

# DUASXXX4

Posted on 14.12.2022 by Rupert Dent

**Category:** [Drone](#)

**Report Title** Safety Management Systems

## Initial Report

*[Company] have shared this occurrence publicly in the hope all drone operators can benefit from their experience and to fully advocate the promotion of a 'just culture' within their respective organisations. By fostering a just culture, [Company] have created an environment in which reporting and learning is becoming a normalised facet of their operation.*

**Report text:** During a survey flight the Unmanned Aircraft (<2kg MTOW fixed wing UA) 'land' function was triggered by the remote pilot due to turbulence and perceived strong winds.

On return to the take-off and landing point, excessive turns were witnessed until the aircraft veered from side to side. Due to strain on the aircraft a wing detached causing the aircraft to spiral to the ground. Whilst the event was reported (UK CAA & AAIB) and lessons learned including provision of feedback to the aircraft manufacturer; the major learnings were derived from [Company] management of the post-crash and emergency response aspects of the event and the future training implications for their flight operations team.

[Company] Global Head of Safety goes on to describe the importance of an SMS for growing organisations, and the benefits of having one, especially through the granting by the Irish Aviation Authority (IAA) of their Light Unmanned Certificate (LUC), (which is recognised in all European Union Aviation Safety Agency (EASA) member countries). Speed of reporting feedback, provision of feedback to Commercial Off The Shelf (COTS) Original Equipment Manufacturers (OEM), publication of an occurrence reporting, internal newsletter and the inclusion of aviation expertise in informing the development and management of the process are all key to a transparent and effective SMS.

Those individuals who are starting out do not need to feel overburdened with the formulation of a complex SMS but should have a simple process in place to report any occurrence that could have led to a serious incident or accident. The data shared with the whole industry is invaluable to ensure we all progress safety forward.

The pilot in question was asked to give his view on the occurrence and how it was handled. Their response was:

*The UAV crash showed first hand that our documentation was fairly generic and didn't encompass all*

*possible situations that could have happened. It was concentrated on the worst case scenarios for if the aircraft injured members of the public but wasn't clear on the step-by-step process to go through for if a minor incident happened. This gap was filled by the Remote Pilot being able to contact relevant safety managers quickly and be guided on the next steps however it was identified that creating more of a structured process would hugely benefit the flight operations team as the department grew. Overall all line manager/safety managers treated this incident with the professionalism as if it were a very serious incident and served as a good testing ground for the procedures which are relevant for any kind of UAV whether it is 1.4kg or 140kg.*

## **Comment**

The Operator has been very transparent in sharing this information, which is great to see. The report has an element of Human Factors and Just Culture in operation in it. The element we thought was worth noting was the wing detachment. Crewed aircraft come with an Operators manual that sets out the limitations of the manoeuvres the aircraft can perform whilst remaining within the design limit load factor. Oddly very few if any Drone Operator manuals for the sub-25kg commercially available aircraft seem to contain any of these limits, other than perhaps a maximum airspeed. In the occurrence above, on triggering the Return To Home (RTH) function the aircraft seems to have flown itself at an excessive airspeed, subjecting it to G forces beyond its design limits, such that the wing broke and the inevitable followed. Somewhere in the design of the aircraft the autonomous execution of a pre-programmed command had been set up to take place at a speed that exceeded the structural design limits. We often think about Human Factors issues as just being in the operation of aircraft but here's a Human Factors issue in the design and compilation of the software!

We would suggest that the learning here is that C-marking, when it happens, could usefully include elements of design limits being incorporated into the Operators manual, along with information on how any autonomous operations have been calibrated. This will then help the pilot decide whether to trigger an autonomous set of commands or fly a manoeuvre using the sticks.

Many of today's production Drones have in-built systems that will warn the pilot via messages on the controller if the aircraft is encountering excessive winds aloft. What pilots should do will depend to some degree on whether the aircraft is rotary or fixed wing. It may of course be to slow down first and then either land immediately or return to the landing spot. An automated RTH feature may be programmed to be executed at a relatively high speed, in which case a hand flown return could turn out to be the best option.



