

Fall 2026

# FAA BRIEFING Safety



FUTURE  
of FLIGHT



Federal Aviation  
Administration

6 Mastering MOSAIC

12 Breaking Barriers  
with BNATCS

15 FAA's eVTOL Integration  
Pilot Program



U.S. Department  
of Transportation

## Federal Aviation Administration

ISSN: 1057-9648  
FAA Safety Briefing  
Fall 2026  
Volume 65/Number 4

**Sean Duffy** *Secretary of Transportation*  
**Bryan Bedford** *Administrator*  
**Caitlin Locke** *Associate Administrator for Aviation Safety*  
**Hugh Thomas** *Executive Director, Flight Standards Service*  
**Tom Hoffmann** *Editor*  
**James Williams** *Associate Editor / Photo Editor*  
**Rebekah Waters** *Associate Editor*  
**Nicole Hartman** *Associate Editor*  
**Paul Cianciolo** *Associate Editor / Social Media*  
**Sunghee Cho** *Art Director*

Published four times a year, *FAA Safety Briefing* 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 FAA does not officially endorse any goods, services, materials, or products of manufacturers that may be referred to in an article. All brands, product names, company names, trademarks, and service marks are the properties of their respective owners. All rights reserved.

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



[bit.ly/m/FAASB](https://bit.ly/m/FAASB)  
[www.faa.gov/Safety\\_Briefing](https://www.faa.gov/Safety_Briefing)

## ABOUT THIS ISSUE ...



The Fall 2026 issue of *FAA Safety Briefing* focuses on the future of flight in the national airspace system. Feature articles include a review of the FAA's eVTOL Integration Pilot Program, a status update on the nation's Brand New Air Traffic Control System, and a profile of Flight Standards' Emerging Technologies Division. We'll also take an in-depth look at the MOSAIC rule and its impact on the GA community.

---

### Contact Information

The magazine is available on the internet at:  
[www.faa.gov/safety\\_briefing](https://www.faa.gov/safety_briefing)

Comments or questions should be directed to the staff by:

- **Emailing:** [SafetyBriefing@faa.gov](mailto:SafetyBriefing@faa.gov)
- **Calling:** (202) 267-1100
- **Tweeting:** @FAASafetyBrief

### Subscription Information

The Superintendent of Documents, U.S. Government Publishing Office, sells *FAA Safety Briefing* on subscription and mails up to four renewal notices.

### For New Orders

Subscribe at [bookstore.gpo.gov/products/faa-safety-briefing](https://bookstore.gpo.gov/products/faa-safety-briefing), telephone (202) 512-1800 or toll-free 1-866-512-1800 or scan the QR code on this page.

### Subscription Problems/Change of Address

Send your mailing label with your comments/request to Superintendent of Documents, U.S. Government Publishing Office, Contact Center, Washington D.C., 20408-9375. You can also call (202) 512-1800 or 1-866-512-1800 and ask for Customer Service, or fax your information to (202) 512-2104.

# FAA **BRIEFING** Safety

*The FAA Safety Policy Voice of General Aviation*



- 6** **Mastering MOSAIC**  
What Every Airman Needs to Know About the FAA's Overhaul of Light Sport Regulations  
by Tom Hoffmann



- 12** **Breaking Barriers with BNATCS**  
How the FAA's Brand New Air Traffic Control System is Transforming Aviation Safety and Efficiency  
by Chris Troxell



- 15** **FAA's eVTOL Integration Pilot Program**  
Advancing Aviation's Next Frontier  
by Ed Goldstein

## DEPARTMENTS

- 2 Leadership Landing:** a message from FAA's leadership
- 3 ATIS:** GA news and current events
- 5 Jumpseat:** an executive policy perspective
- 25 Aeromedical Advisory:** a checkup on all things aeromedical
- 26 Drone Debrief:** drone safety roundup
- 27 Nuts, Bolts, and Electrons:** GA maintenance issues
- 29 Vertically Speaking:** safety issues for rotorcraft pilots
- 30 Flight Forum:** letters from the Safety Briefing mailbag
- 31 Checklist:** FAA resources and safety reminders

**Inside back cover**  
**FAA Faces:** FAA employee profile

- 18** **The Future of Aircraft Propulsion**  
From Hydrogen to Electric, Cutting-edge Propulsion Systems are Pushing Aviation Forward  
by James Williams

- 22** **The Architects of Innovation**  
How the FAA's Emerging Technologies Division is Shaping the Future of the NAS  
by Nicole Hartman and Rebekah Waters





## FLYING INTO THE FUTURE



Whether it's flight training, medical transport, or business travel, general aviation is the true backbone of American flight. As a pilot with more than three decades in this industry, I know firsthand the weight of our shared responsibility. Keeping our skies safe — whether you are flying hundreds of passengers or going solo in a light aircraft — is a sacred trust.

Our safety record is strong. Fiscal year 2025 saw the lowest GA fatal accident rate since the FAA began tracking it in 2009. FY2026 is expected to be even lower. But we all know safety is not a destination; it's a journey and one that demands continuous improvement. One accident, one close call is one too many. To secure the future of flight, we must constantly evolve, ensuring our safety practices outpace the rapid technological shifts transforming our airspace.

A good example of this is the landmark MOSAIC rule. This past July, the final phase of the MOSAIC rule took effect — introducing the new part 22 regulations and revamped Light Sport Category Aircraft certification. This shift modernizes how light-sport aircraft are built and certified and opens the door to a new generation of safer, more advanced, and affordable aircraft for recreational flying, training, and specialized operations.

This past summer, we also launched our new Mobile Clearance application for GA pilots. Instead of relying on traditional voice radio transmissions, pilots can use their smartphones or tablets to request clearances through a digital, text-based system — without having to contact the tower. Mobile Clearance reduces the possibility of readback error and provides better situational awareness for controllers and pilots.

We also know today's tactics won't work in tomorrow's crowded skies. That's why the FAA is undergoing its most significant modernization in decades. We are also moving away from a reactive posture — investigating what went wrong after an incident — toward a predictive posture, where machine learning helps us identify GA safety risks before they happen.

### Unifying Our Safety Data, Leveraging Advanced Data Analytics

Central to this transformation is our newly established Aviation Safety Management Office (ASM). ASM will lead a coordinated risk management strategy across the entire FAA. This unified structure allows us to track hazard identification, risk, analyses, and mitigation in real time — unlocking the true potential of our safety data.

Predictive safety also requires cutting-edge tools. Today, the FAA is aggressively integrating artificial intelligence and advanced machine learning to mine massive volumes of data generated across the NAS.

We used advanced, AI-enabled analytics to evaluate mixed-use airports where helicopters routinely cross paths with major commercial arrival and departure routes in

high-density airspace. Our AI models uncovered a systemic, historical reliance on visual separation in complex environments where human vision simply isn't enough.

In the past, analyzing those trends across thousands of daily operations would have taken our FAA safety analysts months or longer. Now it can be done in near real-time. This is a fundamental, data-driven reengineering of how we manage the sky. AI doesn't replace human judgment; it amplifies it, helping us make better policy and airspace decisions faster.

### Modernizing the Foundation

Technology is only as good as the infrastructure supporting it. For the GA pilot, this means pairing our AI initiatives with a modernized Air Traffic Control system designed to deliver cleaner data, more reliable communications, and smoother transitions through controlled airspace. By building a modern, resilient data architecture, we ensure that both our controllers and the pilots relying on them have the high-speed data tools they need to navigate safely.

The challenges of the next decade — integrating increased commercial space launches, unmanned aircraft, and advanced air mobility (AAM) into the skies we already share — demand that we evolve. As electric vertical takeoff and landing (eVTOL) aircraft conduct real-world testing, we are focused on safely blending them into existing low-altitude environments.

We are moving the FAA into the age of predictive intelligence to fulfill our most sacred promise: Protecting every pilot, passenger, and aircraft from the moment they clear the runway to the moment they tie down.

## AVIATION NEWS ROUNDUP

### Digital Departure Clearances for General and Business Aviation



The FAA is moving forward with Mobile Clearance, a new digital tool that will allow general and business aviation pilots to

request departure clearances through approved flight applications instead of over the radio.

This new tool modernizes communication between pilots and air traffic controllers to improve safety and efficiency.

Mobile Clearance allows pilots to use the ForeFlight and Garmin applications to request instrument flight rules (IFR) departure clearances with a few taps on a phone or tablet. This new capability is designed to reduce read-back errors and give air traffic controllers more time to focus on safety.

Mobile Clearance also allows pilots to cancel IFR through their flight applications, helping them transition to visual flight rules (VFR) while allowing controllers to focus on aircraft separation.

The FAA began operational evaluation of Mobile Clearance in Houston last May. This summer, the evaluation expanded to Appleton International Airport (ATW) in Wisconsin and New Century AirCenter (JCI) in Kansas. More locations, including

Kansas City, Nashville, and Austin, are planned for this fall ahead of nationwide deployment beginning in 2027.

Visit [bit.ly/MobileClear](https://bit.ly/MobileClear) for additional details on mobile clearance and which airports will be getting the feature soon.

### FAA Adds Mental Health Counseling Guidance to AME Guide

The FAA updated its Guide for Aviation Medical Examiners to include new mental health counseling resources for pilots and air traffic control specialists, adding therapy, psychotherapy, and counseling guidance under Item 47, *Psychiatric Conditions*. The revision adds a pilot and air traffic control specialist (ATCS) information page, FAQs for pilots and ATCS, and guidance for psychotherapists treating pilots and controllers.

The FAA also advises pilots and controllers who are considering counseling to see a therapist, counselor, physician, or other provider; review the agency's related FAQs; and provide therapists with the FAA's information for psychotherapists treating pilots and ATCS.

The AME Guide's Item 47 page continues to affirm that psychotropic drug use is disqualifying for aeromedical certification purposes unless covered by listed exceptions. It also says AMEs should defer issuance and forward medical records to the Aerospace Medical Certification Division in those cases.

For more information, review [bit.ly/46l9yfY](https://bit.ly/46l9yfY) and read this issue's *Aeromedical Advisory* department.

### Major Milestone in eVTOL Technology

On July 10, BETA Technologies and United Therapeutics Corporation, in partnership with the Pennsylvania Department of Transportation, flight-tested organ medical-transport capabilities from Virginia to Maryland. This was a major milestone in the FAA's and Department of Transportation's work to safely launch advanced air mobility (AAM) aircraft into America's skies under the Electric Vertical Takeoff and Landing (eVTOL) Integration Pilot Program (eIPP).

BETA's ALIA electric aircraft flew from Virginia Tech Montgomery Executive Airport to Charlottesville Albemarle Airport carrying an animal organ in a containment system — a medical cooler used to keep donor organs alive and healthy during transport. There, the containment system was transferred to another ALIA, which flew to Frederick Municipal Airport and finally to Martin State Airport in Maryland. The flight will assist the FAA's efforts to test and evaluate the reliability of electric aircraft for critical organ delivery.

Additionally, the Pennsylvania Department of Transportation, in partnership with the New Jersey Department of Transportation and

### #FLYSAFE GA SAFETY ENHANCEMENT TOPICS

Please visit [gajsc.org/flysafe](https://gajsc.org/flysafe) for more information on these and other topics.



#### OCTOBER

##### Pilots and Medication



#### NOVEMBER

##### CFIT Avoidance



#### DECEMBER

##### Mountain Flying





Electra, conducted hybrid-electric demonstration flights to test routes connecting small local airports to major airline hubs.

The test flights took place between Manassas and Philadelphia, stopping at:

- Washington Manassas Airport (HEF) in Virginia
- Millville Executive Airport (MIV) in New Jersey
- Atlantic City Bader Field (AIY) in New Jersey
- Northeast Philadelphia Airport (PNE) in Pennsylvania
- Philadelphia International Airport (PHL)

The Pennsylvania Department of Transportation and other eIPP participants are planning additional test flights throughout the rest of the year.

For more information, visit [bit.ly/eIPP](https://bit.ly/eIPP).

### Transitioning GA Aircraft to Unleaded Gas



The FAA recently released its Transition Plan for Unleaded Aviation Gasoline, which provides a

roadmap to safely integrate unleaded fuel into the general aviation fleet.

The plan uses a phased approach to address fuel testing and authorization, gather market experience, execute the national transition, and manage the unique transition in Alaska.

The plan fulfills a provision of the 2024 FAA Reauthorization Act requiring the agency to partner with the aviation industry to safely transition the piston-engine fleet to unleaded aviation gas by 2030. This partnership was through the Eliminate Aviation Gasoline Lead Emissions (EAGLE) initiative. The FAA is testing three different fuels at its William J. Hughes Technical Center as part of the first phase of the transition to address key questions concerning performance and compatibility. The FAA will update the plan after the first phase is complete.

Check out [faa.gov/unleaded](https://faa.gov/unleaded) for additional information.

### Supersonic Flight Announcement



(Image courtesy of Boom Supersonic)

U.S. Transportation Secretary Sean P. Duffy announced the FAA is taking a pivotal step toward enabling civil supersonic flights over the continental United States. Thanks to massive innovations in supersonic technology, it will be possible to safely operate these aircraft without a sonic boom. When operational, next-generation supersonic planes will drastically reduce travel times — enabling faster movement of people and goods.

