March/April 2024

FAA Safety BRIEFING

Weather Wisdom

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ABOUT THIS ISSUE…

The March/April 2024 issue of *FAA Safety Briefing* focuses on aviation weather and its critical effect on safe GA flying. Articles review some of the many resources and tools pilots use to gather weather information as well as explore some of the trends revealed from weather-related accident data. We also sit down with the new FAA Administrator, Michael Whitaker, to discuss his take on general aviation safety.

Contact Information
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FAA Safety BRIEFING

The FAA Safety Policy Voice of Non-commercial General Aviation

DEPARTMENTS

FORECASTING SAFE SKIES

With winter nearly behind us, pilots who have patiently hunkered down for the season can soon look forward to longer and warmer days to get back in the cockpit. As you shake off the rust and prepare for more routine flying, I encourage you to take some time to shore up your meteorological moxie. Spring weather patterns can often take pilots by surprise, so being prepared and knowing where and how to use the information at your disposal is key. This issue of *FAA Safety Briefing* is one way to help boost your weather wisdom.

Accident data shows a clear pattern of just how lethal weather-related accidents can be. In the feature article "Pushing Your Luck," we dive into the data to see where pilots most often fall short in their planning and execution when trying to avoid inclement conditions. VFR flight into instrument meteorological conditions is a top contender, but you may be surprised to see how some other areas ranked.

Preflight weather briefings are essential to safety, so we asked Jeff Arnold, Leidos Flight Service's Director of Innovation and Outreach, to give readers an update on the flight planning site 1800wxbrief.com and how to make the most of your next online self-briefing.

Whether you're a student pilot learning the ropes, or a veteran flyer, it's vital to know what types of weather information are available and which weather reports are best to review. The amount of information can sometimes be a bit overwhelming and difficult to decipher. Check out the feature "A Fresh Forecast" for a primer on how to glean useful and practical information for your flight from METARs, TAFs and other weather reports.

Hearing a different perspective on weather can be enlightening and extremely valuable. Fixed-wing flyers could very well benefit from some of the micro-meteorology nuances that lighter-than-air pilots deem most useful in their practice. Hot air balloon pilot/instructor and FAA Safety Team Representative Adam Magee "opens the envelope" on some of this critical atmospheric insight in his feature "Expanding the Envelope with Aviation Weather."

In this issue we also introduce the FAA's new Administrator, Michael Whitaker. Hear more about Michael's priorities for the aviation industry as he embarks on his five-year term in the feature "Aviate, Navigate, Communicate."

Finally, we honor the hundreds of airmen who have been recognized as FAA Master Pilot and Master Mechanic award winners in 2023. These esteemed awards are a tribute to achieving 50 years of safety and professionalism as a pilot or mechanic. Please join me in congratulating these men and women for their amazing achievements. Check out the full list of award winners in this issue's "Roll of Honor" along with helpful information on how to nominate someone you know.

Before I go, allow me to leave you with a few weather-related resources you may find helpful. First is the *From the Flight Deck* (FTFD) Spring Pilot Workshop from 2023 bit.ly/FTFDSpring23, which covers a host of helpful advice for pilots returning to the skies. I recommend you also have a look at the main FTFD webpage, faa.gov/flight_deck, for a list of videos on airport-specific safety issues and other challenge areas such as complex airport geometry, phraseology, and wrong surface landings.

Two messages from our Fly Safe campaign also cover some important weather topics. There's one on developing personal minimums and leveraging the FAA's expanding weather camera program (bit.ly/FlySafe_WXcam) as well as another on making the most of available weather resources (bit.ly/FlySafe_UseofWx).

I hope these resources. along with the insightful content within this issue, can help expand your weather wisdom and provide guidance on making more well-informed decisions before your next flight.

Safe flying!

AVIATION NEWS ROUNDUP

Protecting Your Pilot Certificate

The FAA and Aircraft Owners and Pilots Association (AOPA) discuss protecting your pilot certificate in the new WINGS-credit course ALC-1093, *Cost Sharing, Time Building, and Posting on Social Media*.

The first chapter of the course covers important information that pilots and aircraft owners need to know and understand regarding flying passengers and property safely and legally. The second chapter is about time building, which is not as intuitive as cost sharing and pertains to flying to build time and experience. It explores topics like whether you can fly your airplane on company expenses and be reimbursed. The third chapter covers important information that pilots and aircraft owners need to know and understand when it comes to posting on social media, holding out for compensation or hire, and what may be used as evidence should safety regulations be compromised.

Take the course at bit.ly/alc-1093 and get WINGS pilot proficiency credit.

Operation ICICLE

In 2019, the FAA led the In-Cloud Icing and Large-drop Experiment (ICICLE) to collect data and evaluate the accuracy of current and developmental icing forecast tools and products for terminal and en route flights, as well as further understand the physical details of clouds. ICICLE prioritized large drop icing environments, which include freezing drizzle and freezing rain, because despite the substantial threat they pose to aircraft, they are not explicitly diagnosed or forecasted in icing products.

The experiment was a success, earning the 2022 National Weather Association's *Aviation Meteorology Award*, and led the FAA to internally change how the Current Icing Product (CIP) and Forecast Icing Potential (FIP) algorithms are producing Supercooled Large Drops (SLD - the insidious freezing drizzle and freezing rain). ICICLE data showed that some of the internal CIP and FIP algorithm scenarios provided little to no value, while a new formation mechanism was identified based on ICICLE in situ observations and was added to CIP and FIP. This new mechanism, "Recirculation," was identified for 7-9% of ICICLE SLD observations.

The FAA is currently in the process of transitioning software code to our National Weather Service (NWS) partners for both CIP and FIP that consider "Recirculation" along with the use of higher resolution (i.e., smaller horizontal grid spacing and vertical level spacing) weather prediction model information. This will result in CIP and FIP output being available in finer detail. Efforts over the next year will focus on calibrating the software to run efficiently on NWS platforms, finalizing assessments, and developing guidance for users on how to interpret and use the finer detail. Operational availability of the enhanced FIP is scheduled for the second quarter of fiscal year 2025 with enhanced CIP following in the third quarter.

The ICICLE program also supported the development of a new terminal area icing tool. Using data collected, a first version of this tool has been developed and is undergoing evaluation and adjustment. This tool provides a gridded output of small

Instruments attached to the wing – including (counterclockwise from upper left) a forward scattering spectrometer probe, Rosemount air data probe, and cloud droplet probes – measure different cloud particle sizes and concentrations.

drop, freezing drizzle, and freezing rain likelihood, which can also be displayed in a simplified way for each terminal area. An FAA technical document describing the first version of the tool is anticipated in the coming year.

To learn more, read "Operation ICICLE" in the Mar/Apr 2020 issue of *FAA Safety Briefing* at bit.ly/Op_ICICLE.

Service Difficulty Reporting System

The FAA recently published Advisory Circular 20-109B, *Service Difficulty Reporting System (Air Operator/Air Agency/General Aviation/Unmanned Aircraft Systems)*, for reporting in-service product and article failures, malfunctions, and defects. The AC solicits Service Difficulty Reporting participation from all segments of the aviation communities that operate in the National Airspace System and promotes the use of the Service Difficulty Reporting System (SDRS) database accessed at sdrs.faa.gov. The overarching purpose of Service Difficulty Reporting is to promote safe operations and improve the operational performance and reliability of products and articles produced under 14 CFR part 21.

You can find this AC on the Dynamic Regulatory System at drs.faa.gov.

Updated Arrival Alert Notices

The FAA is taking several proactive steps to address wrong surface events, reduce the potential for pilot confusion, and help improve safety in the NAS. To manage wrong surface events where an aircraft lines up to or lands on the incorrect runway, taxiway, or airport, the FAA is releasing Arrival Alert Notices (AAN) at airports with a history of misalignment risk.

Sample Arrival Alert Notice

AANs are graphics visually depicting the approach to a particular airport with a history of misalignment risk, and language describing the risk. The FAA recently published 28 new airports for a total of 40 AANs. The complete list of AANs is available at bit.ly/3w8u8Ch.

For additional information, check out the FAA's *From the Flight Deck* video on AANs and other important topics at faa.gov/flight_deck.

A Check-up on Checklist Customization

Checklists are a fundamental part of any safe flight. They provide important structure to the things we check often, usually in a prescribed order of priority, like inspecting an aircraft's components and systems for proper operation and structural integrity and confirming the airplane and engine are functioning properly and are configured appropriately for each phase of flight. Bottom line: checklist usage is a sound and proven way to reduce errors and improve flight safety.

But just like airplanes change with upgrades or modifications, so too should checklists to include those new items and procedures or omit those that are obsolete. Maybe you've added some new avionics equipment or installed a new fire extinguisher. Or perhaps you'd like to reorder your instrument and gauge checks in a more logical manner. Or maybe you'd prefer to use a more specific term to verify a desired state than the sometimes vague "check and set" response. The question for some might be — how exactly do I modify a checklist?

While there is no approval required from the FAA to modify or customize a checklist, pilots and aircraft owners should start by consulting their aircraft's Pilot Operating Handbook (POH) or Airplane Flight Manual (AFM), or panel placards with some older aircraft. These steps should constitute the baseline for your checklist. If there is a manufacturer-prescribed task or procedure you wish to omit — perhaps due to concerns about mechanical wear and tear on a particular component — you should consult directly with the manufacturer to ensure safety is not compromised.

The FAA issued a Safety Alert for Operators (SAFO) in 2017 that addresses safety concerns with using commercial off-the-shelf (COTS) or personally developed checklists. You can review the SAFO at bit.ly/3Sfcx3T. The notice was prompted by an accident involving a landing gear failure in which the pilot used a COTS checklist that lacked key steps regarding manual gear extension. The SAFO urges pilots to ensure any COTS or personal checklist is consistent with what the manufacturer states.

Another important reason for this consistency is apparent during practical exams for a pilot certificate or rating. Designated pilot examiners may require an aircraft manufacturer's procedure is demonstrated when testing applicants. Those who use a checklist that differs from the manufacturer may omit or incorrectly perform an important step, impacting their ability to successfully pass the exam. If you are providing flight instruction, it is essential that you show, demonstrate, and explain any omitted items to students to avoid this potential pitfall. The student should be able to demonstrate the procedure and be able to explain why it has been omitted from the modified checklist and is not performed routinely.

Having checklists that are efficient, logical, and that account for changes to an aircraft's systems can greatly improve safety and even increase the likelihood of them being used. Just be sure the information you use for those revised checks is correct, complete, and consistent with the manufacturer's safety standards.

If you have any questions regarding this information, please email 9-AFS-800-Correspondence@faa.gov.

#FLYSAFE GA SAFETY ENHANCEMENT TOPICS Please visit bit.ly/FlySafeMedium for more information on these and other topics.

MARCH

Pilot Proficiency and *WINGS* — How proficiency training programs, like ***WINGS***, can help improve flight safety.

APRIL

Best Glide Speed — The importance of obtaining and maintaining best glide speed during emergency descents, approaches, and landings.

DR. SUSAN NORTHRUP, FAA FEDERAL AIR SURGEON

REPORTING DISABILITY COMPENSATION

Recently, there has been a lot of discussion in many different forums regarding the FAA and pilots who receive disability compensation, especially from the Department of Veterans Affairs (VA). Some pilots are concerned that a high disability rating can jeopardize medical certification. This is not true. Our determination is based on the condition and treatment, not the amount of compensation. While the likelihood of a significant medical issue does increase with a higher rating, the correlation is not as strong as you might think. In fact, we have pilots who have a 100% disability rating from the VA, yet qualify for a Class I or II medical. On the other hand, some conditions, such as a seizure disorder, can have a rating from the VA, as low as 10%, yet not be safe for flight. For this reason, even a 0% disability rating should be reported. I want to emphasize though that we consider each pilot individually with the goal of issuing a medical when it is safe to do so.

> **PILOTS NEED TO REPORT ANY FORM OF DISABILITY BENEFIT ON THEIR MEDICAL, INCLUDING THAT FROM A PRIVATE INSURER, WORKMAN'S COMPENSATION, OR THE SOCIAL SECURITY ADMINISTRATION.**

I would like to address the responsibility that we pilots have for reporting disability compensation on the FAA medical application (FAA Form 8500-8). I would also like to remind you that you need to report any form of disability benefit, including from a private insurer, workers' compensation, or Social Security disability.

Question 18y, *Medical Disability Benefits*, is answered incorrectly by many pilots. The purpose of providing medical history on the 8500-8 form through MedXPress is to identify areas of potential aeromedical concern and to ensure adequate and aeromedically acceptable mitigation. Sometimes these concerns can be addressed by the aviation medical examiner (AME) while you are in the office, and you leave with your medical in hand; other times additional information and testing might be necessary to ensure aviation safety. This is just as true for a history of medical disability benefits as any medical condition.

Why are we concerned about pilots receiving medical disability? The short answer is that even though pilots should annotate their medical conditions in other parts of question 18, they may not believe that an underlying medical condition or treatment falls within another question on FAA form 8500-8. Additionally, question 18y can serve as a helpful reminder of medical conditions that the applicant did not think about when answering other parts of question 18. Remember that our goal is to ensure the safety of the national airspace system. This question helps us ensure that all underlying medical conditions are disclosed, adequately controlled (or resolved), and that the treatment is aeromedically acceptable.

For those of you who have been granted disability compensation since your last medical application, I recommend that you gather the paperwork you have for that disability compensation and bring it with you

to show your AME at your next FAA medical examination. If it's a VA disability, bring the VA decision letter(s). Consider making an appointment with your AME prior to the examination to review the information for completeness. For those of you who have been granted disability compensation prior to your last FAA medical but did not report it, I recommend that you provide this to the FAA now even if you are not due for an examination. Your AME can help with this. Make sure that you bring copies of all the disability evaluations, not just the most recent ones. This will expedite your review.

Should your disability compensation change, you will also need to report this. Generally, you will do so at the time of your next medical application. Second, independent of any reporting requirements, remember your obligations under 14 CFR section 61.53 (bit.ly/14CFR61_53). The bottom line is that question 18y is like any other question about medical history. We simply want to ensure that the underlying condition is well-controlled and that the treatment is aeromedically acceptable.

Dr. Susan Northrup received a bachelor's degree in chemistry, a medical degree from The Ohio State University, and a master's degree in public health from the University of Texas. She is double board-certified by the American Board of Preventive Medicine in Aerospace Medicine and Occupational Medicine. She is a retired U.S. Air Force colonel and a former regional medical director for Delta Air Lines. She is also an active private pilot.

SUN 'n FUN Aerospace Expo

FAA SAFETY CENTER FORUMS

April 9–13, 2024

	08:30 – 09:30	10:00 – 11:00	11:30 – 12:30	1:00 – 2:00	2:30 – 3:30	
TUESDAY APRIL 9	**Hypoxia Awareness** Ezekiel "EZ" Duran FAA **BK** **AFS0125453**	**How to Navigate Four Weather Seasons** Dr. Ian Johnson Brandon Smith Gary Pokodner **BK1** **AFS0125454**	**Most Common Cause of Fatal Accidents: Loss of Control** Ed Verville DPE **BK2** **AFS0125455**	**Fatigue Human Factors and Maintenance Related Accident Case Study** Mike Millard FAA **AMT** **AFS0125889**	**Low and Fast: Is it Safe, Is it Legal?** Jeff Edwards AvSafe LLC **BK1** **AFS0125890**	**Join us! for daily forums at the FAA Safety Center**
WEDNESDAY APRIL 10	**Flying to Switzerland** Kim Miller Jacques Astre IASF **BK3** **AFS0125892**	**Effective Preflight Planning for Enhanced Runway Safety** Andrew Applegate Dane Guynn FAA **BK2** **AFS0125904**	**Human Factors & Exp Aircraft** Mike Millard FAA **AMT** **AFS0125905**	**Loss of Control and Seaplane Operation** Steve Guetter Wipaire/CFI **AK2** **AFS0125906**	**Flying to the Bahamas** Kim Miller Jacques Astre IASF **BK3** **AFS0125907**	**Join John and Martha King tomorrow!**
THURSDAY APRIL 11	**FAA Accident Investigation Updates** Patrick Hempen FAA **BK3** **AFS0125908**	**Straight Talk About Aviation Safety** John & Martha King King Schools **BK3** **AFS0125909**	**Meet the FAA FAA Leadership**	**Human Element in Weather Related Accidents** Dr. Ian Johnson Brandon Smith Gary Pokodner **BK1** **AFS0125910**	**TBD** Stephanie Wiles FAA Air Traffic Organization **BK** **AFS0125911**	**CAMI will be our early morning star tomorrow!**
FRIDAY APRIL 12	**Aeromedical Certification Updates** Dr. Brett Wyrick FAA **AFS0125912**	**Preflight Briefing Breakdowns** Jeff Arnold Leidos **BK3** **AFS0125913**	**FAA Charles Taylor Master Mechanic and Wright Brothers Master Pilot Awards Ceremony**	**Navigation During GPS Outage** Vince Massimini JoAnn Ford Rick Niles FAA **AK1** **AFS0125914**	**Humility and Wisdom 101** Lee Stromenger FAA **BK3** **AFS0125915**	
SATURDAY APRIL 13	**Flight Illusions** Mike Stretanski Senior AME **BK** **AFS0125916**	**Aircraft Maintenance "Have You Ever Seen Anything Like This Before?"** Mike Millard FAA **AMT** **AFS0125917**	**IFR Tools for VFR Pilots** Tom Slater FAASTeam Representative **AK1** **AFS0125918**	**Will it Kill You or Just Leave a Mark** Ray Heyde Orlando FAASTeam Rep **BK1** **AFS0125919**	**Is Your Cockpit a No Distraction Zone?** Katherine Wilson NTSB **BK2** **AFS0125920**	**See you next year!**

Appropriate **AMT / WINGS** credit will apply to events by using the associated **#AFS012XXXX** listed in each box.

