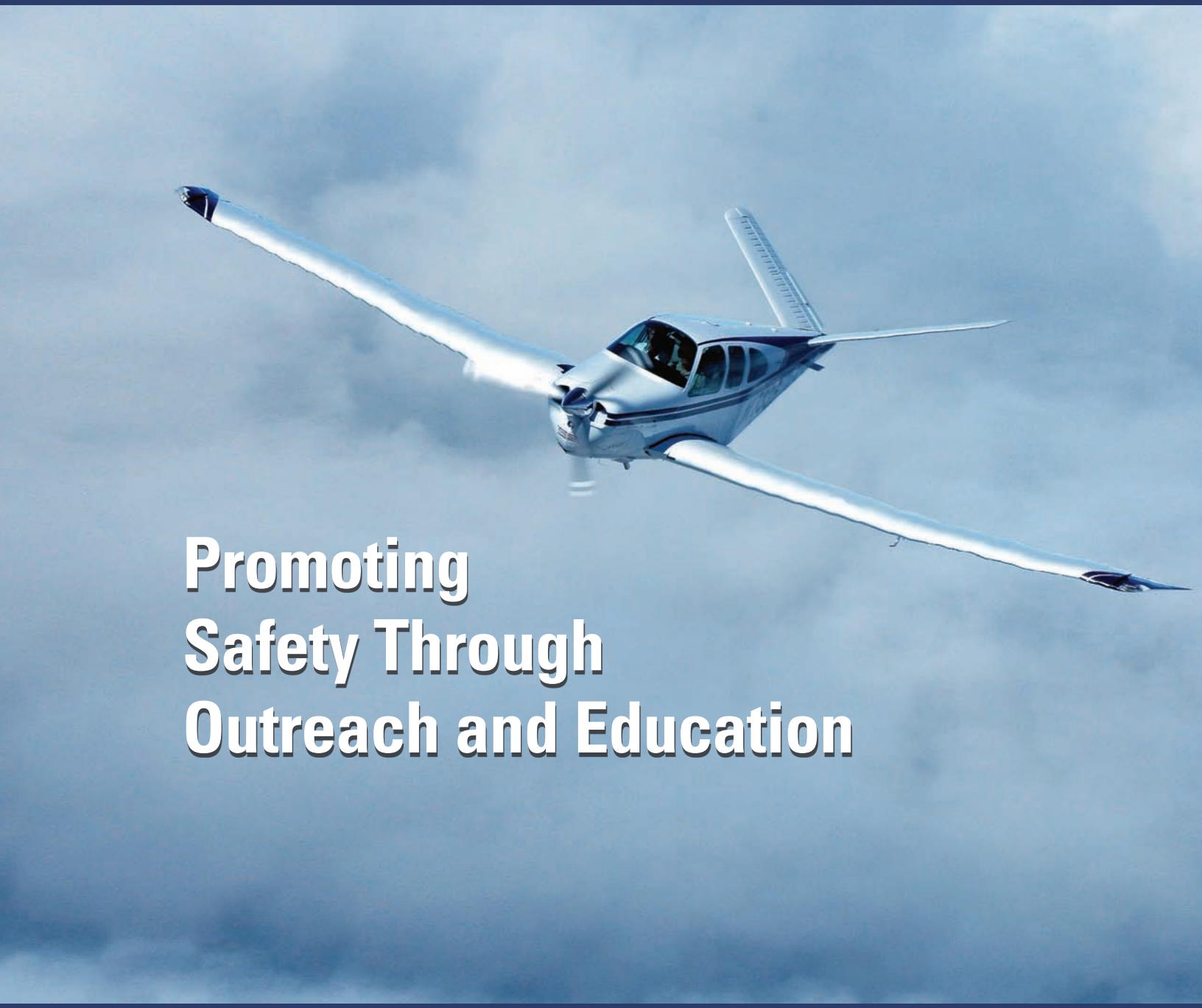
FAA Safety BRIEFING

March/April 2010

Your source for general aviation news and information



Promoting Safety Through Outreach and Education

Federal Aviation Administration

New Name — Same Useful Safety Information

In this issue, we focus on the FAA Safety Team's (FAASTeam) role in promoting safer skies through outreach, training, and education.

Photo courtesy of Adrian Eichhorn

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JOHN M. ALLEN
DIRECTOR, FLIGHT STANDARDS SERVICE

Jumpseat

Introducing *FAA Safety Briefing*

Juliet in Shakespeare's "Romeo and Juliet" didn't think a name made much difference when she asked, "What's in a name?" In love, a name may matter little, but as aviation safety proponents we feel that a safety publication should strongly signal its contents. While this publication has traveled for many years as *FAA Aviation News,* we realize the moniker "aviation news" can cover a lot of territory. Starting with this issue, we are clearly broadcasting our intent and changing the name to *FAA Safety Briefing* to accurately reflect the publication's mission: safety.

As for the next word—briefing—briefings are used in health care, in the military, in aviation, among others. Briefings are essential to get crucial information to key players ahead of time—before the surgery, before the mission, before the flight. That's the point of *FAA Safety Briefing:* Providing you—pilots, aviation maintenance technicians, and more across the general aviation community—with safety information. Through this bimonthly print and online publication we strive to make the GA community aware of FAA resources, help readers understand safety and regulatory issues, and encourage continued training.

The role of *FAA Safety Briefing* is consistent with the FAA's Flight Standards Service mission, which is to enable the commerce and adventure of aviation while assuring safety. For one, commerce is important because aviation is essential to our national economy and to our quality of life. General aviation, which encompasses hundreds of thousands of aircraft operating from the nation's nearly 6,000 public-use and commercial carrier airports, is the foundation of our nation's aviation spirit.

Second, I think you will agree that adventure is essential. It was the prospect of adventure that gave me the flying "bug." So often it is the adventure of aviation that lights a spark and gets a young person started on an aviation career path. Even as we at FAA are serious about our role as regulator and our important safety responsibility, I hope my FAA colleagues remember the passion for aviation that got many of us here in the first place.

Also, the service to the public that aviation provides is instrumental to our economic, governmental, and social fabric. We have a responsibility to enable this facet of aviation and provide our leadership to assure its safety.

This publication is just one of many things that we in Flight Standards do to improve aviation safety. We use every tool we can, starting with developing regulations and providing regulatory oversight. Equally important tools include education and training, information sharing, and working together with organizations across the aviation community.

In addition to *FAA Safety Briefing,* there are a number of ways the Flight Standards Service promotes safety through outreach and education. On the Pilot Training section of the FAA Web site, for example, among many handbooks, you'll find the *Pilot's Handbook of Aeronautical Knowledge.* This handbook introduces pilots to the broad spectrum of knowledge needed to fly in the National Airspace System.

We changed the name of this publication to accurately reflect its safety mission.

Education and outreach is also the role of the FAA Safety Team, or FAASTeam. The FAASTeam includes some 120 FAA safety professionals and more than 2,000 volunteer FAASTeam Representatives across the United States. Read more about the FAASTeam and its cadre of dedicated volunteers in the article on page 7 of this issue.

Of course, Juliet added, "That which we call a rose by any other name would smell as sweet." I trust you'll find this publication—by its new name—as "sweet" and valuable as you develop even greater safety awareness, knowledge, and skills.

ATIS Aviation News Roundup

Deadline Nears for Replacing Paper Pilot Certificates

Pilots who have not yet traded in their paper pilot certificates have only until March 31, 2010, when the paper certificates are set to expire. Renewing a certificate can be done online or through the mail, and instruction can be found at: http://www.faa.gov/licenses_certificates/airmen_certification/certificate_replacement/.

Requesting a replacement certificate online requires you to create an account with Airman Certification Online Services. This only takes a few minutes. Being registered can help you in the future with more rapid processing of an address change or a replacement certificate request.

To process a request by mail, fill out and send in Form 8060-56 (10/09)—see above link—along with a $2 replacement fee. Make your check payable to FAA. New certificates will take four to six weeks to arrive with mail processing and seven to 10 days for online processing.

If you're still using paper, don't delay. Pilots can no longer exercise the privileges of their paper pilot certificates after the deadline. Student certificates are not affected and certain non-pilot certificates, such as those issued to AMTs, are still valid for three more years before they need replacement.

Fire Hazard in Resetting Circuit Breakers

On December 23, 2009, FAA published a Special Airworthiness Information Bulletin (SAIB) advising pilots, owners, operators, and maintenance personnel of potential hazards of resetting an opened circuit breaker (C/B) on general aviation aircraft. This SAIB also gives in-flight recommendations and best practices regarding tripped circuit breakers, inspection and maintenance of systems, and aging wires.

The FAA recommends airplane owners and operators reset *essential* C/Bs in flight only one time:

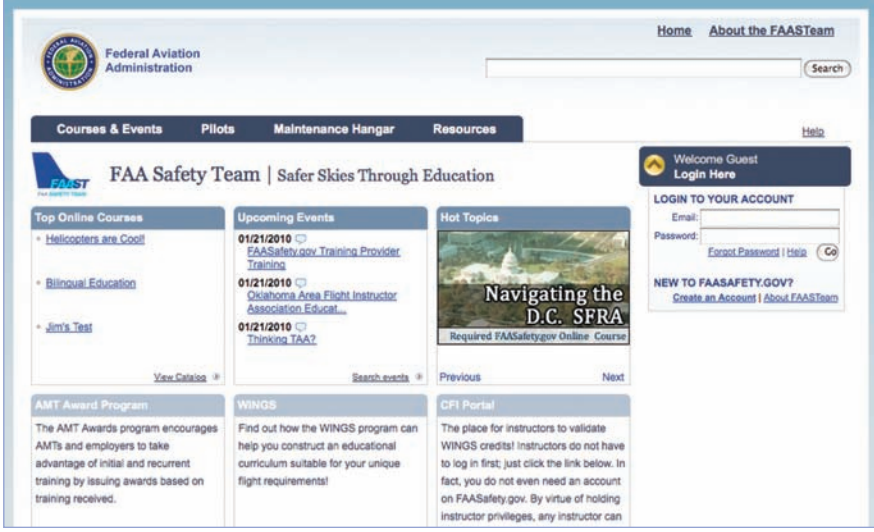
- after at least one minute,
- if there is no remaining smoke or burning smell, and
- if the affected equipment is needed for the operational environment.

Pilots should be aware that tripped C/Bs are not to be reset in flight unless doing so is consistent with procedures in approved flight or operating manuals, or unless it is necessary for the safe completion of the flight. Non-essential C/Bs should *not* be reset in flight. The SAIB also advises maintenance personnel to replace any wires that show evidence of damage. For more information on the C/B reset policy, you can review the SAIB at: http://www.faa.gov/aircraft/safety/alerts/SAIB/ and Advisory Circular 120-80, In-flight Fires, which is available at: http://www.faa.gov/regulations_policies/advisory_circulars/.

New Look for FAASTeam Web Site

After several months of reviewing feedback from the GA community, the FAA Safety Team (FAASTeam) is starting a new chapter in online aviation safety education with a new and improved version of www.FAASafety.gov. "We listened to airmen," says National FAASTeam Manager Kevin Clover, "and built this site with their needs in mind." Among the more noticeable changes is the creation of user-oriented and support portals, which help airmen and visitors navigate more efficiently. Users can choose from online courses, upcoming events, the WINGS and AMT Awards Programs, as well as view Hot Topics.

"There's also a big emphasis on CFI input with this new version," says National FAASTeam Outreach Manager Bryan Neville. "While we prefer that instructors register on www.FAASafety.gov,



The FAASTeam listened to airmen before designing the new Web site.

CFIs can more easily review and validate WINGS credits through the new CFI Portal, without even needing an account."

Neville says other changes for the site include more intuitive menu features, an improved search function, as well as a design more consistent with the branding of www.faa.gov. "We will continue to monitor feedback on the site," says Neville, "so please send your comments to Support@FAASafety.gov."

Stand Down at Sun 'n Fun

Sun 'n Fun's vision is to motivate more people to become involved in aviation. From its beginnings in 1974 to its status as one of the world's largest fly-ins, Sun 'n Fun continues to delight aviation enthusiasts every year from its base at Lakeland Linder Regional Airport in Lakeland, Florida. This year's fly-in, which boasts more than 5,000 static display aircraft, will also serve as the launching point for FAASTeam's Safety Stand Down, a safety and education initiative designed to improve GA safety.

The Stand Down will focus on four key areas: loss of control, surface safety, owner-performed maintenance, and risk management. Getting the word out on these important topics will be accomplished via live and Webcast presentations at Sun 'n Fun, online resources at www.faasafety.gov, and a special DVD that will be distributed nationwide. Sign up today on the FAASTeam Web site—www.FAASafety.gov—to get more information about the Stand Down and to be notified about other FAA-sponsored events and seminars.

NOTAMs Enter the Digital Age

The FAA is transitioning to digital flight operations information and the modernization of *Notices to Airmen* (NOTAM). NOTAMs currently provide timely information about hazards and changes in aeronautical facilities, services, and procedures in paper format. This system involves manual validation and coordination with multiple sources.

The benefits of migrating to a digital NOTAM system include:

- reducing human error
- allowing more timely and accurate distribution of information
- standardizing content, policy, and procedures
- balancing diverse customer needs

"We expect to issue a NOTAM policy change in 2010 that will move us closer to standardized NOTAMs and ICAO compliance," says FAA Systems Operations Manager Dr. Brett Brunk. "As part of this policy change we will introduce keywords that will begin standardizing the way we communicate NOTAMs to the public." The keywords make it easier to identify the topic of the NOTAM so pilots can more quickly and accurately determine which ones will affect their route of flight.

