March/April 2023

FAA Safety BRIEFING

Possible Assistance Needed

Preventing Pan-Pan Problems

Federal Aviation Administration

8 **Difficult and Exhausting –** The Insidious Nature of Exhaust System Issues

12 **No Air Up There –** Hypoxia Awareness

16 **Blinded By The Light –** A Look at Laser Strikes

U.S. Department
of Transportation

**Federal Aviation
Administration**

ISSN: 1057-9648
FAA Safety Briefing
March/April 2023
Volume 62/Number 2

Published six times a year, *FAA Safety Briefing*, formerly *FAA Aviation News*, promotes aviation safety by discussing current technical, regulatory, and procedural aspects affecting the safe operation and maintenance of aircraft. Although based on current FAA policy and rule interpretations, all material is advisory or informational in nature and should not be construed to have regulatory effect. Certain details of accidents described herein may have been altered to protect the privacy of those involved.

The Office of Management and Budget has approved the use of public funds for printing *FAA Safety Briefing*.

ABOUT THIS ISSUE…

The March/April 2023 issue of *FAA Safety Briefing* explores a few urgent aeronautical situations pilots may find themselves in, and which may require the use of the lesser-known, but equally important distress call – pan-pan. We look at some common exhaust system issues, how to handle wildlife and laser strikes, as well as how to recognize the onset of hypoxia and ensure safety during higher altitude operations.

Contact Information
The magazine is available on the internet at:
www.faa.gov/safety_briefing

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- **Calling:** (202) 267-1100
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FAA Safety BRIEFING

The FAA Safety Policy Voice of Non-commercial General Aviation

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STAYING OUT OF THE FLYING PAN

As pilots, we're all familiar with the sheer gravity and undivided attention a "mayday" emergency distress message commands when uttered on the airwaves. Hopefully you never have or never will need to use it. However, it is an important tool for pilots to know and not be afraid to use if the situation warrants. The same can be said of a lesser-known distress signal and, as one popular aviation YouTuber puts it, mayday's little brother: pan-pan.

As with mayday (or *maidez*), pan-pan is of French origin and is derived from the word *panne,* which means a breakdown or failure (... not a delicious pastry!) Pan also spawned a few interesting backronyms, Pay Attention Now and Possible Assistance Needed (used on the cover), to help distinguish it from mayday. Unlike mayday, which is used to describe a life-threatening emergency, pan-pan is meant to communicate an urgent situation that for the moment is controllable, but could easily become worse.

> **PAN-PAN IS MEANT TO COMMUNICATE AN URGENT SITUATION THAT FOR THE MOMENT IS CONTROLLABLE, BUT COULD EASILY BECOME WORSE.**

For example, if you were to become lost and unable to orient yourself; had an engine failure on a multi-engine aircraft; or experienced a system or structural failure that requires your attention and may be causing a change in flightpath, declaring pan-pan over the radio would be appropriate. On the other hand, an onboard fire or loss of control would warrant use of the higher priority mayday signal.

The *Aeronautical Information Manual* (AIM) contains a more in-depth description of distress and urgency procedures in chapter 6, section 3 (bit.ly/AIM6-3). It states that initial communication from an aircraft in distress, and any subsequent transmissions, should begin with either mayday or pan-pan — depending on which is warranted — and be repeated three times (e.g., "Pan-pan, pan-pan, pan-pan, Cessna 12345 ..."). It also states that a pan-pan call takes priority over all other radio calls, except mayday, and alerts all other pilots and controllers not to interfere unless there is no response from the receiving station, at which point anyone can offer assistance. Sometimes ATC will assign a discrete frequency that the aircraft in distress can use without worry of interference.

The AIM also points out some suggested immediate actions an aircraft in distress should take to improve their chances of obtaining ATC assistance (e.g., climb for improved communications) and provides a list of elements that should be conveyed to ATC when making a distress call. The important takeaway here is that a pan-pan call can get you the assistance you need, especially during task-saturated single pilot operations. This assistance could come in the form of vectors back to your departure or a nearby airport, clearing other aircraft from your flightpath, and providing priority handling on the frequency, allowing you to more carefully focus on the problem at hand.

Let's face it: an infinite array of abnormalities can occur on a flight, and many may not have any established procedures to follow. It's extremely difficult, if not impossible, to prepare for each and every issue that could arise. However, awareness of particular situations and how they could impact your flight could go a long way in helping you successfully and safely navigate your way out of them.

That's why we chose to focus this issue on some of these more urgent aeronautical situations that may require a unique or specific response to handle appropriately. We look at some common exhaust system issues, an extremely deadly and insidious danger, how to handle wildlife or laser strikes, as well as how to recognize the onset of hypoxia and ensure safety during higher altitude operations.

We hope reading about some of these urgent situations will help give you an edge if you're ever faced with one. Just know that help is always just a pan-pan call away.

AVIATION NEWS ROUNDUP

New FAA Civil Aviation Registry Online Now

The FAA Registry is now offering online aircraft registration services to individual aircraft owners to submit applications, documents, and make payments. Continuous improvements to the Civil Aviation Registry Electronic Services (CARES) platform will evolve over the next few years.

CARES modernizes the aircraft registration process and payment method, reduces the need to send mail to the FAA Registry, may reduce the rejection rate, improves fraud detection, increases efficiency and security of the process, and provides overall improved customer service.

This Congressionally mandated initiative will eventually replace current paper-based Registry processes and legacy systems. In 2023, CARES will be expanded incrementally to operators, leasing companies, insurance companies, and financial companies. Future releases will address airmen certification and may also include drone registration.

The FAA Registry is responsible for the registration of U.S. civil aircraft and the certification of airmen, such as pilots and mechanics. The FAA Registry maintains information on approximately 300,000 U.S. civil aircraft. The FAA issues aircraft registration to individuals and entities that meet eligibility requirements, such as U.S. citizenship or permanent legal residence.

Go to cares.faa.gov to access the online CARES platform.

FAA Mandates Medical Requirements for Commercial Balloon Pilots

The FAA adopted a final rule in November requiring commercial hot-air balloon pilots to hold medical certificates when flying paying passengers. The rule mandates a second-class medical certificate, the same standard required for other commercial pilots.

Previously, commercial balloon pilots were exempt from the medical requirement. In the FAA Reauthorization Act of 2018, Congress directed the FAA to revise the medical certification standards for commercial balloon pilots. The rule also addresses an NTSB recommendation that the FAA remove the exemption.

The FAA in recent years took steps to increase the safety of hot-air-balloon tourism by working with the Balloon Federation of America (BFA) on an accreditation program. The program includes voluntary standards for pilots and operators and offers multiple tiers of BFA safety accreditation.

The FAA published a proposed rule in November 2021 and reviewed approximately 200 public comments before issuing the final rule at FederalRegister.gov/d/2022-25288.

#FLYSAFE GA SAFETY ENHANCEMENT TOPICS

Please visit bit.ly/GAFactSheets 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.

Adventures in Safety Podcast Episode

The average person probably has no idea what the FAA's Technical Operations, or Tech Ops, employees do, or what an adventure the profession can be. And by adventure, we mean wild beasts, volcanoes, and camping in the middle of nowhere!

In the latest *The Air Up There* podcast episode, "Adventures in Safety," we talk about the extreme nature of Tech Ops and the great lengths our technicians go to maintain the airspace infrastructure so pilots can fly safely and air traffic controllers can communicate with pilots.

Listen in to hear stories from experienced technicians Jeremy Withrow and Charles Barclay, who have maintained flight navigation equipment in the unique — and extreme — environments of arctic Alaska, tropical Hawaii, and the California desert. If you're down for an adventure, you may develop a newfound interest in an exciting Tech Ops career. Nevertheless, you will walk away from this episode with a much higher appreciation for these unsung heroes!

Go to faa.gov/podcasts to listen or get the links to this podcast on Apple, Stitcher, or Google.

Searching on FAA.gov Got Better

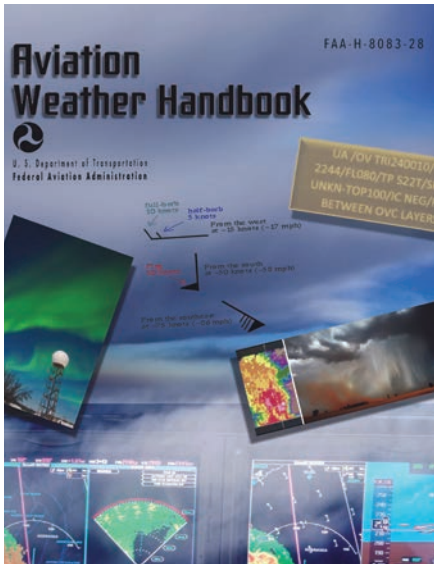
FAA.gov has a new site-wide search to get you the information you're looking for, quickly. You can find it in the top right of every page you visit.

Powered by Search.gov, the new search tool is optimized to bring you the top results for searches across FAA.gov and FAA's Twitter and YouTube channels, as well as FAA content published in the Federal Register.

Search.gov is the premiere search tool for the federal government and is in use by more than 2,000 websites.

FAA's Aviation Weather Handbook Updated

The FAA's updated *Aviation Weather Handbook* consolidates the weather information from several weather-related advisory circulars (AC) into one source document. These ACs include aviation weather, thunderstorms, clear air turbulence avoidance, aviation weather services, pilot windshear guide, and hazardous mountain winds.



The handbook is designed as a technical reference for all who operate in the national airspace system (NAS). Pilots, dispatchers, and operators will find this handbook a valuable resource for flight planning and decision-making, and a consolidated source of weather information.

The *Aviation Weather Handbook* is broken out into three parts:

- Part 1: Overview of the United States Aviation Weather Service Program and Information.
- Part 2: Weather Theory and Aviation Hazards.
- Part 3: Technical Details Relating to Weather Products and Aviation Weather Tools.

Download the *Aviation Weather Handbook* at bit.ly/AviationWx.

IACRA for IA Renewals

Online Inspection Authorization (IA) renewal applications opened in the Integrated Airman Certification and Rating Application (IACRA) on Feb. 1 and will start being processed in March. Using IACRA for your IA renewal helps cut down on errors and ensures a timely re-authorization. Go to IACRA.faa.gov to create an account if you do not have one.

The guidance used by FAA personnel to review IA renewals has also been recently revised. The guidance is available at bit.ly/3weh1fC.

Questions about IA refresher courses should be sent to 9-AFS-IARefresher@faa.gov.

SUN 'n FUN Aerospace Expo

FAA SAFETY CENTER FORUMS

March 28 – April 1, 2023

	08:30 – 09:30	10:00 – 11:00	11:30 – 12:30	1:00 – 2:00	2:30 – 3:30	
TUESDAY MARCH 28	**Most Common Cause of Fatal Accidents – Loss of Control** Ed Verville FAA Designated Pilot Examiner **WINGS: BK3 AFS0119492**	**WINGS is Now E-Z** Ron Timmermans WINGS Industry Network **WINGS: BK3 AFS0119493**	**Leidos Flight Service – How to Co-Exist with Weather** Jeff Arnold Leidos Flight Service **WINGS: BK3 AFS0119494**	**Airman Education CAMI – Hypoxia** Junior Brown FAA AAM-400 **WINGS: BK3 AFS0119495**	**Threat and Error Management** Patrick Hempen FAA Accident Investigation **WINGS: BK1 AFS0119496**	**Join us for daily forums at the FAA Safety Center**
WEDNESDAY MARCH 29	**Wilderness Survival PT 1** Mike Millard FAA AFS-830 **WINGS: BK3 AFS0119497**	**Wilderness Survival PT 2** Mike Millard FAA AFS-830 **WINGS: BK3 AFS0119498**	**Adverse Weather – Perception vs Reality** Dr. Ian Johnson, Danny Sims & Gary Pokodner FAA Aviation Weather Branch **WINGS: BK1 AFS0119499**	**Safety Management Systems** Ted Rodriguez FAA AFS-910 SMS **WINGS: NA AFS0119500**	**Airman Testing & Aviation Data Systems Update** Karen Lucke FAA AFS 600 **WINGS: BK3 AFS0119501**	**Join John and Martha King tomorrow!**
THURSDAY MARCH 30	**Find Your Vertical Aviation Mission** James Viola President/CEO HAI **WINGS: NA AFS0119508**	**Straight Talk About Aviation Safety** John & Martha King King Schools **WINGS: BK3 AFS0119509**	**Meet the FAA FAA Leadership**	**What Would You Do in These Maintenance Situations?** Mike Millard FAA AFS-830 **AMT: MT-IA AFS0119541**	**Delegation Program Focus Areas and Updates** Karen Lucke FAA AFS-600 **WINGS: BK3 AFS 0119542**	**CAMI will be our late afternoon star tomorrow!**
FRIDAY MARCH 31	**Safety Management Systems** Ted Rodriguez FAA AFS-910 SMS **WINGS: NA AFS0119544**	**What FAA's Compliance Program Means to You** Jeffrey Smith FAA AFS-910 **WINGS: NA AFS0119549**	**FAA Charles Taylor Master Mechanic and Wright Brothers Master Pilot Awards Ceremony** After Ceremony Celebration	**TBD** FAA Air Traffic Organization (ATO) **WINGS: BK3 AFS0119552**	**Airman Education CAMI – Physiology** Junior Brown FAA AAM-400 **WINGS: BK3 AFS0119554**	
SATURDAY APRIL 1	**Single Pilot IFR – What Went Wrong PT 1** Jeff Edwards AvSafe, LLC **WINGS: BK2 AFS0119556**	**Single Pilot IFR – How to Do it Right PT 2** Jeff Edwards AvSafe, LLC **WINGS: BK2 AFS0119557**	**Leidos Flight Service – How to Co-Exist with Weather** Jeff Arnold Leidos Flight Service **WINGS: BK3 AFS0119561**	**Recreational Drone Flying** Kevin Morris FAA Office of Communications **WINGS: NA AFS0119562**	**Secrets Only Pilots Know About Airports** Tom Slater FAASTeam Rep **WINGS: BK3 AFS0119563**	**See you next year!**

Appropriate **AMT / WINGS** credit will apply to events by using the associated **#AFS011XXXX** listed in each box.

Access FAASTeam Safety Brochures here:
bit.ly/FAAST_pamphlets

FAA Forum & FAA Exhibit Hall Opens Daily at 8:30 a.m.
Schedule is subject to change. For updates, check the QR code to the right or go to Sun 'n Fun Forums:
bit.ly/FAA_Forums

DR. SUSAN NORTHRUP, FAA FEDERAL AIR SURGEON

SODA — IT'S NOT JUST A FIZZY DRINK

Maintaining the safety of the National Airspace System (NAS) and the public is the fundamental purpose of the FAA. Expanding access for all to the ranks of aviation is also a major goal. To that end, the Office of Aerospace Medicine oversees several processes that allow pilots to get a medical certificate more quickly despite certain disqualifying conditions. We authorize Aviation Medical Examiners (AMEs) to make decisions to speed up the certification process through programs like Conditions AMEs Can Issue (CACI) and AME Assisted Special Issuance (AASI). These successful programs allow more pilots to leave the AME with their certificates in hand. In this article, we'll cover the Statement of Demonstrated Ability (SODA).

So, What's a SODA?

Most individuals qualify for a pilot medical certificate at the time of examination. The majority of those with potentially disqualifying conditions ultimately are also issued a medical, but are required to have a more detailed evaluation. Broadly speaking, there are conditions that typically progress, while others remain relatively static. For the former group, we usually put pilots on a Special Issuance (SI), AASI, or CACI. The particular condition(s) determines the necessary evaluation(s) and frequency. For static conditions, such as an amputation or color deficiency, we generally issue a SODA if the pilot is capable of performing airman duties without endangering public safety. (For color deficiency, we issue a Letter of Evidence (LoE), equivalent from the pilot's perspective. We are currently reviewing this process though). Unlike an SI or AASI, neither a SODA nor a LoE expires as long as the underlying condition has not adversely changed.

