

# CALLBACK

From NASA's Aviation Safety Reporting System



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## Unusual Attitudes and Aircraft Upsets



An aircraft unusual attitude or upset can challenge and test a pilot's ability to maintain aircraft control. The unusual attitude is generally unintentional, unanticipated, and may consist of extreme aircraft attitudes, and yet, it might not exceed the parameters to be termed an upset. During flight or training, an upset generally refers to an unintentional pitch attitude exceeding 25° nose up or 10° nose down, or a bank angle exceeding 45°, or being within those parameters and operating at an airspeed inappropriate for the conditions.<sup>1</sup>

Usual suspects in unusual attitude and upset incidents include environmental conditions, wake vortex encounters, mechanical issues, and Human Factors such as confusion, distraction, fatigue, human-machine interface, physiological conditions, or situational awareness. With aircraft control in the balance, it is crucial that every pilot be proficient in identifying and recovering from unusual attitudes and aircraft upsets. FAA mandates Upset Prevention and Recovery Training (UPRT) for Part 121 operators and encourages it for all others.<sup>1</sup>

This month, *CALLBACK* shares unusual attitude incident reports, primarily from Part 91 operations, that display Human Factors along with some external stimuli. Enjoy the narratives, the lessons, and the cause-and-effect connections.

### Double Down on the Heads Up

Flying in less-than-ideal conditions, a Flight Instructor and student suffered predictable consequences immediately after they took a short, dual recess from their instrument scan.

■ *In continuous moderate turbulence while performing the course reversal on the RNAV Rwy 19 approach into 9D4 with a 50-knot wind out of the southwest, my student disconnected the autopilot when he thought it was not going to be able to complete the parallel entry to the final approach course. He initiated a steeper turn than the autopilot had and then went heads down to look at the approach plate. I was also heads down looking at the approach plate when I noticed increasing positive G-forces and looked at the instruments. We were in a 45-degree bank losing 2,000 FPM of altitude. I immediately called bank angle twice and shielded the controls as the learner recovered. We lost 800 feet and ended up well below the minimum altitude for that segment of the approach. ATC*

*notified us of a low altitude alert, by which time we were already recovering in a stable climb. There is an antenna in the area that reaches 1,927 feet MSL, less than 600 feet lower than our lowest altitude.... This was a poignant lesson for the student on the importance of maintaining an instrument scan, but our safety margin was fairly low. An incorrect recovery input could have quickly turned the upset into a disaster. The aircraft does not have an aural warning when the autopilot is disconnected, which would have [alerted] both of us...that the aircraft was being hand flown. In its absence, I recommend pilots announce...that they are disengaging the autopilot.*

### Within Seconds

This Mooney Ovation pilot experienced an abnormal airspeed indication during cruise in IMC. Procedures were accomplished, but the situation deteriorated rapidly.

■ *I was in cruise and on autopilot for the past few hours. I was handed off to another Controller with ZZZ Center. He was so busy that I could not break in to establish contact. After a few minutes of trying, I pressed IDENT... I finally got through and was switched to another Controller... My airspeed was very slow, 70 knots,...and RPM was at 2,500. I assumed my pitot-static tube was blocked. I...made sure my pitot heat was on. Next, I checked my engine analyzer. All cylinders were cold. I switched tanks and turned on the boost pump and alternate air... There were never any signs of icing. This aircraft is certified for known ice.*

*All within seconds, I was with no power, in an unusual attitude, and in IMC.... I requested assistance. I have been flying for more than 20 years and never had required immediate assistance. I was focused 110% on flying the plane. The autopilot was off. I pushed forward to gain airspeed in case I was in a spin, then leveled the wings and asked for vectors to the nearest airport. ZZZ was 10 miles behind me. The Controller...switched to another frequency. He was fantastic. I was on best glide speed direct to ZZZ. I noticed I was getting some power, and shortly, my engine was running normally... I flew a VFR approach to ZZZ1 for a precautionary landing. I wanted to have it looked at by an A&P mechanic. The mechanic took off the cowling... He felt everything looked normal and operational. He noted that the engine had good compression. His recommendation*

was to go to a test area and run-up the engine to full power a few times. All appeared normal. I fueled up...and continued my flight the following day. The flight was uneventful, but I stayed in VFR conditions as a precaution.

## Unusual Attitude, Invisible Conflict

This military T6 Texan/Harvard instructor was conducting training in a Military Operations Area (MOA). An unperceived threat suddenly materialized during unusual attitude training and nearly resulted in a tragedy.

