CALLBACK

From NASA's Aviation Safety Reporting System

Issue 496 May 2021

Unmanned Aircraft Systems (UAS)

NASA ASRS is pleased to officially introduce the new ASRS UAS reporting form. We welcome everyone involved in UAS operations into the ranks of a committed, transparent, and professional aviation safety reporting community. Whether you are a recreational drone flyer, a certificated remote pilot or crew member involved in commercial UAS operations, or operating UAS for the Military, public safety, or educational purposes, we invite you to contribute to ASRS.

The ASRS goal of improving aviation safety for all is realized through the guiding principles of voluntary participation, confidential reporting, and non-punitive provisions for those in the aviation community who choose to participate in ASRS. Since its inception in 1976, NASA ASRS has received and processed over 1.75 million safety reports.

Important benefits are realized by honest and open safety reporting. Common problems, complications, and obscure nuances are revealed over time and shared with the community. In so doing, we learn from each other's challenges and mistakes. Examples of reported UAS incidents include events in which wind, weather, or equipment are important factors, conflicts between manned and unmanned aircraft, and operational mistakes that may endanger persons or aircraft. Commencing with knowledge extracted from ASRS reports, solutions or preventive measures can be developed to mitigate hazards and threats. Although Unmanned Aerial Vehicles (UAVs) may be similar or vastly different from other types of aircraft, all must operate together in the National Airspace System. Comprehensive safety reporting will improve flight safety for all as each reporting group learns what is required and expected of the others, particularly as the skies become more densely populated from the increased demand for UAVs and larger numbers of UAS operators.

All reports that ASRS receives are de-identified, and names, dates, and other identifying information are removed or generalized to protect the identities of reporters and third parties. Many of these reports are available in the public ASRS Database Online[1] (DBOL) for interested parties to review or research. More descriptive details about ASRS, the new UAS Reporting Form[2], and in-depth information about the operation of UAS, including Drone Safety Tips, may be found at the respective ASRS or FAA website.[3]

This month, *CALLBACK* showcases our newest reporters and partners in the aviation safety reporting community. Already, UAS operators have reported a pertinent cross section of UAS incidents. Enjoy the narratives. As always, our intent is to stimulate thought, training, and discussion related to the type of incidents that were reported.

Part 107 for the Hobbyist

Although FAR Part 107 had not been emphasized at the hobbyist level, its discovery was unexpected, and its content motivated commitment toward personal growth.

■ *I was testing the live-streaming video using my personal hobby drone. Post proof-of-concept meeting, we had a follow-up with flight services, where I was advised of [FAR] Part 107 regulations. I was unaware of the requirements outlined in Part 107 and unaware of the airspace proximity to [a local airport]. During my test flight, the drone stayed in low altitude [mode] and did not leave line of sight. During setup and test of this drone, no aircraft were visibly present.*

I have…the link to the regulations that I was unaware of and will research all unmanned and manned flight regulations for that area prior to any future flights. It is unfortunate that this information is not listed at the hobby level.… This gives me the option to improve my knowledge, moving forward.

Preflight Thoroughly B4UFLY

A better preflight might have prevented confusion for this Part 107 certificated operator when the B4UFLY app indicated that the intended flight area was restricted.

■ *I was operating my drone under Part 107 during an aerial photography mission. On initial setup, I checked the FAA B4UFLY app and noticed that the area I was currently in was restricted.… I checked under the reasons why, and it informed me that it was due to Alert Area A-231. I then checked my terminal area chart on ForeFlight to see what the restrictions were for A-231 and found out that it was from 500 feet AGL to 6,500 feet MSL. The operation I intended to perform was only going to be up to 100 feet AGL, and I quickly glanced to make sure I was not in conflict with any other airspace and [that I was] under the [Class] B shelf. Having done most of my flight training in Phoenix,…I was certain that it was acceptable to operate my drone.*

After no conflicts and completing the flight, I then proceeded to another property located a street over. Again, I was prompted that the flight was restricted due to A-231. Again, I continued to proceed cautiously. After performing three operations all within the same area, I stopped for the day.

Later that evening,…I looked at the terminal chart once again. I then noticed that next to the A-231 boundary, there is a Special Air Traffic Rule (SATR) starting at the surface and [extending] up to 4,000 feet. The SATR states that all aircraft need to establish…and maintain two-way communication with…Luke Approach while operating in the airspace. It is then, that I realized that I may have been in conflict with this SATR.… My previous flight experience in the area led me into a trap of not checking the airspace as closely as I should have.… The SATR is new since I last operated flights in the area.… I need to pay extra caution to all available information, including the B4UFLY app to avoid any further conflicts.