Initial issuance of a SODA or LoE usually includes a medical flight test (MFT) as performed by either an ASI (aviation safety inspector) at a Flight Standards District Office (FSDO) or a designated pilot examiner (DPE). This evaluation typically includes both a ground and airborne evaluation. You will be authorized to take the MFT even if you do not currently qualify for a medical certificate. It is rare, but possible, to authorize a SODA or LoE based on operational experience.

> FOR STATIC CONDITIONS, SUCH AS AN AMPUTATION OR COLOR DEFICIENCY, WE GENERALLY ISSUE A SODA IF THE PILOT IS CAPABLE OF PERFORMING AIRMAN DUTIES WITHOUT ENDANGERING PUBLIC SAFETY.

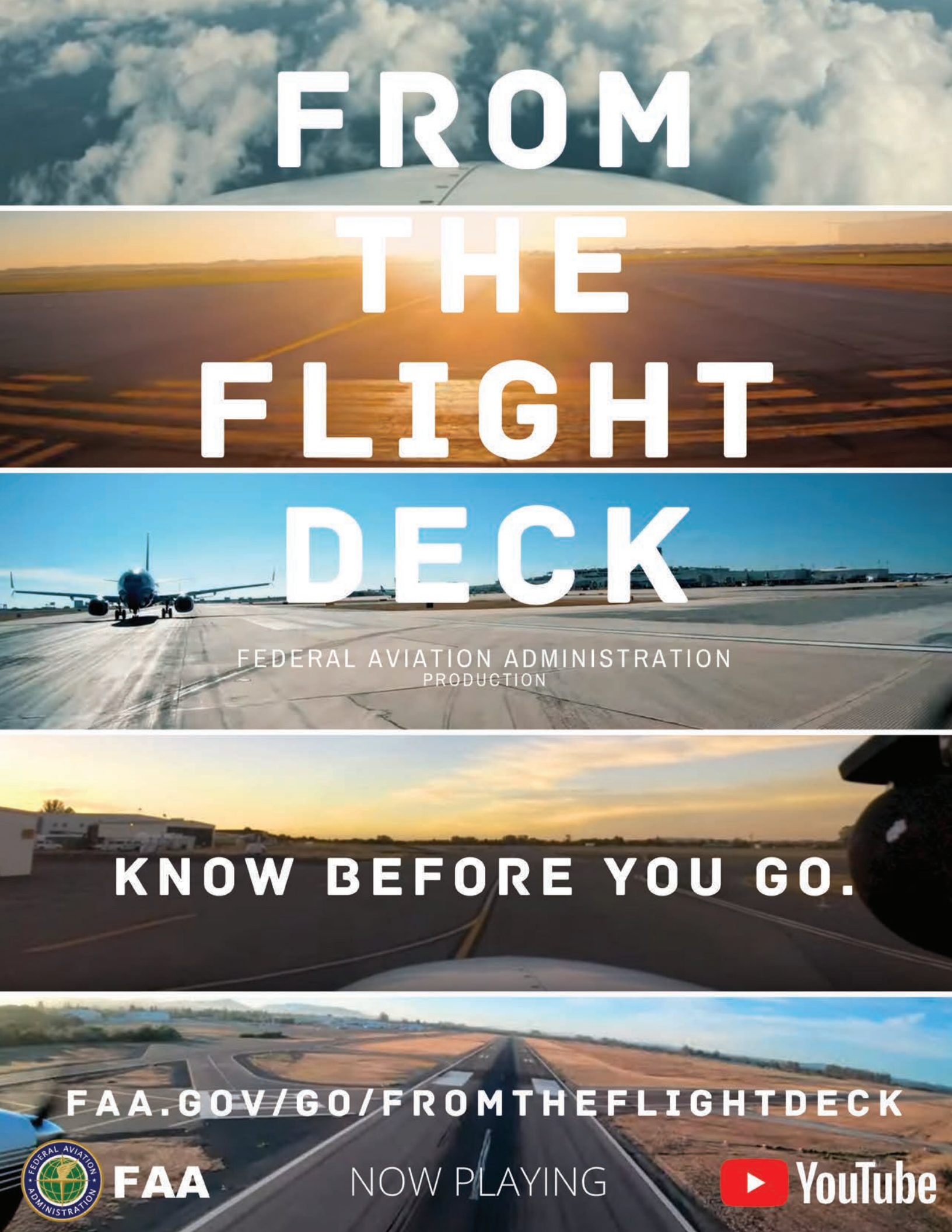
There are some things you can do to help facilitate the SODA/LoE. Before your examination, contact your AME to determine what information to bring and their availability to help with the process; also, discuss the aircraft you want to use. Most FSDOs can accommodate the typical single-engine, dual-control trainers, but your local FSDO might not be able to accommodate a request for other aircraft types. Come prepared to tell your AME which FSDO you request (faa.gov/about/office_org/field_offices/fsdo/). We will send that FSDO an authorization for

an MFT (as applicable) and courtesy copy you. Please identify your desired FSDO early; the process is delayed when we need to ask. Be aware that the AME will defer your exam and the FAA subsequently will issue a denial pending the outcome of the MFT.

Once you have the SODA, simply present your authorization letter to your AME, and he or she may issue a medical certificate if you are otherwise qualified. This simplifies your certification process going forward. The SODA may have specific limitations that allow the pilot to perform to an acceptable standard and will be issued for a specific class of medical (First, Second, or Third).

How Does This Help You?

Once you have provided any additional information needed, successfully completed your MFT (if required), and been granted a SODA/LoE, you're done. If the condition remains static, simply type your SODA number (N/A for LoE) into MedXPress and present the letter (for both) to the AME when you renew your medical. The FAA and other pilots benefit since this frees up resources to expedite reviews of other examinations. It's a win-win.


FROM
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FAA
NOW PLAYING
YouTube

DIFFICULT AND EXHAUSTING

How a "Simple" Thing Like an Exhaust System Can Create Deadly Difficulties

By James Williams

It seems so simple: just a metal tube to safely carry hot exhaust gases away from the aircraft. What could possibly go wrong?

As it turns out, quite a bit. General aviation (GA) exhaust system failures have been indicated in many accidents over the years, leading to concern from the General Aviation Joint Safety Committee (GAJSC). Between 2011 and 2019, 23 GA accidents and incidents involved exhaust systems. This isn't a new concern. National Transportation Safety Board (NTSB) recommendations date back to the 1980s concerning exhaust systems, and prior agency concerns are documented back to the 1940s. That said, it's important to recognize that the solutions to these difficulties are a mix of modern technology and old-fashioned upkeep.

There are three general types of exhaust failures: muffler failures/blockages, exhaust leaks causing noxious gases or fumes to permeate the cabin, and exhaust cracks causing heat damage and/or fire. While there can be some overlap among the three, this framework offers a helpful way to think about preventing an exhaust-related accident.

All Blocked Up

We may scoff at calling the exhaust parts of the power-plant a "system," but it is more than just a bunch of crudely welded pipe sections. In highly competitive environments like Formula 1 racing, the exhaust systems are an area of an

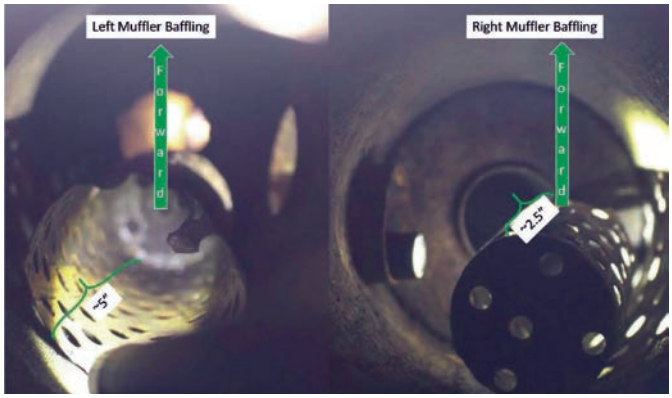


Photo courtesy of NTSB.

Photo of the baffling that rotated inside the muffler leading to the accident referenced on the next page.

intense engineering competition. The racing teams continually try to maximize output while minimizing weight with exhaust system designs. The competition got so out of hand that officials had to limit the number of exhaust systems the teams could use per season. While our GA aircraft exhausts are not nearly as refined, the same principle applies because even small constrictions or blockages can cause degraded performance or worse.

The unfortunate pilots of an amphibious Maule M-7 in Oregon found this out in the worst possible way. After an uneventful taxi and run-up, the pilots began a takeoff on a paved runway and lifted off with about 1,000 feet of runway remaining. The airplane struggled to gain altitude once it departed ground effect, and the pilot realized they would not clear the 50-foot-tall trees on the other side of the river they were approaching. The pilot decided to attempt a water landing but failed to retract the wheels on the floats, causing the airplane to nose over into the water. The pilot was killed, and his passenger received minor injuries.

The ensuing investigation revealed that both mufflers had suffered broken baffles, and the baffling in the right muffler had managed to rotate 180 degrees from its intended position, reducing exhaust flow from that muffler by 89%. The NTSB concluded that the loss of power caused by the separated baffling was the probable cause of the accident.

Out Cold

One of the fears I acquired during my flight training was the use of cabin heat. No matter how cold it was, I always had an unwarranted fear of sliding that lever over and enjoying one of nature's great ironies. While internal combustion engines are great at providing propulsive power in a space and weight-efficient package, they aren't

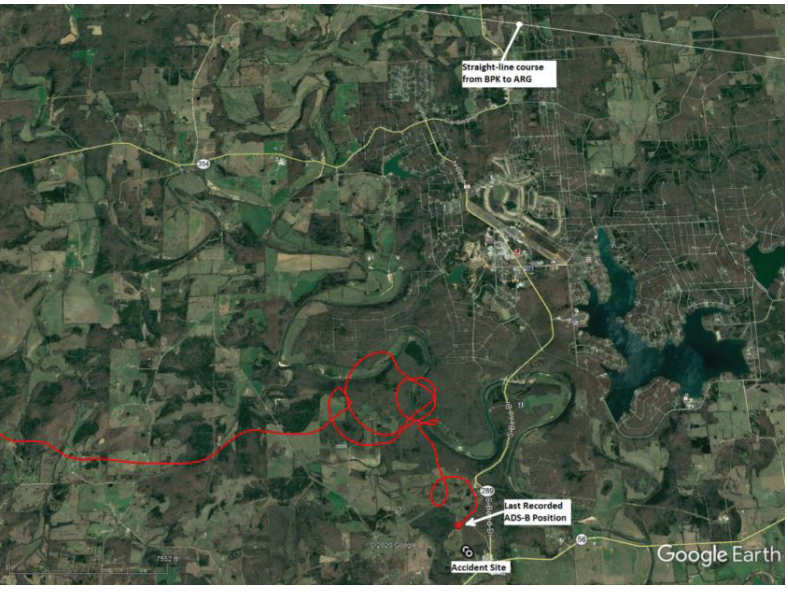


Photo courtesy of NTSB.

The flight path of the last 7.5 minutes of the referenced CO poisoning accident.

Photo courtesy of NTSB.

The wreckage of the muffler from the CO poisoning accident.

great at transforming their fuel into kinetic energy. Most cars probably only convert 30-ish percent of that available energy into work, while our technologically less advanced aircraft piston engines are likely dipping into the 20s. But this major downside comes with one key advantage, most of that energy is transformed into "waste heat" that we can harness. My fear arose from how we harvest that heat. Generally speaking, many GA airplanes use a shroud that wraps around the muffler to circulate outside air around the hot part and then into the cabin. In theory, it's a great system that recycles "waste heat" into a warm cabin at no cost to performance and with no additional fuel burn.

As the saying goes, though, there's no free lunch. The drawback to this marvelous act of recycling is that any crack or leak in the muffler area covered by the shroud would allow exhaust gases, and most critically, carbon monoxide (CO), into the cabin. CO is an odorless, colorless, and tasteless gas that very easily bonds to the oxygen-carrying system in the blood at a far higher strength than oxygen. This means that once CO locks on, that red blood cell can no longer take oxygen from the lungs and to the rest of the body where it's needed. This impairs your ability to function and can ultimately be fatal even if you aren't at the controls of an airplane. That's why it was always a risk-reward calculation between cabin comfort and CO risk.

Unfortunately, a flight instructor and a private pilot ended up on the wrong side of that calculus in late 2020. The instructional flight departed from outside Little Rock. It made a brief stop at an airport near the origination point, then flew up to northern Arkansas over a couple of airports before turning east southeast and requesting an IFR clearance to Walnut Ridge Airport (ARG) from Memphis Center. After initial radar and radio contact, the flight briefly proceeded before radar contact was lost and radio contact became intermittent. Efforts to contact the missing flight by ATC and aircraft in the area continued, but to no avail. The flight continued, but not directly toward the destination airport. The flight's last seven and a half minutes were an increasingly wobbly and looping mess ending just south of Franklin, Ark. The ADS-B track looked like a VFR into IMC accident despite it being clear below 5,000 feet above ground level (AGL) and 10 miles of visibility in daylight conditions.

Both pilots were killed, and the NTSB examination of the wreckage determined that there was cracking in the muffler that predated the accident leading to CO poisoning. Toxicology reports from the flight instructor confirmed this finding.

Fire in the Hole

The last group of accidents is the one that really captures our attention: Fire. I've long known that fire is the one thing that truly scares me in aviation. Don't get me wrong: many potentially dangerous situations deserve consideration, but fire occupies a special place in my mind. Faulty exhaust systems can either be a direct source or create a source for fire. Many components in the engine compartment can be sensitive to high heat, including wiring and fuel lines (both of which can lead to fires if damaged).

There are three general types of exhaust failures:
1) Muffler failures/blockages
2) Exhaust leaks
3) Exhaust cracks

The pilots and passengers of a Piper *Malibu Mirage* encountered such a situation. Thankfully no one was killed, but unfortunately two of the five on board suffered serious injuries when the airplane caught fire in 2018. Immediately after takeoff, the pilot noticed an odor of smoke. After a very brief attempt to troubleshoot the issue, he decided to turn the aircraft back to the airport. At that point, smoke began to pour into the cockpit. Shortly afterward, the engine made a loud noise, the oil pressure dropped to zero, and the engine lost all power. The pilot determined it was impossible to reach the airport and made a forced landing in a field. All five occupants were able to exit the airplane and get clear as the fire burned the forward section of the airplane in front of the cockpit. The local fire department arrived quickly and extinguished the blaze before it spread to the rest of the aircraft.

The NTSB investigation determined that the aviation maintenance technician (AMT) completing a service bulletin on the exhaust system immediately preceding the flight failed to follow proper procedure when reassembling the exhaust leading to the leak and fire. Contributing was the AMT's supervisor, who failed to oversee the process and relied on a post-maintenance inspection where the error would not be visible.

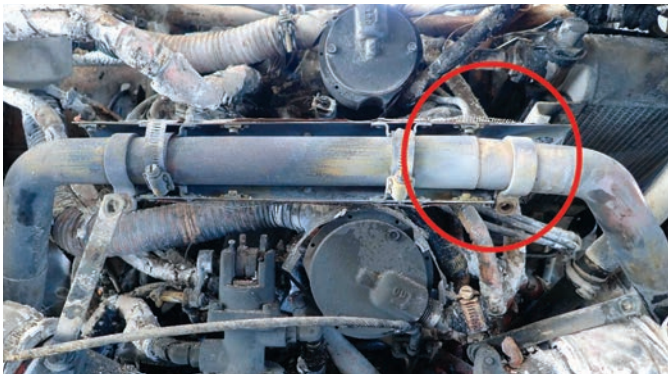


Photo courtesy of NTSB.

