

FAA Safety

BRIEFING

March/April 2018

Your source for general aviation news and information

Flying Companions Guide to GA: *Part II*

Bring Your "A" Game
to Flying [p 10](#)

Flight of the
Navigator [p 12](#)

How to Be a Weather
Wingman [p 24](#)



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The March/April 2018 issue of *FAA Safety Briefing* focuses on **Flying Companions**. Building on our previous companion-based edition in 2014, this issue is specifically designed for the friends and loved ones who join us in the air or might have an interest in doing so. Feature articles help regular or prospective passengers gain a better understanding of the world of general aviation and offer the tips, techniques, and resources needed to take a more active role during flight.



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The Flying Companion's Compendium

Like most pilots, I am eager for family members to share my enthusiasm for flight and I'm thankful for my wife's support for my aviation activities. I'm anxious to have family and friends fly with me, and I want them to enjoy the experience as much as I do.

Because I know how important family support is to a pilot, I am very pleased that this issue of *FAA Safety Briefing* revisits and builds on the GA Flying Companion's guide we published in July/August 2014. As before, this issue is devoted to, and specifically designed for, the family members and friends who share the skies with us in the wonderful world of GA flying. This time, though, we also touch on the challenges of having a fellow pilot flying with you.

I am confident that you and your flying companions will find a wealth of helpful information, advice, and practical suggestions in these pages, which are organized in terms of the aviate-navigate-communicate-mitigate framework we've been using in the past few issues.

Through the articles in this issue, flying companions will have the foundation they need to better understand GA. Those looking for a more active role will also have a good start on being able to help monitor and manage the flight.

Helping Hands

Here's a short checklist of things a flying companion — regardless of aviation qualifications — can do to assist the pilot.

Watch for traffic: One of the most important things a passenger can do is to watch for other airplanes and point them out to the pilot. If the pilot is monitoring an ATC frequency, listen to traffic calls that the controller makes and try to spot the other airplane. You will learn in this issue how controllers use a combination of clock positions, distance, and altitude to convey the other aircraft's position relative to yours.

Run checklists: Pilots at all levels make extensive use of checklists to ensure that all necessary tasks

are completed at the right time, and in the correct sequence. One way to help is to "run" the checklist by reading items to the pilot, and then watching to ensure completion of the required task. In addition to being a big help to the pilot, performing this task will boost your knowledge of the aircraft and of safety-focused aviation procedures.

Monitor progress: Even in the era of moving map navigators, there is no substitute for human situational and positional awareness. A companion can learn to read paper charts, tablet navigation apps, or panel-mounted moving map navigators; follow the progress of the flight; and make verbal callouts when the aircraft crosses a named navigational point. Especially on a flight where ATC gives instructions, it is also helpful to keep a written log of assigned headings, altitudes, and radio frequencies.

Set/monitor radios:

Still another way to assist the pilot is to set and change radio frequencies. A flying companion can also learn to set the aircraft's ATC-assigned transponder code, and to perform basic functions on the installed or hand-held moving map navigator(s).

Happy Hearts

Our hope is that flying companions will eagerly read this issue cover to cover, and take it all to heart. But even if none of your companions can be persuaded to read this passenger-focused issue, I am confident that you will find lots of useful tips and "talking points" to answer or even anticipate their questions.

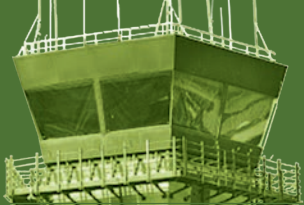
We'll look forward to your feedback, and publish any passenger-care tips you care to share in a future issue.

Through the articles in this issue, flying companions will have the foundation they need to better understand GA. Those looking for a more active role will also have a good start on being able to help monitor and manage the flight.

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Attention ADS-B Non-Compliant Aircraft

In early January 2018, the FAA launched a campaign to significantly reduce the high number of non-compliant ADS-B Out equipped aircraft in the two years remaining before the 2020 deadline. The campaign started with the FAA's ADS-B Focus Team (AFT) mailing hundreds of notification letters to aircraft owners and operators with non-compliant ADS-B equipment.

If you want to find out if you're on the AFT's non-compliant aircraft list, use the Public ADS-B Performance Report (PAPR) service at adsbperformance.faa.gov/PAPRRequest.aspx. If the PAPR identifies problems with your ADS-B equipment, go ahead and get the problem resolved as soon as possible. If you need assistance interpreting a PAPR, there's a user's guide available at adsbperformance.faa.gov/PAPRUsersGuide.pdf, or questions can be submitted via email to 9-AWA-AFS-300-ADSB-AvionicsCheck@faa.gov.

Aerobatic Pilots and ADS-B

As of January 1, 2020, ADS-B Out will be required in most controlled airspace. Pilots who are practicing aerobatics, performing in an air show, or competing in an event, will also be required to report their position via ADS-B Out. This requirement is no different from the current requirement to use an operating transponder for these types of flight operations. The FAA maintains that the ability of controllers and other pilots to identify and track aerobatic aircraft via ADS-B will enhance safety.

According to Sue Gardner, the FAA's national event specialist, the agency has three messages for the community of aerobatic pilots:

1. ADS-B equipment does not function properly during aerobatic maneuvers, and the FAA will not penalize any pilot in that situation.

2. ADS-B Out is valuable for safety when an aerobatic aircraft is not performing dynamic maneuvers. It will transmit an aircraft's identity and position to controllers and pilots of other aircraft equipped with ADS-B In, even if their aircraft is not being tracked on radar.
3. Equipping with ADS-B Out, and In, will help pilots of aerobatic aircraft travel safely to and from events.

The FAA is developing a new policy on the aerobatic use of ADS-B, available in early 2018. The policy will be accessible in the FAA's Flight Standards Information Management System (Order 8900.1) and advisory circular, AC 91-45D, *Waivers: Aviation Events*.

Gardner says the FAA policy for ADS-B is being written in the same way as for transponders. The transponder rule has no waiver under 14 CFR section 91.205. With few exceptions, pilots are required to turn on the transponder. For instance, while in formation when aircraft are not separated during the maneuvering sequence, only the lead aircraft needs ADS-B turned on. This must be authorized by the controlling FAA facility, in advance.

New Option Available for Online BasicMed Course

An online medical course is one of the required steps for pilots seeking to operate under BasicMed without an FAA medical certificate. A pilot must first obtain a physical examination from a state-licensed physician using the Comprehensive Medical Examination Checklist (available at <http://bit.ly/2CZUUAd>). A pilot must then complete an approved BasicMed medical education course. In addition to the AOPA course that was approved last April (BasicMedicalCourse.AOPA.org), pilots now have the option to take the online BasicMed course with the Mayo Clinic at BasicMed.Mayo.edu.

To learn more about flying under BasicMed, go to www.faa.gov/go/BasicMed.

Sun 'n Fun 2018

Get ready for some fun in the sun aviation style at this year's Sun 'n Fun International Fly-In and Expo, scheduled to take place April 10-15, 2018, in Lakeland, Fla. This aviation extravaganza attracts aviators and airplane enthusiasts from all over the



The FAA's DroneZone is a "one-stop shop" for all UAS information and resources. Within the DroneZone Portal, you can also register a drone, apply for a Part 107 waiver, request a waiver or authorization, check the status of a waiver/authorization request, or submit a UAS accident report.

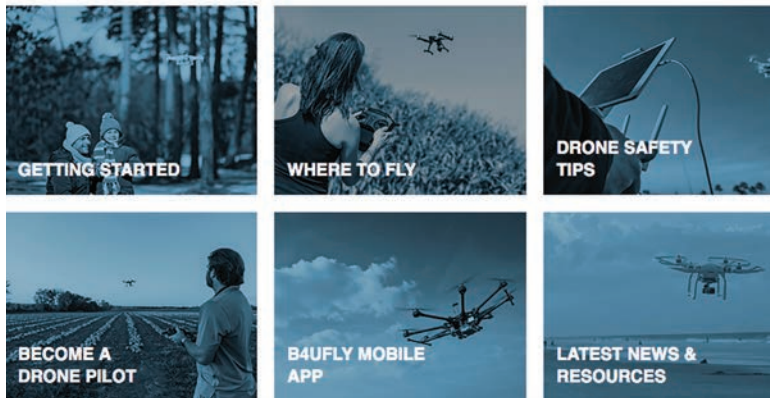
globe. The event features aerial performances, exhibits, and a wide variety of educational seminars (visit bit.ly/SnF18 for more information).

The FAA will also host a series of safety forums between 8:30 a.m. and 2:00 p.m. each day at the FAA Safety Team's National Resource Center. NTSB Board Member Dr. Earl Weener is scheduled to speak about loss of control accidents and the FAA's General Aviation and Commercial Division Manager, Brad Palmer, will discuss the agency's efforts to enhance GA safety. Other forum topics include wilderness survival, BasicMed, UAS regulations, and ADS-B equipage. See the safety forum schedule on page 7 of this issue or take a look at go.usa.gov/x9MZq. And if you're planning to fly to Sun 'n Fun, don't forget to read the 2018 Sun 'n Fun Notice to Airmen (NOTAM) available at faa.gov/air_traffic/publications/notices.

In the Drone Zone

The FAA is aiming to consolidate and improve the processing of unmanned aircraft system registrations, waiver applications, and incident reports with a new cloud-based application — the FAADroneZone (faa.gov/Dronezone).

The FAADroneZone is now the main hub for public, commercial, and government small unmanned aircraft systems (UAS) applicants and operators, for FAA personnel in charge of handling UAS-related submissions and data, and for other agencies and Congress with inquiries on small UAS usage.



While the FAA's automated Low Altitude Authorization and Notification Capability system is the quickest way for a small UAS operator to acquire an airspace authorization, there currently is no single place where operators can register their drones, apply for airspace or operational waivers, check the status of their applications, or submit UAS accident reports. The FAADroneZone encompasses all of those capabilities. The website will also feature "smart" waiver application guidance to facilitate applicants' success for approval.

Flight Plan Changes in Effect for DC FRZ

The FAA will transfer responsibility for the filing of Flight Restricted Zone (FRZ) flight plans from the Flight Service to the Flight Data Unit, located at the

Safety Enhancement Topics

March: Emergency Procedure Training

How to best prepare for the unexpected.



April: Smart Cockpit Technology

Exploring how today's smart cockpit technology may reduce the GA accident rate.



Please visit www.faa.gov/news/safety_briefing for more information on these and other topics.



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Washington Air Route Traffic Control Center (ARTCC), on March 29, 2018. The transfer of this responsibility will increase security in the validation of flights allowed to operate in the FRZ. Pilots will need to use a new telephone number to call in a FRZ flight plan.

Pilots flying in the Washington, DC metropolitan area, designated as both a Special Flight Rules Area (SFRA) and a FRZ, are under additional security measures to protect the nation's capital. The SFRA is an area where the identification, location, and control of aircraft is required and considered national defense airspace. The SFRA consists of a lateral 30-nm radius of the DCA VOR/DME and is clearly marked on the Washington DC sectional chart and the associated terminal area chart. The FRZ, which is subject to additional restrictions, is located within the SFRA and covers approximately the area within a 13-15 nm radius of Washington, DC.

Before departure, IFR and VFR pilots wishing to fly through or within the FRZ, or depart or arrive at College Park, Potomac Airfield, or Washington Executive/Hyde Field airports currently must file a FRZ flight plan with the Washington Hub Flight Service Station. Effective March 29, 2018, at 0400Z, the Washington ARTCC Flight Data Unit will file pilot's FRZ flight plans. These flight plans are only accepted after it has been determined that the aircraft is on the applicable waiver list, or the pilot has provided the appropriate identification. Pilots will not be able to submit any flight plans to or from a FRZ airport online. To receive search and rescue services, pilots must file a separate VFR flight plan with Flight Service.

Check NOTAMs for updated information and the phone number to file a FRZ flight plan. In addition, the DC Special Flight Rules Area course was updated to reflect this change. For further information on training required to fly in the Washington, DC metropolitan area, visit the FAA Safety website bit.ly/2nGg6S2.

The Ultimate Safety Pilot

The safety pilot function is well known in aviation. In specific terms, a safety pilot is a second pilot whose presence is required for certain training scenarios, such as instrument flight training and practice.

A flying companion can also be a safety pilot, albeit in a different context. I'll describe two levels of this safety pilot role which, depending on your relationship with the pilot, may be available to you as a flying companion.

The Here and Now

The first level is assessing the current condition of the pilot. A frequent flying companion may be in the best position to see if the pilot looks tired, or if he or she is a bit under the weather. The pilot may be trying to keep on schedule or simply looking to get a flight in to keep from disappointing you or the group. This kind of pressure is both very subtle and very real. As it relates to pilot fitness, weather, aircraft issues, or anything else that could impact flight safety, the first thing that you, as the "medical safety pilot," need to do is to make it clear that this flight doesn't have to happen, and that it certainly doesn't have to happen right now. In addition, simply verbalizing to the pilot your observations or concerns, can have a major impact. The goal is to alleviate the "external factors" pressure on the pilot.

Another pilot fitness consideration arises from medication, including over-the-counter (OTC) medications. If your pilot is experiencing something like allergies, the symptoms may be a problem, but the OTC medication might be an even bigger one. One of the most common OTC meds for allergies is diphenhydramine (tradename Benadryl), but it's also found in many other meds. Since it is primarily used for allergies, pilots don't always recognize that diphenhydramine can cause significant impairment to the executive functions of the brain that are so critical to flying. Note that diphenhydramine is also used as a sedative in many PM or nighttime-labeled OTC medications.

There are other seemingly harmless medications that can cause major problems for unsuspecting pilots, so caution is warranted. While some meds are strictly disqualifying, others may be considered on a case-by-case basis due to their differing reactions among users. Help your pilot by posing questions: Is this drug disqualifying? Are there warnings on

the package insert to "not drive or operate heavy machinery?" Has the pilot taken this drug before without adverse side effects? Your role isn't to determine the answer to these questions, but rather to act as a sounding board and ask these types of questions where appropriate.

The Sky Ahead

The second level is assessing the pilot's overall use of medications and his or her actual impairment. This level is best evaluated by close friends and family members. This level isn't about the actual go/no-go decision, but focuses more on the bigger picture. For example, one issue could be the prolonged use of medication. Such as, has the pilot been taking Ibuprofen for a while? The medication itself isn't a problem, but the underlying condition is more often the greatest concern.

A more difficult issue comes in the form of a subtle impairment brought on by some form of cognitive deficit. This could present itself as lapses in memory, for instance, that go well beyond occasionally forgetting where you put your keys. It is very hard for the person suffering from this type of condition to even recognize the deficit. While sometimes these symptoms can exhibit the early stages of some kind of cognitive condition like Alzheimer's disease or other dementia, there are also more treatable conditions that could cause such symptoms as well.

Conditions that disrupt proper sleep, for example, can have very similar symptoms. Sleep apnea is an obvious example, but one that might not jump out is acid reflux. Acid reflux can occur at night and cause imperceptible disruptions to your sleep. Regardless of the cause, sleep disruption could significantly impair cognitive performance. The good news however, is that both of these conditions are treatable.

To summarize, the flying companion's safety pilot role is not to make the actual decision, but to make sure that the pilot's decision is an informed one. Simply asking, "Do we have to go today?" or, "Are you sure you're feeling up to it?" can help facilitate better decision making for the pilot. Better decision making means fewer accidents. That's a goal we should all strive for, and as the flying companion's safety pilot, it's a goal that you can help us all achieve.

A flying companion can also be a safety pilot.



Hypertension

*[Editor's Note: To provide a wider range of medical information to aviation enthusiasts, we have retired "Ask Medical" and introduced **Condition Inspection**, which will focus on a specific medical condition in each issue.]*

Definition

Hypertension (high blood pressure) is one of the most common conditions faced by airmen seeking medical certification. Blood pressure is the measurement of the force of the blood pushing against the walls of the arteries as the heart pumps blood. The measurement is presented as two

Hypertension is one of the most common conditions faced by airmen seeking medical certification.

numbers: the systolic (top number) over the diastolic (bottom number) in millimeters of mercury (mmHg).

