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Keeping an UPRIGHT Attitude

Aviation in itself is not inherently dangerous. But to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity or neglect.

— Captain A. G. Lamplugh, British Aviation Insurance Group

We all love and enjoy aviation, right? So you might be surprised, or even ready to argue, when I say that it pays to be a pessimist in this particular activity. Now that doesn't mean that you have to adopt a grim-faced gloom-and-doom outlook. But, as I hope you learned the very first time you preflighted an aircraft, a healthy sense of "it-*could*-happen-to-me" skepticism goes a long way toward keeping you, your passengers, and your aircraft healthy and whole.

As Rich Stowell suggests in his Pilot-in-*Control* article on page 10, nowhere is that "it-*could*-happen-to-me" outlook more important than in our fight against the leading aviation accident hazard: loss of control—in-flight (LOC-I). Loss of control accidents have been on the constant increase for all categories of flight for the past 25 years. And, if the accidents are on the rise, the number of LOC incidents and unreported events are, no doubt, exponentially higher. That's why countering LOC-I is a focus area for the FAA's 2012 Safety Standdown. No matter how LOC is technically defined or accounted for in accident statistics, the fact remains that pilots—and that means *all* pilots—need to focus harder on staying in control.

UPRT Keeps You Upright

So, how do you pursue staying in control and improve your margin of safety in flying? One answer lies in Upset Prevention and Recovery Training (UPRT)—and if the abbreviation seems like too much of a mouthful, try thinking of it as "UPRight" training.

As with many kinds of aviation training, UPRT requires a variety of skills. The obvious one is physical skill, also known as stick-and-rudder skill. There is no substitute for hands-on practice for knowing how to recover and regain control of your aircraft.

But knowledge and attitudes are important as well. As another aviation cliché so deftly explains, a superior pilot uses superior knowledge to avoid situations that require the use of superior skill. Accordingly, another goal of UPRT is to teach you to maintain awareness of situations that could contribute to LOC and avoid putting yourself in LOC-inducing situations.

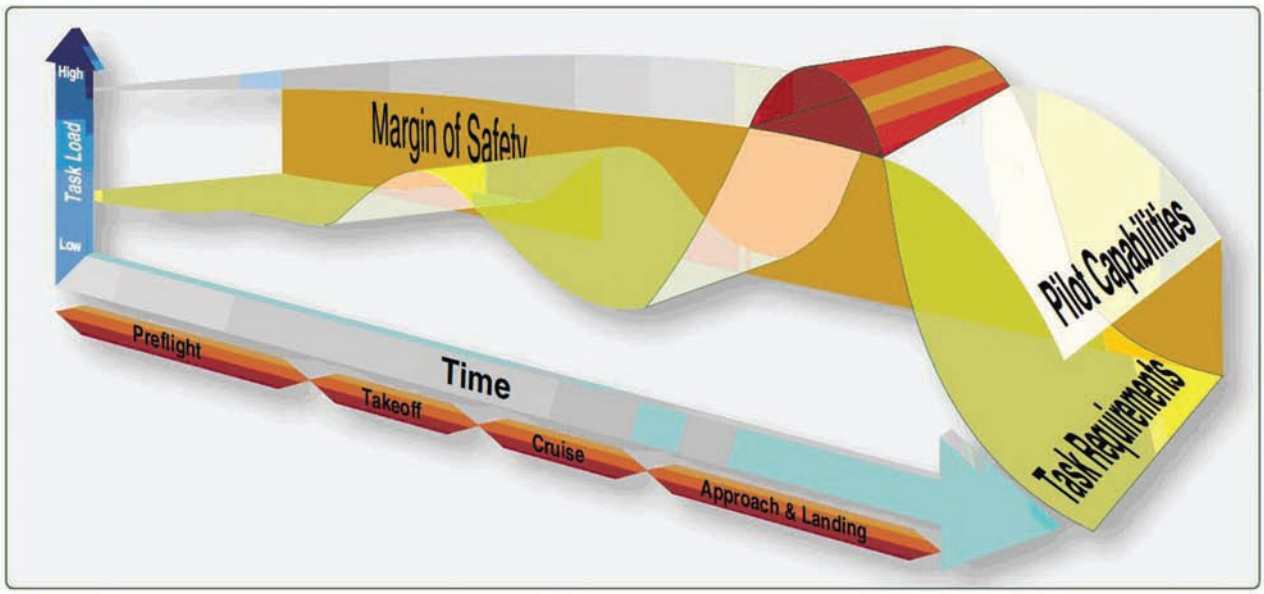
When it comes to awareness, one very important data point is the fact that the margin of safety changes many times throughout a flight. During approach and landing, for example, your task requirements (locating the airport, preparing for an approach to the runway, completing checklists, securing the cabin, etc.) can be significantly greater than the capabilities available to you at the time. Now add the fatigue factor common to the conclusion of any flight, and especially one that was long or replete with weather challenges. This combination of events is precisely how too much workload combined with distractions or other unexpected events (last minute runway change, a go-around, gusty winds, etc.) can lead to LOC.

Research shows that LOC accident pilots often missed, or even ignored, readily available clues and cues that could have prevented the upset or LOC event.

So, with the goal of increasing your margin of safety in mind, let's see how you can develop some of the UP—upset prevention—knowledge, attitudes, and mental habits that will help you avoid LOC.

Clues and Cues

In most accidents or unwanted outcomes, hindsight often reveals a multitude of factors leading up to a potential upset situation. Research shows that pilots often missed, or even ignored, readily available clues and cues that could have prevented



The area in red shows how a pilot's capabilities may be overwhelmed by task demand and reduce his/her margin of safety.

an upset or LOC event. These include such items as icing conditions, flight control malfunctions and wake turbulence. Ultimately, inattention to such clues and cues can lead to inadvertent or deliberate pilot-induced upsets.