The FAA began testing digital distribution of NOTAMs at selected ATC facilities in January, including control towers at the Denver, Amarillo, Tallahassee, Las Vegas, and Boise airports. "As airports go online," says Brunk, "the GA pilot will notice higher quality and more timely NOTAM information."

For latest updates on digital NOTAMs, check out http://notams.aim.faa.gov.

Stay Aware of Intercept Procedures

If your aircraft is perceived as a security threat you can be strongly advised—by a military fighter—to change course. These procedures, found in Chapter 6-3-4e, Special Emergency (Air Piracy), of the *Aeronautical Information Manual* (AIM), authorize military interceptors to force what could be an uncooperative and/or situationally unaware pilot to turn away from protected airspace. The maneuver puts the military fighter in close proximity to the intercepted aircraft as the fighter attempts to get the attention of the GA pilot and turn the aircraft to a non-threatening course.

To avoid tangling with any military escorts in protected airspace, review any and all NOTAMs applicable to your flight at: https://pilotweb.nas.faa.gov/index.html.

FREDERICK E. TILTON, M.D.
FAA FEDERAL AIR SURGEON

Aeromedical Advisory

Strap In, Buckle Up

Many cities and states around the country "encourage" use of automobile safety restraints with billboards that urge drivers to "Click It—or Ticket!" The FAA doesn't use such slogans, but we do require the use of seatbelts and, if installed, shoulder harnesses. In this issue of the magazine, which focuses on the FAASTeam's Safety Stand Down activities, it is appropriate to offer a few reminders on how proper use of these simple safety systems can save lives.

Small Investment, Big Dividends

We all try to maximize the convenience, fun, and safety of flying. Regrettably, there may be times when our best efforts for a safe flight will be inadequate, and an accident could happen. While most accidents are minor and pose no significant risk to the airplane or its occupants, some can result in major injuries or fatalities. However, studies of serious accidents have shown that the proper use of shoulder harnesses, in addition to the safety belt, would reduce major injuries by *88 percent* and reduce fatalities by *20 percent*.

If your airplane is not equipped with shoulder harnesses, you should obtain kits for installing shoulder harnesses from the manufacturer.

Shoulder harnesses have been required for all seats in small airplanes manufactured since December 12, 1986. If your airplane is not equipped with them, you should obtain kits for installing shoulder harnesses from the manufacturer or the manufacturer's local sales representative.

Proper Use Is Key

Federal regulations require that safety belts and shoulder harnesses (when installed) be properly worn during landings and takeoffs. If the restraint is not worn properly, it cannot provide full benefits and can even cause injury in a serious impact.

Tests have shown that slack in the restraint system should be minimal. In an impact, your body keeps moving until the slack is taken out of the restraint, but then must be abruptly stopped to "catch up" with the airplane. The restraint should be adjusted as tightly as your comfort will permit to minimize potential injuries.

The safety belt should be placed low on your hipbones so that the belt loads will be taken by the strong skeleton of your body. If the safety belt is improperly positioned on your abdomen, it can cause internal injuries. If the safety belt is positioned on your thighs, rather than the hipbones, it cannot effectively limit your body's forward motion.

Shoulder harness systems can use dual shoulder belts or a single diagonal belt similar to those used in automobiles. The belts should not rub against your head or neck. This is uncomfortable, will discourage use of the shoulder harness, and can also cause neck injuries during an impact.

For maximum protection and safety, small children should be placed and secured in approved "child safety seat" devices during aircraft operation. Child safety seats must meet current manufacturing and identification requirements of the federal government and be installed and secured in accordance with these regulations. Install the safety seat in a rear airplane seat, but not near an entry door or emergency exit. If you must use a front airplane seat, make sure that the child seat cannot interfere with the airplane controls or limit pilot access to the radios and flight instruments.

For more information on this topic, please see the pilot safety brochure "Smart Protection in Small Airplanes" at: www.faa.gov/pilots/safety/pilotsafetybrochures/media/seatbelt_web2.pdf.

Dr. Tilton received both an M.S. and a M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Dr. Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation *560 XL.*

Fast-track Your Medical Certificate

With FAA MedXPress, you can get your medical certificate faster than ever before.

Here's how: Before your appointment with your Aviation Medical Examiner (AME) simply go online to FAA MedXPress at https://medxpress.faa.gov/ and electronically complete FAA Form 8500-8. Information entered into MedXPress is immediately transmitted to the FAA and forwarded to your AME before your medical examination.

With this online form you can complete FAA Form 8500-8 in the privacy and comfort of your home and submit it before scheduling your appointment.

The service is free and can be found at:

https://medxpress.faa.gov/

DR. WARREN S. SILBERMAN

Ask Medical Certification

Dr. Warren Silberman and his staff administer the aeromedical certification program for about 600,000 holders of U.S. pilot certificates and process 450,000 applications each year. If you have questions for Dr. Silberman to address in future columns, send them to the magazine staff at AviationNews@faa.gov, and we'll gladly forward them on a totally confidential (anonymous) basis.

Q: My son has attention deficit disorder for which he takes medication (Ritalin). Will he be able to take flying lessons?

A: Regulations aside, anyone considering flight training who has problems concentrating or multitasking should evaluate whether they are fit to perform the duties of pilot in command (PIC). Being PIC requires deliberate responses to situations (not just quick reactions), and critical decision-making capability. A lack of attention is not compatible with being PIC—even someone with a clean medical who is temporarily suffering from a problem that affects his/her ability to focus, for example, head cold/headache, fatigue, personal stress. Not only is the condition attention deficit disorder unacceptable to gain medical certification, so is the medication Ritalin.

Send your question to AviationNews@faa.gov. We'll forward it to Dr. Silberman without your name and publish the answer in an upcoming issue.

Q: I've found that I need to snack frequently during the day to avoid that "loopy feeling." Recently, my doctor told me that I am mildly hypoglycemic. Is this a condition that could invalidate my third-class medical certificate?

A: Be careful. Hypoglycemia (low blood sugar) is a serious condition that can be a symptom of diabetes, which requires treatment. However, people without diabetes can also experience hypoglycemia for various reasons. Discuss this with your AME. For more information on hypoglycemia, see http://diabetes.webmd.com/tc/hypoglycemia-low-blood-sugar-topic-overview. For information on FAA policy on insulin-treated diabetes, see http://www.faa.gov/licenses_certificates/medical_certification/specialissuance/diabetes/.

Q: I had successful coronary bypass surgery last year following a heart attack. The treatment is ongoing, but I've had no further symptoms. I am not a pilot but would like to begin flight training. Can I get a third-class medical certificate with my surgical history, or should I avoid the medical certification process altogether and seek a sport-pilot certificate instead?

A: It is entirely possible to obtain a third-(or even a second- or first-) class FAA medical following successful heart surgery, but be prepared to jump through a few hoops. Whether your application is approved depends a great deal on what, if any, medications you are taking, as well as on the results of an ECG and stress test.

If you choose to seek a sport-pilot certificate using a valid driver's license instead of an FAA medical certificate, you still must abide by Title 14 Code of Federal Regulations section 61.303(b)(4). It says you must "not know or have reason to know of any medical condition that would make that person unable to operate a light sport aircraft in a safe manner."

For guidance from FAA's Medical Certification Branch on coronary diseases, see http://www.faa.gov/licenses_certificates/medical_certification/specialissuance/coronary/.

Warren S. Silberman, D.O., M.P.H., manager of the FAA's Aerospace Medical Certification Division, joined the FAA in 1997 after a career in the U.S. Army Medical Corps. Dr. Silberman is Board Certified in Internal Medical and Preventive/Aerospace Medicine. He is a Fellow of the American Osteopathic College of Internists, American Osteopathic College of Occupational and Preventive Medicine, and the Aerospace Medicine Association. He is a private pilot with instrument and multi-engine ratings and holds a third-class medical certificate.

MEREDITH SAINI

Keeping Pace with the FAASTeam

Photo by James Williams

It doesn't matter if you have five hours in a single-engine trainer or 10,000 hours in a business jet—every pilot can benefit from a mentor, especially experienced aviators who have local knowledge and are available to answer questions and offer guidance and support. Nor does it matter if you are a long-time mechanic and got your A&P years ago, you can always benefit from recurrent training.

Photo by H Dean Chamberlain

Photo by James Williams

"Continuous education and improving safety: That's the focus of the FAA Safety Team," says Kevin Clover, National FAA Safety Team Manager. And, the FAA Safety Team, or FAASTeam, is indeed a team. Team members encompass some 120 FAA employees and 2,000 volunteer Representatives in all 50 states and Puerto Rico. The primary emphasis is pilot education through seminars and online training. For aviation maintenance technicians, the AMT award program reinforces and promotes a high level of professionalism and safety.

The focus of the FAA Safety Team: Continuous education and improving safety.

FAASTeam members deliver about 2,500 seminars a year. Each of FAA's eight Flight Standards regions has a dedicated regional manager who oversees anywhere from five to 25 FAASTeam Program Managers (FPM). It's the FPMs who oversee the volunteer Representatives. The goal is to offer programs that target specific subject areas based on the safety issues in that geographic area. For example, a Representative in Colorado may organize seminars about mountain flying, while a Los Angeles area Representative may focus on instrument flying and the dangers of VFR-into-IMC encounters.

While topics for educational programs are initiated at the local and regional level, the FAASTeam's Data Analysis Work Group, based in Lakeland, Florida, also generates training topics by analyzing general aviation accident data. The data is organized according to category and class of the aircraft and pilot certificate level and guides the development of educational programs. Analysis of this data collected over several years reveals the five primary causal areas of general aviation accidents:

- Aeronautical decision making
- Aircraft performance and limitations
- Approaches and landings
- Aircraft control (maneuvering flight)
- Preflight planning

"We recognize that we can reach out and help people understand risks," says Bryan Neville, National FAASTeam Outreach Manager. "Our representatives, through seminars and personal contact, can help other pilots evaluate the risk factors associated with flying, so that they have the confidence to make the correct go or no-go decisions."

Clover reports industry participation is critical to the team's success, providing volunteers with crucial resources and materials to deliver timely, high-quality programs. FAASTeam partners include not-for-profit aviation membership organizations, such as The Ninety-Nines, the National Association of Flight Instructors (NAFI), and the Society of Aviation and Flight Educators (SAFE), as well as for-profit aviation service providers, including Avemco Insurance Company and Aviation Supplies and Academics (ASA).

In addition to sponsoring live seminars, the FAASTeam reaches thousands of pilots, mechanics, and technicians through its Web site, www.FAASafety.gov, as well as through regular e-mail notifications to more than 300,000 subscribers—a list which includes half of all U.S. pilots. The WINGS program is now administered onwww.FAASafety.gov, which makes it easier for participants to record and track their progress.

Safety Starts with Sharing

Kent Lewis is extremely passionate about sharing safety information with the aviation community. The 2009 National FAASTeam Representative of the Year, Lewis has volunteered as a FAASTeam Representative in the Fort Worth, Texas,

Photo by James Williams

Kent Lewis receiving his FAASTeam Representative of the Year award from Administrator Babbitt at AirVenture® 2009.

area since 2003. Lewis currently works for Delta Air Lines, with more than 23 years of flying experience, and also serves as a safety representative for the Air Line Pilots Association (ALPA). He is an active general aviation pilot who helps deliver new and used Cessnas for Van Bortel Aircraft at the Arlington Municipal Airport in Arlington, Texas.

"We all get safety information, but we could be better about sharing it," Lewis says. "How do we get it to where people can use it and apply it?" To this end, he maintains a Web site called Signal Charlie (www.signalcharlie.net), which focuses on promoting the use of safety management systems (SMS), aviation leadership, and the study of human factors in aviation. Lewis has orchestrated dozens of programs on human factors and SMS and is partnering with the FAASTeam to host a two-day WINGS seminar at Dallas Love Field on March 31.

As Lewis explains on the Web site, "When trying to decide on a name for the site, I remembered my naval aviator days and the code words from the carrier, 'Signal Charlie,' which meant that the flight deck was ready for landing ops. This was always a welcome message, especially after a long flight. The Charlie signal flag also means 'Affirmative' and this represents the proactive nature of a quality safety management system, the future of aviation safety. SMS pillars are policy, risk management, assurance, and promotion. In SMS, people nurture partnerships that promote operational goals and safety. Positive communications fuel these partnerships, and Signal Charlie is meant to be a vehicle for critical team communications."

For pilots who can't get to a regional FAASTeam seminar, Web-based training offers a convenient and economical alternative. Retired airline pilot Gene Benson, a volunteer from upstate New York, uses his Web site (www.genebenson.com) as a platform to host online seminars, also known as Webinars. "My wife calls it my ministry," he explains. "Webinars have a tremendous capability to get the safety message out."

Benson designs and develops all of the material for the Webinars, which he offers for free or for a modest $2.00 fee. For example, two programs were scheduled for January. The first program, "How to Prevent Little Problems from Becoming Big Problems," demonstrated how airline-type procedures for dealing with abnormal situations can be easily adapted for use in general aviation. The Webinar lasted under two hours and was worth one credit toward the first phase of the WINGS program.

The second program, "Why Did They Do That; Human Factors in VFR Accidents," examined accidents involving pilots who ran out of fuel or whose airplanes lost power due to fuel contamination. Using actual accident photos and computer recreations, the discussion explored how the accidents might have been avoided through the use of risk-management tools. This program lasted about one hour and was worth half a Knowledge Elective WINGS credit. Benson plans to offer monthly half-credit Webinars.