The source of the inflight fire on the Piper *Malibu Mirage*.

Photo courtesy of NTSB.

A post accident photo of the fire damage to the nose of the airplane.

Easing Your Difficulties

So what are we to do? It takes a mix of diligence, teamwork, and technology. The first and easiest thing to do is step up your preflight of the engine compartment. Look for obvious damage to the exhaust and indications of wear, damage, or staining to nearby components. This can be an excellent way to catch small leaks that can lead to larger cracks. If it's an airplane you fly regularly, consider taking periodic photos of the engine compartment so you can compare them. With almost everyone carrying a high-quality camera in their pocket, it's an easy way to detect slow-moving trends. That way, you have a basis for comparison when something looks off, but you can't remember if it was that way last time. This might not work as well with every airplane but doing the best you can to get a good view of the compartment (like using a flashlight) improves your odds of avoiding adversity.

The next step is to team up with a good AMT and work out a plan. At what interval is your exhaust system inspected per the service manual? What does that inspection include? Do you and/or your AMT feel that is sufficient? There is no requirement to inspect the inside of the exhaust during a 100-hour or annual inspection using a borescope or other means. While we tend to think of an exhaust as a permanent part of our engine, perhaps that thinking should shift to view it as an exceptionally long-lived wear part. Look at it more like brake pads or tires; monitor the exhaust system's condition carefully and replace items before a failure. You may want to talk to your AMT about setting a schedule for periodic inspections and add that item to the nearest annual, 100-hour, or another shop visit. This practice might add a bit of downtime and cost, but it's money well spent.

Another thing you and your AMT can do is report any issues encountered to the FAA's Service Difficulty Report System (SDRS). The SDRS (sdrs.faa.gov) allows the aviation community members to upload a report if they experience an issue with a part. It allows the FAA to

collect data on service issues before they lead to accidents. Gathering data on some component failures during an accident investigation can be difficult. Having trained with accident investigators, I find it truly amazing what they can determine from what appears to be bent metal. Even so, there are usually limitations on what they can categorically declare, especially in cases of fire where much of the evidence may be consumed. Having information from much earlier in the failure chain provides a better look at the cause of the failure and how it might be prevented. GAJSC has struggled with a lack of data on exhaust failures

With GA aircraft exhaust systems, even small constrictions or blockages can cause degraded performance or worse.

so catching them early is critical.

The final leg of this triad is technology, particularly CO detection. CO detectors aren't new. But the ones that I was most familiar with were the little orange dot that was usually affixed to the panel; it would change color in the presence of CO gas. While they certainly work and are very cost-effective (in the vicinity of $5), these devices lack any kind of alarm, meaning you must actively scan them. Paradoxically this means that if CO is potentially impairing you, you must actively monitor a small dot on the panel while continuing all your other tasks. That is precisely the kind of thing that CO poisoning makes more challenging.

Modern CO detectors come in wide varieties; most include an audible alarm and/or visual annunciation, so you don't have to actively monitor them. Some will even log CO levels during flights in reports that you can access later, allowing you to detect small changes over time that may be below the levels that cause impairment, but that could indicate the start of a problem. There are both installed and portable options. One headset manufacturer has even integrated a CO detector into one of its products. You can also find CO detectors integrated into portable ADS-B In units. So even if you only rent airplanes, there are still plenty of options. They are available at many different price points, so a modern CO detector should be a part of your aviation kit every bit as much as your headset and electronic flight bag (EFB). Even the most expensive CO detectors are very cheap insurance against CO impairment.

Through these three methods, we can help reduce exhausting difficulties for you and the rest of the pilot community, making the skies safer for everyone.

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

LEARN MORE

General Aviation Joint Safety Committee
gajsc.org

Service Difficulty Reporting System (SDRS)
sdrs.faa.gov

Non Required Safety Enhancing Equipment (NORSEE)
faa.gov/aircraft/air_cert/design_approvals/norsee

ALC-498: Aircraft Exhaust Systems Online AMT course
bit.ly/ALC498

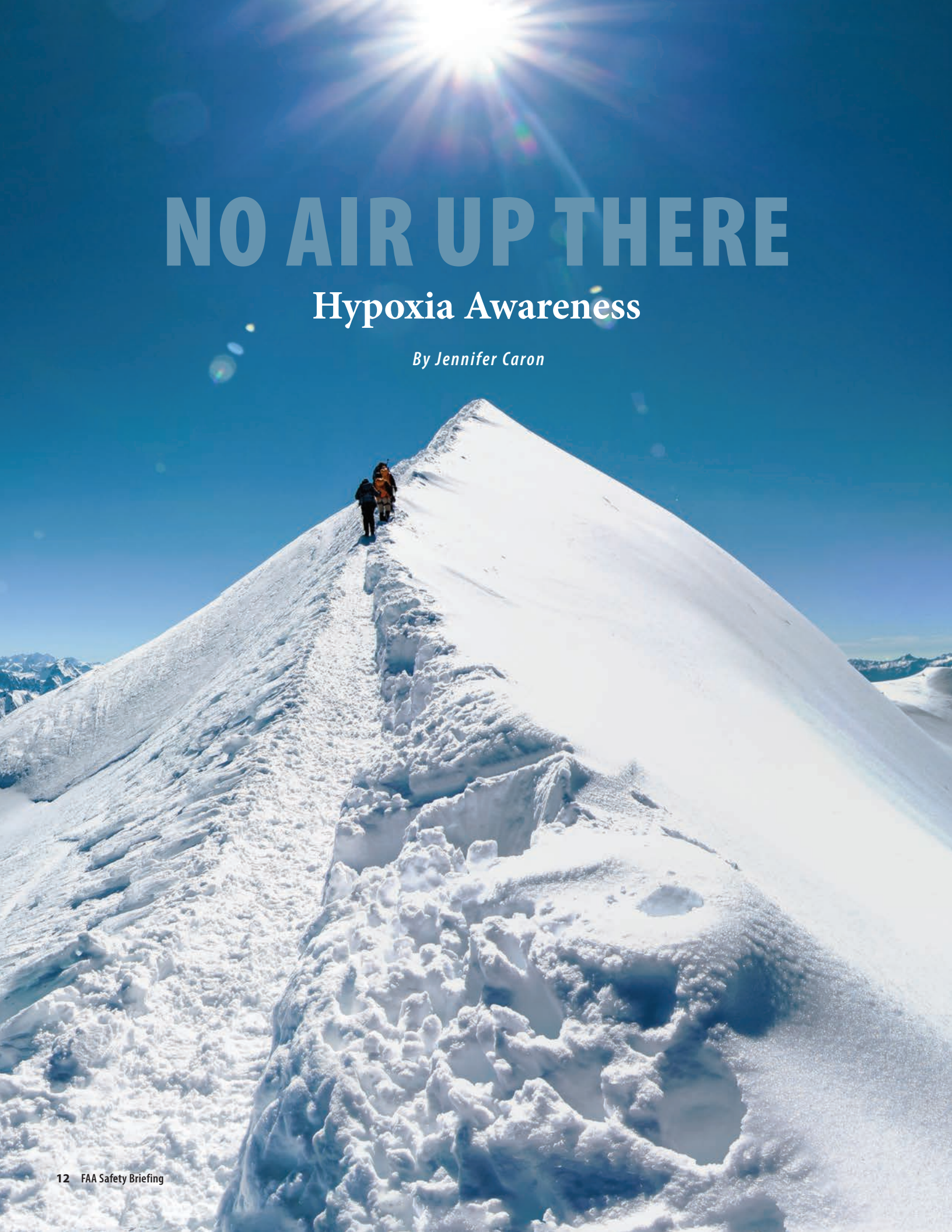
Photo of a headset that features a CO detector.

Photo courtesy of Lightspeed Aviation.

NO AIR UP THERE

Hypoxia Awareness

By Jennifer Caron



Mid-flight is not the time to learn about hypoxia, the medical term for oxygen deficiency. It doesn't give you much warning, and if you don't detect it early enough, it can be a real killer. Some pilots believe that living at a higher altitude offers significant protection from hypoxia. This is partially true. Without question, someone who lives at 9,000 feet will handle an excursion to 12,000 feet better than someone who lives at sea level. However, this benefit can rapidly decrease and is subject to individual variability.

Hypoxia is an inherent risk for many in aviation, but there are regulatory requirements and training designed to mitigate it.

The Rules and the Regs

For the general aviation pilot, 14 CFR section 91.211 applies. While most of us are familiar with the need for oxygen above a cabin pressure altitude of 12,500 feet mean sea level (MSL) for flights over 30 minutes and all flights above 14,000 feet MSL, keep in mind there are additional rules for pressurized aircraft in paragraph (b).

Dr. Susan Northrup, FAA Federal Air Surgeon notes that many FAA resources and training tools cover hypoxia, including:

- Advisory Circular (AC) 61-107B CHG 1, *Aircraft Operations at Altitudes Above 25,000 Feet Mean Sea Level or Mach Numbers Greater than* .75.
- FAA's *Pilot Handbook of Aeronautical Knowledge*, Chapter 17 (bit.ly/2nBxvNT).
- Videos (e.g., youtu.be/E56AmOTSues), Aeromedical Safety Brochures, and an in-person, one-day course in Oklahoma City. The latter includes training in either the altitude chamber or the PROTE (Portable Reduced Oxygen Training Enclosure).

Symptoms

Everyone's response to hypoxia varies. Unless you've had special training to recognize its symptoms, hypoxia doesn't give you much warning. It steals up on you, giving your body subtle clues.

The order of symptoms varies among individuals and include the following:

- Increased breathing rate
- Headaches
- Lightheadedness
- Dizziness, tingling, or warm sensations
- Sweating
- Poor coordination, impaired judgment, tunnel vision, and euphoria.

See FAA's Aerospace Medical Education Division's (AMED) online hypoxia brochure at faa.gov/pilots/safety/pilotsafetybrochures to learn more about how to recognize your symptoms of hypoxia.

PROTE-able Training

To recognize the onset of hypoxia, you can do so safely, and on the ground in altitude training devices that allow participants to breathe air with a lower percentage of oxygen. A quick internet search will show a number of commercial providers who offer this training.

The FAA version of this training is the Portable Reduced Oxygen Training Enclosure, or PROTE, a traveling altitude training device.

Besides the physiological training course with altitude chamber and vertigo demonstrations, you can also take a one-day survival course at FAA's Civil Aerospace Medical Institute (CAMI) in Oklahoma City. Sign up for these courses by visiting: faa.gov/go/aerophys.

Photo of participants in the FAA's PROTE system.

O_2 Equipment

A basic knowledge of oxygen equipment can be critical whether you are flying a commercial, commuter, or a general aviation aircraft. This equipment is the first line of defense against the potentially lethal effects of hypoxia and carbon monoxide poisoning. It is the responsibility of the pilot that all aboard the aircraft — crewmembers and passengers — know how to use this life-saving equipment safely and efficiently.

Photo of oxygen equipment.

Per FAA's brochure on oxygen equipment use in GA, there are three components

to most oxygen systems, whether they are portable or installed systems.

- A storage system (containers)
- A delivery system
- Mask or nasal cannula

> **Mid-flight is not the time to learn about hypoxia. It doesn't give you much warning, and if you don't detect it early enough, it can be a real killer.**

Storage Systems

Oxygen can be stored in the aircraft as a gas, liquid, or a solid.

As a gas, the gaseous aviator's breathing oxygen (ABO) has the major advantage of being more economical. It can be stored in high-pressure (1800-2200 psi) containers or low-pressure (400-450 psi) containers. The major disadvantage is the weight and bulk of the storage containers, which may become an issue in smaller aircraft.

As a liquid, oxygen can be serviced to the aircraft in a liquid state, the liquid aviators breathing oxygen (LOX). The advantage of LOX is that it has a nine hundred-to-one expansion ratio. In other words, one liter of LOX will expand into 900 gaseous liters of ABO. This provides a three-to-one space and a five-to-one weight savings over gaseous ABO. The major disadvantages are that LOX is stored at its critical temperature of minus 197° F and its volatile nature when it comes in contact with petroleum products. If LOX comes in contact with exposed skin, severe frostbite may occur.

Top and bottom photos: The results of a servicing error where high pressure oxygen was used to fill a low pressure system.

As a solid, sodium chlorate candles (solid-state oxygen candles) have the advantage of saving weight and space over ABO because they provide a six hundred-to-one expansion ratio. The major disadvantage is that once the chemical reaction starts (the candle is activated), it can't be stopped easily. Additionally, the candle produces a great deal of heat and precautions must be taken to avoid a fire hazard. Improper shipping of unexpended oxygen candles was the cause of the ValuJet crash from the mid 90's. So this is a major possible safety issue.

There are also molecular sieve oxygen generators (MSOG) that take ambient air and separate oxygen from the nitrogen and inert gases. The separated oxygen is concentrated and used to supply the aircraft. The military has used this system for many years, as well as medical patients who need a portable oxygen system. Civil aviation hasn't embraced MSOG, but it may become more common in future aircraft.

Delivery Systems

Oxygen delivery systems deliver oxygen from the storage containers.

Typically used at 28,000 feet and lower, continuous flow is economical in that it doesn't need complicated masks or regulators to function, but it is also very wasteful — the oxygen flow is constant whether you're inhaling, exhaling, or pausing in between breaths.

The diluter demand system, typically used at altitudes up to 40,000 feet, compensates for waste by giving the user oxygen on-demand (during inhalation) and stops the flow when the demand ceases (during exhalation).

Pressure demand systems provide oxygen under positive pressure that slightly over-inflates the lungs allowing you to fly at altitudes above 40,000 feet, where 100% oxygen without positive pressure is insufficient.

Masks and Nasal Cannulas

Oxygen masks and cannulas need to be compatible with the delivery system you are using.

Quick-don masks must have the capability to be donned with one hand in five seconds or less, while accommodating prescription glasses. Typically rated to altitudes up to

40,000 feet, these masks are usually suspended or stored to permit quick and unimpeded access by flight deck crew.

Airline drop-down units ("Dixie cups") look similar to a GA re-breather mask. However, they function differently and allow users to go to higher altitudes. Used at altitudes up to 40,000 feet, Dixie cups use an external reservoir bag and a series of one-way valves working in sequence to allow a mixture of 100% oxygen and cabin air into the mask. Activated by pulling down on a suspended mask, oxygen from a supply source flows continuously into the reservoir bag. During inhalation, a one-way valve allows the flow of oxygen from the reservoir bag into the lungs. If the reservoir bag empties before inhalation is complete, a second one-way valve on the mask face piece opens to permit the flow of cabin air into the mask, allowing the user to take a full breath. If the user is breathing rapidly, the reservoir bag will appear to not fully inflate. Expired air is vented out of the mask into the cabin via a one-way exhalation valve; expired air is not returned to the reservoir bag.

Know the equipment you have on board, know when to use it, and most importantly, know its limitations. It's your key to a safe and enjoyable flight.

Nasal cannulas are continuous-flow devices and offer the advantage of personal comfort. They are restricted by federal aviation regulations to 18,000 feet service altitude because of the risk of reducing blood oxygen saturation levels if one breathes through the mouth or talks too much.

An example of a nasal cannula system.

Oral-nasal re-breathers are the most common, the least expensive, and the simplest to use. Supplying adequate oxygen to keep the user physiologically safe up to 25,000 feet, rebreathers have an external plastic rebreather bag that inflates every time you exhale. The purpose of the rebreather bag is to store exhaled air so that it may be mixed with 100% oxygen from the system.

