

DUASXX15

Posted on 24.04.2024 by Rupert Dent

Category: [Drone](#)

Report Title Collision during swarming

Initial Report

From AAIB report No [AAIB-29203](#). A swarm of 638 UAs took off as part of a planned test of a light display. The preprogramed launch and animation flight were completed without incident. As the UAs switched to 'return to home' mode they returned to their grid positions. Several UAs then flew out of formation, before the pilot sent an emergency hold command to which the fleet responded, and all UAs held their position. A manual 'return to home' command was sent and the UAs returned to their grid formation. When the swarm began to descend the same UAs again flew out of formation. The swarm was then landed in altitude order, due to concerns about battery endurance. All UAs stayed within the planned geofence. Three UAs sustained broken arms and there were several chipped propellers. An investigation by the operator determined that deviations from the planned flight route were caused by flat batteries in the controller unit, which had been left switched on when stored.

Lessons learned: The Operator has introduced a new procedure to remove all batteries when not in use.

Comment

We agree with the initiative to remove all batteries when they are not in use. We would also suggest that if it isn't already there, it would be a good idea to add a controller battery check as part of the pre-flight checks. Whilst we do not have a significant amount of experience with swarms, we have set out below a few basic recommendations that readers may wish to consider when operating a swarm:

- Battery removal from all drones after use. (Batteries should be maintained at less than 60% state of charge when not in use and disconnected from vehicles during storage).
- Batteries stored in separate location from drones – unless all in Lipo fireproof bags.
- There should be a designated landing area identified away from people and, wherever possible, not over water.
- A return-to-home geofence should be established at a maximum of 15m from the flight area boundaries to trigger automated landing procedures upon exit.
- A hard cutoff geofence should be set at minimum 10m and maximum 50m beyond the return-

to-home geofence to immediately disarm drones if triggered.

- There should be a pre-flight hardware and software check of all drones and ground station components, in particular there should be a protocol for checking that the software is the latest version.
- Maximum wind speeds per manufacturer guidelines should be strictly adhered to.

With swarm light shows becoming more frequent, these provisions are designed to manage some of the potential pitfalls of flying swarms.

Finally, it is worth highlighting that this occurrence is in some respects a good news story. In dealing with the issues that occurred, everything that was supposed to happen did and the UA stayed within the geofence.