A doctor should not diagnose hypertension based on a single reading or at one point in time. However, at the time of your FAA exam, a single systolic reading higher than 155 or a diastolic reading higher than 95 will require your Aviation Medical Examiner (AME) to follow up.

Recently, the American College of Cardiology published new hypertension guidelines, as shown in the table below.

Frequently Asked Questions

I have hypertension, what should I do?

You should determine an appropriate treatment plan with your physician. Uncontrolled hypertension significantly increases your risk of stroke, heart attack, and other vascular diseases. It is also disqualifying for FAA medical certification.

Can I get treatment that is acceptable to the FAA?

Lifestyle changes such as weight loss, exercise, and a healthy diet are highly encouraged. Nearly all anti-hypertensive medications are acceptable to the FAA, including combinations of up to three medications. The one exception is the class of drugs known as "centrally acting" e.g., Catapres, but this class is generally avoided in current practice. More than three drugs will require a special issuance.

How long will it take to get my medical certificate?

If you meet all of the criteria listed in the Conditions AMEs Can Issue (CACI) worksheet, your AME can issue a medical certificate at the time of your exam. You can view that worksheet at bit.ly/2saYbrn or simply Google "FAA CACI Hypertension." If you have any questions, call your AME or Regional Flight Surgeon.

Correction: In our last Ask Medical department (Jan/Feb 2018), we incorrectly stated in Answer 1 that the use of unifocal, non-accommodating intraocular lenses is not acceptable. Use of unifocal, non-accommodating intraocular lenses is acceptable, as well as multifocal lenses. We regret the error.

Penny Giovanetti, D.O., received a bachelor's degree from Stanford, a master's in Environmental Health and Preventive Medicine from the University of Iowa and doctorate from Des Moines University. She completed a 27-year career as an Air Force flight surgeon. She is board certified in aerospace medicine, occupational medicine and physical medicine/rehabilitation. She is also a Fellow of the Aerospace Medical Association and a private pilot.

Blood Pressure	Systolic Reading (mmHg)	Diastolic Reading (mmHg)
Normal	lower than 120	lower than 80
Stage 1 hypertension	between 130-139	between 80-89
Stage 2 hypertension	140 or higher	90 or higher

FAA Safety Forums at SUN 'n FUN 2018

April 10 - 15, 2018 - Lakeland, FL

	8:30 – 9:30	10:00 – 11:00	11:30 – 12:30	1:00 – 2:00
Tuesday April 10, 2018	Wilderness Survival, Part 1 Mike Millard, FAA AFS-830	Wilderness Survival, Part 2 Mike Millard, FAA AFS-830	UAS Regulatory Environment Chris Huebner, FAA AFS-830	Bahamas Flying Terry Carbonell Bahamas Flying Ambassador
Wednesday April 11, 2018	GA Maintenance Insights Al Kimball, DAR	Partnering with GA to Enhance Aviation Safety Brad Palmer, FAA AFS-800	ADS-B Solutions Pahan Ranasingha Avionics Installations, Inc. FAASTeam Lead Rep	ADS-B Equipage Countdown Jens Hennig, GAMA James Marks, FAA Melissa Rudinger, AOPA
Thursday April 12, 2018	Wilderness Survival, Part 1 Mike Millard, FAA AFS-830	Wilderness Survival, Part 2 Mike Millard, FAA AFS-830	Parts 61 / 91 / 141 Regulatory Proposals Update Marcel Bernard, FAA AFS-810	GA and Experimental Accident Review Larry Lewis, NTSB
Friday April 13, 2018	No Events Scheduled (Ceremony Set-Up)	FAA Master Pilot, Master Mechanic Awards Presented by FAA VIP	1200 — 1300 TBA Inquire at FAA Safety Center	Meet the FAA FAA Leadership
Saturday April 14, 2018	Preventing Loss of Control Dr. Earl Weener NTSB Board Member	Congressional Town Hall Hosted by Sun-n-Fun US Congressmen TBA	BasicMed Program Updates Bradley Zeigler, FAA AFS-810	UAS Regulatory Env't Chris Huebner, FAA AFS-830
Sunday April 15, 2018	Hazards of Call Sign Mismatches James Kenney, FAA AFS-430	Future Avionics Technologies Diego Alfonso Flying Colors	Engine Failure Prevention & Survival Diego Alfonso Flying Colors	Weather Factors in GA Accidents Paul Suffern, NTSB

Link to Orlando FSDO
website for updates
and other info:
go.usa.gov/x9MZq



*Schedule subject to change. FAA Forums are held at the
FAA's Orlando Field Office (aka FAA Safety Center) located
at 4425 Sun N Fun Rd. The facility opens daily at 8:00 a.m.,
and the exhibits are open daily from 9:00 a.m. — 5:00 p.m.*

v1a

Look Listen FOCUS

LIVES
ARE AT
STAKE!



to



- **IT CAN HAPPEN TO YOU:** By keeping your head down to complete a checklist or other operational duties, OR engaging in non-operational conversation with passengers while approaching the runway, you may accidentally cross a hold short line.
- **THE FIX:** Complete all checklists prior to leaving the ramp and follow the airlines' lead and adopt a sterile flight deck rule while taxiing.



Federal Aviation
Administration

For additional runway safety education, take the AOPA Air Safety Institute's Runway Safety online course at www.airsafetyinstitute.org/runwaysafety.

SUSAN PARSON

Aviation 101



Understanding the Flying Companion Role

If there is a pilot in your life, chances are good that you have been “encouraged” to occupy the passenger seat in a GA airplane. As an enthusiastic presenter of flying companion seminars over the years, though, I’ve met quite a few reluctant passengers. To help self-described cockpit cowards make the transition to comfortable and confident cockpit companions, I structure these sessions around a couple of key points.

First, GA flying is not a death-defying activity undertaken by risk-loving daredevils. Yes, there is risk, but it can be managed. The scary stuff you see in the media ironically arises not so much because aviation accidents are common, but rather because, unlike auto accidents, they are rare enough to be newsworthy. Certification and maintenance requirements for both aircraft and pilots are a lot more demanding than most people realize, and pilots are intelligent, rational, and accomplished people who get a lot more training than that required for a driver’s license. There are also more inspection requirements for airplanes, and recurrent training requirements for pilots.

Second, pilot incapacitation, which is a common concern in the flying companion community, is rare. Like accidents, these stories make headlines primarily because they are unusual occurrences. That said, acquiring some basic knowledge and skill through ground training and a few hours of hands-on flight training with a good flight instructor can be a great confidence booster. It’s very unlikely a flying companion will ever need to take over the controls, but learning a few basics can enhance confidence, enjoyment, and the ability to lighten the pilot’s workload.

What Does A Flying Companion Really Need to Know?

Pilots quickly learn the Aviate-Navigate-Communicate mantra, which serves as a reminder of essential duties and priorities. Because it’s both helpful and easy to remember, we have chosen to use this framework to present essential information for flying companions.

We have added “mitigate” — another term for risk management — at the end for convenience, but mitigating hazards is really an ongoing process. So it’s no coincidence that you will find more articles under the “mitigate” rubric than in other sections.

Here’s a quick preview of this issue:

Aviate is a fancy word for “fly the airplane,” which is the most important duty. Aviating means controlling attitude, airspeed, and altitude, so we’ll talk about using flight controls and instruments to accomplish those essential tasks.

Navigate means knowing where you are, where you want to go, and how to get there. With the advent of moving map navigators, both those installed in the airplane and those provided through tablets and other handheld devices, navigation is easier than ever before.

Communicate — You are never more than a click of the mic from help; using 121.5 — the “911 of the sky” — will get an instant response. But we will also offer tips for learning and practicing basic radio functions on routine flights, along with a primer on PilotSpeak.

Mitigate means managing risk by identifying hazards and taking action to eliminate or reduce them before they cause a problem. We will look at several areas of practical risk mitigation. We also provide a mnemonic passenger S-A-F-E-T-Y briefing checklist you can use.

There’s a lot to cover, but we’ll make it fun. So, as they say on commercial flights: sit back, relax, enjoy the trip ... and let us know if there’s anything we can do to make your GA flying companion journey more comfortable. ✈️

Acquiring some basic knowledge and skill through ground training and a few hours of hands-on flight training with a good flight instructor can be a great confidence booster.

Susan Parson (susan.parson@faa.gov, or @aviBrix for Twitter fans) is editor of FAA Safety Briefing. She is an active general aviation pilot and flight instructor.



SUSAN PARSON

Bring Your “A” Game

Fly the Airplane, First and Always

Early in training, pilots are taught to fly the airplane first, last, and always. This idea is formalized in the “aviate-navigate-communicate” mantra presented during the very first flight lesson, if not before.

In a “well, DUH” sort of way, it intuitively makes sense that a pilot’s top priority, both in normal operations and in not-so-normal times, is to fly the airplane before tending to any other task. However, those of us whose four-part Myers-Briggs Type Indicator includes an “S” for sensor (versus an “N” for intuitive) have a strong need to know what that means in very practical and very specific terms.

I eventually came to understand that it’s about bringing your “A game.” To aviate — to fly the airplane — means using the flight controls and flight instruments to direct and control the airplane’s *attitude*, *airspeed*, and *altitude*. So let’s get straight on the As.

Attitude

The term attitude refers to the aircraft’s orientation with respect to the horizon.

In flight under visual flight rules (VFR), weather conditions are good enough for the pilot to see and use the natural horizon as a reference point for the what pilots call the four fundamentals: straight and level flight, climbs, turns, and descents.



Attitude indicator

To learn what the right attitude looks like for various phases of flight, look outside. Pay close attention to how the airplane’s nose and wingtips look relative to the horizon in each of the four fundamental maneuvers. Take a mental snapshot and, for later study, use your smartphone.

If the weather is not good enough to see outside, the flight occurs in instrument meteorological conditions (IMC), using instrument flight rules (IFR). In this case, the pilot uses an instrument called the attitude indicator, or “artificial horizon,” to establish and maintain the right attitude for the phase of flight.

It takes specific training and lots of practice for a pilot to be proficient in IFR flying. Chances are good that a non-pilot flying companion will never need to take over the flying at all — much less in IMC. If you want to “get the picture,” though, first master outside references for attitude flying, and then start comparing them to how they are depicted on the attitude indicator.

Airspeed

Before we talk about airspeed, I need to briefly introduce another “A” term: aerodynamics. Aerodynamics deals the motion of air, which is a gas, and the forces that act on solid objects, like airplanes, that move through it.



Airspeed gauge

To put it (very) simply, an airplane flies because air moving over the wings generates a force called lift.

Airspeed is the measure of how fast that air is moving. An airplane needs a certain minimum airspeed to take off and fly. You might hear pilots talk about “true” airspeed and “calibrated” airspeed, but the one that matters for this discussion is “indicated” airspeed (IAS), as shown on the airspeed indicator (ASI).

The values for the necessary IAS differ from one airplane to another. A flying companion can certainly memorize numerical airspeed values for the various phases of flight, but it’s a lot easier to use the color coding on the ASI.

As with attitude flying, start paying attention to the placement of the ASI pointer during various phases of flight. In general, though, pilots use an airspeed in the white arc for takeoff/climb and descent/landing. An airspeed in the green arc is used for normal cruise flying. Yellow is for smooth air only, and the red line is the “never exceed” speed. Don’t go there!

Altitude

As with airspeed, aviation uses several kinds of altitude. Most people think first about height above ground level (AGL). AGL is important, but the altimeter displays the altitude that really counts for flying: height above mean sea level (MSL).

The grid on aeronautical charts shows the MSL value for the minimum safe altitude (MSA) in each square, or block of airspace. In the unlikely event that a flying companion needs to take over from an incapacitated pilot, the trick is to use the altimeter to verify that you are at or above the MSA for the airspace you occupy. So part of your A game is knowing how to read the altimeter.

In newer airplanes with “glass cockpit” instruments, the altimeter is easy to read because it is a moving “tape” with numbers beside it. In older airplanes with “round dial” instruments, you might first think the altimeter is a distorted clock from a Salvador Dali painting. You will see numbers from 0 to 9, and three pointers that indicate height in hundreds, thousands, and tens of thousands. It



Altimeter

takes a bit of practice to learn to read this kind of altimeter quickly and accurately, but your pilot can help — and there are lots of YouTube videos that show it in action.

Getting Straight on the As

You need not be a pilot to benefit from the resources that the FAA and the aviation training community have on these topics, so check them out. Aim to get straight on the “A”s of flying the airplane, so your A game will be ready if ever you need to fly the airplane. ✈️

Flying the airplane is about bringing your “A game.” To aviate means using the flight controls and instruments to direct the airplane’s attitude, airspeed, and altitude.

Susan Parson (susan.parson@faa.gov, or @aviatrix for Twitter fans) is editor of FAA Safety Briefing. She is an active general aviation pilot and flight instructor.

Learn More

Pilot’s Handbook of Aeronautical Knowledge (FAA-H-8083-25B)

www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak

Seek out information from Chapter 5 — Aerodynamics of Flight, Chapter 6 — Flight Controls, and Chapter 8 — Flight Instruments.



This modern glass cockpit panel combines altitude, airspeed, and altimeter information in one display.



Flight of the Navigator

Improve Your Navigation Skills as a Flying Companion

Image courtesy of Garmin

JAMES WILLIAMS

In the days before “modern” airplanes, any significant aerial navigation was the preserve of trained specialists. These special navigators were highly trained and just as necessary as the pilot to the flight. But as technology and techniques advanced, the role of the navigator faded into the pages of history books. As navigation got easier and other pilot workload factors decreased, the task of navigation was transferred to the pilot.

So what does all this mean to you as a non-pilot flying companion?

The More Things Change ...

One of the strongest memories of my early GA experiences was learning to be a navigator of sorts for my dad. My motivation was partially to be helpful, but I admit that it was mostly so I didn’t have to wait for a parent’s answer to the age-old “Are we there yet?” question. I became proficient at operating the Distance Measuring Equipment (DME) radio, and I happily occupied myself by plugging in stations along our route. This practice would tell me not only how far we were from the station, but also how fast we were going and, most importantly, how long it would take to get there.

My DME diversion was primarily useful to my father as a means of keeping me quiet. As I got older and our trips got longer, though, my skills expanded into doing actually useful things like tuning radios and setting up nav aids and charts.

This was in a time before GPS, moving maps, or smart anything. The advent of modern avionics and technology has made flying companions potentially much more powerful assets. Let me hasten to assure you that today’s technology has also substantially lowered the learning curve.

Defining the Tools

Modern navigation tools look nothing like their ancestors. They also are quite different from the tools I used as a kid in the 1990s. Gone are the piles of paper, “whiz wheel” circular slide rule “computers,” and other extraneous gizmos. From the flying companion’s point of view, today’s primary tool is the tablet. Apple’s iPad and Google’s Android tablets are great for use in the airplane. One tablet can replace several pounds of charts, books, and pamphlets while also making access to the information infinitely easier.

The next tool is modern aviation applications, or apps. These apps vary in their capabilities so

it's important to know their limitations. What you can do will be dependent on how your airplane is equipped, and what accessories you have. For example, an app may only provide flight planning materials and charts.

You may have access to a lot more information if you have our next pair of tools, Automatic Dependent Surveillance – Broadcast (ADS-B) and GPS.

While GPS is a widely used technology, ADS-B might be largely unknown outside the world of aviation geeks. In simple terms, ADS-B is a two-part system (ADS-B In and ADS-B Out) that essentially replaces the legacy transponder systems which help Air Traffic Control (ATC) track aircraft.

What makes ADS-B Out different from traditional radar is that the information it provides to ATC (and other properly equipped aircraft in the area) also includes GPS location data. This location data is more accurate and updates faster than the old radar/transponder data.

ADS-B In receives data from ATC as well as other aircraft in the area. That allows everyone appropriately equipped to see everyone else which, in turn, makes spotting and avoiding traffic much easier (see the Angle of Attack department in this issue for more info). In addition to traffic data, ADS-B In can also provide free weather data. ADS-B can come from either the avionics installed in the aircraft or from standalone boxes or dongles, although the latter does not meet the FAA's Equip 2020 mandate requirements.