For a more detailed overview of aviation oxygen system installations in non-pressurized aircraft, see chapter six of AC 43.13-2B, *Acceptable Methods, Techniques, and Practices for Aircraft Alterations* (bit.ly/3iX39mJ).

Check It

With any system you use, and prior to every flight, you should perform the "PRICE" check to inspect oxygen equipment.

PRICE CHECK PLEASE!

- ☐ **PRESSURE**: Ensure that there is enough oxygen pressure and quantity to complete the flight.
- ☐ **REGULATOR**: Inspect the oxygen regulator for proper function. If you are using a continuous-flow system, ensure that the outlet assembly and plug-in coupling are compatible.
- ☐ **INDICATOR**: Don the mask and check the flow indicator to ensure a steady flow of oxygen.
- ☐ **CONNECTIONS**: Ensure that all connections are secured. This includes oxygen lines, plug-in coupling, and the mask.
- ☐ **EMERGENCY**: Keep oxygen equipment in your aircraft ready to use for emergencies that require oxygen (e.g., hypoxia, smoke and fumes, rapid decompressions/decompression sickness). Also, brief passengers on the location of oxygen and how to use it.

Know the equipment you have on board, know when to use it, and most importantly, know its limitations. You can learn more about the O_2 equipment you need for a safe and enjoyable flight by checking out FAA's brochure at bit.ly/Pilot_O2_Equip.

Jennifer Caron is FAA Safety Briefing's copy editor and quality assurance lead. She is a certified technical writer-editor in the FAA's Flight Standards Service.

BLINDED BY THE LIGHT

A Look at Cockpit Laser Illumination Events

By Tom Hoffmann

On what seems like a picture-perfect night flight in smooth-as-glass conditions, you marvel at the endless patchwork of tiny yellow, white, and red lights sparkling like jewels against the black velvet darkness. You treasure this moment of freedom, flying miles above all the traffic, noise, and chaos; your only companions the familiar drone of your 172's engine and the warm glow of your instrument panel. Reducing power on final approach at your home airport, you prepare to call an end to this memorable flight.

Then, it happens. A blinding green light envelops the cockpit and startles you — as if someone sounded an air horn inches from your ear. What had been a smooth controlled approach becomes an erratic, over-controlled struggle to maintain airspeed and glide path. As your eyesight returns to normal, it dawns on you — you've just experienced a laser strike.

Aircraft laser incidents have become an all-too-common occurrence in recent years. In 2022 and 2021, there were 9,457 and 9,723 reported laser events respectively across the United States, nearly tripling the annual numbers from a decade ago. Let's take a closer look at what's being done to address this problem, as well as review some actions you, as a pilot, can take to keep yourself — and your fellow aviators — safe following a laser incident.

Lasers 101

The word "laser" actually contains its own definition. It is an acronym for Light Amplification by Stimulated Emission of Radiation. Simply stated, a laser is an optical device that produces a highly concentrated beam of single-color light. A special optical amplification process known as stimulated emission transforms energy inside the laser into synchronized, narrow light waves within a low-divergence beam. In contrast, an average flashlight or light bulb emits multiple-wavelength light in several directions and becomes greatly diluted.

We often overlook the value laser technology can have in everyday life. It plays a vital role in your ability to do many routine tasks, such as secure your home from intruders,

improve your eyesight, check out groceries at the supermarket, or even remedy that regrettable dolphin tattoo decision you made several years ago. Despite their various practical and scientific uses, lasers can be dangerous and improper use can pose a serious threat to aviation safety.

If you encounter a laser illumination event during flight, remember to Aviate, Navigate and Communicate.

Launch of the Lasers

Lasers first gained attention in the aviation community in the 1990s, when several pilots reported incidents of illumination near public amusement events or attractions. This prompted FAA to provide greater support for outdoor laser operations in the National Airspace System (NAS) by establishing flight-safe exposure limits for lasers near airports. These standards successfully decreased the number of reported laser illumination events and ensured pilots would be protected from lasers that could cause ocular damage.

To validate the effectiveness of these new guidelines, the FAA began closer monitoring of laser illumination events and saw a decline for several more years. Then, something peculiar happened. In late 2004, an unusual spike in incidents occurred that was linked to a new source of laser danger — handheld laser pointers. The correlation was clear as it was about this same time when green laser pointers, generally used by presenters or by astronomers to point out celestial objects, became inexpensive and widely available. Also of concern was the color of these pointers, as green lasers produce a beam near the eye's peak sensitivity, which means that they are perceived as being many times brighter than a similarly powered red laser.

Although the power produced in most laser pointers is usually not enough to cause lasting physical eye damage, there are definite operational issues caused by distraction or the resulting visual effects of a laser, especially during a critical phase of flight.

Operational Concerns Put to the Test

To validate these operational concerns, the FAA performed studies at its test facility in Oklahoma City. The studies exposed several pilot test subjects to varying intensities of laser illumination while performing approach, landing, and takeoff maneuvers in a full-motion aircraft simulator. While illuminations at a lower intensity were regarded as more or less a nuisance, those at a higher intensity resulted in many visual and operational problems for the pilots.

These effects during laser events have also been documented in pilot reports, where aviators have described

losing sight of the runway, flaring too early, or executing a missed approach. These events can be much more challenging for a general aviation pilot who often flies slower, lower, and has no other pilot to take the controls. Even more at risk are helicopter crews, due to their close ground proximity and a helicopter's tendency to present a more stationary target by hovering.

Three visual effects that could impact pilot operations during a laser illumination include:

- *Flash blindness* — A temporary visual interference effect that persists after being "lased," similar to a bright camera flash.
- *Afterimage* — A distracting shadow image left in the visual field after exposure to a bright light that can last for several minutes.
- *Glare* — An object in a person's field of vision being obscured due to a bright light source near the same line of sight.

Laser Strikes on the Rise

As mentioned earlier, aviation laser strike numbers have steadily increased over the years, with a spike in the most recent two years. This uptick has the FAA's attention, as well as that of the Government Accountability Office (GAO), which issued a report on the matter in August 2022. Among the report's recommendations were to:

- Have better reporting
- Reinstate a multi-agency working group
- Determine the best information that helps lead to finding and prosecuting offenders

The FAA concurs with these recommendations and is taking steps to address the issues. The agency is looking at ways to work with other organizations to share and report a more comprehensive set of laser strike data and to develop

a tool to collect and share information with law enforcement later this year. The FAA is also planning to work with FBI and Food and Drug Administration (FDA) counterparts to increase educating the public on laser safety.

The FAA has several other efforts already underway to help identify and reduce laser strikes. One is the creation of a new visualization tool that analyzes laser strike data. Using the Tableau software platform (see fig. 1), the tool identifies trends that include geographic area, per capita data, time of day and year.

The FAA has also developed educational materials like pilot safety brochures and videos and more recently adopted a "Lose the Laser" safety campaign to help raise public awareness of the issue (faa.gov/go/lasers).

The advent of laser eye protection (LEP) technology is another area that is proving useful to pilot safety. The drawback is that many LEP eyewear designs can degrade a pilots' critical color recognition abilities in the cockpit. Further research by the agency with newer products is currently underway; these could hold the key to solving the color recognition issue and help mitigate the consequences of laser strikes. Stay tuned.

The Laser Arm of the Law

The agency has also stepped up outreach and training events for local law enforcement officers (LEOs). This has translated into more prosecutions. Two recent examples involving laser incidents include a Philadelphia man who was sentenced to one year in prison and three years of supervised release, while another person in Mississippi faces up to five years in prison and a $250k fine.

Ultimately the "intel" LEOs rely on for finding and prosecuting these wrongdoers comes from the information gathered from pilots after a laser strike. Quick and accurate reporting is often the best thing to help. Advisory Circular 70-2B, *Reporting of Laser Illumination of Aircraft*, provides guidance on the best ways to report a laser strike.

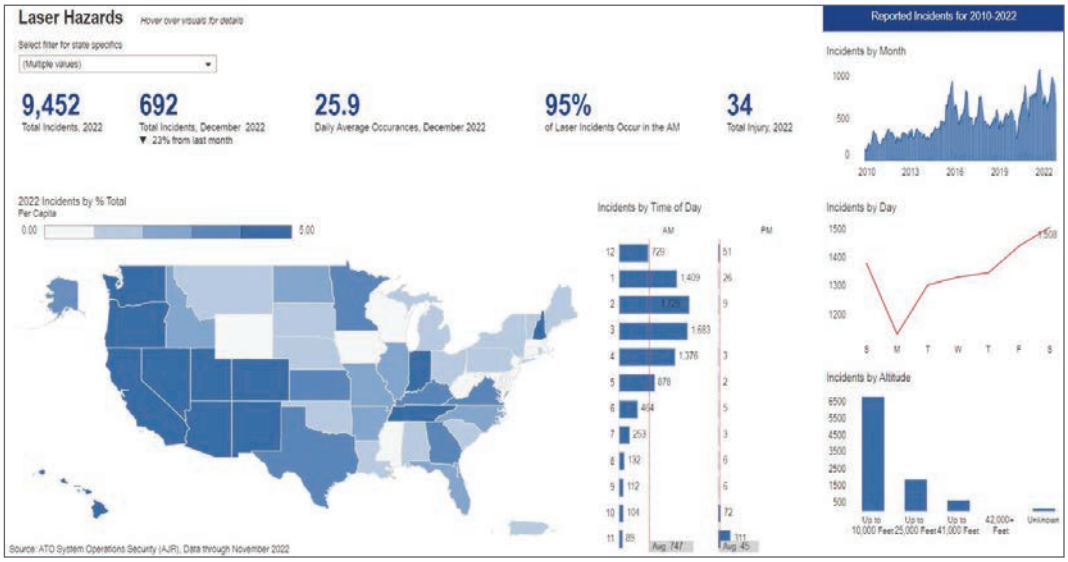
Pilots struck by a laser should report the event to the appropriate ATC controlling facility as soon as possible. Reports should include event position (e.g., latitude/longitude and/or fixed radial distance from a navaid or airport), altitude, color of laser beam(s), originating direction, and whether the strike interrupted or interfered with your flight duties.

If you're flying in uncontrolled airspace, the FAA requests that you broadcast a laser illumination caution message on an appropriate frequency, such as UNICOM or VHF/UHF guard frequencies 121.5/243. This warning should include the following:

- Phraseology "UNAUTHORIZED LASER ILLUMINATION EVENT"
- Event time in UTC, general positional information (e.g., location and altitude); and
- General description of event (e.g., color, intensity, and direction of beam).

Once you reach your destination, please report a laser event via the FAA Laser Beam Exposure Questionnaire at faa.gov/aircraft/safety/report/laserinfo. The site also contains a PDF version of the report that can be emailed to LaserReports@faa.gov or faxed to (202) 267-5289.

Please note that reporting a laser illumination to ATC is by far the best way for authorities to more quickly track



The FAA's new visualization tool (explore.dot.gov/t/FAA/views/LaserHazards/Main) shows laser strike data from 2010 to 2022 and highlights trends by geographic area, per capita data, time of day and year.

down and apprehend the offender. A side benefit is that it also triggers a general caution warning broadcast on all appropriate frequencies every five minutes for 20 minutes and is included in ATIS broadcasts for one hour after the report. Here is an example of a laser-related ATIS report: UNAUTHORIZED LASER ILLUMINATION EVENT, AT 0100Z, 8 MILE FINAL RUNWAY 18R AT 3,000 FEET, GREEN LASER FROM THE SOUTHWEST.

Pointers — What if I Get "Lased?"

If you encounter a laser illumination event during flight, here are a few pointers:

- ANC — Remember to Aviate, Navigate, and Communicate in that order.
- Alert a crewmember — If you're flying with another pilot, advise him or her of the laser and determine if the other pilot is safe to assume control of the aircraft.
- Interrupt the light — Use a clipboard, visor, or your hand to block the light if possible. Sometimes you can maneuver and use the aircraft to block the light.
- Turn up the cockpit lights — Light-adapted eyes are less prone to the effects of a laser.
- Advise ATC or broadcast on the appropriate frequency — Include your aircraft call sign and type; altitude and heading; the color, direction, and location of the laser; the length of exposure; and any injuries sustained. After landing, complete a laser incident report online.
- Resist the urge to rub your eyes — This can irritate the eyes more and cause tearing or a corneal abrasion.
- If you are concerned or if you feel you have suffered any eye damage, have your eyes examined.

Laser Safety

There are many exciting prospects for laser technology, including deep-space data communications and computers that can process at the speed of light. Despite the dangers of "rogue" unauthorized users, we shouldn't lose sight of the many useful applications of laser technology, particularly in the aviation industry. In fact, lasers are already being successfully used to warn aircraft that violate the DC Special Flight Rules Area (SFRA) and could be used as a bird-strike deterrent, as well as to prevent runway incursions.

The key to a safe flying environment is to keep both pilots and laser operators informed and educated.

The key to a safe flying environment is to keep both pilots and laser operators informed and educated. Operators need to understand the dangers caused by careless actions with a laser. And, for pilots, knowing how to recognize, react, and report a laser event is the best way to keep the skies safe now and in the future.

Tom Hoffmann is the managing editor of *FAA Aviation News*. He is a commercial pilot and holds an Airframe and Powerplant certificate.

LEARN MORE

Advisory Circular 70-2B, *Reporting of Laser Illumination of Aircraft*
bit.ly/AC70-2B

Office of Aerospace Medicine – *Laser Illumination of Flight Crew Personnel by Month, Day of Week, and Time of Day for a 5-year Period (2004-2008)* – April 2011
bit.ly/3iX0ucH

FAA's Laser Safety podcast
bit.ly/3XTqFQC

To learn more about safe practices for pilots and laser pointer users
laserpointersafety.com

BREAKING THE LAW...

18 U.S.C. section 39A states: Whoever knowingly aims the beam of a laser pointer at an aircraft in the special aircraft jurisdiction of the United States, or at the flight path of such an aircraft, shall be fined under this title or imprisoned not more than 5 years, or both.

HOW DO I REPORT A LASER INCIDENT?

IN THE AIR

Report on assigned (or appropriate) frequency

ON THE GROUND

Refer to AC 70-2B. Fax the form to (202) 267-5289 or email your information to LaserReports@faa.gov.

ITEMS TO REPORT

- √ Name and phone number
- √ Date and time
- √ Call sign, tail number, and type
- √ Location
- √ Aircraft altitude and heading
- √ Laser color
- √ Direction and distance of laser
- √ Cockpit illuminated?
- √ Injuries?
- √ Interference with crewmember duties? (14 CFR 91.11)

Going to the Birds to Prevent Hazardous Strikes

Promising research suggests UV lights mounted on helicopters and planes drive birds away from aircraft … and danger.

By Jim Tise

The FAA is researching new and potentially game-changing technology that significantly reduces the chances of birds striking general aviation aircraft.

The technology inverts the customary approach to bird hazards, namely how pilots can avoid or maneuver around birds. The new approach — if positive results from research continue to play out — gives birds the warnings they need to fly out of the paths of oncoming airplanes and helicopters.

Anti-bird spikes at an airport.

The danger of bird strikes has been an albatross around the aviation community since humans joined their feathered friends in flight. The number of reported strikes in the United States increased by 144% from 2000 to 2017.

From 1988 to 2018, wildlife strikes killed more than 280 people and destroyed more than 260 aircraft globally. The annual cost of wildlife strikes is estimated at $150 million to $500 million in the United States and around the world.

The most famous example of a dangerous bird strike was the 2009 "Miracle on the Hudson," in which a US Airways jet was forced to land on the Hudson River after both engines of the aircraft ingested birds and failed.

