

CALLBACK

From NASA's Aviation Safety Reporting System

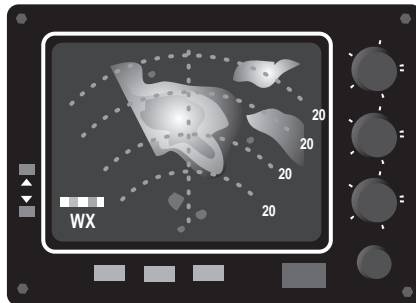


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Weather-Avoidance Radar Incidents

Proper operation and interpretation of airborne weather avoidance radar is dependent on pilots having a full understanding of its capabilities and limits. Factors such as *radar attenuation* (deflection or absorption of the radar beam by precipitation or solid objects like terrain), and use of the radar's tilt and gain controls, may affect the accuracy of radar returns.



Even when none of these factors seem to be involved, pilots can still be surprised by adverse weather that is not accurately depicted on their weather radar, including severe turbulence, lightning strikes, inflight icing, and even microburst activity. More from a recent ASRS report:

■ *Our flight encountered an area of unforecast extreme turbulence. The area was encountered while descending through FL210... Flight conditions were IMC with continuous light chop. Weather radar was operating and displayed no returns. The tilt and gain settings were set properly for the conditions. Due to advisories from Center of possible moderate turbulence, we had elected to activate the continuous ignition.*

The onset of the turbulence was rapid and immediate. The Pilot Flying (Captain) immediately retarded the throttles to idle thrust and disengaged the autopilot. He was able to prevent the plane from rolling to an inverted attitude, but the descent rate or the altitude was impossible to maintain. The aircraft began climbing at a moderate rate. About 5-10 seconds into the encounter, we received simultaneous left and right engine oil pressure warning messages. I shifted my focus to the engine instruments and noticed the engines were maintaining idle thrust. No other abnormal engine indications were present. We escaped the area of extreme turbulence and readily notified ATC. No Flight Attendants or passengers were on board, as this was a ferry flight. There was no way to predict or avoid the stated conditions.

This crew did what they were trained to do – fly attitude. Many air carriers require that flight crews

maintain established distances from weather radar echoes according to the color of the radar return. This policy lessens the risk of adverse weather encounters, including hail thrown into clear air by thunderstorm “overhangs.”

Onboard weather radar equipment itself may be hazardous, as described in this Captain's unusual report to ASRS:

■ *After pushback and engine start, we noticed that our primary flight displays indicated ‘Wx On,’ and the radar display indicated ‘Predictive Windshear On.’ This indicated that the predicted windshear system was active and the weather radar was on, looking for windshear and irradiating the pushback crew. I pulled the weather radar circuit breaker and investigated. Our pilot's reference manual says the predictive windshear system is on when both engines are running and the transponder is on. In this case the transponder was set to ‘Alt Off.’ This switch position is one click from ‘Standby,’ which is where the switch should have been. The inbound crew must have left it in ‘Alt Off’ and we did not notice, despite a thorough preflight check. The switch is small and has 6 positions, making it easy to mis-set...*

There needs to be a warning in our normal procedures that says, “Warning, if the transponder is on and both engines are running, the weather radar is on.” There needs to be a bulletin issued to insure that every crew member understands that the transponder switch is very important and if left in the wrong position, can hurt people...

Prolonged exposure to weather radar radiation may cause injury to ground personnel and damage to ground equipment in close proximity. An aircraft's radar receiver may also be damaged as the result of strong returns from nearby metallic objects such as other airplanes. The design of the transponder switch and the crew's faulty performance of the checklist were also factors in this incident. ▲

ASRS Recently Issued Alerts On...