The last tool is modern avionics. We've seen several massive advances in avionics in my relatively short aviation experience. In those 20 or so years, aviation has seen the transition from traditional ground-based navigation to GPS, and from dials and gauges to moving maps. We've also seen a growing movement from moving maps to full "glass" cockpits being relatively attainable in GA. These modern avionics now offer even more power by allowing connections to external devices like your tablet. With some of these avionics and app combinations, you can edit flight plans and even set standby frequencies. That means you can be a lot more helpful. But where to start your navigation training?

Charting a Course

If you want to help the pilot with navigation duties, the first step is to understand what you're looking at in a couple general areas: Charts and Weather. A great place to start for charts is the FAA's Aeronautical Chart User's Guide (faa.gov/air_traffic/flight_info/aeronav/digital_products/aero_guide).

While rather lengthy, you primarily need to get familiar with the pages dedicated to decoding the massive amount of information baked into aeronautical charts. Pages 25 to 29 are a good place to start if you want to get a quick overview of visual flight rules charts. This section covers how airport, navaids, and airspace are depicted, and what information is where. These are probably your biggest bangs for the buck in terms of providing useful information to the pilot with a minimum time investment.

Pages 73 to 77 cover Instrument Flight Rules en route charts, and pages 96 to 118 are about instrument procedures. Looking over these pages will give you a good idea what you are looking at, whether it's in paper form or on a tablet.

Start with that foundation and work your way out, depending on what information is most useful. A good exercise is to pull up a chart on your tablet (or download a chart from the website referenced above) and look up something you want to learn more about.

The most important things are generally airport, navaid, and airspace information. Items such as the airport radio frequency, navaid frequencies, or waypoint names are helpful. When you get comfort-

A radar data screen shot from a tablet. This information

is very helpful, but should only be used strategically — not tactically.

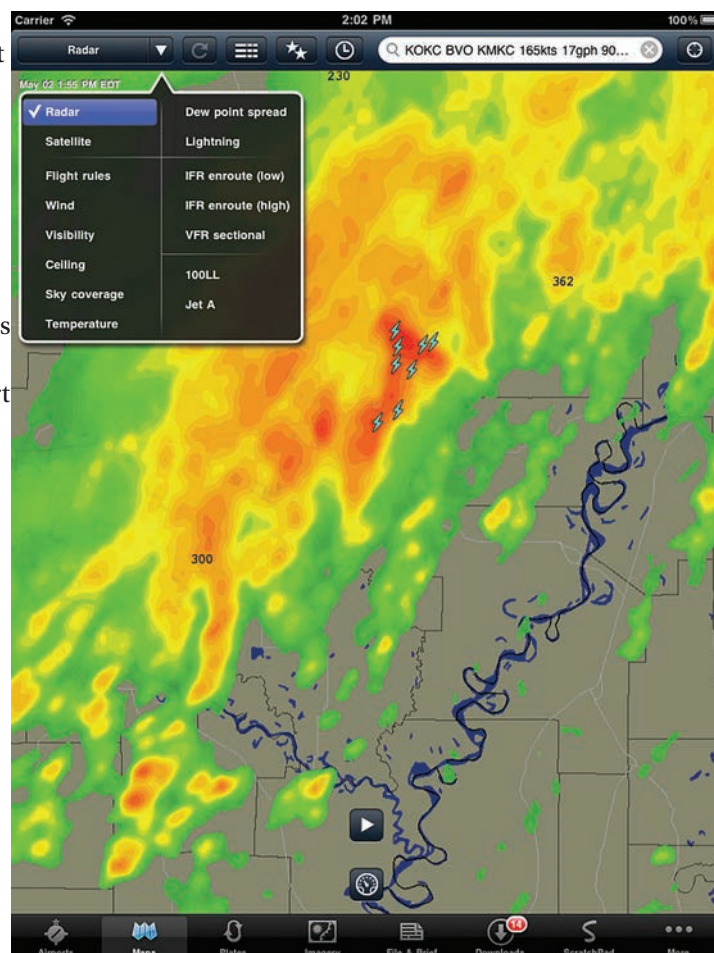


Image courtesy of Foreflight

able with this information, some of these modern setups will even allow you to modify flight plans and upload them to the avionics — a useful skill to acquire as an aid to the pilot.

Whither Weather

Weather is a huge factor in any flight. For this discussion, I will assume you have some kind of live weather feed. The easiest and most familiar place to start is radar. Since everyone is used to looking at radar from the TV, internet, and smartphones, the basic graphics are pretty well understood.

In an aviation context, think of it this way. Light green is probably fine. A little rain is no big deal especially if you're flying IFR. Dark green is a maybe for IFR, but most likely a no for VFR since visibility is likely to drop off as the rain intensity increases. Yellow is a no-go because you are getting into the kind of weather

that, in the best possible circumstance, is going to be very unpleasant for the occupants of a small aircraft. Trust me on this point: even the most solid GA aircraft starts to feel like a cardboard canoe trying to navigate white water rapids as that intensity picks up.

Red areas are a hard no. Don't even think about it. Take the previous example and multiply it by 100. If you see magenta, stay away, very far away — we're talking several counties away.

Radar is a great tool for avoiding the kind of weather that can get you into trouble, but it has some limitations. The radar feed you see in most GA airplanes is a composite of many different radar systems (the same is true of most other radar you see on the internet or TV).

In an airplane, this information is at least five to seven minutes old, maybe as much as 15 minutes old. This is why it's important to avoid any larger cells on the radar by a significant margin, and to pay attention to the trends: which way is the weather heading? Is it getting worse, or better? The bottom line is that radar information in a light GA airplane should be used in a strategic way (give weather a wide berth), not as a tactical tool for picking your way through wicked weather.

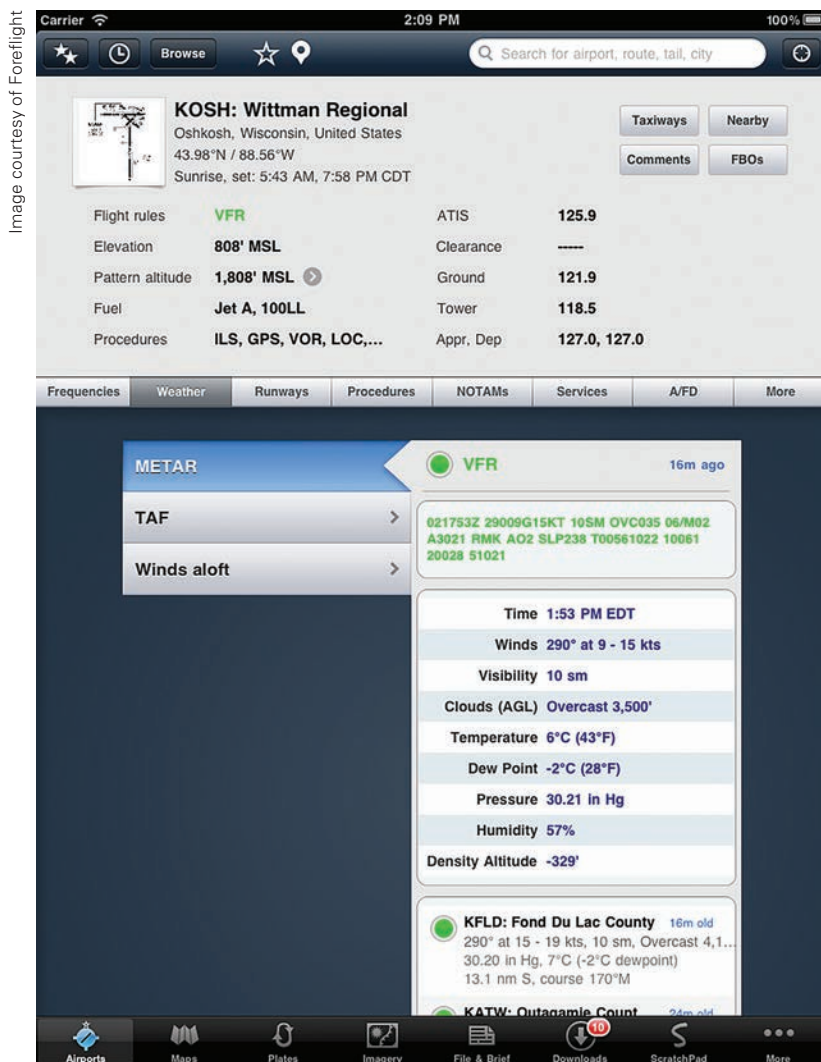
The next level of information is the FAA METAR/TAF info. METAR is a fancy word for what the weather is within the last hour. TAFs are Terminal Area Forecasts, basically just a short-term forecast for the immediate vicinity of the airport.

There is a lot of information in these reports, but there are really only a few pieces most critical for the flying pilot, when you boil it down: Wind, and Ceiling and Visibility. For a more in-depth examination of these factors please see "I've Got Weather (Now What Do I Do with It?)" in the March/April 2015 issue of FAA Safety Briefing: bit.ly/2r08NZN.

Don't worry about the weather code. Most apps will decode METARs and TAFs for you, and many allow you to access the reports by simply tapping on the airport name. You can monitor conditions at your destination, as well as at possible alternate airports along the route. This is especially important if you are encountering adverse weather that demands a diversion.

Having a good idea of nearby airports and their weather conditions, will allow you to assist the pilot as things get busy.

It's also wise to talk to your pilot about his/her personal minimums before the flight, so you can help him or her evaluate conditions and make a sound go/no-go decision.



METAR information is critical for monitoring current conditions at an airport.

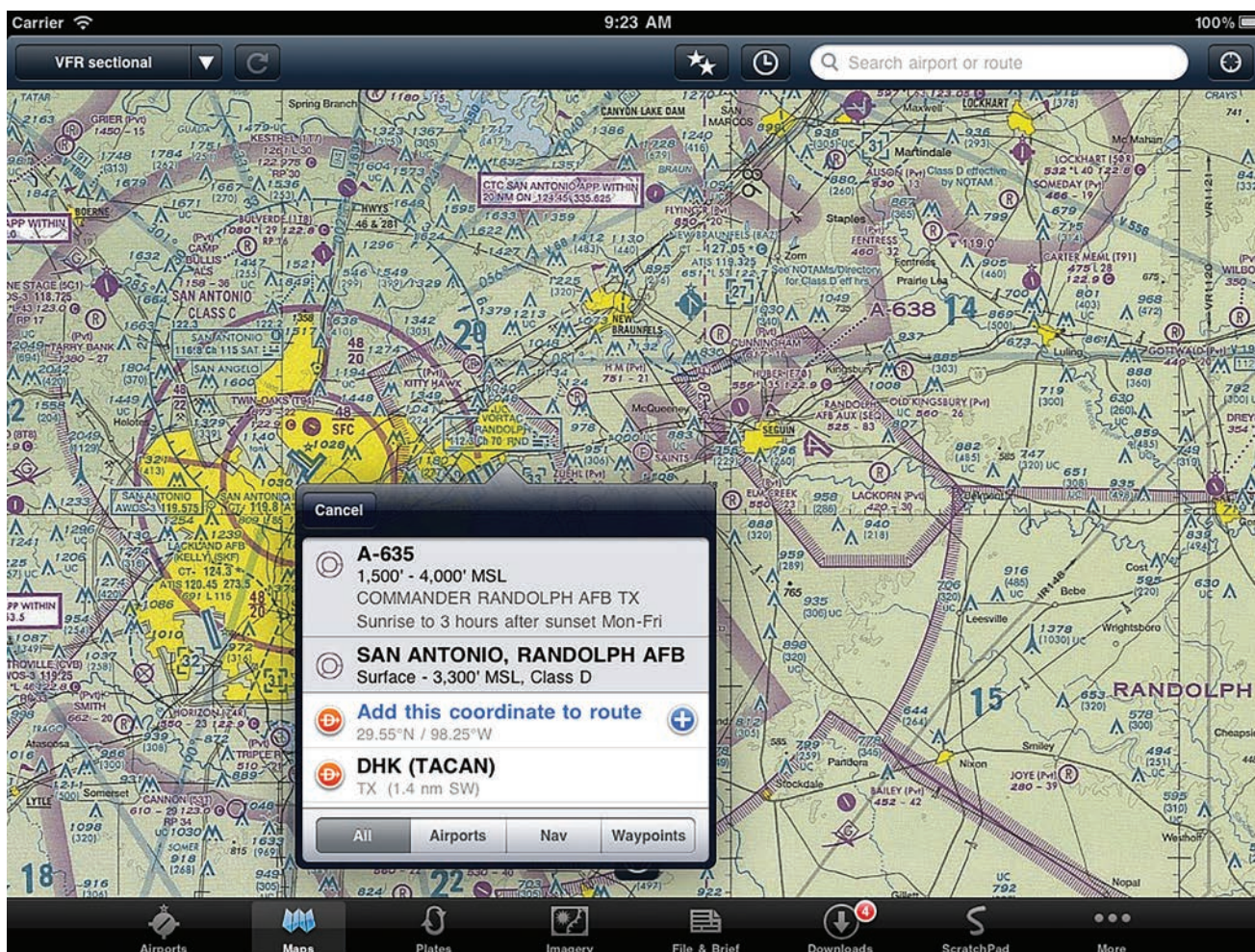


Image courtesy of Foreflight

Some apps allow users to pull up chart information by simply tapping on the item in question.

Preflight Practice

So how do you build these skills when you're not in the airplane? As a companion, you probably don't have the same access to actual seat time that a pilot does. But you can find plenty of online resources. From informative YouTube videos, to FAQ-packed manufacturer sites, to third-party sites that offer reviews, tips, and tricks, the Internet is a great information source for learning the ins and outs of any particular system.

It's also important to know your equipment and how it works. This means everything from making setting adjustments on the tablet to hooking up any required external devices. The latter is much easier these days, as most of the connections are now wireless, but you still have to know how to establish those connections.

A great way to practice is to use PC-based flight simulation. Some apps support connections to popular flight simulators, which allow you to hone and test your skills from the comfort of home. If you're going to be regularly flying with a specific pilot, you might also suggest a couple of sim sessions to get everyone on the same page.

In the end, improving your navigator skills helps you understand more of what's going on during the flight, with the added benefit of reducing the pilot's workload. It may seem daunting at first, but start with the basics suggested here and take it one step at a time. From that foundation, you can continue to build.

Take it from me: developing your navigation know-how is a win-win situation for everyone. 

James Williams is FAA Safety Briefing's associate editor and photo editor. He is also a pilot and ground instructor.

Yellow is a no go because it depicts weather that is likely to be unpleasant for the occupants of a small aircraft. Even the most solid GA aircraft starts to feel like a cardboard canoe trying to navigate white water rapids as intensity picks up.

SUSAN PARSON

IN THE AIR *and* ON THE AIR

Decoding (and Parroting) Pilot Patter

I pride myself on being a word-wrangler. On my first flight lesson, though, I couldn't lasso a single syllable of the static-filled gibberish flowing from the little Cessna's radio. If you've had a similarly baffling experience, here's the not-so-secret "decoder ring" for pilot patter.

Letters and Numbers

First things first. To avoid confusion with similar sounding consonants, the International Civil Aviation Organization (ICAO) has a standard phonetic alphabet for aviation use:

Alpha, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu.

Pilots mostly pronounce numbers as in regular English but with a few exceptions. **Zero** (0) is always "zero," not "oh." **Three** (3) becomes "tree." **Five** (5) becomes "fife." **Nine** (9) becomes "niner."

So if the tail number is N1359T, the pilot and the controller will pronounce the airplane's call sign as: "one-tree-fife-niner Tango." You may or may not hear the call sign start with "November" because, as the first character in the call sign for any U.S.-registered

aircraft, the "November" for "N" is assumed.

Note that for tail numbers, altitudes, and other such transmissions, pilots and controllers pronounce the individual digits: "fife niner" rather than "fifty-nine."

Grammar

Now that you know the letters and numbers, let's look at the "grammar" (structure) and vocabulary. Aviation language follows a sequence of "Ws." With pronunciation as we've indicated earlier, a pilot might say something like: "Phoenix Approach (*whom* you are calling), Skyhawk one-tree-fife-niner Tango (*who* you are), two-zero miles west at fife-tousand, fife hundred feet (*where* you are, both laterally and vertically), landing Falcon Field" (*what* you want to do).

