change proposed, see next slide)

High Altitude Flight Recorders (HAFR)

Sc3 - para 4.5.3d on Solar Radiation:

"no solar radiation during the flight that exceeds the high during 96 hours before"

(Radiation "spike" during record flight = no Record)

High Altitude Flight Recorders (HAFR)

Sc3 - para 4.5.3d on Solar Radiation:

1. The wording must be changed so that flights in low radiation conditions are still validated,

   but

2. Is it needed at all?

High Altitude Flight Recorders (HAFR)

Sc3 - para 4.5.3d on Solar Radiation:

This was put in as a precaution.

We now know more, having consulted:

ICAO	Navigation Bureau (Nancy Graham)
US FAA	HQ (Dr Jeff Schroeder)
	Satellite Navigation Manager (Amy Williams)
	WAAS Manager (Deane Bunce)
	GPS Consultant (Dr Todd Walter)

High Altitude Flight Recorders (HAFR)

1. Max Solar Radiation – 11 yr sunspot cycle /solar flares
   2013-14, last cycle 2002
2. Solar Radiation affects the Ionosphere - 85-600km
   GPS uses Klobuchar compensation for ionospheric effects
3. HAFRs are for 15-30km, well below the Ionosphere
4. Accuracy up to 30km is similar to ground level at same location
5. No evidence of GPS radiation errors in IGC files.
   2002 and 2013-14 GFAC accuracy results normal
   (Solar flare last week, GFAC tests on Oudie-IGC av error > 10m)

CONCLUSION: Delete SC3 para 4.5.3d

(any future detail can be in FR Spec document)

IGC Position Recorders

Rules

SC3	Annex to Chapter 4
SC3 Annex C	Chapter 6

IGC Position Recorders

GFAC advises on technical matters

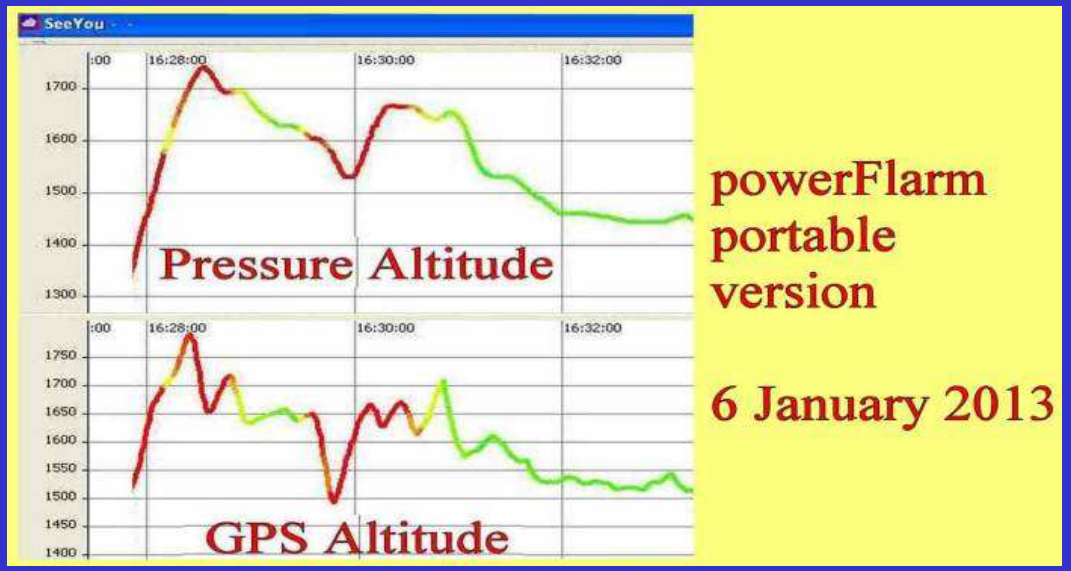
e.g. Earth Model, Predicted fixes, GPS altitude errors,
IGC file structure & security

SC3 update:

GFAC agenda paper: Clearer Ref to Specimen PR Approval on web

GPS altitude used only if Pressure Altitude not present
already in Annex C, needs to be in SC3 as well
See next slide

IGC Position Recorders



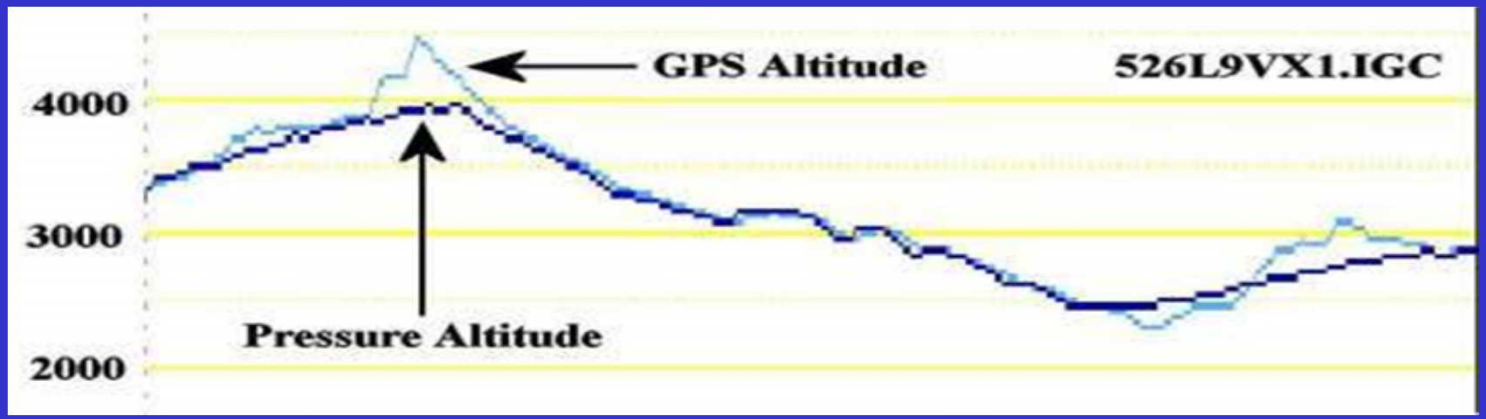
powerFlarm portable version

6 January 2013

IGC files often show erratic GPS altitude compared to more stable pressure altitudes.

so

If no Pressure Altitude, Add 100m margin to GPS altitude figures (existing IGC rule)



IGC Earth Model

IGC Earth Model

SC3 - WGS84 Ellipsoid introduced in 2001 (same time as FAI)

as used by: GPS since 1980,

ICAO and world civil aviation since 1989, Google Earth, etc

SC3 Annex A changed in to mandate a Sphere

for World Championships & other Annex A events

Concerns:

Difference from SC3 (Records and Diplomas use Ellipsoid)

Accurate airspace penalties in Annex A

(see Agenda papers for GFAC & Annex A Committee)

Discussions with Bureau & Annex A committee continue

Comments, Questions?