LR55 cabin altitude warning system malfunction
Frequency coverage problems in an ATC sector
Multiple A319 upper aileron panel flutter incidents
Land and Hold Short incident at a Hawaiian airport
Glide slope anomaly at an international Asian airport

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Air Carrier / Air Taxi Pilots	2663
General Aviation Pilots	774
Controllers	95
Cabin/Mechanics/Military/Other	188
TOTAL	3720

The Three C's Revisited

"Climb, Communicate, Confess" – following this advice has undoubtedly saved the lives of many VFR pilots who inadvertently flew into clouds or IMC weather beyond their capability. It is advice taken to heart even by professional pilots with thousands of flight hours – including this EMS helicopter pilot whose adventure began when an emergency call was received at night:

■ *I departed responding to a call. En route, I encountered nothing unusual except a few patches of lower clouds to the south and west of the landing zone. After a brief orbit to make way for a departing aircraft, I landed. I was loaded in approximately 10 minutes and we departed on a direct route.*

On departure, I observed [that] the weather in the area appeared clear [and] I was able to see stars and the distant lights. I initially climbed to 11,000 feet to ensure adequate terrain clearance and selected a heading which would steer me well clear of terrain. During the climbout, I found myself inadvertently positioned between two cloud layers and gradually losing visual reference. I briefly saw the stars above me and thought I could get on top by climbing a little higher. It was at this time I realized I had lost visual reference and elected to transition to the instruments. I contacted Center and apprised them of my situation. Center issued me a squawk code and suggested I climb to 12,500 feet. Shortly after my initial contact with Center, I was able to clearly establish visual reference with the terrain and proceeded directly to [destination].

The 3C's Forgotten

Our next reporter was intent on building his multi-engine time. He cut a good deal (or so he thought) with an entrepreneurial "old-timer" – but ended a cross-country flight lucky to be in one piece, and a lot wiser.

■ *In an effort to build multi-engine time, I agreed to fly with an operator who had business all across the country... I agreed to pay for all fuel plus a high hourly rate. It is nearly impossible to rent a multi-engine [aircraft] with low time. As we flew across the country, the list of mechanical problems grew at an exponential rate. The owner of the aircraft was an old-timer who was afraid of airspace and considered the FARs an infringement of his freedom. He referred to Class B and Restricted Areas as "the little blue lines." He preferred to go GPS direct and not talk to anyone if he didn't have to. At one point, I had him fly because the weather was low, and the flight terminated by flying tree-top level in rain and low ceilings. When I began to fly again, he was in such a hurry he pressured me to fly VFR into what appeared to be a thunderstorm. That's when I started down through a hole and ended the flight. I landed at the primary airport in Class C [airspace]. Because of my lack of familiarity and a badly precessing*

directional gyro, I nearly landed on the wrong runway without clearance... I'd had enough...and didn't feel safe in this airplane, so I got out 1500 miles from home.

I felt good about this decision. It's better to be on the ground wishing you were in the air, than in the air wishing you were on the ground.

This incident brings to mind three other C's that were sadly lacking throughout this flight: good CRM, clear aircraft Command, and Common sense. We're glad our reporter decided to ground himself and subsequently Communicate with ASRS. ▲

The Saga of "Hairy Hazmat"



It's well known that ASRS reports have been the basis of many safety improvements, but it may surprise some to learn that our reports can also serve as inspiration for poetic flights of fancy. We illustrate with the metamorphosis of a matter-of-fact report received from a B757 Captain into a clever rhyme:

■ *A mouse jumped out of carts in the forward galley and ran into the cabin. The first Flight Attendant entered the event in the cabin maintenance log and did not inform appropriate authorities or warn the departing [cabin] crew. New first Flight Attendant informed us of the discrepancy in the cabin maintenance log after takeoff. Such an event should have been entered in the aircraft maintenance log, and the aircraft either fumigated or the mouse disposed of prior to departure. A mouse has the potential to nibble on wiring, causing short circuits.*

And now the poem inspired by this event, penned by an ASRS analyst (whose identity must remain confidential):

☞ *The food cart's unloading was observed by the crew,
And the cart was secured with a push and a "Whew!"
But during the last minutes of rushed this and that,
UP popped a passenger named Hairy Hazmat,
Indeed, Hairy had carefully rehearsed his part:
For more comfortable seating he jumped from the cart.
Thus vanished the tail of Hairy Hazmat,
But instead of a write-up – the crew needed a cat. ▲*