A proposed rule published in July 2026 ([bit.ly/4wWzMkw](https://bit.ly/4wWzMkw)) sets a noise-based certification standard for supersonic aircraft. Later this year, the FAA plans to propose a related rule establishing landing and takeoff noise standards for supersonic aircraft.

The FAA aims to finalize both rules by mid-2027.

### GAA Nominations Now Being Accepted

The application period for the 2026 General Aviation Awards (GAA) is open, and nominations are due by Nov 30, 2026.

This cooperative effort between industry and the Federal Aviation Administration (FAA), seeks to recognize individuals for their professionalism and dedication to general aviation (GA). Honorees serve as exemplary models of character and excellence for the broader GA community.

Community involvement in the awards program has recently declined, leading to fewer nominations and applications. The GAA Board of Directors encourages flight schools, aviation organizations, universities, Flight Standards District Offices (FSDOs), and other entities to nominate fellow aviators or submit applications. In nearly every aviation community, there are aviators and mechanics who deserve recognition for their efforts to improve and secure general aviation.

The selection process begins following the November 30 deadline at the FSDOs, where honorees are chosen at the district level. These winners then advance to the national level, where a panel of judges, comprising of industry professionals and past honorees, selects this year's national honorees.

Information about the application process is available at [generalaviationawards.com/nominate](https://generalaviationawards.com/nominate).

### FAA Proposes New Inspection Rating for Mechanics

The FAA proposed replacing the inspection authorization currently held by some airframe and powerplant mechanics with a new inspection rating on the mechanic certificate. The Notice of Proposed Rulemaking (NPRM) about this subject was published on July 1 in the Federal Register ([federalregister.gov/d/2026-13282](https://federalregister.gov/d/2026-13282)).

The proposal aims to enable the new inspection rating to carry the same privileges and limitations now held under the inspection authorization (IA), including approval for return to service after major repairs or major alterations, and conducting annual or progressive inspections. The change would remove the current expiration date and the requirement for IA holders to renew in March of every odd-numbered year.

Mechanics holding the new rating would be required to keep records showing recent experience for the previous 24 calendar months. The FAA proposal would also create a process for mechanics who fall out of recent experience to reestablish inspection privileges by completing eight hours of acceptable training or passing an oral test given by an FAA aviation safety inspector.

The FAA estimates the proposal would save mechanics who hold IAs \$1.01 million over 10 years and save the agency \$4.44 million over the same period. The NPRM lists a one-time cost of about \$220,000 for mechanics to request replacement certificates and for the FAA to process and issue them. The comment period on the proposal was scheduled to close on Aug. 31, 2026.

## THE FUTURE OF FLIGHT IS HERE

Looking back on the commemoration of our nation's 250th birthday earlier this year, it's inspiring to think about how far we've come, particularly in the realm of aviation. Over the last century, aviation has evolved from the early pioneering exploits of the Wright brothers to being an integral part of our everyday lives. Take a moment to consider how the earliest powered flights — traveling a total of 120 feet — were shorter than the wingspan of most modern widebody jets. Compare those same 12-second flights with today's commercial operations that regularly span 10,000 miles in more than 18 hours. These remarkable achievements are a testament to human ingenuity and to pushing the boundaries of what's possible.

The FAA plays a big part in maintaining that legacy. The policies and standards we routinely shape not only contribute to us having the world's largest and safest National Airspace System (NAS) but also foster innovation and freedom within aviation's ever-changing landscape. Balancing bold ideas, disciplined execution, and commitment to safety allows the FAA to better adapt to emerging challenges and opportunities and take aviation to new heights.

This issue of *FAA Safety Briefing* highlights some of the FAA's recent endeavors to improve efficiency, innovation, and modernization in the NAS and promote the future of flight. One example is the Modernization of Special Airworthiness Certification (MOSAIC) final rule, which helps increase the availability of safe, modern, and affordable aircraft in recreational aviation. The article "Mastering MOSAIC" takes a deep dive into the details of this



(Photo courtesy of the Library of Congress)

transformative rule and showcases the many benefits and enhancements that will impact not only the light sport sector, but the entire general aviation (GA) ecosystem.

The Department of Transportation and FAA are laser-focused on modernizing the nation's air traffic control infrastructure. The article "Breaking Barriers with BNATCS" reviews the Brand New Air Traffic Control System project that aims to enhance safety in the sky, reduce delays, and unlock the future of air travel. The article focuses on how BNATCS will deliver benefits to all NAS users, including the GA community. It will also serve as a segue to a new regular *FAA Safety Briefing* department to keep readers plugged into the plan's performance in the coming years. For real-time updates on BNATCS, visit [modernskies.faa.gov](https://modernskies.faa.gov).

Having a state-of-the-art ATC system is critical, especially with the accelerated growth of advanced air mobility and electric vertical takeoff and landing (eVTOL) aircraft. To prepare for this expansion of next-generation aircraft, the FAA rolled out a new set of testing environments under its eVTOL Integration Pilot Program (eIPP). The article "FAA's eVTOL

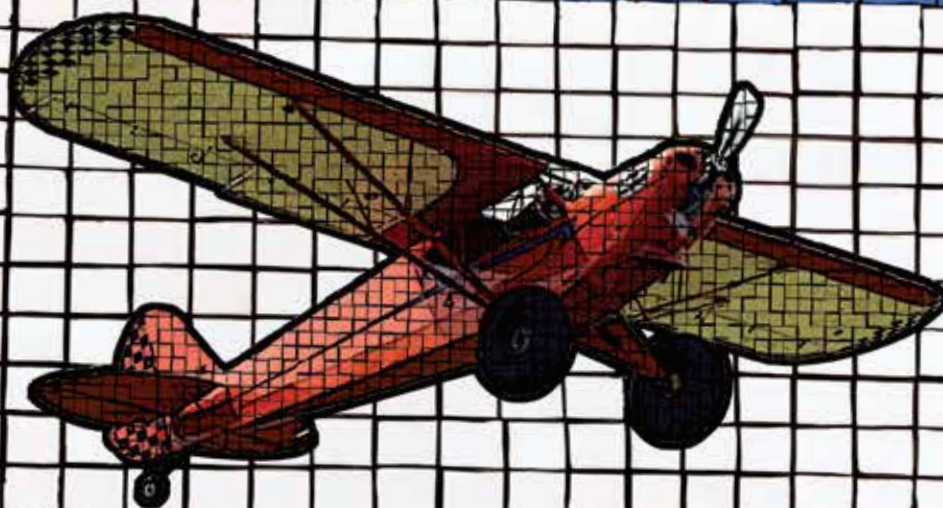
Integration Pilot Program" explores the eIPP that is already underway and providing important data to help further develop this technology.

Instrumental to the integration of these advanced aircraft is the FAA's Emerging Technologies Division. The article "Architects of Innovation" introduces the division and explains how its team of professionals is positioned to address future NAS entrants. This issue's FAA Faces department also profiles Laurie Armetta with the Emerging Technologies Division, detailing her role in enabling eVTOLs to take to the skies safely.

At the very heart of much of this innovation lies the technology to propel it forward. The article "The Future of Aircraft Propulsion" peeks under the cowlings to explore advanced propulsion technologies and aerospace designs that are helping to fuel the next generation of aircraft.

It's an exciting time for aviation as innovation continues to reshape the industry. By embracing new technologies and modernizing infrastructure, the FAA is not only addressing today's challenges but also paving the way for tomorrow's aviation advances. Here's to a bright future!

Safe flying!



# MASTERING MOSAIC

*By Tom Hoffmann*

*What Every Airman Needs to Know About the FAA's  
Overhaul of Light Sport Regulations*

Here's a quick aviation riddle:

- What has no weight limit and can soar faster and further than before?
- What has engines of any kind — reciprocating, electric, or even hybrid — where once only one type was allowed?
- What has the power to let sport pilots fly at night, operate helicopters, and take on new recreational flying opportunities?
- What has new privileges for light-sport repairmen that lets them work on more aircraft than ever?

It's the FAA's new Modernization of Special Airworthiness Certification (MOSAIC) final rule. Long anticipated by the industry and the general aviation (GA) community, MOSAIC updates and expands regulations to address the evolving needs of aviation and airmen, spurring future growth and innovation. While the rule has positively impacted the industry — helping make GA safer, more accessible, and more affordable — its wide-ranging changes have raised many questions about what airmen can and can't do under the new rule. With MOSAIC now in full effect, it's a good opportunity to examine the rule more closely and what its changes mean for the broader GA community.

### Light Sport 2.0

The FAA published the MOSAIC final rule in July 2025 to amend rules for the design, manufacture, airworthiness certification, operation, maintenance, and alteration of light-sport category aircraft. Building on the 2004 Light Sport rule, MOSAIC significantly expands regulations in several key areas:

- Certification of light-sport category aircraft (LSA)
- Sport pilot certification and what aircraft they can operate
- Part 91 operations
- Light-sport repairmen (LSR)
- Maintenance of LSA and experimental amateur-built (EAB) aircraft

To help provide context for the purpose and intent of MOSAIC, let's review some background.

### The Motivation Behind MOSAIC

While the sport pilot rule of 2004 was groundbreaking in creating a new, faster path to flight and establishing the light-sport aircraft category, the rule's weight and performance limitations for LSA indirectly hampered the adoption of certain safety-enhancing technologies that have rapidly evolved over the last two decades. Under the 2004 rule, LSA were capped at 1,320 pounds and 120 knots, and were also limited to daytime VFR flight, fixed gear and props, and a maximum of two seats. Today's technological advances, such as composite materials, advanced avionics

## MOSAIC updates and expands light-sport aircraft regulations to address the evolving needs of aviation and airmen, spurring future growth and innovation.

and autopilot systems, and hybrid propulsion technology, have spotlighted the need for change.

This reality provided the impetus for a set of revised rules to give sport pilots a pathway to safer, more rugged aircraft. By using performance-based standards instead of prescriptive limits, the FAA can achieve higher safety standards and, at the same time, provide industry with greater design flexibility that would help drive down the cost of new aircraft. There is also the benefit of steering sport pilots away from higher-risk experimental amateur-built aircraft lacking certification standards toward FAA-certified, factory-built aircraft.

Another key factor in MOSAIC's development was the FAA's safety continuum, a guiding principle that establishes regulatory oversight and safety standards that are commensurate with operating privileges and risk. One MOSAIC goal was ensuring the operating privileges and certification requirements for light-sport aircraft are appropriate for their place on the safety continuum. Under this approach, the FAA determined that gross weight does not inherently dictate risk, allowing them to instead shift to a performance-based metric based on stall speed. The FAA also recognized the need to decouple sport pilot privileges from limitations for certification of LSA.

Before MOSAIC, the definition of light-sport aircraft (in 14 CFR part 1) set the same performance limits for LSA certification, sport pilot privileges, and light-sport repairman privileges. By eliminating this definition, MOSAIC allowed the FAA to separately adjust privileges and limitations as appropriate for each of these three areas.

The complexity of this undertaking would understandably take some time to sort out.



MOSAIC allows sport pilots to now fly a much larger pool of normal, LSA, and EAB aircraft, like the Cessna 172 pictured here.



“The challenge was determining how much more we could expand what aircraft a sport pilot could operate within the confines of existing training, testing, and certification requirements,” says Aviation Safety Inspector Marcel Bernard with the FAA’s General Aviation and Commercial Division and the MOSAIC rulemaking team. “A lot of regulations and rules had to change to make this happen and accomplish what we wanted, including parts 61, 21, and a new part 22.”

The regulatory changes also prompted various safety analyses to secure buy-in from FAA offices and the public. Although it took nearly eight years to finalize and spanned 717 pages, MOSAIC has the potential to significantly ease the burden on thousands of airmen interested in this sector of aviation as well as spur more widespread growth and innovation. Let’s have a closer look at the details.

## **MOSAIC certification standards eliminated several previous restrictions for LSAs and now allow any weight, any type or number of engines or propellers, and any type of landing gear.**

### **Aircraft Certification**

Under MOSAIC, the newly expanded LSA category allows for any type of aircraft, including airplanes, gliders, weight-shift control, powered parachutes, helicopters, gyroplanes, and electric vertical takeoff and landing (eVTOL) rotorcraft and powered-lift aircraft. Although never certificated in the light-sport category, lighter-than-air aircraft like balloons, blimps, and airships can also be certificated as LSA.

MOSAIC significantly expands the performance limits for LSA certification. This includes a change in  $V_{SO}$  maximum stall speed (now 61 knots with flaps extended

for airplanes), an increase from two to four seats (airplanes only), and an expansion of operating purposes for LSA to include certain low-risk aerial work, like banner towing and aerial photography. The MOSAIC certification standards also eliminates several previous restrictions for LSAs and now allows any weight, any type or number of engines or propellers, and any type of landing gear.

While these changes are considered significant improvements, pilots need to recognize some remaining safety requirements. The new stall speed limits for airplanes that sport pilots can operate must be consistent with their original certification; aftermarket alterations to lower stall speed are not permissible for qualification. Additionally, removing seats from an aircraft to qualify it for sport pilot use is not permitted.

