

Confidential Human Factors Incident Reporting Programme

Drone/Unmanned Air Systems FEEDBACK Edition No 1



Editorial

You are receiving this newsletter because you are a pilot. You may already think of yourself as a pilot or you may think of yourself as an operator or a hobbyist but as far as CHIRP is concerned you are a pilot and you share the air with other pilots. You are a member of a community with a long-standing ethos of sharing experiences in order that we can all improve. This newsletter is part of that sharing process.

The CHIRP Charitable Trust is an independent confidential voluntary reporting programme for the aviation and maritime industries. Our aim is to improve the safety of the travelling public and that of individuals employed within or associated with aviation and maritime operations. This includes drone remote pilots and the public who might be affected by manned or unmanned air systems.

One of the key principles underpinning aviation safety is the 'Just Culture'. This culture recognises that to be a human being is to make mistakes – and honest mistakes are not punished. From the European Aviation Safety Agency (EASA) through the UK Civil Aviation Authority (CAA) it is recognised that if people are encouraged to own up to errors, we can all learn together. Deliberate flouting of the rules will not be tolerated but the majority of safety issues are not the result of wilful bad behaviour, they are the results of human weaknesses. I have included an example of a (manned aircraft) pilot sharing his error in this edition of FEEDBACK. I hope by the 2nd edition you will have provided me with examples from unmanned aviation.

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You will see from the reports included in FEEDBACK that anything that could identify a reporter has been removed. CHIRP is a confidential reporting programme and reporters' identities are not shared

with anyone, including the members of our Advisory Boards. The Advisory Boards comprise experts from 'industry' who have the knowledge and experience to assess reports and provide advice. For drone and model aircraft reports our experts include representatives from the Association of Remotely Piloted Air Systems (ARPAS UK), First Person View UK (FPVUK) and the British Model Flying Association (BMFA). We can also call on advice from manned aviation including the CAA and National Air Traffic Services (NATS).

So, if you have had an incident or something is bothering you – give us a try. It's free! There is a reporting form on our website at www.chirp.co.uk or you can report via our smartphone/tablet App, which is available through Google Play or the App Store.

SINGLE ROTOR UNMANNED AIR SYSTEM (UAS) CRASH

Report Text: The aircraft had just finished a waypoint-based mission which took approx. 14 minutes and for this mission the aircraft was flying at 2m above the ground. At the start of the day the ground station was laid out such that the Real Time Kinematics (RTK) GPS base station was elevated above the surroundings (a small weather station hut) and due to the wind, the First Person View (FPV) monitors were placed on the leeward side of the hut. This meant that the pilot had the ground station to their right (looking to the west) and the video monitors to their left. Direction of the flight area was to the left. As the mission drew to an end the pilot was concentrating on the waypoints being reached (to ensure the right waypoint was selected for the next flight) and also looking at the FPV monitor to see how close the aircraft was to the ground. About 90 secs prior to the crash the Electronic Speed Controller (ESC) on one motor failed. This does not show visually or aurally from the helicopter. The only indication of such a failure would have been a sharp increase or complete loss of the 'current' readout on the telemetry. For some reason this led to a rapid decrease in voltage which again would have been displayed on the telemetry.

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No visual or audible alarms were available for such instances. The pilot did not notice either two indications as they were concentrating on the terminal part of the flight which also involved manual control of the aircraft back from the survey area (300m away at its nearest point, 485m away at its furthest). It was whilst manually flying back to the take off point that the voltage dropped to the point where the rotor head speed dropped sufficiently to cause retreating blade stall, a sudden pitch up of the aircraft resulting in a tail first impact with the ground.

Lessons Learned: Positioning of telemetry readouts should be in the pilot's line of sight at all times and not split as per the layout in this instance although the layout was due to competing requirements.

Audio alarms should be a fundamental part of any fault arising. This ensures that a pilot who is concentrating on maintaining visual contact with the aircraft does not miss any abnormality with instruments or other alarms that are visual based.

