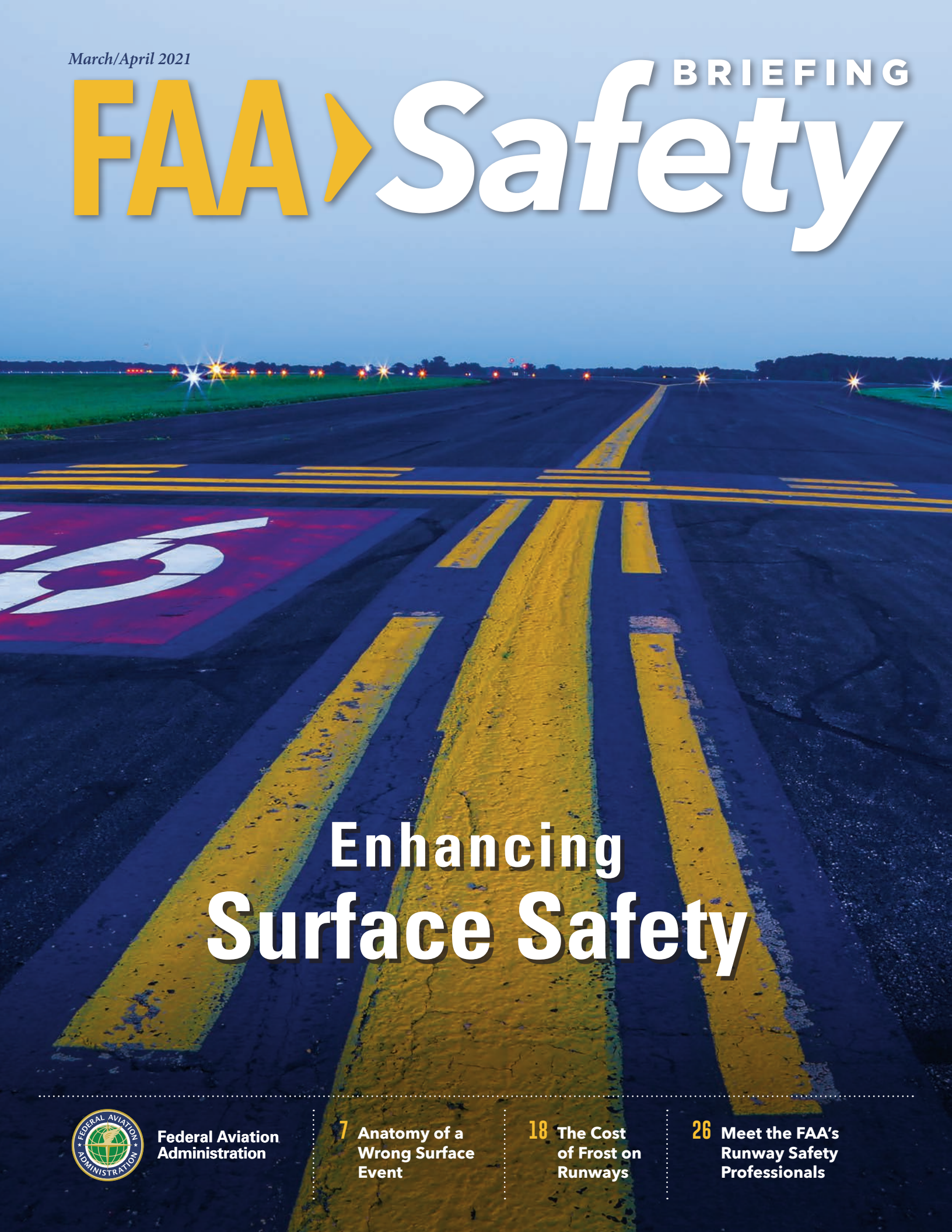
March/April 2021

FAA Safety BRIEFING



Enhancing Surface Safety

Federal Aviation Administration

U.S. Department
of Transportation

**Federal Aviation
Administration**

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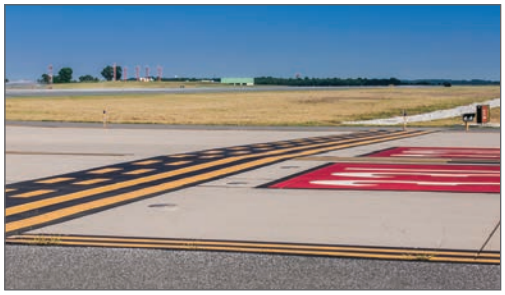
ABOUT THIS ISSUE ...



The March/April 2021 issue of *FAA Safety Briefing* focuses on the many facets of airport surface safety. Feature articles and departments provide a "road map" to the various tools, resources, and strategies airmen can use to steer clear of risk during the ramp-to-runway segment of their journey. We look at some technology advances, both inside and outside the cockpit, that are proving effective in the battle against runway incursions and surface safety events. We also take a behind-the-scenes look at the FAA's surface safety stewards, the men and women who manage the agency's Runway Safety Program and who regularly depend on your feedback.

Cover photo courtesy of Civil Air Patrol Lt. Col. Robert Bowden.

Contact Information
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Comments or questions should be directed to the staff by:

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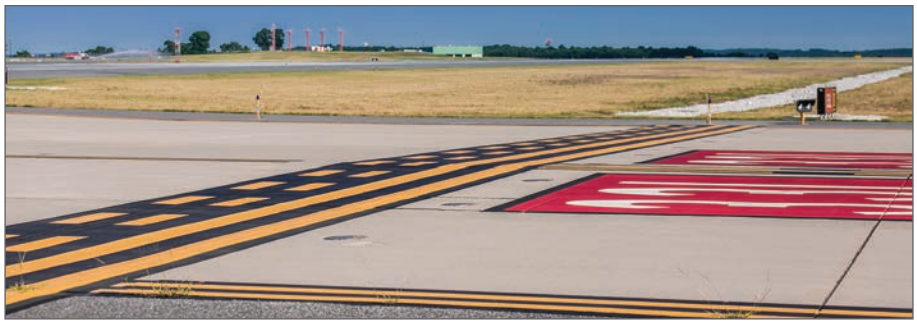
FAA Safety BRIEFING

The FAA Safety Policy Voice of Non-commercial General Aviation

DEPARTMENTS

THE SCOOP ON SURFACE SAFETY



When questions arise about aviation safety, most people — including aviators — tend to focus on the actual flying. That's understandable, because we all know that if something goes wrong while aloft, it's not possible to simply pull over to the side of the road to investigate. When trying to reassure skittish passengers, pilots tend to serve up the old saw about the drive to (or from) the airport being the most dangerous part of the trip. But what about the part of the trip to or from the ramp to the runway? This portion of a flying trip is too often overlooked, dismissed as being the "easiest" or "safest" part of an air journey.

Not so fast. Statistics show that surface-related mistakes are far too common and, as accidents like the 1977 Tenerife crash involving two fully loaded and fully fueled jumbo jets, the level of danger can be monumental. Even without bad weather (e.g., the thick fog that factored heavily into the Tenerife event), airports can be immensely complicated and even confusing to navigate. At smaller airports, complacency can create that "how-hard-can-it-be?" mindset that lures the unwary into mistakes (e.g., those arising from multi-tasking).

As far too many pilots can attest, you never think *you* could be "that" pilot, the one who gums up ground operations and gets an invitation to call ATC after parking the plane. But it happens, and it happens too often. That's why the FAA has a robust Runway Safety Program, whose mission is to decrease the number and severity of surface-related events. That's also why the team has chosen to focus this issue of *FAA Safety Briefing* magazine on this critically important aspect of aviation safety. Even if you think you've heard and taken all the surface safety tips to heart, you can still learn from the material in this issue.

What's in a Name?

You'll hear a lot of terms related to airport surface safety. To be sure we're all on the same page, here's the official "what's what."

Runway Incursion. A runway incursion is any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for aircraft landing and takeoff. For obvious reasons, runway incursions are the main source of surface risk in the National Airspace System (NAS). Examples include the following: (a) An aircraft fails to stop and crosses the runway holding position markings without a clearance. (b) An aircraft takes off or lands on the correct (or incorrect) runway without a clearance.

Runway Confusion. This term describes landing or departing, or attempting to land or depart, from the wrong runway or from a taxiway. Runway confusion is a subcategory of either a runway incursion or surface incident, and you may hear this kind of activity described as a "wrong surface event," or WSE. These incidents have become a top priority for the FAA.

Runway Excursion. You might think of an "excursion" as something fun, but a runway excursion is a trip to avoid — as you can probably guess, it describes veering off or overrunning the runway surface.

Surface Incident. A surface incident is an unauthorized or unapproved movement within the designated movement area (excluding runway incursions), or an occurrence that actually or potentially affects safety of flight in an area associated with the operation of aircraft. Surface incidents can arise from a mix of other causes. For example, the overflight incident involving Air Canada 759 at the San Francisco airport a few years back was a surface incident attributed to runway confusion.

Surface Event. This one describes an occurrence at an airport involving a pedestrian, vehicle, or aircraft on the defined airport movement area that involves either a runway excursion, or an incorrect presence, unauthorized movement, or occurrence that affects or could affect the safety of flight of an aircraft. For example, an aircraft taxis from the ramp non-movement area into a taxiway (movement area) without a clearance.

With that in mind, you're cleared to proceed into the information-packed pages ahead!

AVIATION NEWS ROUNDUP

Photo courtesy of Cirrus Aircraft

Listen for Emergency Autoland Broadcasts

Three aircraft have been certified with Emergency Autoland (EAL) systems in 2020: the Piper M600, the Daher TBM 940, and the Cirrus Vision Jet SF50.

EAL systems can perform an emergency landing in the event of suspected pilot incapacitation. When these systems are activated, the autopilot will begin to announce its intentions on air traffic frequencies. Here's what other pilots in the area should know about EAL systems.

EAL can be activated in three ways:

1. EAL senses erratic flying, stabilizes the aircraft, and checks for pilot responsiveness; if no input, EAL activates.
2. Emergency Descent Mode (EDM) activates. After descending, EAL checks for pilot responsiveness; if no input, EAL activates.
3. EAL can be manually activated by a pilot in distress or a passenger.

Once EAL activates, the aircraft will automatically squawk 7700 and broadcast an advisory on the aircraft's last pilot-selected frequency and on Guard (121.5) as follows: "*Mayday, Mayday, Mayday, November One Two Tree Four (N1234), Emergency Autoland activated, standby for more information.*"

After the initial broadcast, there will be a 25-second pause for air traffic control (ATC) to move conflicting traffic. The next alert broadcasts the following: "*N1234, pilot incapacitation, XX miles southwest of KABC, landing KXYZ airport. Emergency Autoland in XX minutes on Runway 00.*"

The aircraft then begins maneuvering to the selected landing airport. Subsequent broadcasts will be on Guard. After initial activation, it will immediately broadcast on Guard if the destination changes due to weather or other factors. As necessary, the aircraft descends in the hold at the final approach fix for landing at the emergency airport.

The EAL system selects a suitable landing airfield based on several factors: weather, wind, runway length, and towered/non-towered airport status. EAL selects towered airports over non-towered airports where possible, and uses runway requirements that depend on the aircraft type. If the system loses the GPS signal, the airplane continues straight flight without attempting to land until GPS coverage resumes.

The EAL will broadcast on the appropriate ATC frequency or common traffic advisory frequency (CTAF) within 12 miles of the landing airport. Subsequent broadcasts at intervals repeat information and update time to landing. After landing, EAL broadcasts at 90-second intervals on tower/CTAF and 5 minutes on Guard as follows: "*Disabled aircraft on Runway 00 at KXYZ airport.*"

New Safety Data Tool Available

The new Dynamic Regulatory System (DRS) makes it easier to research aviation safety guidance material. DRS combines more than 65 document types from more than a dozen different repositories into a single searchable application. This comprehensive knowledge center consolidates aviation safety guidance material from the FAA's Flight Standards Information System (FSIMS) and its Regulatory Guidance System (RGL).

Each guidance document includes a link to the Code of Federal Regulations provision on which the document is based. A search engine allows for basic or advanced searches and different ways to sort and view the results. The system includes pending and current versions of all documents along with their revision history. Information in the DRS is updated every 24 hours.

The DRS exceeds the requirements of the FAA Reauthorization Act of 2018 to establish a centralized safety database. DRS is constantly evolving, and in the future will provide even more features, functionality, and document types. It will allow the agency to eventually sunset legacy systems such as FSIMS and RGL. Go to drs.faa.gov to use the online tool.

Photo courtesy of NASA.

FAA and NASA Strengthen Partnership in Commercial Space Activities

The FAA and the National Aeronautics and Space Administration (NASA) signed a new memorandum of understanding (MOU) to support commercial space activities related to the transport of government and non-government passengers, cargo, and payloads for both orbital and suborbital missions.

Under the MOU, the FAA and NASA will build a stable launch and reentry framework for the U.S. space industry that is transparent and avoids conflicting requirements and multiple sets of standards. The two agencies will also advance a point-to-point commercial suborbital pilot program with designated spaceports and airspace designs, among other elements, to support this revolutionary form of long-distance air transportation.

The MOU will also aid the FAA and NASA in advancing public safety, facilitate new space technologies and areas for research opportunities, and share medical data on the effects of spaceflight among occupants of space vehicles and space habitats.

An FAA license is required to conduct any commercial space launch or reentry, the operation of any launch or reentry site by U.S. citizens anywhere in the world, or by any individual or entity within the United States.

Weather Cameras Test Starlink Satellite Internet

The FAA Weather Camera Program (WCAM) is conducting a beta test with Starlink, a satellite constellation in development with SpaceX, which will soon provide internet access to public users worldwide. The constellation will eventually consist of more than 42,000 mass-produced small satellites operating in low earth orbit that work in combination with a group of ground transceivers.

"I believe the potential of the Starlink system will transform WCAM operations, both on the ground as well as in the cockpit," says Walter Combs, WCAM manager. "Think of it as a Wi-Fi datalink that delivers data sets from WCAM facilities to the cockpit. If the Starlink service lives up to all the hype, it will definitely transform aviation, both piloted and unpiloted, worldwide," he added.

Starlink currently has over 800 satellites in orbit, with dozens more being launched each month. They have enough satellites in orbit over Alaska and Canada to offer beta testing to interested and qualified participants.

Next steps for the WCAM team will be to refine the operational design, assess the overall service, and work with SpaceX to provide feedback and help tailor operations to better support the program's needs. For more information on FAA weather cameras, visit weathercams.faa.gov.

Photo courtesy of NASA.

2020 a Record Year for FAA Commercial Space Activity

A record number of launches, new streamlined launch and reentry licensing regulations, and a historic licensed crewed mission are some of the noteworthy commercial space transportation achievements.

In 2020, the FAA licensed 41 commercial space operations (launches and reentries), the most in the agency's history. Those operations included a record 39 FAA-licensed launches, including the first-ever NASA crewed mission to be licensed by the FAA. For 2021, the FAA is forecasting the number of licensed operations to reach 50 or more. For more, go to faa.gov/space.

FLY SAFE
Fact Sheets

Visit **bit.ly/GAFactSheets** *for more information on these and other topics.*

MARCH

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

APRIL

Angle of Attack (AOA)
An AOA indicator can help pilots detect this otherwise invisible airfoil position and avoid a stall.

FAA WELCOMES NEW FEDERAL AIR SURGEON

Challenges and crises often lead to stronger organizations on the other side of them. 2020 was certainly a challenge for the Office of Aerospace Medicine (AAM). But the organization I take over as Federal Air Surgeon (FAS) is now stronger for it. While the general aviation (GA) audience was understandably concerned about maintaining general health and medical certification in an incredibly challenging environment, AAM had other challenges in addition to those.

I served as the FAA medical subject matter expert to ICAO's COVID-19 response activities and on the FAA COVID-19 Incident Management Team (IMT). I also served as the AAM liaison to the Air Traffic Organization. AAM serves as the medical certification standards body for air traffic controllers. AAM has been functioning as a key advisor to FAA leadership in how to continue critical operations in the safest possible way and how to implement Centers for Disease Control and Prevention (CDC) recommendations. We also had to balance how to continue our own normal certification operations while protecting our staff. This led to some changes that will likely improve our process going forward, but we will have more information on those changes in the future.

An Introduction

In 1985, I earned a bachelor's degree in chemistry from the Ohio State University, followed by a medical degree in 1989. I added a master's degree in public health from the University of Texas in 1994. I enjoyed a great career in the U.S. Air Force, where I had the honor of serving as the U.S. Head of Delegation to NATO's aeromedical working group, and I later retired as a colonel. I then spent several years as the Regional Medical Director for aircrew and passenger services at Delta Airlines. I joined the FAA in 2007 as the Regional Flight Surgeon (RFS) for the Southern Region and eventually a Senior RFS before serving as acting deputy FAS. In addition, I've authored scientific papers on subjects as diverse as accident investigation, the use of sleep aids by pilots, cabin air quality, and bioterrorism. Having worked in various military and civilian roles at the local, regional, national, and international levels will hopefully help in guiding the Office of Aerospace Medicine forward.

> BUT PERHAPS MORE IMPORTANTLY TO THE READERS OF THIS PUBLICATION, I'M A PRIVATE PILOT.

A Family in Flight

But perhaps more importantly to the readers of this publication, I'm a private pilot. My husband is a former U.S. Air Force F-16 and retired airline pilot and both of our sons are private pilots. So I not only understand the concerns of GA airmen from an academic standpoint, I live them and I am surrounded by them. My husband also holds a flight instructor certificate and continues to instruct in his post-airline aviation career. In addition, he holds an Airframe and Powerplant aviation maintenance technician certificate. That last one has come in handy in maintaining our Harvard MkIV (better known as a T-6 Texan) from circa WWII. We're also restoring a Stearman biplane to add to the family fleet. So our family clearly understands the critical role GA plays, not only as the foundation that much of aviation is built on, but also as an avocation to be aspired to. You might even say it's become something of a family business.

So while my primary objective as FAS is to ensure that we have the safest National Airspace System in the world, I remain firmly committed to the policy of getting as many airmen into the air as safely as possible. I truly understand just how important a medical is to most pilots.

LEO M. HATTRUP, M.D., FAA MEDICAL OFFICER

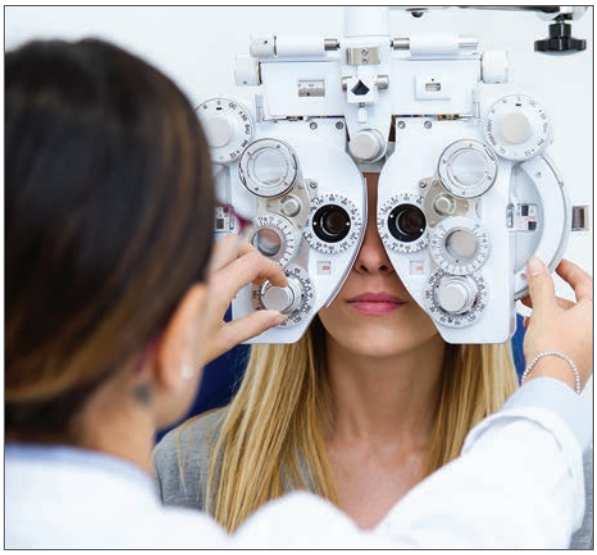
AS FAR AS THE EYE CAN SEE

Sight is the most important sense we use in aviation. From pre-flight to taxi, and in all aspects of flight, sight is key — especially when it comes to "seeing" and avoiding any risks or conflicts.