Certification procedures for new LSAs have always required a statement from manufacturers affirming that they have met the applicable consensus standards detailing how the aircraft will meet FAA requirements. Under MOSAIC, however, the industry developed a full new set of LSA consensus standards that specify how manufacturers will meet the design, production, and airworthiness requirements in the new 14 CFR part 22. The FAA accepted these standards through a Federal Register notice ([bit.ly/4hD2FON](https://www.federalregister.gov/d-2026-0716)) on July 16, 2026, a final step before they became official on July 24.

Having MOSAIC’s final effective date coincide with EAA’s AirVenture 2026 provided the general aviation community with the perfect opportunity to see firsthand the impact of the new rule. During the event, several manufacturers announced designs of MOSAIC-compliant aircraft that aim to take advantage of the newly expanded



LSA performance capabilities, carry a much lower price tag than a comparable part 23 aircraft, and showcase the variety of emerging aircraft types. Examples include a four-seat, six-motor electric design from Cosmic Aerospace, a twin-engine design from Sling Aircraft, and a two-seat IFR trainer from Textron Pipistrel. EAA was also proud to celebrate the first delivery of an aircraft built under MOSAIC rules at AirVenture, a Van's RV-12.

Bottom-line benefits from the expanded LSA certification limits include:

- Improved safety with design flexibility for optional safety features
- More useful, higher-performing aircraft that can carry more passengers, cargo, and fuel
- More rugged designs not constrained by weight limit
- Increased flexibility with allowable types of engines, propellers, and landing gear
- Encouraged innovation with support for new propulsion types
- Lower costs for owners, trainers, and maintainers

### Sport Pilot Certification

While MOSAIC has a strong focus on the certification of light-sport category aircraft, it also impacts aspects of sport pilot certification and training that warrant attention. The biggest change is the types of aircraft that sport pilots are now allowed to operate. As mentioned, the FAA eliminated the existing LSA definition and adopted the new design and performance limits in 14 CFR section 61.316, establishing which aircraft limits fall within sport pilot privileges. This section removes aircraft weight and airspeed limitations, permits the use of any powerplant type (except turbo-jet), allows aircraft with retractable gear and controllable-pitch propellers, allows the use of four-seat airplanes with a two-person onboard limitation, and requires aircraft to be able to establish a controlled descent during an engine failure.



“It’s a bit of a learning curve to understand how we’ve separated aircraft certification from pilot certification since we no longer point to a shared light-sport aircraft definition,” says Bernard. He points out that some sport pilots might think they can operate a multi-engine aircraft certified as an LSA. “That’s not the case,” he states. “While you could have a multi-engine or powered-lift aircraft certified as a light-sport category aircraft, there are no multi-engine or powered-lift privileges available to sport pilots.” A higher-grade pilot certificate is required to fly a multi-engine airplane. Bernard adds that it’s helpful to remember that it’s a sport pilot certificate, not a light-sport pilot certificate.

That said, thanks to changes in design and performance limits, MOSAIC opens up a much larger pool of normal category (part 23), LSA, and EAB aircraft for sport pilots to operate.

Another area of potential confusion in pilot certification is that category and class privileges for sport pilots are granted through logbook endorsements rather than ratings.

**Thanks to changes in design and performance limits, MOSAIC opens up a much larger pool of normal, LSA, and EAB aircraft for sport pilots to operate.**

“When a sport pilot takes a practical test, the examiner puts an endorsement in their logbook that they can fly a single-engine land airplane, glider, or gyroplane,” explains Bernard. “That’s a new concept for people to absorb who are used to taking a practical test and getting a rating, not a privilege.”

Endorsements also play a role for sport pilots making use of some of the newly expanded privileges under MOSAIC, such as flying at night and using aircraft with constant-speed propellers and/or retractable landing gear. This endorsement requirement also applies to sport pilot instructors. For the night-flying privilege, three hours of night training are required, but credit for previous night experience is allowed. Note that sport pilots or instructors who wish to fly (or instruct) at night must possess a valid FAA medical certificate or satisfy BasicMed requirements. If not flying at night, a pilot exercising sport pilot privileges may use a valid driver’s license to meet medical requirements if the pilot’s medical certificate was not denied or revoked, and they medically self-certify.

The FAA has also added a new rotorcraft-helicopter privilege for sport pilots. However, the helicopter must have the simplified flight controls (SFC) designation issued

by the helicopter manufacturer. Manufacturers have not yet produced an LSA helicopter with the SFC designation, but it is expected in the near future.

For more information on sport pilot training and certification, particularly with flight instructor limitations and SFC endorsements, see FAA Advisory Circular 61-146 ([bit.ly/MOSAIC\\_Cert\\_Ops](https://www.faa.gov/regulations_policies/advisory_circulars/61-146)) and Information for Operators 26006 ([bit.ly/InFO26006](https://www.faa.gov/regulations_policies/advisory_circulars/26006)).

### Operational Changes

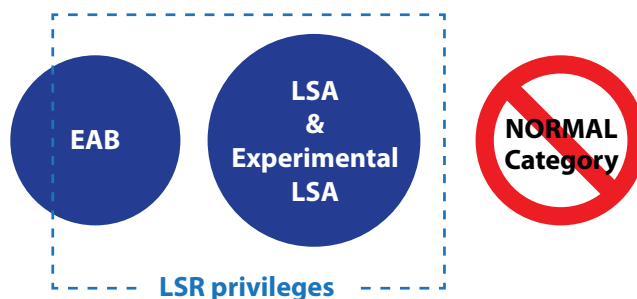
In addition to allowing sport pilots to fly larger and more advanced aircraft, MOSAIC also introduces a few exciting changes to flight operations under part 91. Notably, commercial pilots can now use an LSA to perform some limited aerial work for compensation or hire, such as aerial photography, pipeline patrol, and banner towing (see 14 CFR section 91.327 ([bit.ly/14CFR91-327](https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-91/subpart-F/section-91.327))). However, carriage of cargo or passengers for compensation is not permitted. LSA manufacturers must declare compliance with a consensus standard for the type of aerial work being performed and include the requirements in the Pilot's Operating Handbook.

Other new operational changes under MOSAIC allow the FAA to issue operating limitations for experimental aircraft over densely populated areas that extend to all phases of flight, not just takeoff and landing. MOSAIC also creates a new experimental purpose for operating former military aircraft to support repositioning for repairs, maintenance, storage, or public aircraft operations. Additionally, the FAA revised right-of-way rules to include more aircraft, including those with non-traditional forms of propulsion.



### Maintenance and Light-Sport Repairmen

The final key area is MOSAIC's impact on maintainers. A few changes worth highlighting concern light-sport repairman (LSR) privileges and training. For starters, with proper training, MOSAIC greatly expands the range of aircraft types an LSR can work on, given the new performance-based parameters for light-sport aircraft.



MOSAIC greatly expands the range of aircraft types an LSR can work on. Notice that the privileges box does not include all EAB. The aircraft's operating limitations affect whether an LSR can perform the condition inspection.



The other big change is that an LSR can now conduct the annual condition inspection on EAB aircraft (14 CFR section 21.191 ([bit.ly/14CFR21-191](https://www.ecfr.gov/current/title-14/chapter-I/subchapter-D/part-21/subpart-B/section-21.191))). “This is a huge deal from an aircraft owner and maintainer standpoint,” says airworthiness Aviation Safety Inspector Tanya Glines with the FAA’s Aircraft Maintenance Division and MOSAIC rulemaking team.

This change was not included in the Notice of Proposed Rulemaking (NPRM) but was considered after substantial public feedback. “The FAA reviewed the comments, researched previous rules, and applied the safety continuum concept to develop a solution that has been received as a positive development for the industry,” adds Glines. However, she cautions owners to ensure that the aircraft’s operating limitations allow an LSR to perform the inspection.

Other significant MOSAIC benefits include the elimination of the requirement for manufacturers to authorize minor alterations and repairs, as well as making compliance with manufacturer-issued safety directives recommended rather than mandatory.

On the training side, LSR training courses for the maintenance rating are now performance-based instead of hours-based, drawing on applicable content from the mechanic Airman Certification Standards (ACS). The requirement for the LSR-Inspection rating remains at 16 hours.

While Glines states that the changes from MOSAIC are extremely well received by the GA maintenance community, there are still some areas of confusion. “We get a lot of folks asking how they can recertify their normal category aircraft to LSA so they can do their own maintenance,” says Glines. “Simply put, you can’t.” Additionally, privileges for an LSR with either an inspection or maintenance rating do not extend to normal category aircraft, even if it’s an aircraft a sport pilot can fly.

You can learn more about repairman certificate eligibility, training and certification requirements, and privilege limitations at [faa.gov/repairmen](https://www.faa.gov/repairmen). The page includes a helpful FAQ section that highlights MOSAIC-related changes and scenarios.

### Why MOSAIC Matters

With MOSAIC now fully in effect, the public is starting to see firsthand some of the many benefits of this relieving rule. “Feedback so far has been phenomenally good,” says Aviation Safety Inspector Jim Newberger with the FAA’s Aircraft Certification Service and MOSAIC rulemaking team lead. Along with Bernard and Glines, the three have played an active role in educating airmen about the many changes through presentations and public interactions at aviation events.

“This is a fabulous achievement of the whole recreational sector,” says Newberger. “Industry partners helped shape the concepts for this expansion while the FAA rulemaking



team worked tirelessly to develop the proposal and final rule, addressing over 1,300 public comments. That public input really made a difference and greatly impacted the final product,” he adds. Newberger also acknowledged the ASTM committee on light-sport aircraft for developing and gaining FAA acceptance of over 50 new consensus standards for LSA certification. “All of this collaborative work is helping to open an exciting new chapter in recreational aviation.”

### MOSAIC represents the most significant update to sport aviation in decades.

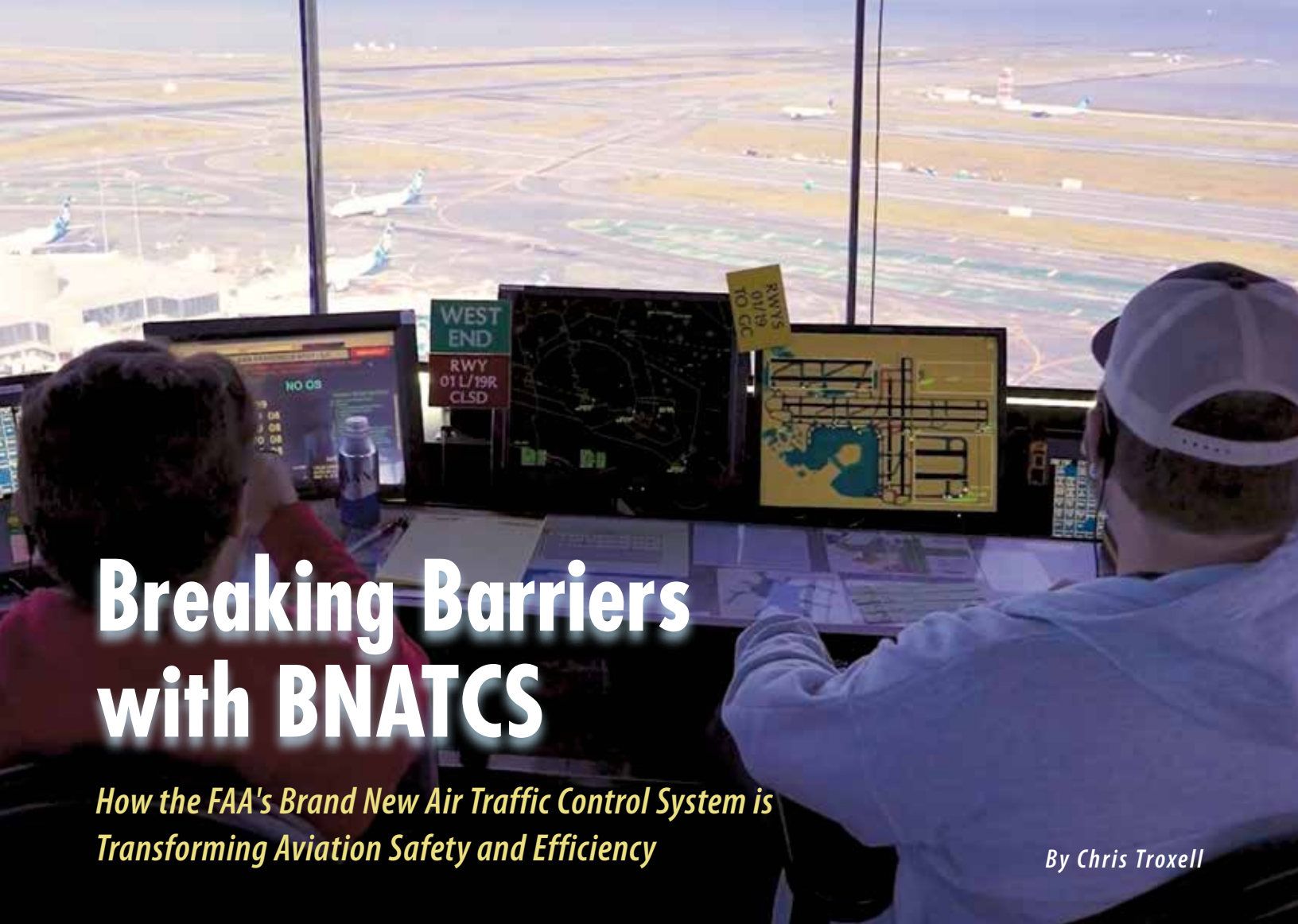
Indeed, MOSAIC represents the most significant update to sport aviation regulations in decades. And it’s not only sport pilots who will benefit from this new rule; its impact extends far beyond. By streamlining processes and reducing red tape, MOSAIC fosters innovation and efficiency across the entire spectrum of aviation. With fewer regulatory constraints, manufacturers can design sturdier, more capable, and more affordable aircraft for all GA pilots. It also serves as a boon to flight schools with higher aircraft utilization, provides operators with additional revenue stream potential, helps unify flying club fleets, and gives private pilots facing medical challenges a viable off-ramp to keep flying under sport-flying privileges. These downstream benefits underscore MOSAIC’s potential to transform not just light-sport aviation, but the broader aerospace landscape as well. ➤

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

#### LEARN MORE

FAA’s MOSAIC landing page  
[faa.gov/aircraft/MOSAIC](https://www.faa.gov/aircraft/MOSAIC)



A wide-angle photograph of an air traffic control tower. Two controllers are visible from behind, seated at a console with multiple computer monitors. The monitors display various traffic and airport maps. Large windows in the background provide a clear view of the airport tarmac, runways, and several aircraft. The scene is brightly lit, suggesting daytime.

