PREMIUM ON SAFETY

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A MESSAGE FROM USAIG

In February, the NBAA held its well-attended Leadership Conference. At the Air Charter Safety Foundation Safety Symposium in March, Brian Fielkow, CEO of trucking company Jetco, gave a superb talk on "Leading People Safety." I attend many safety forums and it's great to see leadership becoming more frequent on their agendas. While emphasizing procedural compliance at the personal level remains vital, it's at least equally important to recognize leadership's impact on any organization's culture.

Most of us readily see value in boosting competency in our trained specialty. But if a title such as CEO, Department Head, Chief Pilot, Director of Aviation, Operations, or Maintenance has been added to your nameplate (or you hope it will) you have to ask yourself the question: are you acting to grow your skills and knowledge in the art and science of leading people?

I hope so. Enhancing your ability to lead through continuing education can be as interesting and enjoyable a pursuit for you as it is vital to your team's safety. Fly smart and fly safe

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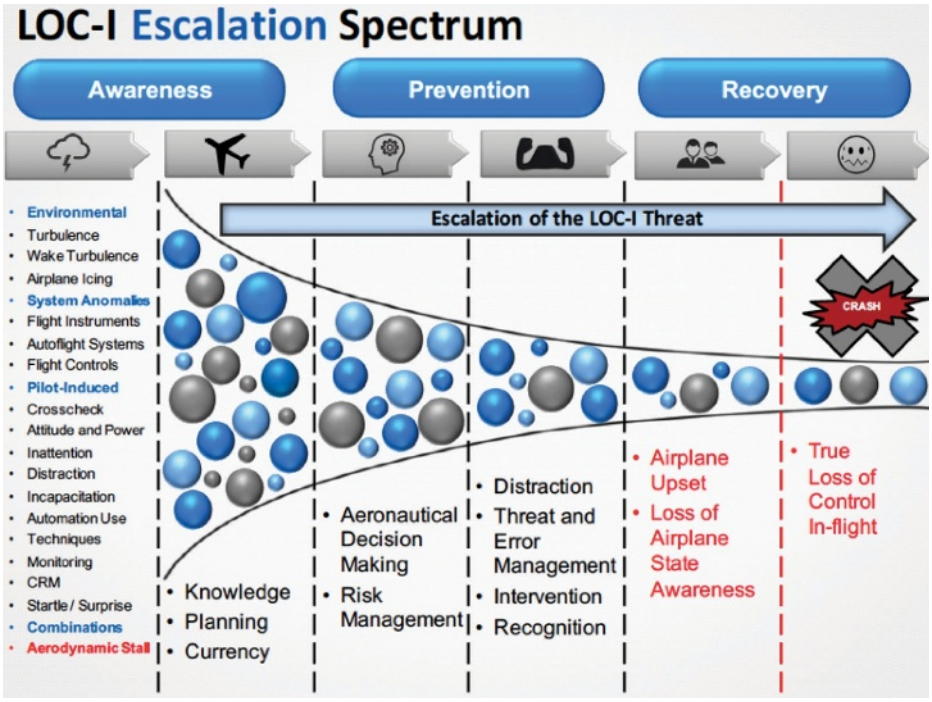
180 Seconds to Impact

BY CLARKE "OTTER" MCNEACE



Yes, this article is about your last 180 seconds on earth. It's about the time after which you, your crew, and your passengers will never enjoy another beautiful sunrise this side of death. Ok, it may sound a bit dramatic but is it really? I mean when you think about the fact that every flight you take could be your last, it's very sobering. Let me ask you: If you knew the last 180 seconds of your life was during your next flight but you had the ability to break the chain of events leading to the impact and stop the clock, when would you want to intervene? Would you want to intervene at the 60 second mark or 180 second mark or before the flight even starts? If you're like me, you would want to intervene as early as possible. If there is one thing I've learned after 38 years of flying and 14,000+ flight hours is that knowing something earlier is way better than later!

The trained pilot is situationally aware and recognizes the developing threat.

SO WHAT'S UP WITH 180 SECONDS?

"180 seconds to impact" is an arbitrary but appropriate amount of time chosen to help us visualize a potential series of events that will happen on a fatal flight resulting in Loss of Control-Inflight (LOC-I). Fatalities caused by LOC-I are now more than twice that of the number two causal factor, controlled flight into terrain (CFIT), and our "180 second window" reorients our mind to the time-critical but realistic series of events leading to a loss of the airplane. In certain situations leading to aircraft upsets, the window for correction may be less than 180 seconds. Once an undesired aircraft state evolves into an actual aircraft upset, the window of action before disaster is much shorter indeed.