The main purpose of the WINGS program is to give pilots an incentive to maintain proficiency, not just currency.

"It's not airplanes that cause accidents; people cause accidents," Benson says. He recalls a friend who crashed a *King Air* into the side of a mountain during an instrument approach. "Pilots are not dumb; they are smart people. We just sometimes do dumb things. Most accidents are caused by a pilot doing something when they knew better. It all comes down to pilots making good decisions."

Earning your WINGS

The main purpose of the WINGS program is to give pilots an incentive to maintain proficiency, not just currency. To sweeten the deal and encourage participation, the FAA relieves pilots, who participate in WINGS, from completing the flight review requirements of Title 14 Code of Federal Regulations (14 CFR) section 61.56(e). See page 10 for more information on WINGS.

Ellen Nobles-Harris, a FAASTeam volunteer since 2006, has actively participated in the WINGS program since she and her husband earned their private pilot certificates in 1991. She says WINGS is an important program for pilots because it encourages safety consciousness, which as a former

WINGS - Pilot Proficiency Program

The WINGS - Pilot Proficiency Program is designed to help individual pilots construct an educational curriculum suitable for their unique flight requirements. It encourages pilots to continue their aviation educational pursuits and requires education, review, and flight proficiency in the Areas of Operation found in current Practical Test Standards (PTS), which correspond with the leading accident causal factors.

"As an active pilot of single- and multi-engine aircraft as well as gliders, I understand the importance of recurrent training. I had participated in the "old" WINGS Program but was skeptical when the FAA launched the new program nearly two years ago.

However, after I began participating in the new program I quickly realized what an exciting, robust, and easy-to-use program it really was. I can easily customize it for the type of flying that I do. I enjoy taking quality safety courses in the comfort of my home that result in me being a better and safer pilot. It's a bonus when my insurance company takes a 10 percent discount off my premium! Tracking my progress and achievements reminds me that aviation learning is an ongoing endeavor, and best of all, it's free!

Completing a flight review every two years might make me legal, but I owe it to my students, passengers, and family, to be proficient, not just current.

— Todd Cameron

Why Participate?

- The greatest incentive to participate is the added level of safety and professionalism that comes with a consistent recurrent training program.
- Aviation insurance companies provide a discount on premiums for participation in WINGS, e.g., 10 percent from Avemco.
- Pilots participating in WINGS need not accomplish the flight review requirements of 14 CFR part 61 (formerly the Biennial Flight Review), if they have satisfactorily completed or currently hold the first phase, or higher, WINGS.
- Avemco Insurance Company provides airmen who have completed a phase of WINGS with the official WINGS lapel pin.

Find out more about the FAA Safety Team and about WINGS at www.FAASafety.gov.

chemical engineer at an oil refinery for more than 30 years, is a subject near and dear to her heart.

"Aviation is a lot more than getting in an airplane and flying someplace," she says. "It's about being part of a community of people with similar goals." In addition to her support of the FAASTeam, Nobles-Harris has held various volunteer positions with her local chapter of The Ninety-Nines, an international organization of women pilots.

A few years ago, Nobles-Harris prepared a WINGS "cheat sheet" to guide pilots through the online documentation process, which continues to evolve. Pilots can get up-to-date tips on the WINGS program from the FAA's official WINGS blog at faawings.blogspot.com.

"I'm hoping more people will get more comfortable with the Web site," Nobles-Harris says. "It's not a quick transition, but your comfort level will increase as you work with the Web site."

Nobles-Harris suggests reaching out to your children or grandchildren if you need a computer assist. "This is a good way to bond and get them interested in aviation at the same time," she says.

Getting Involved

If you decide after reading this article that it's time to take charge of your own proficiency and safety, the first thing you should do is visit www.faasafety.gov and sign up for a free user account. Browse the course catalog and test your knowledge. Take the plunge and participate in the WINGS program, and, if you really want to get involved, become a FAASTeam volunteer. Kent Lewis, Gene Benson, Ellen Nobles-Harris, and 1,997 other folks all recommend it.

Or, do something really crazy: Skip poker night one month and attend a safety seminar instead. You probably won't win any money there, but you just might learn something about flying that could save your life—and that's priceless.

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Photos by James Williams

MEREDITH SAINI

Flying by the Numbers

A PRECISE APPROACH TO LANDING

During those first few hours of flight training, a student pilot is asked to memorize lots of numbers—airspeeds, power settings, runway headings, and traffic pattern altitudes for local airports, to name a few. In the approach and landing phase of a flight, airspeed numbers carry particular significance because minding or ignoring them can mean touching down safely on the intended point or overshooting and ending up in the weeds.

Then, just when the student has dutifully memorized the published numbers, it's time to learn that sometimes they are adjusted to handle a particular situation. For instance, final approach is flown a *little bit* faster on a gusty day to compensate for the variable wind.

But, how much is a little bit? Why do these numbers matter anyway? Why can't we just fly like the old timers did, by the seat of our pants, and not worry so much about all of these numbers?

The truth is that the more experience a pilot accumulates, the easier it is to control the airplane by feel because the numbers become, in a sense, ingrained in how we fly. We don't need to look at the tachometer while setting the throttle because we just know, using our tactile, visual, and auditory senses, that everything is configured properly. We set the power and pitch and then scan the instruments to confirm that we got what we asked for. Even while flying on instruments, we don't fixate on the airspeed indicator or the power setting—our primary focus is on the numberless attitude indicator, just as a student pilot's primary focus is directed outside the airplane, at the earth and sky.

Final Approach and Vref

To understand how final-approach airspeed is determined for a given airplane, we have to start with the landing—the stall, the moment the airplane stops flying—and work the problem in reverse, back up the final-approach course. In a general sense, the speed at which we want to fly the final approach is some airspeed above the stalling speed that will let

Photo by Meredith Saini

us stay aloft while we descend toward the runway, but not have so much excess lift that the airplane will not stop flying when we want it to touch down.

Part 23 of Title 14 Code of Federal Regulations (14 CFR), which deals with aircraft certification, states that "for normal, utility, and acrobatic category reciprocating engine-powered airplanes of 6,000 pounds or less maximum weight, the reference landing approach speed (Vref) must not be less than the greater of Vmc, determined in 14 CFR section 23.149(b) with the wing flaps in the most extended takeoff position, and 1.3 Vso."

A common memory aid for Vso is that it is the stall speed with "stuff out," meaning landing gear and flaps extended. The regulations define Vref as "the speed of the airplane, in a specified landing configuration, at the point where it descends through the 50-foot height in the determination of the landing distance." You may have heard pilots refer to this point in the landing approach as when the airplane is "crossing the fence" or "over the numbers." This is typically the point at which power is reduced, perhaps all the way to idle, and a smooth transition begins from a descent, to a level off, flare, and, finally, touchdown. (Vmc, or minimum control airspeed with the critical engine inoperative, refers to airplanes with more than one engine. For simplicity and brevity we'll limit discussion in this article to single-engine operations.)

Why can't we just fly like the old timers did, by the seat of our pants, and not worry so much about all of these numbers?

Typically, we fly final approach at some airspeed greater than Vref, because in many light airplanes, Vref is just not a comfortable place to be. It's too slow; it feels mushy. The manufacturer's recommended final approach airspeed gives the pilot a generous cushion above the stall that allows for the bit of gentle maneuvering that is necessary to keep the airplane aligned with the runway centerline.

The pilot operating handbook (POH) for the 2001 Cessna 182S that I fly shows that Vso at maximum takeoff weight, zero-bank angle, is 35 knots indicated airspeed at the most rearward center of gravity (CG) and 36 knots at the most forward CG position. Assuming that the average pilot cannot reasonably discern a one-knot difference, we'll use the higher number of 36 knots which, when multiplied by 1.3, produces a Vref of 46 knots. But, as any Cessna 182 pilot will attest, you can't reasonably expect to fly final approach in this airplane at 46 knots. The POH suggests a final approach airspeed range of 60-70 knots with full flaps, which is closer to 1.9 Vso.

The Art of Interpolation

The numbers published in the POH were generated by an FAA-approved team of engineers and test pilots through a rigorous aircraft-certification process. These numbers exist to give the pilot a framework within which to create a stabilized approach and landing, but we need to read the fine print in order to use these numbers effectively.

Stall speeds and final approach speeds are generally published for the airplane at or near maximum gross weight. Yet, we rarely land an airplane when it's that heavy, because presumably we have been flying around for a while, burning avgas at the rate of six pounds per gallon per hour. We know that an airplane's stall speed increases with an increase in weight (or with an increase in load factor, such as during a turn; see "Getting It Right in Maneuvering Flight" on page 15), so this means that the actual Vso at the moment of landing is likely to be something lower than what's listed in the POH. Turning the problem upside down, we can say that most of the time we have a greater margin between the airplane's actual stalling speed and our final approach airspeed than what the POH would suggest.

The benefit of this wisdom is that if we follow the numbers and maintain the POH-suggested airspeeds for each phase of flight, we are in a position to make a stabilized approach and landing. The danger is that if we routinely tack on 5 or 10 knots under the false assumption that faster is always safer, we may be setting ourselves up for a go-around at best, or a very hard landing at worst.

The Gust Factor

One of the few times we want to fly faster than published on final is if it's a really windy, gusty day. The FAA *Airplane Flying Handbook* (FAA-H-8083-3A) recommends adding one-half of the reported surface-wind gust to the normal final-approach airspeed when landing in turbulent conditions to compensate for any sudden loss of headwind component. But, why not add the whole gust amount, or double it? Why add anything, if the published final approach airspeed already has a built-in cushion above the stall?

The simple answer is that gusts are variable and unpredictable, and we want to ensure that we can outsmart them by carrying enough speed to get us to the pavement safely despite them. The airspeed indicator can fluctuate wildly and be difficult to read on days when we're getting batted around like a beach ball, so we'd rather overestimate our airspeed than underestimate it and risk a stall. If we discover during the approach that adding half the gust factor to our speed on final was too much and we end up too high and too fast, we can go around and try the approach again at a slightly slower airspeed.

The POH for the Cessna 182S states "normal landing approaches can be made with power on or power off with any flap setting desired. For a short-field landing in smooth conditions, make the power-off approach at 60 KIAS with full flaps. (Slightly higher approach speeds should be used under turbulent conditions.)" For normal landings on longer runways, final approach should be flown at 70-80 knots without flaps, or 60-70 knots with full flaps. Though the POH does not suggest what flap setting to use in turbulent air, it leaves the door open for the pilot to use any flap setting from 0-30 degrees that will get the job done.

If we follow the numbers and maintain the POH-suggested airspeeds…we are in a position to make a stabilized approach and landing.

Here's where experience and the art of interpolation comes into play, and why adding half the gust factor is a good compromise on a gusty day. Let's say we're approaching a 5,000-foot runway—more than twice what this airplane requires—on a very turbulent day, with surface winds reported as 20

Photo by Tom Hoffmann

knots gusting to 30 knots with a variable crosswind that is typical when such conditions exist. The gust factor is the difference between the gust and the sustained wind, in this case 10 knots. So, we plan to fly final approach five knots faster than normal.

What's normal? The published range for a normal approach is 60-70 knots, so to what number within that range do we add the five knots? Is using full flaps a good idea on a day like this, in this airplane? Probably not, because the wind can reach under those flaps and grab hold of the wing like a professional wrestler flipping his opponent to the mat.

Recall that the airplane's actual stall speed is probably lower than advertised due to its lighter weight. Start with the lower number, 60 knots, and add five to that. Try flying final approach at 65 knots with just 20 degrees of flaps and see how that works. If at any point the gusts are so strong that you hear the stall horn squeak or have any trouble controlling the airplane, given your level of experience, then go around and try the next approach at 70 knots with 10 degrees of flaps, and see if that feels better.

Pilots who "fly by the numbers" are…not reinventing the propeller on each approach.

It's a Wing Thing

An airplane's wing design and resultant stall characteristics also play an important role in determining Vref and final-approach speed, as well as the airplane's relative tendency to remain in ground effect during the landing.

The Cessna 182S uses a conventional, riveted aluminum wing that is twisted slightly along its length so that the wing tips present a lower angle of attack than the wing root, allowing the ailerons to remain effective well into the stall. This design has been proven for many decades and is still being produced. Now, consider the seamless, composite, laminar-flow wing of a 2007 Cirrus SR22 G3. The G3 wing is also twisted to maximize aileron effectiveness during the stall, but employs additional features such as stall strips and a two-section leading edge.

The SR22 is flown at Vref minus one knot for short-field landings (77 knots) and a few knots faster for normal approaches (80 knots), and always using full flaps, if available. The SR22 POH lists Vso at maximum gross weight as 59 knots at the most forward CG position and 61 knots at the most aft CG position. If we take the median, 60 knots, and multiply by 1.3 we get a Vref of 78 knots.

Why is there such a difference between Vref and Vso for these airplanes? Though these airplanes are of similar size, weight, and performance, the wing design is the primary reason for the difference in their stall behavior and recommended landing speeds. One wing is not better than the other; they are just different. The Cessna 182S wing creates more drag than the SR22 wing, and this allows for a steeper and shorter approach and less of a tendency to float in ground effect. The SR22 G3 wing (as well as its more powerful engine) allows it to cruise about 30 knots faster than the Cessna 182S, but the G3 wing (and the overall body design of the SR22) results in a faster final-approach speed and longer required landing distances than the Cessna 182S.

Final Thoughts on Final Approach

Pilots who "fly by the numbers" with precision and accuracy are able to fly stabilized approaches, and make consistently smooth landings, because the numbers they follow provide a proven framework for success. These pilots are not reinventing the propeller, so to speak, on each approach. This methodology is what makes airline travel so safe, and it can work for general aviation pilots, too.

