Flying Fundamentals
Upset Recovery Training
Deterioration of basic flying skills has been blamed for a growing number of recent high-profile accidents, and the topic is getting a lot of attention among business aircraft operators.

No pilot likes to believe his or her own skills are lacking, particularly the fundamentals of stalls and coordinated flight that pilots often believe were fused into their DNA in primary flight training. It's always "the other guy" whose stick-and-rudder skills failed when an unexpected upset came out of the blue. Whether it was loss of control at altitude (such as the Air France Flight 447 accident over the South Atlantic) or a fatal reaction to a stall (as in the Colgan Air Flight 3407 crash outside Buffalo, NY), there is a strong inclination to self verify: "That wouldn't happen to me!"

The likelihood of encountering an aerodynamic upset situation while flying a jet or heavy turboprop is very low. But when it happens, that rarity is a big part of the problem. Professional pilots are conditioned to respond predictably to an engine failure, a complex electrical glitch or any of a host of other emergencies because dealing with those incidents is part of the core curriculum in simulator training. Simulators have rendered even the most unusual procedures-related accident scenarios "usual."

But that's not so easy with stall and spin recognition and recovery — skills that often grow dormant over time. There also is evidence to suggest that newly trained pilots aren't getting the same level of exposure to basic flying skills as those who learned in "the good old days." Years of safe flying "by the numbers" in docile transport aircraft can cause seat-of-the-pants flying muscles to grow soft with inactivity. That isn't just an unattractive mental image; it's dangerous.
Sims Not Always a Good Substitute
Randall Brooks is the vice president of training and business development, and also an upset training and spin-recovery instructor pilot for Aviation Performance Solutions (APS) in Phoenix, AZ. He has plenty of experience with both simulators and real-world airplanes. A 12,000-hour ATP-rated pilot and certified flight instructor, he has flown more than 100 aircraft types and maintains type ratings in four turbine-powered aircraft.

“The simulator’s computer uses a manufacturer’s flight-test data to emulate the aerodynamics of the airplane, but data for FAA-defined ‘unusual attitudes’ is missing,” Brooks said. “That is, greater than 30 degrees pitch-up; 10 degrees pitch-down; and 45 degrees of bank. So the simulator can only extrapolate how an aircraft will react to an upset situation.”

Brooks and APS founder Paul Rensbury co-authored a report to the UK’s Royal Aeronautical Society (RAeS) exploring the capability of pilots to recover from loss of control-in-flight situations. Between 2007 and 2008, 115 pilots of varying levels of experience were tested before and after upset prevention and recovery training to evaluate their proficiency. They faced these five scenarios:

- 30-degree nose-low, and 120-degree overbank
- Wake turbulence, aggravated by rapid onset entry to generate a stall response
- Cross-control stall, which included ample, but unheeded, prevention opportunities
- 45-degree nose-high unusual attitude at 10 knots above stall speed
- Control failure: rudder hard over, which simulates 80 percent deflection and jam.

The results were eye-opening. Before upset recovery training (assessed on their first simulator session), only 28.1 percent of the subject pilots were successful in recovering from these scenarios. After training (assessed on their fifth flight), the number increased to 96.3 percent.

Even the most true-to-life, full-motion simulators can’t come close to turning a pilot upside down. So, most agree the best way to prepare for the “unlikely event” of an aerodynamic upset is to go out in a real airplane—and get upset. That’s not practical in the business airplanes most NBAA Members fly for a living, so some stick time in a lighter aircraft is the alternative. The next question is how to maximize this experience. The answer varies from pilot to pilot.

Motivated to Improve Flying Skills
Rich Stowell, 2006 Instructor of the Year and co-founder of the Society of Aviation and Flight Educators (SAFE), teaches upset recovery, and some of his clients are high-time business aircraft pilots who, he says, are facing down a career-long fear of encountering an upset. His clients are there at their own expense, and Stowell said, “Maybe they’ve long known in the back of their minds that they were missing something; or maybe they had an in-flight issue recently that made them question their physical stick-and-rudder proficiency. Either way, it’s usually after one or two flights that it’s confession time, and they’re willing to admit why they came.”

