

DUAS22

Posted on 20.08.2023 by Steve Forward

Category: [Drone](#)

Report Title Loss of C2 link

Initial Report

The flight crew were contracted to provide drone footage for a TV drama production. They had both worked with the production company on previous series of the drama since 2017, and with the producer since 2021. On the day of the incident the flight location was an exposed headland with cliffs, with the task to provide "top down" views of the cliff scenery to be used for VXF (visual effects), then later on in the day to film an actor jumping onto a green screen. The flight crew (remote pilot and camera operator / observer) normally fly a DJI Inspire 2 UAS with this production, however the wind speed was above the Inspire 2's rated wind resistance of 10m/s, so the Mavic 3 Cine was chosen for the task (it is also far more stable for top-down shots than the Inspire 2).

It is normal procedure for the camera operator to connect the remote controller (RC) to an external monitor for the production crew to view during the flight. The Mavic 3 Cine does not allow a separate camera operator, but the DJI RC Pro does have an HDMI port to output to an external monitor. The RP had used this setup before (the last time was November 2022), however on the day of the incident the HDMI connection did not appear to work. The DJI RC Pro has a mini HDMI socket and the flight crew only had a single cable of this type so could not try a different cable (this was the same cable used in November and had not been used since). The flight crew discussed the problem and thought it may be due to a firmware update. Searching the web there were other similar instances, and answers pointed to an HDMI setting on the device, however this did not work.

It had now taken almost half an hour trying to diagnose the problem and the producer was wanting the drone in the air as soon as possible because the other part of the shoot was ready and the actors on their way to the set. The RP explained the problem and the producer was happy to look over the RP's shoulder at the RC Pro screen. The UAS was prepared for the task and the normal checks completed, however the RP failed to check the action on loss of C2 link. The UAS was recently flown from a boat so the loss of C2 action was set to hover instead of return to home (RTH).

With the Inspire 2, the production crew would be looking at the monitor and discussing the shots with the camera operator, who would also give instructions to the RP to position the UA. The RP would keep the UA in VLOS at all times, and report back to the camera operator if a particular manoeuvre was not possible or would impact VLOS. On this flight the RP was having to look at the

screen and discuss the shot with the producer whilst the camera operator – now acting as a trained UA observer – kept VLOS with the UA reporting back to the RP. The producer requested the RP to lower the UA height at an ideal spot for the shot. As the UA descended it went behind a higher section of the cliff, and the camera operator immediately reported to the RP that he had lost VLOS. In the same instant the C2 link dropped, and the RP was unable to regain control the UA.

The RP reported that the UA would initiate RTH after a few seconds then he could resume control, however the UA did not appear to rise up above the cliff. It was at this point the RP realised he had not checked the C2-loss action, and it was likely set to hover from the work off a boat. The RP and observer started walking towards the UA location, although the terrain was very steep and difficult. By the time the RP was about 50m from the UA's location the low battery failsafe RTH commenced and the C2 link restored as soon as the UA ascended above the cliff. He landed the UA and returned to the production area, there was no damage to the UA and on landing the battery was at 17% remaining charge.

Given the remote location and proximity to the cliffs there was no danger to uninvolved people or other aircraft during the time the UA was hovering. The remainder of the day's flights were executed without any issues.

Lessons learned: The RP was under pressure and failed to check the loss of C2 action, even though it is listed as a check item in the FRCs. The company daily risk assessment document will be updated to ensure all checks are completed prior to flight.

Comment

At the end of the day, a commercial pilot needs to be able to resist outside pressures and stick rigorously to the established protocol. In the world of filming, which sometimes requires a large number of actors and extras being on site, there can be more pressure than in other industries. Report Number 3 in our Drone/UAS FEEDBACK Edition 7 dealt with a similar accident involving filming at Henley Royal Regatta, where pressure to film had been one factor in what may have been the cause of what subsequently happened.

A second observation is that when thinking about Visual Line of Sight, it is important not to forget Radio Line of Sight. Nowadays many of the available Drones have a 'Return to Home' (RTH) function that is triggered if there is a loss of the C2 link. As part of any recurrent training that a pilot does, we recommend that it includes triggering RTH and then cancelling and re-establishing control in order to experience and manage how it actually works.

Our third observation is a simple one that the reporter mentions. Don't forget to set the RTH loss of C2 link action as part of your pre-flight checks! 'Hover' is good for some situations, but 'RTH' is good for others. It is better on the nerves not to rely on the low battery 'RTH' setting, if C2 link loss is set to 'Hover'.

The fourth point is that in the current lexicon of the RPAS ecosystem, the Observer is called an “Airspace Observer”, which is to say their job is to look out for other air threats. Fundamentally it is up to the pilot to determine whether the aircraft is flying within Visual Line of Sight or not. In this instance there seems to have been a re-configuration of responsibilities which might have been unclear.

Finally, we wonder how clear of uninvolved persons the rocks or beach below might have been. It isn’t mentioned in the report, but being certain there was nobody underneath would have reduced the stress of the situation.