"In the future, bird strikes are definitely going to rise because you're going to have more aircraft in the sky," said Dan Dellmyer, an engineer in the FAA's Software and Systems Branch. He noted that the United States is seeing more rotorcraft and drones in the air, with the number of electric vertical takeoff and landing aircraft also expected to grow. Populations of large birds — such as eagles and Canada geese — are increasing, and quieter engines make it more difficult for birds to hear oncoming planes. Yet another factor is that airports are often located near attractive gathering sites for birds, such as trash dumps, swamps, and open bodies of water.

When the FAA began research on bird-strike avoidance in 2015, it considered two questions:

1. Can we put a radar system in the cockpit to help pilots avoid birds, and/or
2. Can we identify a system that deters birds from coming near us?

Testing revealed that avian-avoidance radar in the form of an antenna mounted on the aircraft is expensive, bulky, and difficult to install. There were also issues with the software, such as too many false alarms.

A second approach, said Dellmyer, addressed the question: "Can we alert the birds better?" After extensive research, the FAA believes the answer is "Yes."

Birds have tetrachromatic color sensitivity, which means they can see red, green, blue and ultraviolet colors. Dellmyer's research at the FAA's William J. Hughes Technical Center experimented with replacing the landing lights found on most general aviation aircraft landing gear with a pulsing ultraviolet LED light that birds can detect.

Rodney Shelley — owner of and pilot for his crop-dusting company Whirlwind Aviation in Fisher, Ark. — knows all about birds. A goose flew through the cockpit window of one of his planes, hitting his brother in the face. His brother was okay, and the plane landed safely, though it suffered severe damage. "We deal with ducks and geese on a minute-by-minute basis," he said. It's just every day, every day, every day."

The FAA tested the UV sensor on Shelley's Air Tractor 802, flying the plane for roughly 80 hours over the course of several weeks. The FAA had him run through various scenarios, such as takeoffs and landings with the UV light on and off, diving, and hard banking.

"With the lights on, I could circle the field … the ducks would take off and leave me alone," Shelley described. "They wouldn't stay in the field with me like they normally do. They would turn and go the opposite way immediately. It was pretty interesting."

He also noticed that when the UV LED lights were turned off, the birds returned quickly.

Dellmyer deemed the results "very favorable." He estimates the birds were spotting the plane with the UV LED lights won from as far as 166 yards away, compared to 108 yards away without the lights on, giving the fowl plenty of time to maneuver out of harm's way.

While artificial intelligence and cloud technology might offer better solutions for bird avoidance in the future, Dellmyer says the UV LED light "is the better technology now." Additional benefits include a simple and inexpensive installation process, and easy-to-do maintenance. Mounting the UV LED on a landing gear is a "perfect fit," he added.

What should airports do when wildlife won't leave? The FAA is looking at a possible aerial solution — Drones. See the article at medium.com/faa/faa-seeks-birds-eye-view-of-wildlife-incursions-d72edc084add.

Next up, his office needs to find more funding to continue the next phase of research, including flying at night and in different weather conditions, as well as testing with different bird species.

When asked what he would tell other pilots about lights, Shelley, was quite clear: "If the birds see that light, they will move away. I believe it actually does work."

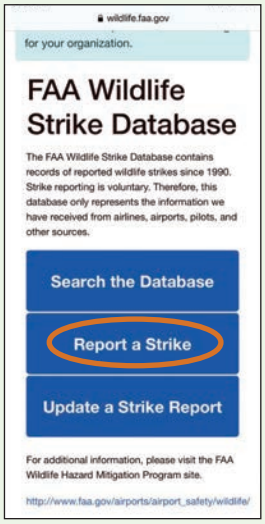
Jim Tise is an editor with the FAA's Office of Communications.

WHAT YOU CAN DO

The biggest challenge for airport wildlife managers today remains the need for good strike data as well as mitigating hazardous wildlife (and their attractants) off airport properties. Pilots, airlines, airports, and air traffic controllers can greatly improve mitigation efforts by reporting all strikes (regardless of how "insignificant") and provide as much information as possible. To improve that data, the FAA has worked to make reporting wildlife strikes much easier.

Simply navigate to wildlife. faa.gov and click "Report a Strike." You can even do it from your smartphone.

"Report a Strike" also includes instructions for safely collecting remains whenever possible. Though admittedly not for everyone, the remains are critical to helping airport wildlife managers create better mitigation strategies. These strategies differ according to species. For instance, the methods used to drive off a hawk are different from those that would be effective against a starling. As outlined on the website, the remains — generally feathers — should be sent to the Smithsonian, which provides identification services free of charge to U.S. registered aircraft owners and operators. If feathers are not available, even a swab of the biological material (a.k.a., snarge) can help experts determine the species through DNA.



When Pan-Pan Becomes Mayday

Search and Rescue in the 21st Century

By Paul Cianciolo

The general aviation accident rate is continuing to decline, but that does not mean search and rescue service workers are out of a job. We still saw 242 accidents in fiscal year 2022. There were 42 people rescued from 28 aircraft incidents that the Air Force Rescue Coordination Center managed in 2022. Many crashes are survivable if rescuers can get to you in time. Here's how to make their job easier.

Simplest Solution

File a flight plan when flying under visual flight rules (VFR). The FAA will initiate a search if you are more than 30 minutes overdue. Asking for VFR flight following always helps, especially if you fly long distances or over remote terrain.

Timing is everything. On Nov. 14, 2021, a 53-year-old pilot and his 13-year-old daughter disappeared over heavily wooded state game lands in Pennsylvania. The FAA issued an alert just after 7:30 p.m. about the overdue aircraft.

In coordination with the FAA, Civil Air Patrol's National Radar Analysis Team used radar data to determine that a crash was likely and appeared to be survivable. The Air Force Rescue Coordination Center then activated a search mission, knowing that the sun had just set, there was freezing rain, and the probable crash location would be hard to reach. More data would increase the chance of finding the potential crash.

What wasn't clear was whether any cell phones or other electronic devices were onboard. Since these can be very helpful to those searching for you, here's a tip. If your Spidey-senses are tingling and you think an emergency could be brewing, you might want to turn your cell phone on and/or turn airplane mode off to help provide critical location data. Many cell phones and smartwatches also have crash-detection modes and can provide easy ways to contact emergency personnel once activated. More data makes it easier for searchers to find you.

Signaling Satellites

Another way to increase your chances of being found is to install an emergency locator transmitter (ELT) that is also GPS-enabled using 406 megahertz (MHz). The accuracy of a standard 406 MHz beacon is 2-3 nautical miles, but if the beacon is equipped with a GPS receiver, activation coordinates could be within 100 yards.

A quick note: the FAA does not require the 406 MHz ELT, but if you are relying on the 121.5 MHz ELT, you might consider upgrading — especially if you intend to fly over less populated areas. Here's why. In 2009, satellites stopped monitoring 121.5 MHz ELT signals. An FAA study also indicated that 134 extra lives and millions of dollars in search and rescue resources could be saved every year if everyone upgraded to a 406 beacon. If you decide not to install the

newer 406 MHz version, or if your aircraft is not required to have an ELT under 14 CFR section 91.207, you might consider carrying a 406 MHz personal locator beacon (PLB) secured by a clip or in a pocket.

If you do install a 406 ELT, the key to success is registration. With a 98% false alarm rate, accurate registration information means that most inadvertent activations can be resolved with a phone call. Go to beaconregistration.noaa.gov to register and update your ELT information, including when you deactivate an old beacon. Make sure to recycle the batteries and dispose of them properly to avoid searchers having to dig through a landfill — been there, done that, not fun. Moreover, an inadvertent beacon activation could interfere with an actual distress situation.

Make sure to include the phone number of the cell phone you fly with in your ELT registration. Also, include your cell phone number in any flight plan to give searchers extra data to aid your survival.

Beyond Beacons

An ELT may not always work correctly after a crash. In the case of our missing airplane in the middle of Pennsylvania, nobody knew if there was a cell phone on board. It was not until a 911 call from the spouse came in at 10 p.m. — two hours into the search — that searchers obtained this valuable piece of data. The local sheriff's office made the connection to the 911 call and the search for the missing airplane. The pilot's phone number and bonus data about an onboard iPad became integral to the mission.

Civil Air Patrol's National Cell Phone Forensics Team was activated to fine-tune the search areas by combining cellphone tower and distance information, the last known radar hit, and GPS information from the iPad. The data from the tablet made all the difference, providing local search and rescue teams with a location accurate to within 11 yards.

Just after 2 a.m., search teams found the survivors. The dad was cuddling with his daughter for warmth because they were exposed to the elements and began suffering from hypothermia. Rescuers carried them nearly a half-mile in the freezing rain to waiting ambulances.

It's All in the Data

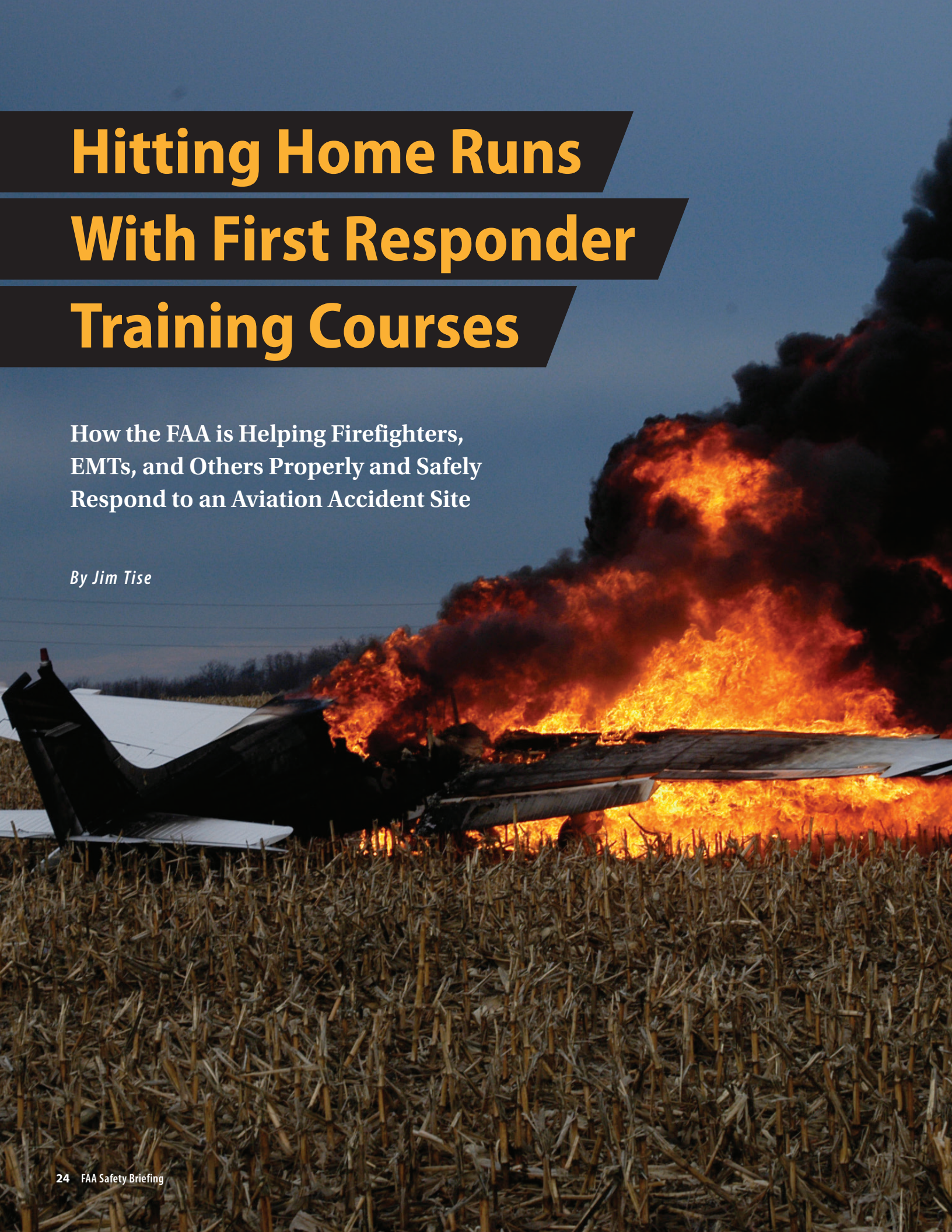
Using 21st-century technology and the tools to analyze location data makes search and rescue operations more efficient. If you are not already using Automatic Dependent Surveillance-Broadcast (ADS-B), consider installing it. File a VFR flight plan and ask for flight following. Make sure people on the ground have information about any personal electronic devices onboard. Upgrade your ELT. The speed of finding you when needed depends on how much data is available for the search.

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.

Hitting Home Runs With First Responder Training Courses

How the FAA is Helping Firefighters, EMTs, and Others Properly and Safely Respond to an Aviation Accident Site

By Jim Tise



The FAA is reaching out to communities small and large across the United States to train their EMTs, firefighters, and other first responders on what to know when responding to aircraft accidents on and off airports. Since 2014, approximately 5,000 first responders from a wide range of fields have attended the courses virtually and in-person, including firefighters, EMTs, police officers, airport managers, nurses, doctors and local pilots.

Jay Flowers, a National FAA Aviation Safety Team (FAASTeam) aviation safety inspector and founder of the "Aircraft Accidents for First Responders" outreach program, kickstarted the project from a professional and personal standpoint. Prior to joining the FAA as an aviation safety inspector, he was an air medical pilot and an EMT based out of Bismarck, N.D., and his father was a lieutenant for the Bismarck City Fire Department. After his father asked him for instructions he should provide to his staff about responding to aircraft crashes, Flowers recognized the need for better training.

"There was very little in the FAA's repository that had anything to do with EMS crews, firefighters, law enforcement and ambulance drivers," Flowers recalled.

He embraced the challenge and developed a comprehensive first responder program, which he started presenting while with the Fargo Flight Standards District Office (FSDO) in 2011. Since then he estimates he has trained more than 1,500 of North Dakota's 5,000 first responders, often volunteering his own time in this educational effort.

Other FAASTeam program managers started submitting materials to improve the course and the format. "They came up with some fantastic ideas and videos [faaert.com]," said Flowers. The four-hour course features a classroom portion and a hands-on portion. (Be sure to check with your local FAASTeam representative for possible offerings in your area, or see the online course here: faa.gov/aircraft/gen_av/first_responders).

> **The FAA is reaching out to communities small and large to train first responders on what to know when responding to aircraft accidents.**

One of the keys to attracting so many participants is creating a community environment around the event. FAASTeam program managers enlist local pilots, aviation organizations and companies, and veterans' and social clubs to participate in and/or host a meeting, including local experts who have responded to accidents who are brought in to speak.

"You have to get that buy-in from the public, and when you do, the doors open up," said Flowers. For instance, the North Dakota Agricultural Aviation Association built and sponsored a mock-up of a crop duster to use in a crash simulation and extrication. The Fargo FSDO FAASTeam uses this simulator to further educate EMS crews across the state.

Flowers' enthusiasm is a common trait among other FAASTeam members. "I've spent my life and career in aviation and emergency medicine," said Melanie Folcik Barillaro, a principal operations inspector at Bradley

Members of the Kindred and Horace (North Dakota) firefighting units practice removing a fellow firefighter from an aircraft accident simulator built by the North Dakota Aerial Applicators. The FAA's Fargo FSDO and FAASTeam helped organize the event.

International Airport (BDL) in Windsor Locks, Conn. "When my FAASTeam program manager asked for me to assist in this program and introduced me to Jay Flowers' program, I couldn't believe it! Jay and I shared the exact same vision in getting this vital information out to the public. From that moment, this program became a passion."