The Air Traffic Controller (ATC) uses a similar sequence to respond: Skyhawk one-tree-fife-niner Tango (*whom* ATC is calling), Phoenix Approach (*who* is making the call), radar contact, twenty miles west, fife-tousand fife hundred feet (*where* the aircraft is). Maintain present heading; descend and maintain tree-tousand, fife hundred feet" (*what* ATC wants you to do).

The letters, numbers, and facility names will vary, but the structural sequence is the same.

Phrasebook

Now let's decode some useful words and phrases:

ATIS (Automatic Terminal Information Service) is recorded information on current weather and airport information, such as runways in use. Each ATIS recording has an alpha-numeric designator. The recording for "ATIS information Foxtrot" follows "ATIS information Echo."

Squawk: This word refers to the aircraft's transponder code, which can be either a standard code (1200 for visual flight rules — VFR) or a discrete code assigned by ATC. It can be a noun ("say assigned squawk"), an adjective ("squawk code is 2345"), or a verb ("squawk 5423").

Mayday: Hopefully you will never have to use this one, but "Mayday" means emergency. In case you're wondering, the word is a corruption of the French term for "help me" (m'aider).

Mystery Man "Roger"

Last but not least ... ever wonder why pilots say "Roger?" Here's a plausible explanation.

The fledgling aviation industry adopted (and adapted) practices from established industries, like telegraph. In the telegraph business, the receiver would send a single letter "R" in Morse code to communicate receipt and comprehension.

Learn More

Aeronautical Information Manual's Pilot/Controller Glossary

go.usa.gov/xnsxG

FAA Safety Team (FAASafetyTeam) Radio Communications Phraseology and Techniques

go.usa.gov/xRFvk

Aeronautical Information Manual

faa.gov/air_traffic/publications/media/aim.pdf

For more information on how to talk like a pilot, take a look at some of our previous articles in *FAA Safety Briefing*: "What Not to Say," in the May/June 2011 issue, "Don't Get Lost in Translation," in the November/December 2012 issue, and "Pilot Speak," on page 12 of the July/August 2014 issue.

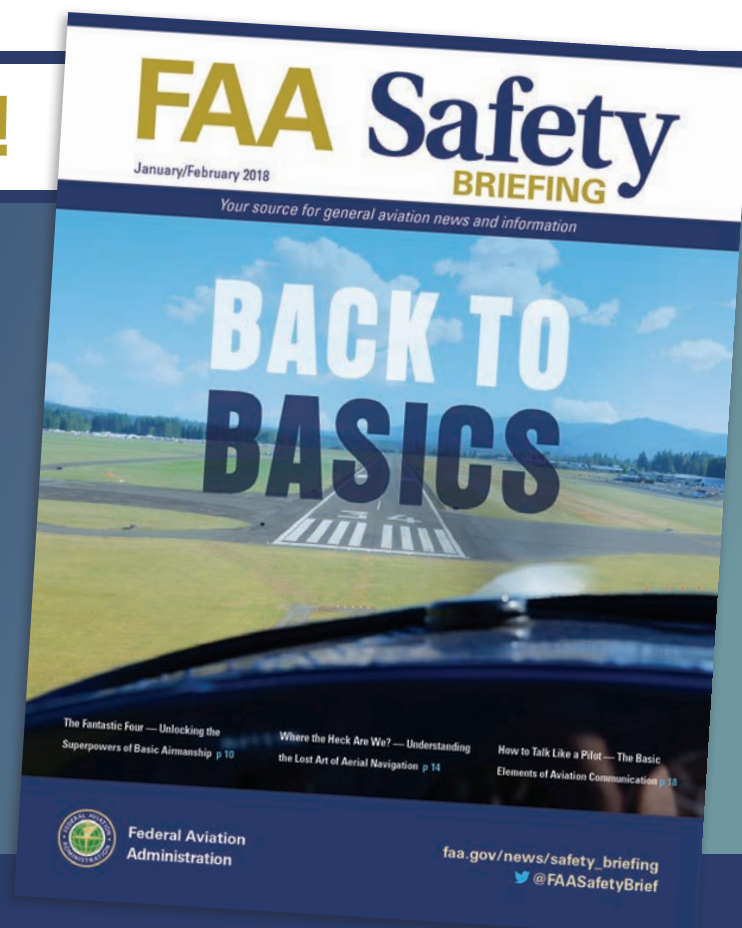
Early pilots did the next best thing by transmitting the word "Roger," the phonetic alphabet version of "R" before ICAO adopted the current scheme. Then, as now, it was simply an acknowledgement that "I have received and understood your last transmission." ✈️

Susan Parson (susan.parson@faa.gov, or @aviatrix for Twitter fans) is editor of FAA Safety Briefing. She is an active general aviation pilot and flight instructor.

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When the Wind Blows *A Mini Weather-Wiki for GA Flying Companions*

Everybody talks about the weather, but nobody does anything about it.

— Mark Twain

If you are the partner or companion of a GA pilot, you have probably noticed that your pilot does more than just talk about the weather. In fact, it might seem that anyone and everyone involved in aviation takes a near-obsessive interest in meteorological matters ... and for very good reason. Unlike commercial airliners, which cruise serenely above the worst of the weather, GA airplanes live where the weather is. So the wise GA pilot aims to be a meteorological maven.

A full-blown weather course is the stuff of textbooks, not magazine articles. Still, you might find it helpful to know what GA pilots consider in the search for “fly-able” weather.

Aviation Weather Data

Pilots do watch broadcast weather reports, but we use them mainly for a broad, big-picture look. For the more detailed information flying requires, we use aviation-specific weather products, both reports and forecasts.

Three of the most commonly-used are the area forecast, the Terminal Aerodrome Forecast (TAF), and the Meteorological Terminal Aviation Routine Weather Report (METAR). The area forecast offers the big picture. Pilots use the TAF to evaluate forecast weather conditions for departure, destination, and en route airports at the times those airports will be used. The METAR provides current conditions at those airports.

There’s a lot of information in these and other aviation weather products, but GA pilots focus on three major meteorological elements: wind, ceiling and visibility, and temperatures.

Wind

For GA flying purposes, wind data comes in two flavors: surface winds, which are provided in TAFs and METARs, and winds aloft, provided in a different report.

A GA airplane pilot needs to consider surface winds in terms of both pilot skill and airplane

capability. If there is a crosswind — that is, wind blowing from the side of the runway — the pilot needs to be proficient in using the controls to keep the airplane in line with the pavement, and to be sure the flight controls have enough authority to counteract the wind.

Pilots use winds aloft data in flight planning. A flight with a headwind will take longer; one with a tailwind will go faster.

Ceiling & Visibility

Aviation uses ceiling and visibility values to define weather in terms of visual or instrument meteorological conditions. Initial certification allows a pilot to fly under Visual Flight Rules (VFR). Flying under Instrument Flight Rules (IFR) requires additional training and testing, as well as regular practice to retain currency and (most important) proficiency. An instrument-rated pilot who hasn’t practiced enough to stay proficient should not be in IFR weather.

Also, there are some instrument conditions, like thunderstorms, that are off limits to all pilots.

Temperatures

Temperatures — both surface and aloft — provide important information about how the airplane will perform. Hot air is thinner, and that means that both the wing and the engine/propeller have to work harder.

Airplanes perform better in colder air, but not if cold air and clouds combine to produce icing conditions. Ice is very dangerous because it reduces lift while adding weight. Unless the airplane is equipped for flight into known icing conditions, the pilot needs to avoid such areas.

Susan Parson (susan.parson@faa.gov, or @avi8rix for Twitter fans) is editor of FAA Safety Briefing. She is an active general aviation pilot and flight instructor.

You might find it helpful to know what GA pilots consider in the search for “fly-able” weather.

Learn More

I’ve Got Weather! (... Now What Do I Do with It?) — Mar/Apr 2015 FAA Safety Briefing
bit.ly/2r08NZN



See Something?

Say Something!

SUSAN PARSON

Flying Companion's Guide to Help Manage Risk

Pilot pride can sometimes interfere with good judgment and good decisions, especially if passengers are involved. Pilots don't want to appear dumb. We don't want to be (or appear to be) cowards. We don't want to disappoint passengers who have agreed — some grudgingly — to put their lives in our hands. We don't want to be (or appear to be) incapable, unable, or unworthy.

Flying companions can do a lot to help a proud pilot make the right decision. In this mitigation-focused section, we'll start with the big picture and then look at several specific areas.

Take It Step by Step

Today's pilot certification requirements include risk management. There are many practical risk management methods around, but PAVE is one of the easiest tools for hazard identification.

Pilot/People: This item reminds the pilot to review readiness for the flight in terms of total experience, recent experience, proficiency, and legal requirements as well as physical and emotional condition. A pilot's partner or friend can be especially helpful in this area, because who is better situated to know when something isn't right?

Aircraft: This item addresses fuel/fuel reserves, mechanical condition, and aircraft performance for day-of-flight conditions. It includes the pilot's level of experience in the type of aircraft, as well as assessment of the airplane's suitability for the type of flight to be made.

enVironment: The V element covers things like airport and runway conditions, airport lighting, terrain, obstacles, and airspace restrictions. It also includes weather. Some pilots are qualified to fly only under Visual Flight Rules (VFR), when the weather is good. But even a pilot qualified for Instrument Flight Rules (IFR) cannot, and should not, attempt to fly in all weather conditions. No GA airplane can safely operate in thunderstorms or severe icing conditions.

External Pressures: Passengers eager for a trip and people waiting at the destination are External Pressures that can adversely impact pilot judgment. A flying companion can help by asking about PAVE hazards for this flight. It is also helpful to actively

assist with plans for a possible delay or diversion. Passengers prepared for these eventualities make it much easier for the pilot to make a "no go" decision when conditions so require.

Build A Buffer Zone

One of the most useful things a pilot can do in aviation safety risk management is to develop personal minimums. I think of personal minimums as the human factors equivalent of reserve fuel. Personal minimums serve a solid safety buffer between the skills and aircraft performance required for a specific flight, and the skills and aircraft performance available.

If your pilot doesn't have written personal minimums, check out "Getting the Maximum from Personal Minimums" (May/June 2006 issue) and encourage him or her to build a personal safety buffer. Once that is in place, a flying companion can contribute by asking the pilot to verify that a proposed flight is consistent with personal minimums. Everybody wins. Personal minimums increase the passenger's comfort and confidence while making it easier for the pilot to make sound decisions.

Just Say No

In addition to speaking up in the areas discussed above, a flying companion can just say no. Agree in advance that if any aspect of the flight is questionable, you will use the veto to request prompt diversion to a safe alternate destination. There will be plenty of time on the ground to review conditions, discuss options, and decide — together — on next steps that will keep everyone safe and ready to fly again.

For an expanded version of this article read "Voice of Reason," in the July/August 2014 issue of FAA Safety Briefing, at bit.ly/2zneCDs. 

Susan Parson (susan.parson@faa.gov, or @aviBrix for Twitter fans) is editor of FAA Safety Briefing. She is an active general aviation pilot and flight instructor.

Learn More

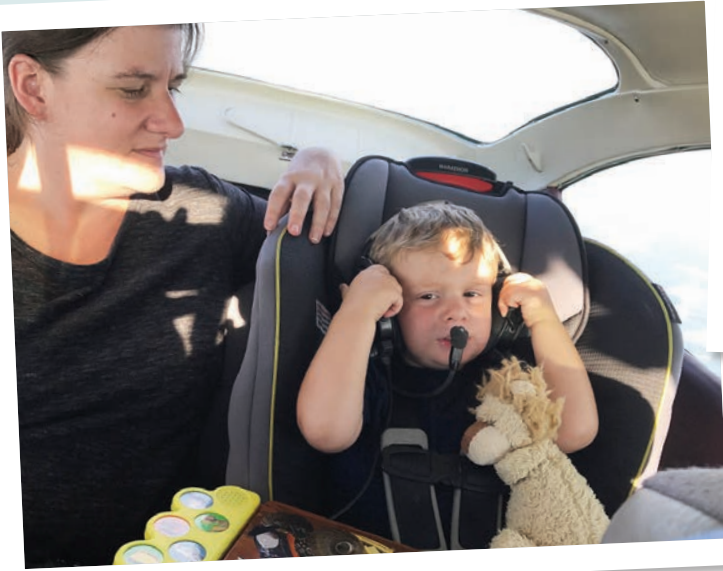
"Your Safety Reserve, Developing Your Personal Minimums"

FAA Safety Briefing — March/April 2015, p 31
bit.ly/2r08NZN



MITIGATE

Flying with Mates, Munchkins, and Mutts



Tips for Keeping Your Passengers Safe— and Happy

BRAD ZEIGLER

Pre-flight the Preflight

My wife and I often drive separately when our family travels. I leave for the airport early with the luggage, and she comes a bit later with the dog and our 3-year old son. That way I have the time to do a thorough walk-around, arrange for fuel, check the

paperwork, load the luggage, install the child safety seat, file my flight plan, and mentally prepare for the flight. My wife simply parks her car, arranges a last minute potty

break, and hops in, while I load up the dog and the toddler. My experience suggests that toddlers (and really kids of any age) don't like waiting around. My wife feels like a rock star because she shows up, and we're in the air less than 10 minutes later.

Brief the Flight

Whether it's their first or four thousandth flight with you, be sure to brief your passengers in age-appropriate language about what your plan for the flight is, what they can and cannot do during the flight, when it's okay to speak, etc., as well as how

to exit the airplane quickly if necessary. I generally avoid the words "in the event of an emergency" in my briefings, but make sure I cover everything that needs to be covered. Some pilots provide passenger safety briefing cards, which may be useful depending on the passenger.

Make the First Flight Short ... but With a Purpose

Someone who's never been in a small plane before may have many preconceived notions of how the experience will play out. No doubt they have concerns for safety, their ability to keep their lunch down, etc. I try to keep the flight as "boring" as possible — shallow bank turns, smooth gradual maneuvers, and slow, ear-friendly descents. No need to impress anyone with the maneuverability of your plane — we're building trust, not trying to shake off attacking MiGs. While the flight may be "boring," make sure it has a purpose. That could be flying over a familiar town, scenic area, or the proverbial "Benjamin Burger" at another airport close by.

Pair a Newbie with a More Experienced Passenger

This tip doesn't work in a two-seat aircraft, but one way to take the stress off of a new passenger is to bring someone else along — ideally a trustworthy person

Whether it's their first or four thousandth flight with you, be sure to brief your passengers in age-appropriate language about what your plan for the flight is, what they can and cannot do during the flight, when it's okay to speak, and how to exit the airplane quickly if necessary.

such as a parent or a friend — to join the first-timer. The new passenger will look to the experienced passenger for cues. Something as simple as a flap movement or an autopilot disconnect alert may initially cause alarm to the newbie; seeing the experienced friend's nonchalance will provide comfort. Also, they can answer questions when the pilot is busy.

Keep Them Safe and Comfortable

If your little ones need a child safety seat in the car, then you need the same in the airplane. Practice ahead of time on how to install it; most GA aircraft won't have the LATCH connections so you'll need to make sure it's secured with the safety belts. Consult the child safety seat manufacturer and/or the aircraft flight manual/operating handbook for more information. For everyone else, make sure they know how to work the safety restraints since they're usually different from what passengers are used to in the car.

Make sure everyone has some form of hearing protection that fits, whether or not they're old enough to have a headset that plugs into the intercom. You can even find hearing protection for babies nowadays.

Pro tip: Get the little ones accustomed to keeping the headset on before you make it to the plane. Fighting with your toddler to keep it on is not fun for anyone.

Explain What You're Doing but Don't Overdo It

One thing that passengers love about flying in GA aircraft is the ability to actually see how the pilot flies the airplane. They'll be watching what you do and wondering why you do it. Use terms that they can understand: a traffic pattern at an airport is a lot like a traffic circle on a roadway; it allows planes to enter and exit while continuously moving. They'll wonder about your radio calls, the intercom system, and whether the "tower" can hear them talking through it. You'll explain that only you can be heard outside the aircraft, and only when you key the mike.

