

CALLBACK

From NASA's Aviation Safety Reporting System



Issue 397

February 2013

You and UAS

Unmanned Aircraft Systems (UAS) — also referred to as “Unmanned Aerial Vehicles” (UAV’s), “Remotely Piloted Vehicles” (RPV’s), “unmanned aircraft” or “drones” — come in a wide range of configurations and sizes, and have multiple military and civilian functions.

UAS operations utilize a Pilot-in-Command who is controlling the aircraft from a remote location. In the event of a data link failure or other malfunction the system may revert to a pre-programmed mode.

The FAA is under congressional mandate to integrate most UAS into the National Airspace System (NAS) by 2015 (2014 for UAS weighing less than 55 pounds) with the primary focus and authority being safety. In planning the integration of UAS into the NAS, the FAA has to develop a safe and efficient way that these systems can operate in the same airspace as crewed aircraft without creating a hazard to other aircraft or to people and property on the ground.

To date, UAS access to the NAS remains restricted pending development of appropriate operational procedures, standards, and policies. The FAA approves UAS operations on a case-by-case basis. UAS authorized by the FAA to operate in controlled airspace have to comply with appropriate FAR or equivalent military standards related to aircraft and operator certification as well as equipment and communication requirements.

The following ASRS reports are presented to increase Pilot and Controller awareness of UAS operations and to provide some insight into the systems from an Operator’s viewpoint. Additionally, UAS Operators may gain a better appreciation of the interaction of UAS with other elements in the NAS.

UAS Altitude Excursions

Four ASRS reports describe incidents in which UAS departed from their assigned altitude. In the first report, an Air Traffic Controller observed a UAS altitude deviation and also expressed concern for the consequences of UAS data link failures.

■ *While working an adjacent sector, I witnessed a UAS deviate from his assigned altitude. This UAS was cleared*

to maintain FL350. The [UAS] aircraft descended out of FL350 to FL300 without a clearance. When questioned by the Air Traffic Controller, the Remote Pilot stated that he could not maintain FL350 so he descended.

I feel this event happened due to the training of the Remote Pilots of the unmanned aircraft. The accountability and standards for remotely piloted, unmanned aircraft should be equal to the standards of commercial pilots.

Also, unmanned aircraft must be held to the same restrictions as manned aircraft. For example, in a [UA] System, if the aircraft loses data link it will fly its programmed flight plan. It will not maintain its last assigned altitude. This can affect the Controller’s ability to maintain positive separation.

An Operator reported losing aerodynamic control of the UAS and was too busy reestablishing control to immediately notify ATC of the problem. It is not known if the UAS Copilot had communications capability with ATC.

■ *I requested a climb from FL190 to FL250 to climb above weather. Before entering into a climb, I asked the Copilot to perform a full sweep with the camera to look for clouds and adverse weather. None was noted.*

Climbing through FL210, conditions were encountered that affected the performance of the [UAS] aircraft and resulted in a loss of altitude from FL210 to 16,500 feet MSL. Due to my efforts to fully regain positive control of the aircraft, I failed to declare an emergency. As soon as I regained positive control, I initiated an immediate climb to the cleared altitude of FL250. ATC advised of the deviation in altitude. I advised ATC that the descent was due to weather and the aircraft was currently in a climb to FL250. The flight level request was amended to FL290 in order to fly above the weather.

A Certificate of Authorization (COA) from the FAA authorizes a UAS operator to use a defined airspace and includes special provisions unique to each operation. Most, if not all, COAs require coordination with an appropriate Air Traffic Control facility and may require the UAS to have a

transponder to operate in certain types of airspace. The UAS Operator who submitted this report to ASRS was operating in accordance with a COA when the data link to the UAS was lost.

■ My UAV was conducting assigned missions at FL200 in accordance with a COA issued by the FAA. At one point in the mission the UAV descended to FL190 without an ATC clearance. At the time of this violation, we lost a control link...with the [UAS] aircraft. As we were then unable to verify the aircraft's position or obtain critical flight information, the command link with the [UAS] aircraft was disabled releasing it on its emergency mission profile in accordance with the approved emergency checklist. The [UAS] aircraft then began squawking 7600 and entered autonomous flight proceeding direct to the assigned emergency mission loiter point and descended to a pre-programmed altitude of FL190.

The remote command link with the UAV was lost for several minutes. This command link allows the aircraft to be flown by a PIC approximately 1,000 miles away using satellite relayed commands. It was this link that was lost and the aircraft was then released to its pre-programmed emergency rendezvous point where it would then be picked up visually and landed by on-site operators. In this case the command link was regained after several minutes and the aircraft flown directly by the PIC to a point where it could be visually acquired by the on-site crew and was landed safely. Maintenance investigation is required to ascertain the reason for the lost link before the aircraft is again released for flight operations.

In another report from a UAS Operator, the aircraft experienced an altitude and heading deviation due to loss of the data link, but the Operator made a timely report to ATC.

■ Due to an inadvertent SPMA (Signal Processor Modem Assembly) reset during a backup communications power up, the UAS experienced a Lost Link situation. The UAS was cruising at FL230 to avoid weather when the Lost Link occurred. The Operator failed to update the Lost Link Profile

to reflect the ATC clearance which caused the aircraft to turn towards the closest Lost Link entry point and initiate a descent to FL190 which was the previous Lost Link Profile. The Operator immediately called ATC and notified Center that the link should be regained within two minutes. Once the SPMA link was reestablished, the aircraft climbed to its previous altitude of FL230.

No additional information was requested by Center after communications were regained and the flight continued without further incident. A software change request is being researched for added protection from inadvertent SPMA resets.

Close Encounter

A small UAS encountered by the Pilot of a manned aircraft may have been outside its designated airspace. If ATC is not aware of a UAS, Pilots have to rely on see and avoid procedures and handle UAS conflicts the same as conflicts with manned aircraft.

■ My passengers and I noticed an oblong shaped UAV (approximately two to three feet long with a long antenna) passing us in the opposite direction within 100 feet of our left wing on the 45-degree entry to Runway 15.... The object did not show up on my TCAS system as a threat. These vehicles need to show up in the cockpit as a threat or stay within the Military Operating Area (MOA).

Additional UAS information can be found at the following FAA websites:

- <http://www.faa.gov/about/initiatives/uas/>
- <http://www.faa.gov/news/updates/?newsId=68004>
- <http://www.jpdo.gov/newsarticle.asp?id=146>

The Aircraft Owners and Pilots Association has a free interactive course, Unmanned Aircraft and the National Airspace System at:

<http://www.airsafetyinstitute.org/unmannedaircraft>

ASRS Alerts Issued in December 2012	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	6
Airport Facility or Procedure	6
ATC Equipment or Procedure	9
Maintenance Procedure	2
Company Policy	1
TOTAL	24

397
A Monthly Safety Bulletin from
**The NASA
Aviation Safety
Reporting System**
P.O. Box 189,
Moffett Field, CA
94035-0189
<http://asrs.arc.nasa.gov>

December 2012 Report Intake	
Air Carrier/Air Taxi Pilots	4037
General Aviation Pilots	936
Controllers	710
Cabin	240
Mechanics	154
Dispatcher	104
Military/Other	26
TOTAL	6207