

Flight Test Safety Fact



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At Your Own Risk

One clear, moonless night, ATC informed us that runway lights were inoperative and that landing would be at our own risk. We first chuckled about the strange phraseology since risk always belongs to those onboard the aircraft. The phraseology “at your own risk,” sounded goofy, but once the controller required specific acknowledgment of the call—perhaps for the tapes—eventually it triggered deeper analysis. Television personality [Mike Rowe believes](#) that nobody else cares more about your safety than you. The traditional mantra of “safety first” can set false expectations that leadership and the process will keep you safe, as long as rules are followed and boxes checked. So we took his words to heart. We were familiar with our home airfield and continued our approach. Our conversation centered on rules and procedures. We tried to recall any regulation that might earn us a meeting with the Skipper for attempting to land. Then, our real-time risk assessment began to take shape on a long straight-in approach. The copilot and I had each accumulated numerous landings to darkened runways in far less hospitable surroundings. But that was a different aircraft type, with night vision devices, and flown by more proficient combat veterans instead of cubicle-weary project officers. We still had another minute or two before touchdown, when I recalled an idea from Gordon Graham’s lecture, [High-Risk Low-Frequency events](#). Graham refers to a phenomenon called Recognition Prime Decision-Making when the brain scans for memory markers. Core critical tasks rely on memory markers from a regular training regimen—to develop a form of reflexes or instinct. In contrast, the brain fails us in less frequent events, when it has no memory markers. In our case, we had additional time to consider the upcoming landing and the additional risk. Our result was an unremarkable landing, but the vignette has relevance to flight test. Safety checklists and hazard analyses are a cornerstone to sound test planning yet the residual risk will always reside with the aircrew. The mere presence of safety briefs, rules, or boxes to check is not enough. Compliance alone does not guarantee your safety. Regular training and rehearsals can ingrain responses to time critical tasks, but **if you have a minute, use it to analyze unfamiliar risk and implement new controls.**

Kurt Pfeffer

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Airshows: A Tail in Two Cities

After takeoff, the C-17 pitches up to over twenty degrees nose high, climbing skyward like a rocket—seeming to defy the laws of physics. A few seconds later, the plane appears to stop in mid-air, rotates about its center, and levels off just a few hundred feet above the ground. I wonder beneath my breath, “Has it even passed the end of the runway yet?” I listen as the pilot announces the next maneuver and watch as the plane banks almost sixty degrees. It may be more. The copilot begins to count down. A few seconds later, a third voice chimes in, “Niiiiice.” The airplane snaps back to wings level. From the tower, you can see the flaps retracting, and the instant they stop moving, the airplane banks again, back toward the tower. This time the bank is steeper. This will place the aircraft just outside of show center for a low pass, from right to left in front of the crowd. Something chimes or buzzes in the cockpit, but the aircrew is silent. A few seconds pass, and a frantic voice says, “Max power! Max power!” I think aloud, “Why did he say that?” The remaining seconds of the video leave me in horror. I see the airplane fall out of the sky and disappear into the tall pine trees beyond the runway. A fireball bursts into the sky and vanishes. The voices of men dying still echo in my head. This tale took place in Alaska, where the crew flew its practice routine for the Elmendorf AFB Arctic Thunder Air Show on July 28, 2010. (Full video is available on youtube.)



(USAF photo)

Just a few days later, the Accident Investigation Board contacted the C-17 test squadron at Edwards AFB and asked me to consult on the investigation. I reviewed data and described my findings. Then they sent the video. An observer stationed at the control tower had recorded the routine for debrief purposes, and the AIB had dubbed the cockpit voice recorder audio over the video. I watched it in disbelief. I listened as four lives ended. It was, literally, the worst of times.