Wind Beneath My 'Wings'

In this incident, a momentary gust of wind demonstrates how vulnerable a UAV can be, and the results hint at how serious the consequences could become.

■ *I was flying my (UAS) drone at the boat harbor. I was recording a boat that just docked with my wife and two friends aboard. I flew too close, approximately 50 feet, at an altitude of 25 to 35 feet AGL. A gust of wind caught the drone and veered it into the rear open compartment deck for viewing on the vessel. Winds were 5 to 8 miles [per hour], approximately, with an occasional gust of 9 to10 miles per hour. I tried to recover, but the UAS hit the roof deck. Witnesses said an unidentified adult man (tourist passenger) batted the UAS with his hand to keep the UAS from striking another passenger and [that he] received a minor cut from the propeller. The passenger exited the boat and left on the tour bus, not leaving his name or other information. The Captain secured the UAS, and upon my giving him all my information, returned the UAS.*

De-Conflicting a Conflict

When this UAS operator projected a potential airborne conflict, discipline and good judgment mitigated the threat.

■ *While performing an autonomous mapping mission of a farm field with my UAS, a DJI Phantom 4 Pro V2, and using Ground Station Pro, an unknown helicopter approached from the north of my operating area [toward] my back. I maintained the line of sight with the UAS at all times. As the helicopter entered my field of vision, I saw that he was lowering altitude as he proceeded south. I stopped the UAS and began to factor if the helicopter was a possible conflict. I began to plan to give right-of-way and began to bring my UAS to my position east of the possible conflict area. I initiated Return to Home (RTH). The UAS returned to my position without incident. The helicopter continued to a hillside about a half mile away and made an off-field landing next to a cell tower. I assume it was doing an inspection of the tower. It then took off again in about 15 minutes and continued south along the mountains. I ceased my flight operations with the UAS. I estimate that there was about a 1,000-foot horizontal and a 100-foot vertical separation between the aircraft for a brief time. At no time, in my opinion, was there imminent danger to personnel or aircraft, and appropriate action was taken to avoid any conflict*

The Icarus Sin Drone

After losing visual contact with the UAV, this UAS operator described actions that were taken to recover the vehicle. The result was less than optimal, but a good lesson is reiterated.

■ *I was flying a small UAS. During the flight, the aircraft passed in front of the sun, and I lost visual contact for approximately 10 seconds. Afterward, I could not reacquire visual contact. I could hear the propeller and executed what I estimated was a 180-degree turn with the throttle at mid-position to bring the plane back to my location. After waiting the approximate [length of] time the plane had been flying away from me, I scanned the likely area of sky but could not see it. I then executed…90-degree banked turns to…increase the visibility of the plane. The plane was flying in a stabilized mode with a roll limit of 90 degrees, so full aileron stick-deflection would cause a consistent 90-degree bank angle. When I was unable to see the plane (I could still hear the propeller at this point), I executed a series of turns while monitoring the Received Signal [Strength Indication] (RSSI)…back at the transmitter…and tried to [fly] a course that would increase the RSSI level, indicating the plane was flying closer. Unfortunately,…I was unable to get a stable enough signal. At this point, the telemetry link was lost.… To minimize any potential damage on landing, I closed the throttle and applied full back elevator to slow the forward speed and descent rate until I estimated the plane would have landed (approximately one minute). The primary initiation of this event was a brief loss in awareness of the plane's path relative to the sun. Normally, I avoid flying near the sun, but in this case, I misjudged.*

1. *https://asrs.arc.nasa.gov/search/database.html*
2. *https://asrs.arc.nasa.gov/uassafety.html*
3. *https://www.faa.gov/uas*

ASRS Alerts Issued in March 2021	
Subject of Alert	**No. of Alerts**
Aircraft or Aircraft Equipment	2
Airport Facility or Procedure	4
ATC Equipment or Procedure	4
Hazard to Flight	1
TOTAL	**11**

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A Monthly Safety Newsletter from

The NASA Aviation Safety Reporting System

P.O. Box 189 Moffett Field, CA 94035-0189

https://asrs.arc.nasa.gov

March 2021 Report Intake	
Air Carrier/Air Taxi Pilots	4,054
General Aviation Pilots	1,478
Flight Attendants	587
Controllers	453
Military/Other	252
Mechanics	204
Dispatchers	190
TOTAL	**7,218**