# Breaking Barriers with BNATCS

*How the FAA's Brand New Air Traffic Control System is Transforming Aviation Safety and Efficiency*

*By Chris Troxell*

Controllers utilize the Surface Awareness Initiative display, pictured center-right, to manage surface traffic.

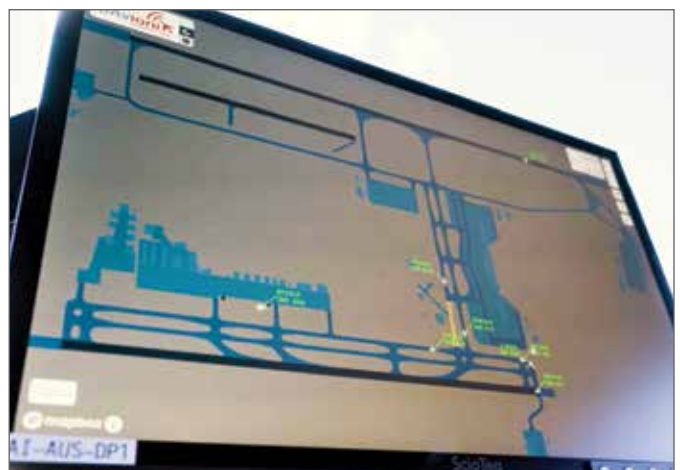
The FAA's deployment of a Brand New Air Traffic Control System (BNATCS) is bringing modern tools and tech to air traffic controllers while strengthening the reliability and sustainability of U.S. aviation infrastructure. The general aviation (GA) community is a key beneficiary.

Modernizing communications, surveillance, automation, FAA facilities, and support for Alaska's airspace are all part of the historic infrastructure project. Thanks to Congress's commitment to this endeavor and the \$12.5 billion investment received through the Working Families Tax Cuts Act, the agency has made significant progress in record time. Let's look at some of the ways building a brand-new air traffic control system will help increase GA safety across the nation.

## Surface Management Tools

The Surface Awareness Initiative (SAI) gives controllers a clearer picture of where all aircraft are located on the airfield — a big boost for runway safety. As of July 31, the FAA has installed SAI at more than 95 of the 220 airports in the agency's plan.

Van Nuys Airport in Southern California is one of the busiest GA airports in the country — with 900 to 1,400 takeoffs and landings per day, many from flight schools on the airport property. Tower controllers are benefitting



The Surface Awareness Initiative shows the exact location of aircraft on runways and taxiways.

from the SAI unit that the FAA integrated into their tower cab last fall. Controllers' visual scanning of the airfield goes hand in hand with SAI, which shows targets of aircraft and vehicles transmitting Automatic Dependent Surveillance-Broadcast (ADS-B) Out on surface movement areas.

Van Nuys Air Traffic Manager Chris Bellmas noted the approach end of the airport's long runway is difficult to see from the tower. While binoculars are helpful, a high volume of aircraft lined up on both sides of the runway makes surface management complicated.

"The SAI adds a whole other layer of protection and a very comprehensive one," Bellmas said. "Utilizing it ensures that you know exactly where that aircraft is. You can clearly see on the screen now that that aircraft is calling up for the correct position. You can look and see out the window and correlate. And when a pilot reports their position, which could be incorrect, we can check that on the SAI screen."

## **The FAA's deployment of BNATCS is bringing modern tools and tech to air traffic controllers while strengthening the reliability and sustainability of U.S. aviation infrastructure.**

### **Digital Radios and Voice Switches**

Clear communication is key to safe aviation, so upgrading communications systems is a focal point of the BNATCS project.

The FAA is replacing 27,000 analog radios across 1,581 sites to enable digital communication between pilots and air traffic controllers. This includes hundreds of GA airports, where controllers and pilots will be able to communicate with less interference and higher fidelity.

The agency has deployed more than 145 of the 450 planned digital voice switches as of July 31 that controllers use to change frequencies — replacing the aging systems of manual buttons and analog patch boards. These new digital voice switches give controllers faster, more reliable access to pilots and controllers at other facilities — working in conjunction with the digital radios. Improving sustainability of the system is another important reason for the analog-to-digital cutover.

"We can't sustain our old system," said Kevin Inouye, who oversees FAA aviation equipment modernization projects in San Diego. "Imagine trying to replace the screen of an iPhone 7. Where are you going to find one? That's what it's like trying to sustain our radios and other old equipment. By modernizing the whole system, we can sustain it and maintain it for years to come."



Old vs. New: The FAA is replacing analog voice switches (top) with digital (bottom). Air traffic controllers can more easily switch frequencies with greater reliability using new digital equipment.

The FAA is also replacing voice switches dating back to the 1990s at Alaska flight service stations. The Alaska Automation Capability project under BNATCS will deliver digital switches and all new consoles with cloud-based software to help flight service specialists reliably and efficiently give pilots the information they need to plan flights and fly safely.

"We have such old equipment that we used tin foil at one point to reduce interference; that kind of helped push the project forward," said the Alaska Automation Capability lead, Robyne Schroeder. "And we're replacing very old consoles too. This is an important upgrade for flight service and pilots in Alaska."

## **The FAA is replacing 27,000 analog radios across 1,581 sites to enable digital communication between pilots and air traffic controllers.**

### **Weather Cameras and Observing Systems**

Another essential component to safe flying is pre-flight planning, and a big part of that is severe weather avoidance. That's why the FAA is expanding its weather camera network in Alaska, Hawaii, and the Northern Mariana Islands under the BNATCS initiative. FAA weather cameras give pilots clear and timely images of weather conditions to help them safely reach their destinations.

**The FAA is managing more than 200,000 GA aircraft annually, and every day, pilots and air traffic controllers work together to rely on clear communication, shared situational awareness, and mutual trust to keep the NAS running safely and efficiently.**

The FAA is adding 64 new camera sites by the end of 2028. As of July 31, the FAA has installed nine of the 64.

The agency is also implementing a new technology called the Visual Weather Observation System, or VWOS, for areas with inadequate or no weather information. VWOS provides both visual and textual weather data to pilots in near-real time. The FAA has started installing them in remote areas of Alaska, with six sites installed as of July 31 out of 60 total systems to be deployed by the end of 2028. These weather observation sites and cameras are critical for general aviation safety by giving pilots the information they need to make the go/no-go decision or to avoid bad weather. And in Alaska, situational awareness for the pilots translates to the well-being of villagers.

“In these remote villages, an airplane is the only way in and out. So, if there’s no weather information, no one is getting in there,” said Cohl Pope, the FAA’s weather camera program manager. “Pilots rely on information from our weather cameras to make flight decisions to deliver food, medicine, and the things people need to survive in remote villages.”

The FAA is managing more than 200,000 GA aircraft annually, and every day, pilots and air traffic controllers work together to rely on clear communication, shared situational awareness, and mutual trust to keep the National Airspace System running safely and efficiently. Investing in modern technology strengthens that partnership, equipping both pilots and controllers with better tools to enhance safety and improve efficiency. As the nation modernizes its air traffic control infrastructure, these transformative upgrades are only the beginning. ➤

Chris Troxell is a senior communications specialist with the FAA’s Office of Communications.

**LEARN MORE**

FAA’s Modern Skies website  
[modernskies.faa.gov](https://modernskies.faa.gov)

BNACTS Fact Sheet  
[bit.ly/BNATCS\\_FactSheet](https://bit.ly/BNATCS_FactSheet)



An FAA weather camera at Misty Fjords, Alaska, is one of many that give pilots a picture of the area weather in near-real time.



# FAA's eVTOL Integration Pilot Program

*Advancing Aviation's Next Frontier*

*By Ed Goldstein*

It was the genetically modified pig heart that made history.

On July 10, BETA Technologies and United Therapeutics Corporation, in partnership with the Pennsylvania Department of Transportation, flight-tested organ medical-transport capabilities, with a package that included the pig heart. Its flight path encompassed multiple aircraft and airports from Virginia to Maryland using BETA's ALIA electric aircraft.

The flight was the initial operation in the FAA's Electric Vertical Takeoff and Landing (eVTOL) Integration Pilot Program (eIPP) ([bit.ly/eipp\\_wyntk](https://bit.ly/eipp_wyntk)), a three-year project designed to help safely and efficiently integrate advanced air mobility (AAM) aircraft into America's skies.

"The eIPP gives us a real-world environment to safely test and integrate the next generation of aircraft into our airspace system," said FAA Administrator Bryan Bedford. "From urban and rural transportation to lifesaving medical and search-and-rescue missions, these aircraft have

virtually unlimited potential and we're grateful for the partnerships that are helping turn that potential into reality."

The eIPP creates one of the largest real-world testing environments for next-generation aircraft that have the potential to generate new jobs, connect communities, and strengthen American leadership in aviation.



BETA Technologies ALIA CX300 electric aircraft.

Last March, the U.S. Department of Transportation announced the selection of eight projects spanning across 26 states to join the eIPP. The program brings together state, local, and tribal governments with leading U.S.-based AAM manufacturers and operators to test a range of operational concepts, including urban and rural air taxi services, wildfire response, emergency medical response, search-and-rescue, and cargo logistics. The FAA will use the findings from these test flights to better understand operational constraints, validate concepts, refine procedures, and inform future regulations, policy, training, and integration. The motivating idea behind eIPP is that innovation and safety are not competing priorities; they must advance together.

**The eIPP creates one of the largest real-world testing environments for next-generation aircraft that have the potential to generate new jobs, connect communities, and strengthen American leadership in aviation.**

Details about the project leads, participants, and objectives of the eight projects are as follows:

- **Port Authority of New York and New Jersey.** Archer, BETA, Electra, Joby, and other industry partners are collaborating on 12 different operational concepts across New England, including eVTOL passenger operations at the Downtown Manhattan Heliport.
- **Texas Department of Transportation.** Archer, BETA, Joby, Wisk, and other industry partners are supporting regional flights connecting Dallas, Austin, San Antonio, and eventually Houston, with air taxi networks expanding from each city to extend regional reach.



An Ampaire Electric EEL aircraft.

- **Utah Department of Transportation.** Ampaire, BETA, Joby, and other companies will test a wide range of next-generation aircraft and operational concepts across four states spanning the Pacific Northwest, the Rocky Mountains, and the Plains of Oklahoma.
- **Pennsylvania Department of Transportation.** The National Association of State Aviation Officials AAM Multistate Collaborative ([bit.ly/NASAO\\_AAM](https://bit.ly/NASAO_AAM)) will work across 13 states to revitalize regional flights across the country, including routes similar to those supported through the Essential Air Service ([bit.ly/EAS\\_DOT](https://bit.ly/EAS_DOT)) program. Partners include BETA, Electra, and other companies.
- **Louisiana Department of Transportation and Development.** BETA, Elroy Air, and other companies will conduct operations to test cargo and personnel transportation capabilities for flights into the Gulf of America and to energy industry locations in Louisiana, Texas, and Mississippi.
- **Florida Department of Transportation.** BETA, Electra, Joby, and other companies will manage state-wide operations focused on cargo delivery, passenger transportation, automation, and medical response.
- **North Carolina Department of Transportation.** BETA, Joby, and other industry partners will hold piloted medical and regional operations across the state while also developing an autonomous flight operation extending into Virginia.
- **City of Albuquerque.** Working with Reliable Robotics, this project is focused on developing autonomous cargo operations.



A Joby eVTOL aircraft.



An Electra EL9 Ultra Short aircraft.

“These projects cover the full spectrum of AAM use cases — from medical and cargo transport to search-and-rescue operations to carrying passengers and a myriad of other public benefits,” said Sunil Chatani, eIPP team lead within the FAA’s Office of Advanced Air Mobility Technologies. “I’m extremely excited about the direction of this technology and the broad benefits this expanding industry can deliver through the eIPP.”