Folcik Barillaro and her colleague, Michael Edreich, have led several online training sessions that drew viewers from across the country and the world, including firefighters from Antarctica and South Africa.

Last year the Bradley FAASTeam held its first in-person responder training at Groton Airport (GON). "This is the first time that we ever did something of this scale," said Folcik Barillaro. More than 250 participants passed through eight training stations and viewed 20 aircraft. They also delivered training at New England's largest EMS Expo in Ledyard, Conn., in October 2022, and plan to do so again this fall.

These sessions covered a variety of scenarios that first responders might encounter, including leaking fluids, live engine shut downs, fire and smoke, and sharp-edged debris. Responders were instructed about how to enter and preserve an accident scene, personal protective equipment (PPE), medical injuries unique to pilots, and chemical hazards to watch for.

"We're reaching deeper into the community," said Folcik Barillaro. "It is so important educating the general public, especially first responders who aren't pilots and who have their hands in that mess. Being a pilot myself, I want to know there are more people out there who can rescue me."

Folcik Barillaro added that they are "beyond proud" that their training has become the first CAPCE (Commission on Accreditation for Prehospital Continuing Education) certified program to offer continuing education unit credits to participants.

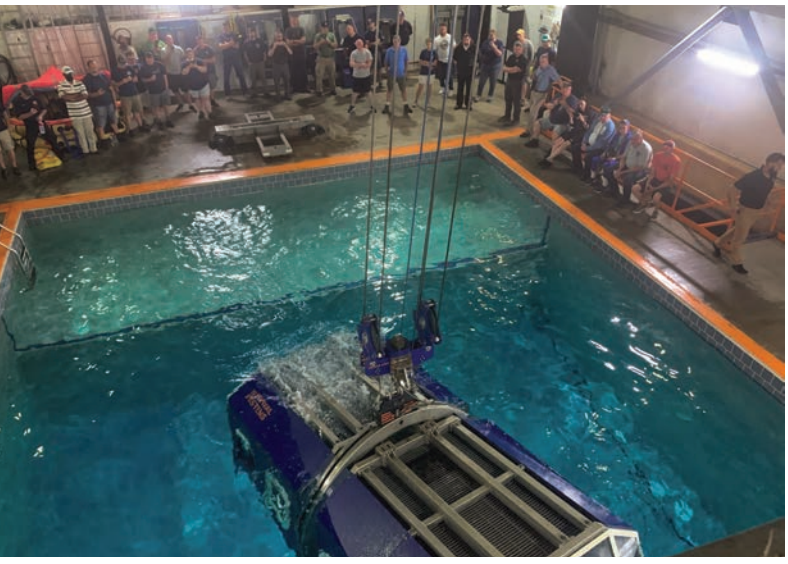


Photo courtesy of Shelly Carter

Survival Systems USA in Groton, Conn., gave an in-depth performance of water rescue.

Aircraft accident simulator built by the North Dakota Aerial Applicators.

"It gives us the opportunity to interact with local first responders," said Jamie Black, an aviation safety inspector and FAASTeam program manager who tailors his session to address issues common to his area, such as hazardous fertilizers and chemicals that can be found in crop dusters. "These are the folks our inspectors and investigators deal with when we're on the accident scene."

David Slack, the training captain of the Bryant Fire Department, said his team benefited from information on newer safety features, such as rocket-fired parachutes and airbag seatbelts. "It was good to know ahead of time. Now [my staff] know what to look for," he added.

Slack said he would recommend first responder training to any fire department, especially if they're near an airport. "I would recommend getting as many people as they could through it."

Brandon Guillot has volunteered with the FAASTeam in Little Rock for years. As director of Saline County Emergency Management/911 Communications, he has a vested interest in aviation safety matters, often participating in first responder training sessions.

"The biggest lesson I have learned is trying to make parallels with what these guys see every day and converting that to the aviation world," he said. "The less they need to stop and recalculate [at an accident scene], the better."

"We are so into offering more," said Folcik Barillaro. "We are planning on ramping up the training program to offer more advanced and updated modules, and with the support of the National FAASTeam, we hope to be able to offer it more broadly across the country."

Jim Tise is an editor with the FAA's Office of Communications.

LEARN MORE

FAA First Responder Training Course
faa.gov/aircraft/gen_av/first_responders

Advisory Circular 150/5200-12C, *First Responders' Responsibility for Protecting Evidence at the Scene of an Aircraft Accident/Incident*
bit.ly/3iNYaF5

ROLL of HONOR 2022

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. For more about the award, go to FAASafety.gov/content/MasterPilot. In 2022, we recognized the following Master Pilots:

Danny Billman	AK	Patrick Scott	AZ	John Tymczyszyn	CA	Walter Barry	FL	Paul Lucas	FL
Richard Burley	AK	Thomas Spaziani	AZ	Robert Tymczyszyn	CA	John Bone	FL	John Maher	FL
Charles Harvey	AK	Michael Stuart	AZ	William Tymczyszyn	CA	Frank Brunot	FL	David Marco	FL
Richard Henry III	AK	Richard Tomich	AZ	Derek Weston	CA	Paul Bryant	FL	James McCarty	FL
Kenneth Kokjer	AK	David Vegh	AZ	Paul White	CA	Carol Cameron	FL	William McNeely	FL
Orlow McInelly Jr.	AK	Paul Wiley	AZ	———		Mark Cannon	FL	Dennis Mills	FL
Richard Milton III	AK	David Williams	AZ	Aland Adams	CO	John Carey	FL	David Mitchell	FL
Philip Shoemaker	AK	Robert Wirth	AZ	Ronald Benell	CO	Mark Conner	FL	Wayne Moschella	FL
Thomas Smith	AK	David Wolf	AZ	Stephen Billester	CO	Mario Consuegra	FL	John Myers	FL
Joseph Stanger	AK	———		Richard Bullion	CO	Edward Cook	FL	Vernon O'Brien	FL
Daniel Vavra	AK	Barry Berggman	CA	Douglas Chanay	CO	David Curtis	FL	John O'Reilly	FL
Bernie Willis	AK	Gerald Blalock	CA	Mark Dickerson	CO	David Denman	FL	Ghassan Reslan	FL
Michael Yorke	AK	Joseph Davies	CA	James Dirker	CO	John Dennis	FL	Scott Roze	FL
———		David Dringman	CA	Gregory Gempler	CO	James Deutsch	FL	Albert Schnur	FL
Eugene Christian Jr.	AL	William Ermolovich	CA	Clifford Goldstein	CO	Dennis Downing	FL	Lawrence Stencel	FL
James Witte	AL	Carter Flygare	CA	Douglas Hill	CO	John Ducey	FL	Merl Stewart	FL
———		Gary Forister	CA	Robert Jerman	CO	Stephen Fletcher	FL	Troy Stimson	FL
Bruce Barth	AR	Fred Gibbons	CA	Robert Kinney	CO	Jonathan Fudge	FL	Robert Talmadge	FL
Raymond D'Angelo	AR	Kathryn Groves	CA	William Marvel	CO	Michael Fuller	FL	Jerry Trachtman	FL
Charles Evans	AR	Charles Henry	CA	John McLaughlin	CO	Douglas Gallman	FL	Jeffrey Tucker	FL
Rickey Markham	AR	C. Hern	CA	Ralph Ridge	CO	Kenneth Glassman	FL	Bruce Turner	FL
Presley Melton	AR	David Herrmann	CA	Steven Scully	CO	Charles Grba	FL	Charles Waterman	FL
Kirk Price	AR	Martha King	CA	Steven Smith	CO	Alan Haaland	FL	Christopher Weaver	FL
Camelia Smith	AR	Jamie Knopf	CA	Stanley Specht	CO	Bruce Harding	FL	Karl Yeakel	FL
William Smith	AR	Hubert Laugharn III	CA	John Taylor II	CO	Patrick Healey	FL	Ronald Ziller	FL
———		Judith Lee	CA	John Thomson	CO	George Hine	FL	———	
Robert Boyd	AZ	Ernest Maurer	CA	Randy Trujillo	CO	Stanley Jhagroo	FL	Benjamin Allen	GA
Gregory Brown	AZ	Gail McCullough	CA	Stephanie Wells	CO	Stephen Johnson	FL	Ron Arnold	GA
Phillip Corbell	AZ	John Mulder	CA	Linton Wollen	CO	Freddie Kaiser	FL	Steven Bischof	GA
John Davee	AZ	George Powell	CA	Roger Ameden	CT	Steven Kaplan	FL	Thomas Brown	GA
Harry Green	AZ	John Rosso	CA	Wayne Dodds	CT	Ralph Kimberlin	FL	Jeffrey Coffey	GA
Michael Holm	AZ	Elwood Schapansky	CA	———		Boyd King	FL	James Crawford	GA
Michael Kelly	AZ	Donald Schiltz	CA	Anthony NeCastro	DE	William Kirkpatrick	FL	Alan Curtis	GA
Jeffrey Kottenbrook	AZ	Henry Sickels	CA	———		Leonard Knight	FL	James Dodge	GA
Henry Meyer	AZ	James Smith	CA	Charles Aaron	FL	Carl Kretzer	FL	Brian Hogan	GA
Richard Orr Jr.	AZ	Joseph Sobczak	CA	Joseph Anding	FL	Eugene LeFloch	FL	Anthony Holder	GA
Rodger Parker	AZ	Mark Swaney	CA	Ballard Barker	FL	James Lewis	FL	Clifford Holt	GA
Richard Schmidt	AZ	James Tymczyszyn	CA	Arlander Barker	FL	William Lieberman	FL	Fred Houston	GA

ROLL of HONOR

Steven Hurst	GA
Robert Lavery	GA
Timothy McCollum	GA
Steven McEachern	GA
Jon McMillan	GA
David Moffett	GA
Jerry Morris	GA
Stacey Murdock	GA
Robert O'Brien	GA
Clarence Romero	GA
Charles Schobel III	GA
Baron Schuler	GA
Hal Sims	GA
Rodney Smith	GA
Henry Taylor Jr.	GA
John Tefft	GA
Dana Vinson	GA
Douglas Brotherton	IA
Dennis Gordon	IA
Roswell Johnston	IA
Gary McCartan	IA
Kevin McFarlane	IA
James Rohlf	IA
Heyo Tjarks	IA
GIlbert Zemansky	IA
James Kerr	ID
Stephen Lohrey	ID
Michael Scott	ID
Todd Sudick	ID
Peter Baier	IL
Craig Bailey	IL
Justin Barchfeld	IL
Harold Bruninga	IL
Jack Fearneyhough	IL
Martin Galis	IL
Edward Kole	IL
Stanley Newby	IL
Bernard Nitz Jr.	IL
Ronald Rogers	IL
Marlin Wade	II
Jerry Wall	IL
Leland Widick	IL

Larry Bothe	IN
Kelly Carnighan	IN
William Dean	IN
Mark Eberly	IN
Nano Farabaugh	IN
Alan Harder	IN
Gerald Harkin	IN
Robert Haynes	IN
Donald Hooley	IN
Joseph Litz	IN
Thomas Myers	IN
Gregory Pardieck	IN
Alan Reber	IN
Cliff Robinson	IN
Mark Smith	IN
Martin Weaver	IN
David Wichman	IN
Timothy Chanay	KS
Charles Chandler	KS
William Cotter	KS
Donald Farmer	KS
Robert Fizer	KS
Keith Houghton	KS
Brian MacInnis	KS
Stephen Qualizza	KS
Gary Schuster Jr.	KS
Norman Thompson	KS
John Tokunboh	KS
Dennis Vogan	KS
Myles Buhlig	KY
John Foree	KY
Dean Hammond Jr.	KY
James Hobart	KY
Richard Lawhorn	KY
Richard McClain	KY
George McInnis	KY
David Sindelar	KY
Gary Wickliff	KY
William Wright Jr.	KY
Benjamin Harris	LA
Stanley Haynes	LA
Terry Johns	LA
Dzung Nguyen	LA

Dan Whelchel	LA
Peter Tokarz	MA
Robert Gawler	MD
Howard McComas III	MD
Joseph Nuccetelli	MD
Stephen Van Kirk	MD
Ronald Apel	ME
Jim Bennett Jr.	ME
Stanton Lander Jr.	ME
Henry Arts	MI
Carl Boylan	MI
John Crabtree	MI
Robert Gallina	MI
Manuel Garcia Jr.	MI
Jonathan Gould	MI
Robert Heine	MI
Matthew Janson	MI
Christopher Lentini	MI
James Linder	MI
Terry Lutz	MI
David Milne	MI
John Mullins	MI
James O'Dea	MI
Duane Packer	MI
Lesley Pritchard	MI
Douglas Ranz	MI
Steven Roemer	MI
Michael Schiffer	MI
William Schutzler	MI
Jerry Sparks	MI
David Strahle	MI
Joseph Taylor	MI
Daniel Thorsby	MI
Donald Wedekemper	MI
David Wood	MI
Richard Altendorf	MN
Charles Bartlett	MN
Bruce Bordelon	MN
Charles Coddington	MN
James Gaasedelen	MN
Chris Glaeser	MN

Bradley Maas	MN
Terrence Matson	MN
Reo Pratt	MN
Thomas Sullivan	MN
Ernest Worthley	MN
Carl Barnes	MO
Gary Cummins	MO
Ralph Etickson	MO
William Hazelbaker	MO
Jimmy Johnson	MO
Anthony McLarty	MO
Charles Moore	MO
Gary Perkins	MO
Jack Reynolds	MO
Larry Wehrman	MO
Dennis Bohn	MS
Patrick Donahue	MS
Mario Feola	MS
Larry Wells	MS
Ray Beck	MT
Rodney Bitney	MT
Robert Buckles	MT
William Galt	MT
Gregory Mecklenburg	MT
Donald Barnes	NC
Dennis Boyd	NC
William Chalfant III	NC
Gary Church	NC
Richard Cook	NC
Susan Dusenbury	NC
James Gilley Jr.	NC
Thomas Grady	NC
Steven Kaltenback	NC
William Lucas	NC
Jeffrey Michael	NC
Charles Nicholson	NC
Leslie Ellingson	ND
Mark Sundby	ND
Larry Bartlett	NE
Duane Clausen	NE

James Kjeldgaard	NE
David Klauschie	NE
Richard Miller	NE
Thomas Trumble	NE
William Batesole	NH
Kevin Burbank	NH
Dennis Hattie	NH
Katha House	NH
Joseph Murphy	NH
Denis Plouffe	NH
Robert Ammend	NJ
John Anastas	NJ
Thomas Callahan III	NJ
William Hill	NJ
Theodore Perl	NJ
Richard Rogers Jr.	NJ
Louis Serafini	NJ
Stephan Siegel	NJ
Ken Clute	NV
Randy Coursolle	NV
Gary Dyer	NV
Charles Johnson	NV
Frederick LaSor	NV
Hubert Mattern	NV
Curt Rhodes	NV
Charles Ross	NV
Jerry Speasl	NV
Frederick Williams III	NV
Barry Barkauskas	NY
Edward Daley	NY
James Greene	NY
Christopher Hansen	NY
Thomas Henion	NY
Michael Henson	NY
Michael Lazar	NY
James Meger	NY
David Newman	NY
Stanley Snopkowski Jr.	NY
Randy Wagner	NY
Nelson Abbey III	OH
Miles Billmaier	OH

2022

Andrew Bourland	OH
Randall Brooks	OH
Gregory Causman	OH
Robert England	OH
Bradley Goris	OH
Jeffrey Gorman	OH
Charles Macuga III	OH
Richard Newlon	OH
Dale Parker	OH
Terry Saylor	OH
Gary Scheideger	OH
Karl Summers	OH
Michael Sutton	OH
Donald Vaness	OH
Herbert Wagers	OH
Michael Winblad	OH