When we talk about "Loss of Control-Inflight" most experienced pilots immediately dismiss the idea that we could possibly "lose control" of our aircraft or that our aircraft could be "unrecoverable" in a loss of control event. In my current experience as a full-time upset prevention and recovery training (UPRT) instructor pilot, having trained hundreds of professional pilots in an all-attitude capable aircraft, I find the vast majority of pilots who arrive ready for training believed they were competent but found out they were actually confidently incompetent.

A competent aviator will realize that numerous events, either foreseen or unforeseen, can lead to an unrecoverable situation. The causal factors leading to a fatal accident may begin 180 seconds prior to impact, 120 seconds, or even 60 seconds prior to takeoff. In any case something in the process of flying the aircraft failed to either prevent or recover the aircraft within our arbitrary but time-critical "180 second window." It is simply the case that a well trained aviator can visualize how all events, foreseen and unforeseen, during a flight can eventually lead to our "180 second window."

FORESEEN AND UNFORESEEN

If pilots killed in LOC-I accidents could come back to life to talk with us, they would likely tell us a story of how they ended up dead. They would likely begin their stories with lines such as, "There I was and next thing I knew..." or "When I started my flight, I didn't check such and such..." or "All of a sudden such and such happened and I reacted in such and such a way but I should have reacted like...." Something foreseen or unforeseen happened to the pilot that he was wholly unprepared to handle. In other words, the pilot failed in prevention of the LOC-I event.

All good UPRT should include prevention training. And prevention training begins with awareness. If you look on the left side of the funnel diagram, you will note a long list of causal factors that can lead to a fatal LOC-I event. They are broken into three categories: Environmentally Induced, Systems Anomalies, and Pilot-Induced. All pilots need to be aware of how these factors can escalate the LOC-I threat if not appropriately mitigated before the unrecoverable point. Obviously, foreseen threats are way better than unforeseen threats.

EXCUSE ME, DO YOU HAVE THE TIME?

There are two general types of prevention training. One type is time-favorable

and the other type is time-critical. Looking at the funnel diagram from left to right, causal factors left unmitigated will become more time-critical. Time-favorable prevention revolves around the concept of effective aeronautical decision making (ADM) through analysis, awareness, resource management and intercepting the error chain through airmanship and sound judgment. Typically on the time scale of minutes or hours, a common example would be a situation where the pilot assesses the conditions at an airport prior to descent and recognizes those conditions as being too severe to safely subject the airplane to that environment on approach. Although a simple scenario, the process of using situational awareness to avert a potentially threatening flight condition is an example of prevention through effective ADM.

The other type of prevention is time-critical through the use of proportional counter-response. In simple terms, proportional counter response is the timely manipulation of flight controls and thrust, either singly or in combination, to manage an airplane flight attitude and/or flight envelope excursion that was unintended or not commanded by the pilot. The trained pilot is situationally aware and recognizes the developing threat. The time scale of this element of prevention is typically on the order of seconds, or fractions of seconds, with its goal being to recognize the development of a threatening condition and take avoidance action that is proportional to the degree of the undesired aircraft state to preclude its development into an actual airplane upset. This level of developing upset is full of surprise, and there is often a high risk of the pilot panicking, then overreacting to the event making the situation worse, even generating structural failure in rare instances.

THE CRITICAL WINDOW

One hundred and eighty seconds to impact is an arbitrary amount of time, and if you ask some experts, a generous guess. NASA and Boeing provided insight into the challenge of an aircraft upset event in a paper published in 2004, titled "Defining Commercial Transport Loss-of-Control: A Quantitative Approach." The authors analyzed six different LOC-I accidents involving airline aircraft in the 1990s. They determined precise measures that defined when an airplane exceeded parameters, indicating an upset event, calling these measures their Quantitative Loss-of-Control Criteria.

These Loss-of-Control Criteria were then used to determine how long it took to get from the initiation of an upset event until it was no longer possible for pilots to intervene to prevent exceeding the limitations of the aircraft and losing control of the aircraft in its certified envelope. They gave a name to this period of time, calling it the Critical Window. For the accidents studied, the period of time available to the flight crew averaged a little less than 10 seconds.

