

KNOW YOUR DRONE

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Category: [Drones/UAS](#)

Edition DUASFB 5

Editorial

You might think 'Read the manual' is trite, but if you don't (and understand it...) you can quickly find yourself in a bind

Welcome to Drone FEEDBACK Edition 5. In this edition of Feedback, we have something of a smorgasbord of reports from a number of different Drone Operator communities. There is a very detailed report from the sub 25kg emergency services community using a DJI Matrice 210 (V1), which is the result of an accident and full report originally published by the AAIB. We make no apology for reproducing a reasonably large section of the report, because we feel it is worth reviewing in some detail. We have our first report from the FPV community, which is excellent to see and we have a report from the USAF which has some similarities to the first report. There is a common theme between them, which we feel we are likely to see again in the future, and that is the pilot's understanding of the control logic sequence. We also have a report from the home build community and, finally, one from the British Model Flying Association's reporting portal. The latter is short and sweet but shows some very logical thinking about how to deal with a manufacturing related occurrence. Human Factors apply as much to the technical development or manufacturing of drones as they do to the operational side, and we of course encourage reports from all aspects of the Drone Ecosystem. Finally in addition to all of this, we have reprinted details of thoughts received from one of our readers on Report No 4 that featured in Drone/UAS FEEDBACK Edition 4.

As many of you know, CHIRP has developed and is promulgating the use of a confidential, independent reporting programme for Human Factors “HF” and Just Culture occurrences, or near occurrences, arising from the operation of drones or Remotely Piloted Aircraft Systems (RPAS). The aim is that drone pilots, who are in many cases relatively new members to the world of aviation, will be able to benefit from lessons learnt and existing practices that have developed within the aviation sector, over many years, for crewed aircraft. Many of the same theories that apply to crewed aircraft apply to aircraft with remote pilots. If all of us can learn from an event that happened to one individual and might happen to another, it is to everyone’s advantage to be able to do so. CHIRP is the conduit for individuals to share their experience of HF occurrences safely and confidentially in a way that enables many others to learn from them. FEEDBACK is CHIRP’s regular publication that seeks to communicate the occurrences we are informed about, draw some lessons, and pass them on to flyers who might benefit. We hope you find them useful.

Finally, CHIRP feels it is important to mention that our readers should keep an eye out for the new final version of Acceptable Means of Compliance or “AMCs” and Guidance Material “GM”, following the closing of the CAA’s Consultation on the document on 31st August 2022.

We would again like to thank those who have taken time to send in a report. Without you, others would have missed out on learning something. We are very grateful to those that have altruistically shared the benefit of their experience. As always here’s hoping there will be lots of good flying weather throughout the summer!

Rupert Dent, Drone/UAS Programme Manager

Comment received on FEEDBACK Edition 4

We were delighted to receive some input on Report No 4 from FEEDBACK Ed 4 regarding the issue of GPS reception levels when flying inside a building. I have reproduced below the comments that we received and a link we were given to some ongoing research into the topic. As use cases rise that demand drone data gathering from both outside in good GPS reception areas and inside where GPS is denied, the moment of transition from one scenario to the other is critical from a control perspective. We will no doubt come back to this subject in the future!

Reader’s Comment

Would you mind if I provided some feedback on the ‘Report 4’ contained in your May 2022 Edition 4 of CHIRP Drone FEEDBACK? I am the lead for position, navigation and timing systems at [Organisation], with my background being aerospace and defence (hence the interest in CHIRP). One aspect of my role is in supporting GNSS threats and vulnerabilities, which requires me to be aware of wider implications of loss and/or disruption to GNSS systems and services. Therefore, I am concerned where issues with drones that have suspected loss or disruption to their navigation systems especially GNSS, is reported.

Within the 'report 4', there is a statement:

"The decision was taken to fly in this mode after some on site analysis of the number of satellites received during earlier flights. The data indicated that although satellites had dipped to 10 for a short period of time, the average was around 12, even though the flights were indoors."

And CHIRP response:

"Whilst in the last four or five years the quality of GPS reception has improved enormously, it is still not viable to fly with GPS positioning switched on in an environment where satellite reception can degrade very quickly and unexpectedly."

The CHIRP statement is correct, but a key aspect here is the presence of multipath: the satellite signals can (and are) reflected off surfaces enabling access to signals that are not line of sight, thus the signal path has taken a longer path than expected – this often results in misleading position reporting even though (as pointed out) the number of satellites in view is sufficient. Essentially, some or all satellites are observed only because the signals have been reflected. There are other implications from this, but all will result in misleading position, velocity and time solutions.

Further to the points raised above, note that multipath for GNSS occurs wherever the signals can be reflected, indeed GNSS reflectometry is another subject! Going back to the issues: it is possible and highly likely in built up areas that strong multipathing will occur, the receivers can cope but will suffer from loss of performance before entering the indoor environment.

For more insight, we have supported UCL (on) the subject of GNSS performance in built up areas and it remains an area of research. Readers may be interested to read the associated paper at: <https://discovery.ucl.ac.uk/id/eprint/1458626/6/ShadowMatching%20Accepted%20Manuscript%20JON%2014-15.pdf>



There are no comments yet.