Meredith Saini is a flight instructor and active general aviation pilot. She works as a contractor supporting the Flight Standards Service, General Aviation and Commercial Division at FAA Headquarters in Washington, DC.

For More Information

FAASTeam online courses "Maneuvering: Approach and Landing" and "Normal Approach and Landing" can be found at:
http://www.faasafety.gov/gslac/ALC/course_catalog.aspx

***Airplane Flying Handbook* (FAA-H-8083-3A) can be found at:**
http://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/airplane_handbook/

SUSAN PARSON

Getting It Right in Maneuvering Flight

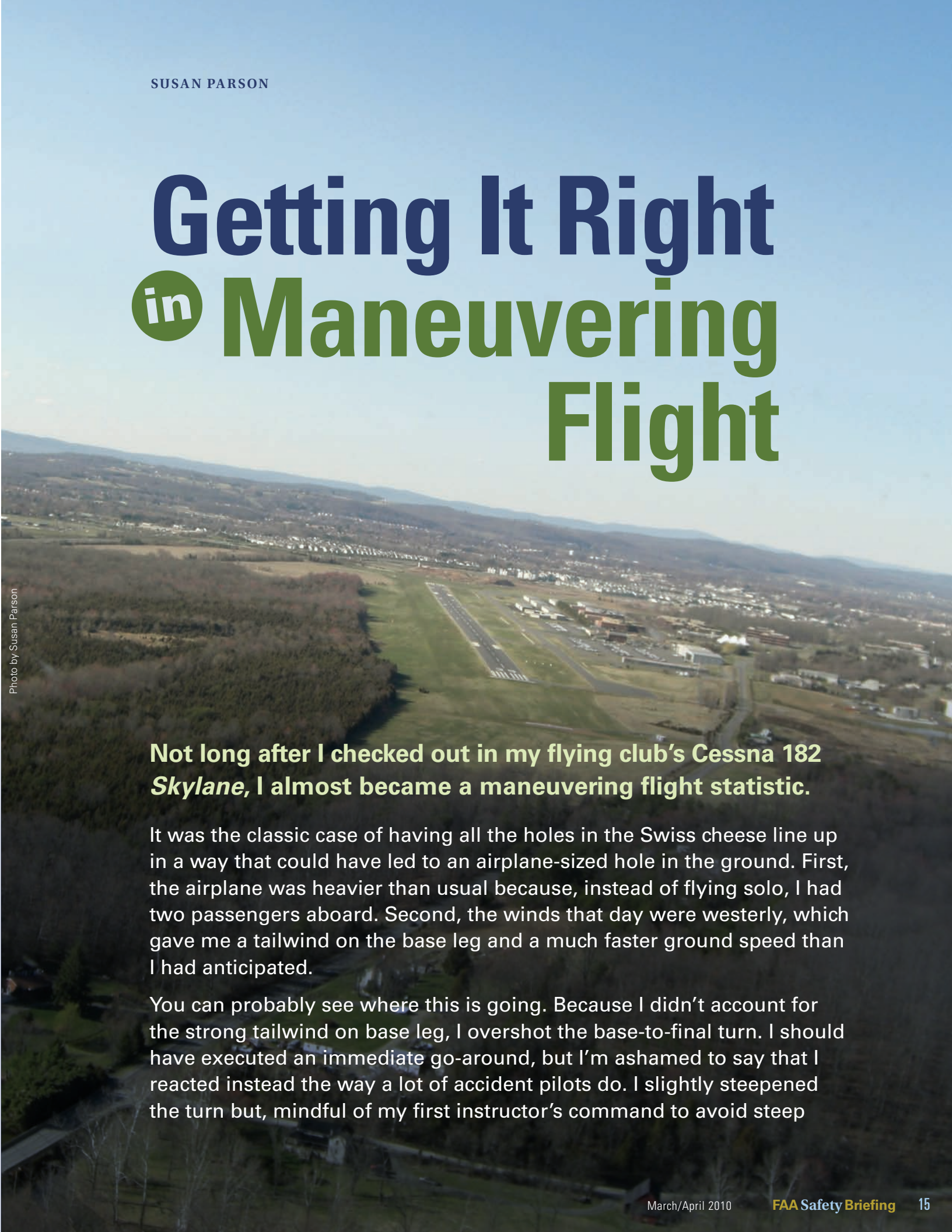

Photo by Susan Parson

Not long after I checked out in my flying club's Cessna 182 *Skylane,* I almost became a maneuvering flight statistic.

It was the classic case of having all the holes in the Swiss cheese line up in a way that could have led to an airplane-sized hole in the ground. First, the airplane was heavier than usual because, instead of flying solo, I had two passengers aboard. Second, the winds that day were westerly, which gave me a tailwind on the base leg and a much faster ground speed than I had anticipated.

You can probably see where this is going. Because I didn't account for the strong tailwind on base leg, I overshot the base-to-final turn. I should have executed an immediate go-around, but I'm ashamed to say that I reacted instead the way a lot of accident pilots do. I slightly steepened the turn but, mindful of my first instructor's command to avoid steep

Photo by James Williams

turns in the pattern, I didn't go much beyond a 30-degree bank. Since that clearly wasn't enough to correct my overshoot, I quite unconsciously applied "bottom" rudder to help slew the nose around to the runway heading.

Fortunately for my passengers, my airplane, and me, the stall horn did its job. That high-pitched beeeeeeeeeeeep that I had previously heard only in the training environment yanked my brain away from its single-minded intent to make this landing work, and cued up the well-drilled stall recovery procedure that my instructor had made me practice so much (thanks, Warren). I relaxed back pressure on the yoke, pushed the throttle forward and, once that annoying but life-saving beeeeeeeeeeeping noise had been silenced, I executed the go-around that I should have made in the first place.

The main antidote to maneuvering flight accidents in the pattern is to develop a thorough awareness and understanding of stall/spin aerodynamics.

Who, Me? Maneuver?

The numbers are as ugly as the accident I almost had that day. According to statistics kept by the AOPA Air Safety Foundation, nearly one-third of all fatal accidents in the last 10 years occurred from loss of control during maneuvering flight. And, although I hadn't previously thought of pattern work as "maneuvering flight," it most assuredly qualifies. Along with aerobatics, aerial work, steep turns, stall/spin activity, formation flight, and (the big no-no) "buzzing," maneuvering flight also includes normal flight operations, such as traffic-pattern flying, that take place close to the ground.

We can all understand how those "bad" pilots get in trouble with buzzing and other bad behaviors, but c'mon, how can good, conscientious, and safe pilots like you and me come to grief with the garden-variety traffic-pattern operations that we have been flying since lesson one? And, more importantly, how do we stay safe? We can avoid aerobatics and ban buzzing, but there's no practical way to avoid maneuvering in the airport-traffic pattern.

It's All about the Stall

Loss-of-control accidents in the traffic pattern—our focus in this article—usually involve an aerodynamic stall. It stands to reason, then, that the main antidote to maneuvering flight accidents in the pattern is to develop a thorough awareness and understanding of stall/spin aerodynamics. It is not possible to earn a pilot certificate without ground and flight training in these topics, so most of us think we have that angle covered already. As my near-statistical experience showed me, though, being able to accurately recite all the right words and phrases from the textbook did not mean that I had a practical understanding of how, or why, it is true that (as the books say) it is possible to stall an aircraft in any flight attitude and at any airspeed.

Having both thought about it and taught about it pretty extensively since then, I suspect that some of the confusion arises from the apparent contradiction that puzzled me the most when I sat in a private pilot ground-school course all those years ago. Specifically, if it is true that the pilot can stall an aircraft in any flight attitude and at any airspeed, why do we talk about "stall speed?" Doesn't that suggest that I can prevent an aerodynamic stall merely by ensuring that I avoid the nose-high attitude I saw so much in the training world and keep my airspeed above the published "stall speed?"

The answer is yes…and no. Let's take a closer look.

Back to Basics

First, we need a review of the basics. Maintaining control of an airplane during flight requires managing lift. Lift is produced by the dynamic effect of air acting on the airfoil, or wing. The pilot controls lift by controlling the angle of attack (AOA), which is the acute angle formed between the wing's chord line and the relative wind (that is, the direction of the air striking the wing). All other things being equal, increasing the AOA increases lift until the wing reaches the maximum, or "critical," AOA. Increasing AOA beyond this point results in a large loss of lift and an increase in drag. A wing in this condition is said to be "stalled."

We pilots tend to associate lift and loss of lift (stalls) primarily with airspeed for several reasons.

- First, there is a clear relationship between lift and velocity (speed). Lift is proportional to the square of the aircraft's velocity, so doubling the speed will quadruple the lift.
- Second, for every AOA, there is a corresponding airspeed required to maintain altitude in steady, unaccelerated flight. An aircraft flying at a higher airspeed can maintain level flight with a lower AOA, while an aircraft flying at a slower airspeed must have a higher AOA to generate enough lift for level flight.
- Third, maneuvers practiced in early flight training, such as demonstration of the effect of airspeed changes and stalls entered from a wings-level attitude, tend to emphasize the relationship between AOA and airspeed.
- Finally, the term "stall speed," which refers to the speed at which the wing reaches critical AOA in a wings level unaccelerated (1g) condition, further reinforces this association.

It is important to understand, however, that airspeed is *not* the only consideration. Because lift must equal weight, an airplane that is heavier because of physical or aerodynamic loading must generate more lift in order to maintain level flight. For any given airspeed, then, an aircraft with a greater load must be flown at a higher angle of attack in order to generate sufficient lift for level flight. Since an airfoil always stalls at the same AOA, an aircraft loaded by additional physical weight (e.g., passengers, fuel, baggage) or aerodynamic "weight" (e.g., g-force from turning flight) flies at an AOA closer to the critical AOA.

Photo by Claudio Bellotto

That was clearly the issue in my maneuvering flight mistake. Because I was operating the airplane with three passengers, and thus at a heavier physical weight, I had to fly at a higher angle of attack in order to produce the lift required to offset that weight and maintain altitude even in straight-ahead flying. That alone put my airplane's wing closer to the critical AOA.

If it is true that the pilot can stall an aircraft in any flight attitude and at any airspeed, why do we talk about "stall speed?"

But, remember that I was also making the base-to-final turn in the traffic pattern. As you learned in the private pilot ground-school textbook, the forces that cause an airplane to turn impose an aerodynamic load, or "weight," on the wings. Every pilot operating handbook (POH) includes a graph that displays the relationship between angle of bank and "g" load on the wing. In general, a 60-degree bank

in a light general aviation aircraft imposes a 2g load, which means that the effective weight of the airplane and its contents doubles. Although I wasn't close to a 60-degree bank in my *Skylane* that day, the turn I was making did impose a higher "g" load on the wings.

Connecting the Dots

Now, let's connect the dots. My airplane was heavier because of the additional physical weight (passengers) and because of aerodynamic loading (turning flight). To maintain altitude I needed to generate more lift to offset (balance) that extra weight. I didn't want to increase airspeed at a time when I was setting up to land, so I chose to increase AOA by increasing back pressure. Even though I was nowhere close to the published (1g) "stall speed" of the airplane, and even though I was nowhere near the nose-high attitude that characterized my stall entry/recovery practice in the training environment, I was dangerously close to critical (stalling) angle of attack at a time when I was also dangerously close to the ground. This was not a happy (or safe) place to be.

An airplane that is heavier must generate more lift in order to maintain level flight.

The good news, though, is that the incident prompted me to learn what I should have understood to begin with about "stall speed" and the "accelerated" stall I almost performed in garden-variety traffic pattern maneuvering flight. Once is enough—but I hope you learn from my experience, and let my "once" be enough for you as well.

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For More Information

***Maneuvering Flight – Hazardous to Your Health?* in the AOPA Air Safety Foundation Safety Safety Advisor**
www.aopa.org/asf/publications/sa20.pdf

***Airplane Flying Handbook* (FAA-H-8083-3A) can be found at:**
http://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/airplane_handbook/

MEREDITH SAINI

Avoiding Runway Incursions:

It's All in Your Head

One of the costliest mistakes a pilot can make is forgetting that the flight begins when the engines start turning, not when the wheels leave the pavement. There are infinite ways a pilot can lose situational awareness on the ground—programming a GPS, carrying on extraneous conversations, or even using a cell phone to call for a clearance while the aircraft is moving. It only takes a momentary lapse of attention by a pilot or, for that matter, a controller for the aircraft to hit an airport truck, a person, or worse yet, another moving aircraft full of fuel and people.

Such incidents are collectively known as runway incursions, and while they are relatively rare and usually result in little more than bruised egos, they can be catastrophic. The deadliest aircraft accident in history occurred in 1977, when two fully loaded Boeing 747s ran into each other in dense ground fog on the Spanish island of Tenerife, killing 583 people. More recently, 49 people died in 2007 when the crew of a Canadair Regional Jet departed from the wrong, too-short runway, and crashed into trees.

The 2009 FAA *Runway Safety Report* includes data related to runway safety in the United States for fiscal years 2006 through 2009. During that four-year period there was an average of 15.7 runway incursions per million-towered airport operations—a drop in the bucket compared with in-flight mishaps, but nonetheless significant. Incursions can and do occur at the nation's thousands of non-towered airports, but those were not included in the study because they typically go unreported since there is no controller to observe and document what happened.

Situational awareness is the key to safe ground operations.

