

DUASXX16

Posted on 24.04.2024 by Rupert Dent

Category: [Drone](#)

Report Title Inadvertent flight above 400ft

Initial Report

At CHIRP we are in touch with several other Human Factor reporting entities, including NASA and their Aviation Safety Reporting System (ASRS) who perform the confidential reporting function in the United States. We are grateful for their permission to reproduce below an HF occurrence that was reported to them in October of 2023 as report ACN: [2951851](#). I have summarised the report below, but for those that are interested to see the whole report and the level of detail NASA manage to get reporters to fill out, follow this link to the site:

<https://asrs.arc.nasa.gov/search/database.html>. To find drone related reports within their online database choose **Federal Aviation Regs (FAR)** and select: **Part 107 or Public Aircraft Operations (UAS) or Recreational Operations / Section 44809 (UAS)**.

I was operating my UAS on a mapping mission with a base station for RTK (Real-Time Kinematic Positioning) corrections. I was running an automated mapping mission using the KMZ file using the app. This was my first operation of the KMZ file as opposed to a KML file. As per the KMZ file, I was having the mission fly to remain no more than 400 feet AGL to the terrain, and in order to maintain a visual line of sight I would move throughout the hilled/undeveloped area in order to maintain VLOS.

I would have to remove the cap on the application in order to allow the drone to fly the 400 feet AGL over the hilled areas. This mission became lengthy as I would return to the home start point, move a few hundred feet to a good vantage point that would keep a VLOS, then start the drone and move with it. I would then have to return the drone to home and I came along with it, which proved to be fatiguing. Part of this fatigue was caused by me being hypervigilant to the nearby airport, as there were airplanes practicing landings/touch and goes, (across the highway, but still close by) and I wanted to ensure no airplanes were moving towards the south (towards me).

Towards the end of the mission, the drone began the return to home. During this the drone began to rise to 1000 ft. I was keeping visual line of sight directly and realized it was becoming increasingly difficult to see. I looked at the remote and realized it was at 1000 ft AGL. I then ceased the operation and took manual control and brought the drone down as quickly as possible. Upon investigating the issue, I soon realized that because I set the return to home safely at 1000 feet, the drone automatically went to that height. My error was not setting it at the 400 feet that I normally set it to.

I set the max altitude in the application to 1000 feet, in order to move along the hillsides. (this height would only happen in relation to the altitude). This was also my first operation in a hilled/varying terrain area which added another layer of difficulty. I mostly run mapping missions on smaller flatter terrain.

Lessons learned: For future flights with varying terrain areas, I will set the return to home altitude no more than 250 feet, which is one of the highest points in the area above my start point. I will also manually fly the drone home at a much lower altitude instead of letting the drone automate itself for a return to home when it comes to unfamiliar sites or varying terrain sites.

Comment

An explanation may be required for some regarding the difference between a .KML file and a .KMZ file. In essence a .KML file is a file format that is used for storing geographic data. A .KMZ file is a file format that stores several .KML files (they are in effect zipped thus the Z), as well as their associated resources.

What the reporter is saying at the beginning is that by using a .KMZ file as the source data for the mapping mission, he was undertaking a more complex and longer flight plan than he had done before. Crucially, the RTH height needs to be set separately from the mapping mission part of the flight and needs to consider not just the surrounding terrain height, but also the maximum height of 400ft that is normally permitted for a standard drone flight. It is also important to remember that the vision system settings need to be considered as well, specifically whether the drone hovers or avoids obstacles if it comes across them when performing an RTH.

Forgetting to adjust the RTH height settings before a flight is an easy mistake to make, but it can have unexpected consequences. We would advocate RTH height settings being added to the sequence of pre-flight checks. They should be based on the maximum height of terrain / obstacles in the region being flown for the mapping mission, plus a safety margin.

There was a final aspect that the Board discussed in relation to this occurrence. Some pilots will automatically press RTH at the end of a mission and some will choose to manually fly the drone back home. What do you think the pilot should have done in this instance?