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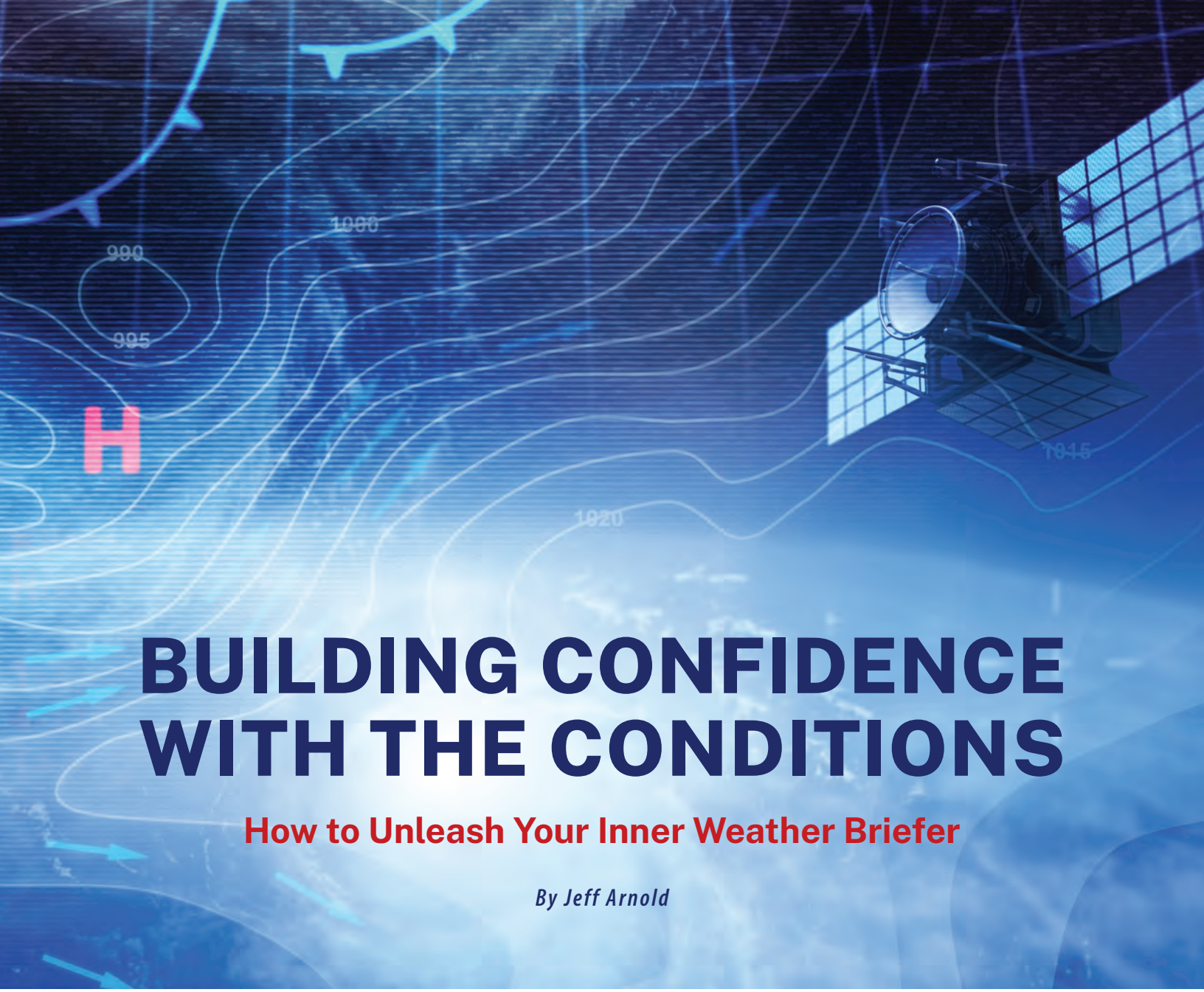

BUILDING CONFIDENCE WITH THE CONDITIONS

How to Unleash Your Inner Weather Briefer

By Jeff Arnold

For the past two years, I've been presenting at flight schools, Experimental Aircraft Association chapters, webinars, and airshows about aviation weather and how to use Leidos Flight Service in the modern age. Each presentation left me with the same impression — there are numerous opportunities for the GA population to expand their grasp on weather. Here are some ways pilots can develop or improve their weather interpretation skills.

Why Self-Briefing?

The title of my presentations for the last few years has been, "How to Co-Exist with Weather," but in my travels, I've observed that only about 20% of pilots feel confident or comfortable co-existing with weather-related aspects of flying.

> **How comfortable are you with the weather and making a go/no-go decision based on what you've seen?**

The question to audiences was simple: "How comfortable are you with the weather and making a go/no-go decision based on what you've seen?" For what it's worth, it took an uncomfortable amount of arm twisting to get 20% of the room(s) to raise their hands.

I can only summarize it with this: Many pilots I've spoken to have self-identified as being uncomfortable or inexperienced with weather. This response, which has been the same no matter where I've gone (with few exceptions), has bothered me since I began asking the question.

One of the examples I like to use with students is the muscle memory, comfort, and familiarity that most of us have, or develop while driving our personal vehicles. Wouldn't it be great if you had the same amount of comfort and familiarity with the weather as you do with your car? It's by no means impossible, but to do that, we need to understand how we got so comfortable with driving in the first place. The simplest answer is regular interaction, day in and day out. To that end, it's been said that flying is a perishable skill, something that I can certainly relate to, but so is weather know-how.

In this writer's humble opinion, the only way to make lasting and meaningful impacts on how pilots obtain, perceive, and interpret weather is to change the way we teach, approach, and think about weather.

> **Wouldn't it be great if you had the same amount of comfort and familiarity with the weather as you do with your car?**

Advisory Circular (AC) 91-92 – An Educational Roadmap

I've jokingly referred to 14 CFR section 91.103, *Preflight Action*, as, "one of the vaguest regulations in the book," but not without cause. Section 91.103 states:

"Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include … "

The regulation goes on to list a few paragraphs for visual flight rules (VFR) and instrument flight rules (IFR) requirements, but still somewhat falls short of the mark of being specific.

In recognition of this, the FAA produced Advisory Circular (AC) 91-92, which provides guidance for required preflight actions under 14 CFR section 91.103. These guidelines include preflight self-briefings, flight planning, weather interpretation, and risk identification and mitigation actions.

Additionally, this AC guides the use of technologies like ADS-B, third-party apps, and electronic flight bag (EFB) providers. It also emphasizes using Leidos Flight Service in a consultative capacity, aiming to enhance pilot comfort and proficiency with weather information and related products via increased exposure.

Lastly, but most importantly as it pertains to 91.103, it's logical to ask: "Where do I start?" and "Where do I stop?" when it comes to obtaining all available info pertinent to your flight.

The answer: AC 91-92 provides a Sample Preflight Briefing Checklist in Appendix B of the document. This is a great place to start implementing a preflight weather routine, anchored to a process and checklist.

I've discovered, through various surveys and other outreach efforts, that most pilots are not aware of AC 91-92. You can read it at bit.ly/AC91-92.

Becoming Comfortable with Weather and Self-Briefing

So how does the industry begin training pilots to be comfortable with the weather? Weather comfort means more than just accumulating knowledge — it refers to and implies some level of practical application and adaptability. As with everything else aviation, comfort and experience comes from routine exposure, which is no easy (or cheap) task these days.

Leidos Flight Service has developed a beginner's process for implementing a preflight weather routine, with the hope that pilots will tailor it into a process that fits their specific needs. Here are a few tips to bridge the gap:

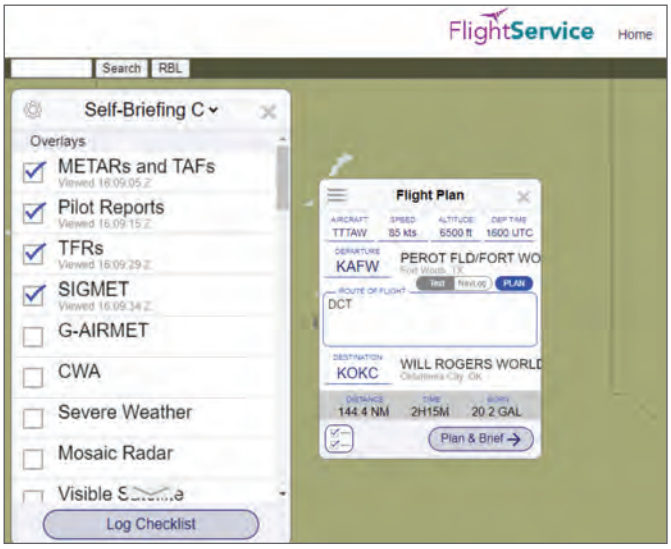

Figure 1: On 1800wxbrief.com, try using the graphical checklist on the interactive map as part of your flight planning process.

Recommendation	What It Brings . . .
Practice	I've been recommending that pilots practice with the weather daily, or more realistically, as much as life allows, even if not planning to fly. The logic here is simple — if we can't get routine exposure, we manufacture it. By going online and generating a quick briefing from a saved flight plan, you can run through the briefing with your preferred checklist. I encourage pilots to do two things while practicing self-briefings: 1. Write down any weather questions and a go/no-go decision after you run through your briefing. 2. Check the weather later that day to see if your decision would have been a good one. This allows you to focus your efforts on weak areas while learning weather products or concepts and builds experience with making go/no-go decisions. **Consider this**: if you were to spend 5-10 minutes a day just twice a week, or whatever you can manage, the dividend payout you'll receive at the end of a year from investing in yourself and your skills is considerable. Lastly, don't make this harder on yourself than you have to — use a familiar route of flight while starting out. Comfort and familiarity, remember?
Process	Make sure you're utilizing a process or a self-briefing checklist. As mentioned previously, AC 91-92 Appendix B offers a great sample preflight briefing checklist. 1800wxbrief.com also provides a graphical checklist on the interactive map (Figure 3). A bonus of using and logging the graphical checklist: if pilots still have questions about the weather and need to call a Leidos Flight Service specialist, they will receive priority call queue handling.
Participation	How many times have you gotten a briefing and absorbed exactly zero of it? Know and work with your resources, but more importantly, invest in the briefing. AC 91-92 does a great job of listing these resources, but here are a few more to consider: • Flight instructors • Flying community • Leidos Flight Service specialists • Flight school support • Online resources
Proficiency	Weather is a lot like aviation; it's not hard . . . it's just a lot. Make an active effort to continue learning, and utilize free educational resources, such as WINGS courses or FAASTeam events. Two WINGS courses of note, **ALC-683: *Conducting Preflight Self-Briefings for Student and VFR Pilots*** and **ALC-889: *Conducting Preflight Self-Briefings for IFR Pilots***, are quite frankly some of the best scenario-based weather training tutorials out there (in this author's opinion, of course).
Precaution	When in doubt . . . sit it out! I can't tell you how many times I've been in an FBO, or an office, or an airplane, and forced myself to say, "If I'm thinking about it this hard, the answer probably needs to be no." That's both saved my bacon and very nearly burned it the few times I've ignored it.

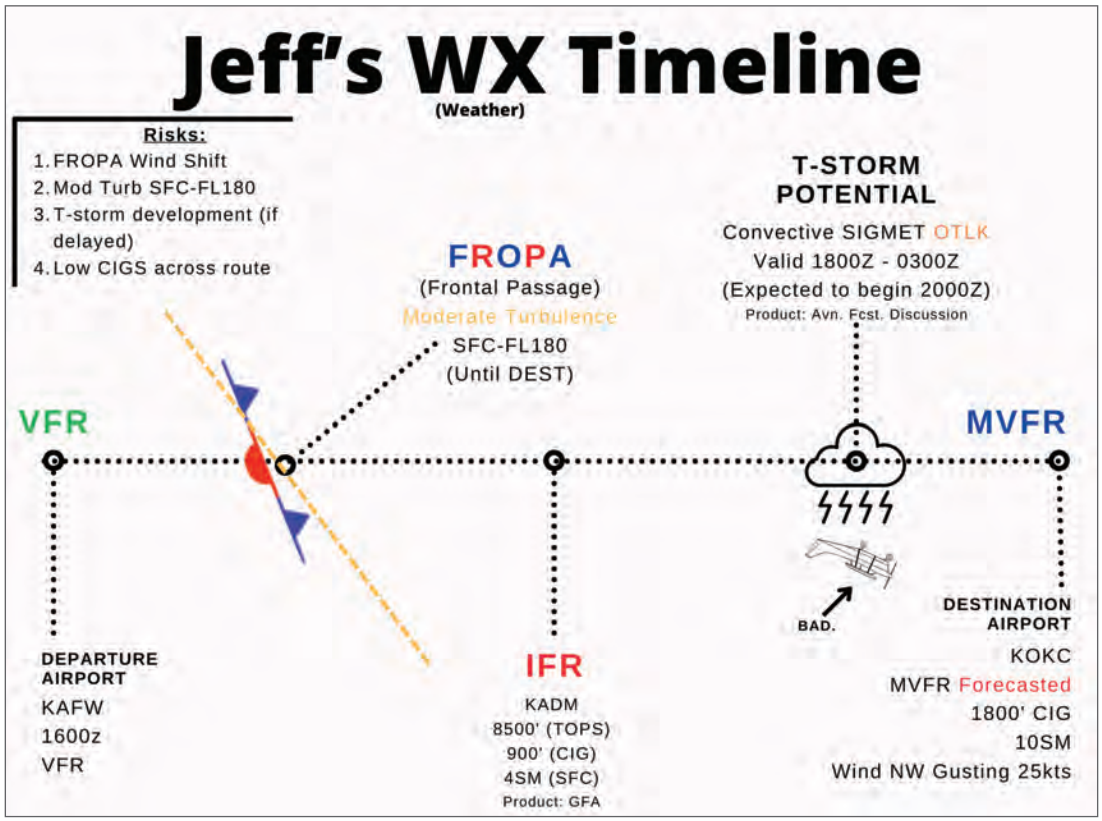

Figure 2: Creating a weather timeline can help pilots better keep track of weather conditions along their route.

WX Timeline

For a sneak peek at next year's presentation content, I've been recommending that pilots keep a "weather timeline," as they brief themselves and fill it in with current or forecast conditions along the route. It doesn't have to be anything fancy, just a reminder of what you previously looked at while you were on the ground. See figure 2 for a sample of mine.

Flight Service Updates

Leidos Flight Service is looking forward to an exciting 2024 that brings new updates to 1800wxbrief.com, including expanded help tools, YouTube tutorials, and weather product upgrades. Make sure you check out our new FAA WX Camera Layer and the Local Area Knowledge tools on our interactive map to learn more about the weather by using the same training material as our specialists!

Leidos Flight Service has developed a beginner's process for implementing a preflight weather routine, with the hope that pilots will tailor it into a process that fits their specific needs.

Weeding Out Your Weather Worries

It's incredibly difficult to train yourself to recognize countless weather variables and respond accordingly, mostly because these variables appear as a multitude of individually overwhelming tasks to complete. By thoroughly immersing yourself in new and unfamiliar environments, these individual variables slowly begin to transform into a fluid mental perception, via experience.

The comfort and experience with weather that we collectively strive for is about more than just embracing new technologies and products; it's about developing a working understanding of the weather, complimented with experience in practical application and good decision-making. That's something that takes time, maybe even a lifetime. It's our sincere hope that this approach will lead to safer and more confident pilots in the skies. Call us when you need us; the phones are on.

Jeff Arnold is a graduate of Oklahoma State University, has held flight & ground instructor certificates for over 16 years, and is a former Leidos Flight Service Weather Briefer & Air Operations Manager. Jeff currently serves as the Director of Innovation & Outreach for Leidos Flight Service.

Any personal opinions expressed in this article belong to the author, and do not necessarily reflect the position of Leidos Inc.