In other words, if you end up within the 180 second window because your prevention efforts failed and your airplane has become "upset" you may now only have an average of 10 seconds to recover the aircraft to normal parameters.

What can you do in 10 seconds? Something that you have practiced before, most likely. If the flight controls work in the same

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The Accident that Didn't Happen

Aeronautical Decision Making Done Right

BY RICHARD G. MCSPADDEN, JR.

Safety programs would be so much easier to fund and administer if we could measure the accidents that don't happen. Situations like the one below. The story is familiar, but the ultimate decision, unfortunately, is sometimes elusive.

It's Sunday afternoon, following a meaningful weekend with close relatives. Now there are pressures to get home: jobs, family commitments, and people relying on the pilot to get them there...she always does. The pilot stared at the computer, assessing the situation, and putting the variables in context. The weather is worse than forecast and will likely be IMC for the entire trip; icing is possible at relatively low altitudes; her normal route skirts a small mountain range; her aircraft is heavy; and all her passengers "need" to get home today.

The passengers sit nearby, flipping through magazines, scrolling through their phones, impatient with the delay. They cannot fully comprehend the judgement required and the trust they place in the pilot to assess the situation and make the most important decision pilots make on any flight: to fly or not.

She assesses and re-assesses, checks satellite views, calls weather, and peruses her tablet, realizing, as we all do in those situations, that the information is never as complete as we'd like. It will, as it normally does, come down to pilot judgment. She decides no, they will not go now, and breaks the news to her passengers.

They were disappointed. "What will I do about work"? "What about school"? These are legitimate questions, however not ones that should influence the fly or no-fly decision.

She made the correct decision for her and that aircraft, and the situation that day. That's good piloting...that's safe piloting. Aeronautical decision making is the most critical skill we use, and the one our passengers rarely see. I wish we could measure all of the lives saved and aircraft undamaged because of sound decision-making. It's part of our environment every day.

Richard McSpadden *works with a dedicated and talented team to advance general aviation and enhance general aviation safety at the AOPA Air Safety Institute. McSpadden, a Project Management Professional, came to ASI from Hewlett-Packard, and before that was a Commander / Flight Leader with the United States Air Force Thunderbirds.*

RICHARD G. MCSPADDEN, JR.
EXECUTIVE DIRECTOR, AOPA AIR SAFETY INSTITUTE

180 Seconds...

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manner that they do for us when we are in the normal flight envelope, then 10 seconds is a significant amount of time to alter the flight path or energy state of our aircraft.

But what if we are talking about a counter-intuitive recovery process that we have never performed before...or even seen executed before? In that instance this 10 second period is likely not enough time for a response of any complexity, especially if control functions work differently or have different response than when we are in the normal flight envelope.

What if the 10 seconds that you have to act could be the last 10 seconds of your life? That was the average time the flight crews in the fatal accidents in the NASA/Boeing study had to act to save their own lives, and the lives of all of their passengers. Given the fact that the task that you have to accomplish in 10 seconds may involve maneuvering you have never executed before, the fact that your controls may have different effects than usual, and that your life is on the line, are you willing to bet your life that you will get it right on your first attempt? That is all you may have in an unexpected airplane upset event; one shot.

180 SECONDS TO IMPACT: ENOUGH TIME, OR NOT?

Startle and surprise during an upset event can be incapacitating. As time available to survive goes down, heart rate and panic go up. Without proper preparation to face the life-threatening consequences of an unanticipated airplane upset event, studies and accident statistics show a pilot's chances are not good; there must be a better way—and there is.

Just as pilots learn to safely and consistently deal with such time-critical situations as an engine failure at V1, it is quite possible to teach them to safely and effectively deal with a wide variety of potential upset situations. However, as in the case of engine failures and other emergency procedures, proper preparation and training must take place before the threat is encountered.

Recent guidance from aircraft manufacturers, regulators, and industry organizations have defined proper actions and priorities for upset recovery. Unfortunately, few pilots today practice comprehensive upset prevention and recovery training. Combining aspects of academic, on-aircraft, and simulator training, properly conducted UPRT is focused and tailored for the wide variety of considerations pilots face in dynamic upset conditions.

With proper training the majority of aircraft upsets can be recovered from within the aircraft's certified flight envelope and within the limited time available. The only question is whether the proper training is received prior to a demanding airplane upset and potential loss of control in-flight or not.

The choice is yours.

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