The Human Element

One of the key lessons from any study of runway incursions is that nearly all of them are attributable to human error, not mechanical failure. In the 2009 report, pilot deviations accounted for 62 percent of the total; 23 percent were air traffic control operational errors/deviations; and 15 percent were vehicle/pedestrian deviations. Most of the incursions posed little or no harm to persons or property.

Photo by H Dean Chamberlain

Photo by James Williams

The most common type of error that resulted in a pilot deviation was a correct read-back of an air traffic controller instruction followed by an "unauthorized maneuver." This type of error occurred in 44 percent of all pilot deviation runway incursions in FY 2007. In 47 of these runway incursions, the pilot correctly read back the "hold-short" instruction and then proceeded to cross the hold-short line (but not the runway edge). In 19 of these incidents, the aircraft completely crossed the runway.

One of the key lessons from any study of runway incursions is that nearly all of them are attributable to human error.

While advanced cockpit technology cannot prevent pilots from making such errors, GPS-driven multifunction displays (MFD) and advanced cockpit avionics can greatly enhance a pilot's situational awareness, give a pilot the opportunity to see the accident chain developing, and break it before the situation gets out of control.

Highlighting Hot Spots

As part of its ongoing effort to reduce runway incursions, the FAA has developed a list of areas on towered airports that present unique challenges to pilots navigating on the ground, though many non-towered airports can also cause pilots grief and confusion. These "hot spots" have been identified as areas where ground control may have limited visibility or where there is high traffic flow or a known history of incursions. You can find this list of airports and hot spots in any FAA Terminal Procedures publication, immediately following the section on Land and Hold Short Operations (LAHSO).

The key to using electronic tools is maintaining balance between looking at the moving-map display and looking out the window.

Hot spots are graphically depicted on both FAA (National Aeronautical Charting Office, or NACO) and Jeppesen airport diagrams, in both paper and electronic formats. The electronic chart databases can be loaded into an MFD, electronic flight bag, or portable GPS receiver. In the general aviation world, Garmin and Avidyne hold the lion's share of the MFD market, with Jeppesen and Garmin providing the chart and navigation databases that make the displays meaningful.

Garmin's G1000 is a fully integrated, glass-panel avionics system that is available as standard factory-installed equipment in several general aviation aircraft, including the Cessna 172/182 and the Cirrus SR20/22. Retrofits for older aircraft are also available. The G1000 features Garmin's SafeTaxi database that identifies runways, taxiways, FBOs, and hangars, as well as the aircraft's exact location on the ground. SafeTaxi is integrated with existing GPS map data and is geo-referenced, allowing pilots to see their aircraft icon move along the airport diagram on the MFD.

Jeppesen also depicts hot spots on its instrument approach charts and airport diagrams, which can be viewed on Avidyne's EX5000 MFD as the CMax chart system, or as ChartView on Garmin's G1000 MFD. Garmin's FliteCharts is an electronic version of the NACO U.S. Terminal Procedures Publication that includes all departure procedures (DP), standard terminal arrival routes (STAR), approach charts, and airport diagrams.

The key to using these electronic tools successfully and safely is maintaining a balance between looking at the moving-map display and looking out the window. Use the moving map to confirm that your taxi clearance makes sense, e.g.,does Taxiway Alpha really intersect Runway 28? Is it a right or a left turn to get to Alpha from your parking space on the ramp? Then, look out the window to verify that you are where you're supposed to be—especially at a non-towered airport where signage may be scant though legal and radio calls by other pilots sub-par or nonexistent.

Pilots should be aware that some MFDs do not accurately depict which way the aircraft is oriented until the aircraft begins moving. For example, the map will correctly show your aircraft on the GA ramp but with the aircraft icon pointed north, when in fact you are facing east. Use the heading indicator or magnetic compass to confirm the MFD's depiction of your position and orientation is accurate once the aircraft begins to move.

An evolving technology that will provide pilots with additional situational awareness tools is Automatic Dependent Surveillance-Broadcast (ADS-B), one of the cornerstones of the FAA's NextGen initiative. ADS-B will, among other things, enable flight crews to be automatically alerted when another aircraft is on the active runway. It will allow air traffic controllers to more effectively monitor aircraft and other vehicle movements on the ground in areas where radar coverage is unavailable. For more information on ADS-B, visit www.ads-b.gov.

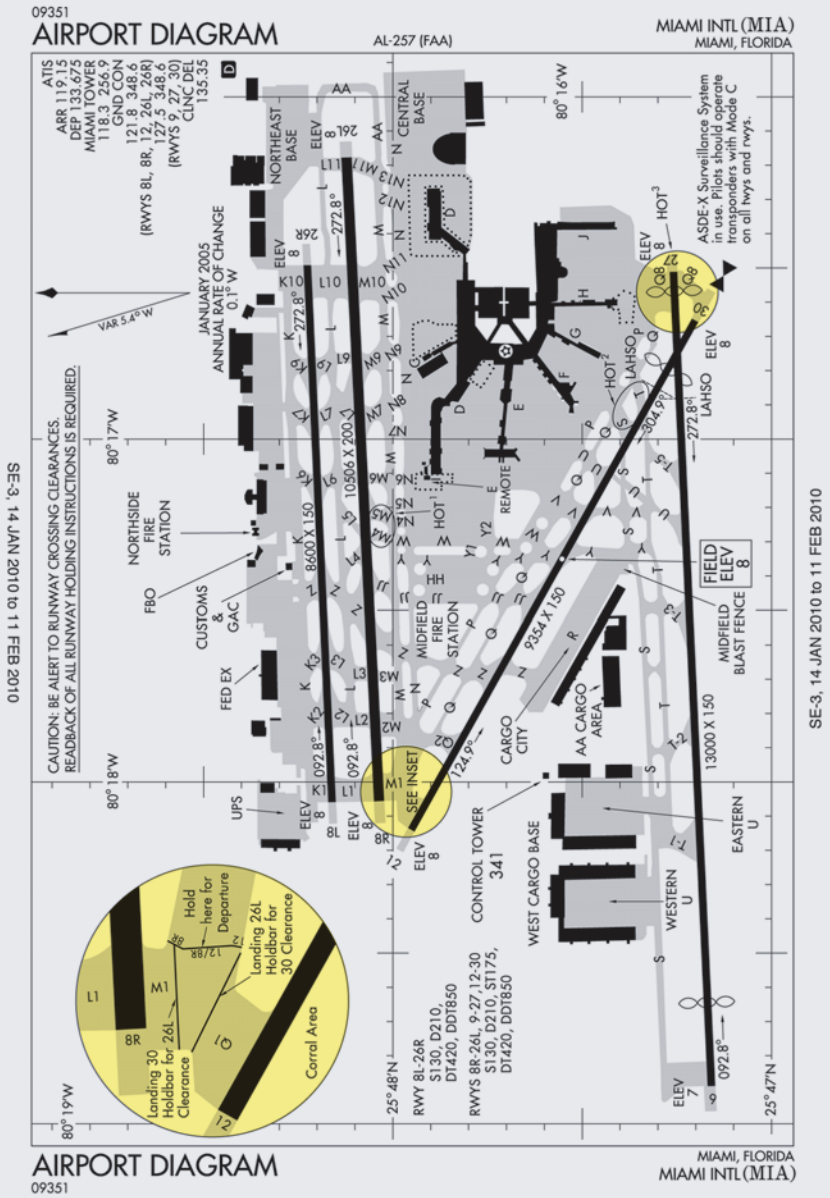
No Glass? No Problem

If the aircraft you fly is not glass-equipped, there are still plenty of things you can do to keep yourself oriented on the ground. Before you begin to taxi, if you have a heading bug, set it to the departure runway heading so you can look out the window and at the heading indicator to confirm you're moving in the correct direction. If you have a moving-map GPS (either panel-mounted or hand-held), zoom in as far as it will let you. Most units will at least show the runway and the numbers at each end.

Keep a full-size (8 ½ by 11-inch) print-out of the airport diagram on your lap and get generally familiar with the field's layout before taxiing. Don't even think about holding the *Airport/Facility Directory or Terminal Procedures* book open to the correct page with your yoke or stick hand while jockeying the throttle with the other. Use a bright highlighter to mark the taxi route on the diagram after copying down the clearance at a towered airport, or carefully planning the best route to the active runway at a non-towered airport. If your aircraft has a traditional yoke flight-control system, consider using a yoke clip to elevate the diagram closer to your line of sight.

Remember to listen to ATIS and pay close attention to any taxiway or runway closures and construction zones, especially when moving around after dark.

Miami, Florida, is a hot spot in more than just the meteorological sense. A quick glance at the Miami International Airport diagram reveals how a pilot unfamiliar with the runway and taxiway layout could easily become disoriented without proper attention and guidance. This is certainly a place where a pilot should consider asking the tower for progressive taxi instructions.



This Multifunction Display (MFD) is showing an airport diagram including hot spots.

Best Practices for Pilots

The FAA has an entire section of its Web site devoted to the topic of runway safety (http://www.faa.gov/airports/runway_safety/). This section features a link to suggested best practices for everyone involved in airport operations, including air traffic controllers and ground personnel. Pilots are specifically encouraged to:

- Obtain and use airport diagrams while taxiing—paper, electronic, or both.
- Visually confirm that a runway is clear before entering or crossing it, even when being directed by an air traffic controller at a towered airport. Trust, but verify.
- If unsure whether you should move onto a runway—stop and figure it out first, or ask the controller for clarification.
- Maintain a "sterile cockpit" when taxiing—avoid unnecessary chatter with other pilots on the frequency or with your passengers.
- Maintain an appropriate taxi speed.
- Focus attention outside the cockpit—be on the lookout for other aircraft, vehicles, and people (such as lawn mowers or other ground personnel).

There is really only one situation where a pilot must relinquish some modicum of situational awareness on the ground, and that is when the pilot accepts a controller's instruction to taxi into position and hold on the active runway. For a few brief, but tense moments, the pilot's back is to the action—with other aircraft potentially hurtling down the final-approach course.

Pilots should pay close attention to the length of time they are holding in position, and should ask the controller for an update if no takeoff clearance is issued within 90 seconds. Listen carefully to the controller's conversations with other aircraft to maintain a three-dimensional mental picture of what's going on around you, and never voluntarily taxi into position and hold at a non-towered airport just because you are in a rush to get off the ground. Always remember that you are responsible for seeing and avoiding other aircraft, and to do that you must maintain situational awareness at all times. Most aircraft do not have rear-view mirrors.

Runway incursions are some of the easiest mistakes that pilots can make, yet they are also some of the easiest to avoid. Basically, all it takes is a map, a swiveling head, awareness, and common sense.

Meredith Saini is a flight instructor and active general aviation pilot. She works as a contractor supporting the Flight Standards Service, General Aviation and Commercial Division at FAA Headquarters in Washington, DC.

For More Information

AC 91-73, "Part 91 and Part 135 Single-Pilot Procedures during Taxi Operations" at:
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%2091-73A/$FILE/AC91-73A.pdf

AOPA online course on runway safety:
http://aopa.ip02.org/rd/9z1zm8d85e7ibi4qp1g5seqcjo5fantkl2jion0r0l8

FAA International Runway Safety Summit, December 1-3, 2009:
http://events.aaae.org/sites/091107/

Taxi into position and hold (TIPH) guidance, FAA Terminal Procedures, and FAA Runway Safety Report can be found at:
http://www.faa.gov/airports/runway_safety/

TOM HOFFMANN

Maintaining your Way *to* Greater Safety

Photos by Tom Hoffmann

A Pilot's Guide to Owner-Performed Preventive Maintenance

Squeak, squeak. Click, click, click. Snap! "There, it's done," exclaims the proud pilot as he looks back to admire his first aircraft spark plug replacement. "It's a thing of beauty!"

While many Aviation Maintenance Technicians (AMT) may not share this pilot's enthusiasm for changing spark plugs, they do realize the benefits of having owners more involved with their aircraft's maintenance. Pilots who perform preventive maintenance reap the benefits of having greater knowledge of the inner workings of engines and airframes, as well as all their associated systems and components. In return, AMTs can better communicate with these pilots, who are armed with improved technical know-how, and can more accurately diagnose difficulties and properly maintain the aircraft.

But, exactly what type of maintenance can a pilot perform? What are the legal restrictions? Is training required? Does someone need to supervise? These are all questions aircraft owners face at one time or another. This article will address these questions and give you a better understanding of what types of maintenance you can and cannot do.

Getting Started

Perhaps one of the best ways you can prepare for your first foray into the world of aviation maintenance is to have a better understanding of the basics. Start by dusting off those pilot handbooks and manuals and review the systems sections for a good refresher on aircraft engines, propellers, electrical systems, landing gear, and more. You can also track down the maintenance manuals for your specific aircraft and examine some of the diagrams and procedures in detail. There's little sense in changing spark plugs or oil filters if you don't fully understand the systems these components impact.

Other good references are FAA advisory circulars on acceptable methods, techniques, and practices (AC 43.13-1 and AC 43.13-2), now available in a print version and available at several online

One of the several preventive maintenance tasks allowed includes cleaning/replacing spark plugs and setting gap clearance (photos on left), replacing position light bulbs, and making simple repairs to cowlings (photos on right).

bookstores. This detailed, one-stop guide for all elements of aircraft maintenance can be a big help to pilots interested in learning more about the overall inspection and repair process.

In addition to educating yourself in system fundamentals, it's equally important to prepare mentally before you start turning a wrench. Maintenance is a serious and regimented activity not to be taken lightly. Just as a pilot needs total concentration to ensure a precise and safe landing, concentration is important for anyone who attempts to perform maintenance, no matter how seemingly minor or inconsequential the task may seem.