What you want to avoid is long, esoteric explanations of aerodynamic concepts (unless your passenger happens to be an aeronautical engineer). Stick to simple concepts. Avoid unnecessary detail that could alarm a passenger. Describing "carb heat" as a "system that allows the carburetor to be effective in all operating conditions" is probably better than "if I don't pull this lever the engine will stop, and we'll have to land in the trees."



Bonus Tips on Flying with Your Mutt

Know Your Dog

How your dog behaves in the car is a great indicator of how they'll do in-flight. If your pooch is known to get sick just by looking at your car, you might want to skip that flight. However, if they can't wait to jump in the car for the ride to the airport, chances are they'll love the plane too.

Make a Spot in the Plane for Your Dog

Dogs are pack animals and like cozy, secure spots. A familiar travel crate, or even a spot in the cargo area with plenty of blankets will do. For everyone's safety, you'll want to secure your pooch pal.

If you can get your dog to tolerate canine hearing protection gear, that's great. Not all dogs will, but making a comfortable space in the plane with blankets will help them a great deal with the noise and motion of the new environment.

Bring a Human Flight Attendant

Especially if your dog doesn't have a lot of GA flight experience, a human flight attendant can be a big help. As a pilot, you need to focus on the flying, and a dog who is not handling the flight can be a big distraction.

Be Strategic with Food and Water

Don't starve or dehydrate your pooch, but minimize large intakes of food and water prior to takeoff. Remember, gas in the body expands at altitude. Limit the duration of the flight and plan for interim stops on longer flights to give your doggy a chance to stretch his legs (and perhaps mark some territory at the same time).

Manage Expectations

Compared to the airlines, most GA airplanes are much more limited in the type of weather they can fly in, even if the pilot is instrument rated. Further, we don't always have a backup airplane available if we experience a mechanical issue. Between the plane, the weather, and the pilot's personal minimums, there are many possibilities in which a flight might need to be canceled. Explain to your passengers ahead of time that there's the possibility that the flight might not take place as planned. If the destination is a "must reach" event like a wedding, funeral, etc., and time is limited, you need to consider other means of travel.

Plan Your Flights Strategically Regarding Weather — Have a Plan B (C and D too)

In the summer, flying at the crack of dawn usually results in the smoothest air and least likelihood of thunderstorms. Remember, we want to keep these

flights boring, right? If the trip is a longer one, it's not a bad idea to have an alternative travel plan in case the flight gets scrubbed. Keep the car gassed up, cash-in your frequent flier miles, or plan an alternate activity. We never want to disappoint our passengers, but if we manage expectations and have a backup plan, we are less vulnerable to get-there-itis.

Plan Around Toddler Naptimes, and Bring Snacks

While naps may be more appropriate to our younger passengers, everyone gets grumpy if they get too hungry. If your little ones fall asleep in a moving car, chances are they'll be out before you even climb to pattern altitude. When they're young, planning a flight around naptime is a great way for everyone to arrive rested and happy. Also, if you have little ones, bring plenty of wipes for clean up, and trash bags to pack everything out.

Keep Your Passengers Involved ... or Let Them Do Their Own Thing

When my wife flies with me, she wants as little to do with the operation of the flight as possible. When our son was born, she moved to the back seat and hasn't returned to the front row. If she's not interacting with him, she's listening to music or reading a book. That's OK. For other passengers, I find assigning tasks can be helpful. A lot of fellow pilots report success bribing their kids to spot other planes. The front seat passenger might follow along on the aeronautical chart. Your math wiz might enjoy calculating winds aloft or figuring real-time fuel burn. A busy passenger is a happy passenger, which leads me to ...

Don't Let Your Passengers Become a Distraction for You

Many of the other tips I've mentioned help prevent passengers from becoming distractions. As a general rule, most hazards from passengers can be mitigated with proper planning. You should be confident that your front seat passenger is not going to grab the flight controls or pull the mixture lever. Briefing your passengers on sterile cockpit procedures can help minimize distractions, but a "pilot isolate" button on the intercom is helpful too. 

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Passenger SAFETY Briefing



Seat belts fastened for taxi, takeoff, landing.
Shoulder harnesses fastened for takeoff, landing.
Seat position adjusted and locked in place.

Air vents (location and operation).
All environmental controls (discussed).
Action in case of any passenger discomfort.

Fire extinguisher (location and operation).

Exit doors (how to secure; how to open).
Emergency evacuation plan.
Emergency/survival kit (location and contents).

Traffic (scanning, spotting, notifying pilot).
Talking ("sterile cockpit" expectations).

Your questions? (Speak up!).



MITIGATE

YOU CAN'T TAKE ALL THAT!

What Aircraft Weight & Balance Means to You

SUSAN PARSON

[Editor's Note: This article is adapted from the Jul/Aug 2014 issue of FAA Safety Briefing.]

One of the joys of GA airplane travel is that you don't have to limit liquids and gels, remove your shoes, or go through airport security scanners. So you pack everything you want, only to discover that your personal pilot is far more ferocious than the stone-faced screeners at Big Airplane Airport. Upon seeing your bags and bundles, your pilot freezes, scowls, and states (or shouts): ***You can't take all THAT in THIS airplane!***

Your offer to squeeze it all in doesn't soothe the pilot. On the contrary, he or she gets even more agitated because ***"you just don't understand how it works!"***

Because knowing something about the basics of aircraft weight and balance could reduce some of the tension that can arise, here's the story.

A-Weigh We Go

The description of GA aircraft as "light airplanes" is apt, because light is the name of the game. The lighter the airplane, the faster and higher it can fly with a given engine. Also, keeping the aircraft light enables the pilot to carry more fuel, more passengers, and/or more cargo.

Notice that I said "and/or" — not just "and." GA flying involves tradeoffs. The presence of four seats doesn't mean it can always carry four passengers, especially if those passengers have baggage. Nor can the pilot just fill the tanks and launch. Here's why.

To stay aloft, the airplane's wings must be able to generate enough lift to equal the weight of the airplane and everything it carries. When an airplane is made, its manufacturer determines its maximum gross weight — stating, in essence, that the airplane can generate enough lift to carry that amount of weight. The pilot decides how to use the set "weight allowance" on any given flight. In most cases, it is simply not possible to load a light GA aircraft with

full fuel, full seats, and passenger bags without grossly exceeding maximum gross weight. So the pilot has to make choices about how many passengers, how much baggage, and how much fuel to carry (which could result in more fuel stops).

Hanging in the Balance

Having dutifully limited your luggage, now you wonder why the pilot starts rearranging the items you've stowed in the baggage compartment, and why there are passenger seat assignments.

That's where the "balance" part comes in. To be stable in all phases of flight, an airplane's weight must be balanced around a point within a fairly narrow range of values established when the airplane is manufactured. The idea is to avoid loading the airplane in a way that makes it either nose-heavy or tail-heavy.

To achieve this goal, the pilot uses the manufacturer's charts and graphs, or apps containing that data, to make a weight and balance calculation. To determine weight, the pilot starts with the airplane's published empty weight, and totals the weights for passengers, bags, and fuel to calculate the total weight.

After verifying that total weight is below maximum gross weight, the pilot calculates the airplane's "center of gravity," or CG. This process involves multiplying each component of the weight by the published "station" value for its position in the airplane to produce a value called the "moment." The pilot divides total moments by total weight to determine the CG — the airplane's balance point. The final step is verifying that the CG is within the acceptable range. If so, good to go. If not, the pilot moves passengers or bags until the CG is acceptable.

Once weight and balance and CG are within acceptable limits, away you go! ✈️

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TOM HOFFMANN

How to Be a **Weather Wingman** *Pay it Forward With PIREPs*

In this flying-companion-based issue, we discuss in detail how teamwork among cockpit crewmembers can have a positive impact on aviation safety. But pilots, what if I told you that you could help be a good cockpit companion even when you're not in the same plane? Better yet, how about if you had the power to potentially help save a fellow pilot's life — maybe several pilots — with a simple click of the mic? Interested? Let's take a look.

As pilots, we can all agree on the importance of weather and its impact on flight safety and decision making. It goes without saying that having the inside scoop on weather conditions could have serious implications on whether you decide to proceed with your flight, divert, change, or cancel your flight altogether. One way this valuable inside information can be provided is with pilot weather reports, or PIREPs.

Now, I know what you're going to say: *PIREPs are too difficult to send; I'm way too busy with other flying duties; they don't even use my information; or, why should I? — the weather is perfectly fine.*

These are among the many reasons and themes that have contributed to an overall reluctance in PIREP reporting. In fact, the sad truth is that many pilots can probably count on one hand how many PIREPs they've submitted in recent years. According to a 2016 study conducted by the Aircraft Owners and Pilots Association (AOPA), three-quarters of their 700 respondents said they filed pilot reports, but 86-percent said they did so only "sometimes" or "rarely." The National Transportation Safety Board (NTSB) also focused its efforts on how to improve the PIREP process with a Special Investigation Report (SIR) issued in 2017. The report incorporated

discussions with several PIREP user groups and looked at 16 accidents and incidents that exposed PIREP-related areas of concern.

Admittedly, drawbacks and inefficiencies in the PIREP system contribute to both submission and dissemination issues. This article aims to address some of these concerns, but also clarify some common PIREP misconceptions and highlight how future changes and emerging technologies may provide some welcome changes to the process. More importantly, I hope it encourages you to be a weather wingman on your next flight.

Can I Get a PIREP Over Here?

Let's begin by defining a PIREP, which is a brief report made of the *actual* weather conditions encountered by a pilot while airborne. PIREPs are submitted to ATC or Flight Service (by radio, telephone, or electronically) and then disseminated to other pilots to improve their weather situational awareness. They can provide a more complete picture of weather for both strategic and tactical purposes. Pilots typically report weather conditions that are not forecast or are worse than forecast — which, incidentally, is one of the problems we'll discuss later. Low visibility, turbulence, icing, and thunderstorms are good examples of conditions that may warrant a PIREP.

As an airborne observer, you might say filing a PIREP is a way to leverage your on-site insight and "pay it forward," a term eloquently used by the NTSB in the title of its 2016 two-day PIREP safety forum and accompanying Pilot Weather Report Safety Alert (go.usa.gov/xny6g).

But PIREP value isn't just measured by pilots. This *in situ* weather information is also one of the most important pieces of information that weather forecasters have when assessing the quality of their forecasts and improving graphical weather products. Even a single PIREP in some cases can influence the decision to issue (or discontinue) a hazardous weather advisory or amend its geographic area. Other beneficiaries include air traffic personnel who use PIREPs when making decisions about the safe and expeditious flow of air traffic in their area of jurisdiction and meteorologists who analyze and archive them for research purposes.

Given their widespread use and significance to NAS safety, it is important to understand the role that all participants play in submitting and disseminating PIREPs, as well as explore ways for those involved in the PIREP process to help improve its effectiveness and efficiency.

PIREP P-Factor

As helpful as it may seem, the PIREP system is only as good as the information that it receives. That means the perishable content in these time-sensitive reports can only be effective when they are plentiful, precise, and promptly processed for NAS users. Therein lie some of the roadblocks we referenced anecdotally earlier. Sparse reporting, for example, prevents air traffic controllers and other pilots from receiving information that could help them develop enhanced situational awareness of weather scenarios.

The reason for this shortage is often the result of pilots simply underestimating a PIREP's importance. While it is conceivable for pilots to sometimes overlook just how beneficial PIREPs can be, think of the times you were on the receiving end of some juicy "intel" on turbulence or reported icing conditions that helped you and your passengers steer clear of a hazard. How helpful was it to have a near, real-time report of conditions that may have filled a critical gap in your weather planning? Or, how about when conditions were exactly as, or better than, forecast, allowing you to proceed as planned? That latter situation seems to be the area in need of some attention.

The Positive Side of Negative Reporting

One of the greatest misconceptions of PIREPs is that pilots believe they are used strictly for reporting severe or unexpected weather conditions. Pilots should actually report any observation, good or bad, to assist other pilots with flight planning and preparation. If conditions were forecasted to occur but

were not encountered, a pilot should also report this null or negative observation. AOPA's PIREP survey tells a different story however; 81-percent of the pilots who responded said they would rarely to never file a PIREP for as-forecast conditions, and 76-percent said that they would rarely to never report benign conditions.

That would certainly indicate a need for a culture change in how pilots perceive the purpose of PIREPs. It should also serve as a call to action for flight instructors to stress the importance of making PIREPs a more routine part of flying during initial training and while performing flight reviews. Real-world scenarios can be especially useful training methods when trying to illustrate the value of fair-weather versus adverse-weather PIREPs as well as how they contribute overall to flight safety. Going forward, the FAA will be looking at ways to improve education on the relevance of both adverse- and fair-weather PIREPs, and will review and revise any existing guidance that can help clarify this point accordingly.

There's an App for That

Technology and cockpit workload tend to work hand-in-hand to present another obstacle for submitting PIREPs. Pilots are often already task-saturated when an unexpected or adverse weather condition comes their way, which puts filing PIREPs lower down on their priority list. But that reluctance can more often be attributed to the method used for submitting, which according to AOPA's survey, is predominantly via a radio call to ATC or flight service. Although this number has likely changed since the survey was conducted in 2016, only eight-percent of the survey respondents indicated that they used on-board technology (e.g., tablets, avionics) to submit a PIREP.

That matters greatly as pilots are often deterred from reporting weather by having to interrupt communications on an already congested ATC frequency or leave an ATC frequency for fear of missing important instructions or advisories. When pilots responding to the AOPA survey were asked what would encourage more PIREPs, the most frequent comments involved making it simpler to file PIREPs, specifically the ability to automate filing via electronic technology.

The good news is that this technology does exist and is continuing to gain ground. Tablet and smartphone-friendly PIREP submission tools are becoming more popular, some with time-saving, auto-populated values based on user preferences or

GPS data. And as datalink capabilities evolve, PIREP text messages may soon be on the horizon for GA. The FAA also has an electronic PIREP submission tool at the National Weather Service's Aviation Weather Center Digital Data Service (ADDS) website. Registered users can electronically submit turbulence and icing PIREPs on the site, which are instantly displayed in graphical form and distributed nationwide. Visit www.aviationweather.gov/user/register to register and see FAA InFO 14011 – *Electronic Submission of Pilot Weather Reports* (go.usa.gov/xnVcW) for more details.

While these tools help simplify the PIREP process, be aware of their limitations, including increased head-down time and connectivity issues. What's important to remember is to use whichever PIREP-submission method that seems most appropriate for the circumstances, considering your workload, the type of weather information, and any other relevant factors. For example, for urgent weather hazards, providing your PIREP to ATC via the radio would likely result in the most rapid, local dissemination of the information.

For the record, submitting a PIREP via radio is not as cumbersome as it might seem. ATC will almost always approve a request to leave frequency for a few minutes while en route, but avoid waiting until the last minute or while in congested airspace. Don't get too hung up on the format. ATC can usually help with coding it properly and/or prompt you

PIREP FORM	
Pilot Weather Report	
3-Letter SA Identifier	→ = Space Symbol
1. UA →	UUA →
	Routine Report Urgent Report
2. /OV →	Location:
3. /TM →	Time:
4. /FL	Altitude/Flight Level:
5. /TP →	Aircraft Type:
Items 1 through 5 are mandatory for all PIREPs	
6. /SK →	Sky Cover:
7. /WX →	Flight Visibility and Weather:
8. /TA →	Temperature (Celsius):
9. /WV →	Wind:
10. /TB →	Turbulence:
11. /IC →	Icing:
12. /RM →	Remarks:
FAA FORM 7110-2 (1-85) Supersedes Previous Edition Electronic Version (Adobe)	

PIREP Tip: To help you estimate visibility, make use of your GPS or sectional chart and plotter to estimate the distance of furthest object you can see.

if you've left out something critical. That leads to our next area of concern for PIREPs: data accuracy.

Precise is Nice, Especially with Ice

Figure 1 shows the form typically used for submitting a PIREP. It might help to think of it as being in a *who, when, where, and what* format. The *what* segment does require some extra detail, but be sure not to skimp on precision for the *when* and *where* sections. As was highlighted in the NTSB's report, PIREPs without accurate position and timing information can have little to no value in some cases. Onboard technology can help with capturing time, location, and altitude, but be sure you're keeping tabs on accurately noting and reporting this information when you see something.

