TRAINING: LOC-I PREVENTION

HOW AIRLINES TRAIN TO PREVENT UPSETS

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In the airlines, simulator training traditionally has been done on an annual basis, but many airlines are now conducting training in nine-month cycles. The rationale is that the more visits to the sim a pilot can make, the better he or she will be.

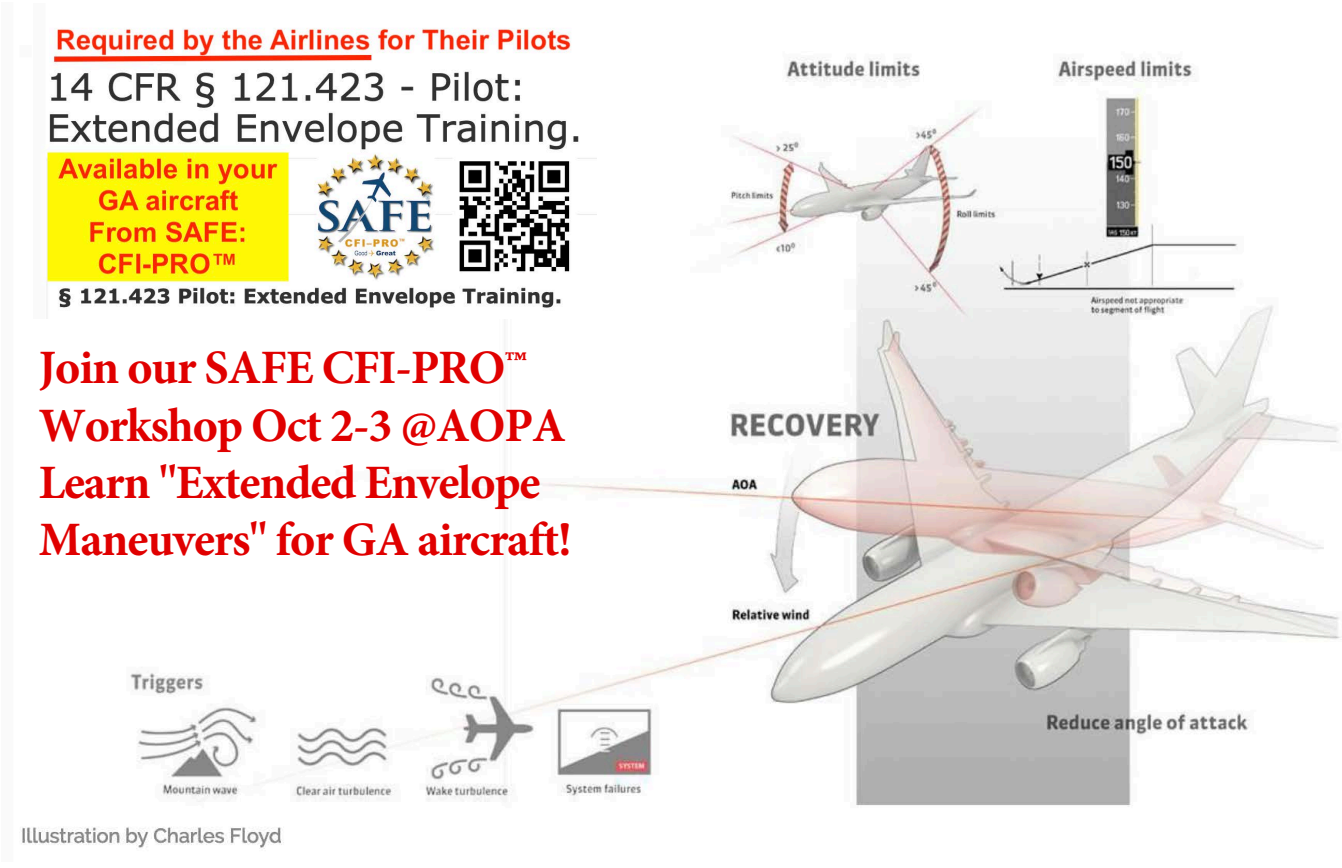

Illustration by Charles Floyd

It gives the operators, in conjunction with the FAA, a chance to introduce more material, to provide more frequent exposure to known trends—and where those trends are not good, to train them out. Also, new procedures can be introduced faster and more feedback can be elicited.

