



Report from Chairman of the GNSS Flight Recorder Approval Committee (GFAC)

for the agenda of the 2015 IGC Plenary

10 January 2015

1 GNSS Flight Recorders. A total of 50 types of GNSS Flight Recorders (FRs) from 18 different manufacturers are currently IGC-approved.

1.1 GFAC Approval. Activity in 2014 was as follows:

- 31 January 2014 - LX Navigation Mini Box Flarm, addition of portable version
- 20 March 2014 - Naviter Oudie-IGC, initial approval.
- 20 March 2014 - Introduction of shorter format in main Approval document.
- 10 April 2014 - ClearNav CNv-IGC, initial approval
- 30 April 2014 - LXNAV Nano 3, initial approval
- 30 June 2014 - LXNAV 9050 and 9050F, initial approval
- 26 November 2014 - LX Navigation LX Eos, initial approval

1.2 Ongoing Work.

- A new type of FR from PressFinish GmbH of Munich is being tested.
- An update to the ClearNav Instruments ClearNav-IGC FR will shortly be tested.
- Another new type of FR that will be tested is from Logstream in Poland.

1.3 False dates in IGC files from some FRs. In November 2014 GFAC was notified that in IGC files from some older types of FRs, false dates were being recorded, typically being 1024 weeks (over 19 years) earlier than the correct date¹. On investigation it was found that if the small internal battery in some types of GPS receiver is allowed to run down, the receiver no longer registers the correct date. These include FRs that use Garmin 25 GPS receivers, such as by Cambridge, Volkslogger and the Zander GP941.

1.3.1 Actions. After discussion within GFAC and further research, a notice was quickly posted on the IGC-discuss email list and on newsgroup rec.aviation.soaring describing the problem and advising owners of affected FRs to charge them regularly when not in use for gliding, to prevent the GPS internal battery running down. The IGC Bureau were also informed. At the same time, all FR manufacturers were notified of the situation and asked to look at their products for this fault, but fortunately most modern types of GPS receivers and FRs are not subject to this error. Where a FR has already lost the date facility, the solution is to return the FR for modification² to the manufacturer or his agent.

¹ *The fault is because the GPS receiver no longer registers the correct GPS date Epoch, reverting to dates in the first Epoch which started on 6 January 1980 when the US GPS system first went on line after its development phase. A GPS date Epoch consists of 1024 weeks (19 years and 36 weeks) before the next Epoch starts. Where this fault exists the date recorded is typically 1024 weeks too early, and in some FRs other faults may also be present. We are now in the second GPS date Epoch. This started in August 1999 and will change to the third Epoch in April 2019. If the GPS receiver or FR firmware recognises that it is in the second date Epoch, the correct date will appear on the IGC file.*

² *Corrective action includes changing the GPS receiver battery, changing the GPS receiver, or updating FR firmware so that the correct date Epoch is recognised and applied before the date is recorded in the IGC file.*

2 **GPS Lat/Long Accuracy.** Accuracy tests in Lat/Long position with FRs using modern multi-channel GPS receivers have shown improvement over previous figures which had an average error of 11.4m. After further analysis, figures will be presented to the Plenary.

3 **IGC File Analysis.** Many IGC files have been analysed including those from FRs being tested, and those sent to GFAC by a number of organisations. Advice has been given to NACs, competition organisers, pilots, OOs and FR manufacturers. This also applies to IGC files from IGC Position Recorders that have a low level of security but use the same IGC file structure.

4 **Amendments**

4.1 FR Specification. Amendment 3 to the FR Specification was published on 30 June 2014. It refined the wording on the High Altitude Flight Recorder (HAFR) for altitude claims above 15,000 metres (49,213ft). It also gave more guidance on Dynamic Link Library (DLL) files that are used for Validation of IGC flight data files.

4.2 Annex B to the Sporting Code. Amendment 9 to SC3B became effective on 1 October 2014. It added references to the HAFR, and refined the wording on IGC Position Recorders. It also brought Chapter 1 in line with the wording in the IGC FR Technical Specification.

5 **Earth Models.** The main volume of SC3 says that "the WGS84 earth model shall be used" and the IGC FR Specification also uses the WGS84 ellipsoidal earth model which is also the model used by the GPS system. However, Annex A to the Code specifies a spherical earth model of radius 6371km "for all calculations". Annex A also includes severe penalties including disqualification, for "entering forbidden airspace". However, under ICAO rules, airspace boundaries worldwide are defined with respect to the WGS84 Ellipsoid. It is therefore not possible to calculate airspace penalties accurately using the Annex A earth model, and it is recommended that it is brought into line with that used for airspace boundaries and the main volume of SC3. If a spherical earth model is to be used in an Annex A competition, it should have the WGS84 radius relevant to the competition site or task area, and an Excel spreadsheet is available that gives exact WGS84 earth radii at any latitude.

6 **IGC ANDS Committee.** Since Bernald Smith retired after the last Plenary, the IGC Airspace, Navigation and Display Systems committee (ANDS) has not been active. Current members are Dr Angel Casado (Spain) and Bruno Ramseyer (Ireland). This is a valuable committee with a wider remit than GFAC and needs new members with a background in Navigation systems and Airspace matters. It is suggested that new members are sought from NACs and vetted and approved by the Bureau. Meanwhile, it is suggested that the GFAC Chairman should be an ex-officio member of ANDS.

7 An update on the above will be given to the Plenary.

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