**eIPP will take into account many variables, including traffic patterns, point-to-point VFR routes, controlled class B airspace with standard instrument departure and arrival procedures, and more.**

Chatani emphasizes that data gathered from the eIPP projects will inform AAM policy-making in an iterative process. “Throughout the program, FAA organizations are evaluating safety risks alongside mitigation strategies, system redundancies, and other critical factors to determine overall readiness to expand operations,” he noted. “The data and operational experience we gain will help us develop the policy and performance standards needed to safely integrate these advanced technologies into the National Airspace System.”



Significantly, the eIPP is being conducted with general aviation in mind.

“We’re taking into account many variables, including traffic patterns, point-to-point visual flight rules (VFR) routes, controlled class B airspace with standard instrument departure and arrival procedures, and more,” said Chatani. “The data we’re collecting can only improve operations for both air carriers and general aviation.” He adds, “Then, as these technologies become more advanced and regulatory pathways become standard, general aviation will incorporate them into a variety of beneficial use cases.”

“With safety as our top priority, we will maximize every opportunity under the eIPP to gather real-world data and operational experience to guide future policies,” noted Chatani.

“The insights we gain from the program will not only accelerate integration of AAM into the NAS but also lay the foundation for future operations and support the continued evolution of this industry through a regulatory and operational framework needed for widespread AAM integration.”

Jim Rose, the director for AAM Technologies in FAA’s Office of Advanced Aviation Technologies is upbeat about the program’s progress. “In the coming months, eIPP operations will complete the initial 90-day phase with operations from each lead partner,” he said. “It’s truly an exciting time!” ➤

Ed Goldstein is a senior communications specialist with the FAA’s Office of Communications.

#### LEARN MORE

FAA’s eIPP Fact Sheet (PDF)  
[bit.ly/eipp\\_fact\\_sheet](https://bit.ly/eipp_fact_sheet)

FAA’s AAM/Air Taxis webpage  
[faa.gov/air-taxis](https://faa.gov/air-taxis)

FAA Press Release on eIPP  
[bit.ly/eipp\\_notice](https://bit.ly/eipp_notice)



# THE FUTURE OF AIRCRAFT PROPULSION

*From Hydrogen to Electric, Cutting-edge Propulsion  
Systems are Pushing Aviation Forward*

*By James Williams*

(Photo courtesy of Joby Aviation)

Light has always been a delicate balance between weight, power, and performance. Our early flying machines were fragile. Their structures were as light as possible, in part, to eke the most performance possible out of the relatively weak and heavy engines of the day. But by the mid-20th century, airplanes had become robust systems capable of doing things that the pioneers could only have dreamed of.

Historically, propulsion technology in general aviation (GA) has advanced less rapidly than in commercial aviation. Even today, many engines are simply improved versions of technology that a mid-century mechanic would instantly recognize. While there's a lot of value in having a proven, reliable technology basis for such safety-critical systems, a lack of dynamic innovation has been apparent.

With new technologies on the horizon, though, general performance may be changing to our benefit. New and different form factors may now move from science fiction to science fact.

**Reduced aircraft noise and vibration and increased operational efficiency are among the key benefits of electric-powered GA aircraft.**

## A Changing Formula

Not all aspects of our future propulsion systems are leading-edge technology. Some of them involve repurposing existing technology. One example is diesel compression ignition. Diesel engines date back to the late 19th century and use air compression rather than a spark plug to ignite the fuel-air mixture in the cylinder. This eliminates the need for spark plugs and their associated systems. Diesel engines are also significantly more thermally efficient than their traditional-fuel counterparts, generating more power per unit of fuel. The downside is additional weight,



A modern compression ignition engine that is in use in the GA fleet. (Photo courtesy of Diamond Aircraft)

as higher cylinder pressures often require heavier engine blocks to withstand the increased load. Modern diesel engines intended for general aviation have one key advantage: they can be certified to run on jet fuel. Jet fuel is usually cheaper than 100LL and can offer significant logistical benefits in environments where only jet fuel (or diesel fuel if approved for the engine) is available. In theory, this could allow some of the GA fleet to adopt a widely available, lower-cost fuel with a long-track record.

Electric power is another option that is coming soon to the GA world. A number of GA electric aircraft models are in various stages of development. We have covered a few in our previous issues (Jul/Aug 2021 and Nov/Dec 2018).

Reduced aircraft noise and vibration and increased operational efficiency are among the key benefits of electric-powered GA aircraft. While traditional internal combustion engines provide about 30% thermal efficiency, and diesels can approach 50%, electric motors are usually 95% or more efficient. The downside is that their fuel, or more correctly, their fuel “tanks” are far less energy dense.

This means the weight of the battery required for a given flight time is greater than the weight of the equivalent amount of combustion fuel for that same flight time. This is why the initial market targeted by electric aircraft is usually for flight training and short-hop air taxis. The shorter flight duration and breaks between lessons, along with the concern about lower operating costs, make it a logical first step. Depending on electricity costs, pilots could see fuel costs per hour drop dramatically, as one prototype aircraft projects an 80% reduction.

Hydrogen is another fuel attracting significant research and development attention. There are several advantages to hydrogen fuel, including no direct emissions other than water and heat. While several hydrogen fuel approaches can be used, including direct combustion, hydrogen fuel cells (HFC) are the most promising. Through a chemical reaction combining hydrogen and oxygen, electricity is produced, which is then used to power electric motors and other required systems. While the HFC portion of the aircraft is still in development, the powerplant and other systems can be sourced from existing technologies supporting battery-electric aircraft.

**Hydrogen has among the highest energy densities of any fuel, making it desirable to pursue hydrogen fuel cell technology alongside battery-electric.**

Hydrogen has among the highest energy densities of any fuel, making it desirable to pursue HFC technology alongside battery-electric. HFC-powered electric aircraft



An experimental hydrogen-powered aircraft that is used to learn about hydrogen use in aviation. (Photo courtesy of H2Fly)



A photo of a hydrogen-powered aircraft refueling. (Photo courtesy of H2Fly)

could address some of the range challenges of current and even future batteries. But, like any system, there are challenges beyond those normally encountered in technology development. At normal ambient conditions, hydrogen is a gas, meaning you must either compress it or cool it for any practical use as a fuel.

Automotive applications have favored compression, but aviation has experimented more with cooling. This isn't just a little bit of cooling, though. To liquefy hydrogen, temperatures should be about 20° Kelvin (K), or about -253°C/-423°F. To maintain temperatures around 20°K, fuel is stored in vacuum-sealed insulated tanks, sometimes referred to as a dewar or dewar flask. Because of this requirement, liquid hydrogen is a cryogenic fuel. Cryogenic liquid hydrogen has been used, particularly in rocketry, for quite some time, but it requires special handling. There are long-established safety procedures to address this, but that

means refueling isn't as simple as pulling up to a pump or a fuel truck. Storage is also more challenging, as even the best dewars will still warm over time. This can lead to a slow boil-off of the liquid hydrogen. It's not a major issue during operations, but for longer storage, it becomes more of a factor. While many challenges still exist, several serious operators are working hard to address them and realize the high potential of hydrogen fuel. These new operators will be flying in areas and at altitudes heavily trafficked by GA pilots, which means there will be some new aircraft shapes to look out for.

### The Need for Speed

Another frontier of advancement is speed, more specifically, supersonic flight. We've been flying supersonic since the late 1940s, and commercial passengers followed suit in 1976 with the introduction of the Concorde. While the Concorde was a technological marvel, it faced several operational challenges. First, the aircraft was very loud. Whether it was the direct noise from the four afterburning turbojets or the sonic boom created by the aircraft at cruise speed, the noise concerns led to a ban on overland supersonic flight by civil aircraft that will remain in place until the final rule publishes, which is expected next summer. Second, the operational costs were very high due to fuel, maintenance, and other issues.

**Another frontier of advancement is speed, more specifically, supersonic flight.**





An experimental aircraft designed to test sonic boom shaping. (NASA photo by Jim Ross)

Particularly at higher speeds, the faster you want to go, the more power you need to get there.

The Concorde used afterburners to increase thrust for takeoff and to accelerate to a cruise speed

of around Mach 2. For an airliner, this is almost unheard of due to the massive increase in fuel flow required. The only other notable example is the Tupolev Tu-144, which coincidentally was the Soviet response to the Concorde.

To address the first challenge, the FAA issued a Notice of Proposed Rulemaking ([bit.ly/4wWzMkw](https://www.federalregister.gov/d/2026-07-02)) on July 2, 2026, in response to an executive order that would replace the current ban with a performance-based standard to allow the development of quiet, boomless supersonic aircraft. There are several civil projects working towards this goal, using modern technology and design to modify the sonic boom to make it as unperceivable as possible at the surface.

Removing the regulatory barrier will allow more people to work on addressing operational cost challenges. With advances in materials and engine efficiency, supersonic travel may become more affordable. Supercruise (the ability to cruise at supersonic speeds without the use of afterburners) was a relative rarity in the days of the Concorde's development. The Concorde could supercruise, but normally used afterburners to accelerate to cruise speed. The irony is that military aircraft would rarely cruise at supersonic speeds, while a civilian airliner would. A notable exception was the SR-71 Blackbird family of aircraft, which had to employ continuous afterburners to do so.



(Image courtesy of Joby Aviation)

Today's engine technology enables more aircraft to supercruise, resulting in dramatically reduced fuel burn during supersonic flight. Combined with more sophisticated modeling and design systems, additive manufacturing, and modern materials, the costs of supersonic travel could be reduced to levels much more affordable than in prior generations.

GA applications in this realm are limited, although there have been some proposed business airplanes in the modern supersonic revival. In the future, GA pilots may need to be aware of these aircraft in the NAS, as their unique design may require some specialized operating procedures. Supersonic propulsion could also open up new employment opportunities for pilots looking to advance their aviation careers.

## The next 20 years could truly be an aviation revolution to remember.

### Warp Speed Ahead

With these advancements, along with those in other facets of aviation, we stand at the edge of a potential revolution in aircraft propulsion. We've seen several of these before. We entered World War II with biplanes still in frontline service and ended it with operational jet aircraft. Through the 1950s and 60s, jet aircraft went from subsonic to cruising at two to three times the speed of sound. In the 2000s, general aviation saw composite construction grow from a small share of production aircraft to become the best-selling aircraft available today. Now the propulsion systems are catching up. Cutting-edge technologies like electric propulsion are being proven at smaller scales, making them more readily available for adoption in GA aircraft. These new forms of propulsion have enabled aircraft such as tiltrotors and ducted fans that were not practical before. With the rollout of new regulations, like those in the MOSAIC final rule (see this issue's article *Mastering MOSAIC*), and the industry's relentless spirit/pursuit of innovation, more options will be available. The next 20 years could truly be an aviation revolution to remember. ▶

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

### LEARN MORE

FAA Hydrogen-Fueled Aircraft Safety and Certification Roadmap  
[bit.ly/4xABbh0](https://www.faa.gov/hydrogen)

FAA Supersonic Flight  
[faa.gov/supersonic](https://www.faa.gov/supersonic)



# THE ARCHITECTS OF INNOVATION

*How the FAA's Emerging Technologies Division  
is Shaping the Future of the NAS*

*By Nicole Hartman and Rebekah Waters*

Employees within the Emerging Technologies' General and Commercial Aviation Branch attend a drone pilot training event at Virginia Tech in Blacksburg, Va.

**A**s the National Airspace System (NAS) continues to evolve, the integration of drones and advanced air mobility (AAM) has moved from theoretical discussion to operational reality.

Central to this transformation is the FAA Flight Standards Service's Emerging Technologies Division. It provides a single, unified point of oversight within Flight Standards for these rapidly advancing technologies. The division's complex yet vital mission is to ensure innovation flourishes without compromising a century of American safety standards. From package-delivery drones to the next generation of electric vertical flight, the Emerging Technologies Division serves as one of the agency's primary architects for normalizing advanced operations and new entrants.

It's worth learning about this group and how they're turning emerging concepts into standardized procedures and what these changes mean for pilots, controllers, and operators.

## The "Unified Hub" Strategy

Centralizing drone and AAM operational oversight within the Emerging Technologies Division simplifies the landscape for both operators and the general aviation community. The service ensures consistent, repeatable decision-making across

**From package-delivery drones to the next generation of electric vertical flight, the Emerging Technologies Division serves as one of the agency's primary architects for normalizing advanced operations and new entrants.**

the board that accelerates policy development, while the division remains grounded in risk management. "We do not always 'get to yes,' but we do produce carefully considered decisions that provide options for forward movement, aligned with the safety-risk continuum in mind," shared Joe Morra, the manager of the division.

To make that forward movement as efficient as possible, the division functions as a "one-stop shop" for operators and manufacturers. Rather than trying to navigate complex regulatory requirements alone, industry partners enter a structured path early on.

"We have what we term a 'product development lifecycle' for emerging technologies," said Morra. "Interested parties can start with the Integrated Proposal Document (IPD) process, where we answer questions and begin a working relationship."

Through this unified lifecycle, novel technologies progress seamlessly through aircraft evaluation, policy development, live operations, and oversight under the division's Safety Assurance Branch.



UAS Safety Specialist Roberto Ingrao and Aviation Safety Inspector Sergio Lopez practice drone piloting at Virginia Tech.