Steven Robinson	OK

David Baxter	OR
Gary Evans	OR
Richard Giles	OR
Clifton Hanson	OR
David Heusser	OR
James Hubele	OR
Gary Ludeke	OR
Keith Moes	OR
Richard Osterhuber	OR
Richard Paulsen	OR
Donald Powell	OR
Robert Schwarzler	OR
John Sedey	OR
Lloyd Swenson	OR
Jacob Thiessen	OR
John Warren	OR
Charles West Jr.	OR
Harry Wildgen	OR

George Dorn	PA
Roscoe Draper	PA
George Green	PA
George Hansen	PA
Robert Harrington	PA
Charles Mantz	PA
James McClelland III	PA
Victor Perry	PA
Christopher Polhemus	PA
Martin Quinlan, Jr.	PA
Craig Reichold	PA
Michael Roberts	PA
John Sibole Jr.	PA
John Taylor	PA
Stephen Wojdylak Jr.	PA
Arthur Wolk	PA
James Zelesko	PA

James Burns	RI
Henri Gautschi	RI
Thomas Magnan	RI

Donald Conaway	SC
Stephen Crimm	SC
Dale Ellis	SC
Walter Fanti	SC
Clifton Friend	SC
Cleveland Gore	SC
Henry Grenfell	SC
Robert Harrington	SC
John Heverling	SC
Thomas Horne	SC
James Jewell	SC
Ray Johnson	SC
Robert Jonte Jr.	SC
Kelly McMullin	SC
Robert Moser	SC
James Phillips	SC
John Pipkin	SC
Daniel Stukas	SC
Brian Turrisi	SC

James Christopherson	SD
Gene Ebneter	SD
Gerald Kasuske	SD
Harold Schramm	SD
Harrison Thompson	SD

Kenneth Anderson	TN
Anthony Bertasi Jr.	TN
Russell Bliss	TN
William Cabe	TN
Edward Carney	TN
David Cassalia	TN
Sam Crimm II	TN
Donald Dillman	TN
Gregory Franklin	TN
Michael Haraseviat	TN
Jerry Hope	TN
Joseph Hyde	TN
Theodore Key	TN
James Lara	TN
David Loy	TN
Mark Olinger	TN
William Pagett	TN
Bruce Quinby	TN
Walter Soplata	TN
Walter Stone	TN
Kent Thompson	TN
William Tippin	TN
Larry Varnum	TN
J. Wilcox	TN

Gregory Aaron	TX
Robert Agostino	TX
Warren Amos	TX
Edward Askins	TX
James Ayers	TX
David Ayre	TX
John Bailey II	TX
Danny Belcher	TX
Johnny Berry	TX
Littleton Billingsley Jr.	TX
George Bourne II	TX
George Bryant	TX
Michael Bryant	TX
Michael Collins	TX
John Couch	TX
Jimmy Crawford	TX
Michael Cumiskey	TX
James Dawson	TX
David Devine	TX
Timothy Donovan	TX
Steven Drange	TX
John Dyer	TX
Gary Evans	TX
William Garrison	TX
Thomas Gould	TX
Ronald Gray	TX
Thomas Grove	TX
William Hall Jr.	TX
Robert Hasson	TX
Raymond Henderson	TX
George Hendricks Jr.	TX
Donn Hile	TX
Richard Hill	TX
Stephen Holmes	TX
William Hunter Jr.	TX
Bobby Jackson	TX
Larry Jordan	TX
Thomas Katri	TX
Patricia Keefer	TX
Gerald Kinman	TX
Hughlen Kyle	TX
David Larson	TX
Brian Lloyd	TX
Sven Mauritzson	TX
Charles McFarland	TX
Darrell Morgan	TX
Dennis Narciso	TX
Matthew Naylor	TX
Kenneth O'Neal	TX
Nancy Pierce	TX
Bruce Rainwater	TX
Richard Ranspot	TX
Ona Reed	TX
Larry Restine	TX
Thomas Richards	TX
William Sellmeyer	TX
Keith Shankland	TX
Charles Smith	TX
Charles Spence	TX
Gregory Stone	TX
Joe Waltz	TX
Claytus Watters	TX
John White	TX
Gerald Wingett	TX

Norman Anderson	UT
George Davis III	UT
Robert Lewis	UT

Walter Boulden	VA
Jon Carlson	VA
Kim Miller	VA
Walter Penn III	VA
John Phillips	VA
Ronald Wagner	VA
Herbert Walton Jr.	VA
Robert Woodberry	VA
Werter Wright III	VA

James Parker Jr.	VT
David Savoie	VT

John Bright	WA
Michael Elrod	WA
Bobby Fortenberry	WA
Charles Hogan	WA
Edward Horne	WA
Donald Keating	WA
James Lilje	WA
Jack Lodato	WA
Richard Luke	WA
Thomas Morris	WA
Robert Payton	WA
Teresa Sloan	WA
Frederick Spencer III	WA
Noah Trent	WA
Joseph Tymczyszyn	WA

William Amorde	WI
Gerard Baeten	WI
Gilbert Buettner	WI
Henry Didier	WI
Roy Forsstrom	WI
Harold Gaier	WI
William Hasenfus	WI
Edward Hughes	WI
William Krcma	WI
Paul Lupton	WI
Arnie Mengel	WI
Raphael Roethle	WI

Albert Depto	WV
Michael Gwinn	WV

Robert Palmer	WY

ROLL of HONOR 2022

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. For more about the award, go to FAASafety.gov/content/MasterMechanic. In 2022, we recognized the following Master Mechanics:

Danny Billman	AK
William Tinney Jr.	AK
Daniel Vavra	AK
Michael Yorke	AK
Bruno Nacinovich	AL
Dennis Epstein	AZ
Victor Gutierrez	AZ
William Mitchell	AZ
James Polhamus	AZ
Marvin Ruthenberg	AZ
Randolph Cole	CA
Richard Dilbeck	CA
Bruce Dobson-Edwards	CA
LaVerne Dyson	CA
Robert Miehle	CA
David Minnis	CA
Albert Sanchez	CA
Galen Schlagel	CA
Henry Sickels	CA
Joseph Sobczak	CA
Gus Villarreal	CA
Stephen Warchola	CA
Douglas Chanay	CO
Larry Gentz	CO
Thomas Hendricks	CO
John McLaughlin	CO
Phillip Potter	CO
James Schneider	CO
Walter Arias	FL
Arlander Barker	FL
Stephen Booe	FL
Morris Brown	FL
John Dennis	FL
Christopher Gallapis	FL
Douglas Gallman	FL
Michael Hall	FL
Lawrence Hilla	FL
William Kling	FL
Michael Kubes	FL
Charles Melot	FL
Joseph Radosky	FL
Ted Scoggins Jr.	FL
Joseph Smith	FL
Keith Colgrove	GA
Jack Cummins	GA
David Jones	GA
Donald Tuel	GA
John Costanzo	HI
Miguel Ramierz Jr.	HI
John Sjaardema	IA
Donald Kilborn	ID
Keith Rittenberry	ID
Kerry Leifeld	IL
Matthew Poleski	IL
Francis Waddell	IL
Richard Christy	IN
Richard Ellis	IN
Michael Grabbe	IN
Thomas Hosburgh	IN
Timothy Chaney	KS
Donald Farmer	KS
Dean Miranowski	KS
Robert Nash	KS
Jerry Unruh	KS
Charles Holsclaw Sr.	KY
David Sindelar	KY
Dean Amidon	LA
Terry Johns	LA
Larry Whipple	MA
Richard Peri	MD
John Peters	MD
Timothy Spindler	MD
George Perrin	MI
Richard Altendorf	MN
Patrick Fenwick	MO
Larry Wherman	MO
James Popp	MS
Jerry Schiffer	MT
Dennis Blackburn	NC
Susan Dusenbury	NC
Thomas Hurlocker	NC
Leslie Ellingson	ND
James Kjeldgaard	NE
Hugh Roche Jr.	NV
Frederick Snyder	NV
Wayne White	NV
Peter Burkhard	NY
John Facilla	NY
Jose Falcon	NY
Kenneth Goll	NY
Stephen Grieco	NY
Patrick Healy	NY
Thomas Mirande	NY
Higinio Vivero	NY
Elswood Dornbusch	OH
Gary Scheideger	OH
Donald Veness	OH
Frank Lofton	OK
Andrew Reo	OK
Drew Spears	OK
James Hubele	OR
John Pike	OR
Roger Boeckmann	PA
Timothy Detwiler	PA
Kenneth Gardner Jr.	PA
Thomas McMullen	PA
Richard Muys	PA
Lloyd Stull	PA
Stephen Wojdylak Jr.	PA
Danny Fisher	SC
Edward Lemmond	SC
Edwin Shields	SC
John Bucher	SD
Gerald Kasuske	SD
Robert Clay	TN
Raymond Reid	TN
Jimmie Ruckman	TN
Douglas Bowen	TX
Rafael Fuentes	TX
Roy Glass	TX
Richard Jankowski	TX
Ronald LeVrier	TX
Carl Mason Jr.	TX
Bruce McClure	TX
Dennis Pettas	TX
Eugenio Rivera	TX
Ted Snyder	TX
Claytus Watters	TX
Johnny Richter	UT
Joseph Wardle	UT
Kim Miller	VA
Scott Thomas	VA
Kenneth Wiley	VA
William Loomis	WA
Thomas Reeves	WA
David Hedgecock	WI
Eugene Hembrook	WI
Marvin Robinson	WY

RISING ABOVE AVERAGE

(Editor's Note: This department by our former editor initially appeared in the Sep/Oct 2019 Emergency! issue. We've repurposed it here as these checklists may have similar applicability to this issue's theme, dealing with abnormal or urgent situations.)

Emergency Approach/Landing: Alphabet Checklist

- **Airspeed.** Memorize best glide speed and try not to lose any altitude until reaching that speed. Once there, trim for hands-off glide.
- **Best field.** Note wind direction and strength, then current position. Where are you relative to a suitable field (e.g., high, low, downwind, base, final)?
- **Checklist.** Start with a flow pattern across the panel. If altitude and circumstances permit, review the written restart checklist. Under all circumstances, fly the airplane first.
- **Declare an emergency.** Note current position and then tune the radio to 121.5 MHz, which should already be in the standby position. When making the mayday call, state who (tail number), what, where, and how many aboard. Set the transponder to 7700. (Note – If your situation is urgent but under control, you can start your transmission with pan-pan instead.)
- **Exit preparation.** Prepare passengers: secure seatbelts, brief passengers on exit procedures, move first aid/survival equipment to a convenient place, and prepare the aircraft, e.g., cracking doors if the Pilot's Operating Handbook/ Aircraft Flight Manual so directs.
- **Fire prevention.** Shut the fuel off, along with the three Ms: mixture, mags, and master. Ensure the fire extinguisher is close at hand.
- **Ground plan.** Touch down at the slowest possible airspeed and then evacuate the aircraft. Account for everyone and use the first aid/survival equipment as needed.

Preventing Emergencies: Use Personal Minimums

Use personal minimums to prevent emergencies resulting from conditions beyond the capability of the pilot and/or aircraft. Personal minimums should provide a safety buffer between pilot skills and aircraft capability required for a specific flight, and pilot skills and aircraft capability available through training, experience, currency, proficiency, and airplane performance characteristics. To create personal minimums:

- **Step 1** — *Review Weather Minimums* (VFR, MVFR, IFR, LIFR).
- **Step 2** — *Assess Your Experience and Comfort Level.* What are the lowest weather conditions that you have comfortably experienced in the last six to twelve months?
- **Step 3** — *Consider Other Conditions.* Similarly, what are the most challenging environments or conditions you have comfortably (and recently) experienced in terms of wind, turbulence, high density altitude, challenging terrain, busy airports, or short runways?
- **Step 4** — *Assemble and Evaluate.* Use these numbers to develop your baseline personal minimums.
- **Step 5** — *Adjust for Specific Conditions.* Any flight involves almost infinite combinations of pilot skill, experience, condition, and proficiency; aircraft equipment and performance; environmental conditions; and external influences. Make adjustments based on changes in the PAVE checklist factors — Pilot, Aircraft, enVironment, and External Pressures.
- **Step 6** — *Stick to the Plan!* Just as with fuel, you shouldn't attempt a flight that requires the "reserve" or worse, "unusable fuel" level of your piloting skill and aircraft capability.

Preparing the Passengers: S-A-F-E-T-Y Briefing

Always review critical items with passengers in an emergency. Here's a good checklist to use:

- **Seatbelts.** Secure seatbelts and safety harnesses.
- **Air.** As appropriate, ask passengers to help with opening or closing air vents. This item is also helpful if the situation involves airsickness.
- **Fire Extinguisher.** Brief passengers on location and use.
- **Exit, Emergencies, and Equipment.** Make sure passengers know how to open the door(s). (Note: You can also prevent an emergency by ensuring that doors are properly closed!) Brief emergency equipment and evacuation plans.
- **Traffic and Talking.** Let passengers know when you need them to minimize conversation.
- **Your Questions?** Especially in an emergency situation, be sure to resolve any questions as time and conditions permit.

REBEKAH WATERS

OUTSMARTING MURPHY'S LAW

It's a beautiful day — not a cloud in the sky! You're ready to fly. What could go wrong? According to Murphy's Law, quite literally anything. If it can go wrong, it will go wrong. I have come up with a solution, which I've affectionately named Rebekah's Law: if you are prepared for everything that could go wrong, when it does, you'll be ready.

When I pack for a trip, I think about every aspect of that trip and try to envision every single thing that could go wrong. If I'm going to the beach, I pack drops for swimmer's ear, sunscreen and aloe for sunburn, and baking soda for jelly fish stings. When I go camping, I pack calamine lotion for poison ivy, bug spray, tweezers for ticks, and rain gear even if the forecast calls for sun. In the end, this slightly suppositious approach might not guarantee that I have a great trip, (and may only result in heavier luggage) but it's a really good tactic when it comes to flying drones.

There are many things that could go wrong while flying a drone, such as lost link, battery issues, and system failures. That's why it's important to think about and be able to mitigate every potential risk to your operation before you lift off. Before you launch, have you tried to think of everything that could go wrong? Do you have a plan in place to handle anything that Murphy's Law might throw your way? If not, I recommend some metaphorical over-packing.

Here are some things to think about before you take off:

1. **Airspace/Operating Environment**: How can the risk to people on the ground or other aircraft in the air be reduced? Can you avoid densely populated areas and dense airspace? Can you avoid adverse weather? Can you avoid areas where GPS and radio signals are degraded?
2. **Aircraft Risk**: Have you conducted a safety analysis of your drone? What damage would it do if it crashed? Does it employ a parachute or other mitigation that reduces its impact? Did you follow all manufacturers' maintenance instructions? Is your firmware updated? Did you preflight your aircraft? Do you have a pre-programmed response to lost-link, lost GPS, geo-fence boundary break? Did you ensure the drone's battery was charged? Did you ensure the command-and-control link was adequate?
3. **Operator**: What type of operation are you planning? What is your flight path? Can you route your aircraft to limit air and ground risks if something malfunctions? Are you familiar with the regulations or laws (e.g. part 107, part 91, 49 U.S.C. section 44809 you are operating under? Are you familiar with your aircraft systems and software? Did you check the airspace using the B4UFLY App?

Risk considerations are linked to the complexity of your operation. A simple daytime operation in class G airspace, below 400 feet and conducted within visual line of sight, may only require a short safety checklist. More complex operations require more rigorous risk identification and mitigations. For more complex operations, you may consider using a Safety Management System (SMS) that helps identify and mitigate risks based upon the complexity of your operation. Part of your SMS might be a Safety Risk Management (SRM) process that helps you to take an in-depth look at your operation, to identify potential hazards, and make a plan to assess the severity and likelihoods of the hazards to ensure the risk levels are reduced to acceptable levels.