LEARN MORE

AC 91-92: *Pilot's Guide to a Preflight Briefing*
bit.ly/AC91-92

ALC-683: *Conducting Preflight Self-Briefings for Student and VFR Pilots*
bit.ly/ALC683

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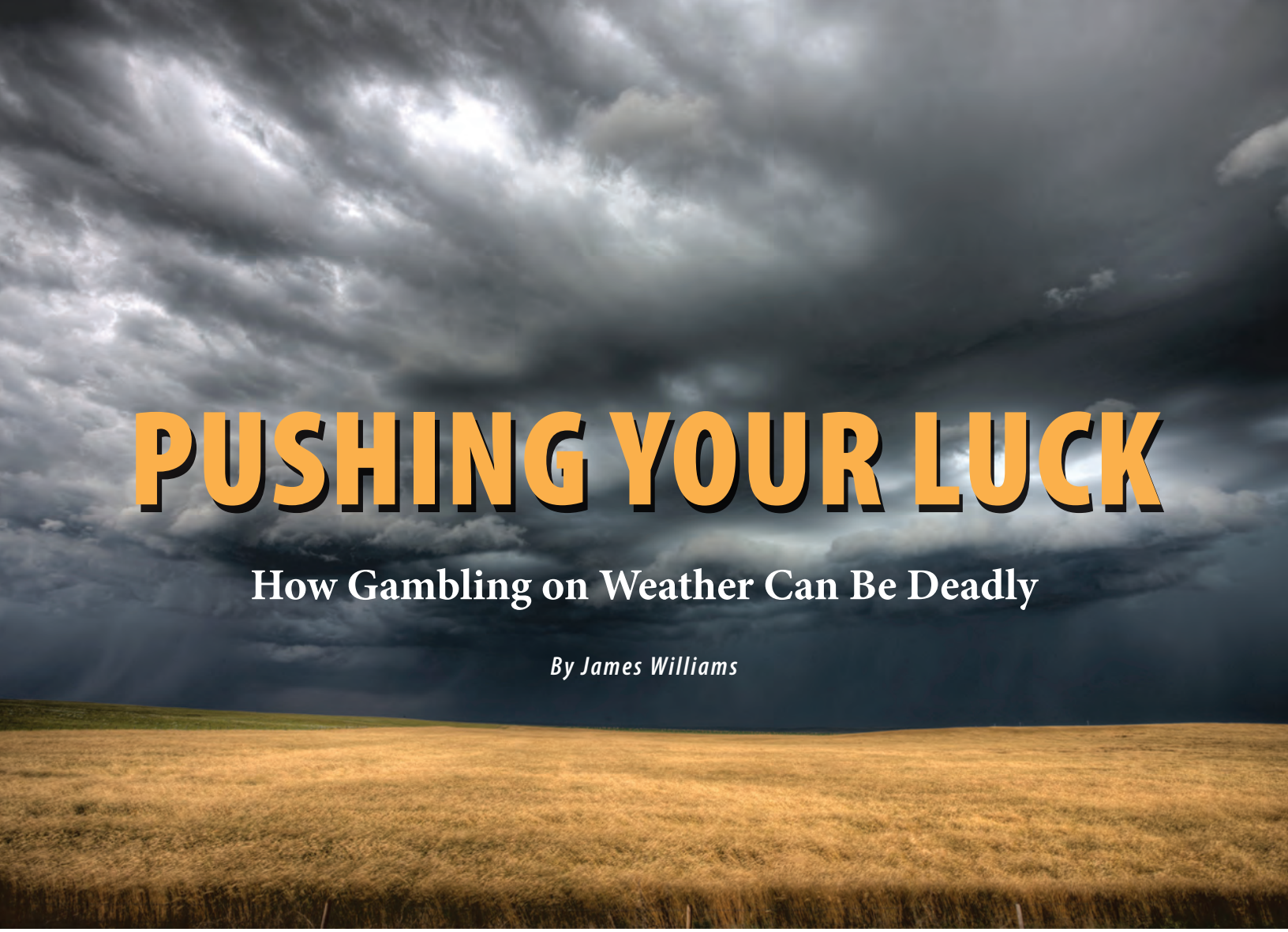


PUSHING YOUR LUCK

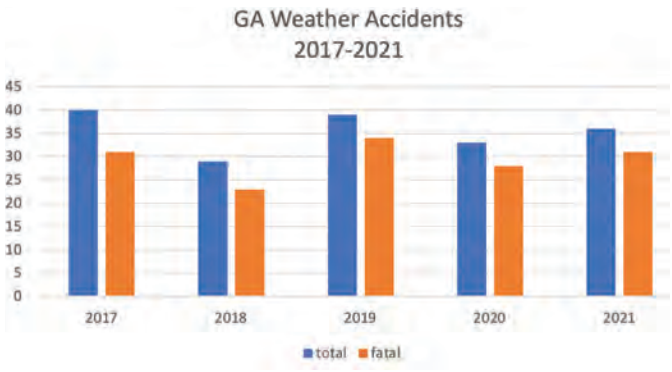
How Gambling on Weather Can Be Deadly

By James Williams

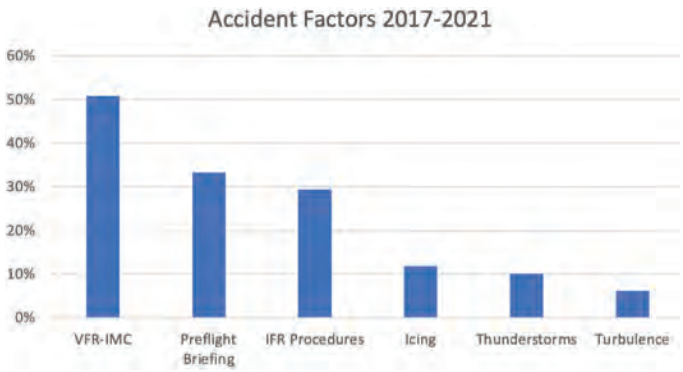
What's the scariest thing you've ever been through in an airplane? For me, pretty much every one of those stories involves weather. Even though my weather gambles paid off, they are still seared into my memory as moments where my life, and in my experiences, the lives of others, teetered on the edge of a knife. Those "good" outcomes rank among the most dangerous moments of my flying experience. That's one of the reasons I've always had a particular interest in weather accidents and watching those trends over time. I've written numerous articles over the years on the topic, and my process has always involved reading through general aviation (GA) weather accident reports from the National Transportation Safety Board (NTSB). Reviewing individual reports gives me a feel for details that aren't easily discernable with a simple numerical count. One trend I noticed declining in a recent data review was the number of pilots without instrument ratings who were filing and flying on IFR (instrument flight rules) flight plans. Let's look at the numbers.

By The Numbers

For this article I reviewed accident data between 2017 and 2021. This yielded 177 accidents with 83% fatal and 321 lives lost. The rate hovered around 30 to 40 accidents per year, with 2017 being the highest (40) and 2018 being the lowest (29). Of these accidents, 75% resulted in loss of control (LOC) and 25% were controlled flight into terrain (CFIT) or obstacle strikes.



More than half of all the accidents I reviewed involved visual flight rules (VFR) operation into instrument meteorological conditions (IMC), and a third of them involved a failure to prepare for the flight properly in terms of a weather briefing. More than a third of the pilots did not possess an instrument rating. Other weather-related factors, such as icing (12%), thunderstorms (10%), and turbulence (6%), were noteworthy but not a significant driving force. A larger area of concern was the 29% of accidents involving a failure to follow instrument procedures and air traffic control (ATC) instructions. The percentages don't equal 100% as more than one factor may be involved in each accident.



The Devil in the Details

While it is time-consuming to skim more than 200 NTSB reports (there are more than a few accidents that were mechanical in nature and had to be excluded), it does give you an excellent feel for how these accidents are happening. As I mentioned earlier, a notable trend in prior decades saw a surprising number of non-instrument-rated pilots filing and flying IFR and ending up in an accident report. By the turn of the century, these incidents had all but disappeared. The failures to obtain a preflight briefing are more challenging to detect with the rise of a host of new resources not all of which track usage. But in many cases, we can tell either by conversations with friends, family, and bystanders or by other actions that the pilot was cognizant of the weather. So, the cited third of those accidents involving a failure to properly prepare for a flight only includes those who disregard the need for a weather briefing rather brazenly, meaning there is no record of any other corroborating evidence of weather awareness.

Speaking of brazen, there's something I've noticed in the reports. There seems to be a growing trend of non-instrument-rated pilots who take off into IMC with no flight plan despite other pilots, friends/family, or airport denizens strongly urging them not to. In these cases, we know the pilot is well aware of the dangers. In one case that involved an airplane with multiple owners, the non-instrument-rated owner sought advice from an instrument-rated owner regarding the flight. The instrument-rated owner reviewed the planning and weather and told the accident pilot the flight could not be conducted under VFR. Unfortunately, he was right.

In another accident case, an aviation maintenance technician who had just completed repairs to the airplane strongly encouraged the pilot to delay his take-off as the field was experiencing low IMC. The pilot declined this advice and disappeared into the clouds just after lift-off, with fatal results a few minutes later. These aren't cases where there's even a chance of staying below the clouds or mistaking the conditions. I have not dug deeply enough to quantify whether this might be a few outliers presenting as a trend or something else entirely, but I will be taking a closer look at it in the future.

When in Doubt

So, how do we address these issues? The first corrective action would be to step up your weather briefing skills. Review the checklist developed by Jeff Arnold in the article "Building Confidence with the Conditions" for more information on specific self-briefing advice. But in more general terms, you need to emphasize weather briefings and make them more than just a box-checking exercise. While there were exceptions, overwhelmingly, the weather conditions that would prove fatal in so many cases were forecasted before the flight departed. One step that may help would be to use a weather log. This is a method of recording the contents of your briefing in an easy-to-reference format. By categorizing the weather, you force yourself to consider it more deeply than if you just scan the briefing page. You are also creating a record of the conditions that you found acceptable on launch to have something to compare to if you run into unforecasted conditions. Another solution is to crowd-source your decision-making.

> **It's crucial to approach flying in the weather with the respect it's due because when things go wrong, it can easily turn fatal.**

With the rise of electronic communications, your briefing data is nothing more than a few virtual keystrokes to send your proposed flight's weather log to a fellow pilot for a quick review. Ideally, this would be a mentor with more experience than you, but any other rated pilot still offers a huge benefit; they aren't invested in making the flight. "Get-there-itis," especially when combined with the sunk cost fallacy (I paid for a hotel/vacation), does a number on our decision-making capabilities. It's still hard to combat even when we're aware of it. Using a neutral party who doesn't have that kind of investment is an excellent reality check. Another great benefit of using a weather log is the

reminder that a go/no-go decision is a continuous process that can be reversed or amended if circumstances change. While a weather log gives you an excellent mechanism to fall back on, it isn't required for you to reevaluate your decision. If you feel things aren't going to plan, ask for help and turn around.

Another area of concern is instrument procedures and processes. The failure to follow these critical procedures has a few different causes but primarily boils down to a lack of IFR proficiency and task saturation during IMC. The ideal solution to these problems is more IFR practice in IMC with an instructor. However, both cost and practical considerations, like trying to schedule the weather, make that a challenge.

I've always advocated for simulation as an additional tool for this situation. Whether in a formalized environment like a flight school or even at home on a desktop computer, the ability to practice procedures without risk in an IMC environment is a big win. There are even services that employ air traffic controllers to guide you in the sim just as if they were working in an actual approach control environment. This gives you the chance to practice procedures and learn weaknesses in your IFR proficiency that you can work on with an instructor. It's also an excellent chance to improve radio proficiency and get more comfortable working with controllers.

It's crucial to approach flying in the weather with the respect it's due because when things go wrong, it can easily turn fatal. But also, because many of these accidents are so easily avoided. Focus on knowing the conditions you're expecting, and the capabilities of both you and your aircraft. And avoid thinking about the go/no-go decision as a singular point in time. You can always change your mind if things don't seem to be going to plan.

Gambling can be a fun pastime in a casino, but you shouldn't do it in an airplane when the odds are stacked against you. Instead, make your own luck and keep the odds in your favor by following the recommendations above.

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

LEARN MORE

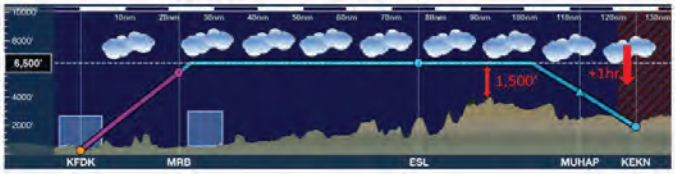
"Make Your Weather Briefing as Easy as 1, 2, 3" *FAA Safety Briefing*, May/Jun 2022
bit.ly/48LLR0f

Weather Log

Date of Flight	
Time of Flight	3pm
AC#	N123WC
AC Type	C182
Altitude	6.5K

Briefing Info	
Type	ABRV
Time	130pm
Source	Self

Personal Minimums	
Wind	10
Gust	12
Vis	5
Ceiling	30



Segment	Name KFDK — miles, mins, 2 hrs Fuel left	Name MRB — 20 miles, 8 mins, 1.8 hrs Fuel left	Name MUHAP — 110 miles, 45 mins, 1.1 hrs Fuel left	Name KEKN — +1hr 120 miles, 51 mins, 1 hrs fuel left
Clouds	8K AGL	8K AGL	5K AGL	5K AGL then <1K
Visibility	10 SM	10 SM	10 SM	6 SM then <1 SM
Wind	340@4	5KT HDWND	5KT HDWND	320@8
PRECIP				
Density Alt				
AIRMET				IFR +1hr
SIGMET				
PIREP				

Risk	Note
Cross wind TO/LDG	
Gusty TO/LDG	
DA reduced takeoff performance	
VFR on top; unable to Land @ Waypoint	
Low Clouds en route	Close to clds, High mtn
Low clouds at night	
Low Visibility/Haze/Virga/Rain	
Conditions worse +/- 1 Hr	+ 1hr IFR @EKN
VFR WX alternate beyond range	Possibly
METARs worse than prior TAFs	Yes
WX products disagree	
Bad PIREPs	
Strong TB	
Nearby IFR	Yes
Nearby convective activity	
Unfamiliar Dep/ER/Dest	
Strong headwinds	
Route close to mountains	Yes
Close or exceed personal mins	
other	

Weather logs can help record the contents of your weather briefing in an easy-to-reference format and force you to take closer notice of the conditions.

EXPANDING THE ENVELOPE WITH AVIATION WEATHER

A Balloon Pilot's Perspective on Microscale Meteorology

By Adam Magee

Have you ever encountered unexpected instrument conditions, marginal VFR, just been surprised by weather, or been fearful of experiencing unexpected weather? You're not alone. Aviation weather is complex. There are PhDs in meteorology after all! It's no wonder pilots, at every skill level, struggle with weather knowledge. One study even graded properly rated instrument pilot's performance on instrument flight rules (IFR) and VFR knowledge and skills a "D." One thing I always love about the FAA Safety Team (FAASTeam), and this magazine, is the sharing of knowledge from all different areas of aviation to improve overall aviation safety. Microscale meteorology is one such area that provides an opportunity for myself and my fellow balloonists to share knowledge of how we fly.

There are several microscale weather resources that provide balloonists the additional safety data they need for safe flight, but which may also benefit aviators in any aircraft type.

I've explained in a previous article ("Teaching the Unknown," Nov/Dec 2018 issue) that balloons are unique aircraft. Given their unique flight characteristics, like being susceptible to winds and without an engine or mechanical directional control, balloons truly are a part of weather. If you think about it, a balloon aloft is nothing more than a particle in the sky susceptible to the forces of nature. That's why it's so important for balloon pilots to know and understand weather on a small scale. When we fly, we become one with the weather. The slightest miscalculation on weather — winds, fog, clouds, thunderstorms — puts a balloon at risk of an accident. Once a balloon is in bad weather, there's no getting out of that until the weather changes.

As pilots, we know 14 CFR section 91.103 states: "Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight." FAA Advisory Circular (AC) 91-92, *Pilot's Guide to Preflight Briefing*, provides guidance that aids in meeting the regulatory requirements of 91.103. The problem for balloon pilots though is that many available weather resources are too broad. Many weather forecast tools cover large geographic areas and apply mostly to the upper layers of the atmosphere. Here are some microscale resources that provide balloonists the additional safety data we need for safe flight, but may also benefit aviators in any aircraft type.

Wind

When you think about a forecast, specifically for winds, you may focus on surface winds and winds aloft, but winds are so much more than that. Maybe during take-off or landing in an airplane you've had the feeling of being rocked around a bit or faced an unexpected loss of lift. After that encounter, you might have reviewed the weather again for the airport and realized there weren't any gusts reported or forecasted. You might wonder, what just happened? As a balloonist knows, winds can change constantly on a microscale level, both in speed and direction as you move up the wind profile. While the observed winds and forecast could be for calm winds, the winds not far off the tops of the trees could be 20 knots.

The National Oceanic and Atmospheric Administration (NOAA) has a Rapid Refresh (RAP) model that provides a forecasted wind profile. A balloon pilot, Ryan Carlton, created RyanCarlton.com to display the contents of the RAP hourly wind profile model based on the user-identified location. This microscale wind profile provides great data points, which I often refer to as a simplified Skew-T. It provides hourly wind direction, speed, and temperature/dewpoint for the specified altitude.

In the example shown in figure 1, you can see there is a temperature inversion. In ballooning, we always want to know what time the inversion is predicted to weaken because when it does, the strong surface winds will mix downward to the surface and make landing difficult. A good rule of thumb is to find the temperature at the top of the inversion (around 46 degrees in the example) and know that once the surface temperature heats up to at or near the inversion temperature, the winds will pick up. If you were to

Sunrise 7:12 AM CST		Sunset 5
RAP 2/6/2024 4:12 PM	7:00 AM CST 2/7/2024	8:00 AM CST 2/7/2024
0 ft	141 @ 7 KTs 34°F / 33°F	132 @ 8 KTs 34°F / 33°F
92 ft	146 @ 12 KTs 34°F / 33°F	135 @ 12 KTs 34°F / 33°F
253 ft	150 @ 14 KTs 33°F / 32°F	137 @ 14 KTs 33°F / 32°F
519 ft	166 @ 19 KTs 33°F / 32°F	153 @ 19 KTs 33°F / 32°F
899 ft	187 @ 27 KTs 39°F / 29°F	179 @ 24 KTs 42°F / 27°F
1401 ft	201 @ 29 KTs 44°F / 22°F	198 @ 22 KTs 48°F / 19°F
1880 ft	206 @ 25 KTs 45°F / 18°F	203 @ 20 KTs 48°F / 17°F
1998 ft	207 @ 25 KTs 46°F / 18°F	205 @ 20 KTs 48°F / 16°F
2684 ft	210 @ 21 KTs 45°F / 14°F	210 @ 18 KTs 48°F / 10°F
3455 ft	215 @ 20 KTs 44°F / 8°F	216 @ 19 KTs 47°F / 5°F
4167 ft	218 @ 19 KTs 43°F / 1°F	218 @ 22 KTs 46°F / 5°F

Figure 1: RyanCarlton.com displays the contents of the Rapid Refresh model (RAP), which provides an hourly wind profile model based on a user-identified location.

advance the hourly forecast, you would see this trend. This simplified Skew-T also has other benefits we'll discuss later.