## From Waiver to Normalization

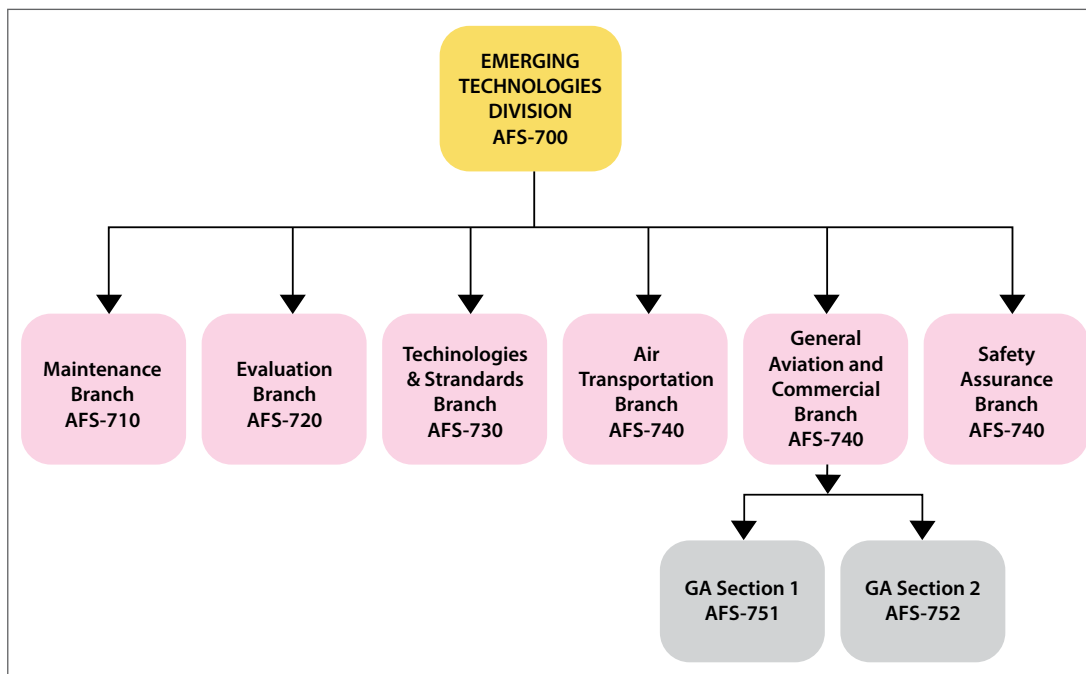
Keeping pace with rapidly advancing technology requires clear pathways to normalize operations within the NAS. The Emerging Technologies Division plays a central role in guiding new concepts from the "experimental" stage into routine integration. The key to this evolution is data collection — leveraging lessons learned from the high volume of waivers and exemptions the division processes.

"Once we have identified safe and scalable pathways for normalizing a particular technology or type of operation through waivers and exemptions, we can use the data to solidify policy," said Morra.

Ideally, this shift would occur through rulemaking; however, rulemaking is not the only mechanism for establishing policy.

"We have been able to normalize drone light shows, first responder operations, and agricultural operations through standard waiver and exemption templates," shared Morra. "When something is new, we gather data, conduct operator site visits, and continue to modify the provisions in the waivers until we have sufficient knowledge and data to show we can create a standard waiver for low-risk operations that are similar in nature."

A prime example of data driving regulatory change is 14 CFR section 107.29. Between 2016 and 2021, the FAA processed thousands of individual part 107 night-operation waivers. Analyzing data across those approvals allowed the agency to establish proven safety standards. Rather than continuing to require repetitive individual waivers, the FAA codified those requirements directly into section 107.29, permanently streamlining the process for operators.



The Emerging Technologies Division organizational chart.

## The Innovation Onramp

Regardless of what the new technology is, the Emerging Technologies Division follows an established process for how Flight Standards intakes, evaluates, and manages new entrants.

Lessons learned from working with drones have built a strong foundation for other new technologies, and the process embodies the FAA's longstanding safety management system (SMS) principles.

However, the steps below do not account for the critical work of engaging industry, building relationships, and considering new ideas before they're brought to the FAA. Often, meaningful work to understand new technologies and the industry players developing aviation innovations is already happening before formal requests are received. This is a key component of the division's success.

The Emerging Technologies Division's process for new entrants:

1. **Intake/Initialize/Hypothesize** — intake new concepts and technologies, analyze, identify hazards, develop safety risk management (SRM) plan
2. **Test** — research, evaluation/validation, operational suitability demonstrations (OSD)
3. **Record** — document SRM, draft policy, retain artifacts
4. **Incubate/Implement** — implement safety assurance, transition to the field when appropriate

transition to the field when appropriate

The building blocks of SMS — SRM (identify hazards, test/validate); policy (create policy, implement); safety assurance (monitor) — have informed our drone work and serve as the basis for our process to safely enable new and emerging entrants. By maintaining an unprecedented level of safety, this process is keeping the United States the leader in global aviation technological development.



## The building blocks of SMS have informed our drone work and serve as the basis for our process to safely enable new and emerging entrants.

### Looking Ahead

With AAM functions growing, the division is focused on normalizing electric vertical takeoff and landing (eVTOL) aircraft operations. A key driver is the FAA's eVTOL Integration Pilot Program (eIPP), which partners with eight state and local agencies across 26 states. The division is leveraging real-world insights from these initial eIPP operations to shape effective safety standards and policy.

"In the drone sphere, we learned early on that the key to effective drone integration was incremental implementation," said Morra.

This "crawl-walk-run" approach allowed small-scale operations to generate vital safety data without disrupting broader airspace. Flight Standards is applying this same proven blueprint to eVTOL integration.

For traditional pilots and aviation professionals wondering how these changes affect their daily environment, the division's message is clear: the NAS can increase in complexity while simultaneously becoming safer.

Automation plays a pivotal role in this shift. By pairing human oversight with automated systems, the industry can reduce workload while enhancing overall airspace safety. Integrating SMS principles ensures that these automated systems are evaluated using proactive, data-driven decisions.

Ultimately, modern collision avoidance requires shifting from relying solely on visual "see-and-avoid" out the cockpit window to establishing shared electronic situational awareness across all aircraft — traditional and new entrants alike.

Centralizing this work ensures new entrants are normalized safely. It is not merely about adding aircraft to the sky, but creating the standards that allow traditional flight operations and emerging technologies to seamlessly coexist. ➤

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

### LEARN MORE

FAA Safety Management System (SMS)  
[bit.ly/faasms](https://bit.ly/faasms)

Advanced Air Mobility  
[bit.ly/AAM-airtaxi](https://bit.ly/AAM-airtaxi)

The eIPP: What You Need to Know  
[bit.ly/eipp\\_wyntk](https://bit.ly/eipp_wyntk)

## DIVISION MISSION STATEMENT

Guided by the principles of safety and efficiency, our mission is to unleash the benefits of innovative and technologically advanced drone operations in the U.S. and global aviation ecosystems.

### Goals 2026-2030

Our goals and objectives for the next four years align with the FAA's three guiding pillars: People, Safety, and NAS Modernization in *Flight Plan 2026*. After all, Safety is our North Star, our People are our best asset, and NAS Modernization is crucial.

#### 1 Leverage Technology

- Transition the FAA's workforce from drone integration to normalization. (People)
- Create a specialized inspector workforce for drones. (People)
- Identify and implement training needed for routine operational oversight. (People)

#### 2 Position the Workforce

- Implement regulatory flexibility by issuing waivers under Section 927 of the FAA Reauthorization Act of 2024. (Safety)
- Engage with the International Civil Aviation Organization (ICAO) to address safe drone operations over the high seas. (Safety)
- Issue and implement the BVLOS rule. (NAS Modernization)

#### 3 Modernize Regulations and Regulatory Tools

- Prioritize research to identify and address the benefits and risks of using counter-UAS systems in the NAS to promote safety and security. (Safety)
- Conduct research to facilitate use of technologies for air domain awareness. (NAS Modernization)
- Leverage the Safety Framework for Aircraft Automation to enable more complex drone operations. (NAS Modernization)

#### 4 Utilize Cutting-Edge Research & New Frameworks

- Incubate innovative safety concepts on a modern technology cycle rather than a traditional governmental timeline. (Safety)
- Shift from a NAS that accommodates the least equipped users to a modern NAS built on electronic situational awareness. (NAS Modernization)
- Build on the success of drone normalization to accelerate emerging technology programs such as the eIPP. (NAS Modernization)

## SUPPORTING THE NEXT GENERATION OF PILOTS

It is no secret that many pilots are hesitant to disclose a mental health condition and treatment. There is concern that if one does so, they will be grounded for an excessive period or even permanently. Frankly, there is some truth to the concern, for the practical reason that delays in required evaluations were occurring due to a huge surge in new pilot applications, mirroring the airlines' hiring.

Compared with previous generations, many new pilots had been diagnosed with attention deficit hyperactivity disorder, anxiety, or depression, and treated with medications. At the same time, we were able to expand the list of acceptable medications one can take and still fly, which also increased the number of cases to review. I would like to share some of the steps that the FAA has taken to address these issues.

We published guidance for aviation medical examiners (AME) permitting them to issue a medical certificate despite a mental health diagnosis or use of medication when circumstances allow. This has enabled many pilots to walk out of the AME's office with their certificate in hand rather than waiting for FAA review and approval after undergoing a mental health evaluation.

We also made several recent changes to the mental health section of the AME Guide. This is part of our ongoing effort to demystify the

approval process and to encourage pilots and controllers to seek treatment early. While we have traditionally focused on the aviator's condition and its remission status, we want to emphasize the pilot's insights, transparency in the review process, aviation safety and operational performance, and resilience to prevent/mitigate future problems.

For almost all medical conditions, the earlier treatment begins, the greater the likelihood of success and the less onerous the treatment. Unfortunately, some pilots delay treatment/help due to fear of potential grounding. We want to bridge the gap between your own self-assessment/self-grounding (14 CFR section 61.53) and an official diagnosis from a doctor. For pilots, this means that grounding might not be necessary, and when it is, the duration is minimized. On the other hand, avoidance of early treatment or disclosure of a mental health condition can often result in more time out of the cockpit, which can potentially impact flight safety. Let's clear up some of the confusion.

### **Q. Is therapy always reportable?**

**A.** Not always. Counseling from a member of the clergy or an employee assistance program counselor generally is not reportable unless that person is also a licensed counselor.

Counseling is useful for many common issues, such as life stresses, divorce, family loss, work issues, etc., and can help keep a situation manageable. We encourage counseling when appropriate and do not want pilots to hesitate to seek it when it can be helpful.

### **Q. Can I continue to fly while I see a licensed counselor?**

**A.** Frequently, the answer is

“yes.” The underlying question is “Am I safe to fly?” If the answer is “yes,” then there is no need to ground yourself. However, a pilot should self-ground and seek evaluation if symptoms significantly impair concentration or memory, emotional regulation, decision-making, overall functioning, and sleep/energy levels.

You can find the self-assessment requirement in 14 CFR section 61.53 ([bit.ly/14CFR61\\_53](https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-61/subpart-B/section-61.53)). If you are unsure of commercial services that offer advice, checking with a trusted and reliable pilot friend can be very useful.

### **Q. Do I need to report counseling immediately?**

**A.** No. There is no requirement to report this to the FAA prior to renewing your medical certificate. However, compliance with 14 CFR section 61.53 still stands.

### **Q. I am concerned that if I seek counseling, I will be grounded for an extended period and not be able to fly. My pilot friends tell me that I should tough it out.**

**A.** We find this concerning for two reasons. First, if a problem requires you to be grounded, letting it fester will only make it harder to treat and prolong your time away from flying. Second, pilots who seek treatment early demonstrate good judgment, which may allow them to return to flying more quickly. We also address these concerns in an FAQ sheet in the AME Guide, available at [bit.ly/4pXxUWP](https://www.faa.gov/air_traffic/flight_info/aeronav/14CFR61.53) (PDF).

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





## KNOW THE RULES BEFORE OPERATING DRONES OVER PEOPLE

Every year, a community organization in Palm Tree, New York, hosts several large outdoor events that regularly attract more than 10,000 attendees. But at a recent holiday celebration, there were several uninvited guests: numerous drones flying over the crowd.

“The drone activity appeared unsafe and raised significant safety concerns,” said Burach Lowy, event coordinator for the Congregation Yetev Lev. “We also witnessed a drone crash during the event, which could have resulted in serious injuries had it struck someone below.”

Lowy contacted the FAA for guidance about available reporting and enforcement options.

### Operations Over People

This organization has valid reporting options that could lead to serious legal and financial enforcement actions against the drone operators. Remote pilots may not operate over people, for any duration, unless they have a category-compliant drone or a waiver. Both part 107 rules and recreational flight statutes governed by 49 U.S.C. section 44809 do not permit operations over people, as well as over moving vehicles. Operating a drone illegally over people or dense crowds can trigger swift consequences from the FAA, alongside potential state and local law enforcement interventions.

### UNAUTHORIZED REMOTE PILOTS MAY NOT OPERATE DIRECTLY OVER LARGE OUTDOOR EVENTS OR OPEN-AIR ASSEMBLIES OF HUMAN BEINGS.