The good news is that there are some very practical and straightforward cognitive (thinking) techniques that, if developed into solid mental habits, can help you pay closer attention and more accurately perceive information that could be a precursor to an inflight upset. Human factors scientists who study pilot decision-making have developed a number of models over the years. You may already be familiar with the DECIDE model, an acronym designed to guide the pilot through a series of structured steps you can use to avoid LOC-I. For example:

Detect that a change has occurred (*e.g., aircraft has departed straight-and-level flight*).
Estimate the need to counter or react (*e.g., need to lower pitch and increase airspeed*).
Choose a desirable outcome (*e.g., return to straight-and-level flight*).
Identify actions to control change (*e.g., pitch down, increase power*).
Do the necessary action (*e.g., execute the actions identified in previous step*).
Evaluate the effect of the action (*e.g., confirm resumption of straight-and-level flight*).

For those who find the DECIDE model too lengthy or complex, the FAASTeam has developed a simplified tool: the Perceive, Process, Perform (3P) model. Here's how it works.

Perceive: In order to avoid or mitigate risk factors, you must consciously seek out the clues and cues providing information about yourself and your surroundings. A structured way to perceive is to use the PAVE model to identify hazards associated with the pilot, aircraft, environment, and external pressures. You may have encountered PAVE as a preflight tool, but perceiving clues, cues, and hazards is an ongoing process. Ask yourself: "What am I paying attention to? What am I thinking about? Is my focus where it should be at this point?" Consciously monitor the engine parameters to seek information on the status of your aircraft systems. Look outside for weather, traffic, and UFOs (just seeing if you are paying attention). Though it sounds simple enough, pilots sometimes fail to perceive clues and cues effectively because paying attention takes mental effort and energy. Did you know that actively thinking burns more calories than just watching a video?

Process—Now that you have gathered information about the pilot, the aircraft, the environment, and external pressures, you need to process it. Ask yourself: "How am I doing? How is the aircraft performing? Is the weather as expected? Is there anything that needs to be acted upon? How will the situation be in the future?" And yes, the act of thinking to evaluate and process information also takes mental effort and energy.

Perform—Depending on the outcome of your processing, you may or may not need to act. If all is well, go back to step one and perceive.

Mental Muscle Matters

Now, let's look at an example of how the mental muscle you develop through habitual use of the 3P

model can help you avoid LOC-I. Imagine that you are flying a typical four-place GA airplane. You are approaching your destination airport and preparing for the landing. The controller tells you that you will be following a Boeing 737.

You continue to perceive, looking for the B-737 traffic while you complete your approach and landing checklists. You know from training and experience about wake turbulence, and you consciously bring that knowledge into processing the information ATC has provided about the B-737 traffic. Knowing how quickly a wake turbulence encounter can induce LOC, and how dangerous LOC would be this close to the ground, you determinedly scan until you spot the traffic at your 11 o'clock position. You tell the controller you have both the B-737 and the airport in sight, and acknowledge being cleared to land, number two behind the Boeing. You make a special mental note of the controller's standard "caution wake turbulence" admonition. You further process by reviewing wake turbulence avoidance procedures when winds are calm, as they are on final today.

Now it's time to perform. The B-737 is ahead, just below your altitude and descending. Although your normal procedure is to begin your own descent, you know you need to stay above the B-737 to avoid encountering its wake. With the long runway ahead of you, though, you recognize that you will have plenty of room to remain above the B-737, land "long" (i.e., beyond the larger aircraft's touchdown point), and decelerate with room to spare. You carefully maneuver your aircraft in accordance with what you have perceived and processed, and you land without incident.

Imagine, though, what might have happened had you not used your mental muscle. Let's say that you fail to spot the traffic right away, but you acknowledge landing clearance and continue inbound. You finally spot the B-737—wow, it's closer than you realized. You tell the controller you have traffic in sight and set about with your normal approach and landing configuration and routine. You turn final at 1,000 feet AGL. Your aircraft suddenly rolls a full 90 degrees to the left. Startled, you use your physical muscle—all of it—to wrestle the aircraft back toward level flight… descending all the while. You land (probably not one to brag about) and, still shaking from the near-disastrous LOC, taxi to parking.

Whether you performed correctly or (as teachers like to say) with "areas for improvement," there is a final and important step:

Evaluate—What were you thinking? Where did your decision-making process work, and where did it break down? What will you do differently next time? Using the B-737 example, perhaps you could request a turn for more spacing behind a large airplane. Or you could decide to go around and completely avoid the turbulence threat.

The most important thing is to think it through, either way: a good outcome might be the result of good thinking, but it could also be just lucky—and luck has a way of running out at very inconvenient times. We can have knowledge and perceptions, but fail to process information. We can process information (correctly or incorrectly) and fail to perform, or perform incorrectly. We can evaluate our performance incorrectly and never decrease the probability of having a bad outcome and fail to increase our margin of safety. It is this breakdown in our decision-making that contributes to LOC events, incidents and, unfortunately for some, fatal accidents.

Upset Prevention and Recovery Training (UPRT) can teach awareness and avoidance of situations that contribute to loss of control-inflight.

Stay UPRighT, stay safe, and stay alive!

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Learn More

Special Airworthiness Information Bulletin CE-11-17 on Design Maneuvering Speed
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/dc7bd4f27e5f107486257221005f069d/3c00e5aa64a2827e8625781c00744393/$FILE/CE-11-17.pdf

Advisory Circular 61-67C Stall and Spin Awareness Training
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%2061-67C/$FILE/AC61-67C.pdf

International Committee for Aviation Training in Extended Envelopes
http://icatee.org/

Upset Prevention & Recovery Training Association
http://uprta.org/