Since most pilots aren't professional meteorologists, describing the observed conditions or the "what" of a PIREP is by nature a fairly subjective process. The ability to properly assess and relay weather conditions that pilots encounter is typically linked to their training and experience. A new or low-time pilot, for example, may have a tendency to overestimate turbulence and icing intensities.

Icing intensity should be reported as trace, light, moderate, or severe and by type (rime, clear, or mixed). Be sure to include sky cover and temperature with an icing PIREP. Turbulence intensity

Fig -1 PIREP Form — Items 6 – 12 cover the "What" of a PIREP: Sky Cover (SK) includes cloud amount, bases, and tops. Weather (WX) reports precipitation, flight visibility and any restrictions to visibility. Pilots should report Temperature (TA) and Wind (WV) when known. Intensities of Turbulence (TB) and Icing (IC) should be reported as objectively and accurately as possible — reference the AIM or AC 00-45H for details. Remarks (RM) clarify or add information not contained in other elements, such as the movement of thunderstorms, low-level wind shear, and mountain waves.

should be reported as light, moderate, severe, or extreme and the duration as intermittent, occasional, or continuous. A common tip for estimating turbulence intensity is to imagine how a full cup of coffee would react in the cabin: from a slight slosh in light turbulence, to flat out wearing the coffee in severe or extreme conditions.

A good way to refine your reporting skills on these two phenomena is to reference the *Aeronautical Information Manual* paragraphs 7-1-20, -21, and -22. Also, FAA Advisory Circular 00-45H, *Aviation Weather Services*, contains extensive information on how to report and read PIREPs, how to apply intensity modifiers for precipitation and other weather phenomena, and how to use the remarks section to further describe the weather phenomena. The FAA is currently reviewing ways to better harmonize and possibly revise guidance in both of these references.

Promptly Processed

Our final PIREP P-factor deals with what happens on the collection and dissemination side. Delayed, missing, or improperly keyed reports not only affect data quality, but these issues may ultimately lead to a lack of faith in the system and inhibit future reporting among pilots. The NTSB's SIR recommended changes in several areas that could help improve the efficiency and accuracy of PIREP processing. These areas focused on PIREP solicitation, guidance, collection and handling methods, verification procedures, training, and technology.

To address issues identified with these and other factors, the FAA is establishing a team of subject matter experts from across the agency's Air Traffic Organization, including representatives from the Air Traffic Services, System Operations, Safety and Technical Training, and Mission Support Service Units. This team will analyze and determine the feasibility of adopting the NTSB's recommendations. In addition, the FAA surveyed ATC facilities across the nation to solicit ideas for procedural changes or improvements. The FAA will review this feedback as it considers ways to make PIREP processing techniques easier, less time consuming, and more accurate. Expect to see more later this summer.

The Power of PIREPs

Despite all the technological advances in weather radar and forecasting, there is still nothing more valuable than a PIREP in helping aviators avoid hazardous weather. As Susan Parson notes in her "Pipe Up With PIREPs" article (*FAA Aviation News*,

Five Things You Should Know About PIREPs:

1. A pilot report or PIREP is a pilot's report of **actual** weather conditions encountered while airborne.
2. A PIREP's main purpose is safety — it helps weather forecasters update their data and improve quality of forecast.
3. A PIREP filed to report good weather is just as important as a PIREP filed to report bad weather.
4. Yes, you can submit them electronically — check out the electronic PIREP submission tool at the National Weather Service's Aviation Weather Center Digital Data Service (ADDS) website.
5. Don't be overly concerned with strict format or phraseology. The important thing is to relay information beneficial to other pilots.

May/June 2008), this first-hand weather report from a fellow aviator may be the single most informative piece of data you have in that stack of "all available information" you gathered before your flight. So on your next flight, pay it forward with PIREPs and be the best wingman you can be! 

Tom Hoffmann is the managing editor of FAA Safety Briefing. He is a commercial pilot and holds an A&P certificate. Contributing to this article was Terry Lankford, an active pilot, retired FAA Flight Service Station specialist, and current FAA Safety Team representative.

Learn More

FAA Advisory Circular 00-45H, *Aviation Weather Services*

go.usa.gov/xnfkt

NTSB News Release on PIREP Special Investigation Report 17/02

ntsb.gov/news/press-releases/Pages/pr20170417.aspx

NTSB Presentations from PIREP Seminar

ntsb.gov/news/events/Pages/2016_pirep_FRM_agenda.aspx

AOPA ASI course – PIREPS Made Easy

aopa.org/training-and-safety/online-learning/online-courses

AOPA's 2016 Pilot Report Survey

bit.ly/2DCLuad

ROLL of HONOR



Wright Brothers Master Pilot Award

The FAA's most prestigious award for pilots is the Wright Brothers Master Pilot Award. It is named in honor of the first U.S. pilots, the Wright brothers, to recognize pilots who have demonstrated professionalism, skill, and aviation expertise by maintaining safe operations for 50 or more years. The following master pilots were recognized in 2017. For more about the award, go to faasafety.gov/content/MasterPilot.

John Amundsen AK
Burton Bomhoff AK
Eric Denkwalter AK
Maurice Hendrickson AK
Francis Jones AK
David Matthews AK
Frederick Patterson AK
Michael Van Hatten AK
David Viewel AK

Clarke Barber AL
Robert Butler AL
Henry Hall, Jr AL
James Kale AL
Elwyn Roosevelt AL
John Wilkes AL
Melvin Yanda AL

Herbert Baker AR
Barry Beck AR
Lloyd Blasdel AR
David Cahoon AR
Robert Connor AR
Alfred Gore AR
Danny Helms AR
John Holtam AR
James Marlar AR
Thomas Mitchell AR
Edward Seaton AR

Robert Bloemer AZ
June Bonesteel AZ
Marion Burton AZ
Harold Burtzloff AZ
William Canino AZ
Robert Dilday AZ
John Fedor AZ
Jerry Fischer AZ
Dennis Genzman AZ
John Giehm AZ
Aleck Gragijan, Jr AZ
Bernard Gross AZ
Gordon Grover AZ
Frank Hertzler AZ
Jeffrey Jacobs AZ
James McDermott AZ
E. Monroe McDonald AZ

Benjamin Middleton AZ
John Redden AZ
Arthur Rogers AZ
Ronald Rounds AZ
Edward Rountree, Jr AZ
Arvin Schultz AZ
Charles Wait AZ
James Warniers AZ
Robert Wasik AZ
Edward Weber AZ
Richard Wetherell AZ

John Adair CA
Gerald Alves CA
Charles Asbury CA
Arthur Barth CA
Richard Biggs CA
Joseph Biviano CA
Stuart Bloom CA
Lewis Brown CA
Michael Cowan CA
James Davidson CA
Raymond Dean CA
John Draper CA
James Dubois CA
Gordon Evans CA
Eugene Evans CA
Glynn Falcon CA
Peter Gillies CA
Bill Griggs CA

Carl Hakenen CA
Gregory Hein CA
George Inskeep CA
Jack Irwin CA
Russell Kellum CA
William Kramp CA
Wood Lockhart CA
John Lotz CA
Thomas Luciano CA
John Lyon CA
Alan MacHardy CA
Michael Magnell CA
Richard Martindell CA
John McGowan CA
Joseph McGuire CA
Henry Miller CA
Gerald Orr CA

Roger Paskell CA
Scott Patterson CA
Gerald Penn CA
Kenneth Pepper CA
Kenneth Petersen CA
Michael Phillips CA
Robert Pina CA
James Pinckney CA
John Pugliese CA
David Raspert CA
Lawrence Rector CA
Paul Richey CA
Thomas Rosen CA
William Shoup CA
Paul Singer CA
Robert Spencer CA
Richard Stahlman CA
Louis Tobin CA
Joseph Valla CA
Michael Venturino CA
Leslie Waller CA
Richard Webb CA
Robert Welsh CA

Stephen Benson CO
Robert Deline CO
Gary Kopp CO
John Pinell, Jr CO
Ronald Williams CO
John Bailey CT
Richard Bliss CT
Herman Carvache CT
Kenneth Forrester CT
August Gorreck CT
Norman Graham CT
Sheldon Holson CT
John Kirmayer CT
Evelyn Kropp CT
Paul Mangini CT
Rafael Quiros CT
Ted Selken CT
Roger Van Dyk CT

Howard Brandon DC
Lloyd Austin DE

Delbert Collier DE
Frank Cotroneo DE
Gordon Anderson FL
Thomas Berg FL
Prescott Bond FL
Douglas Coleman FL
William Corley FL
David Creasman FL
Versel Dalton, Jr FL
Daniel Diz FL
Kendall Durkee FL

John Feliu FL
John Foster FL
John Fow FL
Carroll Gammill FL
Howell Gannon FL
Irvin Gleim FL
Phil Greco FL
Loren Haatvedt FL
James Harris FL
Lowell Howard FL
Horace Howard FL
Edward Johnson FL
Lowell Johnston FL
George Kelley, III FL
Charles Kessler FL
Lester Kyle FL
Victor Landau FL
Lee Lauderback FL
John Lindsay FL
James Lynch, Jr FL
Don Marek FL
Frank Marsalek FL
Edwin Martin FL
Frank Maskiell, Jr FL
Craig Maudsley FL
Jere McKee FL
James McLennan FL
William Meenan FL
Gordon Moyer FL
Richard Osmer, Sr FL
Ronald Patton FL
Ronald Pearson FL
David Pomerance FL
Grover Rawlings, Jr FL
Thomas Sage FL

Larry Seesholtz FL
Conrad Shad FL
Dennis Sherman FL
Howard Smith FL
Clarence Smith FL
Charles Starr FL
Charles Steele FL
John Steidinger FL
Allan Tiburzi FL
Susan Upchurch FL
Wayne Ziskal FL

Julius Alexander, Jr GA
William Austin GA
Jesse Bell GA
Homer Bentley GA
Reinhardt Carlson GA
Luke Closson, Jr GA
Lawrence Gilbert GA
John Godbehere GA
George Greene GA
Truitt Harper, Jr GA
George Huffman GA
John Jameson GA
Lewis Lytton GA
Dale Mastley GA
Irvan NeSmith GA
Charles Reed GA
Roff Sasser, III GA
Ronald Walters GA
David Winans GA
Gerald Zimmerman, Sr GA

Richard Emminger HI
Jack Schneider HI
Adell Brecheisen, II IA
William Hemme IA
Harley Noe IA
William Stout IA
Fernando Arenas, Jr IL
Ronald Arnett IL
John Barrett IL
Armand Bendersky IL
Donald Berrier IL
Jerry Coarson IL

Donald Cramer	IL	Lawrence Lay	KS	Ernest Harbin	MI	Loretta Jones	MO	Richard Cramer	NM
Donald Day	IL	Nicky Mardis	KS	Richard Hare	MI	Allan Koebel	MO	Anthony Sobol	NM
John De Joris	IL	Jay McLeod	KS	James Harris	MI	Dennis McAlee	MO	—————	
Vincent Doss	IL	Douglas McMullin	KS	Thomas Hoagland	MI	Jack Mehner	MO	Eliot Alper	NV
William Garland	IL	Alan Moler	KS	Bill James	MI	Herman Person	MO	Darrel Blomberg	NV
N.H. Verne Jobst	IL	Terry Poling	KS	Larry Johns	MI	William Pollard	MO	Ronald Cassinelli	NV
Jean McLaughlin	IL	William Qualls	KS	William Kelley	MI	Richard Sauder	MO	Richard Clark	NV
Orrin Moen	IL	Sarah Lee Ratley	KS	James Klein	MI	Ralph Schmude	MO	Gary Griffith	NV
Robert Peacock	IL	Thomas Rourke	KS	Joseph Lupton	MI	Randall Schuermann	MO	Linda Hivert	NV
Michael Rafferty, Jr	IL	Mark Schlegel	KS	Donald MacLeod	MI	Daniel Scott	MO	Earl Jobson	NV
Robert Russo	IL	Jimmie Smith	KS	Robert Malin	MI	Carl Sparks	MO	James Martin	NV
William Saloga	IL	Ernest Spriggs	KS	Theodore Mathis	MI	Donald Tate	MO	Mark Potter	NV
Steven Seaman	IL	David Tiday	KS	Charles McConnell	MI	John Taylor	MO	Manny Puerta	NV
John Sheridan	IL	Harold Walter	KS	Larry McKillop	MI	Peter Van Arsdale	MO	Eric Rebstock	NV
Samual Sisk	IL	John Wolesky	KS	David Schneider	MI	Michael Williams	MO	Barton Welsh	NV
Thomas Smith	IL	Ronald Wood	KS	Thomas Sherman	MI	—————		—————	
George Stuhr	IL	Donald Yoder	KS	Mario Sotolongo	MI	David Bennett	MT	Albert Cerullo, Jr	NY
Henry Villiger	IL	—————		Cody Welch	MI	Bob Davis	MT	David Freed, Jr	NY
John White	IL	Terry Richardson	KY	—————		Dale Edlund	MT	Charles Gilbert	NY
Gerald Whitehurst	IL	—————		Kayland Call	MN	Charles Sherman	MT	Phillip Ide	NY
Garner Williams, Jr	IL	Thomas Barnard	LA	Donald Clobes	MN	Mary Wadekamper	MT	Ernest Kovacs	NY
Garner Williams	IL	Kenneth Brummett	LA	James Conn	MN	Clifton Walters	MT	Donald Mann	NY
John Zaeske	IL	Michael Bryant	LA	Keith Davison	MN	Clayton Wilhelm	MT	Paul Middlebrook	NY
—————		Robert Carbary	LA	William Enxing	MN	—————		Allen Roggen	NY
Thomas Carney	IN	Phillip Collins	LA	Wilbur Finley	MN	Russell Barringer, Jr	NC	Kenneth Scheider	NY
Jared Combs	IN	Jerry Cutrer	LA	Arthur Howard	MN	Charles Czermak, Jr	NC	Martin Schemer	NY
Dale Etherington	IN	Fred Phillips	LA	Robert Johndahl	MN	James Dukeman	NC	—————	
William Hohlt	IN	Paul Storment	LA	John Johnson	MN	Hershal Hollifield	NC	Donald Apple	OH
Gerald Keller	IN	—————		Harold Kral	MN	Kenneth Huffine	NC	Donald Chopchinski	OH
George Lohmeier	IN	Frank Bill	MA	Peter Kroll	MN	Clarence Hustrulid, Jr	NC	Todd Fisher	OH
Robert Lutes	IN	Gary Kearney	MA	Darrel Larson	MN	Henry Joyner	NC	Theodore Kellogg	OH
Charles Marshall, Jr	IN	Gary Potts	MA	William Lothert	MN	Larry Mullis	NC	Donald Leis	OH
Russell McDonald	IN	Donald Staszko	MA	Barbara Mack	MN	Kenneth Pagurek	NC	Donald Louderback	OH
Thomas Rea	IN	Kermit Wieselquist	MA	Gerald Michaletz	MN	John Peake	NC	John Lundblad	OH
Winfried Rudloff	IN	—————		Carl Moser	MN	Ronald Shoemaker	NC	Vincent Massa	OH
John Sanders	IN	Robert Bricker, Jr	MD	Niel Petersen	MN	Richard Smith	NC	Gordon McOwen	OH
Leon Sanders	IN	Edward Walker	MD	Gerald Sather	MN	William Whiteheart	NC	Don Miller	OH
James Stark, Jr	IN	William Wallace	MD	Terrel Stern	MN	Bernard Zimmer	NC	Russell Otto	OH
Daniel Tannas	IN	—————		George Sugden	MN	—————		Earl Pounds, III	OH
—————		Gary Chandler	ME	Charles Swanson	MN	Daniel Heuer	ND	Earl Redmond	OH
Ronald Black	KS	Elvin Drake	ME	Jerry Van Kempen	MN	—————		Terry Schubert	OH
David Blanton	KS	Gary Dumond	ME	Andrew Vano	MN	Michael Howard	NE	Ronald Siwik	OH
Robert Blanton	KS	Christopher Hayden	ME	—————		William Redick	NE	Michael Smyser	OH
Wayne Bormann	KS	—————		George Alexander	MO	Donovan Schardt	NE	Richard Todd	OH
Harry Clements	KS	John Adams	MI	John Ampleman	MO	William Stuart	NE	James Yarbrough	OH
Rex Corbin	KS	Ray Belz	MI	Leon Basler	MO	—————		—————	
Richard Curtis	KS	Leslie Brown	MI	Gregory Bettis	MO	Richard Connor	NH	Phil Carson	OK
Robert Davis	KS	Cecil Carreras	MI	David Davidson	MO	—————		Russell Craig	OK
Larry Gourley	KS	Richard Druschel	MI	David Dungan	MO	Robert Dannhardt	NJ	James Duea	OK
Gerald Griggs	KS	Don Dykstra	MI	Forrest Frazier	MO	Francis Fine	NJ	Charles Gauntlett	OK
Donald Grunke	KS	Ralph Fairbanks	MI	Richard Green	MO	Alan Greenhalgh	NJ	Edward Maxwell	OK
Larry Hastings	KS	Jimmy Farris	MI	Leslie Heikkila	MO	John Humbert	NJ	Ronald Murray	OK
Michael Jacobi	KS	Robert Fox	MI	John Hessling	MO	Walter Kahn	NJ	Edward Petersen, III	OK
Wesley Kimball	KS	John Gostinger	MI	Raymond Higgins	MO	Jeffrey Tait	NJ	Charles Shelton	OK
Stephen Larsen	KS	Keith Haddix	MI	Jeanette Hoynacki	MO	Joel Turpin	NJ		