Visual standards for Class I and II airman medical applicants require having, or correcting to, 20/20 far vision and 20/40 near vision in each eye separately. Class III medical applicants must have or correct to 20/40 vision, near and far. Color vision adequate for the safe performance of aviation duties is necessary for all classes. Pilots who choose an alternate pathway from FAA medical certification can fly using the limitations on their driver's license. These visual standards can be as low as 20/50 in some states and many have no color vision requirement.

Consider the current standards as minimums to ensure safety. Better vision increases the time one has to react. Consider two aircraft five miles apart approaching each other head-on at 125 knots each. The closure speed of 250 knots means they will meet in 72 seconds. Spotting an aircraft head-on from five miles away can be challenging. The cues available at five miles for someone with 20/20 vision are not available until 2½ miles — a closure time of 36 seconds — if your vision is 20/40. How often do we find ourselves heads-down looking at a map/tablet, checking an approach plate, or programing the GPS? What if the other pilot is also heads down? The big sky theory sounds good, but there are many choke points and no mandated altitude separation at or below 3,000 feet above ground level. Try timing how long it takes you to perform routine cockpit tasks (with a safety pilot, of course). It could be an "eye-opener."

The FAA strongly encourages all pilots to obtain their best corrected vision. We allow use of spectacles or contact lenses in general. However, we do not permit monovision lenses (i.e., one lens corrects near and the other far vision) or contacts that only correct for near vision. Bifocal or multi-focal contact lenses are acceptable. We generally permit other surgical corrections, although after monovision surgery you will need a six-month stabilization period before applying for a medical flight test and statement of demonstrated ability. Earlier approval is possible if you wear corrective lenses. So it's a good idea to discuss any proposed changes to your current (approved) method of correction with your aviation medical examiner (AME) first.



Your examiner checks your color vision using an approved testing device at the time of the examination. Those who do not pass this testing can opt for an operational medical test. This includes correctly identifying the colors on a signal light test and reading a sectional chart. Historically, we considered color vision adequate for aviation if the pilot passed the operational test. However the current aviation environment is much more color rich, which creates challenges for someone with color deficiency. Even if they can interpret the displays, they may take longer to do so and risk is increased. Even if you have been cleared by the FAA, if you do have a color deficiency, try reading a sectional chart in different light conditions and the aircraft color displays on the ground, and then have an instructor check you again in flight. Note that while color deficiency is typically an inherited condition, it can also be caused by certain medications and diseases. There is no cure for a color deficiency. Glasses advertised as a "cure" actually filter out some light wavelengths. They can improve contrast, but we prohibit their use because they can block some colors on a sectional chart and colored displays.

One final thought. If you need glasses or contacts, carry a spare pair. Glasses break and get lost and contacts fall out. Having a backup just might save the day, and your flight.

Leo M. Hattrup, M.D., received a bachelor's degree from Wichita State University, a master's in public health from Harvard University, and a doctorate from Vanderbilt University. He is retired from the U.S. Air Force in which he spent the majority of his career in aerospace medicine. He is board certified in aerospace and occupational medicine. He is a certificated flight instructor and enjoys flying airplanes, helicopters, and gliders.

The Anatomy of a WRONG SURFACE EVENT

Discernment Through Dissection

City of Chandler Photo.

By Nick DeLotell

Use this QR code to follow along with our companion animation at: www.runwaysafetysimulator.com/wrongsurfaceevent.html

As you roll out of the right turn from base to final, you're lower and closer than normal. That was expected, and you grin as you remember how you love it when a plan comes together. You did a circling approach after all. You're slightly inside a half-mile final.

Visually, you're rolling out on the extended centerline and you note the Precision Approach Path Indicator (PAPI) on the left. You look for the runway numbers as you do a cursory glance down the runway, but your eyes move quickly back inside. Manifold pressure coming back to 18 inches, speed checks at 110 knots, final flaps now in transit, gear down and locked.

You begin focusing on the Touchdown Zone Markings as you cross over the airport fence. It's been another great day; clear skies, calm winds, the smell of leather and avgas, and your baby has been purring like the 300 horsepower kitten she is. All you have to do is grease the landing. Ready … set …

That's when you see it.

You're about to rear-end a helicopter that's hovering above the Touchdown Zone!

Your heart rate doubles. Your breathing stops. Your pupils dilate, and your grip tightens as your body instinctively reacts. Somehow, your brain manages to broadcast an SOS to your left arm that says, "Bank, don't pitch!" Before you know it, you're in a violent evasive right turn. You settle on a course that's generally straight downfield between the parallel runways, beginning your actual go-around as you pass mid-field.

> **Possible pilot deviation, advise you contact tower at this phone number after you park …**

You cleared the helicopter by about 50 feet. You intuitively kept it on your side of the airplane for visibility, but you narrowly missed the windsock as a result. Things like this tend to excite Air Traffic Controllers; as you regain your senses, you realize what they are trying to communicate to you.

You were cleared to land on the parallel runway, not the one in use by the helicopter. You finally land safely and check in with the ground controller. Hiding your emotions, you acknowledge the final transmission. "Possible pilot deviation, advise you contact tower at this phone number after you park …"

You're no fledgling, so just how in the name of Wilbur could this have happened?

FAA Photo by Bryan Dahlvang.

Gross Anatomy

The word anatomy is from the Greek *ana temnein*, meaning, "to cut up." Just like in the medical connotation, we can dissect and study this event for the benefit of all. That's exactly what we did when we published the *Anatomy of a Wrong Surface Event* animation series on the Runway Safety Pilot Simulator (www.runwaysafetysimulator.com).

A trait we all share as humans is mortality. In facing that, some of us choose to donate our remains to science, or the aviation equivalent of sharing our flight information, in the interest of training future doctors or pilots. Thus we contribute to advances in medicine or aviation, and in making positive impacts on future generations. The FAA's Compliance Program facilitates that sharing through an open, problem-solving approach that allows safety problems to be studied though an exchange of information. When you share safety-related information, we get better at identifying the things that threaten aviation safety.

Let's look at how we dissected this event, what we learned about it, and what it means to you.

> **When you share safety-related information, we get better at identifying the things that threaten aviation safety.**

The Human

The pilot in this case had been flying an average of 37 hours per year for the past 33 years. However over the past four years, the pilot had averaged about 15 hours per month, and even more so over the past 90 days. The private pilot was instrument current, was a certified pilot in other foreign countries, and had some glider hours logged as well. With a valid medical certificate, a good training record, and no history of violations, you'd be hard pressed to find a better example of a general aviation (GA) pilot.

How do you relate? Are you a "rustier" pilot, or perhaps less experienced? Are you a seasoned pro with more experience and qualifications? Would you be surprised if I told you that it didn't matter?

It doesn't matter.

The ego-busting trait we share as pilots is the fact that we're all humans. Humans make mistakes, and given the right combination of variables, we're all susceptible to the same traps and errors.

The Machine

The five-year-old aircraft in this scenario was a well-equipped, high-performance, complex, single-engine airplane. Like the pilot, it had a good maintenance record, no history of discrepancies, and you'd be hard pressed to find a better example of a GA aircraft.

Does it matter? Yes! Most runway incursions or other surface incidents like this wrong surface event (WSE) involve airplane single-engine land aircraft with less than 400 horsepower. Multi-engine and sea airplanes are still well represented, just to a much lesser extent.

What kind of aircraft will you be flying next?

The Setting

This event occurred mid-morning in visual meteorological conditions (VMC) conditions within busy Class D airspace. This matters too, because nearly all WSEs occur in daylight VMC conditions in Class C or Class D airspace. The trend clearly indicates (pun intended) that we humans have some visual acuity issues.

> **_Few_ of us have had a close call. _All_ of us are susceptible to the same traps and errors that can lead to them. It really could have been you.**

So trust, but verify! Check out the article, "Sound on the Ground" in this issue to learn what you can use inside the cockpit to verify what you see outside of it.

The Sequence

We encourage you to refer to the Runway Safety Pilot Simulator animation *Anatomy of a Wrong Surface Event; Episode 1* to see how this event played out.

Following the completion of a practice RNAV (GPS) approach to Runway 28L, the pilot was instructed to circle south of the airport making right-hand traffic for Runway 10R. The Air Traffic Control Tower (ATCT) was also working with a helicopter in left-hand closed traffic on Runway 10L.

Due to the hangar location, the pilot requested Runway 10L. The ATCT replied, "Have your request," but then cleared the pilot to land as planned on Runway 10R.

The rest is history.

Eureka

The word eureka, from the Greek *heur*ēka, means "I have found it." Picking up where we left off, you secure your airplane and then call the ATCT in response to the "possible pilot deviation," aka the *Brasher Notice*. The purpose of the *Brasher Notice* is not to give angry controllers the opportunity to scold pilots. The intent is to give you an opportunity to make note of the event and to collect your thoughts in preparation for a conversation with a Flight Standards Service inspector.

The conversation with Flight Standards is all about information sharing and analyzing the many factors that contributed to the event. That's where the Compliance Program really begins, and where you first recognize the FAA's evolution towards a "just culture." During the conversation, you and the inspector review the Air Traffic Control audio of the event and retrace every detail of the flight. There is consideration of honest mistakes, and a very positive interaction. You're relieved to find yourself speaking with another mere human, one who can totally relate to your experience!

In this case, the investigation reveals several contributing factors.

- Unusually complex airspace that forced you to modify the circling approach. The airspace offers limited space for base and final approach legs.
- Loss of situational awareness when you failed to recognize several radio transmissions that should have alerted you to the presence of the helicopter operating on the parallel runway.
- Expectation bias when you requested the more convenient runway (10L), but never mentally acknowledged that you were cleared to land on the parallel (10R).
    - You're reminded that ATCT phrases like "roger" and "on request" are not approvals or clearances.

Eureka!

For the Benefit of All

The Compliance Program is all about accountability and correction, not blame and punishment. Based on the results of the investigation, you and the FAA took the following actions:

- You voluntarily submitted a detailed NASA Aviation Safety Reporting System (ASRS) report.
- You voluntarily completed several applicable online courses via the FAA Safety Team (FAASTeam).
- You agreed to participate in a Remedial Training Program with the FAA, where you accomplished a flight review with the local designated pilot examiner.
- You maintained your spotless pilot record.
- The FAA published a Notice of Proposed Rule Making (NPRM), which proposed changes to the local airspace that provide additional protections for circling.
- The FAA created several outreach products that bring awareness to the common factors associated with WSEs.

Looking back, you're appreciative of the journey and your good fortune. You have your health, you've made some new friends at the FAA, you're a better pilot, and you have one heck of a story to tell. We are all that much safer for it.

Few of us have had a close call. *All* of us are susceptible to the same traps and errors that can lead to them. It really could have been you. Heed the advice we offer in this issue and fly (and taxi) safely, my friends.

Nick DeLotell is an aviation safety inspector in the FAA's Flight Standards Service in collaboration with the Runway Safety Group. He holds an airline transport pilot certificate, flight and ground instructor certificates, and is a remote pilot.

LEARN MORE

From the Flight Deck
faa.gov/go/fromtheflightdeck

Runway Safety Pilot Simulator
www.runwaysafetysimulator.com

HOT SPOTS! PART DEUX

Don't Get Burned at Airport Hot Spots

By Paul Cianciolo

Unless you're filming a live-action movie, you don't need to worry about dodging chickens shot across your windscreen or avoiding a piano on the taxiway that's tossed out of a helicopter. All you need to worry about is keeping your cool while you taxi around the airport surface and take note of any noted hot spots.

An airport surface hot spot is a location on an airport movement area with a history or potential risk of collision or runway incursion where heightened attention by pilots and ground vehicle drivers is necessary.

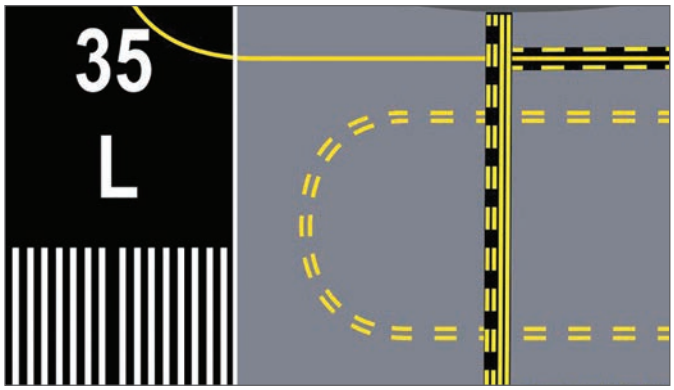
Runway Incursion

Any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Most runway incursions are caused by general aviation pilots.

"We'll Settle This the Old Navy Way: First Guy to Die, Loses."

All too often at airports in the national airspace system, pilots fail to hold short of or they cross active runways when they are instructed to taxi *to* a runway or a specific spot on the airport. Whether the runway is active or not, a specific clearance is required to cross any runway. A clearance to taxi to a runway *is not* a clearance to taxi onto that runway. Pilots have failed to hold short of a runway after receiving, and in some cases, after correctly reading back hold-short instructions from the tower. Pilots have also crossed hold-short lines, and held short of the white runway edge markings. While the aircraft may not be on the runway itself, it is still within the runway safety area intended to protect aircraft taking off or landing on that runway.

Another common runway incursion happens when a pilot is issued a clearance to taxi to a specific runway but doesn't understand that this clearance does not authorize them to cross any other runway encountered on the way to that assigned runway. When the tower issues a taxi clearance, they will first state the runway assignment followed



A clearance to taxi to a runway is not a clearance to taxi onto that runway. Hold at the hold short line, not the white runway edge marking.

by the detailed taxi route. It's important to listen carefully for any runway hold-short instructions.

Make sure you read back all hold-short instructions *with* your call sign. If you omit this, the tower will ask you for the runway hold-short read-back. Remember that you are not authorized to cross any runway enroute to your destination runway, even if it is inactive, unless you've received a clearance to do so.

It's important for pilots to understand the various taxiway signage and markings and actively scan for them. Many airports across the country have installed above ground signage including runway guard lights and enhanced taxiway centerline markings. However, these helpful tools won't do any good if the pilot is rushed or preoccupied with head-down tasks within the cockpit and don't see the signs. This sort of error could lead to a go-around for landing traffic or an aborted takeoff for departing traffic. At worst, this could lead to a collision.

Roger

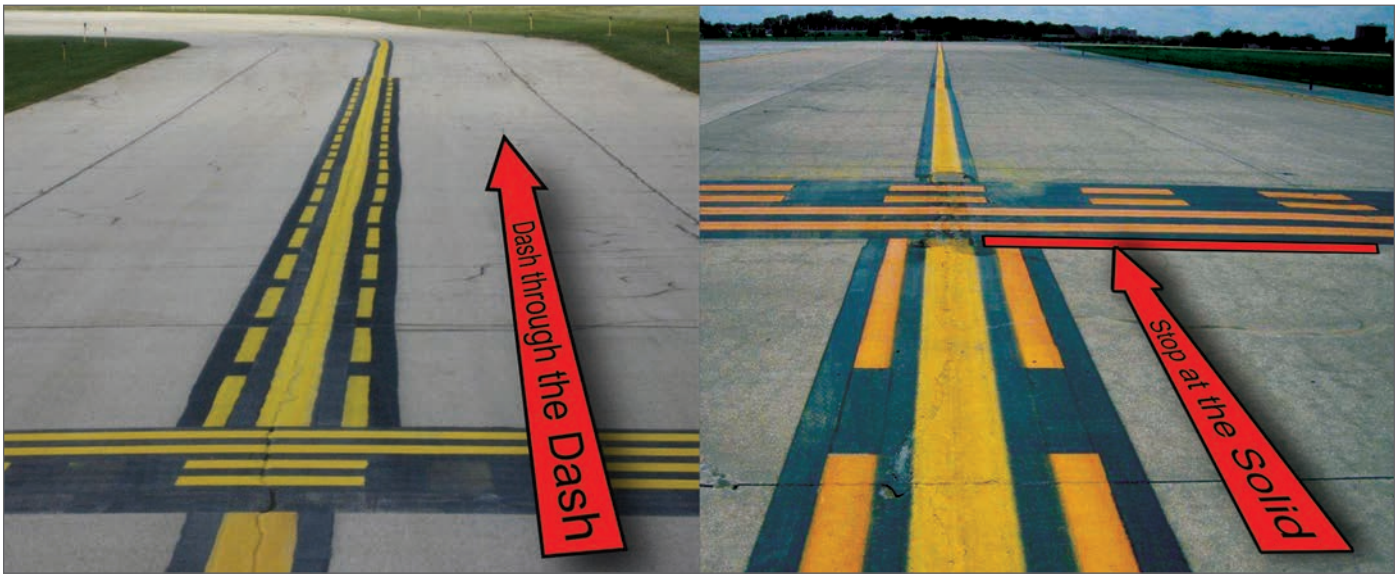
The word "roger" is not a clearance; it is simply an acknowledgment of your last transmission.

"You Don't Understand. I Can't Walk — They've Tied My Shoelaces Together."

Pilots can avoid making costly mistakes on the airport surface by following these tips and best practices:

- Review your received taxi clearance on the airport diagram or moving map display before you taxi.
- Verify turns, runways to cross, and your clearance limit.
- During taxi and approaching a runway crossing ask yourself: Am I cleared to cross? Verify with the tower before you cross a runway hold-short line.
- Actively scan and identify the various runway signs, markings, and lighting to confirm if you're approaching or at the correct location that was cleared by the tower.
- Defer all head-down activities until holding short at the appropriate location.
- If there's any doubt in your mind about any clearance, ask the tower.
- If you are ever in doubt as to your position on the airport or your taxi clearance, don't be afraid to stop where you are and ask the tower for progressive taxi instructions.

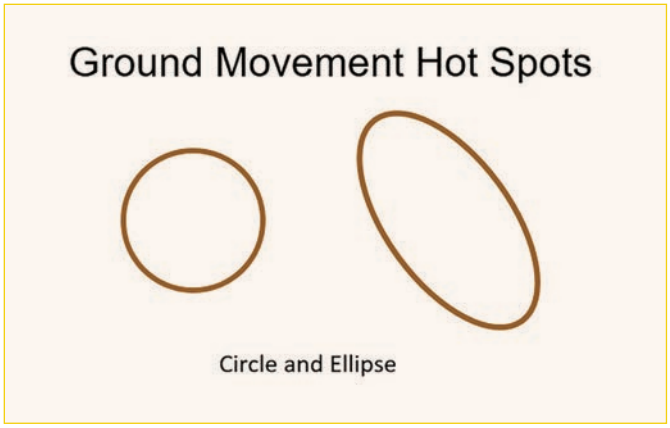
Avoiding dangerous mistakes like crossing or entering a runway without clearance makes flying more efficient, fun, and above all, safe.



A good mnemonic to remember about what side of a runway hold short line you are on is to "Dash through the Dash and Stop at the Solid."

"What Are You Reading? *Great Expectations*. Is It Any Good? It's Not What I'd Hoped For."

It's vital to know where the hot spots are before you go to any airport — even if you have been there before. Check the current airport diagram for any hot spot designations.



In an enhancement initiative by the FAA's Runway Safety Group (RSG), hot spot depictions will become standardized in the symbology used on airport diagrams. The many shapes currently used will be morphed into circles or ellipses for surface safety risk areas like taxiway/runway configurations and intersections. A cylinder will be used to highlight wrong surface event risk areas such as offset parallel runways, a nemesis for general aviation pilots. The RSG is also working collaboratively with agency and industry stakeholders on the development of a visual enhancement tool to help pilots with runway confusion at certain airport locations. Stay tuned.

You have the same responsibility piloting your aircraft on the ground, as in the air. Think of surface safety as a fourth phase of "flight," and live to fly another day.