Even so, many airline pilots still operate within a three-month window for training, with the first being "early grace," the second being the base month, and the last being the "late grace." As challenging as it can be to get one-twelfth (about 8 percent) of my airline's pilots into training every month while taking into account vacations—and the need to fly the regular schedule—it's even more challenging to get pilots into the same number of simulators on a nine-month cycle, what with getting new hires trained and pilots changing seats or equipment.

Historically, recurrent training has consisted of V1 cuts, single-engine approaches and go-arounds, wind shear recoveries, controlled flight into terrain (CFIT) scenarios, and a review of items deemed necessary by a review of accident trends. But in light of the Colgan Air Flight 3407 crash in 2009, as well as a few other accidents around the globe, there was a realization that in swinging for the fences, we were missing some singles, doubles, and triples.

It turns out that the real threat was something called loss of control in flight (LOC-I) accidents. Simply put, pilots were stalling and not recovering, or were attempting to recover incorrectly. From 2008 to 2017, LOC-I accounted for 47 percent of all fatalities (with fatalities including people on the ground) and 25 percent of all fatal accidents among the worldwide commercial jet fleet. The Colgan accident is a prime example. The crew attempted to pull the nose up, which aggravated its stall. Air France Flight 447, which crashed into the Atlantic in 2009, is another example, because the crew never seemed to understand their predicament, and therefore never initiated a correct

response.

The LOC-I training I took focused on upset recovery. An upset can be defined two ways. First, it's a pitch attitude that exceeds either 25 degrees nose up or 10 degrees nose down, or a bank angle in excess of 45 degrees. Second, it can be defined as airspeed that is not appropriate for the conditions of flight. The second scenario describes the Colgan flight, as the aircraft slowed to a speed that was not appropriate for the segment of flight, and in icing conditions to boot.

Stalls and upsets can have numerous triggers. Mountain waves, clear air turbulence, wake turbulence, and systems failures all can lead to a stall, to say nothing of inappropriate pilot action (or inaction), which may be because of poor decision making or fatigue. In the past, pilots traditionally have been trained to recover from a stall while minimizing altitude loss. In jet aircraft, powering out of a stall was not an uncommon response at relatively low altitudes.

But now, the big shift in upset recovery training is that the first crew action should be a reduction in the angle of attack. This sounds elementary—and it is—but the shift now is to more forcefully break the aerodynamic stall, no matter what altitude—with the understanding that an altitude loss may be involved. At a few thousand or a few hundred feet over the ground in a large airplane, that takes a certain faith in the process. That makes the simulator the perfect place to train for this.

Upset training also needs to teach processes and steps that can be used at any altitude and attitude. Even when nearly inverted, a push on the nose is the first appropriate response. Think back to your basic aerodynamic training: A stall can occur at any airspeed or attitude. There's no requirement that the airplane be right-side up. The wing(s) can exceed the critical angle of attack even when inverted. Pushing the control yoke forward helps break the stall and also makes the ailerons more effective. We are not flying aircraft designed for extreme maneuvers, and executing the maneuver correctly is critical for not exceeding structural design limits or G loads. This is as true at 35,000 feet as it is at 3,500 feet.

The FAA and the various stakeholders—the airlines, aircraft manufacturers, pilot

unions—all agreed that this training was necessary and overdue. It took some time to develop procedures and a training course, in part because most airlines operate multiple aircraft fleets. American, Delta, and United needed to come up with training that would require very little change in the pilot mindset as they go from, say, a 737 to an Airbus to a wide-body jet.

The course I took consisted of an in-depth look at aerodynamics, especially at high altitudes. Stall characteristics, appropriate airplane systems review, and the proper application of cockpit resource management all were reviewed. The prebrief went even deeper and included a discussion of some well-known accidents in the United States and overseas.

One concept especially hit home for me. The quote, attributed to the ancient Greek poet Archilochus, describes peoples' response when startled: "We don't rise to the level of our expectations, we fall to the level of our training." In this case, the training has to be simple, with repeatable, easy-to-remember steps.

Mission accomplished. This was some of the best, most productive training I've had in a long time, and it will no doubt become a staple of all jet and turboprop training, especially if the expected results materialize.

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