■ [This was a] training flight...in communication with... Center, but operating VFR within the boundaries of our assigned MOA block. We were executing a variety of contact maneuvers between 12,000 and 17,999 [feet] MSL, including basic air work, out of control flight, and unusual attitudes. We were monitoring the assigned...Center frequency but were not able to pay close attention due to focusing on the training maneuvers. At one point, I heard a civilian aircraft being advised that they were filing a flight plan through an active MOA but did not hear the aircraft's response. I heard multiple company aircraft checking in for the MOA, including blocks adjacent to mine.... I set up my student for a nose-low unusual attitude recovery maneuver. I noted a TCAS contact, but it was on a depicted section line for the MOA, so I dismissed the contact as company traffic with the expectation that they would be deconflicted through SOP adherence. As we entered a significant nose-low descent for training, we received another traffic advisory very close to us. We executed a 5G pull and turn for avoidance. Our indicated altitude dropped below the contact. I would estimate that we came within 100 feet of the conflict, though I did not get a visual on the other aircraft. Center called us and asked if we had to execute a significant evasive maneuver and advised that the conflict had been a civilian multi-engine aircraft. The Controller was apologetic for not providing a traffic call to us, though due to how dynamic our training maneuver was, I do not believe that the Controller could have anticipated the severity of the conflict.

## The Reality Checkride

A PA46 pilot shares some sobering wisdom after an aircraft problem in IMC led to an undesirable aircraft state.

■ After an uneventful instrument cross-country flight, I listened to the destination airport ASOS: wind 29 knots, gusting to 38, clouds overcast at 900 feet and visibility 4 miles. I set up the Flight Director (FD) for the RNAV approach into the non-towered airport. I had done this

approach before in marginal VFR conditions.... Cleared for approach with the autopilot coupled to the FD, I passed the IAF in heavy IMC and turned inbound at the intermediate fix. Approach cleared me to switch to the UNICOM frequency. I noticed that the autopilot was not maneuvering the airplane as I had intended. It was making a climbing left turn off course. I decoupled the autopilot and hand-flew the airplane while attempting to reset the FD.... Distracted trying to reset the FD, I inadvertently got off altitude and heading, and found myself in an unusual attitude. I recovered from the unusual attitude, got the airplane stabilized, hand-flew the airplane, and landed without further incident.

I performed well during my recent instrument proficiency check, but single-pilot instrument flying in heavy IMC is not the same as being...under the hood with a Flight Instructor in the right seat. Also, emphasis should be made on Upset Prevention and Recovery Training. I will seek training before doing single pilot low IMC approaches in the future.

## Not the Captain's First Rodeo

A B767 Captain experienced an abrupt, pitch-up attitude and out-of-trim condition. Fortunately, the Captain was all about business at the time, and the situation was quickly resolved.

■ [I] selected the Left Autopilot on at 1,200 [feet] AGL, 230 knots, slats retracting, [with] VNAV engaged at about 5 degrees of pitch. When the autopilot became active, it directed an abrupt positive pitching moment. Passing 18 degrees of pitch [up] with no sign of stabilizing, I deselected the autopilot and recovered the aircraft. No alerts of any anomalies were displayed, and the stick shaker did not activate. When I took manual control of the aircraft after the event, the aircraft was significantly out of trim, nose up. I considered raising the guarded switches and cutting out the trim, but I ascertained quickly that I was able to trim out the stick forces without being overridden by the trim system. After I stabilized the aircraft in normal flight, I engaged the Left Autopilot again and noted no other anomalies for the remainder of the flight. I wrote the event up in the [software program] and read a few hours later that the Left Autopilot was deferred. This event could have easily been a stall and recovery event if I had put the autopilot on and become occupied with another cockpit task. As it was, this event was an unusual attitude recovery.

1. Advisory Circular AC 120-111 Change 1, Upset Prevention and Recovery Training, 1/4/17, [https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_120-111\\_CHG\\_1.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-111_CHG_1.pdf)

ASRS Alerts Issued in January 2023	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	3
Airport Facility or Procedure	8
ATC Equipment or Procedure	6
Hazard to Flight	1
Other	2
<b>TOTAL</b>	<b>20</b>

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 A Monthly Safety  
 Newsletter from  
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 P.O. Box 189  
 Moffett Field, CA  
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January 2023 Report Intake	
Air Carrier/Air Taxi Pilots	5,261
General Aviation Pilots	1,256
Flight Attendants	872
Controllers	413
Military/Other	256
Mechanics	202
Dispatchers	181
<b>TOTAL</b>	<b>8,441</b>