Editor's Note: The quotes in this article are from the 1993 action/comedy film Hot Shots! Part Deux.

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

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FAA Airport Diagrams: *Search Menu*
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FAA Video: *From the Flight Deck – Hold Short*
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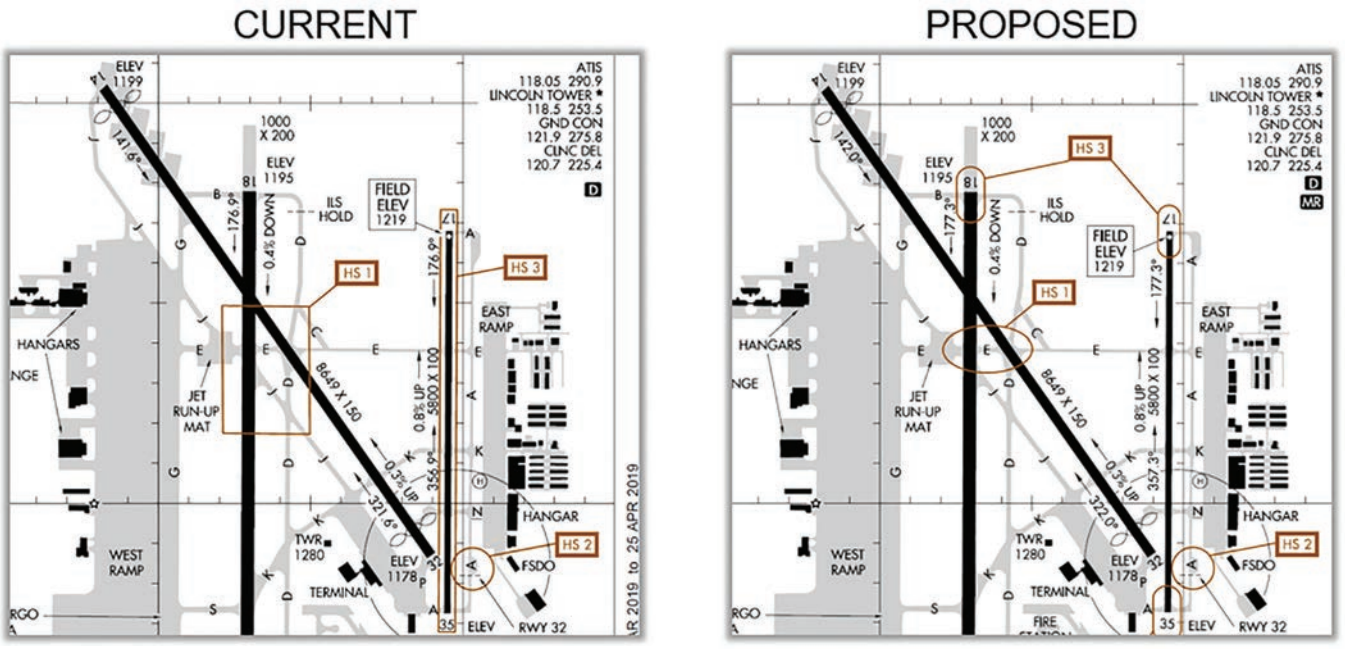
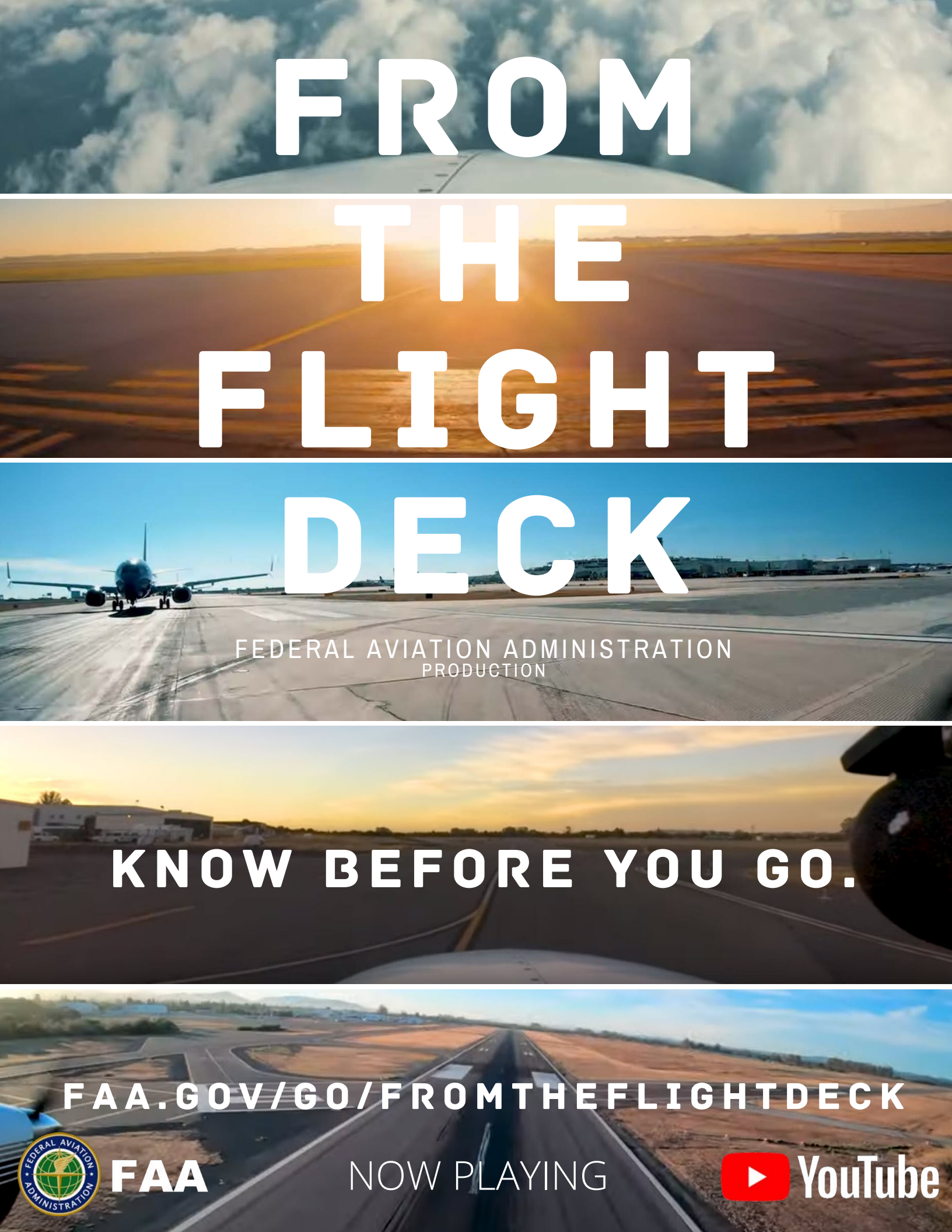


The chart on the right shows the new standardized depictions for hot spots – circles and ellipses will indicate ground movement hot spots, and cylinders will indicate misalignment risk areas.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THE
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FEDERAL AVIATION ADMINISTRATION
PRODUCTION
KNOW BEFORE YOU GO.
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Right Stuff

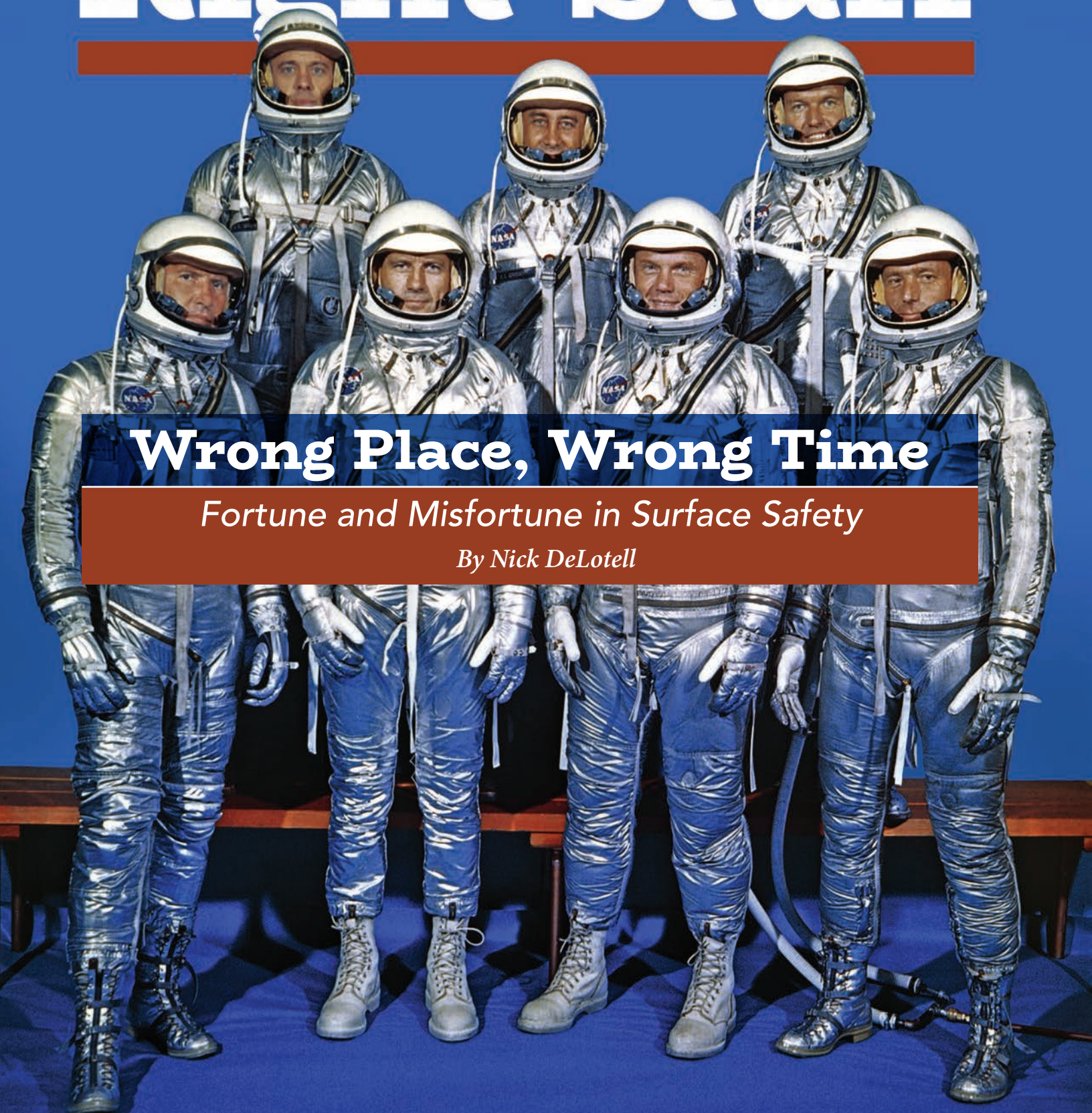


Photo courtesy of NASA

Wrong Place, Wrong Time

Fortune and Misfortune in Surface Safety

By Nick DeLotell

Let's be clear. *The Right Stuff* is real. As pilots, we can all identify someone we've flown with who has *it*. Maybe it was a mentor, a copilot, or an instructor. Heck, maybe it was a student! While it's hard to put into words and it's not something we sit around talking about, I think it's important to acknowledge the silent respect we have for those that have the right stuff.

What is the right stuff? Maybe it's easier to define what it's not. *It* is not super-human abilities. *It* is not something you're born with. *It* is not standard issue in the military, and *it* is definitely not something you purchase in the college bookstore. *It* doesn't come with a uniform, and *it* is not measured by the number of stripes on your epaulets. Having the right stuff does not make you immune to making mistakes.

Describing the right stuff, author Tom Wolfe wrote that it is a pilot's "… ability to go up in a hurtling piece of machinery and put his hide on the line and then have the moxie, the reflexes, the experience, the coolness, to pull it back in the last yawing moment — and then to go up again the next day …." How does that translate for those of us who aren't test pilots, who haven't been beyond Mach 1, and who have less than one lunar landing in our logbooks? I'd argue that it's the ability to keep your hide out of trouble and, in the event trouble finds you, the skill to safely recover that hide.

The late Brigadier General Chuck Yeager has always been one of my heroes. Less so for his achievements, great as they were; more for his attitude and character. Despite his legendary status and being one of the main characters in the 1983 movie adaptation of Tom Wolfe's *The Right Stuff*, General Yeager never claimed to have *it*. To the contrary, Yeager himself said, "I know that golden trout have the right stuff, and I've seen a few […] here and there that I'd bet had it in spades, but those words seem meaningless when used to describe a pilot's attributes." Even more to the point, Yeager was honest about his abilities, saying, "All I know is that I worked my tail off to learn how to fly, and worked hard at it all the way. And in the end, the one big reason why I was a better-than-average pilot was because I flew more than anybody else. If there is such a thing as the right stuff in piloting, then it is experience."

Photo courtesy of NASA

The Bell X-1 aircraft that General Chuck Yeager first piloted beyond the speed of sound.

As for General Yeager's famous 1947 record-breaking flight through the sound barrier, he regarded it as being in the right place at the right time. Humble yet gruff, he wasn't in it for fame or notoriety. He did it because it was his duty; it was his job.

Wrong Place, Wrong Time

On the evening of Nov. 22, 1994, at the Lambert-St. Louis International Airport (STL), a McDonnell Douglas MD-82 collided with a Cessna 441 at the intersection of Runway 30R and Taxiway Romeo. Both people in the Cessna were killed. The NTSB cited the probable cause of

Aftermath of the CE-441 wreckage following the Nov. 22, 1994 runway incursion at STL.

> **"The Cessna 441 pilot's mistaken belief that his assigned departure runway was Runway 30R, which resulted in his undetected entrance onto Runway 30R, which was being used by the MD-82 for its departure."**

the accident as "the Cessna 441 pilot's mistaken belief that his assigned departure runway was Runway 30R, which resulted in his undetected entrance onto Runway 30R, which was being used by the MD-82 for its departure."

The Cessna pilot had nearly 8,000 hours and was known as a conscientious, safety-oriented pilot. His logbook indicated that he had only been to STL once in the past seven years, and that was eleven months prior and in daylight.

Of the pilots involved in this collision, maybe some had the right stuff, or maybe not; that's not something that I can judge. However, one of these pilots was definitely in the wrong place at the wrong time.

2 On the evening of July 7, 2017, at the San Francisco International Airport (SFO), an Airbus A320 overflew Taxiway Charlie, nearly colliding with four aircraft on the ground prior to going-around. Runway 28L was closed with a large illuminated "X" and its runway lights off. The A320 was cleared to land on Runway 28R, but instead lined up with parallel Taxiway Charlie. The estimated clearance between the A320 and the tails of the largest aircraft on the taxiway was alarming, measurable in inches. The combined passenger load of the five aircraft involved exceeded 1,000, which made this incident one of the nearest we've seen to becoming the worst aviation disaster in history.

The A320 captain had over 20,000 hours, had no previous accident or incident history, and no records that showed failed checkrides. He had been to SFO several times, including recently, but had never seen Runway 28L "dark." The first officer had a similar experience.

Of all of the pilots involved in this near miss, maybe some had the right stuff, or maybe not; again, it's not something I can judge. However, two of these pilots were definitely in the wrong place at the wrong time.

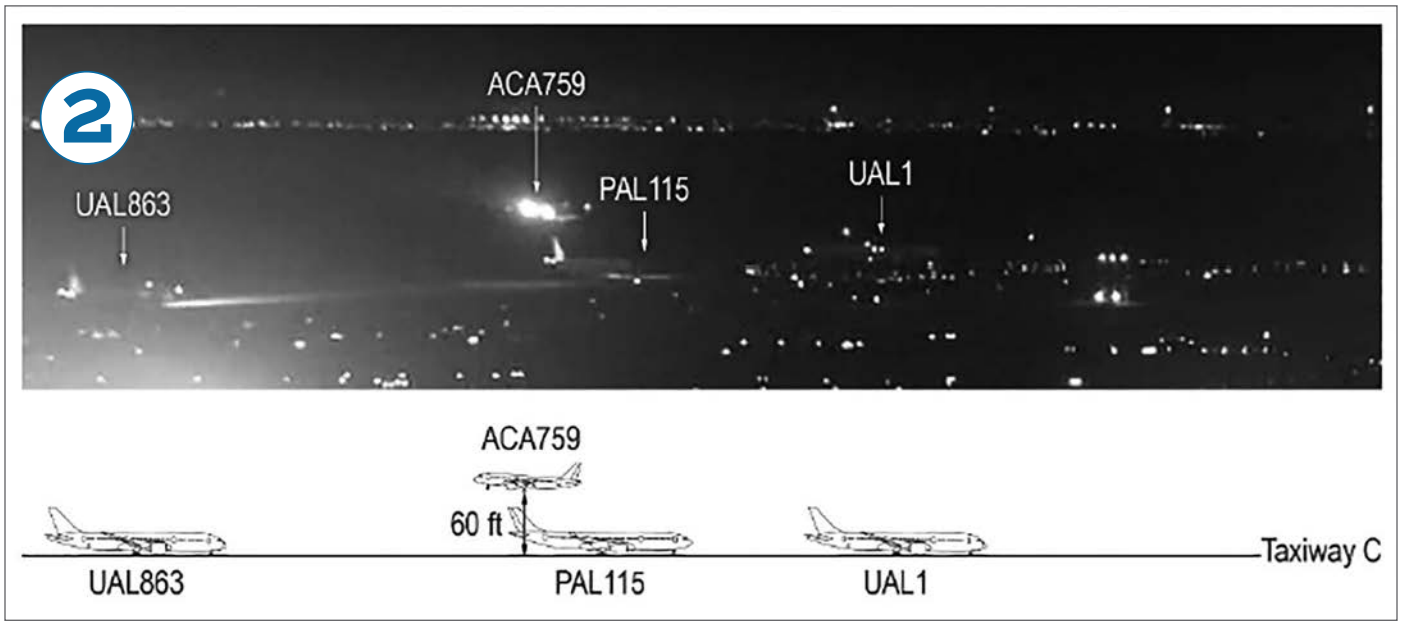
Wrong Place, Right Time

From October 2019 to September 2020, there were 555 "Category D" runway incursions caused by pilot deviations, most involving general aviation pilots. In each of those 555 pilot deviations, the pilot either failed to hold short of the runway holding position markings, or landed or departed without clearance. Fortunately, there were no other aircraft in close proximity. The only thing that kept those 555 pilot deviations from being more severe examples of runway incursions was being in the wrong place at the right time. The same mistakes would have had different consequences had another aircraft been operating on the runway.

Right Stuff, Right Now

How do you strive for the right stuff, ensuring you're always in the right place at the right time? Here are two suggestions that I'd bet General Yeager would endorse.

1. Work hard at it, all the way. Whether you are a student pilot with ten hours, or you have some of those coveted



A320 overflight of Taxiway Charlie, July 7, 2017 at SFO.

The only thing that kept those 555 pilot deviations from being more severe examples of runway incursions was being in the wrong place at the right time. The same mistakes would have had different consequences had another aircraft been operating on the runway.

lunar landings, be a lifelong student of airport signage, markings, lighting, runway incursion avoidance, and the Pilot-Controller Glossary. Low visibility have you grounded? Grab your mobile device and spend some time with the FAA's Runway Safety Pilot Simulator and From the Flight Deck videos.