It's interesting to note that gusts need to be 10 mph greater than the sustained wind to be added to a forecast. Winds just above the trees can often be greater (15-20 mph) and create a strong speed gradient that can affect the aircraft's performance on takeoff and landing.

It's important for all pilots to know that a reported calm wind isn't always calm. There's likely a wind direction above the surface or during the profile to landing, which is impacting aircraft performance. Any tailwind does have a significant impact on your landing roll-out and has the same effect as excess airspeed on touchdown in no-wind conditions, so beware. A tailwind compounds your landing roll-out distance by the square of the ratio of the tailwind component plus your actual touchdown speed over your normal touchdown speed. You could also experience a loss of lift from a sudden headwind reduction. This might cause you to hit the ground a little harder than anticipated.

Fog/Clouds

My meteorologist friends always say that pinpointing exactly where fog and clouds will develop is incredibly challenging. It's no surprise that finding an accurate microscale forecast on fog and clouds is equally challenging. Flight into IFR is incredibly problematic for any aircraft, but especially for a balloon, which is a part of the weather once airborne. The National Weather Service has an excellent hourly weather graph that provides good data. It's easy to see when the temperature and dewpoint might be close and when the relative humidity is high. There is also a fog weather element check box, which can be checked to show the likelihood of fog by the hour.

The simplified Skew-T found by looking at RyanCarlton.com also provides good data points to consider when analyzing microscale weather. The temperature and dewpoint spread provided hourly at the various altitudes does a good job of letting the pilot visualize fog or low clouds. Sometimes there's that pesky low-level cloud deck that has pilots hanging out around the airport wondering when it will lift. Using resources such as RyanCarlton.com

Whether a fixed-wing flyer or balloon pilot, give thunderstorms the respect and space they deserve.

allows pilots to advance the forecast and see when the clouds might lift to visual meteorological conditions (VMC) while also analyzing the macro weather factors impacting the fog/cloud development and prolonged occurrence.

When dealing with unexpected fog and low clouds during flight, it's important to remember that they likely didn't appear out of nowhere. Instead, it was likely the result of a missing microscale forecast. It's always better to err on the side of caution. Sometimes an AIRMET (Airmen's Meteorological Information) isn't issued, but the fog is there and visibility is low. It's important to

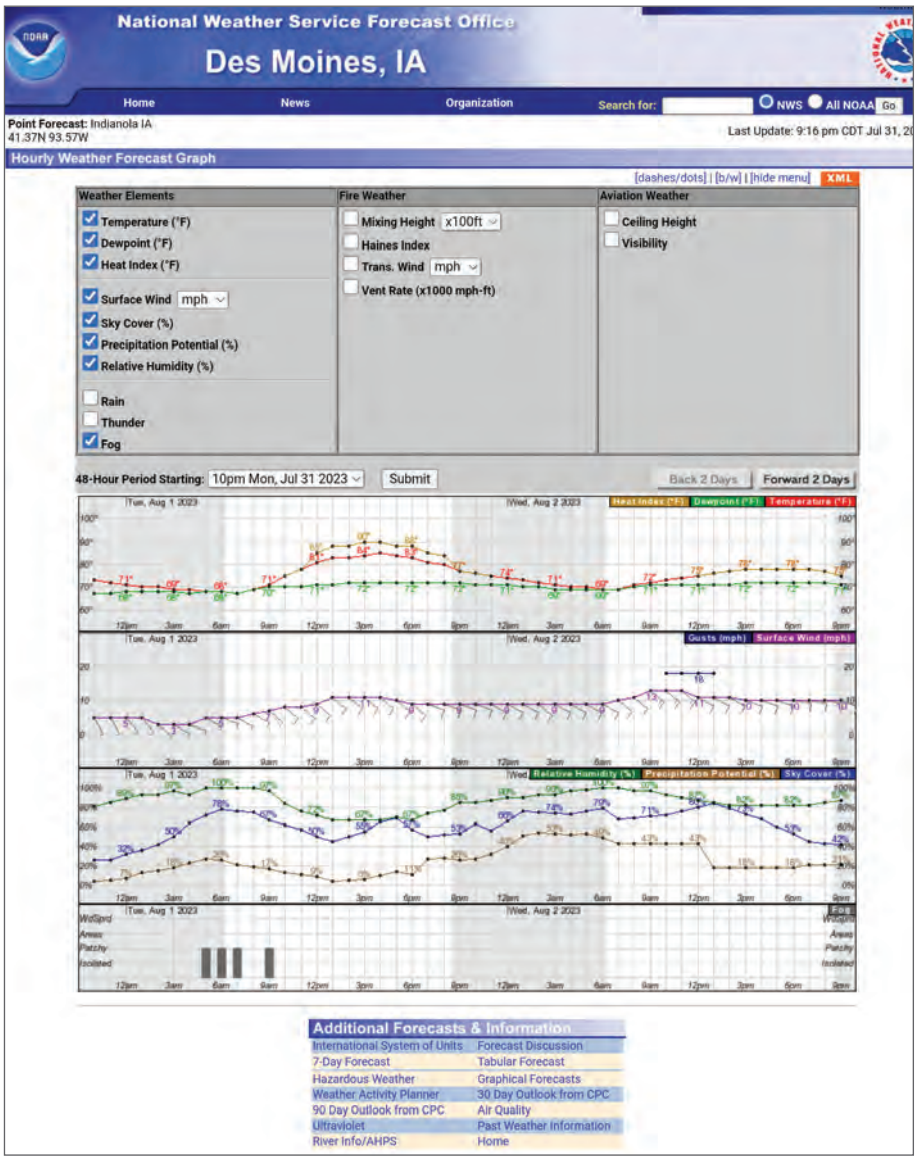
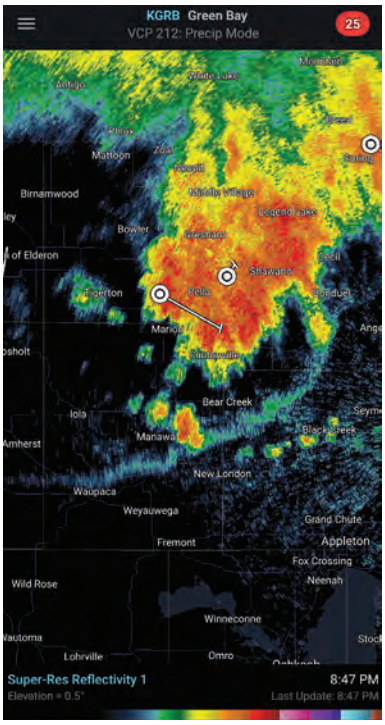


Figure 2: The National Weather Service hourly weather graph is a nice tool to help spot potential fog. To access this, go to weather.gov, enter your location or ZIP code, and then click the Hourly Forecast link.

understand the local environment — lakes, rivers, rain the night before, etc. — that can impact fog development. Use microscale weather sources to supplement your weather forecasts and help you in spotting fog or low clouds. Finally, avoid the hazardous attitude of impulsivity, where pilots feel the need to do something immediately. Remember to think first and not rush through decisions when faced with observed or forecasted fog or low clouds.

Thunderstorms

One of the biggest realizations that balloon pilots make is that radar apps could be deceiving you. The radar image you see could be delayed by 15 minutes. Projecting out to compensate for the delay is likely not telling the whole story. For example, you can't tell if the storm is building or dissipating, or what else might be developing that you can't see. Sometimes the outflow from thunderstorms can be seen on radar, and sometimes it can't.



This radar image depicts a strong outflow south of a storm near EAA Airventure in Wisconsin, the green line running from Waupaca to the west of Angel.

For balloon pilots, a good rule of thumb is to give thunderstorms space of 100 miles. Outflow winds are often felt more than 100 miles away, and the outflow winds can be in any direction. Give thunderstorms the respect and space they deserve.

Whether you're a fixed-wing flyer, or rely on hot air to get you there, I hope these weather resources and tips are useful to you as you prepare for your next flight. Everyone in the aviation community has unique skill sets and knowledge, which if shared, can improve safety for all of us. If you'd like to help, I encourage you to volunteer with the FAA Safety Team and share your experience and expertise.

Adam Magee is a commercial hot air balloon pilot and flight instructor, designated pilot examiner, and FAASTeam Lead Representative. He was named the 2021 National FAASTeam Representative of the Year. He is co-founder/president of The Balloon Training Academy, a 501(c)(3) nonprofit organization and industry member of the FAASTeam, as well as serves as a member of the board of directors and treasurer of the National Association of Flight Instructors (NAFI).

A Fresh Forecast

Aviation Weather Under the Microscope

By Nicole Hartman and Rebekah Waters

Every summer for over thirty years, Paul Hamilton, a seasoned pilot with 38 years of flying experience, flies his family from the Washington, D.C., area to Sandy Island, N.H. This journey requires accurate timing because there is a scheduled boat to the island. Many parts of this trip are unchanging. Every year the departure airport, Potomac Airfield (VKX), and the preferred destination, Moultonborough Airport (4MB), are the same. Every year the van meets them at the airport to take them to the dock to meet the boat that will take them to the island. However, one thing that might change is the weather. Hamilton relies on weather data and forecasting tools before and during these flights to make sure he and his family arrive safely and on time. We will discuss these tools and check in with Hamilton again to see how his trip went last August.

The Field of Forecasting

Since the beginning of civilization, humans have used recurring meteorological and astronomical events to anticipate weather patterns and plan for seasonal changes. Originally based on mostly inaccurate observations of the sky, wind, and temperature, these forecasts have evolved to be more advanced and reliable. More recently, new technology has revolutionized the field of forecasting.

Today, almost everyone relies on weather forecasting to anticipate weather and schedule their day accordingly — particularly when it comes to flight planning. Weather conditions significantly impact aircraft flight time, performance, and safety. The weather we experience on the ground and in the air affects every decision made in aviation.

Meteorological Minutiae

Pilots cannot make good decisions based on incomplete or missing information. Fortunately, there are numerous weather and flight planning products available to aid in safe decision-making. These products assist with flight planning and highlight potentially hazardous weather.

Meteorological Aerodrome Report (METAR)

The METAR is the international standard code format for hourly surface weather observations. These reports are generated by an airport's weather observation system and are specific for that aerodrome (aka, airport), depicting the weather conditions within a 5-mile radius of the center of the field. METAR reports are issued frequently (every hour at a minimum), and since they deal with current weather conditions, they are observations, not forecasts.

When the weather changes rapidly, more frequent updates to METARs are reported and referred to as special reports or SPECIs. When a METAR is labeled as a SPECI, pilots should take note that the winds, visibility, or precipitation levels have changed appreciably within a shorter timeframe than an hour.

Coded Conditions

Here is an example of a METAR:

METAR KRDU 010150Z 10009KT 10SM -SHRA OVC050 23/15 A2982 RMK RAB40 FQT LTG DSNT SW SLP094

Translation:

Aviation routine weather report for Raleigh-Durham Airport, observation the first day of the month at 01:50 Zulu time, wind from 100 degrees true at nine knots; visibility 10 statute miles; light rain showers; ceiling 5,000 feet overcast, temperature 23 C; dewpoint 15 C; altimeter 29.82 inches. Remarks: Rain began at 40 minutes past the hour; frequent lightning to the distant southwest; sea level pressure 1009.4 Hectopascals/millibarH.

Terminal Aerodrome Forecasts (TAF)

TAFs are issued for specific airports and are valid for a 5-statute-mile radius from the center of the runway complex. They contain information on the expected surface winds, visibility, weather, obstructions to vision, and cloud coverage and heights. TAFs are issued four times a day and each forecast is amended according to prescribed criteria, as required.

Coded Conditions

Here is an example of a TAF:

KBOS 041145Z 0412/0518 34015G25KT 5SM -SHSN SCT010 BKN018 TEMPO 1215 1/2SM SHSN VV008 FM 041500 33012G22KT P6SM BKN050

Translation:

Boston Aerodrome Forecast for the 4th day of the month, valid time 12:00 Zulu. Surface wind from 340 degrees at 15 knots with peak gusts to 25 knots; visibility five statute miles; light snow showers; scattered clouds at 1,000 feet above ground level (AGL); ceiling 1,800 feet broken AGL; occasionally, visibility one-half mile in moderate snow showers; indefinite ceiling 800 feet (an indefinite ceiling represents surface-based phenomena obscuring the whole sky). Changes expected on the 4th 15:00 Zulu surface wind from 330 degrees at 12 knots with gusts to 22 knots; visibility greater than six miles; ceiling 5,000 feet broken.

Airman's Meteorological Information (AIRMET)

An AIRMET is a concise description of the occurrence or expected occurrence of specified en route weather phenomena that may affect the safety of aircraft operations, but at intensities lower than those requiring the issuance of a SIGMET. AIRMETs are intended to inform all pilots, especially those under visual flight rules (VFR) and operators of sensitive aircraft, of potentially hazardous weather phenomena.

Significant Meteorological Information (SIGMET)

A SIGMET is a concise description of the occurrence or expected occurrence of specified en route weather phenomena, which is expected to affect the safety of aircraft operations. SIGMETs are intended for dissemination to all pilots in flight to enhance safety.

Pilot Report (PIREPS)

A PIREP is a report of the actual weather conditions encountered by an aircraft in flight. Traditionally, these reports are transmitted by radio to an appropriate ground station for dissemination, but when necessary, they can be made by telephone after landing. The ground station receiving the PIREP will format and disseminate the information to all concerned parties.

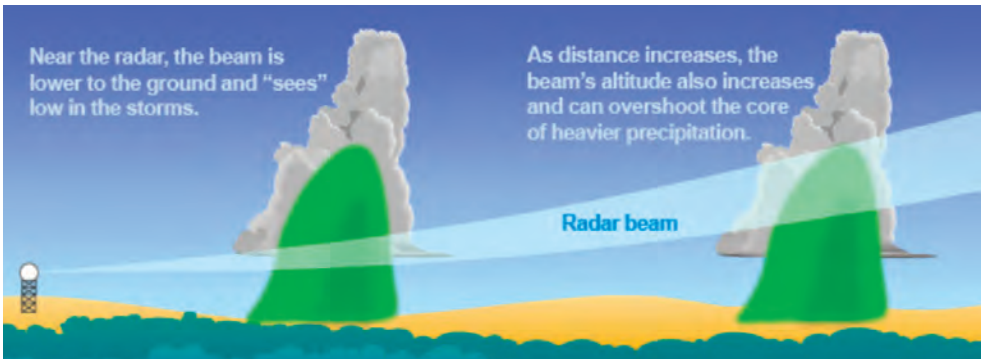
Five Things You Should Know About PIREPs:

1. A PIREP is a pilot's report of actual weather conditions encountered while airborne.
2. The main purpose is safety — it helps weather forecasters update their data and improve quality of forecast.
3. A PIREP file to report good weather is just as important as a PIREP file to report bad weather.
4. 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 info beneficial to other pilots.

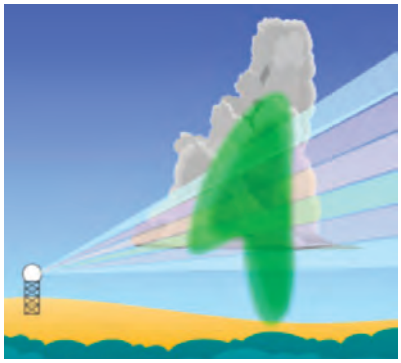
Radar and Satellite Imagery

Like METARs, radar and satellite imagery are not forecasts. They display a near real-time picture of the current weather at given locations. They are used as tools in producing forecasts, but more importantly, they help to evaluate current conditions — the first place a pilot should start. Radar and satellite imagery provide a great deal of useful information. However, it's vital aviators know how to

Images from NOAA.gov



Example of a radar scanning one single elevation angle (base reflectivity).



Example of how composite reflectivity is produced.

use it. Understanding when and how to analyze the different imagery available is key to utilizing these valuable tools for evaluating flight conditions.

Commonly known as Doppler radar, the WSR-88D NEXRAD (Next-generation Radar) provides comprehensive observations that inform about impending weather. It operates in two modes: clear air and precipitation. Clear Air Mode is the most sensitive operational mode, with a slow antenna rotation allowing for extended atmospheric sampling. Images are updated approximately every 10 minutes in this mode. In Precipitation Mode, the radar operates with a faster antenna rotation due to stronger return signals from precipitation targets. This allows images to update faster, approximately every 4-6 minutes. The intensity values in both modes are measured in dBZ (a metric related to precipitation intensity) and are depicted in different colors, based on echo intensities, on the radar image.