CHIRP Comment: We are grateful for this, the first report submitted to CHIRP by a UAS remote pilot. It is interesting to see that the issues affecting UAS have direct similarities with manned aviation. It is easy to be overwhelmed with information and have one's attention divided; for this and all kinds of other reasons it is much better to operate as 2 crew. Also, the desirability of alerts having audio as well as visual components applies equally to manned aviation. It is known though that when under stress, hearing is the first sense to be 'lost' leading to audible alarms being ignored or not even heard. 'Haptic' (vibration) notification of alarms could additionally be used where available to give as many sensory notifications as possible of a potentially unsafe condition being detected



INFRINGEMENT WHILST DISTRACTED

A REPORT ABOUT MANNED AVIATION APPLICABLE TO UNMANNED FLYING

Report Text: I conducted a flight from Le Touquet to [], routing directly across the channel via Lydd, Tonbridge Town (North East of Gatwick's Control Zone) and then West direct to [].

The infringement took place approximately 3 miles north of Redhill aerodrome whilst in contact with

Farnborough Low Altitude Radar Service receiving a traffic service.

I descended to 1,300ft remaining clear of controlled airspace, beneath the Gatwick Control Area on the leg TONBRIDGE town to M25/M23 Junction Visual Reference Point. When north of Redhill (laterally clear of Gatwick Controlled Airspace) I initiated a climb to a target of 2,400ft to remain clear of the London Terminal Control Area 2,500ft base of controlled airspace. The aircraft had very good climb performance as it was light and so this happened very quickly. However, during the climb I was provided with traffic information. If I remember correctly, two separate transmissions on a primary contact (glider at Kenley Gliding) and another fixed-wing single-engine aircraft crossing left to right slightly above. After a good lookout I was visual with both. The good climb performance and traffic information/look-out which distracted me during the climb led to accidentally exceeding my intended altitude. Just as I noticed and began a safe urgent descent the controller informed me and verified my level. I made every effort to quickly descend again to a clear altitude. I believe the infringement lasted no more than 5-10 seconds.

However, during the climb I was provided with traffic information.

My situational awareness was not compromised at any point. I knew exactly where I was and aware of my surroundings (including controlled airspace). This simply was an accident but I acted honestly with the Mandatory Occurrence Reporting Scheme through the CAA and NATS.

I read your reports monthly and believe that extending my honesty about my mistake may help me improve.

CHIRP Comment: Distraction is a common cause of airspace infringements and this example illustrates that the distraction need only be momentary if insufficient margin from controlled airspace is planned. The reporter had wisely allowed 200ft separation from the Gatwick CTA but when he climbed for the second time, he allowed only 100ft from the London TMA. The lesson – allowing an adequate margin from areas where you do not want to be - is as applicable to remote pilots as it is to the rest of aviation.

PAY AS YOU GO INSURANCE

Report Text: My pay as you go (PAYG) drone insurance provider requires setting a location on a map (a circle with 500m radius), selecting the aircraft, time and amount of liability cover (in £m) required. This can be done days or even weeks in advance however due to the unpredictable weather I do this just prior to take off as I believed it couldn't be cancelled once set up. This particular drone flight involved taking photos of two sites that were approx. 1km from each other. The distance of the sites mean I have to relocate and effectively



create two sets of insurance policies (one covering each location). At the first location as per my checklist I did the usual pre-flight checks (airframe, battery, GPS etc.) and obtained insurance prior to take off. After relocating to the next site, due to losing light I felt a bit of time pressure and elected to follow the checklist from memory. Unfortunately, as I discovered after the flight, my memory failed me and I did not obtain insurance for the new location. I fell foul to a similar occurrence in May 2018, when a stressful drive to the location meant I forgot to obtain pay as you go insurance, my mitigation for this first occurrence was enhancements to my checklist (which was sufficient until this instance when it failed to mitigate the occurrence). In both instances the flights were conducted without incident.