2. If there's such a thing as the right stuff, then it's experience. Stay current, stay active, and stay engaged. The more you're exposed to certain environments and various situations, the more acclimated you'll become. As you gain experience, you'll gain the moxie, reflexes, and coolness to keep yourself out of trouble. Grab your safety pilot or flight instructor and go get some taxi practice. He or she can also help you gain some experience with environments outside your comfort zone (e.g., complex airports). Low ceilings have you down? You can still practice taxiing, rain or shine.

As a pilot in command, you have a solemn responsibility to operate your aircraft as safely as possible. Whether you're in the air or on the ground, this is your job — *your duty* — and at some point, your life may depend on it. What are you doing right now to get (or keep) the right stuff?

Fly safely, my friends.

Author's Note: Writing this within days of Chuck Yeager's passing, December 7, 2020, I'd like to recognize and humbly thank the late General for his contributions to aviation, space, and humankind. "We live in fame or go down in flame — nothing'll stop the U.S. Air Force."

Nick DeLotell is an aviation safety inspector in the FAA's Flight Standards Service in collaboration with the Runway Safety Group. He holds an airline transport pilot certificate, flight and ground instructor certificates, and is a remote pilot.

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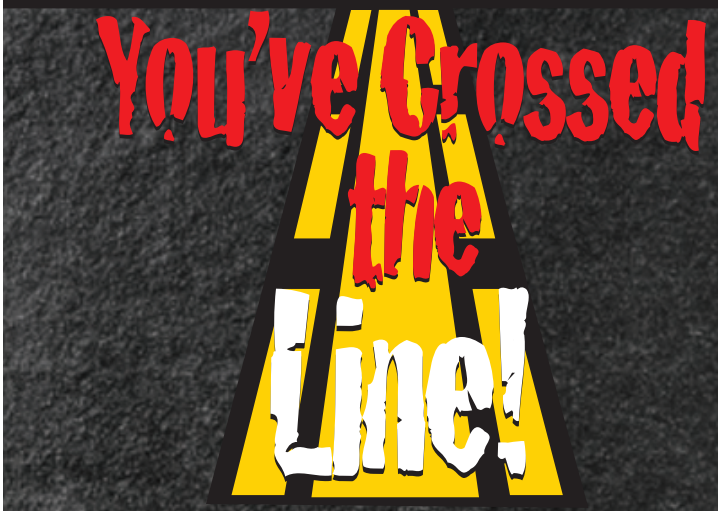
Federal Aviation Administration

If You Cross the Line



When you cross the line...

- *You've entered an area designed to protect landing and departing aircraft.*

You've crossed the line when...

- *You are on the runway without authorization to cross or taxi on it, to take off, or to await a takeoff clearance.*
- *You don't follow an assigned taxi instruction or route.*
- *You jeopardize yourself, your passengers, your airplane, and others.*

Stay focused.
Follow instructions.
Taxi carefully.

www.faa.gov/go/runwaysafety

The Cost of Frost on Runways

A Look at Heated Pavement Technology

By Jennifer Caron

As an early December 2020 storm complicated an already tricky landing with ice and snow, Spirit Airlines Flight 696 touched down at Baltimore/Washington International Airport (KBWI) safely, but during their taxi to the terminal, skidded off the icy taxiway into the grass. Luckily no one was hurt, and all aboard departed with what will likely be a colorful "there-I-was" travel story. Not all such events turn out so well.

Every year, snow, ice, and freezing rain pose a serious challenge to pilots and airport operations.

To further enhance runway surface safety, the FAA, through the Center of Excellence Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability (PEGASAS), looked at the method of using heated pavements on airport surfaces to melt ice and snow. This method is not only innovative, but also economical, since it would re-purpose shelf-stable technology and products from other industries. Read on to learn more about these hot (ahem) technologies.

Slush Fund

Some see a crisp blanket of glistening white snow as pure delight. For others, the mere forecast of white stuff evokes muttered curses, as it portends the dreaded chore of back-breaking shovel work. For pilots, flight crews, airport managers, and equipment operators, inclement weather means lots of preparation. Long before the first flurries touch the tarmac, pilots and air traffic controllers monitor the weather. Airport personnel stand ready to clear ice and snow from runways, taxiways, and aprons. Conventional snow removal systems consist of well-practiced teams operating the equipment that plows, blows, and sweeps hundreds of feet of asphalt, while the long arms of de-icing trucks dispense liquid chemicals to deprive frozen precipitation of its traction-stealing power.

But snow removal is quite costly for airports. Snow plows run around a million dollars apiece, with vehicles, brooms, and sand adding to the price tag. De-icing chemicals deal another blow to airport budgets, costing as much as $20,000 or more per use. When you factor in the cost and facilities to collect contaminated ice and snow, garages to house the equipment, maintenance costs, round-the-clock staffing, and flight delays and cancellations, you're looking at quite a hefty expense. There is also potential for environmental damage from de-icing chemicals.

Age-Old Problem Meets Age-Old Solution

Imagine a practical and cost-effective way to deal with the time-consuming, expensive, essential task of clearing airport surfaces. What if that technology was already in use, poised to cross into the aviation community? That's where heated pavements come into play.

Alternate snow removal strategies like ECON have the potential to keep both commercial and GA airports operational during severe cold weather.

Similar to the technology we already use in our cars to de-ice windows and warm chilly seats, this technology lends itself to using heated pavements on airport surfaces. PEGASAS studied this idea to de-ice frozen apron areas and, potentially, taxiways and runways to improve traction and safety for critical surface operations. The collaborative FAA/PEGASAS research team includes Matthew Brynick in the FAA's Airport Pavement Research and Development division at the William J. Hughes Technical Center, and university lead Dr. Halil Ceylan of Iowa State University.

Heated pavement systems (HPS) are not a new technology. They are already used by hospitals, offices, and shopping centers to keep sidewalks and parking areas slip and fall free. Heated pavements work in one of two ways, either by hydronic (water-based) or electric heating.

Hydronic HPS is the most established technology, primarily used in bridges and at many U.S. and European airports. It works by circulating hot fluid, namely glycol antifreeze, through a series of pipes running through the pavement. The challenge with this technology is two-fold. First, if any of the embedded tubing cracks or breaks, corrosive liquid can leak, damaging concrete and posing the same threat to the environment as de-icing chemicals. Second, large boilers are needed to heat the circulating liquid, thereby increasing energy and maintenance costs. It also requires a large space to house the components.

Electrical HPS uses basically the same principle as defrosting windows in your car. Comparable to the black lines you see layered in the glass of your rear window, electrical HPS uses a grid of heating cables embedded in the bottom of a pavement system. The drawback is that these cables have to be placed at the very bottom layer of pavement, forcing heat to travel through the entire thickness of the concrete before it can reach the top layer to melt ice and snow. The result is higher operating costs and reduced efficiency.

But there's a more effective solution. Adding electrically conductive materials such as carbon fiber and graphite directly into the concrete mix, the entire pavement becomes a heat source and starts generating heat at the very top layer where it's needed. "That's why from the very beginning we focused our research on electrically conductive concrete, or ECON for short," says Dr. Halil Ceylan, who has been the PEGASAS lead on this project for over seven years. "The advantage of this technology is that we don't have to heat the entire thickness of the pavement, thereby reducing the downtime required to melt the ice and snow," he explains.

Heated Pavements in Action

Dr. Ceylan and PEGASAS researchers have conducted an on-site demonstration of ECON in action. The world's first, full-scale ECON slabs at a U.S. airport were installed in the general aviation (GA) apron area at the Des Moines International Airport (KDSM) in Des Moines, Iowa in November 2016 (see Figure 1).

Throughout the evaluation period (2016-2017 and 2017-2018 winters), the ECON pavement system consistently provided uniform heat distribution and prevented snow and ice accumulation on the surface. Here's how it works. When the system is activated, it generates enough heat to melt a one-inch thick layer of snow in about 30 minutes. You can see the system at work with the thermal imaging shown in Figure 2.

"The period between when the system is turned on and the snow and ice is melted depends on the atmospheric conditions at the time, such as the rate of snowfall, air tem-

Photo courtesy of Dr. Halil Ceylan, Iowa State University.

Figure 1: The heated test slabs at KDSM Airport effectively clearing the ice and snow.

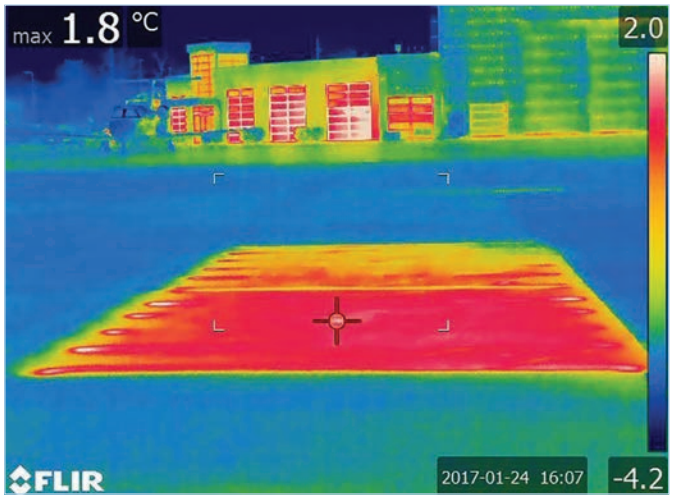


Photo courtesy of Dr. Halil Ceylan, Iowa State University.

Figure 2: A thermal image of heated airfield pavements at KDSM Airport.

perature, relative humidity, and wind velocity," notes Dr. Ceylan, "but we were able to demonstrate that our technology works under harsh winter conditions to quickly melt any frozen precipitation on contact and keep the surface temperature above freezing." It has no adverse impacts on aircraft communication or sensitive equipment, and airports can activate it ahead of a snow storm or automate start and stop times. Dr. Ceylan recommends that airport managers use this system proactively, activating it up to two hours before any expected winter weather event.

Ramp Up the Heat

Alternate snow removal strategies like ECON have the potential to keep both commercial and GA airports operational during severe cold weather. They also allow airports to reduce or eliminate dependence on traditional snow removal equipment and de-icing chemicals, saving time and money. "One of the goals of the research project is to help smaller airports clear runways during winter storms," says Dr. Ceylan. Although GA airports focus more on specialized services (EMS, air cargo) than part 139 airports, maintaining winter operations in these smaller hubs will increase their operating revenue resulting in substantial cost advantages.

In addition, ECON installation will have benefits in congested ramp/apron areas where most employee slip and fall injuries occur. Runways are long, straight strips, much easier and faster to clear with heavy equipment than aprons, where clearing and hauling snow is more time consuming and complicated due to the mix of ground staff and equipment. "You can't send a large snow plow into an apron area, which is why it makes the most sense to implement ECON in these congested areas first, and then expand it into other areas of the airport, such as high-speed taxiways, where most of the skidding events take place," explains Dr. Ceylan. "Snow plows leave a thin layer of snow and ice behind when they clear any airport surface, but with our technology, the skid resistance is much higher, providing better operational safety in these critical areas," he added.

> **"Our ultimate goal," says Dr. Ceylan, "is to keep airfield pavement systems safe, open, and accessible during winter weather events."**

ECON technology:

- Increases safety for ground staff and vehicles,
- Improves runway surfaces and safety,
- Reduces labor and equipment costs for snow and slush removal,
- Eliminates environmental impacts that toxic de-icing chemicals can have on airport pavements and bodies of water,
- Reduces costly flight delays and cancellations, and
- Provides practical and economically sensible alternatives to current ice and snow removal.

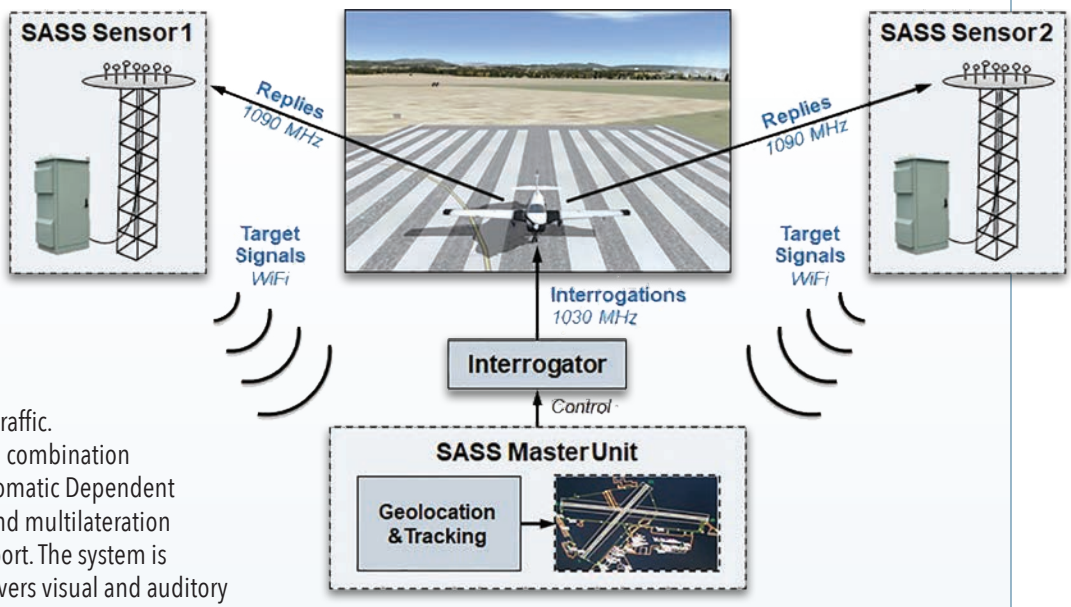
Clearance to Proceed

"To further advance and demonstrate this technology, the next logical step is to build upon the progress shown at the airport in Des Moines, and implement larger-scale heated pavement systems," says Dr. Ceylan. Additional research involves a multi-pronged approach that examines anti-icing systems such as a full-scale demonstration of electrically conductive asphalt concrete pavement systems, superhydrophobic (super-water-repellent) coatings, phase change materials, and hybrid heating. The next expected outcome of this research is an update to FAA Advisory Circular 150/5370-17, *Airside Use of Heated Pavement Systems*, which will provide guidance to airport owners, engineers, operators, and contractors to design, construct, and maintain heated pavement systems. "Our ultimate goal," says Dr. Ceylan, "is to keep airfield pavement systems safe, open, and accessible during winter weather events."

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

A New Tool to Reduce Runway Incursions at GA Airports

Most large airports surrounded by Class B airspace are equipped with a runway safety tool called ASDE-X, the Airport Surveillance Detection Equipment – Model X or its successor, the Airport Surface Surveillance Capability (ASSC). ASDE-X/ASSC allows air traffic controllers to track aircraft and vehicles on the surface, as well as nearby airborne traffic. ASDE-X collects tracking data from a combination of multiple surveillance radars, Automatic Dependent Surveillance – Broadcast (ADS-B), and multilateration sensors located throughout the airport. The system is equipped with safety logic that delivers visual and auditory alarms to alert controllers of potential runway conflicts, thus reducing the potential for collisions or incursions. However, medium-size airports (surrounded by Class C airspace) and airports surrounded by Class D airspace that are outside of any Mode C/ADS-B Veil (www.faa.gov/go/ADSBairspace) generally lack ASDE-X due to cost considerations. Controllers need a less expensive, commercial, off-the-shelf system comparable to ASDE-X that can be installed at small airports and used to provide and improve situational awareness, particularly during inclement weather and/or low visibility.



To meet this need, researchers in the FAA's NextGen Technology Development and Prototyping Division developed a concept called the Small Airport Surveillance Sensor (SASS). SASS uses a novel phased-array antenna, state-of-the-art digital signal processing, and commercial off-the-shelf hardware. Unlike ASDE-X, the SASS system only requires two sensor arrays and a master unit, all of which can be located on the airport grounds. The SASS concept has the potential to increase situational awareness for controllers at smaller airports, which may lead to reduced runway incursions or incidents.

MIT's Lincoln Laboratory designed, installed, and operated a SASS proof-of-concept testbed at Hanscom Field (KBED) in Massachusetts. The test system successfully achieved surveillance of Mode S and Air Traffic Control Radar Beacon System transponders, with an accuracy of 30 feet to identify aircraft and vehicles on the airport surface; and a surveillance range of up to 20 nautical miles to detect aircraft flying on final approach to the airport.

Based on this demonstrated performance, the FAA hosted a virtual industry day on February 4, 2021 to introduce the SASS project to the aviation community. Although SASS is in the early phases of research and development, the FAA intends to begin technology transfer to industry for further prototyping and development. For more, visit bit.ly/SASSIndustryMtg.

Safe and Sound on the Ground

An EFB APP-roach to Improving Surface Safety

By James Williams

You might not quite see "forever" while flying on a nice VFR weather day, but the bird's eye view makes that hallowed "I-Follow-Roads" approach to navigation pretty easy. Then you land. Even at an airport with a relatively simple layout, getting around on the ground without that bird's eye perspective can be challenging. It can also be dangerous if even momentary "where-the-heck-am-I" confusion takes you into a wrong turn.

Fortunately, today's technology has your back. Any of the many flight management apps for either installed or portable Electronic Flight Bags (EFBs) can restore the bird's eye view when and where you arguably need it the most.

Charting the Way

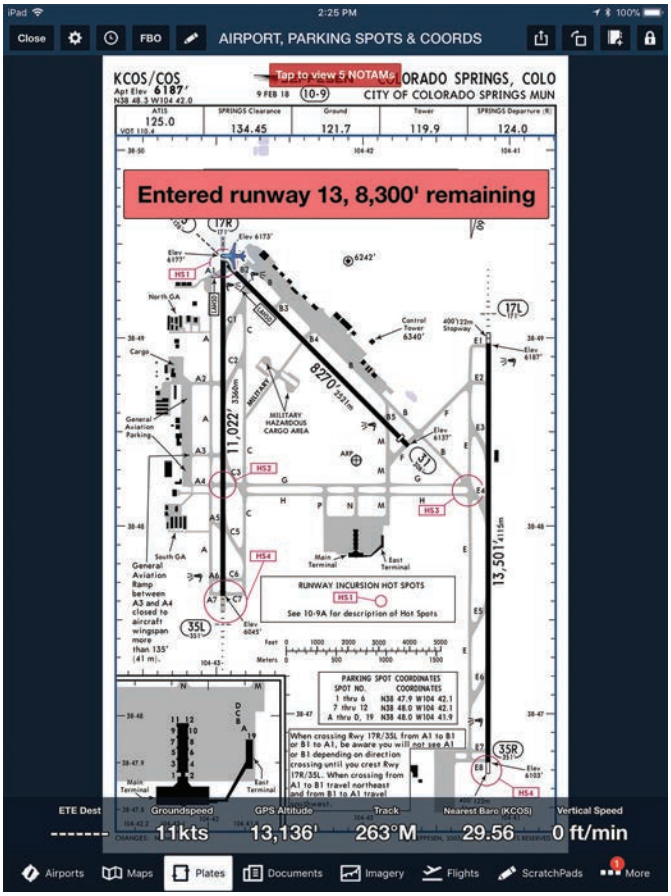
EFB apps excel in the integration of charts, planning, and mapping. Beyond saving you the effort of digging through a set of charts, modern EFBs allow the pilot to load procedures for all phases of flight. The advent to geo-referenced charts and procedures is clearly a breakthrough boon to surface safety. These offer a moving map not just for aerial navigation, but also for showing where you are on the airport surface. Implementation varies, but the function is founded on the basic concept of allowing GPS sensors to locate your aircraft on a chart and track its movement.

In the surface safety world, this tool lets you see your "ownship" location on an airport diagram. GPS on the ground reduces confusion, because you get that bird's eye view of where you are and what is around you (e.g., runways, taxiways, FBOs, etc.). Better yet, some vendors now highlight runways and airport hot spots — with the option of audible warnings — as you approach them. Several apps allow you to annotate maps and charts, so you can copy and/or highlight taxi instructions. Seeing the highlighted route offers a great opportunity to verify correct (and mutual) understanding of taxi instructions. If what you drew looks odd, check it out before you move.