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Airshows: A Tail in Two Cities (continued)
 You already know that in this line of work, **words have the power of life and death**. What the copilot said confused me—it was wrong. He called for max power instead of directing an unusual attitude or stall recovery. I wonder if his instincts and reflexes failed him when he needed “core critical tasks [that] rely on memory markers from a regular training regimen—to develop a form of reflexes or instinct.” Have we—had they—allowed skills to erode that much? I had so many more questions, but most of all, I wondered, “What I would say in such a situation?” Thus I am reminded of another tale from another city. This story has a happy ending, but after I tell it you will understand why I still question.

In 2013, [two HondaJets conducted a formation flight demonstration](#) on Tuesday during the Airventure celebration at Oshkosh. It was an honor to be part of the team of pilots flying the two-ship demonstration. I certainly don’t remember all the details, but I believe we wrote a test plan and held a test safety review board. We also went to a local airport to practice our routine, and the maneuvers were well within the cleared envelope of the aircraft. All of this to say that I think we did our due diligence during the prep for the airshow.

On the day of the show, our routine began with a flawless takeoff in fingertip formation. The routine was going well, just as we had planned, until...until a chime sounded in the cockpit. I hadn’t heard that during the practice routine. Out of the corner of my eye, I could see the red of the master warning flashing...it was the landing gear alert. They were retracted, and we had dipped below 300 ft AGL. As the SIC, I verbalized the cause of the warning to the PIC.



(Photo credit unknown: provided to author in 2013.)

Have you ever wondered if you should have said something? You already know that in this line of work, **words have the power of life and death**. I didn’t say anything else that day, but nothing bad happened. We finished our formation flight routine in front of an amazing crowd at Airventure in world-famous Oshkosh, Wisconsin. It was the best of times. But should I have said something else in the debrief?

Two tales about the intersection of airshows and flight test... So what questions should we ask in the wake of both?

Do we understand why miscommunication happens in the cockpit? If we do, do we report on it appropriately? More importantly, do we learn from it? If miscommunication happens in the cockpit, does it happen in the conference room? Does it have the same consequences? How do we address it in public forums? Do we understand how to have healthy conversation, even conflict, about highly provocative topics? What does the organization say when the team does not address the things it should debrief? Who do we address it to? Can an organization admit “We were wrong”, or does the risk of litigation and liability prevent us from talking about it?

What We Talk about When We Talk about Airshows

The subject of airshows appears frequently in the annals of SETP’s Cockpit magazine: There are 12 papers discussing various aspects of airshows in SETP’s database. (The SFTE database was not available for query at the time of publication.) These range from reports on airshow incidents to discussion of airshow maneuver development, the flight test techniques used to validate maneuvers, altitudes, and energy management parameters. Des Barker (SETP) has written several of these papers as well as an [entire book on the subject](#), and he continues to publish information annually about airshow safety. Barker admits the natural tension between sales and safety: “Flight test demonstration, also referred to as commercial demonstration flying or new product demonstration flights, is as in all cases of exhibition flying, a hazardous activity that is not only important from the commercial viewpoint of “making the sale”, but can be potentially hazardous, having killed many pilots, including highly experienced test pilots, over the years.” Furthermore, FTSC’s Tom Huff believes that test pilots should not conduct airshows. Billie Flynn advocates the opposite position: He believes test pilots *should* be the aircrew to conduct airshow demonstrations. What do you think?

In my opinion, the most important question is this: “Is there a brevity word to alert the team, the department, or the organization that we are headed for disaster?” I don’t think we have shared norms or procedures for talking about these things in the debrief, to commanders and CEOs, and to the general officers writing accident reports. We need the ability to talk to other agencies when we recognize that *the organization* said the wrong thing. Finally, we must be able to verify that the “pilot-in-command” of the organization heard.

Barker’s 2018 Airshow Accident Report

Des Barker has authored more pages about Airshow Safety than I have authored words, and he has teamed with many other members of our community in this endeavor. What he continues to accomplish is simply astounding. He shared his most current Airshow Accident summary report and republishes some of his past papers here: <https://flighttestfact.com/aerial-demonstration-and-flight-test/>.