So whatever operation you are planning, just remember Rebekah's Law: prepare for everything that could go wrong and you won't be surprised when it does. Have a safe flight!

Rebekah Waters is a senior communications specialist in the FAA's UAS Integration Office.

LEARN MORE

Advisory Circular 60-22, *Aeronautical Decision Making*
bit.ly/3Hlj47l

FATIGUE COUNTERMEASURES

Have you ever fallen asleep at the wheel or driven home and don't remember the drive? Are you on edge or short-tempered? Have you ever forgotten to replace an oil cap or misrigged the flight controls?

If you answered yes to any of these questions, you might be suffering from fatigue. The issue of fatigue is critical in 24/7 operations and has recently been associated with a number of aviation incidents and accidents.

You might be surprised how a few fatigue countermeasures can improve your mood, health, and safety. A little extra sleep can improve your interaction with family, friends, coworkers, and even the people you drive by on your way to work.

The FAA Safety Team (FAASTeam) is committed to helping you achieve the highest level of safety by providing the resources you need. Visit FAASafety.gov to learn about the hazards of fatigue, the role of sleep, and methods you can use to effectively reduce or eliminate fatigue at home and work.

Train From Home or Hangar

Register on FAASafety.gov.

- You'll also find thousands of free, online safety and risk reduction seminars and webinars that you can attend virtually. There are also online courses available. Most are free or low cost.
- Need to renew your inspection authorization? There's a list of Inspection Authorization (IA) renewal courses and programs as well.
- Take a look at the training on risk management and human error in the maintenance hangar tab, and you'll also discover resources on everything from maintenance alerts and safety tips to standards, regulations, and scholarships for up-and-coming mechanics.

Complete the 2023 online Core Course — Fatigue Countermeasures for AMTs (ALC-911) — click on the Maintenance Hangar tab and you'll find it under *My AMT*.

- You can complete the course in multiple sessions, and then take the exam.
- Second time's a charm — if you didn't pass the first time, you can re-take the exam right after your first try.
- Need a refresher? You can take the course again 90 days later and receive additional AMT or WINGS program credit.

Get An Award for Recurrent Training

Staying proficient is not easy, but it is important for each aviation maintenance technician (AMT) to take a personal interest in continued and recurrent training.

Register at FAASafety.gov to participate in the AMT Awards Program and get your award for receiving, promoting, and fostering initial and recurrent maintenance training.

- Eligible training also includes aviation maintenance career-related training in such categories as technology, human factors, and certain courses from an accredited trade school or university.
- You can enter your eligible training in the *My AMT* tab under *Enter Eligible Training*.

- *Pro Tip*: Keep a personal log to document all completed training and recent experience requirements. Keep all your training certificates.
- Manufacturers, repair stations, and FAASTeam members develop courses for AMT credit with a focus on accident/incident causal factors, special emphasis items, and regulatory issues.
- Technicians who successfully meet the program requirements within a given calendar year will obtain a certificate of training, and a Bronze, Silver, or Gold AMT Award!
- Your employer can also get a Gold or Diamond Award of Excellence based on the number of technicians in the company that receive an award each year.

If you have any questions or need help, contact Guy Minor at Guy.D.Minor@faa.gov.

The learning process never ends. Get recognized, awarded, and become a safer technician by going to FAASafety.gov today.

Jennifer Caron is FAA Safety Briefing's copy editor and quality assurance lead. She is a certified technical writer-editor in the FAA's Flight Standards Service.

LEARN MORE

FAA Information and Services for Mechanics
faa.gov/mechanics

NEW VISIBILITY ESTIMATION TOOL COMING SOON

Pilots familiar with the FAA's Weather Camera Program are about to get an important new planning tool upgrade that aims to greatly enhance flight safety. The new Visibility Estimation through Image Analytics (VEIA) algorithm has been approved by the FAA and will soon be available for use within Alaska as well as in other areas covered by the FAA's Weather Camera Program. (For more details on the Weather Camera Program, see the article here bit.ly/3QZgU0H).

VEIA uses existing FAA weather camera infrastructure to provide visibility estimates based on an automated comparison of current conditions to clear day images. This provides pilots with an easy-to-use online planning tool incorporating real-time visual information to mitigate the effects of weather.

During the program's testing phase, information was published on an experimental version of the FAA Weather Camera Program website. Pilots then used VEIA, along with other approved tools, to plan their flights. Flight dispatchers and meteorologists also used VEIA to support them.

The FAA Office of NextGen's Aviation Weather Division managed development of the VEIA algorithm concept beginning in 2016. Led by FAA engineer Jenny Colavito, the VEIA project is part of the FAA's Aviation Weather Research Program (AWRP). VEIA was developed by Massachusetts Institute of Technology's Lincoln Laboratory and was installed and tested on the Weather Camera website through collaboration with the FAA Weather Camera Program, National Oceanic and Atmospheric Administration's Global Systems Laboratory, FAA's Aviation Weather Demonstration and Evaluation (AWDE) services team, and AvMet Applications, Inc.

"The display the Weather Camera program created for VEIA makes the data very easy to read and interpret," said Colavito. "The camera images are always displayed too, so any user can give VEIA data a sanity check."

Screen capture from the Weather Camera Test website showing the VEIA estimated visibility for Sheep Mountain, Alaska on April 27, 2022.

AWRP began working directly with the Weather Camera Program Office in September 2019 to transition the VEIA capability from a research project into its operational program. This process included a quality assessment by NOAA and a virtual user assessment that included meteorologists, pilots (GA, Part 135, and Part 121), and dispatchers.

"The feedback from the users was overwhelmingly positive," Colavito said. "The users all agreed that VEIA would enhance safety by providing greater situational awareness for flight planning. In particular, the users really liked to see the trend line of the last six hours of estimates."

Following the user assessment, the FAA convened a Safety Risk Management (SRM) panel to discuss and evaluate any potential hazards associated with the introduction of VEIA visibility estimates. The panel determined that VEIA can be safely implemented but advised that the camera images themselves always be visible as a cross-check to VEIA.

Beyond the pilot community, VEIA can also serve the critical needs of other members of the aviation community, including flight planners, meteorologists, and system operators of the Weather Camera Program.

Overall, VEIA can have a significant impact on the safety of the aviation community by providing measurements of flight-critical weather information that is currently unavailable, increasing situational awareness in regions with available surface operations, and system monitoring of the weather camera installations.

"The success of VEIA is a great example of what can be accomplished when research programs and operations programs work together," said Colavito. "I can't thank the Weather Camera Program enough for being open to new ideas and working with us to bring our concepts through to operations. We hope to continue that relationship in the future. We are currently working on a concept to use the cameras to estimate cloud cover. I think that would be a great follow-on to VEIA."

FAA expects VEIA to begin full operations in the fall of 2023. For more information, visit weathercams.faa.gov.

Eric Spears is a contractor with the FAA's NextGen Portfolio Management & Technology Development Directorate.

LEARNING FROM THE PAST

When it comes to aviation accidents, understanding past mistakes and recommended recovery actions is an important way to help prevent future accidents.

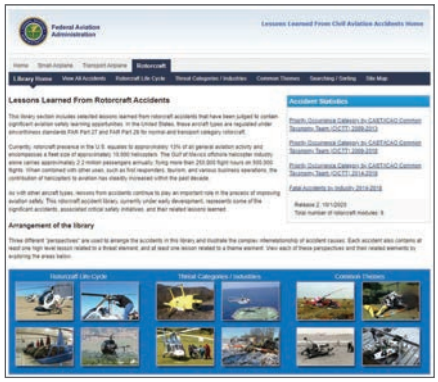
That is why the FAA has created a Lessons Learned from Civil Aviation Accidents Library at lessonslearned.faa.gov. The library contains information-rich modules from selected large airplane, small airplane, and rotorcraft accidents.

A newly added lessons learned module is underway that covers a significant helicopter accident from 2015 that occurred in Frisco, Colo.

This accident stands out because it helped prompt watershed Congressional legislation requiring rotorcraft (helicopters and gyroplanes) manufactured on or after April 5, 2020, to contain crash-resistant fuel systems.

The Frisco Lessons Learned module helps pilots and mechanics learn about potential risks through an exhaustive description of an actual accident.

On July 3, 2015, at 1:39 p.m., an Airbus Helicopters Model AS350B3e helicopter lifted off from a hospital en route to a public relations event at a Boy Scout camp. Immediately after liftoff, the helicopter started spinning counterclockwise and then crashed into a recreational vehicle parked near the heliport. The pilot was killed and the two flight nurses were severely injured. A post-crash fire followed within seconds because of spilling fuel that ignited. One of the flight nurses exited the aircraft through the left-side door but suffered burns over 90% of his body. The other nurse was ejected from the helicopter upon its impact into the parking lot.



So how did this occur? As with many accidents, several factors combined to create a tragedy. In this case, the helicopter's tail rotor flight control design and warning systems, the pilot's pre-flight inspection, and the lack of a crash-resistant fuel system all played a role, according to the National Transportation Safety Board and FAA analysts who developed the Lessons Learned module.

The crash was among three similar events that prompted the FAA to issue two emergency airworthiness directives (EADs). The FAA EADs require actions to prevent Airbus Model AS350B3 helicopters from taking off without hydraulic pressure in the tail rotor hydraulic system. This loss of hydraulic pressure caused the Frisco helicopter to spin. The pilot conducted a pre-flight check of the tail rotor hydraulic system without taking a critical final step — reengaging the yaw servo hydraulic switch after the check. The pilot might have discovered the lack of hydraulic pressure had he performed a hover check just after lift-off.

The EADs required installing certain parts and a warning system. The tail rotor hydraulic system check also must be conducted after rather than before flight. The reasoning was that pilots are more likely to perform the check during shutdown when they don't feel as rushed. The ADs also required that the yaw servo hydraulic switch be in the "ON" position before take-off.

> **WHEN IT COMES TO AVIATION ACCIDENTS, UNDERSTANDING THE DETAILS FROM THE PAST IS AN IMPORTANT WAY TO HELP KEEP FUTURE ACCIDENTS FROM OCCURRING UNDER SIMILAR CIRCUMSTANCES OR FOR SIMILAR REASONS.**

Collectively, pilots should consider the factors that led and contributed to this accident's fatal outcome and what can be done to reduce accident risks. A crash resistant fuel system provides an additional layer of safety by minimizing the occurrence of a post-crash fire should a survivable accident occur.

We all have issues that distract us. Using checklists for pre- and post-flight inspections is crucial for safe flights. They help us focus on specific safety checks. There's so much more that this Frisco accident profile and the other lessons learned will teach you. Please read them.

Gene Trainor works as the communications specialist/executive technical editor for the FAA's Compliance and Airworthiness Division.

LEARN MORE

FAA Safety Briefing, Lessons Learned Library, Sep/Oct 2020
bit.ly/3c33yMp

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.

A Return to PIC

Thank you for the safety briefings. I am a 72 year old pilot getting back into flying after a 22 year hiatus. Just completed a satisfactory flight review. Your articles are a great refresher for me. Thanks and keep up the great work!
— Benatech

Welcome back to the skies and congratulations on your flight review! We appreciate the feedback. The FAA Safety Briefing *team works hard to help educate airmen, and we are very happy to know that our publication helped refresh your return to flying. We wish you continued success, and thank you for reading* FAA Safety Briefing*!*

Collision Avoidance

As a helicopter pilot, it's only a matter of time before you will encounter a drone in the air. Spotting a drone while flying is highly unlikely. Watch this video for 12 tips on avoiding collisions with drones: facebook.com/FAA/videos/810607343330320.

Why Do We Need Arrival Alert Notices (AAN)?

To address wrong surface events where an aircraft lines up to or lands on the incorrect runway, taxiway, or airport, the FAA has released Arrival Alert Notices (AAN) at several airports with a history of misalignment risk. Watch this video to learn more: youtu.be/wgA2RXUwaxo.

It's All in Your Approach

Before you sink your teeth into that juicy airport diner cheeseburger deluxe, you must carefully set the table for a successful landing. Take a look at some ways to fine tune your approach and get you on your way at bit.ly/3GU1fv8.

I think it all starts with one of the most important skills noted in the Airplane Flying Handbook Chapter 9 - fully developing a good eye for estimating the trajectory of the airplane toward the aiming point from as far out as possible. This allows the pilot to spot deviations sooner and more accurately than with any mathematical estimates.
— Warren

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 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.

JAMES SUTHERLAND

Program Manager and Aerospace Engineer, FAA Aircraft Certification Service's Organizational Performance Division

Living under the flight path of a major airport may not be for everyone, but it is the sound of opportunity for people like James Sutherland. That beautiful roar of jet engines convinced James at age seven to be part of the world of aviation.

By middle school, James was still unsure if he wanted to be a pilot, aerospace engineer, or a controller. His Legos put him on the path to aerospace engineering, and Civil Air Patrol vectored him to flying. James soled as a CAP cadet and earned his private pilot certificate after graduating from high school in Seattle. He went on to earn an aerospace engineering degree from Embry-Riddle Aeronautical University in Prescott, Ariz.

James eventually took a job with Lancair, working on the certificated version of the *ES* kit plane. He also became an FAA designated engineering representative (DER) for fuel, control systems, and structures for the aircraft manufacturer. Later he moved on to Columbia Helicopters as the engineering manager, then to Precise Flight as the director of engineering, and expanded his DER authorization for oxygen systems.

Once James landed at the FAA, he worked in the airframe branch and focused on general aviation (GA) projects at the Seattle Aircraft Certification Office (ACO). James had also recently upgraded from personal flying of the Diamond DA20 *Katana* to the Cirrus SR22, so GA work was the perfect fit. However, he did venture into the larger world of Boeing as a program manager for the 737NG and 747-8, and he worked on the return to service effort for the 737 MAX.

James went back to working in GA as the small airplane program manager before taking his current position working with government-industry safety partnerships like the General Aviation Joint Safety Committee (GAJSC) and U.S. Helicopter Safety Team (USHST).

"I work with the different safety teams to identify and address emerging safety issues," explains James. "I help coordinate these issues within the FAA's aircraft certification line of business while providing support addressing the concerns and activities of the safety teams."

One of the safety enhancements James is working on involves collaborating with industry to gather information about muffler/exhaust system issues. Issues of degradation in power, complete loss of power, and carbon monoxide poisoning are still occurring. He is also working on additional educational outreach about aircraft loss of control and the proactive use of angle of attack indicators.

"The FAA and manufacturers [OEMs] have great working relationships, which allows us to monitor safety issues. This continued operational safety work leads to design changes, service bulletins, SAIBs, and ADs," James notes. "However, even the OEMs get limited data on GA aircraft after delivery or outside of the warranty. We need your help! If you see something, say something."

You can help proactively improve the safety of our GA community by filing a service difficulty report (SDRS) or a "NASA report" through the anonymous Aviation Safety Reporting System (ASRS).

"Owners, pilots, and mechanics are our best source of information on the difficulties and challenges with maintaining and operating the GA fleet," he said. "We want to identify issues, come up with a fix, and get that fix out before we have an accident."

Reports as simple as losing engine power on takeoff and then landing safety can still provide valuable data. Details like the make/model or what specifically malfunctioned and part numbers are vital to a voluntary report. Reporting when something is amiss helps the FAA identify problems before they are even known.

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.

Photos courtesy of James Sutherland.

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Look Who's Reading *FAA Safety Briefing*

Pilot, pioneer, and global STEM ambassador Shaesta Waiz keeps her safety skills sharp by reading *FAA Safety Briefing*.