In addition to educating yourself in system fundamentals, it's equally important to prepare mentally before you start turning a wrench.

31 Flavors (of Savings)

Pilots, especially those who enjoy tinkering with mechanical things and interested in saving a few dollars here and there, often ask the question: Exactly what kind of maintenance can I do on my aircraft? If you hold at least a private pilot certificate issued under Title 14 Code of Federal Regulations (14 CFR) part 61 and your aircraft is not used under 14 CFR parts 121, 129, or 135, you may perform preventive maintenance on your own aircraft. To see a list of the 31 items a pilot can perform without supervision, see Appendix A in 14 CFR part 43. Examples of these approved items include:

- Removal, installation, and repair of landing-gear tires
- Replacing and servicing batteries
- Cleaning fuel and oil strainers or filter elements
- Replacing any cowling not requiring removal of the propeller or disconnection of flight controls

But before you start changing tires, there's an often overlooked detail contained in the definition of preventive maintenance that can affect your eligibility to perform these tasks. For one, 14 CFR section 1.1 defines preventive maintenance as "…. simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations." The key word here is *complex*.

Due to differences in aircraft design and accessibility of certain components, a procedure like changing an oil filter may be a simple job on some aircraft, but complex on others. Owners and pilots must use good judgment in determining whether a specific function appropriately qualifies as preventive maintenance. When in doubt, talk to a mechanic. Keep in mind also that if a job is not listed in 14 CFR part 43 Appendix A, it does not qualify as preventive maintenance and therefore cannot be performed unsupervised.

It's Awl or Nothing

With a wrench in your hand and a brain fresh with mechanical knowledge, you're now ready to pop open the cowling and get your hands dirty, right? Not exactly. It takes a bit more than technical know-how and a desire to get some dirt under your nails to start any kind of aviation maintenance. There must also be a clear understanding of all facets of the work you plan to perform, along with careful attention to all applicable regulations.

Pilots performing preventive maintenance are bound by the same regulations as any certificated AMT under 14 CFR part 43. Among the regulation requirements is the need to make certain you have all available tools, equipment, and test apparatus necessary for any maintenance task. You'll also need all associated reference materials and manuals. In particular, 14 CFR section 43.13(a) states that each person performing maintenance—pilot or mechanic— is required to use "the methods, techniques, and practices prescribed in the current manufacturer's maintenance manuals…or data acceptable to the Administrator."

Part 43 goes on to state that pilots performing preventive maintenance must perform all work in such a manner "that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition." Here's a stipulation that requires a great deal of consideration before you embark on any kind of preventive maintenance. If the job seems the least bit complicated, or includes any step that is beyond your ability, put down the tool, step away, and seek help. Have someone qualified, who knows the task well, walk you through the steps.

"Learn to do it properly, before doing it at all," says FAA Aviation Safety Inspector (Airworthiness) Kim Barnette. "It might cost a little extra the first time

you have a qualified repairman or mechanic show you a particular task, but there are dozens of tips you can only learn from someone who has experience with that procedure."

With more than 30 years of GA maintenance experience, Barnette is privy to many of the inside tips that aren't always explained in a manual and which can easily trip up a unsuspecting pilot during preventive maintenance. "Take safety wire for example," explains Barnette. "I've seen many pilots over-tighten safety wire to where you could pluck it like a guitar string. If installed that tight on an oil filter, the safety wire could begin to cut into the filter, and within 15 to 20 hours, your engine might start dumping oil." He's seen it happen—unfortunately with tragic results.

Another easily misunderstood concept concerns torque values. Habits picked up from performing certain automotive maintenance tasks, like hand-tightening an oil filter during an oil change, can trickle over during similar aircraft preventive maintenance tasks, sometimes with deadly consequences. Components such as oil filters, spark plugs, and fasteners typically have a prescribed torque value that must be followed using the appropriate tool or torque wrench.

Also, take care not to exceed the torque values: Tighter does not always mean better. Torque values are set just as much for preventing over-tightening as they are for making sure an item is properly secured. An over-tightened spark plug may actually damage both the engine and the spark plug, which can cause problems with the transfer of heat from the combustion chamber.

Please Sign on the Logbook Line

Maintenance record entries are another critical regulation often overlooked by pilots. Part of the duty and responsibility that comes with the privilege of doing preventive maintenance is returning the aircraft you worked on to service. This is normally a straightforward process that entails making the proper entry in the aircraft records. The entry boils down to three basic parts:

- Description of work
- Date
- Signature and certificate number

In the description of work performed the entry should indicate what was done and how it was done. If the description is extensive, reference the document containing the description, e.g., manufacturer's manual and/or advisory circular.

The signature constitutes the approval for return to service for the work performed. Forgetting this important step could find you in violation of 14 CFR section 91.407(a), which states that no one may operate any aircraft that has undergone preventive maintenance unless it has been approved for return to service with the required maintenance entry. In addition to your certificate number, include the type of airman certificate you hold. For example, PP, CP, or ATP would be used to indicate private, commercial, or airline transport pilot, respectively. Finally, remember to keep all entries neat and legible.

Can I Do More Than Preventive Maintenance?

You can perform aircraft maintenance other than preventive maintenance, just not by yourself. According to 14 CFR section 43.3(d), you must be under the supervision of a properly certificated AMT or repairman to perform maintenance or alterations, which the supervising mechanic has authorization to perform. The regulation also does not authorize the performance of any required inspections. Only a properly certificated AMT or repairman can do that.

Maintenance is a serious and regimented activity not to be taken lightly.

This provision in the regulations affords pilots, and even non-pilots, a unique ability to learn more about aviation maintenance and get an inside look at how their aircraft operates beyond the allowed preventive maintenance procedures.

Yet another good opportunity to become more acquainted with your aircraft is during the annual inspection. Although you cannot participate in the actual inspection, you can assist with removing panels, cowlings, seats, etc., as well as help perform some of the maintenance tasks required for the inspection. It's best to coordinate ahead of time with the AMT with Inspection Authorization (IA) or repair station performing your annual before you attempt any work. Working together to set up a

Preventive maintenance tasks include the removal, installation, and repair of landing-gear tires, as well as cleaning and greasing wheel bearings.

coordinated schedule should allow the inspection process to proceed more smoothly, and possibly help you reduce aircraft downtime. (See Nuts, Bolts, and Electrons on page 34 for more information on IA roles and responsibilities.)

"When working with an AMT or IA, be involved and ask questions," says Walt Schamel, a FAASTeam representative and training manager for Airline Transport Professionals in Jacksonville, Florida. "The more you know about the condition and work being done to your aircraft, the safer the plane will be and the more in tune you'll be to keeping it maintained safely in the future."

A procedure like changing an oil filter may be a simple job on some aircraft, but complex on others.

Tools and Training

Like most things in aviation, aircraft maintenance techniques and procedures are in a constant state of flux. The challenge for many mechanically-inclined pilots (and many AMTs for that matter) is keeping up with all the updates. Fortunately, there are several good resources to learn more about aviation maintenance. Start with the aircraft-specific service and maintenance manuals, as well as any specific equipment manuals to cover installed components such as brakes, tires, and carburetors. Also, review any applicable *Airworthiness Directives* (AD) that pertain to your aircraft.

Another worthy endeavor to make peeking under the cowling a less bewildering experience is to attend a training class. Many AMT schools offer classes on preventive maintenance, some tailored specifically for pilots. Type clubs are another good source for maintenance information, as are many of the various air shows and fly-ins held throughout the year that frequently offer hands-on seminars. If you happen to be at Sun 'n Fun this year, check out Walt Schamel's presentation on owner-performed maintenance at the FAA Safety Team's National Resource Center.

Weighing the Pros and Cons

Performing maintenance on your aircraft can have several important benefits. It can save time, money, and can open doors to a new world of understanding about your aircraft. But along with this new knowledge comes responsibilities.

"Don't get lulled into a false sense of security," warns Barnette, who has seen pilots, armed with a little maintenance knowledge, try to troubleshoot problems beyond their ability. "Focusing on an incorrect solution may wind up doing more harm than good." When faced with a mechanical problem, Barnette suggests landing as soon as possible to have someone qualified check it out.

As many pilots would agree, preparation is the key to the quality and safety of a flight. That same approach applies to performing maintenance on your aircraft. With good practices, the proper tools and materials, and a professional attitude, you'll be sure to "maintain" your way to greater safety.

Tom Hoffmann is associate editor of FAA Aviation News. He is a commercial pilot and holds an A&P certificate.

For More Information

Advisory Circular (AC) 20-106 "Aircraft Inspection for the General Aviation Aircraft Owner;" AC 43-12A "Preventive Maintenance;" AC 43.13-1B "Aircraft Inspection and Repair: Acceptable Methods, Techniques, and Practices;" AC 43.13-2B "Aircraft Alterations: Acceptable Methods, Techniques, and Practices;" and AC 91.59A "Inspection and Care of General Aviation Aircraft Exhaust Systems"
http://www.faa.gov/regulations_policies/advisory_circulars/

Title 14 CFR part 43 Appendix A paragraph c – List of allowable preventive maintenance tasks
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=ab9209d5338e00128fa564d7a59e8d8a&tpl=/ecfrbrowse/Title14/14cfr43_main_02.tpl

SUSAN PARSON

It Takes All Kinds
(of Equipment)

Few of us will forget the first time we faced all the dials, gauges, knobs, and switches in a typical general aviation airplane. Glass cockpit avionics in newer airplanes are less cluttered; still, all the gadgetry can be intimidating to the novice. Over time, though, we come to know and understand the equipment that allows us to aviate, navigate, and communicate in our trips to and from the sky. Because it is extremely reliable, we also learn to trust that equipment. Unlike the aviators of an earlier age, who always launched wondering *what* would break and *when* it would happen, most pilots of today's aircraft take the reliability of our machines for granted.

But, equipment can and does fail. As the saying goes, aviation is terribly unforgiving of carelessness, incapacity, or neglect. Consequently, there are some fairly precise rules—Title 14 Code of Federal Regulations (14 CFR) section 91.213 to be exact—to guide the go/no-go decision when you find faulty equipment in the airplane you plan to fly.

For most general aviation aircraft, the key regulation for determining airworthiness of an aircraft with inoperative equipment is 14 CFR section 91.213(d). If you find something wrong with the aircraft, here is a four-question checklist you can use to determine if that problem renders it unairworthy.

Question 1: VFR-Day Type Certificate

Is the deficient equipment part of the aircraft's VFR-day type certificate? If yes, then the aircraft is unairworthy.

Question 2: Listed as Required on Equipment List or KOEL?

Is the affected equipment listed as required on the aircraft's equipment list or on its Kinds of Operations Equipment List (KOEL)? If yes, then the aircraft is unairworthy.

Before we continue, though, let's take a closer look at these lists. The aircraft's equipment list is usually located near the back of the pilot operating handbook (POH) or airplane flight manual (AFM).

Photo by H Dean Chamberlain

Photo by Tom Hoffmann

If you haven't paid much attention to it before, take a minute now to pull out the POH/AFM and take a look. If the list shows that the manufacturer considers the equipment required, then the aircraft is not airworthy if that item is inoperative.

If you fly one of the newer aircraft, you need to be familiar with the Kinds of Operations Equipment List, which is generally located in the Operating Limitations Section of the POH/AFM. The KOEL is meant to be an easy-to-use reference for what the manufacturer deems essential for particular operations. In the Cessna C182T Nav III POH, for example, the KOEL is set up in table form. The lefthand column lists the item or system and the next four columns allow the manufacturer to say whether the system is required for a given kind of operation: VFR day, VFR night, IFR day, and IFR night.

There are precise rules to guide the go/no-go decision when you find faulty equipment in the airplane you plan to fly.

The righthand column allows for comments. For example, the KOEL indicates that the C182T Nav III POH/AFM is required for all four operations, and the comment states that the POH/AFM must be accessible to the pilot in flight. Most pilots of my acquaintance are surprised to learn from the KOEL that the manufacturer does not require the 24V standby battery to be operative for any of the four kinds of operations, but a prudent pilot might want to think hard about launching into day or night instrument meteorological conditions (IMC) without it!

Question 3: Required by Any Other Regulation?

Is the affected equipment required by any other regulation, i.e., 14 CFR sections 91.205 and 91.207? If yes, then the aircraft is considered to be unairworthy.

You need to be familiar with both of these equipment-related regulations. The first, 14 CFR section 91.205, lists the instruments and equipment required for different types of flight. Some pilots use acronyms (e.g., TOMATO FLAMES) to remember these items. Another way is to think of them in terms of three categories: engine, performance/navigation, and safety. Below are charts listing required equipment for each of these categories.

	Engine	Performance & Navigation	Safety Information
VFR day	•Manifold pressure (if applicable) •Oil pressure (each engine) •Oil temp (each engine) •Tachometer (each engine) •Temp (if liquid-cooled)	•Altimeter •Airspeed indicator •Magnetic compass	•Fuel gauge (each tank) •Anti-collision lights •Landing gear indicator (if applicable) •Safety belts •ELT (14 CFR section 91.207)

	Engine	Performance & Navigation	Safety Information
VFR night	•Manifold pressure (if applicable) •Oil pressure (each engine) •Oil temp (each engine) •Tachometer (each engine) •Temp (if liquid-cooled)	•Altimeter •Airspeed indicator •Magnetic compass	•Fuel gauge (each tank) •Anti-collision lights •Landing gear indicator (if applicable) •Safety belts •ELT (14 CFR section 91.207) •Fuses (if applicable) •Landing light (if for hire) •Anti-collision lights •Position lights (14 CFR section 91.209)

	Engine	Performance & Navigation	Safety Information
IFR day	•Manifold pressure (if applicable) •Oil pressure (each engine) •Oil temp (each engine) •Tachometer (each engine) •Temp (if liquid-cooled)	•Altimeter •Airspeed indicator •Magnetic compass •Generator •Rate of turn indicator •Attitude indicator •Ball •Clock •Radios (com/nav/ VOR) •Direction indicator	•Fuel gauge (each tank) •Anti-collision lights •Landing gear indicator (if applicable) •Safety belts •ELT (14 CFR section 91.207)
IFR night, add			•Fuses (if applicable) •Landing light (if for hire) •Anti-collision lights •Position lights (14 CFR section 91.209)

Question 4: Required by Any Other Regulation?