Another important factor to understand is the type of radar image you are viewing. Radar can be displayed in Base Reflectivity or Composite Reflectivity. Base Reflectivity is a display of echo intensity (reflectivity), showing the amount of transmitted power returned to the radar receiver at a single elevation. Images are used to detect precipitation, evaluate storm structure, locate atmospheric boundaries, and determine hail potential. Composite Reflectivity displays the maximum echo intensity (reflectivity) from any elevation angle at every angle from the radar. When compared with Base Reflectivity, Composite Reflectivity can reveal important storm structure features and intensity trends of storms.

Satellite imagery is another good tool to better understand current and short-term expected flight conditions and is available in multiple image types. Infrared (IR) imagery senses the surface temperature of an object, like a cloud top, ocean, or ground surface. IR images are independent of visible light and thus available day and night. Looping a series of these images together can offer valuable clues as to whether a system is strengthening or weakening based on whether the cloud tops are cooling or warming. Visible imagery presents clouds using the visible part of the spectrum. The display is similar to what you would see with your naked eye and allows you to distinguish low-lying fog and stratus clouds, which the IR imagery may not detect. Visible imagery is valuable for detecting smoke plumes, dust, and thin layers of volcanic ash, which are usually too warm to be easily seen on IR imagery. However, these images are only available during the day when the sun illuminates the features.

Water vapor imagery highlights the presence of water vapor in the upper atmosphere and provides the ability to identify the presence of jet streams and headwinds aloft and the possibility of mountain wave turbulence even under clear skies. Rivers of atmospheric water vapor will often be visible on the water vapor images even when the IR and visible imagery indicate clear skies.

Image	What Pilots Should Be Able to Identify	Why to Use Caution with Image
Visible	Fog/stratus extent. Determine difference between stratus/fog and snow-covered peaks. Be able to infer low-level wind flow.	Difficult to tell snow from clouds.
Infrared	Determine areas of cold/warm air advection as well as precipitation trends or areas.	Cold air mistaken for stationary clouds or precipitation.
Water Vapor	See upper features that may affect inversions. Watch for dry air advection, which is good precursor for nighttime fog.	Hard to determine which areas are precipitation as may just be thick clouds.

Current Cautions & Conversions

Winds shown on a METAR, TAF, winds aloft table, or surface analysis chart are represented in true headings, whereas winds represented through an Automatic Terminal Information Service (ATIS), Automated Surface/Weather Observing System (ASOS/AWOS), or PIREP are in magnetic headings. It's important to be cognizant of wind direction when determining wind components and to make conversions as necessary. Runways are always identified in the magnetic direction, so to accurately figure out all wind components you must convert the wind from true to magnetic. To do this, determine the magnetic variation for the airport, which can be found in the chart supplement. As a reminder, westerly variations are added, easterly are subtracted, from the true direction. A useful adage is that "If you read it, it must be true. If you hear it, it's magnetic."

Hamilton Family Vacation, August 2023

Now let's look at how Hamilton used some of these tools for his family's trip in the summer of 2023. Keep in mind that because there was a scheduled boat ride, timing was important. Since the destination airport (Moultonborough) is VFR only, he needed an alternate airport. Laconia Airport (LCI) with an instrument landing system (ILS) approach and weather reporting, is just across the lake. It's a long drive around the lake from Laconia to the boat dock though. Laconia lacks a TAF, so he needed an official alternate, which was Manchester, NH (MHT). These factors add complexity to weather planning. Air and ground transport had to be coordinated over four outcomes:

1. Laconia reports VFR — fly to Moultonborough.
2. Laconia reports marginal VFR — shoot an ILS to get below the clouds and continue to Moultonborough.
3. Laconia is IFR — land there, change shuttle pickup location, and allow extra time.
4. Laconia is below minimums — go to a distant airport (MHT) and arrange transportation.

A WSR-88D NEXRAD Doppler weather radar system being repaired after severe storm damage in 2017.

Weather conditions significantly impact aircraft flight time, performance and safety.

Before the Flight

No weather forecast is good at 10 days out. However, Hamilton's more than 30 years of experience let him reasonably estimate the probability of each outcome. The Aviation Weather Center Prog Charts give a look at the highs, lows, and fronts a week out. The Area Forecast Discussion predicts four days out and discusses flight conditions, winds, and storms. This is when Hamilton started thinking about his flight. The nearest aviation TFR forecast site, Concord, N.H., issues a 24-hour forecast. That was a key point in his planning. Summertime is thunderstorm time, typically driven by midday heating of moist air. Takeoff is 7 a.m., and storms usually are a factor only when there is frontal activity. The same goes for adverse winds. Morning fog, however, is common in the New Hampshire mountains.

Hamilton used the grid winds in his electronic flight bag to determine how long it would take and planned a departure time that would put him and his family at the destination in time for the scheduled van pickup.

The initial forecasts indicated IFR conditions with possible thunderstorms. Four days before departure, all indications pointed to no thunderstorms but possible sub-VFR conditions. The convective forecasts agreed. This was better than the forecast for the day before the planned departure. When the TAFs came out, they looked good enough to continue with the original plan to land at the destination at 10 a.m. Hamilton went to bed and slept comfortably. He had plans for all contingencies and the next day looked good.

Right Before Takeoff

At this point, TAFs are very reliable and NEXRAD and METARS are highly relevant. There's now enough data to

make a go/no-go decision. Hamilton needed to decide: Is it safe to depart? Will he need an arrival alternate or a departure alternate? Should he tell the van company to pick him and his family up at Laconia instead? Does he change his departure time based upon the weather?

There was no major precipitation on NEXRAD. The first half of the trip was marginal VFR with spots of IFR conditions. The second half was marginal VFR to VFR. Laconia was in IFR in low clouds and fog. The Concord forecast called for it to lift by an hour after the 7 a.m. takeoff and be in VFR by arrival time. No forecast is perfectly reliable, but Laconia was definite, and Moultonborough was highly probable. So far, conditions were substantially as forecast the night before.

Pilots cannot make good decisions based on incomplete or missing information.

Enroute

Here is where datalink weather really pays off. Hamilton uses XM satellite weather. It provides several weather products, and it works even when the airplane is on the ground. (ADS-B weather gives an adequate suite of products. It can only receive data when the airplane is high enough to pick up a station. This is a few hundred feet at his airport.) NEXRAD weather is one of the best products that XM delivers. Hamilton recommends using NEXRAD with caution though because there can be a lag of 5-10 minutes or more, but it is still his best strategic planning tool. He backs up the NEXRAD with his Stormscope, which detects lightning in real time.

Hamilton and his family departed their home airport in marginal VFR conditions with plenty of cloud clearance. Air traffic control (ATC) cleared him on course and up to 7,000 feet. The winds were a bit less favorable than planned, but he was above the clouds into sunglasses weather.

"One of the good things about being a pilot is that we see a good deal more sunshine than nonpilots," states Hamilton. "The cloud tops on this day were brilliant in the morning sun."

An hour out, passing Atlantic City, N.J., the undercast started to break up. Passing New York City, Hamilton had a broken deck. Best of all, the METAR at Laconia now showed good VFR conditions. Not only was he not going to Laconia, but he also didn't need to do an instrument approach.

Arrival

The Laconia METAR indicated south winds, so Hamilton anticipated an approach to Runway 20. That's a steep descent on final to a short runway, so he prepared for it mentally

"It was good VFR the rest of the way and we spotted the mountains surrounding the lake when they were 15 miles away," he said.

There was some haze as he approached the lake. At 3,000 feet overhead Laconia, he canceled his IFR flight plan and descended to cross the lake 1,000 feet above the water. He and his family made it to the boat with time to spare.

Sunset

Whether you are new to flying or a seasoned aviator like Hamilton, weather planning is essential. The evaluation products we discussed are just a few of the products available to support an exhaustive weather briefing and inform good judgment for all aviators. Make sure to familiarize yourself with all the tools available and understand how each product fits into your flying timeline to develop a total awareness of the atmospheric conditions.

Nicole Hartman and Rebekah Waters are F*AA Safety Briefing* associate editors and technical writer-editors in the FAA's Flight Standards Service.

LEARN MORE

METARs
aviationweather.gov/data/metar

TAFs
aviationweather.gov/data/taf

AIRMETS
aviationweather.gov/gfa/#gairmet

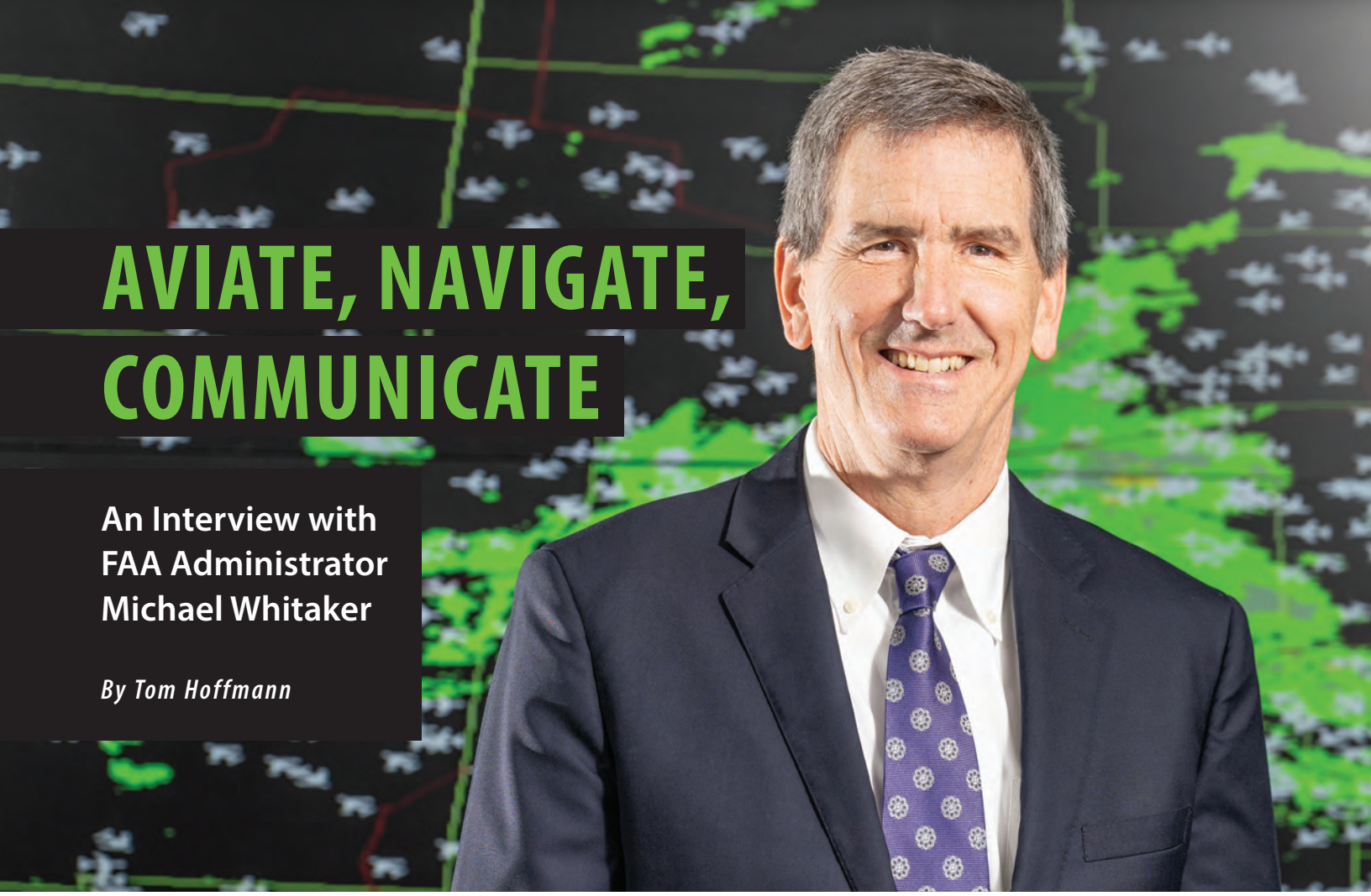
SIGMETS
aviationweather.gov/gfa/#sigmet

PIREPS
aviationweather.gov/data/pirep

Radar and Satellite Imagery
aviationweather.gov/gfa/#obs

InFO 14011, *Electronic Submission of PIREPs*
bit.ly/InFO14011

Prog Charts
aviationweather.gov/gfa/#progchart



AVIATE, NAVIGATE, COMMUNICATE

An Interview with FAA Administrator Michael Whitaker

By Tom Hoffmann

Michael Whitaker was appointed FAA Administrator in October of 2023. You may recall Michael as the former Deputy Administrator from 2013 to 2016. In addition, he has experience as an airline and advanced air mobility (AAM) industry executive and is an active general aviation (GA) pilot. This background has provided an excellent foundation for understanding the complex and dynamic world that makes up aviation transport.

The *FAA Safety Briefing* magazine team got the opportunity to sit down with Administrator Whitaker in early January. We were eager to hear about his priorities for the aviation industry and his vision for the future of GA as he embarks on his five-year term.

Tell us a little bit about your background and what experiences have prepared you for your role as FAA Administrator.

My dad was in the Army, so I moved around a lot as a kid and kept moving around as an adult. I don't have a natural home base, although I do consider New England home, specifically Vermont, where I've spent the last 20 years. I took ground school and my first flying lesson in college, but unfortunately, that project wound up being put on hold for about 30 years. I've always had an interest in aviation though and have been in the industry full-time for about 32 years. After law school I practiced for a short period of time, then joined TWA [Trans World Airlines]. I later worked with United Airlines in Chicago, starting out in regulatory matters, and ended up in charge of commercial alliances, joint ventures, and international affairs.

> **The purpose of getting my certificate and instrument training was to help me understand the system better from all sides. It was very useful in being able to understand how ATC works and better appreciate the role of GA.**

I learned to fly 10 years ago when I was the Deputy Administrator, flying out of Freeway Airport in Maryland. I later worked on my instrument rating back in Vermont. I passed my written exam and was preparing for my checkride when COVID-19 hit. I have suspended that training for now, but I do plan to get back to it. The purpose of getting my certificate and instrument training

was to help me understand the system better from all sides. It was very useful in being able to understand how ATC works and better appreciate the role of GA. It connected a lot of dots for me.

For our readers, this article might serve as your introduction to them. What would you like them to know about your stance on the importance of GA?

I think there are a number of layers to that answer. We have 5,000 airports across the U.S. that are a national treasure. As new forms of aviation are developing, like AAM or electric fixed-wing aircraft, those airports are going to become increasingly important. I think they're going to be a boon to GA and should lower the cost of becoming a pilot. Electric aircraft are much cheaper to operate, much simpler in design once they're in the market, and of course, there are the environmental advantages. From a workforce point of view, we need to do everything we can to encourage a robust GA ecosystem along with flight training and all the components that go with it. GA is a really important part of our system.

(Editor's note: Michael enjoyed visiting the annual Sun 'n Fun Aerospace Expo in Lakeland, Fla., during his tenure as Deputy Administrator and hopes to attend again to meet more members of the GA community.)

How do you envision a national airspace system (NAS) that safely integrates new entrants given the complexity and diversity of GA operations?

Some of the new entrants out there, like eVTOL [electric vertical takeoff and landing] aircraft, can be incorporated into the NAS under the existing rules. But to fully accommodate and integrate what those sectors may become, we're going to need a vision for how we accomplish that, which will be heavily reliant on technology. Part of my role will be to work with stakeholders and industry to help fill in the blanks on what that's going to look like going forward. And that will certainly be part of what we tackle starting this year.

What do you think will be the most challenging task?

My principal focus is safety. Because things are changing so quickly, it's important we don't just rely on doing things the way we've always done them. While that may have delivered a safe outcome in the past, we can't count on it doing so in the future. So, I think we must become a culture of continuous improvement and be alert for clues that maybe what we're doing isn't enough and that we may need to go above and beyond that.

> **We must become a culture of continuous improvement and be alert for clues that maybe what we're doing isn't enough and that we may need to go above and beyond that.**

Can you talk about your first 100 days at the FAA?

So far, it's been safety, safety, safety. My discussions with the management team and employees at the FAA have been framed using the aviation mantra pilots learn early on in training: aviate, navigate, communicate. That's in order of priority. And the first 100 days have been all about aviating. For us this means asking ourselves: Are we meeting our mandate on safety, are we identifying the risks in the system, how are we addressing close calls, and how are we dealing with controller fatigue? If you look at the things we've done in the first 100 days, from 25-hour cockpit voice recorders to drug and alcohol testing at foreign repair stations, everything has been safety-focused. I've also met with a fair number of employees so far. I have been to control towers in Boston, Philadelphia, D.C., and Dallas, and visited our Tech Center in New Jersey. We've focused our attention where it needed to be these first 100 days, but this year we'll start to focus on some of our longer-range priorities as well.

What do you most enjoy about working at the FAA?

I had a very positive experience before and enjoyed working closely with former Administrator Huerta. I learned a lot from his management style, and I think we had a well-run organization during that time. Not only did the people here know me, but I knew them. I really enjoy meeting and spending time with employees, and that's truly my happy place. The extent that people go above and beyond at the FAA is just extraordinary.

You've been Administrator for a few months now. What's been your biggest surprise so far in this role?