ROLL *of* HONOR

Charles Allen	OR	Morton Boggs	TN	Francis Compton, Jr	TX	Jim Pope	TX	William Carico	VA
Daniel Beltrami	OR	Ben Carr, Jr	TN	William Darby, II	TX	Stephen Poppe	TX	Robert Dobbs	VA
William Dewey	OR	Billy Cox	TN	Patricia Darby	TX	Omer Price	TX	Bruce Holmes	VA
Dallas Enger	OR	Clifford Eldred	TN	Louis Ebersole, III	TX	Jimmy Ray	TX	Floyd James	VA
Robert Halvorsen	OR	Douglas Eshelman	TN	Donald Euton	TX	John Reynolds	TX	Gerald Knouff	VA
Richard Markee	OR	Roger Flenniken	TN	Charles Fischer, Jr	TX	John Richardson	TX	Frank Stapopoli	VA
Richard Maury, III	OR	Kenneth Franks	TN	Jimmie Foreman	TX	Steven Richmond	TX	Owen Thompson	VA
Thomas Murphy	OR	George Gunn	TN	James Fowler, Jr	TX	Louis Rochester	TX	Steven Zaboji	VA
Cecil Radcliff	OR	Lynn Hadler	TN	David Fulton	TX	Ronald Roland	TX	_____	
Thomas "Sam" Spayed	OR	Arthur Hiatt	TN	Bobby Grantham	TX	Robert Scheinblum	TX	Barry Bergeron	WA
Kelly Wilson	OR	Michael Jacobs	TN	Charles Hall	TX	Wayne Schmitt	TX	Carl Domschke	WA
_____		Boyd Mitchell	TN	James Hartman	TX	James Schwertner	TX	Michael Dyberg	WA
David Allen	PA	Charles Nabors	TN	Matthew Hartnett	TX	James Schwertner, Jr	TX	Robert Guthrie	WA
Joseph Baginski	PA	Scott Niswonger	TN	Luther Hathorn	TX	Harlan Screws	TX	James Hawks	WA
Anthony Bartolo	PA	William Rondeau	TN	John Hawley, Jr	TX	David Setzer	TX	Edward Hoit	WA
J.D. De Angelis	PA	Thomas Sharpe	TN	Howard Horton	TX	Paul Smith	TX	Daryl Jackson	WA
Kenneth Egge	PA	Nicholas Smith	TN	Jim Humphries	TX	Robert Stark	TX	Randal Kersten	WA
David Gurkin	PA	Robert Sudderth	TN	J.R. Hurt	TX	Gary Sublette	TX	Patrick Mitchell	WA
John Kandravi	PA	David Sullivan	TN	Norwood Jennings	TX	Russell Thorstenberg, Jr	TX	G.M. "Jake" Nelson	WA
Roger Lucheta	PA	_____		Leland Johnson	TX	Russell Thorstenberg	TX	Robert Pastore	WA
Joseph Pelletier	PA	Donald Albert	TX	Stephen Johnson	TX	Wallace Thrash	TX	Rupert Tart, Jr	WA
_____		Jackie Ashmore	TX	Kendall Kelly	TX	Cranford Viosca	TX	Lawrence Tobin	WA
Michael Ballee	SC	George Auburg	TX	Don Klos	TX	James Watkins	TX	Kevin Ware	WA
Leo Berube	SC	Stephen Balogh, Jr	TX	Quentin Koecher	TX	Guy Watson	TX	_____	
Roger Blackman	SC	Norwood Band, Jr	TX	Lawrence Latimer	TX	Harold Watson	TX	Charles Aldrian	WI
Raymond Enslow	SC	Allen Barseth	TX	James Lattimore, Jr	TX	Larry Wheelock	TX	Jeffrey Anderson	WI
Edward Ganter	SC	Louis Bass	TX	Arno Leuthardt	TX	Robert Williams	TX	Larry Boehme	WI
Robert Jenkins, Jr	SC	Glenn Beavers	TX	Bobbie Long	TX	Richard Williams	TX	Jake Jasinski	WI
Arthur Magill	SC	Steven Bernstein	TX	Paul Loyd	TX	John Wing	TX	Mark Koenig	WI
James Malek	SC	Grant Bogue	TX	Robert McBride	TX	Richard Wingfield	TX	Robert Nelson	WI
John McGrath, Sr	SC	William Boothe	TX	Carter McGregor, III	TX	Larry York	TX	William Plendl	WI
Lawrence Savage, Jr	SC	Edward Borowky	TX	John McMurray, Jr	Tx	James Zoeller	TX	Milbert Schott	WI
Elijudah Yisrael	SC	Donald Bowles	TX	Jack Merrell, Jr	TX	_____		Scott Sherer	WI
_____		James Bristol	TX	Brian Moline	TX	Dale Larsen	UT	_____	
Bruce Allred	SD	Juan Brito	TX	Mark Mulder	TX	Richard Sweet	UT	Robert West	WY
Roger Huntley	SD	Randy Brown	TX	Thomas Musgrave, III	TX				
Roger Hutchison	SD	Phillip Bryant	TX	Phillip Myers	TX				
Mark O'Leary	SD	Jerry Campbell	TX	Ronald Paduh	TX				
		Wilmer Carroll	TX	Harry Perez	TX				

GA SAFETY ON THE GO



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Charles Taylor *Master Mechanic* Award

The FAA's most prestigious award for aircraft mechanics is the Charles Taylor Master Mechanic Award and recognizes the lifetime accomplishments of senior mechanics. It is named in honor of the first aviation mechanic in powered flight, Charles Taylor, who served as the Wright brothers' mechanic and is credited with designing and building the engine for their first successful aircraft. The following master mechanics were recognized in 2017. For more about the award, go to faasafety.gov/content/MasterMechanic.

Edwin Keith	AK	David Girard	CO	Wayne Sanchez, Sr	IL	David Umlauf	NC	Donald Bennett	SC
Michael McHenry	AK	Joseph Kilbourn	CO	Thomas Smith	IL	Jack Zeock	NC	James Franklin, III	SC
Theodore Novotney	AK	_____	_____	_____	_____	_____	_____	Howard Hollis	SC
Rodney Russell	AK	Herman Carvache	CT	John Bruno	IN	Jerry May	NE	Elijah Yisrael	SC
_____	_____	Mark Josel	CT	Robert Girdley	IN	_____	_____	_____	_____
Thomas Miller	AI	_____	_____	David Pieper	IN	Jack Barry	NH	Lynn Hadler	TN
William Monk	AL	Merle Thomas	DE	James Spore	IN	Donald Vallerand	NH	Edward Hasch, Jr	TN
Larry Riggs	AL	_____	_____	Paul Williams	IN	_____	_____	William Henley	TN
Ernest Roberts, III	AL	Oscar Aloyo	FL	_____	_____	Joseph Esmerado	NJ	John Starnes	TN
_____	_____	Juan Blanco	FL	William Qualls	KS	Roger Hughes	NJ	_____	_____
Herbert Baker	AR	Thomas Bragg	FL	_____	_____	_____	_____	Warren Bischoff	TX
James Marlar	AR	Loren Friedle	FL	Lawrence Andrzejewski	KY	Magel Lugo	NV	Grant Bogue	TX
Kenneth Miller	AR	Jimmy Grizzard	FL	Frank Piasecki	KY	_____	_____	Donnie Brown	TX
Thomas Schmidt	AR	Frank Hartle, Jr	FL	_____	_____	Raymond Calascibetta	NY	William Butler	TX
_____	_____	Thomas Hay	FL	John Goglia	MA	Michael Cartelli	NY	James Garrett	TX
Cyril Manning	AZ	David Lockner	FL	James LaBrecque	MA	Gennaro Cibelli	NY	Perry Gilroy, III	TX
James McDermott	AZ	William Meenan	FL	Robert Nelson	MA	John Grindley	NY	Henry Hilburn	TX
Hector Mendoza, Sr	AZ	Richard Osmer, Sr	FL	Gary Potts	MA	Donald Mann	NY	Donald Hite	TX
Rodney Peterson	AZ	Randall Pickron	FL	_____	_____	Donald McLoughlin	NY	Paul Jonathans	TX
_____	_____	Luis Rivera-Guzman	FL	Anthony Serio	MD	Michael Scott	NY	Ronald Paduh	TX
Carl Aronson	CA	Gordon Schmidt	FL	_____	_____	Randy Wagner	NY	Dennis Quesinberry	TX
Ross Belfiore	CA	Conrad Shad	FL	Elvin Drake	ME	George White	NY	Robert Rushlow	TX
Khalil Boini	CA	Charles Steele	FL	_____	_____	_____	_____	David Santoy	TX
William Angelo Canario	CA	John Steidinger	FL	Mark Welke	MI	Dennis Baran	OH	Harlan Screws	TX
Edward Cohn	CA	John Zielinsky	FL	_____	_____	James Beisner	OH	Robert Stark	TX
Mickey Curry	CA	_____	_____	Darrell Bolduc	MN	Donald Leis	OH	Joseph Steinback	TX
David Dent	CA	Jesse Bell	GA	Harold Fown	MN	Victor Speroni	OH	Edward Strong	TX
Thomas Evans	CA	Truitt Harper, Jr	GA	James Hancock	MN	Robert Zitney	OH	Tommy Williams	TX
Peter Frinchaboy	CA	David Hickey	GA	Lance Matteson	MN	Thomas Zoldesy	OH	Joseph Wolf	TX
Antonio Geck	CA	Thomas Long	GA	Dale Mendenhall	MN	_____	_____	_____	_____
Albert Glover	CA	_____	_____	Robert Turner	MN	Douglas Burdette	OK	Luis Alicea	VA
Joseph Gonsalves	CA	William Louch	HI	_____	_____	John Eberstein	OK	Barry Barbini	VA
John Harper	CA	Kenneth Simpson	HI	Lawrence Johnson	MO	Charles Gauntlett	OK	_____	_____
Ronald Lyda	CA	Victor Valentin	HI	Harold Schilling	MO	Albert Hutton	OK	Hugh Devlin	WA
William Malcomson	CA	_____	_____	_____	_____	_____	_____	Carl Domschke	WA
John Neal	CA	William Kyle	IA	James Bondurant	MS	Daniel Beltrami, Jr	OR	Carl Domschke, Jr	WA
Robert Pina	CA	John Tibben	IA	_____	_____	John Fisher	OR	Michael Potter	WA
John Schaper	CA	_____	_____	Dale Edlund	MT	Thomas Murphy	OR	Thomas Robinson	WA
William Shoup	CA	Thomas Anderlik	IL	Michael Ferguson	MT	Louis Myers	OR	_____	_____
Richard Stahlman	CA	Patrick Finn	IL	_____	_____	_____	_____	Rex Kessler	WI
Gary Suozzi	CA	William Garland, Jr	IL	Charles Maresca	NC	David Allen	PA	Darrell McCullion	WI
John Wilholt	CA	Raymond Gepford	IL	Norman Oakley	NC	Paul Haubert	PA	_____	_____
Thomas Wittman	CA	Richard Mileham	IL	Ronald Shoemaker	NC	John Trupchak	PA	_____	_____
_____	_____	Alan Pattenaude	IL	Roger Thompson	NC	_____	_____	_____	_____



How Airplanes Work

My first experience flying in a general aviation (GA) aircraft was thrilling. To my fellow passenger? Not so much. It occurs to me that perhaps if he had just known a bit more about how an aircraft works, he might have relaxed a bit and enjoyed more of what that experience had to offer. To understand the rather complex and beautiful nature of how aircraft fly, I am going to break this all down.

Heart of the Matter

There are two major types of engines: piston engines — driven by a mechanical component within the engine that is connected to other major components to provide rotational torque (twisting force); and gas turbine engines. Since the majority of airplanes in the existing GA fleet have piston engines, we'll focus on that engine type. The engine gets its power via one or more reciprocating pistons that convert the pressure they generate into a rotational motion. That motion is transferred to a crankshaft, which in turn powers the propeller, which creates thrust (pull).

The biggest thing to remember here is that all engines enable thrust, the force by which an aircraft moves forward through the air.

The Wind Beneath My Airfoil

The special shape of an airplane wing makes it an "airfoil." As an airplane moves forward and air is split around the wing, the angle and curve of the top half of the wing allows for the air to move over it much faster and with much lower pressure than the air below it. Since the higher pressure air below the surface always wants to escape to lower pressure spaces, the wing is "lifted" up. The faster the plane travels forward while maintaining a sufficient angle of attack (tilt), the greater lift is generated.

In order to control the air that flows around a wing, and maneuver the aircraft in flight, it comes equipped with flight control surfaces in the form of flaps and/or ailerons. Most flaps are attached to the trailing edge of the wing to increase or decrease the amount of lift by increasing or decreasing the curvature of the wing. Extending the flaps can increase the lift a wing can generate, but it also creates drag (air resistance). This slows the aircraft (i.e., for landing) and lowers the speed at which an aircraft will stall. Once safely down, the pilot will raise the flaps to

ensure there is no extra lift being generated and the aircraft can brake properly.

Ailerons are a hinged control surface found on the trailing edge of a wing typically located next to the flaps. They work opposite from one another to control bank (roll). As one aileron lifts up the other drops down, causing the aircraft to roll. When combined with a pitch up motion, the aircraft will also turn.

In the cockpit, the pilot has to understand and manipulate an assortment of gauges, switches, levers, and pedals that provide information about the aircraft and give control over it. Some more recognizable cockpit devices are the yoke (steering device), the throttle (controls engine power), the radio (to chat with air traffic/controllers), as well as the heading, fuel, speed, and altitude indicators. This equipment is just as integral to aircraft flight as the wings or the engine.

Bringing Up the Rear

The last structural section is the empennage, or tail end of the aircraft. In most GA aircraft, a rudder is housed in the vertical part of the tail called the vertical stabilizer. The rudder is a hinged vertical flap that is operated by foot pedals in the cockpit. The rudder is used to keep the fuselage aligned with the direction of flight by controlling yaw (nose left or right). You will usually find two more little wing-like structures that help to stabilize and control the aircraft in flight called the horizontal stabilizer. Attached to the trailing edge (on most aircraft) are elevators, which move up and down to make the aircraft climb and descend in flight.

The chance to ride along with a friend, family member, or coworker as he or she pilots a GA aircraft is a tremendous opportunity. So sit back, relax, and hit the skies knowing you now have a little background knowledge of how airplanes work.

(Editor's Note: This article originally appeared in the Jul/Aug 2014 issue of FAA Safety Briefing magazine.)

Sabrina Woods is a guest writer for FAA Safety Briefing. She is a human factors scientist with the FAA's Air Traffic Organization. She spent 12 years as an aircraft maintenance officer and an aviation mishap investigator in the Air Force.



