

DUAS23

Posted on 20.08.2023 by Steve Forward

Category: [Drone](#)

Report Title Low Temperature Power Loss

Initial Report

Due to low temperature (-3c) battery simply stopped operating and the drone fell. In subsequent correspondence, the reporter added that the drone was a DJI phantom 4 pro. A great bit of kit, well supported by DJI with software and updates. Yes, indeed it was -3, with several inches of snow.

When I couldn't find the drone after it disappeared, I hooked my base unit up to my PC at home, and yes, it had recorded the entire flight, and I was able to locate it in daylight hours, the following day. I sent it off for repair and paid about around £200 for gimbal damage.

The drone was 2 years old when it had the event in the snow. Hours-wise and battery-wise, it had flown about 40 hours. From memory I think the batteries had been recharged around 30 times. The aircraft had all auto functions switched on and despite having flown quite a few trips over some of our local lochs, there was never any indication of issues caused by faulty inputs.

Sadly, I no longer have the drone as I experienced a detachment of a rotor blade during a subsequent flight, and although I located it using the DJI app, it was in such a heavily forested area, I lost it altogether. I have more than 15,000 hours flying all sorts of aircraft in all sorts of situations, military ops, difficult terrain etc, and I am more careful than needed. I also teach human factors, so feel I could recognise such, should they appear. I don't think they affected the operation.

Bottom line, imho, (in my honest opinion) low oat, battery performance, sudden death of the battery. Don't fly in cold weather. Software located drone (it was white against a background of 1 foot of snow)

Comment

This report involves another battery related problem. The reporter, an experienced crewed aviation pilot, felt that the battery stopped functioning because of the temperature and for no other reason. The manufacturer specification states that the aircraft involved (and in fact its controller too) has an operating temperature range of 0⁰C to 40⁰C. So, the pilot may indeed be correct. But regarding their assertion that there was no Human Factors involved, on the basis of the evidence we have seen, we feel there may indeed have been an element of Human Factors. The reason is that

operating it at -3°C is outside its operating limits set out in the User Manual. As a pre-flight check item, it is worth including the operating temperature limits as part of a quick reference guide kept close by for the pilot to look at.

There are a couple of other points to note:

1. If there was snow on the ground, humidity might have been high, which may have lead to icing conditions. Could this have been the cause of it falling to the ground?
2. Some Drones (including the one referred to in this report) have bottom facing sonar and radar Vision Systems. We wonder if at the moment of take off, the aircraft had come into contact with the snow which might have confused the Vision System. The Users Manual refers to avoiding flight over uniform colours or surface areas including snow, because it confuses the Vision System.
3. Our experience is that IMUs can fail in cold weather. When it happens, the effect is that the Drone can fly straight into the ground because it thinks it is horizontal but it is in fact flying at an angle.

Readers thoughts on this are more than welcome.