Is the affected equipment required to be operative by an airworthiness directive? If so, the aircraft is considered unairworthy.

Now What?

If you were able to answer each of the four questions in the negative, then the aircraft is not unairworthy—but you still have some work to do before you can legally fly. Specifically, 14 CFR section 91.213 (d) requires that you remove or deactivate the inoperative item, placard it as inoperative, and record your actions in the maintenance log. But remember, if you do this, 14 CFR section 91.405(c) requires that it be repaired, replaced, removed, or inspected at the next required inspection.

Know before you go, because it takes all kinds of (operative) equipment to ensure a safe flight!

Susan Parson is a special assistant in Flight Standards Service. She is an active general aviation pilot and flight instructor.

SUSAN PARSON

Checklist

Stand Down, but Don't Stand Still!

It is hard enough for anyone to map out a course of action and stick to it, but it is doubly hard for an aviator to stay on the ground waiting for just the right moment to go into the air. (Glenn Curtiss, 1909)

For a pilot, the idea of "standing down" from flying—especially when the icy howl of winter has finally given way to beautiful springtime flying weather—is a tall order. Perfect isn't always possible in aviation, but practice at least makes proficient, right?

True enough—but an aviation luminary by the name of Wilbur Wright once observed that, "It is possible to fly without motors, but not without knowledge and skill." If, as we hope, you choose to participate in the FAA Safety Team's Safety Stand Down on April 17, 2010, think of standing down not as standing still, but rather as an opportunity to build your aviation knowledge and safety awareness.

Think of standing down not as standing still, but rather as an opportunity to build aviation knowledge and safety awareness.

www.FAASafety.gov

One of the many FAA aviation safety resources at your disposal is www.FAASafety.gov, and one of the most important elements of the site is the Safety Program Airman Notification System (SPANS). For those who prefer "bricks" over "clicks" as a learning venue, participation in SPANS offers an easy way to learn about FAA-sponsored safety events and seminars taking place in your area. Anyone can search the SPANS system and register online for these events. To take advantage of this free resource and get automatic e-mail notifications of safety events, go to www.FAASafety.gov, click on Create an Account, and follow the prompts. If you are already registered on www.FAASafety.gov, take a moment to update your user preferences to ensure you get the aviation safety information you want. Rest assured that the FAA Safety Team never shares its user database with anyone else.

A second safety resource on www.FAASafety.gov is the Courses & Events section, which includes a growing catalog of online courses and a list of upcoming safety seminars. The purpose of the online courses section is to offer a convenient, informative, and interesting means of continuing aviation education on a wide range of safety topics that qualify for credit in the FAA's WINGS - Pilot Proficiency Program or the William (Bill) O'Brien AMT Awards Program.

When you click the link to the online course catalog, you'll see an alphabetical list of available courses, or you can click a link to see broad categories to choose from. The list of categories covers both specific subjects, including weather, and targets specific audiences, such as pilots or AMTs. The category names in the online course catalog match those in the searchable library.

The Web site is, of course, the portal to the WINGS - Pilot Proficiency Program. After you register on www.FAASafety.gov, just click on the WINGS link under the Pilots tab to get started!

Maintenance Hangar

A recent addition is the "Maintenance Hangar," a special section designed specifically for AMTs. Tabs include a "Toolbox," information about AMT-specific events and seminars, the AMT Awards Program, and a list of FAA-approved Inspection Authorization (IA) courses and providers. There is also a special projects tab with several initial maintenance training products on identifying hazards and risk situations in the work environment.

By using www.FAASafety.gov and its many resources, many more than mentioned above, you can make the Safety Stand Down an outstanding opportunity to enhance your aviation safety knowledge and skill.

Susan Parson is a special assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.

The FAA Production Studios
at the
FAASTeam National Resource Center
presents the

FAA Forum Schedule for SUN 'N FUN 2010

"The Aviation Safety Year Starts Here"

	0830 – 0930	1000 – 1100	1130 – 1230	1300 – 1400
Tuesday, April 13	**Flying Solo** *Walt Schamel* *2004 ASC of the Year*	**FAASTeam** **Risk Managment** *Fred Kaiser*	**FAASTeam** **WINGS - Pilot Proficiency Program: Accident Mitigation - An Instructor's Perspective!** *Bryan Neville*	**FAASTeam** **Loss of Control - Approach to Landing** *Ernie Strange*
Wednesday, April 14	**Surviving Forced Landings** *Eric Basile*	**FAASTeam** **Surface Safety** *Sporty's*	**FAASTeam** **"Cloudy Skies, Clear Judgment"** *Susan Parson*	**Surface Safety** *Office of Runway Safety*
Thursday, April 15	**Teaching in the Glass Cockpit** *Tina Oborny* *Kerry Hackney*	**AOPA-ASF** **What Went Wrong** *JJ Greenway*	**The Kings on Practical Risk Management** *John & Martha King*	**Owner –Performed Maintenance** *Walt Schamel* *2004 ASC of the Year*
Friday, April 16	**Stall Spin Prevention** *Diego Alfonso* **Safety Lessons I Have Learned** *Kermit Weeks*	**Maintaining Your Medical** *Dr. James Fraser* *Dep. Federal Air Surgeon*	**AOPA-ASF** **10 Things Other Pilots Do Wrong** *JJ Greenway*	**Meet The FAA** *Doug Murphy* *Host*
Saturday, April 17	**FAASTeam** **Risk Managment** *Fred Kaiser*	**Surface Safety** *Wes Timmons* *Director of Runway Safety*	**AOPA-ASF** **10 Things Other Pilots Do Wrong** *JJ Greenway*	**Safety Stand Down Recap** *Rod Machado*
Sunday, April 18	**Flying on the Flip Side** *Kathy Hirtz* **All You Need to Know about a Spin & Were Never Told** *Steve Wolf*	**Guide to Rotax Aircraft Engine Maintenance** *Phil Lockwood*	**Bahamas** **Flying the Islands of the Bahamas** *Leonard Stuart* *Greg Rolle*	**Mexico** **Caribbean Sky Tours** *Rick Gardner*

The Forum opens daily at 0800 and the schedule is subject to change. Go to www.faaproductionstudios.com or www.FAASafety.gov to check for updates or to see all these seminars LIVE, click on the "View Safety Seminars Live" link.

Seaplane Splash-In: Thursday @ Fantasy of Flight/Balloon Launch Briefing: Saturday, 0600/Night Air Show: Friday
All or part of some of these presentations will be simulcasted on Sun 'n Fun Radio AM1510 and FlightLine Radio.com

Look for presentations on ATN, The Aviation Training Network, GETN, The Government Educational Training Network & FAN, The Florida Aviation Network on April 13,14,15,16 at 12:30 Eastern.

For our year-round programs & schedule please see:
http://faaproductionstudios.com/
http://www.faasafety.gov
http://www.flightlineinternetradio.com

For Broadcast information please see:
www.floridaaviationnetwork.com/

TOM HOFFMANN

Hot Spots

Avoiding Airborne Pilot Deviations

When aviators think of pilot deviations (PD), runway incursions generally come to mind first. That's not a surprise, given the amount of attention these incidents have attracted in the last few years. And, while the progress made in reducing runway incursions is significant, it's important to remember there is an equally dangerous variant of deviations that deserves our attention—airborne deviations.

What is an airborne PD? While there are several actions that may potentially result in an airborne PD, the term generally indicates a pilot action that results in violation of a regulation while in flight. Airborne PDs are typically comprised of altitude and airspace violations, but can also be caused by airspeed violations, unqualified pilots, and VFR flight into IFR conditions, among other things. Such deviations could result in a dangerous loss of separation between your airplane and another, or put you face to face with the side of a mountain. Neither is a good place to be.

Pilot deviations typically occur because of poor flying techniques, loss of situational awareness, or failure to plan properly.

A Look at the Numbers

There were 2,079 airborne PDs recorded in FY2009, which accounted for 65 percent of the total reported PDs that year. Although there was a 10 percent drop from the prior year for airborne PDs, yearly fluctuations of PDs and a reduction in the number of overall aircraft operations may have contributed to some of that decrease. The top contenders in the airborne PD categories come as no surprise: Altitude, course, and airspace clearance round out the top three, just as they have in previous years.

To better understand airborne PDs and why they occur, let's take a closer look at the top three causes.

- **Altitude Clearance:** A deviation of 300 feet or more from an assigned altitude. *(Example: Misunderstanding ATC instructions and flying through an assigned altitude by 300 feet.)*
- **Course Clearance:** A deviation from a pilot's approved flight plan. *(Example: Failing to follow the clearance issued by ATC.)*
- **Airspace Clearance:** A deviation that involves an aircraft operating in certain airspace without approval or proper equipage. *(Example: Entering Class B airspace without an explicit authorization from ATC.)*

Why Do Pilot Deviations Occur?

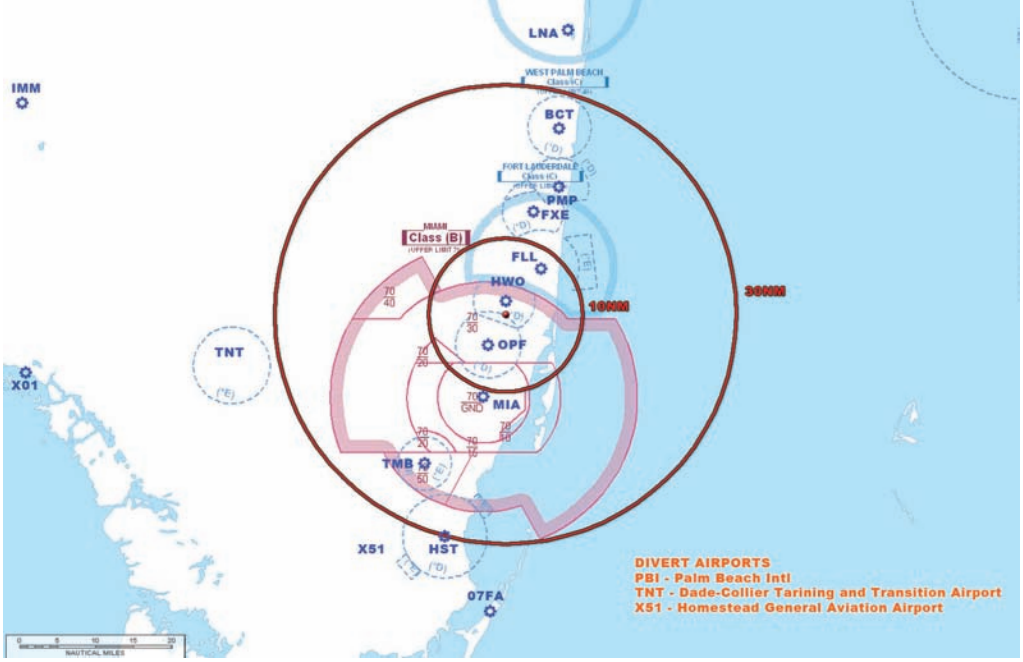
Pilot deviations typically occur because of poor flying techniques, loss of situational awareness, or failure to plan properly. Adding to these factors is the increasing complexity within the national airspace system (NAS), especially with respect to security-related restrictions that can pop up on short notice.

"Many times airborne PDs occur when a pilot is not aware of a restriction before departure or while en route," says FAA Strategic Planning Program Manager Tim Wallace. To keep abreast of any restricted airspace along your route, Wallace urges pilots to check *Notices to Airmen* (NOTAM) before and during any flight. "Check with Flight Watch occasionally to see if there are any changes. ATC is more than happy to help identify any unexpected airspace conflicts along your route of flight."

While most airborne PDs do not result in an accident, they can create loss of separation and, therefore, increase the potential for catastrophe. This separation loss also causes re-routing and can slow capacity in the NAS. All of these factors are disruptive to the safe and efficient movement of aircraft.

What Is Being Done?

"Recent numbers indicate a positive trend in reduction of airborne PDs, but there's still plenty of work to be done," says FAA Aviation Safety Inspector Greg French. Co-chair of the FAA Pilot Deviation Workgroup, French is a firm advocate of a new policy set to begin later this year that will alert CFIs, via letter, of any PD committed by a student within a 12-month window of last contact. "This



Computer simulation of 2010 Super Bowl TFR

new notification process will provide an excellent teaching opportunity for CFIs, as well as help pilots gain a better understanding of PDs and how to avoid them," adds French.

Another initiative to help combat airborne PDs is a revised outreach procedure designed to give pilots more advance notification of impending temporary flight restrictions (TFR). The procedure involves an interagency partnership with FAA, the Department of Defense, the Transportation Security Administration, the Department of Homeland Security, and others. The goal is to improve lead time for notifying airports and pilots who may be affected by security-related airspace restrictions. This notification zone has been expanded to include airports within 500 nautical miles of the restriction.