Going beyond upset recovery training and receiving full aerobatic lessons from an expert takes the game to another level. Many well-known airshow performers, including Sean Tucker, Patty Wagstaff, and Michael Goulian, also teach aerobatics, tutoring experienced jet pilots on their upside-down world.

Goulian said, “In many cases, we’re dealing with ex-military pilots who were once very comfortable with unusual attitudes back in the day. But that might have been decades ago. After a few flights, their confidence comes soaring back.”

The important thing to remember, even when the instructor is a marquis performer such as Goulian, is that you’re not there to

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learn how to perform a picture-perfect 16-point roll. “That has nothing to do with it,” he said. “Just as with the training with FlightSafety or SimCom, Executive Flyers [Goulia’s second-generation, family-operated flight school in Massachusetts] has a syllabus. It’s all about flying the program and getting pilots to feel comfortable. If they choose to pursue aerobatics afterwards, that’s fine. But that isn’t what this is all about.”

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Which leads to another issue in upset recovery training for professional pilots. There is some sensitivity to the concern that “upset training” is pilot code for “having a blast flying cool airplanes on the company’s dime.” APS’s Brooks acknowledged that concern and addressed it this way. “Proper loss-of-control training consists of teaching a serious subject seriously. It needs to be sold to company management as addressing ‘holes’ in current training. But, there is the possibility that, as a secondary outcome, you might have some fun.”

APS uses an Extra 300 competition aerobatic aircraft as its platform, and Brooks explained, “We’re training in the domain the pilot requires, based on the airplane he [or she] flies professionally. The numbers on the airspeed indicator won’t be the same as in a jet, but at the operating speeds used in recovery training, that doesn’t make a lot of difference.” He added that the ruggedness of the Extra ensures that the pilot can make any mistake without fear of overstressing the airframe. That enables a comfort level that is essential to the training process.

And for those concerned with their ability to execute high-G aerobatics, all these training providers assure students that pulling G’s is not what the training is for. It’s about ensuring they can more easily recognize an impending unusual attitude, and take the steps to avoid it, or recover. “It’s recognizing how to safely pull out of a nose-low situation, or how to recover from a nose-high situation while losing the minimum amount of altitude,” said Goulia.

Learning in a Military Aircraft

Lee Lauderback, founder of Stallion 51 in Kissimmee, FL, feels his upset recovery program takes the replication a step further for big-iron pilots, using an Aerovodochody L-39 Albatros jet trainer. The former business jet pilot has spent the last 25 years running his flight operation, which primarily focuses on training pilots to fly World War II P-51 Mustangs safely. But for the past five years, Stallion 51 has been developing its own unusual attitude and upset-recovery program, labeled Unusual Attitude Training, or UAT (with an upside down ‘A’ in the company’s logo). Lauderback announced the new initiative at the NBAA Convention in Orlando, FL last October.

The program includes three phases: a ground-school focused on the physiology of how the body reacts to upset situations and how to counteract the false physical sensations of spatial disorientation. The second phase is 1.2 hours of visual flight rules flight training – including defining unusual attitudes, asymmetrical loading, power management, the best recovery techniques and more. Finally, there is an instrument flight rules training regime, including time in the L-39, a Cold War-era Czech-built jet trainer popular among warbird pilots here in the U.S. UAT’s L-39 is equipped with a Garmin GNS530 navigator and G500 electronic flight instrument systems screens in both front and rear cockpits with Dynon standby attitude indicators.

As with most other upset training programs, the aircraft is also equipped with internal and external video cameras for comprehensive debriefings.

NBAA shares the concern over the slow deterioration of stick-and-rudder flying skills within the industry, and supports adding upset training to any business jet pilot’s regular curriculum. While NBAA does not endorse any specific program, Doug Carr, the Association’s vice president, safety, security, operations & regulation, said, “NBAA encourages operators to integrate upset recovery into their training programs.”