Geo-referenced charts and procedures are clearly a breakthrough boon to surface safety.

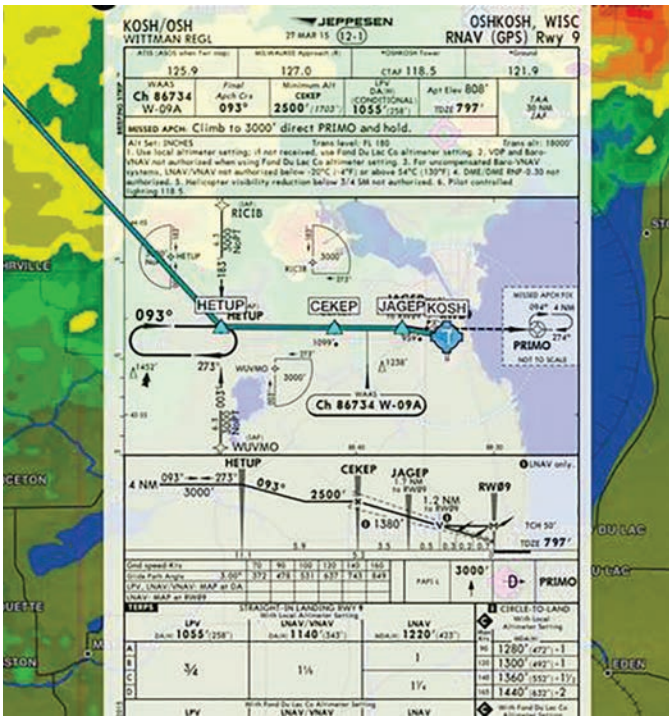
EFBs with geo-referenced charts can also help you avoid other surface safety mistakes, such as lining up with the wrong runway when approaching to land. This kind of runway confusion is (at least in theory) harder to do if you are on an actual IFR approach procedure, but your flight deck discipline should always include such verification. When flying VFR or making a visual approach, use the geo-referenced "ownship" display to confirm that you really are heading to the right piece of pavement. If your particular app offers a track vector, be sure to activate it so you can see exactly where your flight path is taking you.

Photo courtesy of ForeFlight.



Seeing your "own ship" position on the airport diagram is a powerful tool for avoiding trouble on the surface.

Photo courtesy of Garmin.



Superimposing procedure charts into your moving map helps you maintain situational awareness as you approach or depart the airport environment.

When flying VFR or making a visual approach, use the geo-referenced "ownship" display to confirm that you really are heading to the right piece of pavement.

Illuminating the Gloom

We looked at Synthetic Vision (SV) capabilities in a previous issue ("Extra Eyes in the Sky" medium.com/faa/extra-eyes-in-the-sky-41066976980e). While that piece focuses on SV's value as an inflight tool, there are plenty of ways it can also help with surface safety. Just to refresh your memory, SV's virtual three-dimensional representation can improve situational awareness by helping you see ahead in darkness or limited visibility. It also offers a good cross reference to any airport diagram or detailed moving map display: Does what appears on your SV look correct when compared to the chart? Some systems even monitor/track your preflight planning and can provide alerts if you line up on the wrong runway or a taxiway.

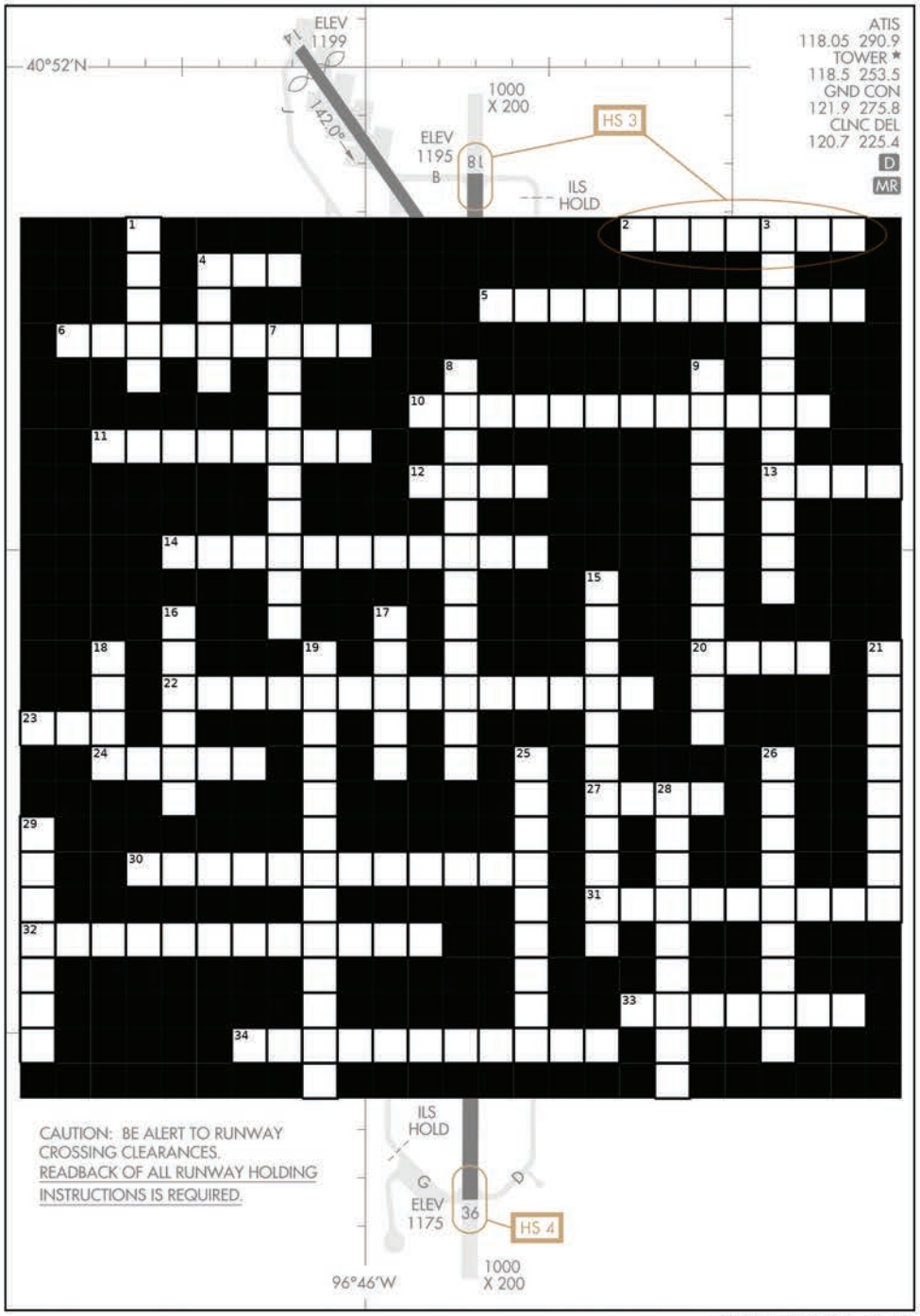
Expanding Your EFB

Updates and new hardware can offer a constant stream of fresh features. Portable ADS-B In receivers that connect via Bluetooth to apps can add features like live weather and traffic. Keep in mind, though, that especially when dealing with traffic, how that information is gathered can affect how you can best use it. One vendor offers a terminal traffic system that tracks ADS-B traffic information on the moving map even during taxi. It includes depiction of ground vehicles equipped with ADS-B. Some apps offer similar systems, but it's always important to know the limitations. For example, some use internet traffic for ground targets. That means they require an internet connection and have higher latency. Consequently, they should be used more for broad/strategic general awareness than for close-up "tactical" navigation. We hasten to stress, though, that responsible pilots should use these systems only as an aid to spotting and confirming traffic, not as the sole means of see-and-avoid.

Here's the bottom line. Thanks to rapid (and constant) advances in technology, even a modest investment will give you access to capabilities once available only in multi-million dollar aircraft. Even better, there is competition to spur a range of options, features, and price points and, as noted above, many offer free trial periods for a chance to "test fly" them. Such tools can help you avoid costly — not to mention dangerous — surface safety mistakes, so they are well worth adding to your aviation safety arsenal.

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

AIRPORT SURFACE SAFETY CROSSWORD PUZZLE



WASHINTON, D.C.
FAASTEAM (AFS)

Across

2 Area where heightened attention is necessary.
4 Responsible for the operation and safety of an aircraft.
5 Always your job.
6 You may use the runway at your discretion. "Cleared for … "
10 Runways, taxiways, and other airport areas under ATC control.
11 Mulligan.
12 You may land. "Cleared to … "
13 Universal best practice when you see white on red.
14 Yes.
20 Arrester bed that reduces runway excursion severity.
22 Map that leads you to success.
23 Area inside the holding position markings that includes the runway.
24 As you wish.
27 A pair of synchronized strobe lights.
30 Children do it at intersections. So should you.
31 Needed before crossing the double yellow.
32 X marks this spot.
33 You may depart. "Cleared for … "
34 FAASTeam Course ALC-573 can get you this.

Down

1 Received.
3 Precise taxi instructions given to unfamiliar pilots.
4 Four lights, red on white.
7 Any incorrect presence within the Runway Safety Area.
8 Black square, you're there!
9 You only have the runway, wind, and altimeter info.
15 You may only overfly the runway, not touch it. "Cleared for … "
16 No thank you, I cannot. Let's go to plan B.
17 Notice containing information essential to pilots.
18 Your invitation to sit still on the runway.
19 Where the rubber should meet the road.
21 No.
25 Wind not parallel to a runway.
26 Departure from a clearance.
28 Action required to avoid an imminent situation.
29 Distorted or interrupted radio transmission.

Across

2 HOTSPOT
4 PIC
5 SEEANDAVOID
6 THEOPTION
10 MOVEMENTAREA
11 GOAROUND
12 LAND
13 STOP
14 AFFIRMATIVE
20 EMAS
22 AIRPORTDIAGRAM
23 RSA
24 WILCO
27 REIL
30 LOOKBOTHWAYS
31 CLEARANCE
32 CLOSEDRUNWAY
33 TAKEOFF
34 WINGSCREDIT

Down

1 ROGER
3 PROGRESSIVE
4 PAPI
7 INCURSION
8 LOCATIONSIGN
9 HAVENUMBERS
15 LOWAPPROACH
16 UNABLE
17 NOTAM
18 LUAW
19 TOUCHDOWNZONE
21 NEGATIVE
25 CROSSWIND
26 DEVIATION
28 IMMEDIATE
29 BLOCKED

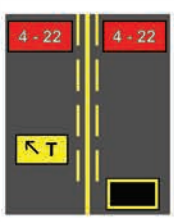
RESOURCES

Aeronautical Information Manual (AIM):
bit.ly/AIMweb

Pilot/Controller Glossary (PDF download):
bit.ly/FAAglossary

AIRPORT SIGN AND MARKING – QUICK REFERENCE GUIDE

EXAMPLE	TYPE OF SIGN	PURPOSE	LOCATION/CONVENTION
	Mandatory: Hold position for taxiway/ runway intersection.	Denotes entrance to runway from a taxiway.	Located L side of taxiway within 10 feet of hold position markings.
	Mandatory: Holding position for runway/runway intersection.	Denotes intersecting runway.	Located L side of rwy prior to intersection, & R side if rwy more than 150' wide, used as taxiway, or has "land & hold short" ops.
	Mandatory: Holding position for runway approach area.	Denotes area to be protected for aircraft approaching or departing a runway.	Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or apch/ departure airspace.
	Mandatory: Holding position for ILS critical area/precision obstacle free zone.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Mandatory: No entry.	Denotes aircraft entry is prohibited.	Located on paved areas that aircraft should not enter.
	Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/ taxiway hold sign.
	Runway Location.	Identifies the runway on which the aircraft is located.	Normally located where the proximity of two rwys to one another could cause confusion.
	Runway Safety Area / OFZ and Runway Approach Area Boundary.	Identifies exit boundary for an RSA / OFZ or rwy approach.	Located on taxiways on back side of certain runway/ taxiway holding position signs or runway approach area signs.
	ILS Critical Area/POFZ Boundary.	Identifies ILS critical area exit boundary.	Located on taxiways on back side of ILS critical area signs.
	Direction: Taxiway.	Defines designation/direction of intersecting taxiway(s).	Located on L side, prior to intersection, with an array L to R in clockwise manner.
	Runway Exit.	Defines designation/direction of exit taxiways from the rwy.	Located on same side of runway as exit, prior to exit.
	Outbound Destination.	Defines directions to take-off runway(s).	Located on taxi routes to runway(s). Never collocated or combined with other signs.
	Inbound Destination.	Defines directions to airport destinations for arriving aircraft.	Located on taxi routes to airport destinations. Never collocated or combined with other types of signs.
	Information.	Provides procedural or other specialized information.	Located along taxi routes or aircraft parking/staging areas. May not be lighted.
	Taxiway Ending Marker.	Indicates taxiway does not continue beyond intersection.	Installed at taxiway end or far side of intersection, if visual cues are inadequate.
	Distance Remaining.	Distance remaining info for take-off/landing.	Located along the sides of runways at 1000' increments.

EXAMPLE	TYPE OF MARKING	PURPOSE	LOCATION/CONVENTION
	Holding Position.	Denotes entrance to runway from a taxiway.	Located across centerline within 10 feet of hold sign on taxiways and on certain runways.
	ILS Critical Area/POFZ Boundary.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Taxiway/Taxiway Holding Position.	Denotes location on taxiway or apron where aircraft hold short of another taxiway.	Used at ATCT airports where needed to hold traffic at a twy/twy intersection. Installed provides wing clearance.
	Non-Movement Area Boundary.	Delineates movement area under control of ATCT, from non-movement area.	Located on boundary between movement and non-movement area. Located to ensure wing clearance for taxiing aircraft.
 Taxiway Edge.		Defines edge of usable, full strength taxiway.	Located along twy edge where contiguous shoulder or other paved surface NOT intended for use by aircraft.
 Dashed Taxiway Edge.		Defines taxiway edge where adjoining pavement is usable.	Located along twy edge where contiguous paved surface or apron is intended for use by aircraft.
	Surface Painted Holding Position.	Denotes entrance to runway from a taxiway.	Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections.
	Enhanced Taxiway Centerline.	Provides visual cue to help identify location of hold position.	Taxiway centerlines are enhanced 150' prior to a runway holding position marking.
	Surface Painted Taxiway Direction.	Defines designation/direction of intersecting taxiway(s).	Located L side for turns to left. R side for turns to right. Installed prior to intersection.
	Surface Painted Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located R side. Can be installed on L side if combined with surface painted hold sign.

Ref. AC 150/5340-1J *Standards for Airport Markings*, and AC 150/5340-18D *Standards for Airport Signs Systems*

Federal Aviation Administration

OK-08-0403

Surface Safety Done Right

Meet the FAA's Runway Safety Professionals

By Tom Hoffmann

I have fond memories of my first flight, an Eastern Airlines DC-9 bound for Orlando and our transport to a week in — you guessed it — Disney World. We departed at night from JFK Airport, taxiing among a dizzying array of colorful lights, illuminated signs, and pavement markings unlike anything I'd ever seen. With my face glued to the small cabin window, I watched in awe as we bobbed and weaved around the airport grounds and joined the delicate dance with planes of all sizes on their way to the runway. It all seemed a bit of a mystery to me as to how anyone could tell where they were going, and more importantly, not clip each other's wings!

That mystery would be unraveled nearly a decade later after I began flying lessons at nearby Islip Airport. While runway safety remained paramount throughout my flying, it wasn't until I started my career with the FAA that I could appreciate the full extent of what goes on behind the scenes to ensure airport surface safety. Allow me to introduce the FAA's runway safety professionals, the highly skilled men and women who quite literally ensure that aviation safety starts from the ground up.

It All Starts With a Plan

Since runway safety spans several different operational domains, the FAA's effort takes on a collaborative approach to ensure all the key players have a say in the decision-making process. There are three main pillars of support: the FAA's Air Traffic Organization (ATO), the Office of Airports (ARP), and the Flight Standards Service (FS). Each of these three, along with a supporting cast of internal and industry stakeholders, plays a distinct role in how surface safety is executed in the National Airspace System (NAS).

These collaborative efforts are also in line with the agency's guiding light on surface safety, the National Runway Safety Plan (NRSP). This report provides the framework for the FAA's risk-based and data-driven approach towards enhancing NAS safety on a local, national, and international scale. Its success stems from the integration of Safety Management System (SMS) principles to create a systematic approach for managing safety. A prime example of the NRSP's effectiveness has been the ability to identify wrong surface operations as a rising risk in recent years, and to create an action plan to mitigate that risk.

Air Traffic Organization

While the NRSP provides the overarching strategy for improving runway safety, FAA Order 7050.1B, *Runway Safety Program*, details the organizational structure and policy framework necessary to carry out the plan's initiatives. As outlined in the Order, the focal point for the FAA's runway safety initiatives is ATO's Safety and Technical Training Directorate which provides executive level oversight of the FAA's Runway Safety Program. But where you're more likely to see the "rubber hit the runway" in terms of day-to-day execution is with the Runway Safety Group (RSG), formerly known as the Office of Runway Safety. This group is broken out into three main service areas: Eastern, Central, and Western, as well as a headquarters team in Washington, D.C. Each service area is further split into three regions to ensure proper coverage of the NAS (see

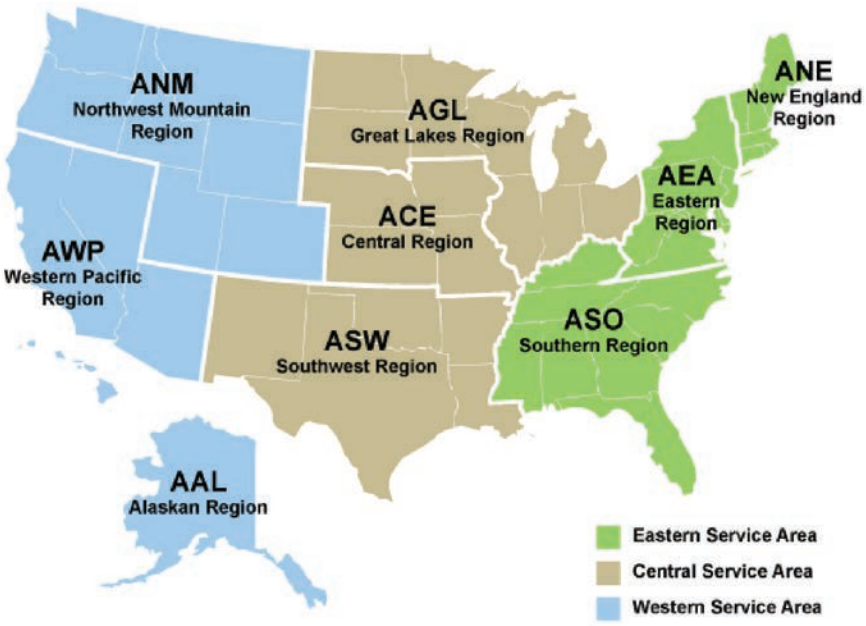


Figure 1: FAA Runway Safety Group Service Areas & Regional Offices

Figure 1). The service areas (including headquarters) each have a team manager, and there are regional runway safety program managers in place at all nine regions.