I think it's being in the limelight even more than when I was here before. I've been here 10 weeks, and we've been the lead story in the *New York Times* twice. That's a lot of public attention. I don't think that's necessarily a good or bad thing, it's just how it is and something you have to manage. My preference is to be down in and do the work. I try to limit distractions that come from outside and give the significant work we do the attention it needs.

> **We need to do everything we can to encourage a robust GA ecosystem along with flight training and all the components that go with it. GA is a really important part of our system.**

This issue will be focused on the importance of aviation weather. Can you recall a time when your personal weather know-how and/or technology played a significant role in the safe outcome of a flight?

Weather is a topic I pay a lot of attention to. When I was learning to fly and training for my instrument rating, I found weather to be a complex and sometimes challenging topic. I have a lot of respect for those who intuitively understand it or can easily explain what to expect with cold or warm fronts or temperature inversions before you even get into the deep analytical matters.

My focus at FAA before, and again now, is to make sure we're pushing as much of that data out to pilots as possible and letting the marketplace develop apps or programs that can be used inflight.

My first "ah-ha" moment about weather technology occurred when I was getting my certificate 10 years ago and was with my instructor for a cross-country evening flight. We got up in the air and were able to look at ADS-B In data — we were flying to Lancaster, Pa. — and saw the enroute weather was not as forecasted. We realized the risk of complications on the return leg, so we ended up scrapping the trip and coming back.

I think having that information at your fingertips is really key so you don't get in a situation where you're not just able to avoid weather, but also anticipate what it's going to look like two hours ahead so you can adjust your plans accordingly. It's hard to overstate the importance of getting that data out in a usable format to pilots.

What are some things you like to do in your free time?

I have always wanted to make sure I saw the world from every angle since I was a kid. I've kind of systemically explored all those areas by doing some deep-sea diving, sailing, skydiving, mountain climbing, and of course, flying. It's not really a bucket list thing but rather a genuine desire to explore the world. I'm focused on what I'm doing in my new position, so I enjoy just walking the dog more than anything else at the moment.

Is there anything that we didn't ask you about that you'd like to share with our readers?

Go to faa.gov/jobs! We're hiring. We need pilots, we need mechanics, we need all kinds of folks. I know a lot of people spend their careers in aviation, and I hope we could become a place where people say: "I've done a lot of things in aviation, and I'd like to spend a few years at the FAA." We want to make it easier to come work here and make it a place of choice to work.

LEARN MORE

Michael Whitaker, FAA bio page
faa.gov/about/key_officials/whitaker

ROLL of HONOR 2023

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 50 years of exemplary aviation flight experience, distinguished professionalism, and steadfast commitment to aviation safety. In 2023, we recognized the following Master Pilots. For more about the award, go to FAASafety.gov/MasterPilot.

Peter Blackmon	AK
Garland Dobson	AK
Rex Gray	AK
Paula Huckleberry	AK
Ronald Klemm	AK
Edward Kornfield	AK
Thomas Ruppert	AK
Charles Slagle	AK
Thomas Thibodeau	AK
Glen Barker	AL
Walter Clolinger	AL
Jameel Joseph	AL
Jack Lynn	AL
John Murphy	AL
David Rothenanger	AL
James Rutland	AL
Jeffery Smith	AL
Rickey Smith	AL
Ronald Williams	AL
John Young	AL
Billy Bean	AR
Lewis Casey	AR
Garland Goodwin	AR
Larry Kline	AR
Steven Archbold	AZ
Bruce Arnold	AZ
William Chambless	AZ
Michael Chittick	AZ
Louis Clark	AZ
Charles Crinnian	AZ
Mark Donnelly	AZ
James Fangman	AZ
John Fay	AZ
Warren Flies	AZ
Aldo Galvanoni	AZ
Fred Gibbs	AZ
Dennis Granquist	AZ
Scott Hein	AZ
Clovis Jones Jr	AZ
Keith Lamb	AZ
Kelly McMullen	AZ
Robert Mittelstaedt Jr.	AZ
Thomas O'Reilly	AZ
Jerry Owings Jr.	AZ
Timothy Tarris	AZ
William Walker	AZ
Robert Way	AZ
Arthur Wenger	AZ
Thomas Anderson	CA
Michael Berryman	CA
John Calcara	CA
Edward Crouse	CA
Jim Dalton	CA
George Deeter	CA
Richard Duste	CA
Scott Dweck	CA
Allen Ehrke	CA
Richard Escola	CA
John Fisher	CA
Robert Forbes	CA
Stephen Greene	CA
James Gregory Jr.	CA
Barry Hansen	CA
Steven Hart	CA
Robert Haygooni	CA
Willam Heyland	CA
Peter Hudes	CA
Ronald Kelly	CA
Charles Kemp	CA
Charles Kerber	CA
John Kern	CA
Vladimir Lange	CA
Richard Launey	CA
Garrick Lee	CA
Henry Lee	CA
Robert Lenox	CA
Paul Likens	CA
Elver McClelland	CA
James McCrory	CA
Martin Michaud	CA
Lawrence Miles Jr.	CA
Martin Murdock	CA
Robert O'Connor	CA
Charles Raines	CA
Sidney Rockwood	CA
Hal Savage Jr.	CA
Robert Scherzinger	CA
Julian Steffenhagen Jr.	CA
Steven Steinhoff	CA
Thomas Tingley	CA
Douglas Triplat	CA
Walter Wilson	CA
Arthur Wilson	CA
Frank Anthony	CO
Raul Boerner	CO
Philip Brown	CO
Nicholas Cerretani	CO
Ralph Cerretani	CO
Michael Daciek	CO
Philip Fleming	CO
Larry Hawkins	CO
David Hurley	CO
Howard Janzen	CO
Robert Kinney	CO
Kenneth Maples	CO
Lynn McCullough	CO
Jan McKenzie	CO
Rex Miller	CO
Per Naess	CO
Leslie Noall	CO
Terrance O'Neill	CO
Clement Silvers Jr.	CO
Harold Smethillis Jr.	CO
Frank Watson	CO
Richard Woodward	CO
Kurt Fisher	CT
Santo Galatioto	CT
Edward Jepsen	CT
David Sampl	CT
Thomas Sessa	CT
Michael Shea	CT
Robert Wilson	CT
James Allen	DE
Robert Cooper	DE
Joseph Czachorowski	DE
Arnold Itzkowitz	DE
Richard Speck	DE
Craig Wheel	DE
William Allyn	FL
Peter Bales	FL
James Barnhart	FL
Donald Beach	FL
Marcel Belleville	FL
Richard Bender	FL
Frank Benedetto	FL
Gene Bennett	FL
Chester Bennett	FL
Frank Bernaby	FL
Michael Boyce	FL
Joseph Braden	FL
Allen Brinckerhoff	FL
Steven Bryan	FL
Steven Bulwicz	FL
Joseph Burnside	FL
Arthur Chausmer	FL
George Coats	FL
Randel Compton	FL
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James Dent	FL
Jack Duelks	FL
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Malcolm Easterling	FL
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Roberto Escobio	FL
Don Etchison	FL
Janes Ferrari	FL
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Miguel Gil	FL
Carol Gosling	FL
Robert Haynes	FL
Thomas Johnson	FL
Lee Kraus Jr.	FL
Donald Kronen	FL
Robert LeBlanc	FL
Robert Linenweber	FL
Gaynell Logue	FL
Johann Lutz	FL
James Lynch	FL
Jeffrey Macuga	FL
Joseph Manor	FL
Mario Mastrandrea Jr.	FL
Andrew Mikos	FL
Roger Molitor	FL
Ralph Moser	FL
Ralph Moulton	FL
Roy Myers	FL
Janice New McWilliams	FL
Mark Nichols	FL
Austin Norton II	FL
Osvaldo Ojito	FL
Roger Olson	FL
Scott Parks	FL
John Posey	FL
Jan Potter	FL
Ronald Reese	FL
Charles Renuart	FL
Donald Rise Jr.	FL
Charles Rucquoi	FL
Charles Septer	FL
Allen Simmons	FL
Jeffrey Siskind	FL
Joaquin Solano	FL
Harlan Sparrow III	FL
Ricky Spencer	FL
James Stasny	FL
John Sullivan	FL
Ernest Taylor Jr.	FL
James Thorpe	FL
Robert Thousand Jr.	FL
Ronald Timmermans	FL
Albert Voss II	FL
Merle Wagner	FL
Terry Wallace	FL
Stephen Walton	FL
Willie Weaver	FL
Lloyd Webb	FL
Gerd Wolf	FL
Carl Wood	FL
William Wright	FL
Michael Baier	GA
Rickie Barron	GA
Louis Belline	GA
Dean Bloom	GA
Thomas Calvanelli	GA
Glenn Carr	GA
Robert Caster	GA
Mario Corti	GA

ROLL of HONOR

William Davis	GA
Rick Ferrin	GA
Calvin Flanigan	GA
Curt Helling	GA
John Holmquist	GA
Brian Hood	GA
Robert Inman	GA
Cecil Johnson	GA
Fred Kirijan	GA
Arthur Lapointe	GA
William Lavender Jr.	GA
Stanley Musick	GA
James Pate	GA
Jack Phillabaum	GA
Ronald Prox	GA
Kenneth Sines	GA
Calvin Stephens	GA
Christopher Waggener	GA
Richard Williams	GA
Michael Young	GA
Richard Olsten	HI
Richard Alston	IA
Scott Biller	IA
David Camp	IA
Timothy Hickey	IA
Clyde Sievers	IA
John Tibben	IA
Ronald Hanks	ID
Willis Maxson	ID
James Roberts	ID
Richard Strawn	ID
Winfred Vinton	ID
Daniel Warnick	ID
Richard Williams	ID
Diane Earhart	IL
Lawrence Frey	IL
Orlando Ham	IL
Dennis Holman	IL
Eldridge Johnson Jr.	IL
Jerry Lay Sr.	IL
Forrest McClelland	IL
Stuart Moment	IL
Douglas Partl	IL
Larry Sandford	IL
Duane Seitz	IL
Thomas Soerens	IL
John Steichen	IL
Andrew Targosz	IL
Steven Targosz	IL
Robert Wicke	IL
Stephen Willis	IL
James Bisesi	IN
Gary Cottingham	IN
Teddy Cox	IN
David Freeman	IN
Wade Palmer	IN
Morris Wiegand	IN
Mary Aikins	KS
Timothy Bonnell Sr.	KS
Monte Bowling	KS
Terry Burger	KS
Richard Carlson	KS
Edward Chesnut	KS
Noble Davis	KS
Charles Dick	KS
Clarence Flynn	KS
Robert Hays	KS
George Livergood	KS
Steven Manweiler	KS
Kirby Ortega	KS
Ralph Rissmiller	KS
Roy Sauder	KS
Carl Weaver	KS
Daniel Wedman	KS
Gary Burkett	KY
Lauren Fillmore	KY
Stanley Hunter	KY
Robert Rounsavall III	KY
Horace Boggs III	LA
Andrew Carter Jr.	LA
Darryl Christen	LA
William Cope Jr.	LA
William Upton Jr.	LA
Olga Mracek Mitchell	MA
Richard Sands	MA
Peter Tokarz	MA
David Heemstra	MD
John Orzechowski	MD
Jarrell Pratt	MD
George Shaver	MD
Gerald Sligh	MD
Frederick Cahn	ME
David Rier	ME
John Shenton	ME
David Vroom	ME
Randy Coller	MI
Gregory De Gaynor	MI
Richard Degraw	MI
Pierre duPont	MI
Warren Eaton	MI
John Eiler	MI
Timothy Fino	MI
Carl Franz	MI
James Giordano	MI
Dennis Hartsell	MI
Rodney Hatcher	MI
Raymond Hunter	MI
Anthony Hurst	MI
Patrick Keenan	MI
James Koch	MI
John Lemmon	MI
Jeffrey Nelson	MI
Robert Parker	MI
Daniel Schiffer	MI
William Stuart	MI
Dean VanNasdale	MI
Kurt Welsh	MI
James Wise	MI
Patrick Halligan	MN
Donald Johnston	MN
Calvin Peterson	MN
J. Vanatta	MN
Charles Bailey	MO
Albert Benker	MO
Robert Brummett	MO
Lloyd Darter	MO
Milo Farnham	MO
Danny Hall	MO
Michael Lee	MO
Phillip LePage	MO
William Martin	MO
Richard McCleish	MO
Thomas Richards	MO
Jerry Wade	MO
Darrell Yelton	MO
Mark Gary	MS
Wesley Pearson	MS
Terry Albertson	MT
Ross Campbell	MT
John Lieberherr	MT
Roger Meggers	MT
Michael Pardis	MT
James Perhay	MT
John Tronstad	MT
Michael Vivion	MT
Glen White	MT
William Cannon Jr.	NC
Frederick Cassel	NC
Robert Chaplin	NC
Oystein Dahl	NC
Charles Finkle	NC
Jere Fountain	NC
Michael Jones	NC
Manuel Lopez	NC
Donald Matthews Jr.	NC
Hugh McKay III	NC
Joseph Miller	NC
Michael Monkhouse	NC
James Monroe Jr.	NC
Roy Moore	NC
Alexander Nelon	NC
Harry O'Nan	NC
Lawrence Peoples	NC
Andrew Pierce	NC
Bruce Powell	NC
Roger Richardson	NC
Mark Roberts	NC
Donald Sellers	NC
Billy Shomaker	NC
Charles Snow	NC
Eugene Spainhour	NC
Richard Thayer	NC
Sidney Tolchin	NC
James Woolf	NC
Dean Affolter	ND
Alan Butts	ND
Milton Lindvig	ND
Russell Makeeff	ND
Glen Wharam	ND
George Czarnecki	NE
Richard Green	NE
Charles Hull	NE
Richard Jaworski	NE
Jerry Morelock	NE
LeRoy Svododa	NE
Henry Dahlquist	NH
George Fogwell	NH
Michael Lavoie	NH
William Moran	NH
Jeffrey Newcomb	NH
Michael Rush	NH
William Bosma III	NJ
Steven Cook	NJ
Lawrence Finnegan Jr.	NJ
Harold Ford Jr.	NJ
David Hollinger	NJ
John Varoscak	NJ
Morris Wiener	NJ
William Madden	NM
Stevan Pearce	NM
Richard Roderick	NM
John Arvidson	NV
David Bartz	NV
James Doyle	NV
Pete Koliastasis	NV
Gary Lacore	NV
Vincent Latona	NV
Michael Leonard	NV
Everett Long	NV
James Murdoch III	NV
Gorden Neal	NV
Richard Nurge	NV
Thomas O'Connor	NV
Edward Peterson	NV
Mark Rasner	NV
Ralph Stephens	NV
Emerson Allen	NY
Philip Benanti	NY
Frank Bonacci	NY
Gary Campbell	NY
Jeffrey Carlson	NY
Jerry Chapman	NY
John Dolan	NY
James Emma	NY
Jack Farenga	NY
Gary Ferdon	NY
Trevor Forde	NY
Thomas Kizis	NY
Don Lockard	NY
Arthur Mount	NY
Mark Seal	NY
Gregory Semendinger	NY
James Shelor	NY
Wayne Smith	NY
John Staber	NY
Richard Suett	NY
Robert Van Sise Jr.	NY
Daniel Vergason	NY
Ronald Weinstein	NY
Kenneth Wile	NY
Ivan Williams	NY
William Davis Jr.	OH
John Dye	OH
Ronald Faliszek	OH
Luther Gibbs	OH
Gregory Gorniak	OH
Gayle Green	OH
Richard Green	OH
Terry Jones	OH
Robert Larson	OH

Charles Macuga III	OH
Donald Nelson	OH
Bradley Newman	OH
James Pusateri II	OH
Richard Smith	OH
Paul Stojkov	OH

Danny Burdette	OK
Gerald Dixon	OK
Jimmy Emory	OK
Charles Ewers	OK
Joseph Flinton	OK
Dale Ford	OK
Raymond Foutch	OK
Monte Jestes	OK
Allen Meyer	OK
John Spurlock	OK
Robert Stebbins	OK
Sharon Stebbins	OK
John Wise	OK
Perry Zimmerman	OK

Friedhelm Baitis	OR
John Fiedler	OR
Lennard Fierling	OR
Kenneth Foote	OR
Ted Millar	OR
Frank Sneed	OR
Walter Swan	OR
Stanley Swan	OR
Robert Wood	OR

Harry Arnold	PA
Joseph Bennett III	PA
Edwin Campbell	PA
Charles Capozzolo	PA
Duane Clawson	PA
Dennis Daly	PA
William Dickinson	PA
Richard Duncan	PA
John Dyke	PA
Roy Early	PA
Kerry Fritz	PA
Stephen Galle	PA
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Brian Newhart	PA
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Edward Patrick	PA
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Roy Uptegraff III	PA
Henrik Vejlstrup	PA

Alfredo Cortes-Melendez	PR

David Anderson	SC
Milton Edwards	SC
George Flanagan	SC
William Grannis	SC
Marion Hope	SC
John Hunt	SC
Elizabeth Loda	SC
William Mabry Jr.	SC
James Pfaffenroth	SC
John Ross	SC
Robert Taylor	SC
Carter Taylor	SC
Michael Turner	SC

Douglas Jones	SD
Larry Warinner	SD

Terry Balentine	TN
James Corkern	TN
Kimberly Coryat	TN
Bryan Davies	TN
Willis Derryberry	TN
Robert Dilk	TN
Ronald Dillard	TN
William Duncan	TN
Bradley Haslett	TN
Calvin Janes	TN
Ronald Malone	TN
Dan Mills	TN
Thomas Monterastelli	TN
William Radford	TN
Alvin Rice	TN
Roger Richardson	TN
Harry Shumate Sr.	TN
Dudley Stith	TN