Lessons Learned: I have a good understanding of human factors and the impacts external stressors can have on decision making but I've learnt just understanding it isn't enough, it needs to actively be thought about and challenged. In my case this would've stopped me from rushing and forgetting a very important item on my checklist. I have since learnt that the policies can be cancelled and I will therefore update my procedures to schedule insurance at the point of arranging the drone flight in the future. I have also added a clear label to my drone controller reminding me to check insurance prior to take off and I will also make better use of my observer for checklist management in the future. My suggestion to the industry would be to integrate the PAYG Insurance with the drone ground station so it automatically activated or popped up with a warning if no insurance policy was identified at the point the drone motors start up.

CHIRP Comment: This report reinforces the importance of following checklists especially when feeling rushed and under pressure, as those are the times when things are most easily forgotten. Checklists can be amended to add check of insurance to the pre-flight planning before beginning the operation along with checking all permissions & authorisations are in place and current.

THE CONTROL RADIO DOESN'T WORK

HOW WE NEARLY FELL FOR GROUP THINK & CONFIRMATION BIAS

Report Text: We had travelled for several hours and hired a flying site to fly a new model aircraft. The model was fitted with two independent but identical radio control systems giving split control (primary system controlling primary flight controls, secondary system controlling auxiliary flight controls) and had been built for representative crew training in advance of flying a larger unmanned research aircraft. Both radio systems were transmitting telemetry and had a common power supply.

During extensive bench testing and taxi trials, no faults or incorrect behaviour of either radio system were evident.

The second flight went well until just after lift-off, when control was lost completely on the secondary radio system, and only intermittent control was available on the primary radio.

Before the first flight we did another range test with both systems in low power 'range test' mode and had intermittent control, then lost all signal at considerably less than the 30m range required. After a period of range testing with variable and intermittent performance, some re-routing of power leads away from the receivers was carried out. This caused an apparent improvement in both systems signal strength and control response to an acceptable level, and as it was cold and we were keen to fly, we (the team of 6 including two experienced pilots) convinced ourselves that the problem was 'fixed' and carried on to fly.

We had one flight with some telemetry dropouts on both radio systems, but no other issues.

No other changes were made to the model, and we prepared to have a second flight, but before take-off had to reset one onboard radio system to regain telemetry.

The second flight went well until just after lift-off, when control was lost completely on the secondary radio system, and only intermittent control was available on the primary radio system. Sufficient

control remained to make an abbreviated circuit and land, and on rollout after landing all control was lost.

Lessons Learned: When the machine inexplicably didn't work as tested or expected, we should have taken the time to understand why. The imperative to fly (having expended a reasonable amount of time and money to be at the flying location) led us to do some pointless but seemingly effective tinkering and convince ourselves that we had 'fixed' the problem and so were safe to carry on and fly. It did not help that we were outdoors in the cold and we had a time limit on our flying time available, which put under additional pressure to 'do something' while we weren't in the best environment for critical thinking.

CHIRP Comment: We are grateful for this report highlighting a well-known aviation phenomenon: press-on-itis. When focussing on a task and subject to real and perceived pressures, it can be very hard to recognise that it is time to take stock and make a dispassionate judgement about whether it is wise to continue. Fortunately, in the circumstances above, no harm was done but it is worth us all asking ourselves how we can develop the awareness to avoid pressing on beyond the point of prudence.

Reports received by CHIRP are accepted in good faith. While every effort is made to ensure the accuracy of editorials, analyses and comments published in FEEDBACK, please remember that CHIRP does not possess any executive authority.

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CONTACT US

To submit a new report, please head to our website www.chirp.co.uk

For enquiries, please contact Steve Forward, Director Aviation at steve.forward@chirp.co.uk

CHIRP, One Kingdom Street, Paddington Central, London, W2 6BD

01252 378947