RSG members at the regional level routinely work with local airports, flight schools, airport tenants, and various other stakeholders to research and resolve runway safety issues, develop regional runway safety plans, and provide outreach at events. These are among the people you're likely to see chatting up pilots at a fly-in or discussing airport hot spots at the local Runway Safety Action Team (RSAT) meetings (more on that later). Service area involvement in the RSG tends to be on a broader scale with an emphasis on managing air traffic resources for that area.

One unique difference is with the headquarters service area. This group is responsible for coordinating with the Runway Safety Council (RSC), an executive steering committee that is a combination of agency and industry partners. RSC members work together to identify root causes of surface safety issues and develop mitigation plans. Airmen and operators get a seat at the table for policy decisions via representative organizations like AOPA, EAA, NBAA, or the National Air Traffic Controllers Association. The RSC also corrals various FAA resources across different lines of business to ensure a holistic approach to problem-solving. This process will be formalized in an upcoming revision to the 7050.1 Order and will give the RSC more of a lead role in resolving critical runway safety issues and promoting a more proactive safety culture.

Headquarters service area runway safety program manager Christine Madden works closely with the RSC and the associated Surface Safety Group (SSG), a collaborative team of subject matter experts across the FAA and industry who develop and monitor surface safety initiatives in line with RSC objectives. A major focus for Christine and the SSG is outreach. Together they have developed tools to educate both vehicle drivers and pilots on how to prevent runway incursions. Two recent examples include the Runway Safety Pilot Simulator (runwaysafetysimulator.com) and the From the Flight Deck video series (faa.gov/go/FromTheFlightDeck) that details runway safety strategies at specific airports.

Christine is also a strong advocate for safety outreach at non-towered airports. "Just because we don't have data coming from these locations doesn't mean [pilots] don't need to understand how to operate safely." This has become more prevalent, even at some towered airports that are seeing reduced operating hours due to COVID-19. Christine, and her team co-lead Ray German, are also supporting a new effort to standardize airport hot spot symbology and have proposed a visual depiction that provides a cockpit view of the runway environment at airports where data indicates wrong surface events are a problem. See the article "Hot Spots! Part Deux" in this issue for more on these.

> **Collaboration among many diverse agency and industry stakeholders makes team efforts to greater than the sum of its parts. NAS users are also an important part of runway safety.**

Airports

Another group integral to the FAA's runway safety efforts is the Office of Airports (ARP). In addition to awarding and facilitating airport grants, ARP helps manage infrastructure needs and is responsible for overall airport safety and design standards. The RSC and SSG rely heavily on input from this organization, especially when runway incursion mitigations involve the need for structural changes. ARP's flagship program for managing these efforts is the Runway Incursion Mitigation (RIM) program formed in 2015 (faa.gov/airports/special_programs/rim). While existing guidance had discussed ways to mitigate, reduce, or eliminate runway incursions, RIM was developed to address the problem in a more focused way.

Tasked with leading the RIM program, National Resource Expert for Airport Design Steve Debban set out to analyze existing runway incursion data to more clearly identify high-

Screenshot of the Runway Safety Group's weekly "Making the Connection" meeting where participants from headquarters, field offices, and stakeholder groups share and discuss surface safety information.

risk areas. Several years ago, working with the FAA's William J. Hughes Technical Center, they were able to come up with a list of taxiway elements or "geocodes" that have commonalities with incursions. Some examples include taxiways having direct runway access from the ramp to the runway, short taxiing distances between runways, and unexpected hold short line locations. "We even noticed incursions at locations with standard taxiway designs because of visibility limitations and differences with smaller aircraft," said Debban.

Armed with that information, the agency set out to geo-reference incursions at the more than 500 tower-controlled airports over the past seven years and narrowed the focus on the more frequent offenders. After validating these locations and weeding out some of those outlier incursions caused by communication issues or special events (construction), an inventory of approximately 140 locations was created. "This allowed us to get these locations into the RIM program and get specific mitigation projects underway," stated Debban. As of January 2021, 65 RIM locations implemented site-specific enhancements including taxiway reconfigurations and changes to lighting, markings, and aircraft operations. Other solutions like an education campaign or a hot spot designation are employed when physical changes are not feasible or best suited.

Debban is proud to point out the impressive 77-percent average reduction in runway incursions for RIM locations that were mitigated. He adds that they continuously monitor these locations for reoccurrence as well as assess incoming data for any new RIM candidates. Debban also credits the many ARP regional and district employees who do a bulk of the work at the individual airports including geometry redesign assessments and bringing RIM discussions to the forefront at local RSAT meetings. "They are really the pointy end of the sword with work that's done," said Debban. See more on RIM in this video: youtu.be/GAFELfIVctI.

ARP is also researching ways to mitigate wrong surface events (WSEs). A current study will consider some customized solutions including a closer look at ambient lighting and surrounding geography at an airport. There is particular attention on developing some new standards for the lighted "X" for a closed runway. Is the current standard large or bright enough? Does the X's configuration or placement impact its effectiveness? Ongoing lab tests may soon supply those answers.

Flight Standards

Rounding out the triad of support for the FAA's runway safety program is the Flight Standards Service. This group helps develop surface safety policy and guidance material (FAA handbooks, Advisory Circulars, etc.), facilitates runway incursion investigations, and is a critical component to the agency's education and outreach efforts on runway safety. Flight Standards assigns staff to work within the Runway Safety Group, with Aviation Safety Inspector Nick DeLotell as the primary conduit between the two groups. Nick is active within the SSG and RSC, and provides critical input on runway safety matters as well as assistance with investigations and data collection efforts on surface events. (See this issue's FAA Faces department for more about Nick.)

Complementing Flight Standards' work on the national scale are the thousands of FAA Safety Team (FAASTeam) Program Managers (FPM) and Representatives scattered throughout the United States. As part of the FAASTeam's National Performance Program, FPMs and Reps are encouraged to integrate runway safety principles throughout their different outreach vehicles, including seminars, meetings, and electronic messaging. They also work closely with ATO and ARP personnel by providing valuable local insight and setting up and advertising the RSAT meetings mentioned earlier. RSATs are a vital part of keeping airmen and airport stakeholders informed about issues specific to their local airport and operating area. They are required to be held at least annually for every towered airport, but can be more frequent depending on the status of ongoing projects or recurring issues.

According to FPM Ernie Copeland at the Scottsdale Flight Standards District Office, attendance at RSATs in his area range as high as 60 at some larger and more complex airports. Despite the new virtual platform for RSATs due to COVID-19 restrictions, Ernie notes that attendance is still extremely good. In fact, Ernie is excited about having this attendance-boosting virtual option available even after in-person meetings resume.

"We've seen hot spots completely disappear as a result of RSAT meetings," said Copeland. One example he notes is with a particularly confusing taxiway configuration at Phoenix-Mesa Gateway Airport (KIWA). He describes the angular intersection as similar to a "peace" symbol, with four taxiways converging right near the runway. "People were not only making mistakes taxiing, but were also inadvertently wandering out on the runway." Thanks to the collaborative discussions at RSATs, a safety-enhancing solution successfully made its way from concept to construction (see Figure 2).

Another success story rooted in RSAT deliberations is an ongoing project to change a confusing offset parallel runway configuration at Tucson International (KTUC) to a more standard configuration with matching runway lengths and widths. But as Copeland notes, not all solutions involve major construction. "Sometimes safety can be improved with a simple can of paint." That was the case at Phoenix Goodyear (KGYR), where an area of taxiway lines was redrawn to reduce the potential for runway conflicts.

Collaboration is Key

So there's your behind-the-scenes glance on how the FAA is working to improve surface safety. There are lots of moving parts and pieces, but the FAA's Runway Safety Program stands as a model in the aviation industry for convening the right people and resources to effect positive change. Key to its success is the collaboration among the many diverse agency and industry stakeholders, enabling the team's efforts to truly be greater than the sum of its parts. Remember, NAS users like you are an important part of that runway safety equation too. To ensure your voice is heard, reach out to an advocacy group, attend an RSAT, or chat with your friendly FAASTeam Rep. Together we can make a difference to keep things safe both in the air *and* on the ground!

LEARN MORE

FAA Order 7050.1B, Runway Safety Program
bit.ly/RunwaySafetyProgram (PDF)

National and Regional Runway Safety Plans
www.faa.gov/airports/runway_safety/publications

FAA's Runway Safety Homepage
faa.gov/airports/runway_safety

AC 90-66B, Non-Towered Airport Flight Operations
bit.ly/AC90-66B

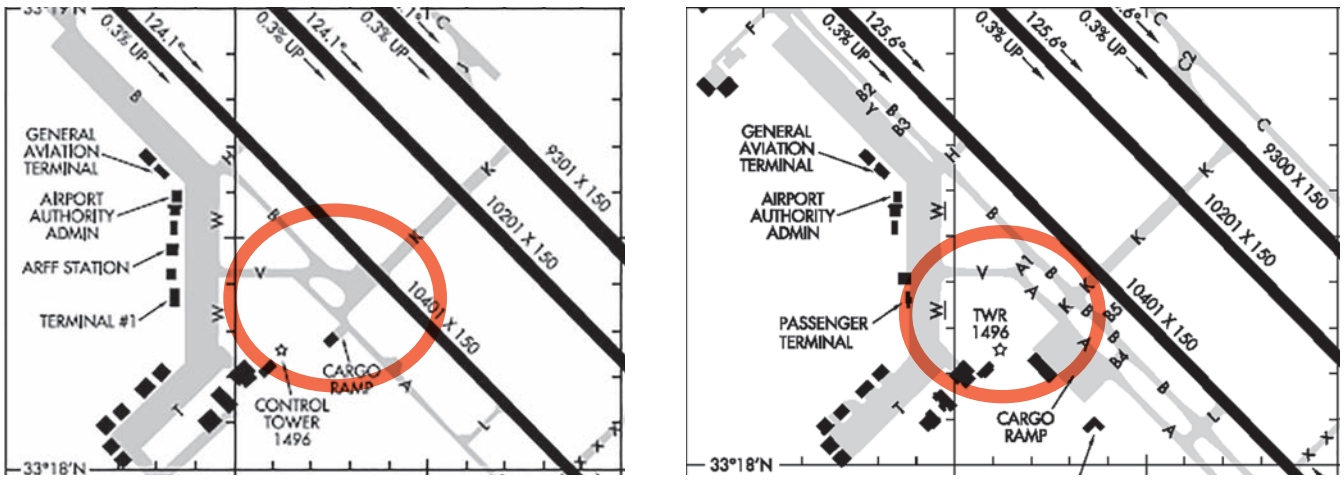


Figure 2: Before and after images of an incursion prone intersection at KIWA Airport.

ROLL of HONOR

Wright Brothers *Master Pilot Award*

The FAA's most prestigious award for pilots is the Wright Brothers Master Pilot Award. It is named in honor of the first U.S. pilots, the Wright brothers, to recognize 50 years of exemplary aviation flight experience, distinguished professionalism, and steadfast commitment to aviation safety. In 2020, we recognized the following Master Pilots. For more about the award, go to faasafety.gov/content/MasterPilot.

Robert Davis	AK
Harry Jordan	AK
Herman Ludwigsen	AK
Mark Murdock	AK
Theodore O'Malley	AK
Stanley Oaksmith, III	AK
James Woodley, Jr.	AK
———	
Frank Groner	AL
Bernard Reeves	AL
Charles Seale	AL
David Sheppard	AL
Gerald Smith	AL
William Stuefer, Jr.	AL
Samuel Tomlinson, III	AL
———	
William Allaben	AR
Charles Bright	AR
John Hastings, Jr.	AR
John Knight	AR
Ronald Menzie	AR
David Vaughan	AR
———	
Robert Boyd	AZ
Brunhilde Bradley	AZ
Paul Bronsing	AZ
George Buchner	AZ
Edward Chandler	AZ
Russell Gilmore	AZ
Ronald Gollhofer	AZ
Gerald King	AZ
James Marske	AZ
Norman McLane	AZ
Thomas McNamara	AZ
Wayne Pratt	AZ
James Schear	AZ
James Van Namee	AZ
John Varljen	AZ
Lloyd Watson	AZ
Terry White	AZ
Robert Wilson	AZ
———	
Jeffrey Atchison	CA
Julius Bertolucci	CA
William Brooks	CA
Robert Cashman	CA
Patrick Clar	CA
Lawrence Cochran	CA
Richard Collier	CA
Oliver Coolidge	CA
Barry Dallwig	CA
Timothy Delaney	CA
Johannes Driessen	CA
Edward Gregory, Jr.	CA
Marle Hewett	CA
Robert Hornauer	CA
Larry Jobe	CA
Eugene Korney	CA
John Krikorian	CA
Jack Linet	CA
Floyd Marshall	CA
Stephen Martin	CA
Claude Morgan, Jr.	CA
William Payne	CA
Norman Peebles	CA
Russell Perpall	CA
Jimmy Price	CA
Larry Rice	CA
Boris Rimensberger	CA
Charles Rothschild, III	CA
Ronald Shintaku	CA
Dennis Smith	CA
Jack Sobelman	CA
Kenneth Steiner	CA
Frank Stoner	CA
Timothy Tucker	CA
Paul Villa	CA
Robert Wess	CA
Fred Williams, Jr.	CA
Allen Yourman, Jr.	CA
Kathleen Zancanella	CA
———	
James Custis	CO
James Dye	CO
Charles Eckenrode, Jr.	CO
Carlo Gaines	CO
Nicholas Hinch	CO
Val Johnson	CO
Carl Miller	CO
Milton Moores	CO
George Nolly	CO
Michael Silva	CO
Phillip Wolff	CO
Stephen Zimmerman	CO
———	
William Bodkin	CT
Bernard Ferro, III	CT
Douglas Garrett	CT
Gil Midford	CT
Dennis Ouimette	CT
Richard Proffitt	CT
———	
David Bennett	DE
———	
Fred Adams	FL
Howard Atkins	FL
Victor Babyak	FL
Gary Blodgett	FL
William Brock	FL
Lance Carey	FL
Larry Casale	FL
John Collinson	FL
James Countryman	FL
John Cox	FL
Alexander Craig	FL
Edward daSilva	FL
William Farnham	FL
John Ferns	FL
Frank Gallagher, Jr.	FL
James Good	FL
Jack Hallett	FL
Jerry Harwood	FL
James Hemphill	FL
Ronald Hoerter	FL
Eleanor Hutchins	FL
Raymond Isherwood	FL
Ruth Jacobs	FL
John Jensen	FL
Kenneth Johnson, Jr.	FL
Robert Jones	FL
Joesph Kittinger, Jr.	FL
John La Bella	FL
Clarence Lee	FL
David Lehtonen	FL
Frank Lenz	FL
James Long, Jr.	FL
Richard Low	FL
John Lumley	FL
Alan Maurer	FL
MIchael McKenny	FL
John McLean, Jr.	FL
William McNair, Jr.	FL
Bernard Morris	FL
Frank Noble, Jr.	FL
Clyde O'Baker	FL
Ronald Odegard	FL
Richard Petrucci	FL
James Piche	FL
Darrell Pope	FL
Lynn Postel	FL
Paul Proffett	FL
William Rice	FL
James Rogers	FL
Juan Ruth	FL
Steven Schwenk	FL
Jimmie Seeley	FL
Larry Shanks	FL
James Sloane	FL
Sherman Smith	FL
David Strain	FL
Charles Svoboda	FL
William Tanis	FL
Alan Taylor	FL
Frederick Telling	FL
Barry Trotter	FL
Edward Waldorf	FL
Wayne Wilkinson	FL
Michael Windom	FL
John Wood	FL
Frederick Yoder	FL
———	
Herman Anderson	GA
Edward Andrews, Jr.	GA
Kenneth Baggett	GA
Cono Borrelli	GA
James Campbell	GA
William Clary, Jr.	GA
James Cook	GA
James Dalton, II	GA
Clarence Deal	GA
Donald Dodson	GA
Larry Dunwoody	GA
Danny Giallourakis	GA
Richard Gilbride	GA
Marshall Gildermaster	GA

Felton Havins	GA
Michael Holland	GA
James Ingram	GA
Edmund Laird, Jr.	GA
Robert Maynard	GA
Jackie McCormick	GA
Alan Murray	GA
Thomas Owens	GA
Michael Quiello	GA
William Riley	GA
Robert Ripley	GA
Sidney Smith	GA
Charles Spillner	GA
James Tatum	GA
Ralph Whitlock, Jr.	GA
Roy Wicker	GA
Jeffrey Zito	GA

Scott Crosier	HI
Bernard Watson	HI

Gary Aho	IA
George Cobley	IA
Paul Elmegreen	IA
Charles Hawley	IA
Gerald Lowry	IA
Timothy Ross	IA
Richard Willetts	IA
Connie Younger	IA

Richard Bush	ID
Ray Dupree	ID
Richard Durden	ID
Alma Mallard	ID
Holbrook Malsen	ID
James O'Donnell	ID
Daniel Olmstead	ID

Stephen Bartley	IL
William Colantoni, Jr.	IL
Keith Cook	IL
Kenneth Dufour	IL
Raymond Harvey	IL
Paul Heinrich	IL
Timothy Mickel	IL
Craig O'Mara	IL
John Reed	IL
Evan Roberts	IL
William Short	IL
Jeffrey Whitney	IL
Jerry Yearwood	IL
Joseph Zubay	IL

Charles Beene	IN
John Davis	IN
Ronald Dick	IN
Charles Dye, Jr.	IN
James Ewen	IN
Robert Graves	IN
Robert Hill	IN
Larry Jacobi	IN
James Mead	IN
James Smith	IN
Paul Williams	IN
Bart Wooldridge	IN

Gregory Barnhill	KS
Stephen Craig	KS
Andrew Downey	KS
James Kirk	KS
David Landoll	KS
Jon Paschka	KS
Frank Von Geyso	KS
Edward Zenner, Jr.	KS

Mark Allen	KY
Roger Moore	KY
Rodney Smith	KY
Helmut Weislein	KY
Ronald Zielke	KY

Roy Carraway, Jr.	LA
Jimmy Fordham	LA
William Girard	LA
Michael Marchand	LA
Ralph McRae, Jr.	LA
William Pardue, Jr.	LA
William Straughan	LA
Kenneth Wojcik	LA

Peter Dooley	MA
Robert Hansman	MA
Richard Kahn	MA
John Kinney	MA
Michael Nagle	MA

Michael Mooers	MD
Calvin Peacock	MD
Herbert Rosenthal	MD
Neal Samonte	MD

Richard Acker	MI
Daniel Bauman	MI
Brian Carroll	MI
James Cihak	MI
Daniel Conrad	MI
John Fellows	MI
Larry Fuerst	MI
William Gitchel	MI
Dennis Glaeser	MI
Ralph Hotton	MI
Ellsworth Johnson, III	MI
Kenneth Laurence, Sr.	MI
Clifford Maine	MI
Neil McCormick	MI
Joseph Noto	MI
William Packer, II	MI
Daniel Peacock	MI
Arthur Ranger	MI
Howard Rundell, Jr.	MI
Ronald Sackett	MI
Thomas Shipp	MI
Thomas Trumbull	MI
Daniel Van Dyke	MI
Jack Ward	MI

Edgar Fischer	MN
Roger Gomoll	MN
Greg Herrick	MN
Ronald Smith	MN
James Younggren	MN

Robert Britton	MO
Dennis Calvin	MO
Federick Clapp	MO
Ronald Gallop	MO
Howard Gretencord	MO
Dale Grove	MO
Sheldon Hamilton	MO
Raymond Hamilton	MO
Gerald Hawkins	MO
John Herren	MO
Gregg Maryniak	MO
Robert May	MO
Fount McKinley, Jr.	MO
Robert Mock	MO
Jerry Nichols	MO
Larry Norcross	MO
Ralph Pingel	MO
Joseph Slavich	MO
Joseph Towns	MO