#### Complying with Part 107

The expansion of part 107, effective April 21, 2021, enabled limited operations over people without requiring an individual waiver when using a compliant drone. These operations require the use of a compliant drone that meets predefined weight, design, and safety standards set by the FAA. Without an official category-compliant drone, any operation over people requires an approved waiver.

#### Recreational Flyers

To comply with the limited exception (14 CFR) for recreational flyers, anyone flying under section 44809 is mandated by federal law to strictly adhere to the FAA-approved safety guidelines of an FAA-recognized community-based organization, or CBO. Currently, there are no FAA-approved safety guidelines from any recognized CBO that permit recreational drone flights directly over open-air crowds or gatherings. Depending on the drone's weight, anyone operating over people or moving vehicles is governed by either 14 CFR part 107 or part 91.

Recreational flyers who fly outside of CBO guidelines instantly lose the statutory exemption and are treated as operating under part 107 rules. If not in compliance with all part 107 rules, including holding a remote pilot certificate, non-compliant pilots face

targeted administrative compliance and enforcement actions and possibly criminal charges under 18 U.S.C. section 39b for the unsafe operation of a UAS, as enforced by the Department of Justice. If approached by law enforcement, drone operators must immediately show:

- Their remote pilot certificate (if the flight is governed by part 107)
- Photo identification
- Drone registration documentation
- Any airspace authorizations or waivers that enable the specific flight

Drone pilots should always use good judgment and maintain safe lateral and vertical distances from people or moving vehicles. When not using a category-compliant drone, this means keeping the aircraft positioned exclusively over unoccupied ground, vacant parking structures, or clear open spaces, rather than directly above a crowd. Operators must also maintain visual line of sight with the aircraft without relying solely on first-person view monitors, while strictly keeping altitude below 400 feet above ground level.

Better yet, leave the aircraft safely packed away at home, and enjoy the gathering safely from the ground!

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

#### LEARN MORE

Operations Over People Overview, FAA webpage  
[bit.ly/OpsOverPeople](https://www.faa.gov/flightstandards/flightoperations/ops/ops-over-people)

Part 107 Waivers, FAA webpage  
[bit.ly/107Waiver](https://www.faa.gov/flightstandards/flightoperations/ops/part-107-waivers)



## AIRCRAFT MAINTENANCE UNDER REMOTE CONTROL



When it comes to safety and maintenance efficiency, one key aspect is the ability to accurately diagnose and address aircraft faults. Understanding new technologies in aircraft system diagnosis methods and airplane fault detection techniques is crucial for ensuring reliable and safe operations.

Remote technology encompasses a range of tools and methods that use video, audio, imaging, or communication systems to support maintenance or inspection activities performed from a location other than the immediate inspection area. Technologies currently used in aviation maintenance environments include robotic systems, augmented reality, virtual reality, remote visual inspection equipment, remote diagnostic systems, virtual maintenance technologies, and small unmanned aircraft systems (sUAS). Conducted in accordance with applicable regulations and approved procedures, remote technology can support maintenance and inspection activities by offering access to inspection areas that may be elevated, confined, or difficult to reach, improving inspection efficiency, supporting data collection, and facilitating communication between personnel.

### Going Remote

Typically, general aviation (GA) operators don't have the benefit

of commercial airline budgets or massive corporate infrastructure. For private owners, flight schools, and small-scale maintenance shops, the focus shifts to cost-efficiency, accessibility, and local problem-solving owner-assisted maintenance. General aviation maintainers have technology options that give a high priority to compact, cost-effective hardware and software solutions, without sacrificing critical diagnostic power.

Remote diagnostic systems may use sensors, predictive analytics, and data communication systems to monitor aircraft systems and support identification of maintenance conditions, system degradation, or potential failures. These systems may collect operational data, such as temperature, vibration, pressure, or system status, to support maintenance planning and troubleshooting. Virtual maintenance technologies may include augmented reality, virtual reality, and small drones to support maintenance troubleshooting, task guidance, and system visualization.

### Beyond the Wrench

Rather than deploying complex, high-cost enterprise network architectures, general aviation operators are successfully implementing highly practical, consumer-grade technology platforms to achieve powerful results:

- **Augmented Reality (AR):** Using tablets or lightweight smart glasses, technicians can overlay 3D wiring layouts and torque specifications directly onto physical hardware, keeping their hands free. AR also enables instant, real-time visual collaboration with off-site senior maintenance technicians to diagnose difficult faults.

- **Virtual Reality (VR):** VR headsets replace the real world with fully interactive 3D simulations. Flight schools and maintenance teams use VR for risk-free, muscle-memory training and procedural familiarization on complex components without taking aircraft out of service.
- **sUAS/Drones:** Lightweight commercial drones quickly perform rapid visual sweeps of elevated, hard-to-reach aircraft structures — such as vertical stabilizers, rudders, or upper fuselage and wing surfaces — greatly reducing the safety risks associated with ladders, stands, or scaffolding.

### The Regulatory Caveat & Hangar Practices

While remote tools act as incredible capability multipliers, operators must align their usage with traditional safety and regulatory standards. The following hangar rules ensure safety remains paramount:

- **The Tactile Boundary:** Remote technology is a supportive tool, but cannot replace physical presence when direct tactile assessment, manual manipulation (such as checking cable tension or control surface play), or non-destructive testing is required. If sensory checks are necessary under part 43, a qualified mechanic should perform the task.
- **Secure Hangar Connections:** Broadcasting live audio and video feeds introduces potential cybersecurity vulnerabilities. Always protect your shop's network by applying basic Cybersecurity and Infrastructure Security Agency (CISA) guidelines, including enabling multi-factor authentication



(MFA) and not reusing administrator credentials across tools.

- **Part 107 Drone Compliance:** Any sUAS operations conducted around the hangar or ramp for aircraft inspection must comply with 14 CFR part 107. Drone pilots must be licensed, aircraft must be registered, and operations must strictly respect airport airspace boundaries and local flight guidelines.

The use of remote technology is intended to support and enhance maintenance and inspection activities. Unless specifically authorized by applicable regulations, approved maintenance programs, or approved maintenance data, remote technology does not replace required inspection methods, maintenance procedures, or personnel qualifications.

Jessica Kruse is an analyst with the Aircraft Maintenance Division within FAA's Flight Standards Service.

### Regulatory Compliance Notice:

Under 14 CFR, section 43.13, remote technology must not diminish the effectiveness or independence of required inspections. The certificated individual signing the return-to-service (RTS) release holds full legal liability and must maintain sufficient direct involvement to verify conformity with approved data. Stop the session immediately if video clarity, lighting, or latency degrades.

### Technology Reference Quick-Guide

| TECHNOLOGY             | HANGAR PRACTICALITY                                                                                                                | SAFETY & REGULATORY ADVICE                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| AR Glasses and Tablets | Projects hands-free wiring layouts, torque values, and facilitates live see-what-I-see troubleshooting with remote experts.        | 20-10 Routine: Limit smart-glass sessions to 20 mins, followed by a 10-minute visual rest break to prevent fatigue. |
| VR Simulator Headsets  | Enables immersive, standalone procedural familiarization and risk-free system fault troubleshooting training in classrooms.        | Ensure simulation spaces are clear of physical obstructions; cap session lengths to mitigate visual strain.         |
| sUAS/Drones            | Conducts quick, high-resolution visual sweeps of elevated, hard-to-reach structures like vertical stabilizers and hangar ceilings. | May require a license under part 107. Drone video cannot replace required hands-on tactile evaluations.             |

# VA SAFETY IT'S OK TO STAY

**SOMETIMES THE BEST  
DECISION A PILOT CAN MAKE  
IS DECIDING TO STAY...  
AND THAT'S OK!**

Empowering pilots, operators, and safety leaders to make deliberate decisions, communicate clearly, and have the confidence to pause when conditions demand it.

Access our full resource library at  
[verticalavi.org/safety/ok2stay](https://verticalavi.org/safety/ok2stay)



LEAH MURPHY

## FLIGHT PATH TO A JUST CULTURE

As a wide-eyed, eager, and oh-so-naïve helicopter student pilot, Leah Murphy walked into her flight school one afternoon, prepared for a ground lesson, when she noticed an unusual energy among the instructors. The chief pilot's door was shut, but muffled shouting leaked through the walls. Gaggles of instructors and students whispered to each other, glancing nervously toward the office. As she set her backpack down, she wandered over to a small group and asked what was going on.

### CHARTER AND TOUR OPERATORS MUST DEVELOP AND IMPLEMENT AN SMS BY MAY 28, 2027.

A flight instructor, Joe (not his real name), had an engine overspeed.

With no more than twenty hours in her logbook, she didn't fully understand what that meant. But she understood enough from the room's tension that it wasn't good, and that whoever "Joe" was, his day was not going too well. The instructors' hushed tones and the chief pilot's raised voice made one thing abundantly clear: mistakes were punished, not learned from. That moment was her earliest exposure to negative safety culture, and it shaped her understanding of how deeply culture influences safety outcomes in helicopter operations.

Today, industry has evolved far beyond those closed-door reprimands and whispered post-incident rumors. One of the most significant drivers of this shift has been the implementation of a structured safety management system (SMS), not only as a best practice, but now as a regulatory requirement. In 2023, the FAA expanded the

14 CFR part 5 SMS requirements to tour operators flying under section 91.147 and charters operating under part 135.

SMS implementation marks a deliberate move toward a proactive, data-driven approach to helicopter safety. It formalizes processes to ensure hazards are identified early and addressed systematically rather than reactively. At its core, SMS comprises four key components: Safety Policy, Safety Risk Management, Safety Assurance, and Safety Promotion. Together, they create an environment where you do not wait for an accident or incident to reveal weaknesses in training, procedures, or communication.

**Safety Policy** establishes organizational expectations, leadership accountability, and a just culture — something that was starkly absent in the "Joe" scenario. The required SMS implementation means leaders can no longer rely on fear-based management or inconsistent responses to errors. They must define clear policies that support reporting, transparency, and constructive learning.

**Safety Risk Management** provides operators with a structured process to identify hazards and assess associated risks before they escalate into an event. Under the FAA's requirements, SRM is no longer optional or informal; it must be continuous, documented, and integrated into every operational decision.

**Safety Assurance** verifies that risk controls are working through trend analysis, audits, data collection, and feedback loops. For helicopter operators, this can include monitoring approach profiles, reviewing recorded flight data (if equipped), analyzing maintenance discrepancies, or tracking procedural compliance.



**Safety Promotion** reinforces the cultural transformation. Training, communication, and shared lessons learned help normalize reporting and reduce the stigma associated with errors. In a required SMS environment, operators must ensure that every employee understands the SMS and their role within it. This would have completely changed the culture I witnessed as a student pilot; instead of a closed-door scolding, there would have been an open discussion, a teaching moment, and a safety bulletin or debrief for the greater learning of the school.

The FAA is building systems that actively hunt for hazards, verify the effectiveness of their controls, and, most importantly, foster an environment where reporting an error, such as Joe's preventable engine overspeed incident, is seen as a contribution to collective safety, not a career-ending mistake. Ultimately, the successful implementation of SMS is what makes helicopter operations not only compliant but fundamentally safer.

Leah Murphy is a dual-rated flight instructor and helicopter air ambulance pilot. She is also an FAA Safety Team Representative in Cleveland, Ohio.

#### LEARN MORE

FAA's SMS webpage  
[bit.ly/faasms](https://bit.ly/faasms)

NBAA's SMS Guide for Small Operators  
[bit.ly/NBAASMS](https://bit.ly/NBAASMS)

IHST's SMS Toolkit  
[bit.ly/IHSTSMS](https://bit.ly/IHSTSMS)



Check out our GA Safety Facebook page at [Facebook.com/groups/GASafety](https://www.facebook.com/groups/GASafety).

If you're not a member, we encourage you to join the group of nearly 17,000 participants in the GA community who share safety principles and best practices, participate in positive and safe engagement with the FAA Safety Team (FAASafetyTeam), and post relevant GA content that makes the National Airspace System safer.



### Uninvited Guests

We received the following email in the [SafetyBriefing@faa.gov](mailto:SafetyBriefing@faa.gov) inbox:

*Our community holds several large outdoor events on public streets each year. These events attract more than 10,000 attendees, and our annual Lag BaOmer event is among the largest, drawing over 50,000 people. At our recent Lag BaOmer event, numerous drones flew over and near the crowd. Some of the drone activity appeared unsafe and raised significant safety concerns. We also witnessed a drone crash during the event, which could have resulted in serious injuries had it*

*struck someone below. Given the size of these gatherings and the potential risk to public safety, we would like to better understand what options may be available to help prevent unsafe drone operations at future events.*

*We would appreciate guidance regarding:*

- *FAA procedures for large outdoor public events.*
- *Available reporting and enforcement options.*
- *Whether local law enforcement can coordinate with the FAA before and during such events.*
- *Any recommendations for event organizers seeking to improve drone safety around large crowds.*

— Burach L.