Allen Akin	TX
Calvin Allen	TX
David Arber	TX
Thomas Arnzen	TX
Bruce Black	TX
John Bowen	TX
Michael Brake	TX
Howard Cagle	TX
Mark Calkins	TX
Ottis Cameron	TX
J Carroll	TX
Alvin Carstensen	TX
David Cole	TX
Paul Cook	TX
John Cooley	TX
Charles Crossno	TX
George Crow	TX
Gary D'Antoni	TX
Terrel Davidson	TX
Neil Downing	TX
Daryl Dressler	TX
William Eslick	TX
Robert Fitzpatrick	TX
Ricky Foutch	TX
Mark Frnka	TX
Robert Funk	TX
Donald Gardner	TX
Jerry Gazada	TX
Audie Gill	TX
Stephen Greene	TX
Donald Gumm	TX
Giles Hadrych	TX
Daniel Hall	TX
Frederick Hall	TX
Charles Hamilton III	TX
Patricia Hockett	TX
Bob Horton	TX
John Jacobson	TX
John Jaeckle	TX
Carl Keil	TX
Richard Keyt	TX
John Kleber	TX
David Leyerle	TX
John McComas	TX
Robert McDonnell	TX
Edward McManus	TX
Mark McNair	TX
Allan McVicker	TX
Kennerth Miller	TX
David Moore	TX
James Musil	TX
Larry Nemecek	TX
Stephen Newsom	TX
John O'Leary III	TX
Robert Pastusek	TX
Ronald Patterson	TX
Paul Pickering	TX
Michael Reamy	TX
James Rose	TX
Charles Ross	TX
Gerard Scheeler	TX
James Schlattman	TX
Paul Siedschlag	TX
Charles Smith	TX
Terrance Sonday	TX
B.B Stanfield III	TX
Leven Staples	TX
Alan Steel	TX
Harry Stevenson III	TX
Raymond Stewart	TX
Russell Stricker	TX
Tom Thibault	TX
Stephen Thomas	TX
John Treanor	TX
Jackie Vaughn Sr.	TX
John Voss	TX
Wayne Walczak	TX
Richard Wasik	TX
Bruce Watts	TX
James Weatherill	TX
Robert Williams	TX
Gerald Winfield	TX

William Brodegard	UT
Jeffrey Granger	UT
James Lipscomb II	UT

Harry Arthur	VA
Dan Baptist Jr.	VA
Thomas Butler	VA
David Eberly	VA
Jack Einstein	VA
Bernard Estes	VA
Joseph Fluet Jr.	VA
George Franklin	VA
Robert Hahn Jr.	VA
Ray Hoover	VA
Mark Horton	VA
Walter Johnson	VA
James Kellett	VA
Lewis Martin II	VA
Larry Omps	VA
Donald Ratcliff	VA
Jerry Updyke	VA
David Young	VA

David Kent	VT

Arreed Barabasz	WA
Kenneth Collins	WA
Mark Dawson	WA
John DeFeo	WA
Michael Friend	WA
Willis Garretson	WA
Randall Gray	WA
Gordon Hall	WA
Alan Hewitt	WA
John Kirry	WA
Larry LeFever	WA
Robert Major	WA
John Martinsen	WA
Bruce McCaw	WA
Mark McIntyre	WA
David Miller	WA
Dennis Nichols	WA
Robert Norton	WA
Thomas O'Boyle	WA
Stephen Ortman	WA
Earl Poland	WA
Russell Roberts	WA
Gary Scott	WA
James Stock	WA
John Swedburg	WA
Gregory Williams	WA

Per Anderas	WI
Terry Blaser	WI
Carl Gollnick	WI
Roy Huffman	WI
Jeffrey Hughes	WI
Jerome Isaacson	WI
Joseph Lienau	WI
Walter Neverman	WI
Gary Smith	WI
Robert Warinner	WI
Joseph Weber	WI
Kenneth Welch	WI
Dean Wollaston	WI
Herbert Zimmers	WI

Karl Gustafson	WV
Okey Simmons	WV
Richard Stefanick	WV

John Campball	WY
Dallas Chopping	WY
Donald Cooksey	WY
Bruce Hanson	WY
Gary Marquiss	WY
Julia Smith	WY

ROLL of HONOR 2023

Charles Taylor *Master Mechanic Award*

The FAA's most prestigious award for aircraft mechanics is the Charles Taylor Master Mechanic Award. It is named in honor of the first aviation mechanic in powered flight, Charles Taylor, to recognize 50 years of exemplary aviation maintenance experience, distinguished professionalism, and steadfast commitment to aviation safety. In 2023, we recognized the following Master Mechanics. For more about the award, go to FAASafety.gov/MasterMechanic.

Ronald Klemm	AK
Edward Kornfield	AK
Marlin Priest	AL
Richard Anderson	AR
Michael Wilson	AR
Robert Cumback	AZ
James Godfrey Jr.	AZ
Buddy Knutson	AZ
Clarence Otis	AZ
Dave Thompson	AZ
Frank Tortorici	AZ
Gary Barnard	CA
Paul Bernard	CA
Thomas Burke	CA
Manuel Goncalves	CA
Stephen Hasik	CA
Michael Hedrick	CA
William Johnston	CA
Robert Johnstone Jr.	CA
John Kerr	CA
John Krueger	CA
George Quackenbush	CA
James Robba	CA
Ty Smith	CA
Jose Valenzuela	CA
Danny Brown	CO
Thomas Needham	CO
Keith Serkes	CO
Joseph Walsh	CO
Harlan Durham	DE
Harold Rutledge	DE
Robert Allison Jr.	FL
Steve Douglas	FL
Jeffrey Evans	FL
Richard Lemke	FL
James Lynch	FL
Alfred Neidhardt	FL
Russell Pace	FL
James Potts	FL
Harlan Sparrow III	FL
Terry Stanforth	FL
Mark Stemple	FL
William Torphy	FL
Richard Trestor	FL
Stanley Wiencek	FL
Larry Williams	FL
Cecil Johnson	GA
Charles Milton	GA
Larry Owen	GA
Dennis Pepin	GA
Clarence Romero Jr.	GA
Vincent Chicoine	IA
Dean Wehrle	IA
Randy Weyer	IA
William McCauley	ID
Leonard Skunberg	ID
Earl Turner	ID
Louis Derington Jr.	IL
Eldridge Johnson Jr.	IL
Thomas Soerens	IL
Dennis Davis	IN
Stanley Goddard	IN
Dale Hidy	IN
Kerry Hyde	IN
Marty King	IN
John Kirchner	IN
Ralph Lutes	IN
Robert Hays	KS
Steven Lyddon	KS
Daniel Wedman	KS
Louis Esposito	KY
William O'Donnell	LA
John Bishop	MA
Robert Brigham Jr.	MA
Jean Jacques	MA
David Pepple	ME
Delma Bellamy	MI
William Birch	MI
Frederick Burger	MI
Pierre duPont	MI
Rodney Hatcher	MI
William Hatfield	MI
John Lemmon	MI
Michael Trudeau	MI
Robert Horak	MN
Autrey Ivy	MN
Charles Nichols Jr.	MN
Gary Neurohr	MO
David Cox	MS
Howard Harris	MT
Thomas Willis	MT
John Allen	NC
Richard Basco	NC
Robert Carter	NC
Frederick Cassel Jr.	NC
John Hall	NC
Charles Kleven	NC
Mohammed Koujak	NC
William Newby	NC
Thomas Nicastro	NC
Jerry Morelock	NE
Michael Rush	NH
Richard Millward	NJ
Thomas Brown	NV
Carl Steinhoff	NV
Jack Bush Jr.	NY
John Chapman	NY
William Herlan III	NY
Michael Kolesar	NY
Edward Libassi	NY
Michael McGuire	NY
David Milo	NY
John Penna	NY
Francisco Ruiz	NY
Donald Cunningham	OH
Carl Fisher	OH
Roy Goins	OH
Thomas McGuire	OH
Kenneth Shauman	OH
James Andrews	OK
Robert Borders	OK
Larry McCray	OK
Terry Tucker	OK
John Fielder	OR
Frank Sneed	OR
Bernard Blanco	PA
David Cain	PA
Raymond Dougherty	PA
Richard Duncan	PA
Patrick Gallagher	PA
Daniel Garcia	PA
Daniel Giegel	PA
John Kondratrick	PA
Larry Kriner	PA
Bruce Kukuruda	PA
Edward Meegan Jr.	PA
Donald Mueller	PA
Vincent Nolan	PA
Gregory Werking	PA
Richard Woodard	PA
James Franklin III	SC
Roger Smith Jr.	SC
Henry Williamson	SC
Ronald Winburn	SC
Kenneth Hall	TN
Eusebio Montano Jr.	TN
Thomas Monterastelli	TN
Roger Poindexter	TN
Melvin Asberry	TX
Richard Hosmer	TX
Kenneth Lifland	TX
George Lux	TX
Roger Nowling	TX
Efren Pabon	TX
Stephen Wilson	TX
Michael Anello	UT
Joseph DeCosta	VA
Fred Dyen	VA
George Franklin	VA
Kenneth Kerzner	VA
Frederick Leonelli	VA
Thomas Sare Jr.	VA
Wilbert Smith	VA
Mark Dawson	WA
Joseph Rough	WA
Frederick Spencer III	WA
Richard Vaux	WA
James Stock	WA
James Adams	WI
James Bournonville	WI
Dennis Faivre	WI
Kim Gaertner	WI
Joseph Lienau	WI
Nicholas Upton	WV
Donald Cooksey	WY
Bruce Hanson	WY
Robert Palmer	WY

At a ceremony last Veterans Day, the FAA awarded 31 Wright Brothers Master Pilot awards and one Charles Taylor Master Mechanic award to members of Experimental Aircraft Association Chapter 983 in Granbury, Texas. The ceremony was the largest of its kind for the FAA.

JAMES WILLIAMS

WHAT IS A BRIEFING?

In my early flight training days, things seemed so much simpler when it came to weather. To get a weather briefing, you called or stopped in at a Flight Service Station (FSS), and the briefer gave you all the information about weather and other topics relevant to your flight. If you didn't talk to a FSS briefer, you didn't have a briefing. A good preflight briefing is important because, in addition to being valuable for your general survival, being familiar with all available information concerning your flight is also a regulatory requirement (14 CFR section 91.103). But as technology changed, the idea of visiting an FSS disappeared, and calling one became less relevant. With the rise of many excellent third-party options, an obvious question became even more important: What is a briefing these days?

An Answer at Last

One of the things I learned after joining the FAA was that even seemingly simple questions don't always have simple answers. However, an idiom that I learned around that time regarding advisory circulars (AC) has always provided some insight into reacting to such questions. An AC is a way, but not the only way, to comply with a regulation. To answer the above question, the FAA produced AC 91-92, *Pilot's Guide to Preflight Weather Briefing*. The goal of this AC is to give pilots a roadmap for developing their self-briefings and debunk the idea that there is such a thing as a "legal briefing" that can only come from Flight Service. While Flight Service (1800wxbrief.com) remains an option for weather briefings, it is far from the only one.

> THE GOAL OF AC 91-92 IS TO HELP PILOTS FEEL MORE COMFORTABLE CONDUCTING THEIR OWN SELF-BRIEFINGS.

In fact, the AC has an extensive, but not exclusive, list of resources including what information each can provide. These include AviationWeather.gov, FAA's weather cameras, the Alaska Aviation Weather Unit, FAA's Special Use Airspace/TFRs, NOAA's Storm Prediction Center, the Weather Prediction Center, and more.

You will notice that all these resources are government systems, but that does not mean they are the only resources you can use to meet the weather briefing requirements. There are several third-party resources that you can use. So long as you cover the elements of a standard briefing (adverse conditions, synopsis, current conditions, forecast conditions, winds aloft, NOTAMs, and PIREPs), you have a comprehensive briefing. It doesn't matter if you get the information from a one-stop shop like 1800wxbrief.com or from services like ForeFlight or Garmin Pilot. The important thing is to use the service that provides you with all of the required information and allows you to properly plan, brief, and file for your flight.

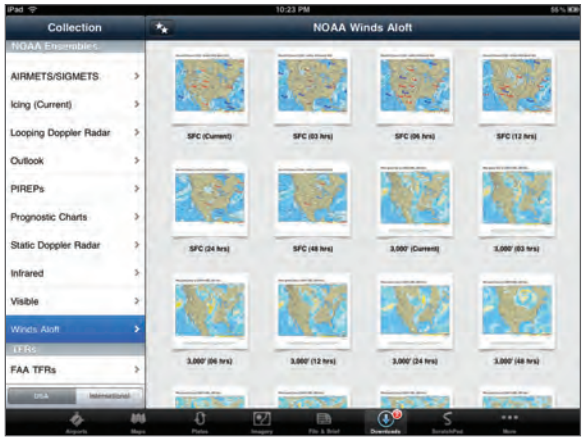


Image courtesy of ForeFlight

Covering Your Bases

You aren't required to document your briefing, although recording the information in a weather log is a great idea. Many commercial services will record all the activities you completed, including the briefing you received. If that's important to you, you should ask your chosen provider if they record that information. The FAA is not particular with how you get a briefing; they care that you get a complete briefing.

If you haven't had a chance to check out AC 91-92, please do. It's a reasonably quick read and an excellent framework for self-briefing. If you want more info, check out our FAASTeam courses on self-briefings (VFR and IFR courses are available).

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

LEARN MORE

AC 91-92, *Pilot's Guide to Preflight Weather Briefing*
bit.ly/AC-9192

ALC-683: *Conducting Preflight Self-Briefings for Student and VFR Pilots*
bit.ly/ALC683

ALC-889: *Conducting Preflight Self-Briefing for IFR Pilots*
bit.ly/ALC889

REBEKAH WATERS

FAIR WEATHER FLYERS

After a long winter cooped up inside, most of us are itching to spend some time outside. Spring gives us more daylight and there is nothing better than the clear blue skies of a warm spring day. But spring weather is a fickle friend full of surprises. Before you take your drone outside, let's take a look at how weather could affect your plans.

Weather is an important factor no matter what time of year you fly. Luckily, there are plenty of tools to help you plan before you fly. If your flight calls for a more comprehensive review, head to the National Weather Service's Aviation Weather Center (AviationWeather.gov). Most drone pilots usually only need a local view of the weather. For that, there are plenty of weather apps, like Windsock and AURA, devoted to drone pilots. But if you choose not to download one of these, make sure you at least check your local weather forecast for the latest information.

> FOG OR EVEN LIGHT RAIN COULD IMPACT YOUR ABILITY TO MAINTAIN VISUAL LINE OF SIGHT.

After deciding what weather tool to use, the next step is knowing what weather information you need. Weather that interferes with your ability to fly safely includes temperatures, which can impact battery life, precipitation, which can reduce visibility, and wind, which could affect control and stability of the flight. For a deep dive into how temperatures affect drone flying, read "How Cold is Too Cold to Drone On?" in the Nov/Dec 2023 issue of *FAA Safety Briefing* (bit.ly/colddrone). During the spring, wind and rain are more likely culprits.

Unless you have a waiver, rule number one of drone flying is that you must be able to see your drone at all times — also known as maintaining visual line of sight. Fog or even light rain could impact your ability to do this and limit how far or how high you can operate. Visual line of sight isn't the only consideration when it comes to fog and rain. If your drone isn't waterproof, moisture could damage important components. Spring precipitation can occur suddenly, so always stay prepared, and check the forecast often.

Pilots know that crosswinds can make takeoff and landing in crewed aircraft particularly tricky. Strong winds can cause problems for drones too during any phase of flight. Maintaining control is crucial. Some drones have special safety features that help them fly better during windy conditions. Even if your drone has this feature, stay within your limits and never press your luck. A soft spring breeze can become a blustery gust with little warning. A sudden gust could easily exceed your drone's relatively low top speed and render it uncontrollable/unrecoverable. When windy conditions occur, it's best just to land as soon as it is safe to do so.

> IT'S ALWAYS BETTER TO LAND SAFELY AND BE ABLE TO FLY AGAIN ANOTHER DAY.

Bottom line: always be mindful of how weather could impact your flight plans. You may be disappointed when the weather threatens to keep you grounded. You might be tempted to keep flying even as you notice that weather conditions are worsening hoping that perhaps the clouds will part and the wind will die down. But if there is even the slightest chance that weather could make you lose control of your drone, why risk it? It's always better to land safely and be able to fly again another day.

Rebekah Waters is an *FAA Safety Briefing* associate editor. She is a technical writer-editor in the FAA's Flight Standards Service.

REBEKAH WATERS

ENGINE OIL 101

Most people know engine oil is essential — it is the lifeblood of the reciprocating engine — but not everyone knows all the reasons why. So, besides lubrication, what exactly does engine oil do? Engine oil also cools, seals, and cleans. From viscosity to consumption, let's explore the basics of engine oil.

The lubrication provided by engine oil is crucial for reducing friction between moving parts in the engine. This prevents wear and tear on the engine components. As it absorbs and dissipates the heat generated by the operation of the engine, oil contributes to the overall cooling of the engine. Oil also helps seal gaps between various components such as piston rings. This prevents leakage of combustion gases and helps maintain optimal pressure. Finally, engine oil helps keep the engine clean and functioning properly. It does this by carrying away contaminants, debris, and by-products of combustion.