David Childress	MS
Bobby Meadows	MS

Robert Breum	MT
John Fulton	MT
John Hebbelman, Jr.	MT
Charles Inman	MT
Roger Lincoln	MT

Robert Allison	NC
Richard Basco	NC
Elbert Boyd, Jr.	NC
Jewell Brown	NC
John Butler, Jr.	NC
William Cherry	NC
Robert Dore, Jr.	NC
Loren Edwards	NC
Daniel Glover	NC
Charles Mirman	NC
James Morris, III	NC
Gerald Munson	NC
John Pelton	NC
Robert Phillips	NC
Terry Schilson	NC
Leslie Scott	NC
William Terry	NC
Thomas Waskow	NC
Daniel Watkins	NC
David Weeks	NC
Edgar White, Jr.	NC
Johnnie Williams	NC
JB Williams	NC

Larry Linrud	ND
Galen Marsh	ND
James McLeish	ND
Kent Pietsch	ND

Edwin Bowes	NE

Frederick Brough	NH
Scott Doremus	NH
Michael Sweet	NH
Paul Taylor	NH
Peter Temple	NH

James Davidson	NJ
Lorraine Denby	NJ
Thor Solberg	NJ

Frank Bowlin, III	NM
Donald Schrier	NM
Harley Wadsworth	NM
Del Wardlow	NM

Peter Baurer	NV
Lawrence Baxter	NV
Lynn Billow	NV
Richard Bletzer	NV
Leonard Bochicchio	NV
Richard Chapman	NV
Phillip Chik	NV
George Clary	NV
Roy Clason	NV
Francis de Peyster	NV
Garry Duff	NV
Thurman Elliott, Jr.	NV
Richard Flechsig	NV

ROLL of HONOR

Lewis Gage	NV
Lee Griffin	NV
Roger Harker	NV
William Hesser	NV
Larry Ingram	NV
Robert Johnson	NV
Robert Knutzen	NV
James Lehman	NV
Douglas Melson	NV
William Petersen	NV
John Petts	NV
James Pittman	NV
Doyle Ruff	NV
William Scott	NV
Joseph Sheble, II	NV
Ronald Sutton	NV
Thomas Taber	NV
Patrick Walker	NV
Lewie Webb, Jr.	NV
Frederick Webb	NV
Harriet Bregman	NY
Carol Jarecki	NY
Peter Lane	NY
Donald McNeil	NY
Ronald Rios	NY
Conrad Stergas	NY
Richard Zaiman	NY
Matthew Zuccaro	NY
———	
Larry Diemand	OH
Douglas Eades	OH
Curtis Hiser	OH
Allen Maurer	OH
Bernie Ockuly	OH
Richard Packer, Sr.	OH
James Roberts	OH
Hyman Rosin	OH
James Sayers	OH
Rex Schlagenhauf	OH
Steve Skilken	OH
Lester Sommers	OH
Ernest Stadvec	OH
Maurice Verdeyen, Jr.	OH
James Weiss	OH

Peter Cappadona	OK
Joseph Davis	OK
Alvin DeVane	OK
Earl Downs	OK
Nan Gaylord	OK
Gary Quinby	OK
Floyd Totten	OK
———	
Michael Danielle	OR
Irl Davis	OR
Eugene Maahs	OR
Joseph May	OR
Russell Savage	OR
Terry Tomeny	OR
John Watson	OR
Richard Williams	OR
———	
Jerrold Atwell	PA
Kenneth Hopke	PA
Thomas Knauff	PA
Robert Mapel	PA
Ranley Nelson	PA
Judith Redlawsk	PA
John Suzenski	PA
Charles Tame, Jr.	PA
———	
Daniel Ahern	SC
Robert Albracht	SC
Charles Angle	SC
Gary Burleson	SC
Gary Ellis	SC
Mark Glibbery	SC
Charles Kirkley	SC
Michael Klindt	SC
Bruce Landsberg	SC
Cedric Metsker	SC
John Payne	SC
Walter Sain, Jr.	SC
———	
Donald Abbott	TN
Wayne Baker	TN
David Craig	TN
Richard Del Frate	TN
Robert Devrnja	TN

Charles Gant	TN
Marshal Mize	TN
Clyde Mullins	TN
William Thornton	TN
Terry Zubrod	TN
———	
Gene Allen TX	
Daley Bales. Jr.	TX
Gregory Barber	TX
Joseph Beatty	TX
Frank Bell	TX
James Blair	TX
Philip Bonasera	TX
Ralph Bowers	TX
William Bussey	TX
Terry Cecil	TX
Brian Childs	TX
John Chilstrom	TX
Keith Clarry	TX
James Clement	TX
Jerome Cohen	TX
Larry Cole	TX
Edward Cole	TX
Oren Cooley	TX
Marty Crabdree	TX
Michael Elliott	TX
Curtis Farley	TX
Glenn Frels	TX
Charles Fridge	TX
Edwin Gunter, Jr.	TX
James Hardgrove	TX
Richard Hecker	TX
Joseph Henderson	TX
Arther Jackson	TX
Mike Krampitz	TX
Gordon Lester	TX
Lynn Long	TX
Edwin Loskill	TX
Randall Maley	TX
Wayne Maynard	TX
Mike McClendon	TX
Michael McNamee	TX
Ralph Miller	TX
Darrell Mize	TX

Manuel Montes	TX
Joe Morris	TX
Philip Owens	TX
Michael Parrish	TX
Harry Pierce, III	TX
Steven Polk	TX
Terry Pratchett	TX
Byron Reed	TX
Michael Reeser	TX
William Rucker	TX
Steven Seats	TX
Timothy Sikorski	TX
Michael Spedale	TX
Gary Spidel	TX
Gaylon Stamps	TX
Gerald Stofer	TX
Norman Thompson	TX
Gary Van Wagner	TX
Gary Walker	TX
Lon Wimberley	TX
Richard Winter	TX
Kenneth Wittekiend, Jr.	TX
David Young	TX
———	
Lloyd Crumrine	UT
James Wisecup	UT
Donald Wittke	UT
———	
Steven Bosshard	VA
Herbert Bullock	VA
Robert Coolbaugh	VA
Louis D'Alessandro	VA
Michael Friedman	VA
Charles Lamb, Sr.	VA
Kenneth Perich	VA
Scott Ruffner	VA
David Scull	VA
Jones Stanley	VA
———	
Charles Catlin	VT
Edward Scott	VT
———	
Larry Amundson	WA
Ray Ballantyne	WA

Gayle Brink	WA
Frank Christiansen	WA
Timothy Conroy	WA
Geoffrey Curtis	WA
Richard Gauron	WA
Karl Gruber	WA
Wesley Gustafon	WA
Paul Hansen	WA
Marc Hawkins	WA
Douglas Hawley	WA
Peter Lagergren	WA
Terry Morrison	WA
John Mulhern	WA
Gregg Munro	WA
Michael Pickett	WA
Richard Smith	WA
Minard Thompson	WA
Carleton Waldrop	WA
———	
John Blair	WI
Gerald Flaugher	WI
Peter Fobia	WI
Robert Helfferich	WI
Thomas Helm	WI
James Kirvida	WI
Thomas Muehl	WI
Philip Peterson	WI
Larry Phillips	WI
Jeffery Scherer	WI
James Zuelsdorf	WI
———	
Roderick Winston	WV
———	
John Traylor	WY

Charles Taylor *Master Mechanic Award*

The FAA's most prestigious award for aircraft mechanics is the Charles Taylor Master Mechanic Award. It is named in honor of the first aviation mechanic in powered flight, Charles Taylor, to recognize 50 years of exemplary aviation maintenance experience, distinguished professionalism, and steadfast commitment to aviation safety. In 2020, we recognized the following Master Mechanics. For more about the award, go to faasafety.gov/content/MasterMechanic.

Randolph Beilfuss	AK
Melvin Brabham	AK
Mark Dekreon	AK
Ronald Hoecher	AK
Stanley Oaksmith, III	AK
Michael Selhay	AK
James Dover	AL
Toby Stroud	AL
David Altrui	AR
Phillip Beck	AZ
Michael Ellis	AZ
Michael Gonzales	AZ
Lawrence Michaud	AZ
Richard Peavley	AZ
Thomas Burriss	CA
Leonard Federico	CA
Andrew Hendrickson	CA
Victor Hutchings	CA
Claude Morgan, Jr.	CA
Ronald Silcox	CA
Paul Tarr, Sr.	CA
Rick Zaw	CA
Stephen Hardy	CO
Stephen Sanborn	CO
Stanislaus Senk, Jr.	CT
Alan Speakmaster	CT
Stephen Stodoiski	CT
James Marvin	DE
Dale Walley	DE
Terry Brandenburg	FL
David Collins	FL
Reynaldo Fernandez	FL
Marion Grau	FL
Jesus Lozada	FL
Dale Meiler	FL
Thomas Perez	FL
Phillip Vernon	FL
James Warren	FL
Richard Wortman	FL
Lawrence Ashley	GA
Clarence Deal	GA
William Johnson	GA
Harry Piper	GA
Robert Ripley	GA
Roy Wicker	GA
James Mayo	HI
Rene Pfaffenbach	HI
Clifford Smart	ID
Robert Cronsell	IL
Raymond Ganske	IL
Edward Meyer	IL
Charles Beene	IN
Francis Deford	IN
Dan Sedberry	IN
James Smith	IN
Stewart Van Dyke	IN
William Bryan	KY
Robert Poe	KY
David Vigen	KY
Larry Kidwell	LA
Dale Johnson	MA
Marc Patacchiola	MA
Arnold Paye	MA
James Reed	MD
John Rittenhouse	MD
Roger Robinson	MD
Kevin Gilbert	ME
Dale Johnson	MN
Bruce Bauer	MO
Harold Dickey	MS
Trong Vu	MS
Clayton Wilhelm	MT
Jimmy Allred	NC
Larry Belton	NC
Roger Cope	NC
Michael Dieck	NC
Thomas Hall	NC
Robert Phillips	NC
Jerry Toms	NC
Reinhard Bauer	NH
Dennis Hamel	NH
Roger Love	NH
Leonard Boyd	NJ
James Davidson	NJ
Michael Gutman	NJ
Neil Nederfield	NJ
Ronald Porreca	NJ
Kenwood Cassens	NY
Mervin Lewis	NY
Jeffrey Shapiro	NY
Stephen Shataka	NY
Charles Smith	NY
Thomas Eggleston	OH
Gary Jacobs	OH
Alan Kettunen	OH
Richard Packer, Sr.	OH
Richard Fontes	OR
John Binek	PA
Franz Dobler, Sr.	PA
Donald Lambert	PA
Albert Leonard	PA
Daniel Moyer, Jr.	PA
H. Shuch	PA
Michael Ballee	SC
Jerry Collins	TN
Charles Simons	TN
Michael Baier	TX
Glenn Bang	TX
Bill Brinkley	TX
Jerome Cohen	TX
Oren Cooley	TX
Harry Dumas, Jr.	TX
John Hurn	TX
David Kohler	TX
Allen Lemmons	TX
Daniel McNulty	TX
Darrell Mize	TX
Carl Ploch	TX
Michael Reeser	TX
Karl Young	TX
Philip Smart	UT
Steven Buckbee	WA
Richard Juarez	WI
Terry Peed	WI

LIBRARIES AND "SKYBRARIES"

Runway safety continues to be one of the FAA's highest priorities. Achieving that goal involves everyone who has an airport presence or role — not just pilots, but also air traffic controllers and airport vehicle drivers. To support runway safety, the FAA's Runway Safety Group has developed a wide range of guidance, resources, and expertise that you can access (at no cost, of course) on the FAA's website. You'll find the URL in the "Learn More" section below, but here's a preview of what you'll find.

Airport Diagrams

There are many sources for airport diagrams, but the FAA's website offers one as well. From the Runway Safety landing page (ahem), you can search the FAA database for PDF versions of airport diagrams that you can download and print.

The purpose of airport diagrams is to assist in the movement of ground traffic at locations with complex runway/taxiway configurations. If you are flying to such an airport, or to any airport you've never visited before, it's a really good idea to get a copy of the airport diagram and study it long before you get into the airplane. Whether you use a paper diagram or an electronic display on your tablet, you can use a highlighter (most electronic flight bag apps have them in multiple colors) to mark items of special note or interest.

Hot Spots

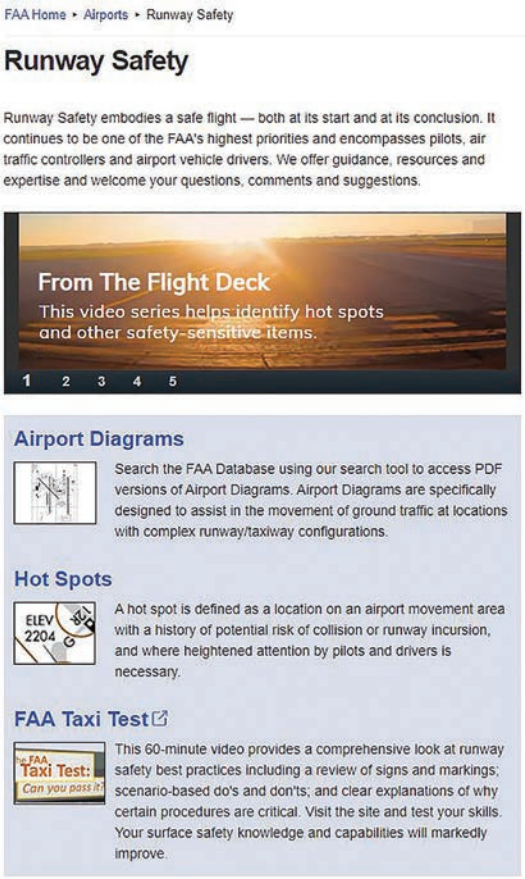
The FAA defines a "hot spot" as a location on an airport movement area that has a history of potential risk of collision or runway incursion. The goal is to raise awareness among pilots and drivers operating at that airport. More importantly, identifying hot spots makes it easier for airport users to plan the safest possible path in and around that airport. By noting hot spots and then planning aircraft surface movements to avoid them or exercise caution in them, pilots add another layer of safety to flight operations.

FAA Taxi Test

You can use a day when circumstances let you only think about flying to watch this 60-minute video which offers a comprehensive look at runway safety best practices. You will find a review of signs and markings, scenario-based DOs and DON'Ts, and clear explanations of why certain procedures are critical. Investing just the one hour it takes to watch the video will markedly improve your surface safety knowledge and capabilities. So check it out, and test your skills.

But Wait ... There's More!

Clicking on the "Runway Safety Resources" link will take you to a page of links to handy resources of all kinds. There are specific resources for pilots, controllers, and vehicle drivers, along with more airport references. Of note is the link to Animations and Videos (under Trending Now) and the airport construction notices towards the bottom of the page. You will also find links to external (non-FAA) materials, such as WINGS-eligible runway safety training developed by the AOPA Air Safety Institute, ICAO Runway Safety resources, and links to the "Skybrary." I'll let you discover what's included in that catchily-named site on your own.



Please take a few minutes to check out some of these resources, bookmark the Runway Safety page, and consider subscribing for updates. You'll be glad you did, and so will your fellow airport users!

Susan K. Parson (susan.parson@faa.gov) is editor of *FAA Safety Briefing* and a Special Assistant in the FAA's Flight Standards Service. She is a general aviation pilot and flight instructor.

LEARN MORE

faa.gov/airports/runway_safety

DRONE OPERATIONS NEAR AIR/HELIPORTS IN CLASS G AIRSPACE

One of my favorite travel spots is the island of Culebra, a municipality of Puerto Rico. The island has many great locations for videography including its crown jewel, Flamenco Beach — rated as one of the top ten beaches in the world. I recently traveled to Culebra and brought my DJI Mavic Mini drone to take videos of the island's beauty. Allow me to share some of the risk mitigation strategies (RMS) I used to fly while operating near an airport and heliport in uncontrolled airspace. Flight safety is paramount no matter where you are — in a busy city or in paradise.

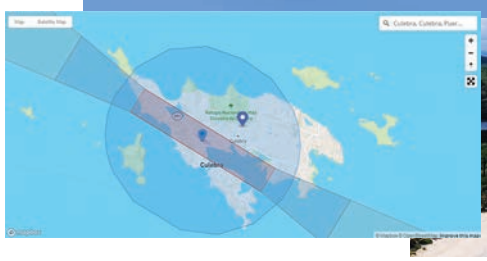
Culebra is about 20 miles east of Puerto Rico measuring around seven miles long by two miles wide. The island is hilly with a maximum peak height of 646 feet at Mount Resaca. It has a general aviation airport, Benjamin Rivera Noriega (CPX), north of Dewey that offers scheduled passenger service. The single runway designated 13/31 is 2,600 feet in length, 50 feet wide, and at 49 feet mean sea level (MSL). Airport operations are limited to propeller aircraft with 10 seats or less. There is also a private heliport, Hill, southwest of town that is 60 feet long, 60 feet wide, and at 80 feet MSL. The scheduled and unscheduled flights go to other airports in Puerto Rico and neighboring islands.

As a part 107 certificated remote pilot, I know that while operating my drone in the vicinity of airports I cannot "*interfere with operations and traffic patterns at any airport, heliport, or seaplane base*" (14 CFR section 107.43). I must yield the right of way to all aircraft and "*may not pass over, under, or ahead of it unless well clear*" (14 CFR section 107.37). To plan my first flight, I checked the B4UFLY app to check on any restrictions at Linda Bay near Dewey. Unfortunately, the app did not support this location — it couldn't tell me if I could fly there or not. So I went to the SkyVector website to review the aeronautical chart for CPX and Drone Notices to Airmen (DROTAMs). Both facilities were in Class G airspace with no notices. Low Altitude Advanced Notification Capability (LAANC) airspace authorization was not needed because the flight would occur in uncontrolled airspace. Therefore, I was cleared for takeoff.

While on the island, I successfully conducted 34 flights using the following 10 RMS:

1. Learn take-off and landing schedules and traffic patterns to avoid flying at the same time and airspace.
2. Use FlightAware to track flights.
3. Do not fly within the airport traffic pattern (DJI installed a "well-clear" geo-fence in the Mavic Mini software; the geo-fence kept the drone 2,000 feet away from the runway centerline and from entering the takeoff and landing paths).
4. Shadow the hills and mountains and fly alongside them.
5. Use infrastructure masking (I flew very close to power lines and structures).
6. Monitor the airspace for sights and sounds of air traffic.
7. Learn tips from a local drone pilot (I met a local pilot who is an emergency medical technician).
8. Program the remote controller to maintain maximum horizontal and vertical distances of 300 feet — this maintains proper visual line of sight and aircraft altitude.
9. Fly at low altitudes and film at slow speeds (cinematic mode).
10. Be ready to lower to a safe altitude (15-20 feet above ground level (AGL)) if there are any signs of an aircraft approaching the area of operation.

By using these strategies, I was able to safely film eight locations and create content that highlights the beauty of this island. To see one of the videos I created, visit bit.ly/CulebraIsland.



John Reinhardt is a program manager in the UAS Integration Office's Operational Program Branch. He currently manages the FAA's UAS Test Sites Program.