Thanks for reaching out, Burach! Your inquiry inspired the Drone Debrief section of this issue. First, you should call 911 if there is a direct physical threat. Next, you should report this activity to your local Flight Standards District Office ([bit.ly/3DAkYPt](https://bit.ly/3DAkYPt)). Be sure to include as many details as possible (e.g., date, time, location, drone make/model/color/features, estimated altitude/flight path, photos or videos, operator's location and description if known). And read Drone Debrief to find out more about regulations that prohibit drone ops over people and the consequences for violating them. You can also reach out to the FAA UAS Support Center at [faa.gov/uas/contact\\_us](https://faa.gov/uas/contact_us).

### Mobile Clearance

Recently, the FAA announced it is moving forward with Mobile Clearance, a new digital tool that will allow general and business aviation pilots to request departure clearances through approved flight applications instead of over the radio. The new tool will:

- ✓ *Improve communication and accuracy*
- ✓ *Reduce readback errors*
- ✓ *Strengthen controller focus*

Initial feedback on social media has been 👍👍👍

*I used Mobile Clearance for the first time the other day, and it worked great! I asked the controllers and they said they liked it as well. Excited to see this continue to roll-out across the country, hopefully easing workload and improving accuracy at the same time.*

— Joshua B.

*Can't wait for it to come to my local airfield!*

— Wayman Alfredo L.

*Excellent progress. Every trusted digital interaction removes friction while improving safety and situational awareness. Mobile Clearance demonstrates how digitizing critical operational processes can reduce errors and increase confidence. The next evolution is connecting these trusted workflows across operators, airports, FBOs, regulators, and passengers so aviation intelligence follows the flight from planning through completion. Great work by the FAA.*

— Jacob B.

---

*Let us hear from you! Send your comments, suggestions, and questions to [SafetyBriefing@faa.gov](mailto:SafetyBriefing@faa.gov).*

*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 District Office or air traffic facility.*

## AI IN AVIATION

In the last year or so, nothing has been hotter than the topic of artificial intelligence (AI). It seems every business is touting its revolutionary new product that is either AI-powered or enabled. The vast majority of these pitches are the wishful thinking of an on-trend marketing department. But access to useful AI tools has never been more widespread, and these tools are becoming increasingly useful by the day. They are being used more and more in place of search engines and for researching topics by some users. What does that mean in the aviation world?

### Dot Com Redux

In many ways, it's not that different than the early days of the internet. Anyone who was around for those heady times will remember all the hope and genuine enthusiasm generated by access to so much information. Near-seamless communication across the globe had arrived, and it felt like the entirety of human knowledge was at your fingertips. It wasn't long after that that people learned not everything on the internet was true. Whether it was an honest mistake, satire, or active deception, we quickly learned to adopt the proverb of "trust, but verify."

When acting as pilot-in-command (PIC), we are responsible for all aspects of the flight, including the briefing, planning, and background research. The same applies to our aeronautical research and education; we are the "learner-in-command." This doesn't mean a pilot must know everything possible about a topic, but that they must make an effort to ensure what they have learned is correct. Pilots relying on AI sources should be wary. Many AI models are built by scraping data from various sources, often

the entire internet. The old computer science mantra of GIGO (garbage in, garbage out) is hard to completely eliminate, but AI can be helpful in distilling a large amount of information into more digestible chunks. It can also allow the user to ask specific questions that fit their exact circumstances. Additionally, some models have ongoing capabilities that allow pilots to task them with assignments and build capabilities over time.

### Ghosts in the Machine

There are subtleties about AI in general and each AI model in particular that create challenges to their use. One of the biggest challenges is referred to as hallucinations. In the AI world, a hallucination is when a model will, with absolute confidence, lie to you. It may not be a lie per se, but it will be a horrifically wrong answer stated with absolute conviction and, at times, provided with completely made-up sources. For example, an AI model may say Class D airspace is uncontrolled, which is not true. If the inquirer is familiar with the subject, this will be rather obvious, but if they aren't, it can lead to a huge misunderstanding. Another concern is that AI models tend to be overly sycophantic, trying to ingratiate themselves with the user. This means that they might not be as direct in answering questions as we would like.

Additionally, AI is not a monolith. There are many models from various providers, each with their own strengths and weaknesses. For example, some models were notoriously bad at math, even basic math. They could provide excellent summaries of complex topics but couldn't keep up with a junk-quality desk calculator



from the 1980s in math. It seems counterintuitive that a model could be so impressive in one aspect and lackluster in another, but what a model is built for matters. So, selecting the right model for the right task is important. And remember, these models are constantly changing. That can lead to improvements in some areas and reduced performance in others.

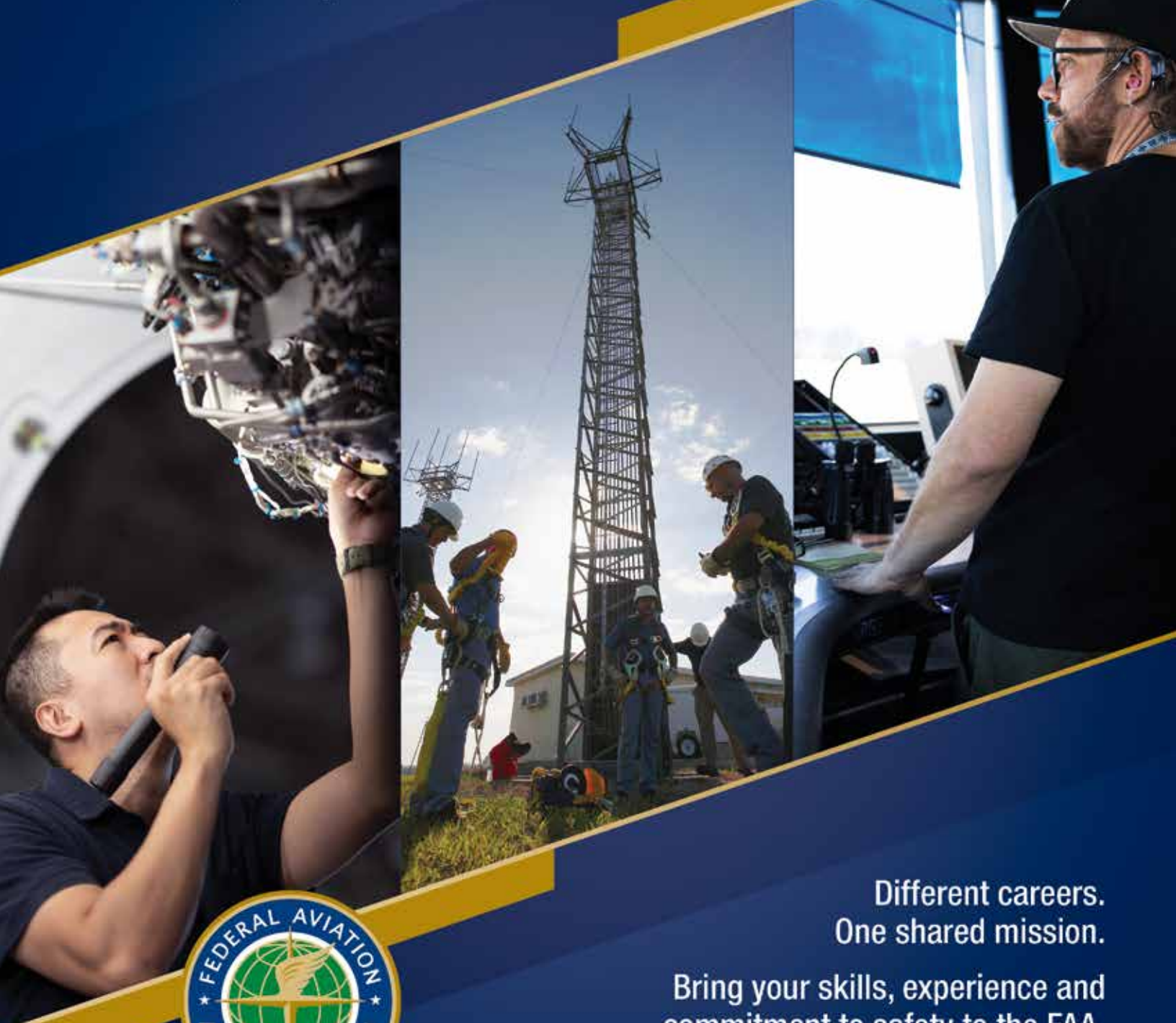
Does this mean AI is useless? No, it can be a very useful tool. But like any tool, it requires training to get the most out of it. For example, you could task AI to monitor weather conditions and forecasts along a certain route in the days before a flight to help inform your briefing. Also, like any tool, it can be dangerous to use it without familiarity. Try experimenting with different models and ask around to see if other pilots have suggestions. Following our "trust, but verify" approach, pilots should look for reliable sources to verify any AI statements. This can help evaluate how good a model is at a task. The FAA can provide some of that information. A good starting point would be the library of handbooks at: [bit.ly/faahandbooks](https://bit.ly/faahandbooks).

*Editor's note: AI model recommendations were not provided to avoid endorsing any specific models and because recommendations may not be as valid by the time this article reaches publication.*

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

# Safety Takes *All* of Us

Every safe flight is supported by dedicated professionals working across the National Airspace System.



Different careers.  
One shared mission.

Bring your skills, experience and  
commitment to safety to the FAA.

**START YOUR CAREER AT THE FAA**  
[www.faa.gov/jobs](http://www.faa.gov/jobs)



## LAURIE ARMETTA

*Advanced Air Mobility Section Manager, FAA's Emerging Technologies Division*



From the flight deck of a Boeing 747 to the cutting edge of advanced air mobility, Laurie Armetta's aviation journey is

driven by a profound love for aircraft and an unwavering commitment to safety.

As a manager focused on advanced air mobility safety assurance within the FAA's Emerging Technologies Division, Armetta is helping to pave the way for the next generation of flight.

Born in Brooklyn, New York and grounded in her Italian roots, Armetta's early life was defined by travel, including regular summer trips to visit family in Sicily. Her passion for aviation was ignited at age 5 during a flight out of JFK Airport. Wandering away from her mother upon boarding an Alitalia Boeing 747, she headed straight for the cockpit. Instead of being sent back to her seat, the pilot sat her in the co-pilot's chair and showed her the flashing instruments. That experience planted the seed for her future in aviation.

When her family moved to Boca Raton, Florida, Armetta pursued every opportunity to get closer to airplanes. At 15, while seeking a flight training scholarship, she began volunteering with local airframe and powerplant (A&P) mechanics. "As much as I liked flying, I learned that I loved fixing airplanes," she recalls.

At 17, Armetta joined the Navy as an aviation machinist's mate, maintaining F-18 engines. After her military service, she earned her A&P

certificate and an associate degree in aviation maintenance management. Her career grew rapidly as she worked as a night shift mechanic, chief inspector, and quality assurance inspector for commercial airlines and repair stations. She later completed a bachelor's degree in aviation administration and ran her own successful aviation consulting firm for six years.

Seeking to make a lasting impact on aviation safety, Armetta joined the FAA in September 2010, taking a position at the Flight Standards District Office (FSDO) in Anchorage. Her time in Alaska was filled with unforgettable experiences, including serving as the principal maintenance inspector for aircraft operating around Denali National Park and experiencing her first glacier landing. She later transferred back to Florida to care for her ailing mother, eventually stepping into a frontline manager role at the South Florida FSDO.

In February 2026, Armetta stepped into her current role within the Emerging Technologies Division's Safety Assurance Branch, which was established to unify FAA oversight of drones and advanced air mobility (AAM). Today, Armetta's team manages the transition of pioneering electric vertical takeoff and landing (eVTOL) manufacturers into certifi-

cate management.

A major pillar of her current workload is the eVTOL Integration Pilot Program (eIPP), an initiative to safely deploy AAM vehicles into the National Airspace System (NAS). In March 2026, the FAA selected key state departments of transportation and city entities as partners to build out this framework.

"We perform the same duties as a standard FSDO, but our focus is strictly on UAS and integrating revolutionary eVTOL aircraft into the skies safely," Armetta explains.

Armetta offers clear reassurance — these systems are built with multi-layered safety protocols and are not "flying blind." She highlights three core concepts for safe co-existence:

- **Fly Cooperative:** Keeping active transponders or ADS-B Out enabled ensures autonomous aircraft can instantly track traditional planes.
- **The Corridor Model:** Initial AAM routes will be segregated into specific altitudes and predefined transit corridors, keeping them safely separated from traditional traffic.
- **Detect-and-Avoid:** Autonomous systems utilize onboard radar, optical vision, and transponders to detect and avoid nearby aircraft faster than human reaction time.

Looking ahead, Armetta envisions a transition from piloted to fully autonomous operations, driven by digital traffic management networks and hybrid-electric propulsion systems. Through it all, her mission remains clear: keeping the skies safe for every pilot, passenger, and future aircraft.



Paul Cianciolo is an aviation safety analyst and associate editor for *FAA Safety Briefing* magazine. He is a U.S. Air Force veteran and an auxiliary airman with Civil Air Patrol.



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

800 Independence Ave., S.W.  
Washington, D.C. 20591

*FORWARDING SERVICE REQUESTED*

Official Business  
Penalty for Private Use \$300

# Look Who's Reading *FAA Safety Briefing*

*"Keeping current with FAA Safety Briefing — that's how we roll.  
Smoke on!"* — Titan Aerobatic Team