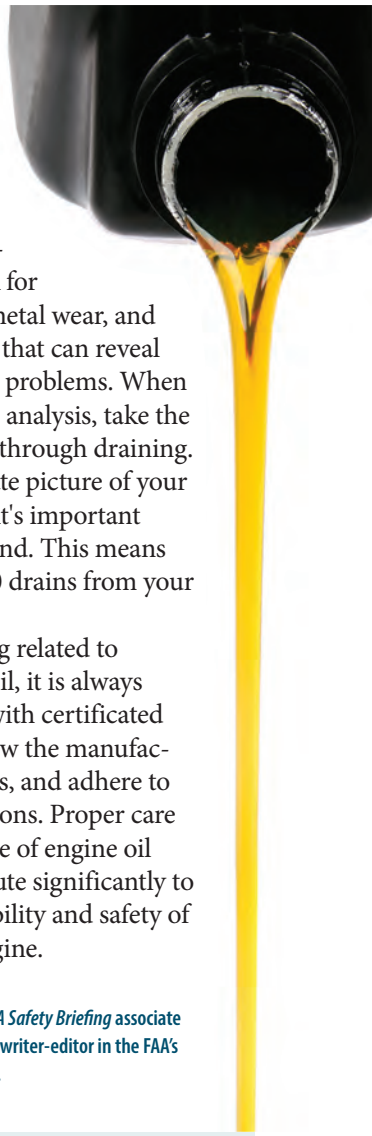
There are different types of aircraft engine oil, so how do you know which type is best for your aircraft? This will depend on a few things. In addition to following the manufacturer's recommendations, Jeff Simon, author of the Aircraft Owners and Pilots Association (AOPA) article "All About Oils," says you should consider your operating environment, outside temperature, engine/cylinder type, and how often the aircraft is flown. From mineral-based to synthetic or semi-synthetic, each type of engine oil has specific properties suited for different types of engines and operating conditions.

> ALWAYS STORE YOUR OIL IN A COOL, DRY PLACE AWAY FROM DIRECT SUNLIGHT AND EXTREME TEMPERATURES.

Viscosity, the thickness of oil and its resistance to flow, is another factor to consider. Too low is a problem, but so is too high. Oil that is too thin won't provide enough lubrication. This increases wear and tear. Too much friction will damage essential engine parts. But if oil is too thick, there is too much fluid friction. This increases the power required to run the engine and lowers fuel economy. It can also lead to parts overheating. This can shorten the life of the lubricating effects by accelerating oxidation. Remember that cold weather is a consideration too. In colder climates, aircraft engine oil needs to be able to maintain proper viscosity at lower temperatures. Some oils are formulated specifically for cold weather to ensure adequate lubrication during start-up. So, when it comes to choosing what oil to use, use the Goldilocks method, and look for an oil that's just right!

Once you've selected the right oil for your aircraft, there are a few more things you should know. Proper storage is essential. Always store your oil in a cool, dry place away from direct sunlight and extreme temperatures. There are also environmental impacts to consider. Spillage or mishandling of engine oil can have severe environmental consequences. Keep an oil-absorbent pad on hand and be sure to follow any environmental regulations. It is also important to follow a strict maintenance schedule including regular oil changes and inspections, which is vital for the longevity and safety of your aircraft's engine.

Since oil plays such a vital role in the health and safety of your aircraft's engine, oil analysis can be a valuable tool. This is a process that involves sending oil samples to a laboratory to check for contaminants, metal wear, and other indicators that can reveal potential engine problems. When collecting oil for analysis, take the sample midway through draining. To get an accurate picture of your engine's health, it's important to establish a trend. This means sampling 5 to 10 drains from your aircraft engine.



With anything related to aircraft engine oil, it is always best to consult with certificated mechanics, follow the manufacturer's guidelines, and adhere to aviation regulations. Proper care and maintenance of engine oil systems contribute significantly to the overall reliability and safety of your aircraft engine.

Rebekah Waters is an *FAA Safety Briefing* associate editor. She is a technical writer-editor in the FAA's Flight Standards Service.

LEARN MORE

FAA's *Pilot's Handbook of Aeronautical Knowledge*, Chapter 7
bit.ly/AeronauticalKnowledge

"*All About Oils,*" AOPA article
bit.ly/3HMyq4B

AC 20-24D, *Approval of Propulsion Fuels, Additives, and Lubricating Oils*
bit.ly/4buV3YX

GENE TRAINOR

DON'T STRIKE OUT

Spring is a time when the aerial application industry in the U.S. ramps up for the planting, fertilizing, and spraying seasons. Helicopters play a key role.

But sometimes this work comes at a cost.

In June, July, and August 2023, the National Transportation Safety Board and the FAA reported 15 helicopter aerial application accidents, four of them fatal, along with 15 accidents the summer before, one of which was fatal. These accidents marked an increase from the 11 reported in the summer of 2021. The 2023 accidents sparked additional interest because three of the fatal accidents occurred on consecutive days: July 29, 30, and 31.

> **IF YOU DON'T NEED TO BE AT A LOW ALTITUDE IN THE WIRE ENVIRONMENT, STAY OUT.**

The summer 2023 accidents came at a time when the overall number of accidents involving U.S. registered helicopters dropped from 130 in fiscal year 2022 to 105 in 2023. The number of fatal accidents dropped from 21 to 18 during the same period.

Most of the summer 2023 aerial application accidents resulted from wire strikes. Wire strikes have been a safety issue for decades for all sectors of the helicopter industry.

The FAA's Civil Aerospace Medical Institute sought to answer the causes of such accidents by conducting a focus group in 2022 with 22 agricultural operations pilots whose aircraft collided with wires during routine flights. The FAA researchers identified cognitive risk factors that included situational awareness (e.g., focused on another obstacle, distracted by a radio call); judgment errors (e.g., forgetting that a wire was there, misjudging proximity to wires); and pressure to perform well (internal or external). See the full report at bit.ly/WireStrikeStudy.

The National Agricultural Aviation Association (NAAA) has been committed to educating pilots about wire strikes through online and in-person wire safety courses, email, and magazine articles. NAAA also provides the Professional Aerial Applicator Support System (PAASS), a yearly safety education program created and presented by aerial application pilots at state and regional NAAA conferences.

"Wire strikes have always been an issue," NAAA CEO Andrew Moore said. "We're flying in a wire environment."

The FAA, too, has been educating pilots about wire strikes, often joining with the U.S. Helicopter Safety Team. To that end, the FAA offers these wire avoidance tips:

- If you don't need to be at a low altitude in the wire environment, stay out.
- During flight preparation, review any known wire installations on the planned flight path.
- Familiarize yourself with the terrain, navigational charts, and obstacle heights. Crossing the same set of wires multiple times on the same flight requires sustained vigilance and caution to avoid them.
- The flight path, sun angle, surrounding terrain, and weather conditions can make wires almost invisible. Instead, look for signs of supporting hardware (towers/poles) and other environmental cues (cleared trees/vegetation in straight lines).

- Wires often run parallel or near roads, so assume wires are present if overflying a road.
- Pay maximum attention to the flight path ahead ("eyes outside") and avoid distractions.
- In addition to electrical, look for all types of wires, such as transport cables, guy wires, and ski cables.
- If a passenger is with you, use them as extra eyes to scan for wires.
- Consider installing a wire strike protection system, or "wire cutters," on the helicopter. This wire-chomping mechanism cuts through undetected wires coming in contact with the helicopter. Although this system does not prevent wire strikes, cutting through the intruding danger can be a lifesaver.

These video resources also are helpful for pilots operating in low-altitude environments:

- Spotlight on Safety: You Cut It? (HAI) bit.ly/47XGbj3
- Rotorcraft Cable Collision Avoidance (EASA) bit.ly/47GYAAm
- Surviving the Wires Environment (FAASTeam) bit.ly/4b7fZoT
- Avoiding Wire Strikes (FAA Tech Center) bit.ly/47HoTGr

Gene Trainor is a technical writer/editor in the FAA's Aircraft Certification Service.

Check out our GA Safety Facebook page at **Facebook.com/groups/GASafety.**

If you're not a member, we encourage you to join the group of nearly 16,000 participants in the GA community who share safety principles and best practices, participate in positive and safe engagement with the FAA Safety Team (FAASTeam), and post relevant GA content that makes the National Airspace System safer.

Catching Up on Currency

I have a commercial instrument SEL license. I was also a CAP [Civil Air Patrol] mountain-certified mission pilot. I stopped flying 6 years ago and am trying to get current. I've completed both the online self-study and webinar versions of AOPA's Rusty Pilot schools. I've also had a couple flights with a CAP flight instructor. He suggested I should do my Flight Review via the FAAST program rather than him signing me off directly. What does that mean and how do I do that?

— Chris

Hi Chris. Thanks for reaching out and congratulations on your decision to start flying again! Your flight instructor is referring to the FAA's WINGS Pilot Proficiency Program which is designed to help improve pilot's skills and knowledge.

Accomplishing any phase of the WINGS Pilot Proficiency Program satisfies the Flight Review requirements of CFR 61.56. (See paragraph (e) "A Person who has, within the period specified in paragraph (c)of this section, satisfactorily accomplished one or more phases of an FAA-sponsored pilot proficiency award program need not accomplish the flight review required by this section.")

A WINGS phase consists of 3 knowledge credits (documented on FAASafety.gov) and 3 flight credits, (documented by an appropriately rated flight instructor).

For more information visit FAASafety.gov and check out the #FlySafe overview of the program with links to additional resources, including the WINGS Pilot Proficiency User's Guide, at bit.ly/WINGSPPP.

From the FAA's LinkedIn Page

What the Helo?!

The FAA recently highlighted the hazards caused by wake turbulence from helicopters with the following post:

Viewers echoed the significance of this risk and shared their experiences:

I don't think wake turbulence from helicopters is recognized enough throughout the industry. I've been involved in multiple accidents involving wake turbulence from a helicopter and am all too familiar with the risk. Once, a PA28 flew through the wake turbulence of an S76 on final and encountered a severe right roll and crashed. I was training on the airfield, so I was first on the scene and helped pull the pilot from the PA28.

It's also important to be aware of the downwash from helicopters, especially those that can taxi on the wheels because the rotor disc is tilted forward, so the wash naturally blows away quite some distance from the helicopter.

— John

This is great information! People in aviation who haven't drilled these concepts into their heads, please absorb this information. There is real potential for helicopter vortices to roll your aircraft over. This applies to taxiing and flying near rotorcraft. Think about the concepts described in this post, apply the knowledge to what you already know about aerodynamics, and it will all click into place.

— Zachary

For more stories and news, check out our new blog "Cleared for Takeoff" at medium.com/FAA.

Let us hear from you! Send your comments, suggestions, and questions to SafetyBriefing@faa.gov. You can also reach us on X (formerly known as Twitter) @FAASafetyBrief or on Facebook at 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.

TOM HOFFMANN

A MACRO LENS ON WEATHER

You've likely seen or heard of the memes for the weather forecasting rock. The whimsical signs you might see outdoors, sometimes even near an airport, feature a stone hung by a rope along with a sign that indicates how this "highly technical and accurate" weather forecasting tool operates. If the rock is wet, it's raining; if it's swinging, it's windy; if it's white, it's snowing, and, well ... you get the idea. It's an amusing way of poking fun at weather forecasts where the timing or conditions predicted don't quite match reality.

Weather forecasting has come a long way in a relatively short span of time. Enhanced satellite and radar technology, more robust forecast models, and even artificial intelligence have played a role in achieving that higher degree of accuracy. However, it seems only Mother Nature has direct knowledge of how or when weather events will actually unfold.

As pilots, we are especially keen on this reality, with each of us experiencing first-hand the fickle nature of forecasting. We study the charts, review the forecasts, and fine-tune our cockpit weather displays, yet there always seems to be some cumulus-shaped curveball tossed our way. There's probably no better example of this on full display than check ride day, the day many learner pilots come to know the weather gods by their first name. While you may aspire for that perfect prognostication, it rarely occurs. On the plus side, it offers you some real-world issues to discuss with your examiner about how you might proceed differently, or if necessary, postpone or cancel the flight. While the changed flight plan might not be the ideal outcome, it's a chance to sharpen those go/no-go skills that will serve you well on future flights.

One thing that has always helped me when it comes to weather is understanding the bigger picture of what's happening in the atmosphere. Back in the 1990s during my collegiate flying days, I fondly recall having to print and post weather charts for our university flight school's briefing area as a lab component of my advanced meteorology course. The charts depicted frontal systems, wind directions, and temperature/dew point spreads, among other items. I realize these black-and-white line drawings produced on a dot-matrix printer may seem crude compared to the sparkling high-res images rendered instantly on a tablet. However, seeing a mural of images side by side forces you to step back and string together a weather story much bigger and more comprehensive than what is just outside the window. Sometimes our rush to see what's happening right here and now narrows our view and eclipses the bigger picture of events.

In a similar way, I'm guilty at times of blindly following the polite voice of my Google Maps navigator only to find myself going down a highly undesired path. Were I to simply widen my view of the map, I'd easily see a more viable detour, or, more importantly, verify if I'm even headed in the right direction. My experience and local knowledge of roads, traffic lights, and bottleneck areas often trump the advice of my navigator. Taking a few extra minutes to get the big picture of where I'm headed and what other factors might affect my ETA can be extremely helpful.

> **A SURFACE ANALYSIS CHART IS ONE TOOL THAT CAN PROVIDE YOU WITH A "BIG PICTURE" VISUAL OF WEATHER DETAILS.**

The same is true when it comes to weather. Having a large-scale weather perspective can provide that extra bit of insight that leads to a more informed go/no-go decision or backup plan. A surface analysis chart is one tool that can provide you with an overview of areas of high and low pressure, along with frontal boundaries, temperatures, dew points, wind directions and speeds, local weather, and visual obstructions. Using this chart as part of your preflight can help you discover any potential trouble spots you'll want to focus on or discuss further with a weather briefer if needed. Getting the "big picture" allows you to funnel all the available information into a sound go, no go decision for your route of flight as well as see potential alternates if conditions change.

PAUL CIANCIOLO

BRADFORD SIPPERLEY

Aviation Safety Inspector, FAA General Aviation Group

Growing up in small-town America is a common theme among FAA employees featured in this column. Regular people from all over the country answer the call to public service and are passionate about improving aviation safety. Bradford Sipperley is another stellar example of bringing diverse experiences together to further our commitment to safe flying.

Brad grew up in Clarkston, Mich. The pinnacle of growing up in any rural town is that kid-mowed baseball diamond etched into an unused field. That's where he often found himself gazing up into the sky when small airplanes buzzed by — igniting the spark of eventually taking the yoke and flying himself.

"After working odd jobs, taking college night classes, and moving to Florida, I decided to join the Air Force," he explains. "That's where my aviation and weather careers began."

Brad was first stationed at Elmendorf Air Force Base in Alaska as a Morse systems operator. But the best part of that duty assignment was the base aero club, where Brad earned his wings.

"I was hooked on flying from my very first lesson," he adds. "My interest in weather and learning all I could about it was sparked by my flying experiences. Plus, the cold hard fact that in Alaska, one must know and understand the weather to be a safe pilot."

The Air Force changed Brad's specialty track and sent him to weather observer and forecasting training. Throughout his military career, he continued flying through aero clubs at every base where he was stationed. Brad earned an associate degree in weather technology from the Community College of the Air Force and a

bachelor's degree in aeronautics from Embry-Riddle Aeronautical University.

After retiring from the Air Force, he worked as a flight instructor, charter pilot captain, aviation weather instructor at the University of Alaska Fairbanks, fire weather forecaster, and spent 13 years with the National Weather Service. Brad joined the FAA in 2014 as an aviation safety inspector in Fairbanks, Alaska. He worked at the local Flight Standards District Office (FSDO) and Certificate Management Office (CMO). Before moving to FAA headquarters in 2023, he was the operations front-line manager at the Fairbanks FSDO. He is now responsible for policy and coursework development and interpretation for the Flight Standard Service's General Aviation Group.

Brad continues to fly year-round on wheels, floats, and skis, including as a Civil Air Patrol (CAP) volunteer since 1988. He has even been credited with 6 "saves" over the years, flying missions for CAP tracking emergency locator beacon (ELT) signals, searching for overdue aircraft, and flying grids looking for missing hikers and hunters. With his extensive GA flying and weather expertise, Brad has some advice about the weather for even seasoned pilots.

"Awareness should begin with pilots observing the weather daily to learn how to read the sky," he explains. "Just being able to recognize cloud types, understand how and why each one develops, and what each indicates, is so important. For example, those lenticular clouds that warn of turbulence or the growing cumulus clouds during the hot afternoon that could lead to showers and thunderstorms contain several hazards to flying."

Brad adds that the most important fact is that the weather will, at some point, change. He advises understanding your limits and the aircraft's limits you plan to fly concerning the current and forecasted weather conditions. Set your personal weather minimums and stick to them.

"Sometimes the shortest way home is the longest way around," he adds. "It is better to go around the weather and arrive late than attempt to go through and exceed your capabilities."

Paul Cianciolo is an associate editor and the social media lead for *FAA Safety Briefing*. He is a U.S. Air Force veteran and an auxiliary airman with Civil Air Patrol.

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