The United Nations General Assembly meeting in New York City last September provides a good example of outreach at work. The advance notification likely contributed to the 50 percent drop in airspace PDs, compared with the same event in 2008. This new policy applies only to higher-profile security events that would have a greater benefit to pilot community.

It's okay to check with your FBO for any last minute updates to airspace restrictions, but make sure that is a secondary source of information, not the primary. NOTAMs must be the first source.

If the idea of sifting through dozens of NOTAMs that may or may not affect your flight discourages you, fear not. Currently under development is a new system to put NOTAMs into a digital format. This new format will allow for greater accuracy and quality of data, as well as provide tools to sort and filter NOTAMs to your specific needs. Look for more information on digital NOTAMs later in 2010.

How to Stay Safe

The FAA Safety Team (FAASTeam) is committed to increasing PD awareness and encourages pilots to sharpen their skills. Take advantage of all the resources available at www.FAASafety.gov. Enroll in an online learning center course, or search the online library for guidance on airborne deviations. Future courses covering PD awareness will include training on Special Flight Rules Areas (SFRA), restricted airspace, and TFRs, as well as courses on altitude and airspeed management.

Ultimately, it is the pilot's responsibility to be aware of the operating environment and any changes that take place in his/her airspace.

Technology is helpful, but only to a certain point. Ultimately, it is the pilot's responsibility to be aware of the operating environment and any changes that take place in his/her airspace. So to avoid getting that dreaded "contact tower after landing" message, take the time to prepare before your flight. Reviewing NOTAMs and maintaining awareness of your location are two of the best ways to stay safe in today's busy airspace. Fly safely.

Tom Hoffmann is associate editor of FAA Aviation News. He is a commercial pilot and holds an A&P certificate.

For More Information

FAA TFR Map
http://tfr.faa.gov/tfr2/list.html

Aviation Learning Center
www.FAASafety.gov

Know Before You Go: Navigating Today's Airspace – AOPA online course
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TOM HOFFMANN

Nuts, Bolts, and Electrons

Inspecting the Unexpected

An Inside Look at IA Roles and Responsibilities

Got a new propeller? New engine? Or, maybe your annual inspection is due soon. Aircraft owners know there's only one person to call for any of these situations. It's not Batman or the Ghostbusters. And, although your mom might appreciate a call, she's unlikely to help in this case. Instead, it's time to call that trusty steed of technical precision, that wizard of mechanical know-how, the avatar of airworthiness—the IA.

All fanfare aside, the IA, short for Inspection Authorization (or in full, Aircraft Maintenance Technician with Inspection Authorization) does exactly what the title implies. The IA is authorized by the FAA to perform airworthiness inspections during annual or progressive checks, as well as after a major repair or major alteration. While these responsibilities may initially seem a bit narrow in scope, there is a great deal of behind-the-scenes knowledge, expertise, and responsibility that runs to the core of how an IA operates. Besides determining if your airplane is kept in a safe and airworthy condition, IAs also bear the responsibility of upholding the values and principles of the maintenance profession. These are duties not to be taken lightly, and they warrant a closer look at an IA's role in aviation safety.

Did You Know?

- There are about 22,000 FAA-certified IAs in the United States.
- More than 1,200 mechanics took the IA written test with an 80 percent pass rate in 2008.

How to Build an IA

A good way to understand more about what an IA does is to learn what it takes to become one. Title 14 of the Code of Federal Regulations (CFR 14) section 65.91(c) lists the eligibility requirements. Candidates must:

- Hold a currently effective Airframe and Powerplant (A&P) certificate, each of which has been in effect for at least three years
- Have been actively engaged in aircraft maintenance for a two-year period prior to application
- Have a fixed base of operations at which the candidate can be contacted
- Have available equipment, facilities, and inspection data necessary to properly perform inspections
- Pass a comprehensive written exam

Clearly, IA candidates are required to have a significant amount of experience under their "tool" belts before applying for inspection authorization. It is this knowledge and experience that the IA knowledge test is designed to examine, along with a competency metric set much higher than is required to earn an A&P certificate.

"Becoming a new IA involves many hours of reading, training, and plenty of communication," says Ben Coleman, an IA with 36 years of general aviation experience and an active FAASTeam presenter. Coleman stresses communication to emphasize the importance of having a support network. "It's a good idea to have some seasoned IAs to bounce ideas off when you're first learning the ropes." Of course, with an industry as dynamic as aviation, that same advice stands true for all IAs, no matter what level of experience they may have.

Some Major Responsibilities

Once an aircraft mechanic attains an IA certificate, he or she joins an elite group of professionals dedicated to maintaining air safety. Among the core responsibilities of an IA is determining airworthiness after a major repair or major alteration. This involves ensuring the aircraft is in a condition for safe operation and that any work done conforms to approved data. An IA must also determine compatibility with any previous repairs or alterations.

Another task reserved exclusively for the IA is the annual inspection. For many GA aircraft owners, this often dreaded procedure may actually be the only in-depth inspection that an aircraft receives for an entire year. For that reason, the importance of this

yearly checkup cannot be overstated. Here are a few points to keep in mind during an annual inspection, both as an aircraft owner and as an IA:

- Check that all applicable *Airworthiness Directives* (AD) have been accomplished (some ADs involve recurring action).
- Be mindful of alterations or repairs that may have changed operating limitations or added additional instructions for continued airworthiness.
- Remember that routine servicing is not part of the inspection and that correction of discrepancies or unairworthy items is typically additional to inspection.

Pilots might find it helpful to review 14 CFR part 43 Appendix D for a full list of the items checked during an annual inspection. For those pilots who want to assist with the annual, here's the skinny: While a pilot cannot assist with the actual inspection process, he or she can perform certain maintenance tasks that accompany the inspection. This usually comes in the form of removing inspection panels, cowlings, or performing preventive maintenance items beforehand.

"Assisting with an annual can be a great learning experience for a pilot," says FAA Aviation Safety Inspector (Airworthiness) Kim Barnette. "Just remember that only the IA can inspect." Also keep in mind that while helping to ready an aircraft for inspection can save precious time, accidentally stripping the head of a screw on an access panel can have the opposite effect!

Why Become an IA?

For some, it's the honor and prestige. For others, it's the extra money. But whatever the reason, no mechanic can deny the excitement of the opportunities afforded with a new IA certificate. In addition to the ability to perform a greater variety of maintenance tasks than any other single aviation maintenance entity, becoming an IA is also an important factor in advancing a mechanic's career. It can open the door for the next job, perhaps as a director of maintenance (DOM) or chief inspector.

There are several ways to prepare for an IA certificate. Many colleges and trade schools teach IA prep courses—usually in one week. If self-study is your learning method of choice, check out the *IA Knowledge Test Guide* (FAA-G-8082-11B) on www.faa.gov. This comprehensive guide provides an excellent overview of what to expect on the test, as well as what test aids and reference materials can be used. (There's also a section of this guide that pilots may find helpful to read. "Get It Straight" on page 21 outlines the importance of communications between IAs and aircraft owners.)

Currency Requirements for IA

The IA currency period is made up of two one-year segments, each with an activity requirement. During March of every odd-numbered year, an applicant for IA renewal must present evidence to the FAA that he or she continues to meet the requirements of Title 14 Code of Federal Regulations (14 CFR) section 65.91 (c)(1) through (4) and also meets the requirements of 14 CFR section 65.93(a)(1) through (5) by fulfilling one of the activities for each year segment:

- Perform at least one annual inspection for each 90 days held, or
- Perform inspections of at least two major repairs or two major alterations for each 90 days, or
- Perform or supervise at least one progressive inspection during the 12-month period, or
- Attend an approved eight-hour refresher course each year, or
- Pass an oral test by an FAA inspector.

Meeting the Challenges

One thing you can always count on in aviation is change. Keeping up-to-date with the latest changes can be one of an IA's biggest challenges. "Since IAs can find themselves repeating the same tasks on the same aircraft," says FAA Flight Standards Aircraft Maintenance Division Manager Carol Giles, "IAs should continually expand their knowledge base and incorporate diversity in their maintenance duties whenever possible."

Another good way to stay in touch with industry changes is to attend a local IA refresher course. You can find a list of refresher courses—which also apply towards an IA's currency requirements—on www.FAASafety.gov.

Tom Hoffmann is associate editor of FAA Aviation News. He is a commercial pilot and holds an A&P certificate.

SUSAN PARSON

Editor's Runway

New Look, New Name, New Game

You may have done a double-take when you picked up this issue of the magazine. Though it has familiar elements, the cover sports an updated look. The more dramatic change, though, is the title transition from *FAA Aviation News* to *FAA Safety Briefing*.

What's Up with That?

When we updated the magazine nearly two years ago, we pledged to keep the design fresh and the content relevant to the needs of our audience—the non-commercial general aviation community. You may be thinking, as we initially did, that a two-year-old graphic design can hardly be deemed decrepit, even in the fast-changing aviation world. We did, however, discover that we needed to make some changes in order to bring this publication into compliance with the branding standards and guidelines the FAA developed in the last few years. The cover changes accomplish that objective, but they also serve the original goal of periodically refreshing the magazine's look without the kind of complete overhaul you first saw in the March/April 2008 issue.

The new title is a better reflection of our core mission (providing safety information), and "briefing" underscores the kind of safety-minded practices that we hope to encourage.

What's in a Name?

As we reviewed possible cover designs over the past few months, we also took the opportunity to consider updating other aspects of the magazine. Feedback suggested that the magazine's name didn't really reflect our audience, our mission, or our approach. Together with colleagues from the FAA Safety Team (FAASTeam), whose mission we showcase in this issue, we brainstormed possibilities and concluded that *FAA Safety Briefing* is a much more descriptive name. The new title is a better reflection of our core mission (providing safety information), and the word "briefing" underscores the kind of safety-minded practices that we hope to encourage and promote. We hope you'll agree, and that you'll enjoy *FAA Safety Briefing* as much (or, rather, more!) than *FAA Aviation News*.

What Else is New?

It is appropriate to introduce the magazine's new title and updated cover with this issue, because, as the Sun 'n Fun organizers like to say, "The Aviation Year Starts Here." And, what better way to launch the new aviation year than with the FAASTeam's first-ever Safety Stand Down, described in one of this issue's feature articles?

Even if your spring plans don't include a visit to Lakeland, Florida, you can still participate in the FAASTeam's Safety Stand Down by catching some of the broadcast, Webcast, and podcast events designed to cast (so to speak) the spotlight on both best practices—what to do—and worst practices—what not to do. Although, we generally seek to focus more on people and procedures that we as pilots should emulate, there is also benefit in heeding the costly lessons taught through others' less-than-ideal experiences. As I wrote in the page 15 article on my close encounter with a cross-controlled stall, letting someone else's "once" be enough for you, too, is another good lesson to take from any kind of safety stand down.

As always, we look forward to your feedback and comments on the new look and name for the *FAA Safety Briefing*. Safe flights and happy landings!

Susan Parson is a special assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.

JAMES WILLIAMS

FAA Faces

Improving Safety One Laugh at a Time

If you have been on the air show circuit or any of the national annual aviation events, you may have met Kieran O'Farrell, a regular presenter on flying in Alaska and general flight safety. You may recall her humorous and light-hearted approach to these serious subjects. However, hidden beneath a bubbly and cheery personality is a committed safety professional on a personal mission.

"I like to use humor to make my points," O'Farrell says. "We're all human and we all do really funny or stupid things, and we can learn from them." And, she has learned a lot from experience. A 24-year veteran of Alaskan bush flying and flight instructing, O'Farrell's FAA journey began 12 years ago in the Juneau Flight Standards District Office (FSDO) manager's office.

"He called me in and asked me to apply for a job as an aviation safety inspector," O'Farrell explains. "I said, 'What? You can't catch me, so now you want to hire me?' But, he made a good point. He said 'You can't fix what's wrong and what you care about from where you are.'"

Taking a Stand

That advice didn't fall on deaf ears. "In 24 years, I lost 17 friends to Alaskan flying," O'Farrell says. "It's an amazing place to fly, but it's very unforgiving." For nine years, O'Farrell worked in the Juneau FSDO to help improve a situation she knew all too well. Next, she joined the FAA Safety Team (FAASTeam), which eventually led to a dramatic change of scenery and climate.

Today, she serves as the Frontline Manager of the FAASTeam National Resource Center (NRC) in Lakeland, Florida. "At the NRC, we function as a hub for the FAASTeam. We look at the data and coordinate the efforts of the FAASTeam across the country to maximize our effect on safety. It's a dynamic group of people, and I'm proud to be a part of it."

Making a Difference

"I love working with the FAASTeam because I get the opportunity to make a difference around the country." A big key to the FAASTeam's success is its Web site (www.FAASafety.gov) where more than half of all airmen are registered. They receive updates on seminars in their area and the latest FAA safety information via email.

"The most dangerous thing for any pilot is complacency," is O'Farrell's response when asked about the greatest threat to GA safety. "Being in the here and now is the difference between making a smart command decision and letting something irrelevant distract you in the event of an emergency or create that emergency. We all need to work on airmanship and professionalism in the cockpit.

The most dangerous thing for any pilot is complacency.

"I think the greatest thing about aviation is that it touches everyone's life," O'Farrell continues. "General aviation is so diverse and filled with memorable characters. That's what makes it such a great community…because there's a shared admiration between the pilot in the *Cub* and the pilot at the controls of a 747. Both are sitting there thinking the other's in a great situation. This community is one of mutual admiration for its story-rich diversity, and that is what makes this job so awesome."

James Williams is the FAA Aviation News' assistant editor and photo editor. He is also a pilot and ground instructor.

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