JENNIFER CARON

A TUG HERE AND A TOW THERE — RUNWAY SAFETY FOR AVIATION MECHANICS

"Let's try to duplicate the fault with the throttles advanced." That idea meant a taxi from the maintenance hangar to the run-up enclosure. A call to ground control cleared us to Taxiway C with a hold short at Runway 22R. "Did he say hold short at 22L? Let's just cross." As the nosewheel met the surface painted hold short signs, I saw a Piper Cherokee on takeoff roll coming straight at us! I immediately applied heavy brakes and cut power. The Beech came to an abrupt stop, but the nose was already over the runway edge line. In shock, I watched the Cherokee apply maximum brakes. Smoke was coming from both main tires. It rolled to a shuttering stop, its wingtip just a few feet from us …

This excerpt is from an Aviation Safety Reporting System submission describing an aviation mechanic's close shave on the runway. It's an all-too-common example of a runway incursion — the incorrect presence of an aircraft, vehicle, or person on the protected area designated for the landing or takeoff of aircraft. Pilots do make up the majority (two-thirds, actually) of these incidents, but aviation mechanics are no strangers to surface incidents/runway incursions. A mechanic incursion is classified as a vehicle/pedestrian deviation of aircraft that is taxied or towed by a non-pilot with no intention for flight.

Runway incursions are primarily caused by one or a combination of three factors: 1) communication failure, 2) airport unfamiliarity, and 3) loss of situational awareness.

"Say Again, Over"

Most mechanic incursions highlight a pattern of unauthorized runway crossings. To safely taxi, tug, or tow an aircraft, proper communication is key:

1. **Always obtain a taxi clearance before you move.** Do not cross the runway holding position markings without clearance, even if the runway is closed. If you're confused, stop and ask ground control to "say again." Cross the runway at the departure end, not the midpoint, to give an encroaching aircraft more time to react. When you do proceed, look left, right, and up.
2. **Know the right ground frequency and how and when to communicate with air traffic control.** Know the proper radio procedures and phraseology; don't think over the radio; be clear, concise, avoid "uh's" and "umm's;" tell the controller: *WHO* you are, *WHERE* you are, and *WHAT* you intend to do.
3. **Read back (mandatory) your clearance with aircraft ID, tug/vehicle ID.** "Roger" means "received;" it does not deliver clearance. If ground control forgets you, **never assume you have clearance to proceed.** Call them to be certain.

Black Square, You're There

In the airport operations area, every towered U.S. airport has both a movement and a non-movement area. Here's what that means. Non-movement area: the ramp (apron); no clearance needed. Movement area: taxiways (yellow markings); controlled by ground control, and runways/runway safety area (white markings); controlled by the tower. The solid yellow lines (boundary lines) are on the non-movement area (safe side) separating the ramp/apron and/or taxiway/runway from the dashed lines on the movement area (protected side).

1. **Markings on an airport copy the U.S. highway system** — you can't (legally, that is) cross a solid yellow line to pass another car. Likewise, in the ramp area you have to get clearance from ground control before legally crossing a solid yellow line. Runway holding position signs copy roadway stop signs — white on a red background means stop.
2. **Memorize airport signs and know their meaning.** Here are some tips: ***"Black Square You're There"*** — a location sign indicating the runway, taxiway you're on. ***"Yellow Array Points the Way"*** — a yellow direction sign with black arrows pointing to a runway, taxiway, or destination. ***"Red and White? Runway's in Sight"*** — a never-cross-without-clearance runway holding position sign; white on red.

If You Don't Know, Ask — If You're Not Sure, Verify

Maintain situational awareness at all times. Be aware of what's going on around you, other aircraft, or vehicles. Don't get distracted or complacent and keep in constant contact with your team. Memorize the rules and layout of your airport. Start by keeping a current airport diagram. Ongoing training in surface safety for taxiing, run-up, and vehicles or tow equipment is essential.

You have the same responsibility as any pilot taxiing an aircraft. Everyone plays a vital role when it comes to runway safety.

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

GOING THE WRONG "WAY"— A TALE OF TAXI CABS AND TAXIWAYS

Learning to drive in New York City was definitely not without its challenges. I recall the frantically busy streets of Flushing, Queens as the proving grounds for getting my license. If you can drive a car here, you can drive it anywhere, right? So I thought.

During driving school I was confident I was being exposed to every roadway hazard imaginable: detours, construction zones, emergency vehicles, jaywalkers, and piano-sized pot holes. You name it; we drove through, over, or around it! Safely, I might add.

Despite my perceived prowess behind the wheel, I was in for a rude awakening one December morning when I offered to drive a few friends into Manhattan. At a rather large intersection, I made what I thought was a routine left turn onto a two-way street. It was instead a six-lane one-way street with what looked like a sea of yellow cabs careening towards me. You can imagine my panicked reaction. Luckily, I was able to shuffle in to a vacant parking spot to avoid the swarm of oncoming vehicles before sheepishly making a 180-degree turn.

So what happened? How could I make such a big mistake? "Did you not see the one-way sign?" shouted the peanut gallery from the back seat. Truth is it was pretty hard to notice among the throng of parking and bus stop signs, not to mention all of the double-parked delivery vans. Excuses aside, I should have been more careful. It just goes to show that expecting something to always be a "certain way" can end up being your downfall. Thankfully it was a taxi cab and not a Cessna *Citation* screaming towards me.

Unfortunately, that same type of mistake at an airport is more common than you might think. Sometimes obscured visibility, inoperative or unfamiliar airport signage/lighting, or confusing intersections, can cause you to mistake a taxiway for a runway (or vice versa), and lead to a dangerous incursion.

The problem isn't just on takeoff either. Consider Delta Air Lines Flight 60 in October 2009. The Boeing 767, on a pre-dawn arrival from Rio de Janeiro, landed on Taxiway Mike at Hartsfield-Jackson Atlanta International Airport. No damage or injuries were reported, but you can only imagine the catastrophe that would have ensued had the taxiway been occupied. Contributing factors to this incident included unavailable runway approach lighting and a confusing mix of lighting technologies on the taxiway.

This type of mistaken identity can lead to runway confusion, aka, wrong surface events (WSE). To help reduce the occurrence of such events, the FAA continues to make use of two very effective tools: the *Runway Safety Simulator* and the *From the Flight Deck* video series. The former offers users a combination of animations and interactive scenarios depicting different challenges a pilot may face while taxiing. Three of the animations focus specifically on WSEs.

The FAA's *From the Flight Deck* video series provides pilots with actual runway approach and airport taxiway footage captured with cockpit mounted cameras, combined with diagrams and visual graphics to clearly identify hazards and hot spots. There are currently more than 25 different airport videos with more on the way. The series also contains videos that cover specific risk areas like wrong direction intersection takeoffs and hold short awareness.

It might seem obvious to some pilots, but focusing on your surroundings and understanding what can blur the distinction between a runway and taxiway can really go a long way in making sure you head out the right "way" each time.

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

LEARN MORE

Runway Safety Simulator
runwaysafetysimulator.com

From the Flight Deck Video Series
faa.gov/go/FromTheFlightDeck

A 4-STAR HELICOPTER SAFETY RATING SYSTEM

Many of us in the helicopter safety business have long promoted the idea that the entire helicopter community needs to commit to safety. Across the spectrum — from pilots and mechanics to manufacturers and government agencies — that message has taken hold.

The Helicopter Association International's Land and Live campaign, the Airborne Public Safety Association's Safety First campaign, and the U.S. Helicopter Safety Team's safety enhancements are just a few examples of this commitment to safety.

We need to do more. The United States has not seen a sustained decrease in the helicopter fatal accident rate for 15 years. We see the rate drop for a year or two, but an increase soon follows. Consider these numbers: the fatal rates in 2018 and 2019 are about the same as they were in 2005.

To help turn the tide, FAA rotorcraft safety advocates developed a helicopter safety ratings concept for certain categories of helicopter design and equipment, similar to the tools that the automobile industry uses. The helicopter concept proposes a four-star system.

The concept addresses critical occupant protection categories, such as crash resistant seats and structures, crash resistant fuel tanks, and equipment that protects or reduces the impact of bird strikes. It also addresses technology to help prevent and recover from loss of control, reduce collisions with obstacles during flight, and avoid in-flight collisions with other aircraft.

The FAA is challenging the helicopter industry to further develop the concept and implement it as a voluntary education and safety promotion tool. Ideally, increased public understanding of the safety benefits will prompt an increased demand for helicopters that offer these designs and equipment.

Photo courtesy of Bell Textron Inc.

FAA helicopter safety advocates are urging industry to voluntarily build upon and implement the helicopter safety ratings concept.

Fundamental to the FAA proposal is that all FAA type-certificated helicopters are safe since they met the required FAA safety regulations when they were type-certificated. The ratings concept acknowledges voluntary options intended to increase safety.

To improve the chances of surviving a crash and reduce the chances of a crash occurring in the first place, the proposal addresses the two general safety focus areas of design and equipment (occupant protection and accident avoidance) in several ways. These include items such as crash resistant seats and crash resistant structures, which would reduce blunt force trauma injuries. Also included are crash resistant fuel systems, which decrease the likelihood or delay post-crash fires and allow occupants time to escape a damaged helicopter. Bird strike resistant windshields, such as those made from polycarbonates, and deterrents (e.g., lights and audio), would go a long way to prevent or mitigate damage (or worse) from bird strikes.

In addition, the concept addresses fatalities due to loss of control, hitting objects during low-altitude flights, and in-flight aircraft collisions. Examples of equipment for these categories include autopilots to address loss of control, HTAWS to avoid hitting objects, and TCAS to avoid in-flight collisions.

This safety ratings concept was first introduced publicly during the virtual 2020 FAA International Rotorcraft Safety Conference. Jorge Castillo, manager of the FAA Strategic Policy Rotorcraft Section, reports that there was immediate positive feedback. We urge industry to build upon this concept and voluntarily implement it soon.

Gene Trainor is a communications specialist/technical writer with the FAA Compliance and Airworthiness Division and a Rotorcraft Collective team member.

LEARN MORE

FAA Rotorcraft Safety Rating Concept for Design and Equipment
bit.ly/RotorSafetyRatingConcept (PDF)

Check out our GA Safety Facebook page at

Facebook.com/groups/GASafety

If you're not a member, we encourage you to join the group of over 14,000 participants in the GA community who share safety principles and best practices, participate in positive and safe engagement with the FAA Safety Team (FAASTeam), and post relevant GA content that makes the National Airspace System safer.

Here are some of our virtual hangar conversations where GA Safety Facebook members support and help each other.

What are your thoughts about Non-Towered Airport Operations?

Heather Metzler, FAA Safety Team Program Manager and WINGS Pro says, "I fly mainly out of non-towered airports in an airplane without ADS-B and sometimes in an airplane without a radio, but many pilots with ADS-B In think they are seeing all the traffic, and that is not true, even at towered airports. Eyes outside!"

Check out the comments and lively discussion at our GA Safety Facebook page: bit.ly/NonTowered. To learn more about non-towered airport flight operations, read FAA Advisory Circular 90-66B at bit.ly/AC90-66B.

If you hear or read "stabilized approach," what is your first thought?

Check out what everyone has to say on our page at: bit.ly/StabilizedAppr.

New Winter Weather Runway Safety Video

Just want to let you know how much I appreciate the new Winter Weather Runway Safety video at bit.ly/WinterWeatherRunwaySafety. Besides the content which was excellent, the sound quality was the best that I have experienced in all of the FAA/AOPA/NBAA, etc. videos that I have watched over the years. Thanks for that. I ain't getting any younger and neither is the pilot population, so these enhancements make a difference.

— Eliot

Thank you for the feedback! These products always improve when we get your comments to help steer us in the right direction.

Running Up New Ideas for Runway Safety

I retired from the USAF in June 2008 as an airlift and instructor pilot. After 11 years, I have returned to active duty USAF as an operations planner, and I'm always thinking of safety and aviation safety in particular. Maybe this has been looked at and tested, but I thought of aircraft taxi ground mishaps and runway incursions, and I wondered if the FAA has ever attempted to put safety sensors on the most extreme parts of the aircraft on large aircraft like airliners, similar to what is on vehicles that warn you of impending objects, and you'd get cockpit warnings and even a visual presentation.

— Al

Thank you for your service, thanks for your partnership in aviation safety, and thanks for a truly interesting proposal! With your permission, we'd like to take your idea to our Runway Safety Group for discussion. They will definitely know whether anything like this has been explored, and if not, they would be the ones to sponsor the study. We will follow up with you once that's taken place. In the meantime, I do know there are industry partners developing a number of novel solutions on their own. One example is an idea for a collision avoidance system for ground crew using sensors.

Are We There Yet?

If you won't put up with a backseat driver, then don't be influenced by a backseat flyer. The external or social pressures associated with completing a flight can cause an accident.

External pressure on a mission can help you lose perspective. Everyone involved has a safety role. Great article at https://medium.com/faa/are-we-there-yet-49b8f33fc969 from the FAA.

— Phil

Learn more from our new blog on Medium. Check it out at medium.com/FAA.

Let us hear from you! Send your comments, suggestions, and questions to SafetyBriefing@faa.gov. You can also reach us on Twitter @FAASafetyBrief or on Facebook at facebook.com/FAA. We may edit letters for style and/or length. Due to our publishing schedule, responses may not appear for several issues. While we do not print anonymous letters, we will withhold names or send personal replies upon request. If you have a concern with an immediate FAA operational issue, contact your local Flight Standards Office or air traffic facility.

SUSAN K. PARSON

RIGHT PLACE, WRONG SURFACE

When I lived on the East Coast, I sometimes used my then-flying club's C182 *Skylane* to visit family in North Carolina. Several years ago, I was making such a trip, and my destination was Elizabeth City, NC (KECG). It was a lovely VFR day, but since my instrument rating was fairly fresh at the time, I was on an IFR flight plan to exercise my new privileges and to get some easy practice with IFR procedures. What could possibly go wrong?

NEVER ASSUME THAT YOU ARE IMMUNE ... WITHOUT CONSTANT VIGILANCE, YOU CAN EASILY FIND YOURSELF ON THE WRONG SURFACE.

The route was familiar to me, and I knew from the landmarks I could see below that ECG wasn't that far away. I also knew that it was way past time to descend from the assigned altitude of 7,000 feet mean sea level (MSL) if I wanted to reach the 1,511 foot MSL traffic pattern altitude at ECG without making one of those "slam-dunk" descents I had heard other pilots lament. I asked ATC — again — for lower and got one of those "talk-to-the-next-controller" replies. What I should have done, of course, was to cancel IFR so I could manage my own flight path — see and avoid was no problem at all that day. But I didn't.

Not-So-Great Expectations

The next controller did clear me to descend, so all my attention went into getting down without breaking all the club's warnings to avoid "shock-cooling" the C182 engine. I was still scanning the various gadgets and gauges when I checked in with the ECG tower controller a few miles from the airport. He assigned Runway 10 for landing, which would have put me on a left base entry. But what I "heard" him tell me — here's expectation bias in action — was to expect Runway 01. It's not hard to understand how my brain transposed those digits. During the ongoing descent and configuration flurry, I specifically remember thinking that a landing on Runway 01 would be *perfect* because a downwind leg to that piece of pavement would give me a little more time to get the airplane (and myself) ready. I nailed the traffic pattern altitude just as I entered the downwind for Runway 01, and I was breathing a satisfied sigh of relief when a little voice in my head clued me in to the earlier "mishearing."

Right about the time my thumb went for the push-to-talk switch to clarify, the tower controller called to ask if I realized my clearance had been for Runway 10. I immediately and humbly confessed, offering to go around and set up for the correct runway. "That's okay," came the response. "No conflicting traffic, so you're cleared to land Runway 01. That happens sometimes around here; just be more careful next time." While this exchange made it clear that this bobble was not likely to become an official pilot deviation, I did file an Aviation Safety Reporting System report (aka "NASA report") partly as insurance against a possible sanction, but also to help other pilots learn from my lapse.

I've never forgotten the lesson and, thanks to the addition of a disciplined write-it-down procedure, I've never come close to repeating that particular mistake. It also made me hyper-aware of how easy it can be to infringe on runway safety. Thus motivated, I dug into some of the runway safety tips we have been touting in this issue of *FAA Safety Briefing* magazine, and eventually incorporated these and other "learn-from-my-mistakes" lessons into my own aviation instruction practices later on. Never assume that you are immune ... without constant vigilance, you can easily find yourself on the wrong surface.

Susan K. Parson (susan.parson@faa.gov) is editor of *FAA Safety Briefing* and a Special Assistant in the FAA's Flight Standards Service. She is a general aviation pilot and flight instructor.

NICK DELOTELL

Aviation Safety Inspector, FAA General Aviation and Commercial Division's Operations Group

Growing up in Dayton, Ohio around aviation historical hot spots kept Nick DeLotell's head in the clouds from an early age. After all, Ohio is known as the "birthplace of aviation" and is home to the National Museum of the U.S. Air Force — the oldest and largest military aviation museum in the world.

Nick's first flight was in a Robinson R22 helicopter at age 13. After that jaunt in the sky, there was no turning back from a career in aviation. A year later, he took the controls of a 1946 Aeronca *Chief* and headed for the *second star to the right and straight on 'til morning*.

With a bachelor's degree in aviation from Ohio University, Nick worked at the university airport as a flight instructor and air transportation service pilot before moving to a regional airline. He joined the airline's training program as an instructor and check airman, and eventually became their director of training.

Nick also spent time as part of the National Guard in both West Virginia and Ohio where he served as a Sikorsky UH-60 *Black Hawk* mechanic, crew chief, and door gunner. That experience included a 2009 tour in Iraq.

Once Nick became a father, it was time to cool his jets and focus on family. That's when his passion for aviation, experience flying 50 types of aircraft, and Army values aligned with the FAA's mission to provide the safest, most efficient aerospace system in the world.

As part of the Operations Group in the FAA's General Aviation (GA) and Commercial Division, Nick and his teammates manage the regulations and guidance for aerial work and public aircraft operations, unmanned aircraft systems policy and processing, private and commercial flights under parts 91 and 125, fractional ownership program managers under part 91K, helicopter external load operators, and agricultural aircraft operators. The work includes developing Advisory Circulars, Information for Operators, Safety Alerts for Operators, policy interpretations, and providing safety assurance assistance to Flight Standards District Offices. The team also works with special programs and policies like runway safety. Everything is intended to ensure that GA is as safe as possible.

Nick is most proud of the work he does with the FAA's Runway Safety Group, a team of experts dedicated to improving safety on the surface of our nation's airports. One of the many runway safety initiatives they produce is the *From the Flight Deck* video series, a collaborative agency effort designed to help pilots identify hot spots and other safety-sensitive items. These videos are available on the FAA's YouTube channel at faa.gov/go/FromTheFlightDeck.

With so many pilot deviations involving runway incursions, Nick challenges flight instructors to make the investment to their trainees to ensure they understand the knowledge, risk management, and skill components of airport operations and surface safety.

Nick's advice to all pilots is simple:

Aviate — Taxi slowly, intentionally, and without distraction.

Navigate — Use the airport diagram for situational awareness and to manage risk. Avoid hot spots and intersection departures when possible.

Communicate — "Roger" is a person, not a clearance onto a runway. "Unable" is something you should say more and is never frowned upon. If you're lost, confused, or simply need a minute, say so. Clearly communicate your needs and expectations to ATC; they're on your team and care about your safety.

Nick looks forward to a future with pilots "flying" the pavement more safely. He hopes to see new surveillance technologies enhance air traffic services at smaller airports. He notes that the FAA will continue to focus on providing expanded resources for pilots, airfield drivers, airport operators, and controllers to help combat threats to safety at our nation's airports.

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

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Look Who's Reading FAA Safety Briefing

Air racer and aerobatic pilot Vicky Benzing dives into the latest safety info with *FAA Safety Briefing*.

faa.gov/news/safety_briefing

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