Angle of Attack

TOM HOFFMANN

Take Plane Spotting to a New Level

The activity of plane spotting has been around for nearly as long as the airplane itself. While early versions of plane spotting helped identify hostile aircraft during wartime, this activity has grown into a recreational (and sometimes addictive) hobby, attracting aviation enthusiasts worldwide.

Used in more of a safety context, plane spotting is also a skill near and dear to all pilots, especially for those whose aircraft rely solely on the Mark 1 eyeball system (otherwise known as unaided vision) for collision avoidance. While the traditional plane-spotter might be used to a stationary environment and focus on a predictable aircraft flight path, airborne plane spotting can be a much more challenging task. If you have the good fortune of riding along with a pilot and want to show off your plane-spotting skills — and more importantly — take a more active role in the safety of the flight, please read on.

For starters, being a good companion plane-spotter requires a more patient and methodical approach than the constantly moving, head-on-a-swivel tactic that some might think is required. It's quite the contrary. According to the *Pilot's Handbook of Aeronautical Knowledge* (PHAK), effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should not exceed 10 degrees, and each sky segment should be observed for at least one second to enable detection. This slow and steady approach helps pilots compensate for the limitations the human eye has in being able to detect targets. There are dozens of factors that can affect vision while airborne. Some are biological (age, fatigue, germs); some are environmental (weather conditions, sun glare, heat); and others are caused by the aircraft (windshield distortion, interior lighting, aircraft design).

Another reason for this method of interval scanning is to capitalize on the power of peripheral vision, which can be most useful in spotting collision threats from other aircraft. Each time a scan is stopped and the eyes are refocused, the peripheral vision takes on more importance because it is through this element that movement is detected.

So what is the best way to scan for traffic? There's really no one perfect way. Although back and forth eye movements seem preferred by most pilots, each pilot should develop a scanning pattern that is com-

fortable and then adhere to it to assure optimum scanning. And since we can't be looking everywhere all the time, learning how and when to concentrate your search is critical. Scanning traffic patterns in the vicinity of an airport is particularly important. Be sure to clear before each turn in the pattern and be on the lookout for anyone who might be improperly entering the traffic pattern. In this situation, your ears can also be your eyes; listening to radio calls can help you hone in on areas where traffic may pop up.

During normal flight, a good practice is to scan an area 60 degrees to the left and right of your center of vision, as well as horizontally 10 degrees up and down. Be mindful of aircraft blind spots that can impede your outside view such as door or window posts. Maneuvering your head around these obstructions and/or a change in pitch or bank can help you get a better overall view of traffic.

Finally, if during flight your eagle eyes spot a possible traffic conflict, it's important to know how to properly convey this to the pilot. Simply saying, "I see something moving over there," accompanied by a wayward finger point out the windshield is only marginally helpful. Pilots are accustomed to using clock positions relative to the direction traveling to help them locate an object. For example, you might say: "I see a high-wing airplane above us at one o'clock," which would alert the pilot to look up and slightly to the right.

It takes a little practice, but before long you'll be plane spotting like a pro. It's worth noting also that as you train your eyes to spot minute targets in the sky, you'll also learn to see many other important "little" things you may now be missing, and which will enrich your visual experience while flying.

Tom Hoffmann is the managing editor of FAA Safety Briefing. He is a commercial pilot and holds an A&P certificate.

Learn More

FAA Advisory Circular 90-48, Pilots' Role in Collision Avoidance

go.usa.gov/xnsca

Pilot's Handbook of Aeronautical Knowledge, Chapter 14

go.usa.gov/xnscC

How to Avoid a Midair Collision, FAA Team Resource

faasafety.gov/gslac/alc/libview_normal.aspx?id=6851

Helicopter Companions

Pilots will tell you that some of the best times they had flying included a friend or family member who was not a pilot. Whether going somewhere special, or for a hundred-dollar hamburger, the expression on their faces during the first takeoff is priceless.

Every pilot knows that the first step to a safe flight is a thorough preflight. This includes consideration for some challenges when flying with others who are not pilots. That is especially true in helicopters.

As the pilot, you may want to explain some of the basic operating differences between an airplane and a helicopter. These could include how the helicopter main and tail rotor systems work versus the airplane propeller, the difference between how airplanes

You may want to explain some of the basic operating differences between an airplane and a helicopter.

and helicopters take off and land, or why helicopter pilots fly from the right seat while airplane pilots fly from the left. You may want to walk

passengers through your preflight inspection and answer questions they may have. This practice will boost their confidence in you as a knowledgeable and safe pilot.

Most small helicopters allow for the pilot to remove the passenger side collective, cyclic, and anti-torque pedals. If your flight doesn't involve flight instruction, you may want to consider removing those controls. Just be sure to review the rotorcraft flight manual to determine if this function requires a mechanic. If there are no restrictions, but you've never done this before, have a flight instructor or mechanic familiar with your helicopter walk you through the process.

If you choose not to remove the passenger side flight controls, brief your passenger on the importance of not grabbing or bumping the flight controls during flight. A good method I've found is to have passengers keep their feet flat on the floor away from the anti-torque pedals, and to keep their hands in their laps if they're not taking pictures or holding on to something.

It's important to secure all loose items. If an item can fly out, fall, roll under your feet, or get stuck somewhere out of reach, secure it in a cockpit or baggage compartment. If your passenger has a camera, make sure they secure the camera's strap around their wrist or neck to prevent it from falling, and brief them to keep it away from the pilot's collective flight control.

After you've conducted the required passenger briefing on the use of safety belts, you may want to share a few more safety items. Pilot and passenger conversations are encouraged. However, brief your passengers that you may have to stop a conversation abruptly in order to communicate with ATC, other aircraft, or to maintain a sterile cockpit during critical phases of the flight such as takeoff, landing, or hovering. Agree on a short phrase or a hand gesture as a signal that you need to stop the conversation.

Another very important briefing item for helicopter safety is instructing the passenger on how to exit while the rotor blades are still turning. The best way to avoid accidental contact with moving rotor blades, especially the tail rotor, is for everyone to remain inside the helicopter until the rotor blades come to a complete stop. However, if your passengers need to exit the helicopter before the rotor blades have stopped turning, direct them to walk perpendicular from the helicopter's longitudinal axis, and stay low until well clear of the rotor blades. Never walk towards the rear of the helicopter.

Take some time to develop your own passenger briefing card and include these points to standardize your passenger briefings.

Fly smart, fly safe.

James Ciccone is an aviation safety inspector with the General Aviation and Commercial Division. He is also an Airline Transport Pilot, and a Certificated Flight Instructor in multi-engine land airplanes, as well as helicopters, with 25 years of flying in the Long Island and New York City airspace.



Flight Forum

From Our Twitter Pages

You Can't Take All That!! What Aircraft Weight & Balance Means to You is a great article to pass along to your flying companions.

Or clients! I used to provide luggage for overnight trips to make sure they didn't overpack.

— Maria

Thanks, Maria. Check out the full article in the Jul/Aug 2014 issue of FAA Safety Briefing, or visit bit.ly/2zneCDs.

Push to Talk Phobia

Good day! I enjoyed the article about “push to talk phobia” in the Nov/Dec 2017 issue. I learned to fly at a non-towered airport, and was really nervous the first venture into air traffic control land. It took me a while to feel comfortable talking with towers and centers, however, there is one resource that you left out of the article, and that is LiveATC. That site has almost every available airport radio available for free. That site is the one that helped me the most, and I always have one of the feeds going every time I am on my computer. It is well worth checking out. Thanks for the good work!

— Barry

Hi Barry, thank you for your email, and we are very happy to hear that you enjoyed the article! We agree, liveatc.net is a great resource, so much so that we saved it to use in our follow up article called “How to Talk Like a Pilot: The Basic Elements of Aviation Communication” in the Jan/Feb Back to Basics issue of FAA Safety Briefing. We hope that article will also be a great resource for you and all of our FAASB reader community. Check it out at adobe.ly/2p7KwQb.

Sim City Correction

In the FAA Safety Briefing's “Sim City” issue (Nov/Dec 2017), we stated in the Simulation Training Allowance Chart on page 12 that seven hours of flight training device (FTD) time could be applied toward the private pilot certificate under an approved part 141 program. Per 14 CFR part 141, Appendix B, section 4(c)(3), part 141 training in an FTD may be credited for a maximum of 15 percent of the total flight training hour requirements or 5.25 hours. We regret the error.

— ADS-B —
EQUIP NOW!



UNTIL 2020
EQUIPAGE
DEADLINE

DON'T GET LEFT IN THE HANGAR.

Q: Will the deadline to equip with ADS-B Out be extended past Jan 1, 2020?

A: *The FAA has consistently demonstrated its commitment to the January 1, 2020 ADS-B Out compliance date.*

The rule was published in May 2010, nearly ten years in advance to allow ample time for the production and installation of equipment on aircraft and complete deployment of the ATC ground network (completed in 2014). ADS-B is currently used by ATC in all but the smallest facilities where integration with the automation is on track to support the compliance date. Equipment options are varied and plentiful; there are approved ADS-B systems for almost all aircraft types. Manufacturers share this information with the FAA which is available through a searchable database at faa.gov/nextgen/equipadsb/installation/equipment/adsb_ready.

Let us hear from you! Send your comments, suggestions, and questions to SafetyBriefing@faa.gov or use a smartphone QR reader to go “VFR-direct” to our mailbox. You can also reach us on Twitter @FAASafetyBrief or on Facebook facebook.com/FAA.

We may edit letters for style and/or length. Due to our publishing schedule, responses may not appear for several issues. While we do not print anonymous letters, we will withhold names or send personal replies upon request. If you have a concern with an immediate FAA operational issue, contact your local Flight Standards Office or air traffic facility.



Pilot²

At this age and stage, flying is most enjoyable to me as a social activity. Having someone else along to share the wonder that GA flying provides makes it a lot more fun. It may be the same for you. In that spirit, we have devoted this issue of *FAA Safety Briefing* to GA flying companions, with emphasis on welcoming non-pilot partners and passengers. We also aim to offer information that, we hope, will make the cockpit a more comfortable place for our companions. Before we close this edition, though, I want to address the topic of flying with companions — be they friends, colleagues, or life partners — who *do* happen to be pilots.

O Captain ...

Early in my passage along the pathways of pilot-hood, I went joyriding in the sky with a pilot who was then a member of my flying club. We launched as friends, but I'm not sure I would have used that

word when we landed. Both of us were fairly new to GA flying, but his steady barrage of instructional-style commentary made me wonder if he somehow thought the right seat magically made him

a flight instructor. He also had a dismaying habit of “helping” me by, for example, changing trim or flap settings without even telling — much less asking — me first. Since I didn't relish duking it out in the cockpit, I suffered in seething silence.

I probably owe John and Martha King for the fact that I have lots of flying friendships nowadays. In their typical entertaining fashion, they told a safety seminar audience how a single word — “captain” — helped saved their marriage from foundering on the kind of icy inflight interactions I experienced flying with my erstwhile friend.

The fundamental idea is that the pilot in the right seat always addresses the pilot in the left seat as captain, and provides objective information with no personal pronouns. For example, “you're getting too slow!” is forbidden. Instead, the right seat occupant might say, “Captain, airspeed is decreasing.” The captain similarly avoids personal pronouns with a

response such as, “Noted; correcting.” If the situation isn't resolved, the next transmission might be something like, “No correction noted.” “You're still too slow!” is prohibited.

Even if you're not comfortable calling your companion captain, you can still adopt this crew resource management concept. Omitting the pronoun is a small change that makes a big difference when human beings (and pilot egos) are involved. It requires the pilot-monitoring to provide objective information rather than accusations, and it enables the pilot-flying to accept it in that spirit.

Roles & Responsibilities

Having this kind of discussion as part of the pre-brief opens the door to the broader conversation you should have with any pilot you invite to join you — and, for that matter, with any pilot who invites you to fly along.

For one thing, it's important to explicitly establish which pilot will serve as Pilot in Command (PIC). As the rules say, the PIC is directly responsible for, and is the final authority as to the operation of the flight. Lawyers will tell you that knowing who has that role is very important if something goes wrong, but a more fundamental reason is safety. The experience with my friend “helpfully” changing the aircraft configuration “for” me illustrates how dangerous it can be when there are, as the cliché goes, too many cooks in the kitchen.

If you are the PIC, state that before you go to the airplane. Tell your pilot companion what kind of assistance you do (and do not!) want. If you are the guest of the PIC, make no assumptions. Ask whether and how you can assist, and stick to terms you establish during the flight.

If not from your own experience, take it from me that freelancing is not a good idea. So in a Pilot² configuration, get these basics squared away so you don't square off in the sky.

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Kieran O'Farrell and Fred Kaiser



For husband and wife FAA-ers, Kieran O'Farrell and Fred Kaiser, the aviation bug bit hard — and bit early. Kieran's initial experience with aviation might have sent many of us running for the hills. On her first flight, a transcontinental trip from Denver to Newark, an inflight emergency forced an unexpected detour to Chicago. After landing, a flight attendant instructed Kieran — traveling as an unaccompanied minor — to remain in her seat until she could help her exit the aircraft. Kieran watched in awe as the plane touched down on a foamed runway flanked by fire engines and emergency vehicles. "I remember thinking to myself that this is as good as it gets for a 10-year-old," says Kieran, who knew her brothers and sisters would be jealous. "If only I had a picture of me going down the emergency slide."

Despite (or perhaps because of) this unusually exciting introduction to aviation, Kieran embraced the industry by becoming a pilot before graduating high school. Her quest to expand her flying resume took her to Alaska in 1982 for a seaplane rating. Enamored by the beautiful and rugged environment, Kieran quickly realized that the "last frontier" would be her home. After 24 years of flying floatplanes in Juneau (including her favorite — the De Havilland *Beaver*), Kieran joined the FAA as an Operations Inspector. She went on to become a Regional Safety Program Manager, FAA Safety Team Program Manager, Frontline Manager and, most recently, acting manager for the General Aviation and Commercial Division's GA Operations Branch.

Fred Kaiser's path to aviation had a similarly serendipitous beginning: a chance meeting with a

dilapidated Aeronca *Champ*. "It was just hanging there ... dusty, floating, and absolutely mesmerizing," said Fred, recalling his aeronautical discovery in an old barn owned by a friend of his grandfather. As any wide-eyed, 8-year-old boy would do, Fred pestered Mr. McGhee, the owner, to get the old bird back in flying condition. Many months later, and with Fred's help as his apprentice mechanic, Mr. McGhee was able to launch this WWII era trainer back in the sky. Fred's passion and career track for aviation also launched to new heights, bolstered by the expert tutelage of a meticulous pilot and mechanic.

After a military stint in aviation, Fred found his way to Alaska as a bush pilot flying just about every type of workhorse airplane. "There is no way I could pick a favorite," says Fred. "Each aircraft had a life and experience to share, in the way it handled and flew." Fred leveraged his vast Alaskan flying experience to become an FAA operations inspector in 1997 at the Juneau Flight Standards District Office, where his flightpath would intersect with Kieran's.

The flying couple's combined aeronautical experience spans more than 80 years and 140 types of aircraft. This vast experience makes Fred and Kieran understand the importance of flying companion roles and good cockpit resource management. "People say the most dangerous thing in an aircraft is two instructors or two inspectors," jokes Fred. That's why they stress the importance of agreeing who will be the pilot in command (PIC) when they fly together. "This is our first and most important decision, as the PIC always has final say," notes Fred. Kieran is more experienced in floatplanes, so she is PIC in those aircraft. Fred, in turn, is PIC in tailwheel and ski planes. For inflight decisions, they have an agreement to go with the most conservative and informed position. They also defer to each other's strengths: Kieran relies on Fred's critical and disciplined eye for maintenance issues, while Fred relies on Kieran for her uncanny intuition. Their approach is a good model for all aviators.

Oh, and one last pointer from the flying couple: "Never, we repeat, *never* take any kind of disagreement on the ground into the air!" That's good advice for any aircraft occupant: front, left, or back seat.

Tom Hoffmann is the managing editor of FAA Safety Briefing. He is a commercial pilot and holds an A&P certificate.



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